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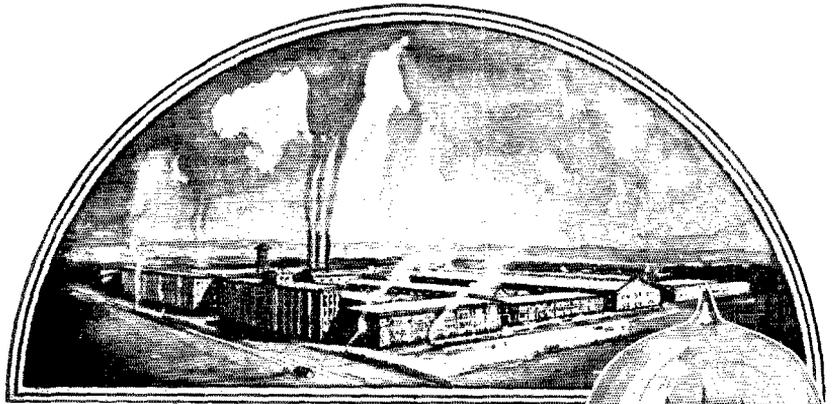


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November 1923

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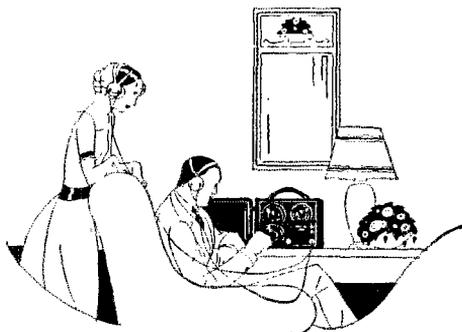
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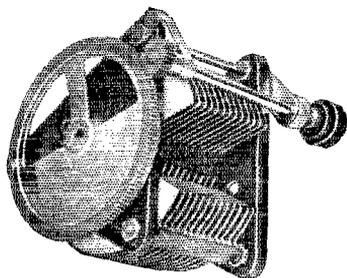
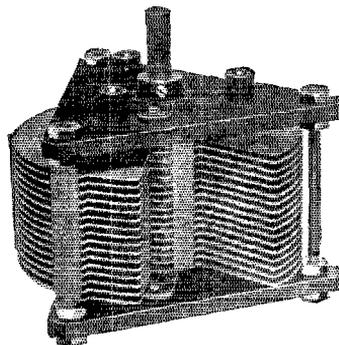
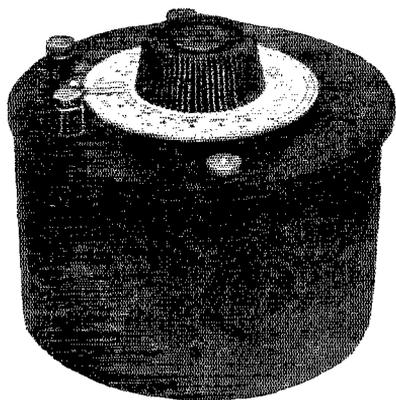
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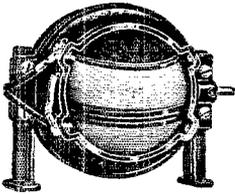
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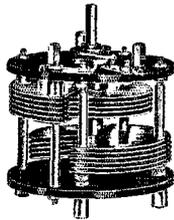
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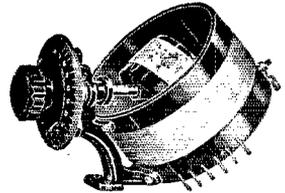
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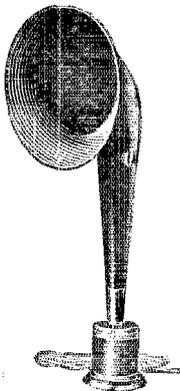
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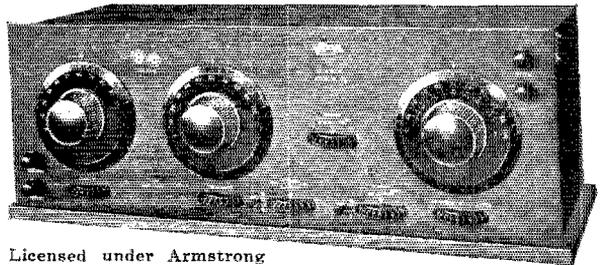


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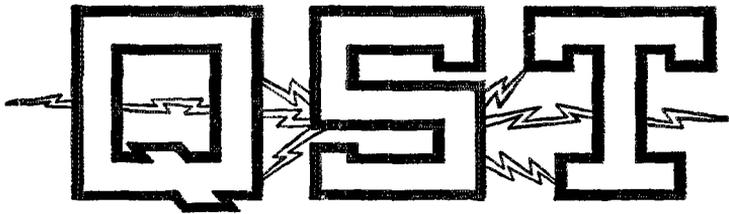


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The Official Organ of the A.R.R.L.

VOLUME VII

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HARTFORD, CONN.

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The American Radio Relay League, Inc., is a national non-commercial association of radio amateurs, bonded for the more effective relaying of friendly messages between their stations, for legislative protection, for orderly operating, and for the practical improvement of short-wave two-way radio telegraphic communication.

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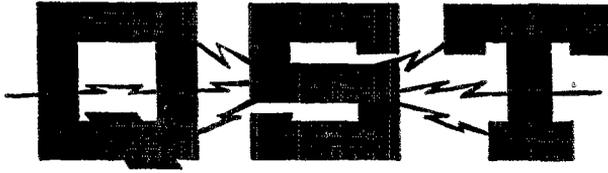
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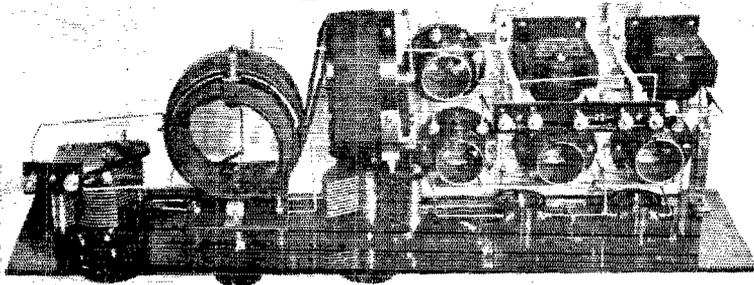
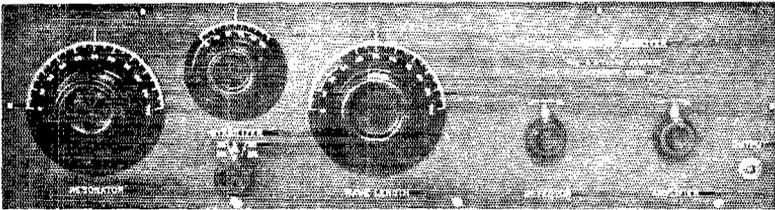
The Superdyne Receiver

By C. D. Tuska*

Mr. Tuska, the first editor of QST, here gives a brief history of the development of radio amplifiers and points out the defects of the various types. He then describes the "Superdyne" of the Tuska Company which overcomes some of these defects. The "superdyne" is a tuned radio amplifier in which a reversed feedback coil is used to prevent oscillation of the amplifier tube. This paper was presented at the Second National A.R.R.L. Convention.—Editor.

THE Superdyne Receiver is a name which has been applied to a new receiving circuit. Almost a year ago Mr. Robert S. Miner, then of the C. D. Tuska Company, started to work on a receiver which would give re-

the latest circuits and every modification of regenerative, radio frequency and other circuits of which we had information. In order to acquaint you with some of the difficulties and problems, I am going to partially review vacuum tube receiving circuits:



sults which surpassed the regenerative receiver and the many radio frequency outfits which we had tested. In seeking for this new "super" circuit, we investigated all of

First we have the usual vacuum tube circuit of straight detection. This type of circuit is illustrated by Figure 1, and is familiar to everyone. The first improvement over this circuit was made by Arm-

*President of the C. D. Tuska Co.

strong, who about 1914 conceived the idea of making the plate circuit resonant to the frequency of reception in the grid circuit. Sometimes an inductance in the plate circuit is coupled to the grid circuit conductively or inductively; at other times the plate circuit is not coupled by any other means than the capacity of the tube; that is to say, the capacity between grid, plate and filament. (See Figs. 2 and 3).

The next attempt to improve the sensitivity of the receiving circuit took the form of efforts to develop radio frequency amplifiers with one or more stages of vacuum tubes coupled together before the detector. These stages are supposed to amplify the radio frequency before it reaches the detector. If this can be done it is very much worth

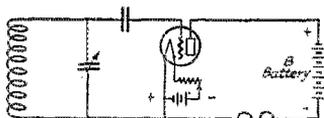


FIG. 1

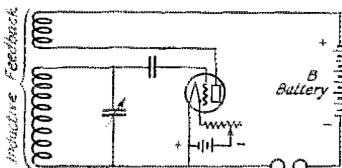


FIG. 2

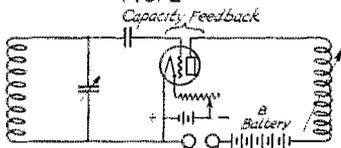


FIG. 3

while because the response of the detector increases approximately as the square of the voltage applied to the grid. The first method of coupling the stages of a radio frequency amplifier was the resistance method in which a high resistance was connected in the plate circuit and the radio-frequency voltage drop across this resistance fed to the grid of the next tube. This is known as a resistance-capacity coupling. In this method the amplification per stage is very low and the resistance is wasteful of B battery, extra cells being required.

The next possible method of coupling the stages of a radio-frequency amplifier is the so-called tuned-impedance method in which the resistance is replaced by a variometer or else by a coil shunted by a variable condenser, the impedance in either case being tuned to approximate resonance. With this scheme the amplification per stage is higher and not so much B battery is required but there is great difficulty on

account of the tendency of the amplifier to oscillate when resonance is approached. This method has accordingly been generally abandoned in favor of the third possible method.

This third method of coupling radio-amplifier tubes consists of connecting radio-frequency transformers between them as shown in Fig. 4. It is not difficult to make such amplifiers for long wave work but at short wave lengths the results are not nearly as good because of several difficulties, especially because of the internal capacity of the tubes themselves. There have been numerous attempts to overcome this capacity trouble, particularly in England where special tubes were built having small elements and having the leads from the grid and plate brought out at different parts of the tube so as to eliminate capacity in the wiring. These tubes have greatly decreased capacity and do improve radio-frequency amplifier performance at short waves.

However, in America we have no such development work on tubes; accordingly Armstrong devised a means of avoiding tube-capacity difficulties by using his super-heterodyne to convert the incoming high radio-frequency into a lower radio-frequency which could be easily amplified. Unfortunately this circuit calls for 6 to 10 vacuum tubes and there is more or less difficulty in its handling by a novice.² Certainly the amount of current required from the A battery is a serious drawback and the high cost of tubes does not make the outfit any more attractive.

Armstrong's later work has been directed at the avoidance of these difficulties and he has developed what he terms the "super-regeneration method." This method takes the circuit of Fig. 2 and so modifies it that we can increase the feedback greatly without having the circuit oscillate as it ordinarily would. While this method seems to offer all the necessary benefits we find it extremely difficult to get satisfactory results in distant reception. Nearby signals are very loud but distant reception is lacking.

Lately Hazeltine has attacked the problem in still another way, using a circuit that is a modification of Fig. 4. In the Hazeltine "Neutrodyne" the radio-frequency transformers have their secondaries tuned by variable condensers. An attempt is made to

¹—However, the C-299 and UV-199 tubes are a step in the right direction: their inter-element capacity is small and the leads from the grid and plate come thru the base at diagonally opposite points so as to decrease the base-capacity. These advantages are entirely wasted if the tubes are used with an adapter in a standard socket.—Tech. Ed.

²—We cannot agree with this; the super-heterodyne is one of the simplest of all circuits to operate if needless controls are omitted, and its freedom from tendency toward oscillation is most gratifying. The real defect of the circuit lies in its high first cost.—Tech. Ed.

avoid the resulting tendency toward oscillation by the use of small condensers connected between the grids of successive tubes, the feedback thru these condensers more or less completely neutralizing the feedback thru the tube capacity. While this circuit does perform well it has several quite critical adjustments and in our experience it tends to oscillate at some wave lengths and offers difficulties in tuning weak signals.

This is a brief and rather hazy review of some of the efforts which have been made to produce a supersensitive receiver.

Mr. Miner, known to amateurs as 1RU, at the start realized that there were two obvious troubles: first, the capacity feedback of the tube; second, the difficulty of securing a resonant plate circuit. The first attempt to produce a more sensitive receiver was somewhat along the lines of most of the radio-frequency amplifiers. All of the various transformers were tried out and attempts were made to design special transformers. This was given up as it was found difficult to get a transformer which would cover the band of wave lengths and give sufficient amplification per stage. We tried using tuned-plate methods but we found two things were inclined to happen; first, we did not get as much amplification as we did with one tube less in a regenerative outfit; and second, the ever-present tendency for the vacuum tube to oscillate as soon as the plate circuit approached resonance with the grid circuit spoiled the amplification. We attempted to overcome this difficulty by means of the usual stabilizer,¹ which QST has so aptly termed a "losser." Even using the stabilizer we found that it was most important to have a resonant plate circuit. One look at the voltage curve of a resonant circuit such as shown in Figure 5 will immediately point out the advantages of curve "AB" over curve "CD." "AB" is the type of curve which we might expect with the resonant plate circuit while "CD" is the sort of result which probably would be had with the transformer-coupled amplifier.

It was evident that we *must* use resonant circuits and it was further apparent that the minute we did use resonant circuits the tubes would start to oscillate and spoil everything. We were in a "vicious circle." The method which was used to overcome this difficulty surely seems obvious now but Mr. Miner can assure you that this was not the case a few months ago. All that is necessary is to put in the conventional Armstrong feedback *but feed the energy back in the reverse direction or negatively.* All that we have to do is give the circuit just enough negative feedback to offset the positive capacity-feedback of

the tube. This will stop oscillation and make it possible to secure absolute resonance between the grid and the plate circuits. Not only have we secured resonance but we have used the maximum impedance in the plate circuit which in turn means the biggest voltage impulse which we can hope to build up.

The Superdyne Circuit is shown in Figure 6. "RC" is the resonant circuit of the grid. "WC" is the resonant circuit of the plate while "XY" is the reverse feedback which stops oscillation. The de-

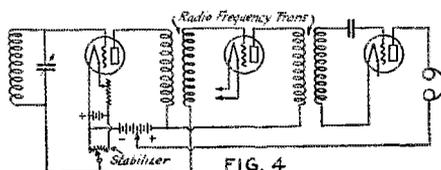


FIG. 4

tor is connected as shown. After we found what the possibilities were with this circuit we began to experiment, thinking that we could improve it by changing the constants. We went through all of the stages of increasing capacity and decreasing inductance as well as the reverse. We tried every sort of coupling and every conceivable turns ratio. Hundreds of separate experiments indicated that the successful operation of the circuit depended to an extremely high degree in following certain dimensions carefully.

Not only is it necessary to follow carefully the instructions about sizes of wire and dimensions but in addition you must be very cautious not to parallel the grid

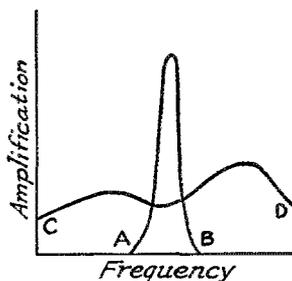


Fig. 5

and the plate wires of the radio-frequency stage. These wires must be kept at right angles and as far apart as possible. If the reverse feedback coil is coupled too closely to the grid coil the capacity coupling between the grid and plate windings exceeds the negative magnetic feedback, and the set will not work. It is extremely important to avoid this trouble. The dimensions and constants of the various coils and con-

¹—That is to say, a grid potentiometer as shown in Fig. 4.

densers are shown in the attached table.

We have not had very good success with reception on the detector, which is probably partly due to the capacity of the phones on the ungrounded circuit. If you intend operating with a small indoor antenna, ground the filaments and connect the antenna to the grid of the first tube, leaving out the antenna coupling turns. With this change phones on the detector probably will be entirely satisfactory. Dead B batteries (even one cell) will prevent the set from

that it operates without an antenna and gives signals of sufficient intensity to be heard through the use of a loud speaker. In Hartford, Connecticut, *without the use of an antenna or loop or capacity of any sort*, other than the usual ground connection, we have repeatedly copied broadcasts on a loud speaker from Chicago, Davenport, Kansas City, and stations nearer to us. In attempting to compare the outfit with some of the sensitive sets on the market, we went to Washington and ran a series of

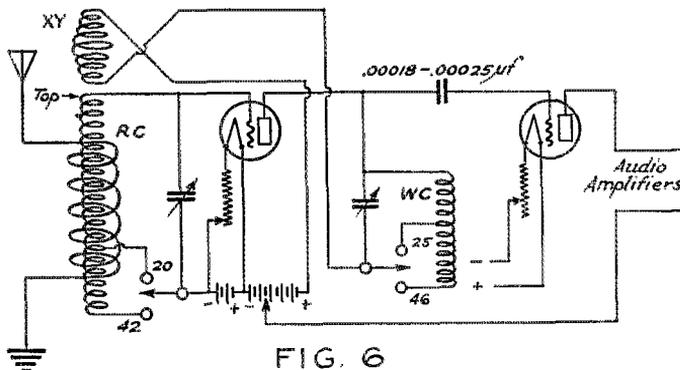


FIG. 6

working properly. The cause of this is not clear. If the difficulty lay in the resistance of the dead cell a by-pass condenser should help but as a matter of fact it does not do any good.

Superdyne Design Data

Secondary, 42 turns No. 22 D.S.C. wire, wound on 4" diam. tube, tapped at 20th and 42d turn. Length of winding, 1¼". 273 microhenries.

Antenna coil, 4 turns No. 22 D.S.C. wire wound over secondary, turns spaced ¼".

Tickler, 3½" ball rotor, 18 turns No. 22 D.S.C. wire on each side, total 36 turns.

Plate Reactance, 46 turns No. 22 D.S.C. wire wound on 4" diam. tube, tapped at 25th and 46th turn. Length of winding 1¼". 264 microhenries.

Grid and plate condensers, each 23 plates, Tuska Type 271, max. capacity .00048 microfarads.

Approximate wave length ranges, 176-358 meters and 310-660 meters.

Suggested dimensions for amateur band, secondary 17 turns, plate 18 turns, tickler same as above.

Results

Now a word about results. The maximum results can be obtained after the operator has learned how to carefully adjust the circuits. It is not possible to get these results until one has had some experience in tuning faint signals.

The astonishing part about this outfit is

tests. First a constant artificial source of power was set up. This was tuned on a regenerative receiver and the audibility measured around 50. With the same power, the same tubes, batteries, etc., the Superdyne receiver showed an audibility of over 200. The same two outfits were tried under similar conditions with a broadcasting station as the source of power. Here the regenerative receiver showed audibility of about 60 while under corresponding conditions the Superdyne receiver showed an audibility of 10,000 which was the end of the meter. The next test was of a more practical nature. Here we compared the Superdyne receiver under actual receiving conditions with the naval six-tube Universal radio-frequency amplifier. The signals with the four-tube Superdyne were probably three to four times louder than with the six tubes on the navy amplifier. The last experiment was the most astonishing of all. In this test we compared the four-tube Superdyne with an 8-tube super-hetrodyne receiver. Some of the signals on the super-hetrodyne surpassed this new circuit while in other cases the Superdyne exceeded the super-hetrodyne. Taken all in all, and being very conservative, the best we could say for the super-hetrodyne was that the signals may have been slightly louder using the eight tubes against our four.

Operation

A word about the operation. In operating this circuit we have found it highly

desirable to adjust the plate circuit for the wave length to be received, then operate the reverse feedback coil (which we have called "stabilizer") and the grid tuning condenser in exactly the same manner as one operates a regenerative receiver. By carefully adjusting the reverse feedback against the positive capacity-feedback one can get astounding degrees of amplification.

In order to simplify the operation we have omitted any tuned antenna circuit and simply used four turns of wire which are closely coupled to the grid circuit. This seems to be sufficiently selective, which is probably due to the selectivity of the two resonant circuits. We have made numerous attempts to simplify the adjustments of the receiver, such as by using fixed reverse feedback and gearing the two tuning condensers together but this decreases the sensitiveness of the receiver. The closed circuits do not affect each other's wavelength, but the feedback varies as the tuning adjustments are changed. We find that adjustment of the reverse feedback has an appreciable effect on the grid circuit tuning. However, and fortunately, the plate circuit remains absolutely constant and may be calibrated in terms of wave length.

Amateur Work

Not a great deal has been done with this tuner in C.W. reception but the results

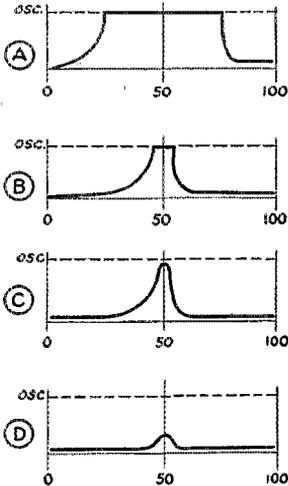


FIG. 7

have been promising. Tuning of the plate circuit of the detector or the use of a separate heterodyne will accomplish the desired results but with difficulty. Unusually good results have been obtained by allowing the first tube to oscillate and operate exactly like an ordinary regenerative receiver. In other words, the negative magnetic feedback should not be quite enough

to hold the tube from oscillation for best C.W. reception. This is not easy to explain in words so reference to Figure 7 may help. If the grid tuning condenser of the first tube is set at half maximum capacity, regeneration caused by adjustment of the plate circuit is approximately as shown in "A", Figure 7. The band of adjustment over which the circuit oscillates is very large. This is with no tickler coil, or with the tickler at right angles to the grid coil.

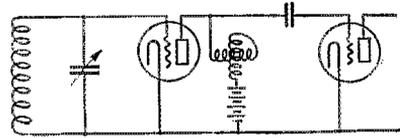


FIG. 8

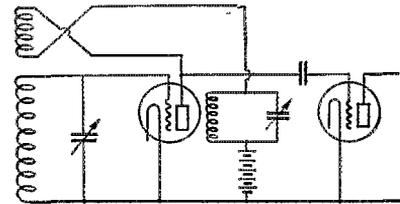


FIG. 9

Such a circuit has been used in England for a number of years. Best regeneration for phone, I.C.W., and spark is obtained just below the oscillation point, while for C.W. the best point is just where oscillation tends to break off. Therefore the old circuit shown in Figure 8 allows the circuit to oscillate long before resonance is reached. With a circuit like Figure 9 the plate circuit can be brought to absolute resonance, with oscillation only over a narrow band, as indicated in "B" of Figure 7, which represents the usual adjustment for C.W. reception. "C" shows the best adjustment for phone reception. It is interesting to note that the plate circuit tuning circuit acts as a rejector of the amplified radio-frequency energy, thus allowing no waste by some of it passing down thru the battery as is common with circuits like Figure 8 and those using resistance coupling. Further, there seems to be a voltage building-up effect in this resonant circuit which voltage is impressed on the grid of the detector tube resulting in the loud reception of weak signals. Excess negative feedback will produce an effect as shown in "D". The feedback adjustment is not critical, especially for C.W., and it may be left alone while the two tuned circuits are varied over most of the amateur range of wave lengths. It is adjusted so the tube just oscillates for

a few degrees on each side of resonance between the two tuned circuits.

For amateur wave lengths only, the switching arrangement can be eliminated and smaller coils used; about 17 turns in the first tuned circuit and 18 in the plate circuit. *The end of the grid coil adjacent to the tickler had best be connected to the filament so as to reduce the effective grid-to-plate capacity of the first tube.*

Now that better radio weather is at hand and more individuals working on this circuit it is probable that a very good

tuner will result that will be easy to operate for extremely distant amateur reception.

While the Tuska Company expects to market complete Superdyne sets, we shall be glad to assist you if you are going to build your own. I should consider it a great favor if you would keep me personally advised as to what sort of success you have with it.¹

¹—And as usual the Technical Editor will look forward to reports of results obtained. Please compare results with a standard regenerative detector with audio amplifier, and such other sets as you care to mention.—Tech. Ed.

The Ham Lets Loose Both Barrels

Call for World League Sounds Keynote of Great Hamfest

By J. K. Bolles, A.R.R.L. Publicity Manager

A FOUR-DAY whirl that made the Chicago loop section look like an Erie flag station in the heart of Kansas—a hamfest that put a conclave of the B.P.O.E. back into the sage brush—typified the Second National A.R.R.L. Convention, held September 12th to 15th. For this dazzling performance credit goes to the Chicago Radio

to tell the story of what took place. From the first peep of tin whistles in a crooning C.W. note until the smoke drifted in a thick haze to the ceiling of the Moon Room on the "Night of Mystery" the convention was a riot, and as hams in small laughing groups departed to the four corners of the U.S.A., it was with a feeling of immeasurable satisfaction



ALL DISTRICTS AND FRANCE AND CANADA AT THE CONVENTION—Left to right: Leon Deloy, French SAB; Canadian 3KN, S. Kruse, 10A; E. K. James, New York City; G. L. Bidwell, Washington, D. C.; QRA "4"?; F. M. Corlett, SZC; W. Kirkpatrick, 6BKO, Los Angeles; Glenn E. West, 7ZU; P. E. Wiggin, SZD; W. E. Schweitzer, 9AAW. Will the "4" please advise his name and QRA so we can give him credit for having represented his district in this photo?

Traffic Association, under whose auspices Hamdom struck a key that will be heard around the world. Amateur radio virtually let loose both barrels! The din of the gang in ebbing volume still shrieks in our ears as we tickle the keys of the old mill

that comes only with the complete fulfilling of all expectations. Told that they would have the time of their lives, every ham left knowing to his hide it was so.

It was the promise of a hamfest that filled the incoming trains, and as such, the

convention was a complete success. The stage setting required the insight of psychologists who knew the ham temperament to its very marrow, and it was this insight, plus an immense enthusiasm, that enabled Bill Schweitzer and R. H. G. "Matty" and the rest of the famous Convention Committee to make this greatest amateur gathering like a high class banquet, in which every course is designed to jab ginger into the appetite. That hungry feeling of the real ham to chew the rag with his fellows, the delight of grabbing a DX man from "down yonder" by the paw and telling him how well you heard his station in Timbuctoo, the joy of mingling with fellows that have a hankering for the key, the appreciative sense of good fellowship amplified a thousand times; these filled the overflowing boards that whetted the taste of anticipation.

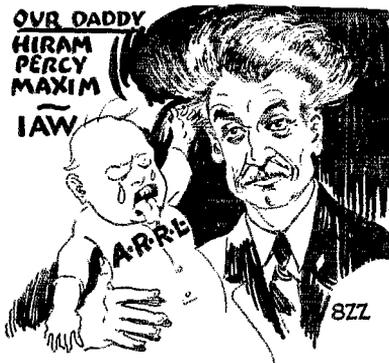
Noise Reigns as King

If the Old Man was there—for all we know he may have been—he could scarcely have preserved the spinach around his neck in the throng that teemed thru the Edgewater Beach Hotel on the way to this or that meeting to the tin whistle tune of nine districts playing in a national ham melody. The din, terrific thruout, rose in crescendo with incoming guests. Noise of the fifty-seven varieties, such as the spark made booming back in the days when Marconi wore short trousers, ripped and tore thru the air torturing the ears of bystanders, thrilling the lungs and heart of every ham with the sense that here was welcome. The high pitch calls that whisked imps of darkness from Bedlam would have jarred to distraction the hearing capacity of a boilermaker and caused him to throw away his bolt-slugging hammer in disgust.

World-Wide Amateur Radio!

Thus this second national convention will be remembered when the South Sea Islanders are using bamboo trees for antenna poles. But beyond those things attributing to the real party which is necessary to every gathering of radio men, a serious vein ran thruout the four days of rejoicing that too will live long and have its appreciable effect on the events which are to come. It was significant that a new epoch had been reached in amateur radio and our old League, composed of loyal men, was even then on moving ground. Always transient from its very beginning back in dim glorious past before the war cloud began to loom, this League of ours is marching forward in vast numbers that threaten to overflow the boundaries of our own country and skim the seas to lands of other tongues, knitting the fellowship of world-wide radio.

If such may be, that was indeed the keynote of the convention, cropping up at every meeting, slipping into conversation, pervading the intangible atmosphere from start to finish, the undeniable assumption that the word America, with its wonderful meaning to us all, was not big enough to hold inside its outflung sentinels the Statue of Liberty and the Golden Gate, the spirit and the work of amateur radio as it has grown and expanded here. Amateurs with vision have anticipated the idea but it was not until the banquet on the opening night when Mr. Maxim's message, from his camp in the Maine woods, boldly proposed the organization of a World Amateur Radio Relay League, that it gained full volume and was welcomed with thunderous applause by amateurs at a national convention assembled. The sug-



gestion was made the more real by the presence at the speaker's table, beside the chairman, of Monsieur Leon Deloy, French SAB, the first visitor to suggest that a few years from now American amateur radio may witness the calling of an international conclave for the purpose of discussing those things that have to do with world amateur radio. President Maxim's message to the convention is here printed!

Our President Strikes Keynote

"Gentlemen of the Convention:

"From this little log cabin in the wilderness, to my friends of the Second Annual A.R.R.L. Convention at the Edgewater Beach Hotel in Chicago, I send herewith my greetings and express my sincere regret that the date of the Convention and that of my vacation here came together. If it had not been for the fact that all my family arrangements had been made many months in advance, I would have foregone the vacation and taken part of it with you in Chicago. But a trip into these remote parts is no small matter and changes in

plans are not practical things to make. I am sending this to Mr. Mathews to present in my behalf.

"This Convention is without question the most important event that has yet happened in Amateur Radio. It comes after two of the most active years Radio has ever seen, and it precedes two years which are unquestionably destined to produce achievements many times broader than have gone before. You have it in your hands at this Convention to blaze the trail and prepare the way for these wonderful two years that are to come and to make the glorious old A.R.R.L. shine as she never shone before.

"Were I to be with you, I would have first urged upon you the wisdom of applying the lessons of the past to the problems of the future. We have a past of glorious achievement and we have accomplished this by maintaining a high standard of conduct toward each other. After everything is boiled down, it comes down to this one thing. We A.R.R.L. people believe in each other—we are loyal to each other—we play the game as gentlemen—and this, taken together with a clear vision of what is practical when it comes to dealing with our fellow men, has been the thing that has put us where we are—the representative amateur radio organization of the world.

"In the years that are before us, these same things can be depended upon to carry us on. We shall grow and expand our activities and our influence will spread and our efforts to advance the art of radio communication will accomplish results, just as we continue to play the game as we have played it in the past. Let's stick, fellow members of the A.R.R.L., and make Amateur Radio in America what each of us knows it is possible of being.

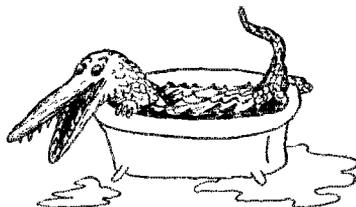
"Had it been possible for me to be with you, I would have told you of the hard work we at Headquarters have been putting in for months past toward building a new constitution for our A.R.R.L. which would be more modern and capable of meeting present conditions. It has been something very close to my heart for several years. I have seen for some time that our organization is ready for a better system of representation. When we were young the money and the time were not available to hold meetings of representatives from all parts of the country. And furthermore amateurs were not in a sufficiently organized condition or even well enough acquainted with each other to form in many parts of the country, anything sufficiently concrete to select a representative. Under those conditions, we who were organized were compelled to act for them as sincerely as we could. But the day has come when not only the amateurs of all parts of our own country are acquainted and organized,

but amateurs of foreign countries are organized well enough to be a tangible factor. And they all look to our A.R.R.L. to lead them. Under these conditions, the time is ripe for a real man-sized constitution and by-laws and we have been working on them. I am very proud to be able to say to you that we have something built closely after our country's constitution, which we are to submit to you shortly, which will result in assured country-wide representation on our Board of Directors, and provide the means for a central meeting at regular intervals for all of these representatives just as our United States Congress provides for meetings of representatives from each of the states. I have every belief that with this solid foundation under us, we shall be able to grow in the future without danger of a break occurring which would threaten our entire structure. When the new Constitution and by-laws come to be submitted to you for your criticism and suggestion, I urge that you regard them in the light in which we prepared them.

"Another matter I intended to take up with you was our international relations. We have already been asked to help out the Australians, English and other amateurs and it is my belief that the time has come for the calling of an international convention and the organization of a World's Amateur Radio League. It is the biggest thought that has presented itself to us, and I urge that you give it your thought so that our Board may have the benefit of the general study when it comes to consider the matter.

"I wanted to take up with you our relations with the Broadcast Listener and to tell you of the hundreds of thousands who would gladly learn the code and come in with us in a modest way, if we could find a way to help them.

"I wanted also to consider the Transpacifics, Transatlantics, some kind of a



The Enthusiastic Delegate from Florida.

national emergency scheme for such situations as sleet and ice storms which paralyze the wire telegraph lines of our railroads, our duty toward the Boy Scouts of America, the new government regulations, the tremendous possibilities in really silent plate supply and "clickless" keying, and other matters, but this has already become



Successors of the late President
Roosevelt, including
Commissioner
Homer L. Johnson, standing in
front of the White House.

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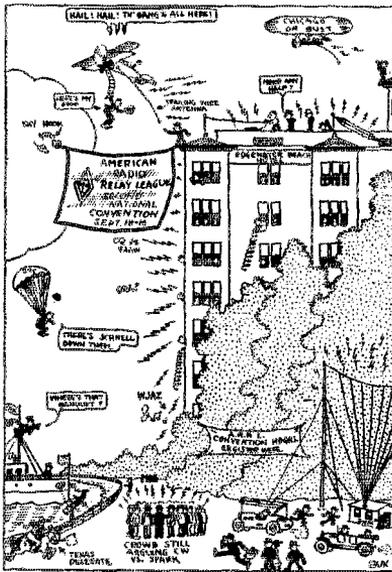
long enough in the way of a communication to a radio convention. I count upon you to take up each of these matters, and others I have not thought of, during the days you will be together. I repeat that I am sorry I cannot be with my many friends and shake them by the hand. I expect to work them frequently from 1AW this winter, however.

"With my best 73's to the good old gang and again urging that you apply the lessons of the past to the problems of the future, I am,

Sincerely,
HIRAM PERCY MAXIM,
President American Radio Relay League."

Hands Across the Sea

Such a greeting served appropriately as an introduction to the distinguished visitor from France, altho this task fell naturally upon the shoulders of the traffic manager.



He has known French 8AB personally since their first acquaintance during the war. He told of the conversation in which they had suggested the possibility that one day they would communicate with one another by amateur radio and perhaps the day would come when there would be trans-oceanic talks between amateurs of both countries. That day has indeed arrived and both met again to witness the result.

"I have come to the United States on a short tour for the purpose of visiting amateur stations in this country," said Deloy, "and to be here at the Second National American Radio Relay League Convention. Outside of the great number of amateur

stations to be seen here, I have been impressed by the business-like manner in which they are installed and operated. In France our transmitting stations are very much less numerous for we have been allowed to transmit only a year and a half. But if their number continues to increase as fast as it has of late, we will very soon have a great many stations.

"We are not allowed to exchange messages and we can only use our transmitters for experimenting; that is why the average station over there is built in a somewhat different way than here. In France we are greatly interested in the transatlantic communication with amateurs in this country. A big effort is being made now and many good stations should be ready to bridge the Atlantic very soon. As for our receiving sets I can say they are very sensitive. The hundreds of American amateur stations we heard during the last Transatlantic tests prove that and I feel confident that two-way communication between American and French amateurs will take place before many months.

"I will end these remarks by saying how glad I am to have this opportunity of saying how I appreciate the flattering and wonderful welcome that is given me everywhere in this country and by extending to all American amateurs the most hearty greeting of French amateurs."

Department of Commerce Represented

The Convention was honored by the presence of Chief Supervisor of Radio W. D. Terrell, as well as the Supervisors of the Eighth and Ninth Districts. Chief Supervisor Terrell addressed the meeting on "The Amateur and the Department of Commerce," discussing their pleasant relations. He congratulated the amateur on his steady progress and the nicety with which he was complying with regulations, and he pledged the cooperation of the Bureau and asked for the continued cooperation of Amateur Radio.

Greetings to the convention from Dr. Lee De Forest, sent from the S. S. Leviathan upon which he was a passenger, arrived in time to be read at the banquet. In fact all this talk is about the banquet, where Bill Schweitzer of 9AAW, Convention Chairman, made the address of welcome and turned the job of toastmaster over to "Matty."

"QST's Life Story"

There was about that banquet in the Grand Ball Room of the Hotel La Salle something which carried enthusiasm throughout the remainder of the convention and we heartily agree with the committee that the opening is the rightful place for a dinner. President Herriott of the Chicago Radio Traffic Association and attorney for the A.R.R.L. upheld Mr. Maxim's opinion

J. C. Warner of the General Electric Labs. presented a lot of hot new dope on the new XL-filament transmitting tubes, announcing that the 50-watter and 250-watter were now to be equipped with the wonderful new filament of the type used in the 201-A, with great economies and improved efficiencies. K. E. Hassell of the Chicago Radio Laboratory spoke on "Underlying Characteristics of Receiver Design," a darbo of a talk which we hope to publish soon. Ross Gunn on "Antennae;" Mr. H. J. Marx, of "Radio Digest," on "What May We Expect from the Amateur?;" and Mr. H. S. Olesen, of the Fansteel Products Co., describing their new chemical rectifier, completed a most interesting program.

Wouff-Hong Dignified

The spirit of the ham as we have known him was exemplified to a remarkable degree thru the initiation into the Royal Order of the Wouff-Hong, held on the "Night of Mystery." Even the hard-boiled owl, breathing in the unmistakable sense of dignity, gazed with unblinking eye on the ritual that was here performed. The weird figures within the closely packed circle of spectators would indeed have done justice to a dramatic setting of the Middle Ages. The intangible fraternity—that something which had kept the amateur together in a solid body—was being shown as in a play. The old-timers were quick to realize the impression. That which was needed to fill a certain gap was explained, the reason for the blown tubes, the super-heterodyne that would not "superhet," the dawgone nights of "watchful waiting" when fingers itched to swat the key, a faint suggestion of what it all meant, what every man there in the Moon Room was working for—all these were brought out under the spotlight.

To the disinterested outsider it was a



THE EMBLEM OF THE
ROYAL ORDER OF THE WOUFF-HONG

farce, put over with the skill of the average lodge, but to the ham it was something that struck pretty close to home. The buttons worn away that night will surely never be regarded as mere bits of bronze. The costumes, we have been told, were valued at \$1200, and if they had charged the gang that much for admission it certainly would not have been too much. A gentle touch of humor to be sure,

but from start to finish there was not a sign of horse-play. The gang from Flint did not rehearse the parts for entertainment. Whatever may have been their object at the outset, by the time that it reached the Second National Convention, the Royal Order of the Wouff-Hong was a thing of dignity expressing that which the ham had long wanted to tell. It grew out of the unvarnished spirit that has kept amateur radio alive.

You will not need, either, to venture the guess that the stuff underneath the gaudy robes was the kind that would endure. Frank M. Corlett of Dallas, Manager of our West Gulf Division, was chosen to exemplify the work for the entire assembly and typical as he is of the American ham, a better subject could not have been found. It would be in violation of our oath as an initiated member of the Royal Order if we were to describe exactly what took place. If you have read the "Old Man" stories in QST, you can guess that the initiation was filled with the spirit in which he writes. The T.O.M. was personified to the nth degree by one of the Flint team, and his candle of truth will glow long in the hearts of those who followed him thru the devious paths of darkness. The novice was led safely underneath the uplifted and shining ax blade, the blood-stained daggers that reached out from the dark and yellow fingers of "Know-It-All."

All credit to the Flint fellows, who under the leadership of F. D. Fallain made that night one long to be remembered by those initiated into the mysteries. These men, who have founded a real institution in Amateur Radio, are: Guy R. Cowing, M.O.; Gordon Bell, M.M.; Harry Phelps, P.A.; Thos. L. Lathrop, O.D.O.; Burton Wallrath, T.O.M.; Frank D. Fallain, I.K.I.A.; Silver King, Q.R.M.; and Chas. Tiedeman, Q.R.N. No dope on the initials, O.M.—you'll have to wait for *your* initiation.

That Vein of Gossip

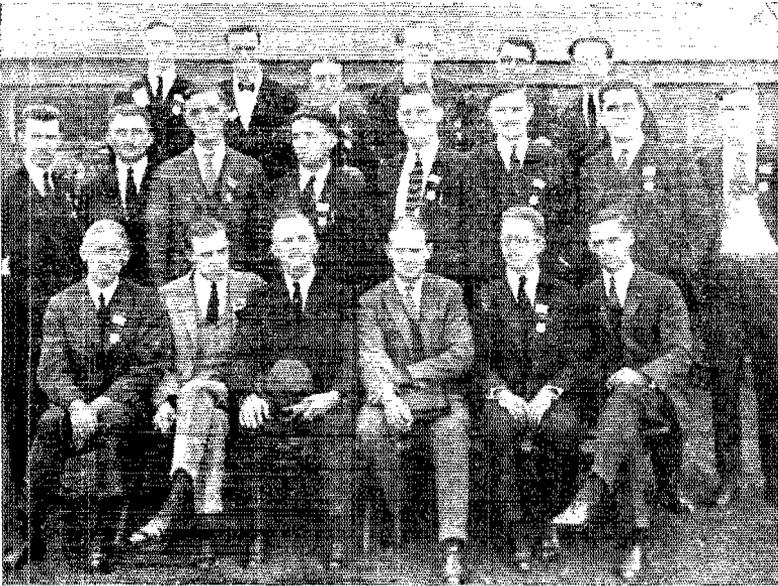
Shacks in and about Chicago virtually bulged with out-of-town guests while ham gossip sparked up thru the chimneys. For many it was the first time they had been given the opportunity of visiting a station in another part of the country and fingers fairly itched to get the feel of a new key and wiggle a message out into the ether. The usual arguments had their place while every part of the apparatus was scrutinized with care. Not a few went back to their own stations thereafter with new ideas, new schemes and new hook-ups. Chicago has more than its quota of good ham stations operating as they should. While 9ZN was easily the favorite at the first national convention, this time 9AAW came in for inspection by the major part of the gang.

And we have a suspicion that one chap camped there at least two nights.

The use to which this station was put in sending press reports of the convention back to A.R.R.L. Headquarters at Hartford gave nearly all of the lingering lizards a chance to punch the key, and Mason, ex-7BK, copying at 1AW until early morning, occasionally shook his head in despair at the difficulty in getting the message coherently while one brass-pounder after another changed hands at the key. This is the first time that press at such length has been sent via amateur radio and possibilities loom up for the next national convention, when fellows unable to attend may be advised of a definite schedule.

ager Schnell had two sessions with his Division Managers at which much important work was accomplished.

The meeting was originally scheduled for two hours on Friday morning. "Try and do it!" It was our fortune to attend these meetings, and say, it was fine to see the D.M.'s get together and compare notes and help out each other on problems. All of them but Gravely and Wise, who were unable to attend the convention, were present. Our very best men, our traffic leaders, were there assembled in conclave. Chief Supervisor of Radio Terrell and Eighth District Supervisor Edwards attended the morning meeting to help with advice and to extend the cooperation of the Bureau



REPRESENTATIVES OF AMATEUR RADIO AND THE DEPARTMENT OF COMMERCE CONFER WITH THE AMERICAN RAILWAYS ON AMATEUR COOPERATION—the attendance at this most important conference of Operating Department officials. Left to right, top row: W. W. Rodgers, 5RZ, manager, Delta Division; H. L. Reid, 4KU, manager, East Gulf Div.; A. A. Hebert, A.R.R.L. Treasurer and Field Contact Representative; Geo. S. Turner, 9DU, manager, Midwest Div.; J. K. Bolles, A.R.R.L. Publicity Manager; L. S. Hillegas-Baird, Central Div. Publicity Mgr. Middle row: K. B. Warner, A.R.R.L. Secretary and Editor "QST"; G. E. West, 7ZU, manager, Northwestern Div.; N. H. Jensen, manager, Dakota Div.; T. E. Nikirk, 6KA, president, Southern California Radio Assn.; F. M. Corlett, 5ZC, manager, West Gulf Div.; A. H. Keith Russell, Can. 9AL, Canadian General Manager and representing all Canadian divisions; Irving Vermilya, 1ZE, manager, New England Div.; Norman Hood, 7ZO, manager, Rocky Mountain Div. Bottom row: Chas. H. Stewart, 3ZS, A.R.R.L. Vice-President and manager Atlantic Div.; R. H. G. Mathews, 9ZN, manager, Central Div.; W. D. Terrell, Chief Supervisor of Radio, Bureau of Navigation, Dept. of Commerce; G. T. Stanton, special representative of the American Railway Association; F. H. Schnell, A.R.R.L. Traffic Manager; S. W. Edwards, Supervisor of Radio, Eighth District.

The Traffic Sessions

The most important assemblies of the convention were the traffic meetings. In addition to a general meeting of all members of the Operating Department, which occupied an entire afternoon, Traffic Man-

in any difficulties or interpretations of regulations. It was very helpful that all the D.M.'s could thus meet the Big Boss of Amateur Radio, too. The chief business of the session was concerned with making arrangements whereby our A.R.R.L. sta-

tions may serve the railroads in times of distress or emergency. Our ability to perform invaluable service in times of this sort has been demonstrated repeatedly, and Mr. G. T. Stanton, of Committee No. 12 of the American Railway Association, attended the conference as a representative of that association to discuss the matter. Plans were discussed and the needs of the railroads ascertained, and the work of organizing the proper communication systems is now in progress. We believe the value we amateurs can demonstrate our selves and our stations to be to the railroads will prove to be one of the strongest things we could do for the amateur's position.

Of course this morning session couldn't finish up and the rest of the day was full, so the men agreed to meet again at midnight, after the technical session, and an adjourned meeting held forth until 6 A.M. (Just a small detail in the life of a boiled owl.) Here the D.M.'s put up their difficulties for solution, arranged for better co-operation between each other, and planned new things which will be reflected soon, we feel sure, in a still more efficient Operating Department.

Here and There on the Floor

You should have seen our Vice-President Charles Stewart cultivating his mustache for the grand spinach race. A mustache was requested and Mr. Stewart did his darnedest to fill the order. Whenever he was not to be seen about the lobby, you could find him in the tonsorial parlors under the main floor wildly calling for more tonic. We would like to know how much that little streak of black cost him. Whether it was worth the tube that was presented to him on the "Night of Mystery" we do not know. Bay rum runs high these days, as several of us discovered when we tried to pick up an acquaintance with our Canadian



THE OLD MAN—AFTER THE CONVENTION

brothers. The applause goes to our Vice-President for his loyal efforts to please.

Did you see the Chief Delegate from Florida? 4FS, 4EZ and 4PL, all of Jacksonville and unable to attend the Conven-

tion, sent a representative in their stead in the form of a baby 3-foot alligator addressed to Secretary Warner. Warner named him "CW" but a subsequent letter from Florida shows that his real name was "CQ." After residing in the bath-tub in Room 750 E.B. for the duration of the Convention, where he was visited by numerous hams from all around, "CQ" was presented to the Lincoln Park Aquarium in the name of the A.R.R.L. Convention. He eats almost anything—B.C.L.'s beware.

Innumerable contests were held during the four days, under the direction of Fred Marco, and a total of over \$3500-worth of prizes in apparatus distributed to the winners. There was a search for a hidden transmitter, with a hundred crews of fellows running around with as many little loop sets; there were cracker-eating contests; and a Liar's Contest which was a scream. 3HS, by the way, placed as a Liar by telling how he sent a report card to 2FP and got a QSL!

Remember how we marvelled when we first had a convention where every district was represented? This time there were gangs from every district. One lad came all the way from New Jersey by foot and auto pick-ups, consuming six days enroute. The hat was passed to buy him a ticket home. Such things as that show the A.R.R.L. spirit.

Up to Friday evening the Convention was still shy the required number of railroad convention certificates to secure half-fare rates home, so a big gang of volunteers went down to Elgin or somewhere around there and bought tickets to swell the total. These fellows were the real heroes of the convention. While in exile, under the leadership of Dizzy Marcus, the funniest man at the meet, they formed the Rummy Order of Suckers and returned to invade the second technical session with an impromptu stunt which brought down the house. And they brought home the certificates!

Photos of the banquet and of the assembly on the hotel plaza may be obtained from Kaufmann & Fabry Co., 425 S. Wabash Ave., Chicago, at \$1.50 each.

The Night of Mystery was a cabaret night at the Rainbow Gardens, with a buffet feed and plenty of entertainment. It certainly hit the spot. Does anybody remember "Nora?!"

Did you ever hear as much noise as we hams can make with a bunch of tin whistles? QRM fierce, OM.

Did our hearts good to see the real hammy advertising in the convention pro-

Sept. 7th, 11:45 p.m. P.S.T. I put on the phones and the first station I heard was WNP trying to work 7DC. He said "Tell the gang to listen for me every night QRA lat 78.30". Figuring that 7DC was working him satisfactorily I camped on his wave

him I would QSR and to listen for me again soon as I would be on every night possible. He came back with "Yes pse QSR and also mail msgs nw 3:19 AM EST will be on every nite fm midnite on will hv PX tonite midnite wl u be on then? QSA vy OM all

Log of A.R.R.L. Stations with WNP

Local Standard Time

Aug. 29	Unstated	KOGN, 650 m. W. Bishop's Rock, England	Hrd WNP QSA wkg 1ANA
" 30	2:00 a.m.	9AKO Ft. Wayne, Ind.	Heard WNP ckg. 1ANA QRZ and QSS
Sept. 1	12:59 a.m.	6CCM San Francisco	Heard WNP several mins. Unreadable, QSS and QRM.
" 5	11:00 p.m.	9BP Prince Rupert, B. C.	Heard WNP QRK calling CQ but couldn't raise.
" 6	Early	8CI Swissvale, Pa.	Hrd WNP ckg. 1ZE or 1UE.
" 7	10:55 p.m.	7DC Bremerton, Wash.	Briefly wkd WNP and got QRA. Commun. spotty.
" 7	11:31 p.m.	KYE at San Pedro, Cal.	Heard WNP wkg. 7DC.
" 7	11:45 p.m.	9BP Prince Rupert, B. C.	Heard WNP wkg. 7DC.
" 7	Unstated	7ADP Seattle, Wash.	Heard WNP wkg 7DC.
" 8	12:01 a.m.	9BP Prince Rupert, B. C.	Wkd WNP, QRK, some QSS. Took 3 msgs; gave news.
" 12	12:28 a.m.	5CT Duncan, B. C.	Heard WNP wkg 9BP. QRZ but steady.
" 15	11:10 p.m.	8MD Dayton, Ohio	Hrd WNP QRZ but steady.
" 16-17	Allnite	9BP Prince Rupert, B. C.	Wkd WNP QSA. Took 600 wds. N.A. N.A. press and 6 msgs. Gave 1 msg. and current news.
" 19	12:15 a.m.	9BP Prince Rupert, B. C.	Wkd WNP. Took 2 msgs.
" 20	Early	9BP Prince Rupert, B. C.	Wkd WNP. Took first 5 dists. of "Calls Heard" by WNP; also 2 msgs.
" 22	Early	9BP Prince Rupert, B. C.	Wkd. WNP. Took some more "Calls Heard; also 1 msg.
" 23	12:27 a.m.	7FD Seattle, Wash.	Hrd WNP wkg 9BP.
" 23	Early	9BP Prince Rupert, B. C.	Wkd WNP. Finished list of "Calls Heard."
" 24	1:00 a.m.	9BP Prince Rupert, B. C.	Wkd WNP. Took 181 wds. N.A.N.A. press and 4 msgs.
" 24	7:00 p.m.	6FY Modesto, Cal.	Hrd WNP vy QSA saying "Pse QSY 230 meters."
" 24	9:31 p.m.	6OH, Ukiah, Cal.	Hrd WNP ckg 9ZV and CQ, QSA.
" 24	Unstated	8BCP Rochester, N. Y.	Heard WNP.
" 28	Early	9BP, Prince Rupert, B. C.	Wkd WNP, QRZ. Gave him 1 msg. WNP on new aerial.

waiting for him to come back. Which he didn't do. So at midnight I gave him a short call with "fm 9BP QSA OM QTC? k". Imagine my delight when in about half a minute WNP comes back with "Hello old top QRK u vy QSA hr". My answer was to tell him how glad I was to work him, advising I had received his latitude OK and asking for his longitude and to GA with messages. He came back: "Long abt 72.30" and then gave me three messages. I told

over forecastle hw?" I then told him that I would try to be on for his press and asked him if he had worked many stations since his arrival there. He replied: "Fine OM arrived hr August 17 u are first station I hv wkd since we came north of Disco Island exchanged sigs with 1ANA and 7DC tts all u cant imagine hw gld I am to raise u OM will look fr u tmw OM wl guess nm nw 73s". Then I told him that 9BP's power was 100 watts with little over 3

Land as originally contemplated. Refuge Harbor is located in $78^{\circ}30'$ N. latitude and $72^{\circ}30'$ W. longitude, and offers very satisfactory conditions for good harbor and the accomplishment of the scientific work of the party. When IANA first picked up WNP's QRA as 78:30, we believed the party was at Cape Sabine enroute Flagler Bay, but that was a poor hunch. Cape

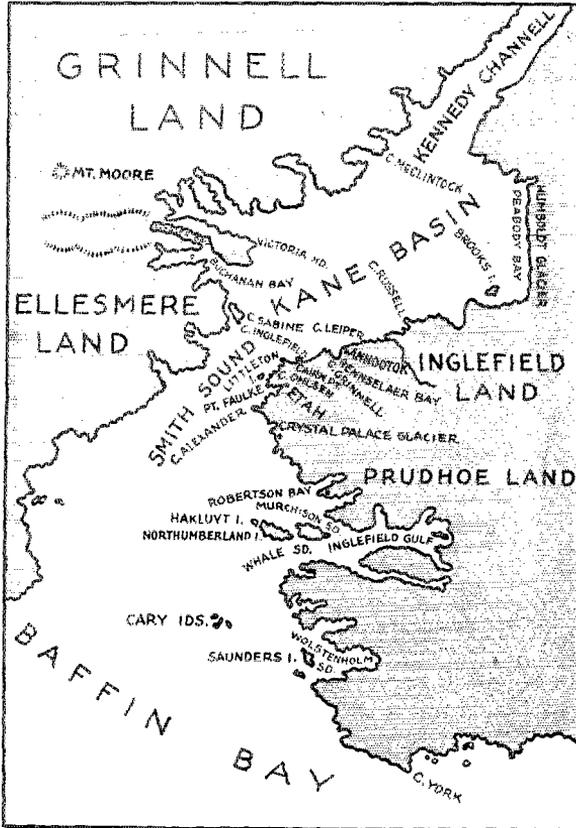
of snow. The vessel is practically unloaded, all food having been packed in boxes on shore, and the magnetic observatory completed and instruments installed.

From the radio standpoint September was a most peculiar month in the WNP story. Only four stations east of the Pacific Coast heard WNP at all and they reported signals QRZ, with no reports whatever from the Atlantic Coast. Quite a few West Coast amateurs heard her, however, and the only communication has been thru them. This pleases us immensely—we hope the gang that thot the MacMillan Expedition was “another eastern stunt” will take another look at the map on page 16 of September QST. As a matter of fact the distance from WNP to 9BP seems to be but about 2200 miles, as compared with about 2500 miles to IANA. (Bourne has been transferred, by the way, and IANA is now dismantled.) The table shows the various reports received this month.

9BP is easily the September star, and by copying the PX on Sept. 16th wins the Zenith set offered by Div. Mgr. Mathews. Mix asked 9BP for the news and heard from him for the first time of the Japanese disaster, the Dempsey-Firpo results, etc. He said: “Single-circuit long wave tuner here and Europe is drowning NSS so don't get press.” At this writing 9BP has handled a couple of dozen messages from the “Bowdoin,” many to families of the crew advising of their safety, and the msgs. are being delivered. Mix has heard hundreds of amateurs and succeeded in unloading a regular “ITS list” on 9BP, altho it took three

nights to do the job. The list appears in the “Calls Heard” Department of this issue; look it up—your call is probably listed. Among the stations heard was 6CEU in Hawaii, to whom Mix sent a message telling him he came in FB!

An extract from a letter from 9BP shows, better than we can tell, what a kick there is in store for the fellows who tie up with Mix;



WHERE THE “BOWDOIN” IS FROZEN IN. A large-scale map of the territory where the MacMillan party is wintering. Remember this map, as we shall refer to it later for locations. Etah, Greenland, shows in the center of the map. The “Bowdoin” is frozen in at Refuge Harbor, ten miles above Etah, which is just about where Cairn Point shows on this map. Cape Sabine is right across Smith Sound. Flagler Bay, the original objective, may be seen northwest of Etah, running west from Buchanan Bay.

Sabine is just across the narrowest part of Smith Sound from them, only 24 miles distant, and the memorial tablet to be erected there will be transported by dogsled when a favorable opportunity comes. The “Bowdoin” arrived at Refuge Harbor on August 17th and at this writing is reported frozen in for the winter in safe anchorage, temperature 9 above, and a foot

Sept. 7th, 11:45 p.m. P.S.T. I put on the phones and the first station I heard was WNP trying to work 7DC. He said "Tell the gang to listen for me every night QRA lat 73.30". Figuring that 7DC was working him satisfactorily I camped on his wave

him I would QSR and to listen for me again soon as I would be on every night possible. He came back with "Yes pse QSR and also mail msgs nw 3:19 AM EST will be on every nite fm midnite on will hv PX tonite midnite wl u be on then? QSA vy OM all

Log of A.R.R.L. Stations with WNP

Local Standard Time

Aug. 29	Unstated	KOGN, 650 m. W. Bishop's Rock, England	Hrd WNP QSA wkg 1ANA
" 30	2:00 a.m.	9AKO Ft. Wayne, Ind.	Heard WNP ckg. 1ANA QRZ and QSS
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amps. He comes back: "R r fine OM thanks vy OM yes hv hrd a lot abt Can. 9BP thru QST two fifties hr ant current 5.5 amps will hv new antenna up in week or so pse tell 7IT his sigs FB hr wl gess nil". Then asked him if they had heard

him goes the honor of being the first western station to connect up with WNP, the first after the long period of no sigs, and at the greatest DX WNP has worked. 7DC uses two 5-watters, with 1.5 amps in a 30-foot-high aerial. He is A.R.R.L. Super-



THE CREW OF THE "BOWDOIN." Left to right, top row: Capt. MacMillan; Thos. McCue, mate; Donald H. Mix, A.R.R.L. radio operator; Sheldon Fairbanks, journalist, who accompanied the party as far as their last stop in Labrador. Bottom row: Ralph Robinson, chief assistant to Capt. MacMillan; Wm. A. Lewis, cook; John M. Jaynes, engineer. Richard Goddard, magnetic observer, is missing from this picture. Photo thru the courtesy of E. F. MacDonald, Jr., of Zenith Radio Corpn.

about the catastrophe in Japan. He said "No hvnt hrd a tng OM long wv tuner NG fr PX". Replying to my question as to how the weather was with them he said "We hv abt foot snow hr ice beginning to form in harbor temp 22." Later I sent him selected news from the papers telling him about the awful earthquake in Japan, etc.

A very great deal of credit is due 7DC, too. He is a young amateur who has been in the game but a short while, and yet to

intendent for District No. 3 of Washington, by the way.

Before another issue of QST is out, the twilight that WNP is now experiencing "all night" will give way to real night and it should be an easy matter for amateurs all over the country to hear her. Remember to send in a report to the Traffic Manager promptly after each time you hear or work WNP, so we can have a complete story each month.

—K.B.W.

Another Canadian Transcon

By J. L. Miller, Canadian 2BN

ANOTHER glorious page was added to the annals of Canadian Amateur Radio when an impromptu transcontinental relay was put thru in an hour and ten minutes on the morning of September 21st without previous arrangement.

I was on watch as usual at 10 P.M.

the night of the 20th. It was raining hard and QSS was very pronounced. QRN became so bad that I could use but detector only. I swung Canadian 1AR early in the evening, and at 11 P.M. 3NI, who shot me five messages. 3NI then suggested a Transcon Test at 1:30 A.M. and asked for my co-operation. You can bet I answered in

the anti-negative and straightway called 1AR and lined him up.

Sharply at 1:30 3NI gave me a message from 4DY addressed to 1AR: "Pse QSL OM," sig Can. 4DY. I handed this to 1AR who gave me a reply at 2 A.M.: "Greetings fm Nova Scotia, success to the tests." The night was so poor that 3NI that we would be unable to make it. However, he stuck to his guns, as usual, and succeeded in working 4ER a little later. 2BN then began to fade so 3NI asked 3BP to QRX for help. 2BN, however, got the message thru direct to 3NI with one repeat. 3NI changed the address of the message to read Canadian 5CT instead of 4DY, to make a Transcon out of it, and sent me a service accordingly. He then shoved it thru to 4ER who in turn gave it to 5CT in Duncan, B. C., on

Vancouver Island, a successful Transcon in just one hour.

5CT then started a reply to 1AR: "Ur wishes and greetings received, same from Vancouver Island." This message returned by the same route and landed at 2BN in just ten minutes. 1AR had shut down and 2BN was unable to raise him, or we would have smashed our last round-trip record to smithereens.

Get a map and note the distance between stations in this relay: 1AR in Halifax, N. S.; 2BN, Montreal; 3NI in Fort William, Ont.; 4ER in Moose Jaw, Sask.; and 5CT at Duncan, B. C. A peculiarity exists in the fact that there were but few Canadian stations on the air at the time but the five stations concerned were among the most reliable ones in the Dominion.

There're not many amateurs in Canada but we're there with the goods!

Entries Solicited for 1923 Hoover Cup

EVERY ham is familiar with the Department of Commerce Cup, the trophy awarded annually during the present administration, under the auspices of the A.R.R.L. Everybody knows that it is Amateur Radio's highest recognition, and we have a suspicion there are quite a few fellows who have worked earnestly in that direction thruout this year. We want to call attention to the fact that 1923 is now approaching a close and that it is time to give thot to the entries; and we want to present the conditions and regulations once more for everybody's guidance.

This will be the third cup given by Secretary of Commerce Hoover, who is himself an engineer and realizes that the greatest benefits come to any art when initiative and individual effort in design and construction are encouraged. 5ZA got the 1921 cup, 2OM the 1922 one; are you in line for the 1923 cup, OM?

Mr. Hoover desires that the cups be awarded primarily for the best amateur equipment in major part constructed by the amateur himself. As the actual goodness of any station is attested only by its operation, the cup will be awarded to AMERICA'S BEST ALL-AROUND AMATEUR STATION, the major portion of which is home-made, as determined by a consideration of the following features:

A—Extent to which the apparatus actually is made by the amateur himself.

B—Ingenuity displayed in design, construction, and arrangement of the station.

C—Over-all electrical efficiency of the transmitter, as determined by test or supported by acceptable affidavits.

D—Consistent transmitting range thru the preceding year, as will be known to the Operating Department of the A.R.R.L. or determined by test.

E—Performance of the receiving equipment, as evidenced by the station log or determined by test.

F—Record of the station in obeying the Radio Communication Laws of the United States in every respect, and in complying with whatever local co-operative regulations are in effect in its community.

G—The quality of the "sending" of the operator, particularly as regards "readability," brevity, and the quality of judgment displayed in operating.

H—The amount of traffic handled in the preceding year, as will be known to the A.R.R.L. Operating Department.

I—Accuracy, completeness, and neatness of the station's log. A log must be kept and submitted as an exhibit in this contest. It will be returned to the owner.

Regulations

The following regulations shall govern the contest and awards:

(1) Any licensed amateur radio station in the United States or its possessions shall be eligible.

(2) The particular idea of this contest being to encourage original design and construction by the amateur himself, the greatest consideration shall be given to the extent to which the apparatus is "home-made," and stations in which the major portion of the apparatus is purchased ready-made shall not be considered favorably.

(3) The calendar year shall be the basis for the annual awards. To be eligi-

ble for any year's award, a station must be in actual existence on December 31st of that year, and its operation during the preceding year will be considered primarily with a view to determining how good a station it actually is. There will be an award each year for four years, the presentation to be made by the Secretary of Commerce on March 1st to the successful entrant of the preceding year.

(4) To enter a station in this competition the entrant shall file the follow exhibits at the office of the American Radio Relay League in Hartford, Conn., not later than February 1st following the end of a calendar year:

(a) A manuscript containing a complete description of the station and its apparatus, particularly of those portions made by the amateur himself, and giving such data on features A to I hereinbefore referred to as will likely be of aid to the Judges in determining the merit of the station.

(b) The station log.

(c) Photographs of the transmitting equipment, receiving equipment, antenna equipment, and such other photographs particularly of home-made features of the station as will assist the Judges in determining the merit of the station.

(d) Wiring diagram of the entire equipment, with constants.

(e) Sketches of any unusual equipment, if desirable.

(5) A Committee of Judges will be announced by the Board of Direction of the American Radio Relay League and shall take charge of the entries and determine the winner. Their decision shall be final.

(6) In determining awards, the Judges shall take into consideration the wave length and power allotted competing stations under their licenses.

(7) These regulations shall be subject to change up to Dec. 31, 1922, as regards the awards for 1923 and 1924; and up to Dec. 31, 1923, as regards the award for 1924.

Plenty of time, fellows, but it would be a good hunch to start getting the stuff together. The race is going to be a good stiff one this year, to all indications, and Headquarters hopes to receive a fine bunch of entries by February 1st.

—K.B.W.



New Schedules for WWV's Standard Waves

Details cannot be given here because this issue of QST is even more crowded than usual. See October issue, page 14.

Eastern Standard Time	Wavelength and frequency in k.c.					
	Nov. 5th		Nov. 20th		Dec. 5th	
	Wave	Freq.	Wave	Freq.	Wave	Freq.
11:00-11:08 P.M.	600	500	1999	150	600	500
11:12-11:20 P.M.	517	580	1578	190	438	700
11:24-11:32 P.M.	468	640	1249	240	333	900
11:36-11:44 P.M.	428	700	1034	290	273	1100
11:48-11:56 P.M.	394	760	833	360	231	1300
12:00-12:08 A.M.	360	833	697	430	200	1500
12:12-12:20 A.M.	326	920	600	500	187	1600
12:24-12:32 A.M.	300	1000	526	570	176	1700

The voice announcements have been abandoned as they did not "get out" well. The test signals consist of long dashes with "WWV" interspersed. The tone is pure C.W. Please report results to A.R.R.L. Headquarters. We wish to thank every one for the fine response on these tests.

Report on the Daylight Transcons of Sept. 23rd

By F. H. Schnell, Traffic Manager

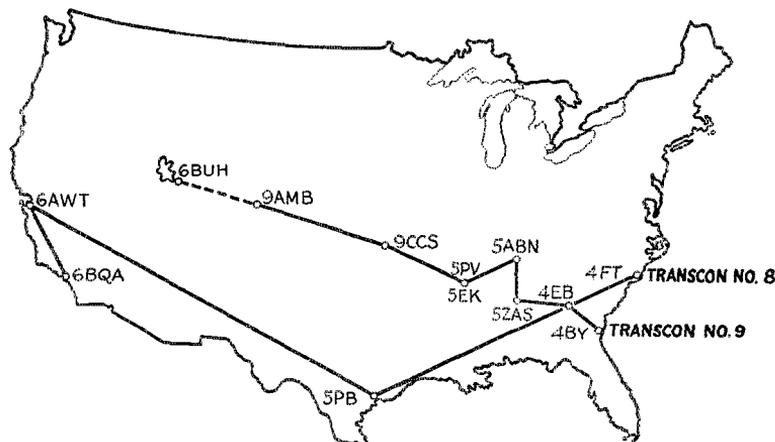
ONE Transcon hopped west right across the country away from the rising sun and got to its destination so early that it wasn't really a daylight message at all. Another, by real daylight work, got from Georgia to Salt Lake City, Utah, before it got stuck. All the others met with various untimely ends.

Thanks, gang, for the bunch of logs! We

Transcon Nr 4, started by 2AJW
Routing: 2AJW-3HH-3ZO-3BLP-? Somewhere in the line, 8ATR copied it from 8AWP and gave it to 8SO-?

Transcon Nr 5, started by 2FC
Routing: 2FC-3BUV-?

Transcon Nr 6, started by 3SC
Routing: 3SC-3SU-8VE-8CWU-8ZZ-8ZF-8CED, who sent it QST-?



ROUTES OF THE MESSAGES THAT ALMOST SUCCEEDED
Transcon No. 8 got across but beat the sun and traveled in darkness
Transcon No. 9 got as far west as Salt Lake City

are able to report that more logs were received on the Daylight Transcons than on any other event in the past. Of course there was the usual number of incomplete logs, but on the whole enough information has been received in time to make a report in some detail which follows:

Transcon Nr 1, started by 1KX

1KX sent it to 1CCZ. No further report.

Transcon Nr 2, started by 1BVB

1BVB sent it by a QST. 1CPN picked it up and the routing from there on is 3ADE-8BOY. In some way 8CTZ received it from 2AJW and gave it to 8BPN—no further report.

Transcon Nr 3, started by 1ER

Routing: 1ER-2GK and 2BY—(at this point Canadian 3HE picked it up and sent it to 8NB-8CCQ-8AVD,—no further report. The routing from 2BY was 8HJ-8CTN-8DGA-8GU-8UJ-Nil. 3BNU got this message from 3BPL and gave it to 8AVL-?

Transcon Nr 7, started by 8SP

8SP has his outfit torn up and was in no position to operate but wasn't going to fall down on the job and by midnight before the tests had something rigged up in the way of a transmitter. However, a short wave receiver was not available so 8SP sent the message QST. 8VE copied it and the routing took a jagged course: 8SP-8VE-8BNH-9OX-Nil. 9CP got it from 9DTJ. 8GZ picked it up from 8AZO and gave it to 9DLR-9DWK-9ZV-9YM-9ACX. After holding it for about five hours, 9ACX snapped out of it and gave the message to 9CFI, but wouldn't give it to any other station. Had he done so, the message would have gotten over, we think, because it was 5:54 P.M. E.S.T. when 5BM got it from 9CFI. Before this time, 9KW, 9BKK, 9AOD, 9EHT, and 9AOG were QSO west. This message stuck at 5BM and 9KW only because 9ACX didn't understand that the idea was to get a message over, regardless of how many stations handled it.

Transcon Nr 8, Started by 4FT

This was the real flyer. It beat the sun across the country by hours:

*Transcon Nr 8 West fm Wilmington, N.C. 4FT Twentythird ck 11
To any radio amateur
Los Angeles Calif
Are you all set for the Transpacific tests answer at once.*

Parsley 4FT.

Routing: 4FT-5PB-6AWT-6BQA. That's all, but it went across. The message was QSL'd by 5PB at 6:15, by 6AWT at 6:45, and by 6BQA at 7:40 A.M. E.S.T. In the meantime, 8GZ copied it from 4FT and gave it to 9OX-Nil. 3BMN also gave it to 3ADE who gave it to 3ARP-Nil.

Transcon Nr 9, started by 4BY

Routing is rather ragged in spots because of lack of detail in logs. Apparently some are missing, but here is what we have:

*Transcon Nr 9 West fm Savannah, Ga. 4BY 23rd ck 17
To any radio amateur
San Diego Calif
A drop of the Atlantic Ocean goes with this message return answer with the salt of the Pacific*

Hodge 4BY

This message certainly went thru a concrete mixer, yet the text remained intact when 6BUH copied it while 9AMB was trying to pass it along to its destination. 4BY gave it to 4EB who gave it to 5ZAS-? 8CMT got it in some way and gave it to 8AVD-8CTN-8BQB-?. 5PV got it from 5ABN and gave it to 5EK who gave it to 5UO. 9CCS copied it from 5EK while it was being sent to 9EKF. 5UO heard 9CCS QSRing it thru 5DT to 5KG. (5KG had copied it from 5SD.) Then 9CCS turned around and gave it to 9AMB. 9AMB was trying to get it off when 6BUH copied the whole thing, but couldn't raise anybody farther west. 6BUH did a good job after all in copying it. Too bad he couldn't push it thru before sunset!

Transcon Nr 10

4ZA tried to start this thru 5QL and 5JR but both stations refused to handle it. Why, OM?

Transcon Nr 12, started by 7HA

Routing: 7HA-7AGE-??

Transcon Nr 14

7LY couldn't raise any station so QST'd and QRT'd.

There were 20 messages in all, ten from the east and ten from the west. No reports on any other messages have yet been received.

Daylight Transcon Sun-Spots

9CP almost forgot about the tests and

answered Nr. 7 by telling 9DTJ that 6KA and 6BKO attended the convention. He came to and finally QST'd the message at 7:25 P.M. E.S.T. Hi!

9YM reports hearing stations in Louisville, Indianapolis, Chicago, Omaha, Lawrence, Kans., and Conway, Ark., in daylight.

6BRF and 6ALK pounded in at 1ZE after sunrise, but 1ZE was not a starter in the tests. One might have gone over in one jump.

Did the gang realize that the idea was to get a message across the country between sunrise and sunset? You know the sun may have set on the east coast, but it was still shining on the west coast. While you may have been without sunlight, there was a possibility of getting a message to another station which was in sunlight. Watch this next time.

"LQ" himself was on at 9KW. Too bad he got stuck with one of the messages. Oh, well, 5BM was his partner on the same one.

5ADV blew his regular outfit and stuck in two UV-201's and worked 300 miles in daylight. Some DX!

9ACX was blessed with almost continuous QRM from some source all day long. He had hard luck ar't.

Leave it to the SSP gang to get under way when they are called upon. They surely did some speedy work in getting a complete set lined up in a few hours. FB!

3HE was the only Canadian to get in on the tests. He did his bit, too.

Well, shall we try Daylight Transcons again, gang? What sa?

**AUSTRALIAN TRANSMISSIONS!**

In connection with the Transpacific Tests Australian amateurs will try to get over to us on the nights of November 5th to 17th, inclusive. Their wavelengths will be between 220 and 230 meters. The communications from there unfortunately have not been complete in details but we believe the hours of transmission will be from 12:15 A.M. to 3:15 A.M. Pacific Standard Time on the dates named. Watch the A.R.R.L. Broadcasts for later information.

Trans-Atlantic Tests

The A.R.R.L. will conduct Trans-Atlantic Tests in co-operation with the British and French amateur societies December 22, 1923, to January 10, 1923. There will be alternate nights of transmission by British and French amateurs. We American and Canadian amateurs will keep our transmitters silent and do our best to copy European signals during the tests. Beginning on January 11th, the lid will come off and everybody is invited to take "pot luck" at trying two-way communication with any European amateur he can hear.

There is a good possibility of having many valuable prizes for reception. Manufacturers interested in donating radio apparatus for the prizes are invited to write to A.R.R.L. Headquarters before October 25th. This time we expect to establish two-way communication and these may be the last Trans-Atlantic Tests—we want them to go over big.

Complete details will appear in December QST—don't miss it.

—F.H.S.

Measurements of Radio Signals*

IN laying out any system of radio communication, whether transatlantic, ship-to-shore, or other sort, it is desirable to know as much as possible about the transmission characteristics of the ether because they vary from hour to hour, from season to season, from locality to locality, and over land and water. This information should be available for as wide a range of wave lengths as possible.

During the past few years, engineers of the American Telephone & Telegraph Company and the Western Electric Company have made accurate measurements of the strength of radio signals under a wide variety of conditions. These measurements are made by means of a special receiving set, one form of which is shown in Figs. 1 and 2, and which is designed and calibrated to give the intensity of the electrical field in the ether due to the presence of electric waves.

The field intensity measurements to be reviewed in this article fall into two different groups. The first group was made in connection with an experimental investigation of ship-to-shore telephony. The other has been made more recently in connection with transatlantic radio telephony.

*This article is re-written from the paper "Radio Transmission Measurements," by Ralph Brown, American Telephone & Telegraph Co., Carl R. Englund, Western Electric Co., and H. T. Frits, Western Electric Co.

The original paper will appear in the proceedings of the Institute of Radio Engineers. This abstract was made especially for QST by the Engineering Department of the American Telephone & Telegraph Co. thru the courtesy of Mr. R. W. King.

Some of the ship-to-shore measurements are given in Fig. 3. The measurements plotted were made on shore from signals sent out from the steamship America as she approached New York Harbor. The points of course show an increase of in-

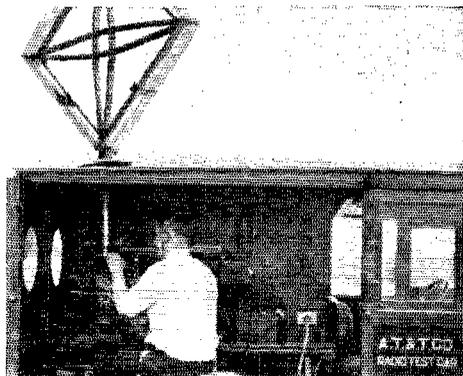


Fig. 1. A. T. & T. Radio Test Car for Measuring Received Signals.

tensity in the radio signals as the ship approached land, but also show a very large change from daylight to dark, transmission being very much better at night. On the night of March 4th, the strength of signals indicated that they passed through the earth's atmosphere for a distance of about 1100 miles with *practically no absorption*. This is shown by the fact that several of the points plotted lie on the curve B which

is calculated on the assumption that the energy of the signals increased inversely as the square of the distance; that is, the field strength increased inversely with the distance. Curve B, therefore, indicates the manner in which light or sound also vary

To the amateur interested in transatlantic signaling, the field strength measurements made in London on signals sent out from Long Island will prove interesting. The radio telephone apparatus which was used for talking to London last

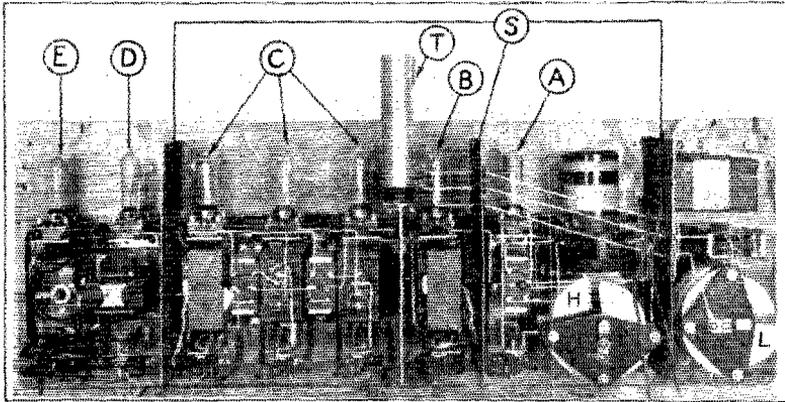


Fig. 2. Super-heterodyne receiving set used to receive signals and measure their strength by comparing them with a local oscillator.
 L—Loop tuning condenser. H—Heterodyne tuning condenser. A—Heterodyne tube, all tubes type "N." B—First detector. C—Three stages long-wave radio amplifier. D—Second detector. E—Audio amplifier. S—Brass shielding between r.f. amplifier and rest of set. T—Tubular socket into which shaft of loop fits.

as we approach their sources. Curve A represents the Austin-Cohen formula for daylight transmission.

Incidentally, Fig. 3 gives us a picture of the phenomenon of "fading." Curves A and B represent approximately the lower and upper limits of ether transmission, and fading is brought about by some variable condition in the earth's atmosphere which carries the strength of received signals back and forth between the two curves as limits.

January has been in service ever since for testing purposes and the data acquired are summarized in curves in Figs. 4 and 5. Fig. 4 covers the winter months January and February, and Fig. 5 the spring months March and April. One set of measurements was made on the strength of the received signals and another set on the strength of interference which, in the curves, is labeled "Noise." The heavy lines give the average intensity of signals and noise at each hour

while the shaded areas show the range of variation of intensities as noted from day to day. At the bottom of each curve is a time scale upon which the night-time for both London and New York are indicated by black strips. Overlapping of these strips indicates that it is night at both New York and London and it will be noted that this overlapping coincides with the portion of the curve giving the greatest signal strengths. A strip of daylight either at the sending end at New York or the receiving end at London tends to diminish transmission. This appears to be particularly true during the winter month. It will be noted that the vertical co-ordinate used for each curve is divided logarithmically; hence, to get a true idea of the change

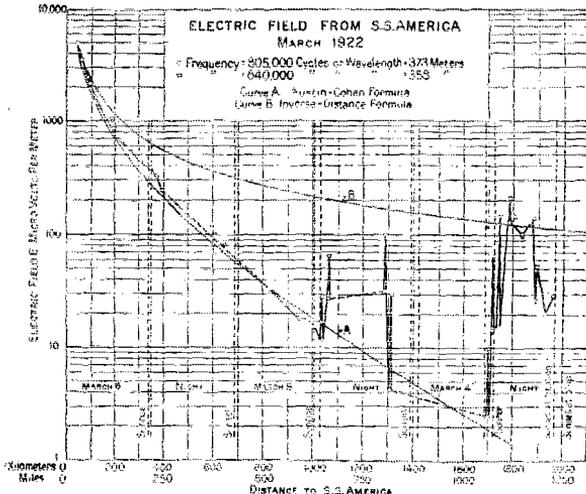


Fig. 3. Signals received in New York from S. S. America.

TRANSATLANTIC RADIO TRANSMISSION MEASUREMENTS
DIURNAL SIGNAL & NOISE VARIATION
Jan 17 - Feb 23, 1925.

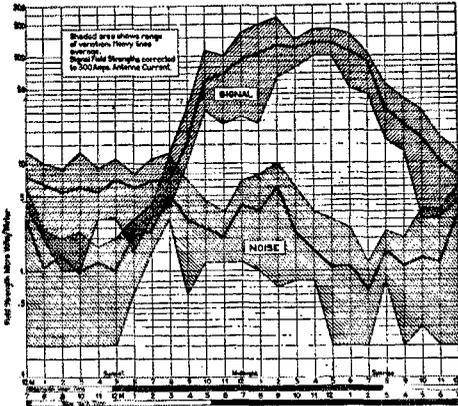


FIG. 4

TRANSATLANTIC RADIO TRANSMISSION MEASUREMENTS
DIURNAL SIGNAL & NOISE VARIATION
Feb 25 - Apr 9, 1925.

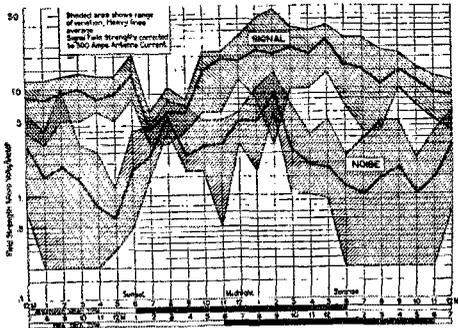


FIG. 5

in signal strength which occurs from day to night one must look at the number printed on the vertical scale.

Vacuum Tube Characteristics

By John H. Miller

WITH thousands of amateurs using vacuum tubes, probably very few have a clear comprehension of their various fundamental characteristics. The subject is, of course, limitless and perhaps for this reason frightens many away. However, the taking of the simple characteristic curves is so easy and the results are so full of information that no one should be afraid the subject is beyond him.

*Chief Engineer, Jewell Electrical Instrument Company.

In conclusion, two features of the above field strength measurements deserve special notice. Knowledge of blind spots or dead areas has frequently arisen through the efforts of amateurs in various cities to communicate with one another. It is here shown (see Fig. 6) that by means of the measuring system, the exact location and importance of these peculiar areas can be

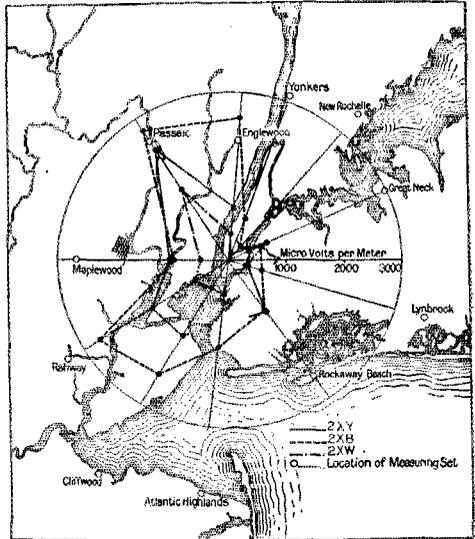


Fig. 6. Some Work Done By the Radio Test Car.

determined. Such a proceeding is a logical step toward the explanation of the existence of these areas.

In the second place, the curve of Fig. 3 should be welcome news to every amateur because it shows that wave lengths of the same order of magnitude as those of the amateur band will frequently travel at night with practically no absorption and at such times will permit long distance communication.

The most important characteristic of a vacuum tube is the grid voltage—plate current relation, usually shown as a curve for varying values of grid voltage. Such a curve, taken with normal filament excitation and with the plate voltage to be used, will tell what may be expected of almost any tube.

Very recently, manufacturers of vacuum tubes have been stating in their literature the "mutual conductance" in "micro-mhos" of particular tubes, this value being taken as a measure of excellence of the particular

tube so rated. This value simply represents the relation mentioned above, the slope of the grid voltage—plate current, characteristic curve. The term "micro-mho" is a convenient value and is simply one millionth of a mho; a mho is the conductance or conducting ability of a circuit of one ohm resistance. In other words, a mho is the reciprocal of an ohm, and it is for this reason simply the word "ohm" spelled backward.

To take such a curve on any tube, its filament must be heated to its normal value and the proper potential applied to the plate. The voltage of the grid with respect to the

compact assembly of instruments, a rheostat, potentiometer and socket, completely wired for taking characteristic curves. The

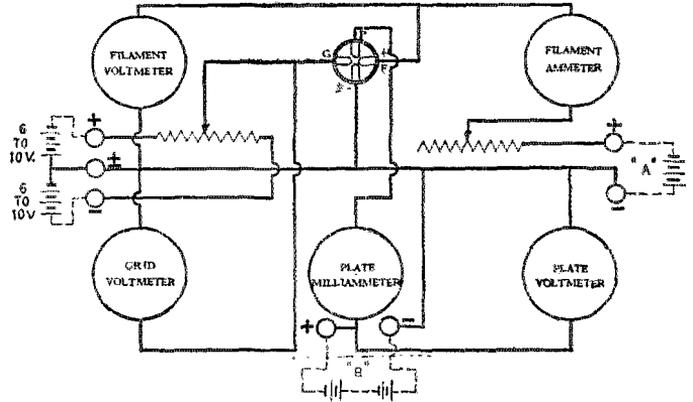


Fig. 1

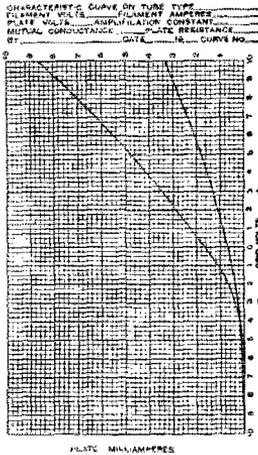


Fig. 2.—The curves above, showing the grid voltage—plate current relations of two standard amplifying tubes of different makes, were made in our laboratories using Pattern No. 95 Radio Test Set, and plotted on the cross-section paper which we supply. The plate voltage was 45 volts on both tubes, and the filament voltage that recommended by the manufacturers. By a comparison of the two curves, it will be seen that the tube giving the upper curve is very much superior to the other tube.

negative end of the filament is then varied from a negative value, sufficient to reduce the plate current to zero, to several volts positive, taking readings of the plate current and grid voltages as the latter is varied.

Connections

The diagram, Fig. 1, shows the connections of a testing set, which is an especially

same results can be obtained by connecting separate instruments as shown in the diagram. It should be noted that any of the instruments in the complete test set may be used separately by connecting to the proper terminals.

In testing a tube, the filament current or voltage is adjusted to the value recommended by the manufacturer, preference being given to voltage adjustment. The proper plate battery should be connected and its voltage checked on the plate voltmeter to make certain that it is of the right value. The grid battery is connected as shown in the diagram; a storage "B" battery is very good for this purpose as a center tap in a 12 cell battery gives the proper voltage relations. "B" batteries or odd dry cells may be used just as well, however.

Method

Vary the grid potential in the negative direction until the plate current is reduced to zero, which gives a starting point for the curve. Then gradually reduce the negative grid potential to zero and increase it in the positive direction by means of the potentiometer, taking readings of both grid voltage and plate current for each volt change on the grid.

Such data taken on a standard amplifier tube is given below:

- Filament Voltage... 5.00 volts
- Filament Current... 0.25 amperes
- Plate Voltage 45.00 volts

(Continued on page 34)

EDITORIALS

de AMERICAN RADIO RELAY LEAGUE



The "C.R.R.L."

TIMES without number the success of the A.R.R.L. in fostering and supporting its magazine *QST* has excited the cupidity of individuals who think how beautiful it would be if they could start some kind of an amateur organization which would get behind their magazine and push it to \$U\$C\$E\$\$\$. Bad cases of getting the cart before the horse, all right, but you can't expect a publisher always to perceive that the organization must come first and develop its need for an organ, and that that organ then must be owned by the association and not by the publisher if either are to succeed.

In Canada we have right now a similar case, where the publisher of a really excellent amateur magazine feels the urge to foster a Canadian Radio Relay League. It seems desirable to repeat in these columns, more particularly for the Canadian amateurs, the position of the American Radio Relay League in the Dominion:

The A.R.R.L. is operating in Canada at the request of leading Canadian amateurs, who realized that Canadian amateurs were not sufficient in number to maintain a relay organization thru their own stations alone, nor could they finance a successful organization. The A.R.R.L. therefore has created Divisions in Canada, under Canadian Division Managers, exactly as in the States. A Canadian General Manager, Mr. A. H. Keith Russell, 9AL, supervises all their activities. The A.R.R.L. has no territorial ambitions and does not for a moment presume that Canada always will remain a part of A.R.R.L. By request it is doing what it can to help the amateurs of a sister country until they attain numbers sufficient to insure the success of an independent organization. When the Canadian amateurs elect to separate and maintain their own association, the A.R.R.L. will withdraw from Canada and turn over the present organization to them. In the meantime the A.R.R.L. considers that it has a sacred trust in Canada and it proposes to safeguard that trust with all its ability. It would be false to its trust if, in these days of the relatively tender growth of Canadian amateur radio, it withdrew in favor of an amateur organization formed by or fostered by a publishing company for pecuniary

motives; or in fact if it yielded on any other basis than at the request of the Canadian amateurs themselves.

So beware of being misled, Canadian amateurs. There is not the slightest excuse for a counter-organization to "buck" the A.R.R.L. When the C.R.R.L. comes it will be by the A.R.R.L. turning over all its activity and organization in the Dominion to a group of all-Canadian *amateur* officers, and the A.R.R.L. stands ready to create this independent all-Canadian organization, see it safely started, and withdraw from Canada, whenever the majority of Canadian amateurs indicate that they so desire. A.R. R.L. in Canada means a safe and sound C.R.R.L. when the time is ripe. Meanwhile "beware of false prophets."

Helping the Railroads

A HALF a dozen times in the last two years storms or floods have created emergency conditions along some of the railroads of our country, wiping out wire communication and leaving trains stranded and cities in need of help. Into these emergencies we amateurs have jumped with our efficient stations, and have established radio communication along the railways and linked dispatchers so that trains were located and rescued and contact with isolated cities restored, temporarily handling all the emergency communication that the land lines would ordinarily carry. And now the railroads have realized what a tremendous service we can do for them and they are much interested in our American Radio Relay League. There is a great and powerful cooperative association of the railroads, of both this country and Canada, known as the American Railway Association, and this body has got in touch with our A.R. R.L. to ascertain what we can do to arrange routes of reliable amateur stations which will come to the rescue when the wires go out. Already Division Manager Hood of the Rocky Mountain Division has a plan in operation in his territory, and at the Convention in Chicago a representative of the railway association met our Traffic Manager and Division Managers to talk over methods for making the system national.

The railroads are the economic backbone of North America. The welfare of our countries is intimately bound up in the successful and uninterrupted running of those railroads. When we amateurs can help in that thing we make ourselves very much worth while and we pointedly demonstrate our value to our country in time of peace.

Plans for emergency networks are now having attention. This is just a preliminary announcement. Think it over and be prepared to help in this most important work when you are called upon.

Dah-Dit-Dah-Dit Dah-Dah-Dit-Dah

WHERE, oh where, have we heard those letters before? To tell the truth, we've heard them a whole lot too much. CQ-ing really amounts to a great evil in amateur radio today, fellows, and we ought to get wise to ourselves.

Opinion is divided, all the way from the chaps who show they like it by practicing it all the time, to three fellows we know whose boast it is they never sent a CQ and firmly believe that every CQ-er should have his license revoked instantly. Neither group is right. CQ has its legitimate uses; the trouble is that it is abused.

It is a mighty convenient thing, when just coming on the air of an evening, to send a brief CQ to announce that you are on the job and ready for anything. And when you have traffic for a certain city or in a certain definite direction and don't hear anybody in that direction, a short CQ followed by the name of the city or the direction is a very convenient and effective way of getting QSO anybody in position to help. We do not favor the actual abolition of CQ, because it is helpful in these things. We would have no quarrel with it if its use were confined to these things. But its abuse has become something awful.

There is the bird who calls CQ fifty or a hundred times. Why? Does he want to get report cards or to connect up with somebody? CQ-ing just to get report cards is an unjustified abuse of the ether and we move that no cards be sent in response to long CQ's. When you call a million times, OM, is it in the hope of raising someone? Let us tell you something, and this is straight dope: the reason you have to call so long before you can raise anybody is that nobody will answer the bird who calls so long! Paradoxical, isn't it? Hundreds of times we've heard good amateurs refuse to answer the long-drawn-out CQ of an ether-mutilator, and oftener than not nobody will stay with you while you consume ten minutes calling—there is too much on the air that is *interest-*

ing. If your sending set is any good it will raise the man with a very short call if he is on your wave. If the transmitter isn't any good, no amount of calling will raise DX and you've no business making ten-minute calls to try it. Nor will any amount of calling raise the man who is not listening on your wave—if he is going to hear you he will get a short call as surely as a long one.

6ZZ has the system. His is a "gateway" station, a strategic relay point, so located that it is desirable to advertise the fact that he is on the air, ready for business. Ever hear him CQ? He calls CQ *once* and signs *once*. Down goes the switch, and for fifteen seconds or so he listens for replies. Often somebody is calling him. If not, he throws over and again calls CQ *once* and signs *once*, and again listens, repeating this until he gets somebody. Let's see how he must have reasoned it out; CQ is a desirable thing in his location, but he mustn't make a nuisance of himself. No use calling CQ fifty times before he signs, and no use calling three times and signing three and repeating this fifty times, for everybody will get tired and tune away from him; and besides, who wants to work a *pest*? No use calling three times and signing three and listening, for if the other fellow is on 6ZZ's tune he'll get the single call as quickly. Therefore *one* call and *one* sign.

Let's be more reasonable about this thing, fellows, and stop abusing CQ.

VACUUM TUBE CHARACTERISTICS

(Continued from page 32)

Grid Volts	Plate Milliamperes
Negative	
6	.00
5	.10
4	.20
3	.35
2	.60
1	1.05
0	1.65
Positive	
1	2.25
2	2.35
3	3.30
4	4.15
5	4.80
6	5.50
7	6.20
8	7.00
9	7.80
10	8.60

This curve may be plotted on any cross-section paper, the special form supplied with the complete test set shown above being especially suitable for this purpose.

(Continued on page 59)

The Operating Department

F. H. SCHNELL, Traffic Manager
1045 Main St., Hartford, Conn.



At the meeting of the division managers during the convention at Chicago, the business of message traffic was discussed and it was decided that our message reports didn't mean a thing and that they should be cut out of QST until the new scheme goes into force. Hence, no traffic figures this month.

Steps are being taken at this writing to adopt a new form of certificate for Official Relay Stations. It will be a most formidable certificate and a real one to have in your shack. There will be several things in connection with the new certificate that are going to be interesting. Division managers are recalling all old certificates and new ones will be issued shortly. On the new certificate an oath must be taken before a notary public. It will mean that messages must be delivered or mailed to their destination within 48 hours; that each O.R.S. comply with the law with regard to wave length and quiet hours; that an O.R.S. abide by the rules and regulations of the Operating Department; that the station be in operation during the time the certificate is held; that stations be ready at all times to act in emergency communication work for railroads. Those are the main things, all of which must be accepted under oath before a certificate is granted. It means that men will be put on their honor to make amateur radio conditions better. No one will be forced to take a certificate, and they will be issued most carefully. In the future, when you see an O.R.S. certificate in a station you will know it is a REAL efficient station complying with the law and acting for the best interests of amateur radio. Are YOU going to "put in" for an appointment certificate as O.R.S.?

There are some corrections, additions, and cancellations in the personnel, which are listed under each division. Please change your records accordingly.

A new method of counting and showing traffic handled will be inaugurated very soon, therefore, continue to send your reports to your D.M.s as you have been doing in the past. The new method will be toward showing messages relayed, mailed, and delivered. Details will be announced as quickly as possible.

The Official A.R.R.L. Broadcasting Stations, which broadcast every Saturday and Sunday night at 10:30 P.M. Standard Time, are: 1FB, 1FD, 1CK, 1BDI, 1IX, 1GL, 1CKP, 1GV, 1BAC, 1AIQ, 1BSZ, 1BEP, 1ARY, 1BKQ, 2CFE, 2BRB, 2AWL, 2CRQ, 2GK, 2OM, 3HH, 3BMN, 3OE, 3ASP, 3WF, 3AIS, 3JJ, 3ZS, 4HS, 4EL, 4EA, 4NT, 4EB, 4FS, 4JZ, 4BX, 5XA, 5ADB, 5VA, 5ZAV, 5XAB, 5KR, 5ZB, 5XB, 5AE, 5UO, 5UI, 5XBF, 5YE, 5MB, 5KG, 5ZM, 6BBH, 6AJR, 6ABX, 6KM, 6APL, 6ZAM, 6ZH, 6BKE, 7WM, 7BJ, 7JS, 7JF, 7ZN, 7ZO, 7TO, 7AGF, 7ZV, 7DH, 7ZU, 8AWP, 8BFH, 8VQ, 8ZW, 8ATP, 8AND, 8CED, 8ZZ, 8BDA, 9UR, 9UH, 9CWC, 9DXV, 9DJP, 9AAU, 9BGT, 9BZI, 9EEA, 9II, 9CA, 9MC, 9APS, 9CFY, 9ADZ, 9AZA, 9BAV, 9ZY, 9OX, 9BBF, 9AVZ, 9DNC, 9DKQ, 9AAW, 9APW, 9AAU, 9US, 9AOG, 9DKY.

ATLANTIC DIVISION

Chas. H. Stewart, Mgr.

2AJF reports traffic business very slack in his section. He is hoisting up a 92-foot mast. 2CQZ hasn't much traffic to report either. 2CRW is overhauling his outfit and will be going when this gets into print. The former spark at 2FZ is replaced by 2 5-watters. 2CMQ and 2CBE are also going in for C.W. 2CBQ continues to do his good work. 2BUY just blew up 4 tubes. (Hard luck, OM—T.M.) 2FC is rebuilding his rectifier. He has been shooting fuses all over Asbury Park. 2ARS and 2CXY are rebuilding their C.W. outfits. 2CUV has been getting out with his lone 5-watter, but is increasing to a 50-watter. 2BXD will open his super-station and will put Newark back on the map again. 2AGB has a good bunch of traffic for a short period of operation. 2AWL doesn't seem to be satisfied with his present station and is increasing power. 2CHG has resigned as C.M. of West New York. Bob Hertzberg of 2FZ has resigned as C.M. of the East Bronx district. 2CWR will succeed 2FZ. 2TS came thru with a report this month. Only six messages were handled, but this number will grow as the months roll by—as 2TS says. More dope is wanted from 2GK, 8AOT, and 2AWF, especially the upper New York districts. 2ABM and 2CFE are on occasionally. 2ABM gets out pretty good on his old spark set. 2BRB went after traffic reports and managed to bag 390 messages in Brooklyn. 16 stations came forward and did this fine piece of work.

Long Island reports are missing this month. What's the matter?

Western New York continues to be wide awake with old 8AWP at the helm. 8AXN is after more reports. Marcy has just acquired a new call—8SR, which means NM on 8BUM. A 50-watter is doing business at 8SR.

It looks like 8AQO will not be with us much this winter. A number of complaints have been received from around Rochester way about reports

not being written in QST. In the past, small items of interest were used where information was of a general nature. In the future, we will try to print these items, but we must have the dope from the stations—nothing can be written without information. Only two Rochester stations reported this month. 8NB, 8BCP, 8CUU, and 8CSE are all rebuilding. 8TC spark is being dismantled. 8AHK, 8TC, and 8NB were among those present at the convention.

Nichols hands in a pretty report. 8CCU is changing QRA. 8BXT has just opened up on a new location. 8BJS has been on a little now and then. 8ABX seems to have been afflicted with the broadcast rage. How about reports from 8ED, 8BRN, 8CJH, and 8AWY? 2AWF is building a complete new outfit, which is to be a dandy.

MARYLAND: No detailed report was received. The regular crew 8BUC, 8BMO, 8LG, 8WF, and 8EM are all doing business at the old stand. 8APT keeps them moving in Baltimore, too. General interest seems to be toward getting ready for winter work, and a better report is expected next month from this section.

DIST. OF COLO.: 8SU is back again and will keep things humming. 8AB has been the standby for most of Washington traffic for the past few months. 8KA dropped in to see the Washington crowd.

DELAWARE: 8AIS is the only station in operation. 8AFB goes to college. 8BSS will be going when this report reaches the gang. 8AUN will be among us just as soon as he picks up a bit on the code.

EASTERN PENN.—Dist. No. 1: 8HH is going full blast with a new rectifier.

Dist. No. 3: When 8BIQ started going he got the whole district started and more will be heard from this crowd next month.

Dist. No. 4: 8CHG is rebuilding with a new 50-watter. 8ZO message traffic has dropped, but the box car totals will be coming along very soon. 8QT and 8AUV help this section out considerably. 8AUW is erecting a new 80-foot mast. 8BJ is working on a new rectifier.

Dist. No. 5: Roehm has resigned as D.S. and will be out of amateur radio for some time. The gang will miss the old familiar fist of "J" at 8ZO. 8CCX and 8BBV are breaking out with 2 50-watters each.

Dist. No. 6: 8BQ's cage came down when a roofer got his ladder mixed up in the thing. 8ANE has quit the game. (For how long?—T.M.) A delayed report came from Weigel, C.M. of York. 8AP, with the new antenna doesn't seem to get out so well. It is reported that a YL is taking 8BG from his radio. 8AAO is back with 2 50-watters as is 8AAY.

WESTERN PENN.: Dist. No. 7: 8CDI is on with 10 watts. A new aerial is in process of construction. 8XE will be operated by the gang from 8BVA, 8CBU, 8BYH, and 8VH. 8BOY is doing fine work with a 5-watter. WWQ is getting set for "ham" work on 1 K.W. of C.W. (FB—T.M.)

Dist. No. 7: 8DY is using both spark and C.W. 8NV, 8IE, and 8ABP are the leading stations. 8AOX is still using spark. The scene of the last hamfest was at 8AKI where plans were made for the increase of business in this district. 8GAW is coming into the ham game very shortly. The city of Johnstown is well represented by 8CBH, 8BMP, 8ADS, 8VO, 8BHA, and 8BYI. All of these stations are working at one time or another.

Dist. No. 9: The home of the A.D.M. (We wish space would permit the detailed report—T.M.) 8QD is using one 5-watter. He also is building a new receiver with a range 150-400 meters. 8CEO reports interest increasing. 8AAG will be with us soon. 8AGQ is breaking forth with a new 100-watt outfit. 8VN will be changed to a "Z" call very soon. 8BW is making good headway in League work. 8LJ had the misfortune to blow a tube, but will be back on the air in no time. Some experimental work is being done on loop reception. The new M-G at 8UT seems to keep the neighbors awake. 8CEF will be 8XG in a short time. 8CLK will be on regularly next month. 8LL is closed down. Op away at school.

8VQ is operated by "AM" "FP" "RU" and "ED". This is one of our star stations and much traffic is handled nightly. 8CKM is using 4 5-watters now. 8CDC is operated by an "ol' timer" who is using five 5-watters. 8AIO succeeded in working 7ZD for a half hour one morning. 8CTP reports 6AWT and 6ARB QSA all over the shack.

PITTSBURGH: 8BT is rebuilding. 8EW and 8AU away at school. 8SF is on the air regularly. 8BRJ has just finished overhauling and rewiring his outfit. 8CEI handled 103 messages. 8DDX reports 21 messages. 8DGE reports working NYC in daylight. (Some DX—T.M.) 8AGO has hooked his "sink rec" up properly and is getting out better. 8ZD and 8VE attended the convention and because of so much business the key was idle most of the time. 8BTM is reaching out FB and is QRV for winter work. 8OC has just finished his new 5 50-watt tube set.

Dist. No. 11: 8DKI handled 28 messages and 8CON bagged 24.

Dist. No. 12: Erie will be kept on the map by 8GU, 8CWW, 8RC, and 8CNB.

Dist. No. 13: 8ABM is using 1200 volts D.C. from a battery. He works into Texas consistently. 8AVU hangs on to the spark set. 8CMN is on with 10 watts. 8QC, with 10 watts has worked 6XAD. 8JN is a new one. 8ALF is using both spark and C.W.

Dist. No. 14: 8BJV handled his traffic while using 1 50-watter and claims "BVD" of his traffic. (BVD—Best Verified Delivery—credit goes to 9CA for the idea—T.M.)

8BRW blew up his M.G. set and is off the air for a while. 8BKY kept his hook clear. 8BSJ is playing with "S" tubes, therefore his traffic is somewhat at a standstill. 8AAF is back with a 50-watter and M.G. 8DKS claims the record for a rectifier—one year without cleaning and still going strong. 8BDU is using a sink rectifier on a 50-watter. 8BRM was with the convention gang and his traffic suffered a bit. 8DBL is having hard luck in getting out OK. 8AYZ is assisting at 8DBL.

CENTRAL DIVISION

R. H. G. Mathews, Mgr.

Altho the national convention interfered greatly with the activities in this division, since the attendance was greater than from any other section in the country, the traffic has taken the usual upward trend to be expected at this time of the year.

OHIO—C. E. Nichols, 739 Weadock Ave., Lima, Ohio is the newly appointed A.D.M. for Ohio.

Dist. No. 1: 8BSI is now in operation with a new counterpoise and antenna. 8CMU has been busy putting up a 60 ft. tower, also with new aerial and counterpoise. 8FU turned in a good total. James Lisk, the 6ZH of Ohio, newly appointed C.M. of Lima, reports a number of stations under construction and several already reaching out. Among these are 8ER, 8AVN, 8GD and 8CPP.

Dist. No. 2: 8BFH reports absolutely no "rubber stamps" among his 416. (Incidentally, we want to thank 8BFH for listing on his report card the number of messages originating at his station, the number relayed and the number delivered—D.M.) (F.B.—we'll all do it soon—T.M.) 8BXX and 8YAE will be on the air soon. 8AAJ reports a good total. 8LJ is back home from 8JJ's and we can therefore list his report this month. 8DRM is hooking up with 8BMF and will be on the job with both spark and C.W.

Dist. No. 3: 8TT reports two operators on the job there now. We have two new stations, 8AQY and 8AHL. Akron reports the loss of its C.M., W. F. Worden. Several suggestions as to his successor have been made, but the appointment has not yet been made. 8BNH now has two sets going, a 50 and a 5. 8WY has a 100 watter finished and is waiting for the tubes. 8CVT is in the same fix. 8BPL has been issued to H. M. Merrill of Akron. 8AWX reports his usual consistent total. 8RY has a Western Electric 50 watter about ready to shoot.

Dist. No. 4: Because of the absence of 8FT, R. E. Humes, 834 Jefferson St., Springfield, O.,

8CKV has been appointed acting superintendent until Furrows' return next February.

Dist. No. 5: 8BYN will be on the air soon. 8TJ is working despite lack of very much time. 8BBH will be on the air with a complete new transmitter. 8BEK has been on with his old set but he is going to open up with a new set in the very near future. 8AER will be closed this winter as he goes to college, as will also be that of 8BHO. 8CWP will be on to represent Lancaster with 150 watts. 8GZ reports a total that looks like winter, using 150 watts. (Watch Windom's smoke in cold weather!—D.S.)

Dist. No. 6: 8AL reports lots of trouble with QRN. 8CRC will be under way soon.

WISCONSIN—Dist. No. 1: 8DHM will report regularly.

Dist. No. 3: A new interest is being shown around the district since we have had a little cold weather. QRN has decreased 50%. DX can be worked most any night of late. The bunch is back from the convention with new ideas so some of those who have laid off during the summer will listen to their stories and start something. 9ALA will soon be on with C.W. He is using spark at present. 9DCT is back from military camp and is using 10 watts. 9BYJ hands in his first report this month, half k.w. spark. 9ABU is constructing a 5 watt set. With the completion of a good station in Merominee and the report that 9AGT is QSO west daylight, district No. 3 is organized for daylight work. This means something because of the size of this district.

MICHIGAN—Dist. No. 1: Traffic totals are up a bit and indications are that from now on they will be on the incline. 8CBO is op. aboard WMIO, but will be going with 10 watts soon.

Dist. No. 2: Traffic is reported as very light even by stations that are on the job continuously. This is probably due to irregular operation of stations in general. Stations in this district are being mailed questionnaires regarding hours of operation and range from which station schedules and route appointment will be made. Plans are laid for operating routes on waves below 175 M to avoid QRM. The following are active stations: 8CED, 8ZF, 8DKC, 8BWR. Following semi-active: 8JJ, 8CGJ, 8BGL. 8FI is rebuilding and will be ready soon, spark temporarily.

Dist. No. 3: 8DKC, newly appointed D.S., had to leave the Chicago convention to greet a new addition to his family. 8VY shoots in a regular winter total. They'll have to raise the limit on the brass pounders league to give something to work for.

NORTHERN INDIANA—Dist. No. 3: 9CP reports having trouble with his 250-watt tube and has gone back to one 50 watt until he gets a new one. A new station, 9DYT, is on the air with a 10 watt set. 9DEK has worked 37 states and Canada since July 23, on 10 watts. 9BON, on 10 watts, worked the coast several times. 9MM reports having trouble with rectifiers. In South Bend there has been little activity this month. 9CTE is testing with 250 watts. 9EFL has just installed a new zinc rectifier using 10 watts, and is getting out in good shape. 9AKD is just moving and has ordered two 50 foot steel masts. 9CNO, on 10 watts, is getting out in fine shape.

SOUTHERN INDIANA—Dist. No. 3: 9BRE is back on the air again with his four 5 watters. He was reported on the west coast three times during August. 9DIS is still the only active station in his vicinity. 9DYU is on spasmodically.

Dist. No. 4: 9BVZ is having generator trouble. 9UR complains that he can't get out.

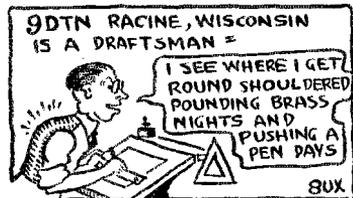
KENTUCKY—Dist. No. 1: 9OX, after spending the summer months recuperating, is back on the air. Besides Pflumm "SEE" J. L. Green, "JG" and J. E. Craft, "EG," both of whom are commercial operators, are on the job and an all night watch will be kept. 9RV, shoot 'em in, gang.

Dist. No. 2: 9EP is in New York but will return in a couple of months. 9DRI is down east but is not QSO the gang hr. 9LH says he has quit the game. (Dull, they never do.) 9ASE has up a new mast and is on the air again. 9YC is to have a 100 watt and will be with us soon. 9EI

burnt out his generator but was heard by 7VF before it went. 9CON will be on the air this fall with several 50s'.

ILLINOIS—Dist. No. 1: 9DZU is on with 5 watts now and 15 to follow. 9AWU is going to increase his 20 watts. 9CFK and his 10 watt ether buster will be going strong again. Peoria: 9BIJ, C.M., reports his own station now on with 50 watts.

Dist. No. 2: LaSalle: 9ABE reports no msgs., which is an example for the rest of you. Report whether you handled msgs. or not! Bourbonnais: 9CXH works 100 miles with ease any night on one 5 watt. 9CXH's motto is "The new maps will have Bourbonnais on them, because 9CXH is there." Streator: "The Squirt" has sorta vent back on us this month, only handled 88 as compared with 1130 last month, but his wave is lower and more QSA. 9DXL is doing good work on two 5 watters. Wheaton: 9BRX will have 50 watts soon, heard in all districts last month.



Ottawa: 9BTA is back home again and will be shooting traffic soon with 100 watts. Ottawa has a new station, 9BRU, which will soon be on the air. Naperville: 9DUL was on only two days. Dana: 9CCM will be on soon as power line is there. Cabery: 9DDY is working for Public Service Co. in Pontiac now—no traffic. Elmhurst: 9WX promised in report verbally at convention to be on soon. Peru: 9BDF is in Chicago. He handled no traffic but reported early in the month. Mendota: Met whole gang at the convention and they all reported verbally "no traffic."

Dist. No. 3: 9BHH, a new station in Jacksonville leads the list this month. 9CXI will be on regularly now. 9EAC seems to have dropped out of the ranks.

Dist. No. 4: 9DQU is on with 100 watt master oscillator circuit. 9BHX will be on November 1st with 100 watts. 9CLJ is a new O.R.S. 9VV got into Australia with 10 watts. Weeks, C.M. of Champaign and Urbana sends in his last report and resigns, due to his leaving town. 9DCE is acting C.M. until a new appointment is made.

Dist. No. 5: 9AYX has been getting out 600 miles regularly. 9AUS is using a W.E. 50 watt which he is rebuilding into a panel. 9DG says "Yes, I received no more report cards" but sent in a report anyhow. 9DZG is increasing power and putting up a new counterpoise. 9AMS is erecting a new aerial and giving the outfit a general overhauling.

Dist. No. 7: The message report from Chicago represents the highest total for a long time, despite the convention. J. E. Brennan, former C.M. of Chicago, has been appointed superintendent of the new dist. 7 of Illinois, comprising Cook Co.

DAKOTA DIVISION N. H. Jensen, Mgr.

What do you say gang, we start right now with a special effort to get reports each month from all stations in the division. We want credit in QST for all traffic handled by our stations and the only way we can get it is for each station to send a report promptly after the 15th day of the month to his superintendent. If you don't know who your D.S. is, write to the D.M. or A.D.M. (See names and addresses in October QST.) Also we are allowed certain space in QST for mention of station activities. Let the D.S. know what you are doing.

Our division had thirteen representatives at the Chicago Convention. 9ZC probably travelled the longest distance of any of the thirteen.

MINNESOTA—Dist. No. 1: Many new stations are opening up. The D.S. has visited the range country and finds that nearly all of the towns in this territory will have A.R.R.L. stations this winter. 9EAU is in operation under the direction of Professor Bruce, who will also have a relay station at his home. J. Ambrozich will operate at 9EAU. 9ZC has just returned from the Chicago Convention and says that he will be on the air shortly and make up for lost time during the summer months. 9DOE has been added to the list of O.R.S. in this district. 9BMR is doing fine work and leads the district in traffic handled this month.

Dist. No. 2: Traffic remained comparatively light this month. 9YAJ will be on with 200 watts in a short time. 9DSW continues to do good work. 9AWM and 9QF will be at the U of M this winter. 9BVY is the new T.M. for the S.M.R.A. Send your reports either to him or to superintendent Skifter at Northfield.

Dist. No. 3: Business has opened up in good shape in this district with nearly 2000 messages handled. 9CIP and 9BKJ have gone east to school and the biggest and smallest stations in St. Paul have thus gone out of existence. Both were A.R.R.L. stations, handled traffic regularly and made many records. Their punches on the air will certainly be missed the coming winter. 9ZG, ex-9APW, is using loose coupled antenna circuit. 9AUA has not been on much due to vacation and attending the convention. 9DGV is coming back on the air with a higher aerial. 9APE blew two 50's and is now sucking 2 amps. out of a 5-watt. He has been heard in Greenland. In Minneapolis, 9BFI leads in traffic handled with 168 messages. With 5 watts he has worked both coasts. 9DGE has been heard in France with 250 watts. 9CVV is now an O.R.S. 9DAW is on with 50 watts and is doing good work. 9AUL handled 164 messages on 5-watt spark coil I.C.W. at a Y.M.C.A. camp, 40 miles north of Minneapolis. This was all daylight work. 9ZT says he is applying convention ideas to a receiving set. Reducing losses daily. Worked eight west coast stations one night and all districts another. 9AUA relayed one of the first messages from WNP. Got it from 9UH.

NORTH DAKOTA—Dist. No. 1: 9BAN is high with 112 messages. Activity has increased somewhat and total traffic this month is 286 messages. All stations doing good work. 9DLI with 50 watts D.C. worked all districts but the 4th in two nights. 9UH now has two 5-watt C.R.A.C. but is reported as QSA as with the old fifties. 9EBT is again on regularly with a new antenna and 20 watts C.R.A.C. instead of the old A.C.C.W. 9AUA has put over a few messages and 9DLF will be on before the month ends. Another mast trepported down, that of 9ADZ.

Dist. No. 2: 9AHC is attending school at U. of Illinois. 9ACK is using one 50 but will be on with two very soon. 9DM is reported about to open up with two 5 watts, 500 volt C.R.A.C. 9BZF has been working a 12 hour shift in the fields with no time for radio. 9DKB, formerly C.M. at Fargo, is having a little trouble with the BCLs, but will have the two 50's going soon. Give this district another month to develop and then watch for results.

SOUTH DAKOTA—Dist. No. 1: While only a few stations have sent in reports this month, the indications are that before long all of the old stations will be going and several new ones will be added. 9AXD is on with 5 watts and expects to increase this to 500 watts soon. 9BVT is another new station which will be started soon. Sioux Falls will have five new stations this winter.

Dist. No. 2: 9CJS is high this month and is doing fine work. 9AYI is going to college, but will be home and on the air week-ends. 9BRI has a new 80-foot tower and has a new 50-watt set using the Master Oscillator circuit. Hobart Gates of 9DWN is at U. of South Dakota and will operate there under call

9EMF. 9DWN will be operated by John Berg. 9YW will soon be on with 50 watts. 9AVZ is getting 10 amps. into his antenna with a 250-watt.

DELTA DIVISION

W. W. Rodgers, Mgr.

Reports reaching Division Headquarters are very gratifying and all show an intense interest in League affairs.

LOUISIANA—Dist. No. 1: 5WY is quitting, allowing his license to pass from him.

Dist. No. 2: 5AAT and 5KC are back on the air in earnest and will have sink recifier going soon. 5UK has 100 watts and gets out OK. 5RH is in France. 5VR is at his summer place in Waveland, Miss. under the call 5NJ. 5AHB is closed for the summer. 5BH is believed to have quit. 5KU will handle some traffic this season. 5PW is installing 100 watts. 5AU is experimenting with loop transmission. (Get that, 5DQ—D.M.) 5UA, 5TQ, and 5QJ are new ones testing. We hope they will blossom out into real DX'ers.

MISSISSIPPI—Everything is waking up in "ole" Mississippi and with the new O.R.S.s we are getting, it looks like a good winter for us. 5TX, 5AOL, 5AGG, 5AIR, and 5KR are doing the main work in this state. 5NJ handled a gang of messages. 5AGG, the D.S., is moving to the A & M College, where he, with 5ZBA, will put 5YD on with 100 watts. 5AIR is a new O.R.S., but is developing into a real station.

ARKANSAS—The A.D.M., Hunter, 5XAB, reports things looking better, but no reports coming in. 5DQ is resting up from the convention. 5MA was there and says he will get on this winter with a real station. This state is in a stage of metamorphosis, so we are looking forward to some good stuff here.

TENNESSEE—Dist. No. 1: D.S. Cowies, 5NZ, reports that 5AAB, has resigned as C.M. of Nashville. Ballots were mailed by the D.M. to all Nashville members, to be used in selecting a new C.M., but not a single one returned. (What's the matter with you birds? Are you all dead? Come on, snap out of it!—D.M.) Nashville can do without a C.M. until they wake up. Memphis: 5AHJ gets out, but gets no report in to the C.M. 5ALV is building a second NAA, with two healthy 78 foot masts. (FB Pharr—D.M.) These fellows are hanging their calls on signs in two foot letters from their masts. 5BW has nothing to say. Guess he sank with his sink gap. 5EK is on with 100 watts, after basking the rain out of his H.T. transformer. 5MO sneaked off to the convention, failing to report beforehand. The C.M. threatens to stick a msg. hook in 5MO the next time he pulls this stunt. 5PV is on the air. 5PY blew a 50. He will be on shortly. 5NZ is rebuilding. 5KZ will get on with 50 watts as soon as his landlord lets him stick up a mast. 5ZB is 5ALV's only rival when it comes to high masts. ZB has two 80 footers and a good looking station. 5ZBA has left for Mississippi A & M College. Address him at 5YD, gang.

Dist. No. 2: 5MB is rebuilding. 5HL reports nothing. Same with 5AAG.

EAST GULF DIVISION

H. L. Reid, Mgr.

ALABAMA—Dist. No. 1: During the month six stations were active, four of which are in the city of Birmingham. We are sorry that 5GP will have to be quiet this winter, since he is going away to school, but 5ACM ought to be able to handle the traffic or get another fellow to help him. Things look very promising indeed for two or three first-class relay stations up in the northwest part of the state, as our A.D.M. McIlvane, with his partner, Breedlove, plan to put up a good station, and two others also plan to open up in Sheffield also; one with 10 watts and the other with 150 watts. Until the D.S. gets his station going, 5ZAS, 5AGJ, 5AMH and 5UP will handle practically all the traffic for Birming-

ham. 5ACM will handle traffic for Anniston and Gadsden, until 5QP, 5HM and 5VC get along properly.

Dist. No. 2: There are only two active stations, 5ABT and 5AJP in Montgomery. They show a total of 447 messages.

Dist. No. 3: 5AC, 5JR and 5QF made the best report this district has ever had. Two more stations are promised next month, 5AFS who has already begun to reach out, and also 5JN.

Dist. No. 4: Due to defective 50-watt bottles, the 4th district is badly handicapped, as 5XA is the only station in that district.

FLORIDA—Dist. No. 1: With the starting of school, the combined energy of 4HZ, 4MT, and 4HJ will be felt at 4ZC. These men are all attending the U. of F. and will keep 4ZC on the air this season. We are also glad to have with us, ex-9EFB, now 4SD, who is also at 4ZC, and has his own station in the bargain. Jacksonville promises to be the relay center for this district this season. 4FS is still star performer, and keeps improving. His 50 watts are reaching out well and he leads the state. 4PL has just started up, and worked into Texas. 4ZE has obtained an Extra-Special-Ticket and is putting it into use. 4HZ handled 15 the last few days before he left for school. St. Augustine will hold its own in spite of the loss of 4MT. 4SB, and 4PI, have just started up and are reaching out well. 4MS, C.M. of Pensacola, is starting up on spark.

Dist. No. 2: 4JZ has been doing splendid work all summer and is still at it. 4JI handled 15 on 5 watts. 4JY, D.S., has just returned from his summer's absence and will be on the air soon.

Dist. No. 3: 4DL, who has been appointed to succeed 4BC as D.S., is back on the ether after a long absence, and is doing splendid work.

Dist. No. 4: 4DP is working Jacksonville and other Florida stations, but no traffic handled.

SOUTH CAROLINA—Greenville: 4DX of this city has lived up to his call, but sorry to say he has left for Charleston where he will attend school. 4KE is building the cutest little 10 wattner you ever saw and his sync rectifier has arrived. 4JK and 4LK have combined and are now sending under the call of 4JK with 50 watts. 4PV has gone to school, and 4FQ has taken a job in North Carolina, so that most kills DX in that section with the exception of 4HW, formerly of Atlanta, but now a resident of Spartanburg. Watch his smoke! 4RR at Wofford College is starting out with 5 watts.

GEORGIA—Things have been rather quiet in Northwest Georgia due to bad weather conditions and also to the fact that some of our best stations were on vacation, that is the Ops. were. 4Al of Rome has been doing some good work on a 20-watt fone set. This set is the reversed feedback circuit with an absorption loop modulation, and has been consistently working 500 to 1000 miles. He is to be congratulated on such good work. 4BQ has been inoperative as he has been spending the summer on Lookout Mountain and has recently made two trips robbing him of time that might have been put to Radio. 4HA of Lindale is about to get in the air with his 200-watt C.W. and fone. We welcome him to our midst and know he will make a valuable relay station. In Atlanta the regular gang are still doing all they can to keep the "ole" town on the map in QST. 4HS, 4EQ, 4QF, 4KU, 4CS, 4DO and 4NA are doing the most consistent work. 4AP is on again with 20 watts and we expect some good work from this station.

All the Atlanta fellows are busy arranging plans for the East Gulf Fourth District A.R.R.L. Convention to be held in Atlanta December 27th to 29th inclusive, and want to extend to all other districts and divisions a cordial invitation to be present. We have a few things to show and feel that we will all have a darn good time.

MIDWEST DIVISION

G. S. Turner, Mgr.

ATTENTION !!! Men of the Operating Department, I want you to read my reports. If you

read 'em once you will always come back for more. REMEMBER, the most interesting happenings are written up in my report every month. LEARN what the gang down here in the Midwest are doing and here's how:

NEBRASKA: "100% C.W."

KANSAS: "Our Technical Editor at Home, or, How I got One Amp. on Ten Watts."

MISSOURI: "Is a Route Manager a Success?"

IOWA: "A Record on Low Power."

READ ON, BROTHER, READ ON!

NEBRASKA—Better weather conditions have increased traffic in Nebraska during the month. The message report is as yet far from satisfactory, but with the gang back on the job, a few new ones included, we can expect a great deal from north Nebraska soon. The main trouble in this territory is the laxness in reporting on time to the D.S. 9GY is on the air with 5 watts and during the daylight he is working consistently within a 200-mile radius. 9AKI has just placed a 10-watt set in operation. 9CZU will be on the air soon. This is encouraging news, gang. Just what we need! 9RA 9AKI, Chas. Freese, Jr., Ravenna, Nebr. 9AQK handled the greatest number of messages in this state last month. 9YU was a close second. 9YU is a new O.R.S. appointee for Nebraska. 9EW is over at Ames with the Iowa gang. If we don't hear Rockwell at 9VE we expect to hear his fist over at Ames. 9DSM has returned from Europe with a 250 Marconi tube, so we can expect great things from him very shortly. Palmer of Lincoln reports that traffic has been picking up considerably. He prophesies the most successful season yet. 9DGE has been visiting a number of the gang in St. Paul. 9EAK has sold his spark and is now on with a 50. (FB) There will be no spark sets this season in Nebraska. Hurry for Nebraska!

KANSAS—BANG! Some of the gang woke up as can be seen by the increased traffic report. The letters written by the A.D.M. are producing results. All fellows as yet are not reporting however. 9CCS handled 157 which leads the state. 9BHN, 9CZW and 9AIM pounded out more than a hundred each. 9AIM burnt out his M.G. right after spending all his jack on the convention too. 9BEZ is doing good work. 9CWC has been quite busy getting his tubes to operate economically. (It's a mean job, 'eh gang?) 9KW handled 4 messages but failed to report 'em. All this on 10 watts too. It is reported his radiation was only one amp. no matter what circuit he used. You'd be surprised if I mentioned his name.

MISSOURI—Conditions have improved considerably since last report. Many who were out of town have returned and are now on the job. 9CTG for one is back and rarin' to go. The C.M. of St. Joseph is a consistent chap. 9DLT, 9CTG and 9ANO are the only active stations so far. 9EX and 9CTG drove to the big convention. Their car was covered with personal sines of all the gang when they got back and attracted considerable attention. That's advertising the A.R.R.L. and the Midwest. (FB) The R.M. reports that a large number of circular letters sent out by him have aroused the O.R.S. to action. New routes for fall will soon be in effect. 9YM reports that stations in Columbia are in fine shape and according to the way YM pounds in here it sure must be. The C.M. of St. Louis reports the gang lining up in great shape. Most of the fellows have been out of town but are now back on the job. Support your C.M., fellows, please. 9PW, 9NU and 9BHI are the new O.R.S. in St. Louis. Others later. D.S. of western half reported direct to the D.M., but no report was received from the eastern D.S. 9AON now has a special amateur license and is now 9ZV. 9AAU has been reported in Liverpool, England September 1923. (Oh you W.E. tubes!) The little town of Rockport wins first honors for the state this month and 9CAO did it with 813 messages. West Plains reports burnt out tubes. 9DUA is moving. 9BZW will install a 50 watt set soon. At KC, 9SS is taking considerable time to rebuild a real station. 9AVX and 9AYL are the two other KC stations

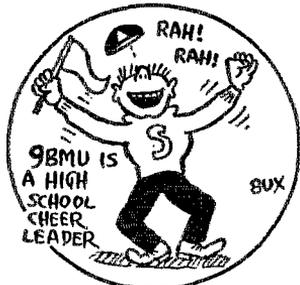
working over-time. 9CKS handled 60 messages just to keep up the good work.

IOWA—A slight increase in traffic has been noted in Iowa for the past month; a total of over 1100 messages being handled. Oh yes, 9CS is still (?) using spark. 9BGT is promising to be back soon. 9HK is proving a valuable relay. 9DSL accounted for 91 messages in 10 days. He is teaching school and will QSR from 5 to 8 P.M. and from 5 to 7 A.M. His power is 10 watts. 9BCX is a new man and doing good work. 9EFH handled the most traffic of any station reporting, having handled 217. 9DKY is using 5 watts and worked both coasts easily. Besides getting DX on a flyer, he also knows how to handle traffic. Yep, got thru 157 this time. Iowa wins for results accomplished on low powers. 9AMI will have 150 watts soon. 9DJM is opening up with 50. C.M. of Des Moines is on the job. 9ERS QSR's 102. A new station for us—listen for 9ACH. 9BZE, 9CWF and 9AED are active and deserve mention. 9ARZ will probably be nil this fall but the "watt" will no doubt be heard from stations at Ames where he is going to school. QRA of your A.D.M. in next QST. Almost forgot to mention 9CNB, another live one on 5 watts.

NEW ENGLAND DIVISION I. Vermilya, Mgr.

This division is shortly due for a shaking down by all appearances and we are going to try and get some real state men on the job who realize their responsibility toward the men of the Official Relay Stations. When the state men fail to report, it only keeps all the men under them from getting credit for the work they do.

In regard to the above paragraph, this office would like to receive applications from active A.R.R.L. station owners in New Hampshire who are anxious to have the job of assistant division manager for the state of New Hampshire.



MAINE—L. B. Hilton has taken over the duties of A.D.M. for the state of Maine. 1BRQ handled 36. 1GTP handled none. 1CIB handled 52 which shows a pretty good job for this time of the year. 1KX heads the list with 130. 1BHR handled 65. 1FM runs 1KX a race and tips off with 125. ('Atta boy—more power to you!)

NEW HAMPSHIRE—Mr. H. R. McLane, A.D.M. of this state, has resigned and the D.M. is ready to receive applications for the job from regular active A.R.R.L. stations in this state.

VERMONT—R. P. Slayton has returned to college and we therefore expect to hear of some great doings from old IARY. 1AIQ was on the air nearly every evening last month and succeeded in handling 18 messages, with no rubber stamp messages. 1CPO has been experimenting with transmitting circuits. 9BKJ has moved into IARY. 1BHC is also attending college at IARY, so with that gang of operators on the job, we expect to hear IARY on quite often. 1CJH is expecting to be back on the job very shortly with 50 watts. 1CPO handled 109 messages.

MASSACHUSETTS—1BVH handled 37 messages. He gives as reasons for the low reports as follows:

mumps, messies, and college. Although 1BCN only handled four messages, he says they were not rubber stamp ones at that. 1OOT reports that they will soon have 2 operators on the job and will then be on the job every evening. 1BDU just got a new aerial up and is now set for the winter work. 1AIR, Slim Crocker, out on Nantucket Island, has managed to grind out 65 messages. He is now using 15 watts and Amrad S tubes, in case you fellows want to know when you hear him. 1ER handled one of the trans-continental and was quite successful, so we hear. He rapped off 166 messages. 1BBM reports his signals get into New Jersey like local stuff. 1BBO has been heard in England lately by British 21J.

1ZE handled 175 messages and three to England. Have received two cards from British 2KW and British 21J last week both reporting signals as vey QSA. A new super-heterodyne 10-tube set will be in operation at 1ZE, when this is in print. Incidentally, 1ZE is moving from Marlon to Mattapoisett and a super-station will be erected there on a high hill. Lee Bates, 1GY, D.S. of Worcester District has resigned from that position. Another appointment will shortly be made in that district. 1JV rang up 131 messages this month. 1ADN handled 202, which is exceptionally good. 1BCU shot out 163. 1DB, 1JV, 1AQM, 1CPN, and 1ADN have served notice—no more rubber stamp messages. 1ADN has been reported by 7ABM. 1CPN has been reported QSA in Liverpool, England. Also worked thirteen nines, since September 1st. Heard five 4s, seven 5s one 6, two 7s, and fifty-three 9s, since Sept. 9th. 1PM at Warren is to be moved to Pawtucket. C. S. Steven has been appointed chief operator at 1YK. 1BVR is also at 1YK this year. 1CMP has been heard in 44 states, Panama, England and Alaska. 1RR handled 95 messages.

Raymond A. Nystrom has taken over district No. 5 Hampshire county. 1IL would like to have all stations in Hamden and Hampshire counties who are interested in handling A.R.R.L. traffic, report to him, so that he can lay out routes, etc. 1CMK's relay certificate has been cancelled on account of absence without leave. 2BGI and 2AAB have been giving a Radio demonstration for the Dept. of Agriculture at the Eastern States Exposition in Springfield. They made good use of the equipment of 1Q and 1ON. The following were visitors at the booth: 1BLN, 1IL, 1JQ, 1BSJ, 1ON, 1CBH, and also Miss Helen G. Daniels, Exec. Ass't. to 1JQ. 1ARF handled 107 messages.

RHODE ISLAND—1BVB had one of those transcons to start off and we are hoping that he made a good job of it. This little state still continues full of pep. 1BVB handled 346 messages which puts him over the top for this time of year. 1II has also pushed an awful hole in the air with 522 messages. Rhode Island is beginning to pick up for the winter work. 1BSD is putting up a 70 foot pole. He expects to lift the fones off the 9th district. 1ET is erecting a huge station and will soon be on the job. 1AXR is out of the game as usual. 1BES is shoving off 11 amps on the tip of his antenna. 1GV has a 75 foot pole and is going after messages hot foot. 1OW is also doing good work. 1CSW has been re-building. 1AQU has "YL-itus" and is having a tough job to tappa key. 1CDM has closed down after doing very good work. 1ALZ is now on the air to stay. He says he likes ham radio better than he does commercial. 1BHK is still working on his set. Fancher reports that no rubber stamp messages were handled in his state. That's certainly fine biz. Here's a good one. 1ACU of Groton Point, Conn. was afraid to send his report to 1QP for fear of its getting side-tracked at Camp Kewpie, so he sent it to Fancher to make sure. Incidentally, 1ACU handled 561 messages, so we don't blame him for not wanting to lose it.

CONNECTICUT—1FD handled only seven, but he has been away on a vacation nearly all month. Sorry to hear 1FD's motor generator was burned out. 1FD has a beverage wire east and west if any of you birds want to try out your special pet transmitters. 1QP just arrived on time with his report, so we're not going to slam him this

month, but we do want a bigger report next month for Connecticut. Incidentally we want to see IAW's report of messages handled. IMY handled 184. IAJB handled 150. IAGH is going to have a U.V.204 very soon.

(There is no report of activities from this state, and if you fellows sent in any, better get after John, as none reached the D.M.)

The T.M. wishes to take permission to insert here a bit of news. Don't drop dead when you read it, please! Probably by the time this appears in print two new stations will be heard on the air. One will be that of K. B. Warner, 1BHW; the other will be that of F. H. Schnell, 1MO. The QRA for both stations is the same, 282 Fern St., West Hartford, Conn. On October 2nd, the whole crew, including French SAB, poked a hole in the air with a 72 foot mast. Probably an "X" call will be used also for short wave work. Four 50-wattors (unless they go west before this gets out) will be burning the power. More about this next month.

NORTHWESTERN DIVISION Glenn E. West, Mgr.

WASHINGTON—The traffic this month is beginning to look like old times again. With the cessation of summer static a number of the fellows are on the job again and others are rebuilding and getting ready for the winter's work. The state is just being reorganized for the season in the hopes that reports will come in in better season, with more of them.

Dist. No. 1: The D.S. was a caller at the shack of the A.D.M. on September 12th. Tate reports little activity in the northern part of the Sound at present, but promises to move scads of traffic when he gets the stuff he took home with him hooked up.

Dist. No. 2: There is no activity outside of Seattle at present. However, it is hoped that TABB will see his way clear to be with the gang again this winter on 100 watts. In Seattle there is considerable QRO going on with the hope of greater DX this winter. TAFE, TADP, TGO, TFF, and TTK, (ex-7LY) are on the job and have worked nines. TUU is in need of a shot of "peppo." He has a special TEG, but nothing to put it on the air with. TADQ has returned from the east and reports there is no place like Puget Sound for radio and otherwise.

Dist. No. 3: There are four stations in this district that are on regularly. TAIK, TACA, TDC and TWS are all in line to QSR. TDC has worked WNP on 10 watts. (Howsat, you eastern hi-power birds.)

Dist. No. 4: This district is either dormant or there are no hams reporting. The A.D.M. hopes to make a trip down there to find out what the main difficulty is.

Dist. No. 5: TGP at Olympia still holds the state honors for messages handled. TGP works all districts except the fifth. TYZ, Olympia, is getting ready for the winter's work and will be heard this season. In Tacoma the main traffic stations are TAGI and TWM, while a number of others seem to be getting out with ease, but are slack on the traffic. TAGI has just put up a 100-foot tower that is said to be one of the prettiest sights in Tacoma. (More power to you, OM. Here's hoping QST will print the story of it.)

Dist. No. 6: In this district DX has come back with a bang and unusual interest tells that the weather is luring them back into the shacks again. Traffic was handled in all directions by TBJ and TLY. TLY is all tuned up and doing wonderful work with his 5-watt pistol. He has shot up a cow town or two in Texas and is filing notches in his key handle for all the new states in the ninth district. BJ is still working them from California to Ohio and states that it looks as the one of his five watt triplets was going to die pretty soon. TAJV is rebuilding and two others are putting in C.W. Watch them next month.

Dist. No. 7: TNE is on the air quite regularly with a K.W. of spark and works well in all directions. His 10-watt C.W. set has passed into the land

of lower plate voltages. TAIY has changed his QRA but is now putting up a humdinger of a new aerial and expects to rattle the eons of our Australian neighbors this winter. (Hop to it, OM.)

Dist. No. 8: Thru a mix-up in appointments, there is no report from district No. 8 this month, but we will have one soon.

Dist. No. 9: TGE has been the only station in this district operating this summer and fall. All stations in this district are requested to report their activities to TGE.

Dist. No. 10: The activity in this district still centers around Spokane. There are two new stations there, TGI and TYL. TSZ has been doing some good DX work but the "QSR THRU SPOKANE" slogan went to the dogs last month for traffic was rather short. The other stations are changing QRA's or are troubled with the "wild women."

From this report it will be seen that the small sets in the west are doing better work than a lot of the high-power boys in the east.

OREGON—Dist. No. 1: TLR takes second honors this month with 267 messages handled. Only one so-called 5-watter was used. He will have 50 watts going soon and ought to reach New Zealand easily. T1W, the A.D.M., has been away on a vacation and has not been able to send in reports.

IDAHO—Dist. No. 1: Martin, T1N, reports that things have been rather stagnant in Idaho all summer. With coming of good WX we hope that the old reliables will get back on the air. T1O and T1N have been on quite often. T1F will have 100 watts going by Oct. 1st. T1Z's familiar fist has been heard quite regularly.

MONTANA—Montana is coming back with a wallop! Several new stations have sprung up during the last month. TAJD of Billings has a brand new 10-watter and soon will be busting the ether wide open. TWP is being heard in the east nearly every night. TEL has no city power but uses a 5-watt spark coil set and gets out FB. TEL and TZF handled most of the traffic this month. TZU is busy trying to make a ten-tube superhet perk.

PACIFIC DIVISION J. Vance Wise, Mgr.

CALIFORNIA—Dist. No. 1: 6AVR, using 20 watts of C.W. has worked everything from the fives to stations in Canada. The amp. meter in this station shows 5.8 amps. 6ALK is installing a new C.W. transmitter for winter work, and for that reason has not been on the air very much of late. 6ZH has spent most of his time this last month working on a 100-watt transmitter to work on 200 meters. The old 20-watter hereafter will do the biz on 220 and 275 meters.

Dist. No. 2: 6CBB is now a 10-watt rectified A.C. C.W. station. This station is only operated after 10:30 P.M. and on Sundays. 6CBB has an O.R.S. 6APV is under repairs now. The transmitter is 100-watts. There are two 72-foot sticks going up now, which means 6APV will be going strong very shortly.

Dist. No. 3: 6AVV is busy with his old reliable 50-watter. For a while he was using a 250-watter, but due to having blown three plate transformers, he has decided to give his big boy a rest until he gets a transformer of the correct size. 6AME has spent most of his time rebuilding his set for the winter rush. Using 300 volts at 60 mills, amp. meter registering .9, he has been reported by WUP of St. Paul. 6AME is forced to use storage batteries throughout his entire plant, thus his power is quite limited, but nevertheless he gets many DX reports, and handles any amount of traffic.

Dist. No. 4: 6BRU, an O.R.S., has been confined to his bed for the past month and in all probability it will be another month or more before he will be able to operate his station. 6TU is back with us again, a full C.W. station, and a real one. A complete new antenna and counterpoise system has been erected. The entire station is mounted on glass. This includes inductance and all meters.

All insulators are 22" long, 2" wide by 1/2" thick, clear glass. The power at 6TU is two 50-watt tubes in a Hartley Circuit. The amp. meter reads 4.9. The DX for August is 5LG, 9BUN, 9BGG and 9DMA. 6TU is ready for biz.

Dist. No. 6: The station of P. W. Dann, 6BFL, Oakland C.M., is now 6ZX, the old call of the D.M.; the call, 6BFL, having been cancelled.

Traffic is moving very well, also the route east is once more open via 5ZAV.

Several sparks have changed to C.W. We have yet to convert 6AQU. Everybody is hard at work on him. 6BNU is now a 50-watt station. 6BCU, formerly of Ogden, Utah, has moved to Richmond, and will shortly have his good C.W. set perking. Mr. Dann, 6ZX, made a flying trip down south of his territory. He says in part, 6NX, 6UW and 6TV (ex-8CMD) certainly have some mighty neat and efficient sets. 6IK is signing 6ZL using 50 watts of C.W.

Dist. No. 7: 6BQB has just completed a new set of masts and is doing very good work. 6FH is the old reliable boy of Sacramento.

The D.M. has cancelled his special license, thus losing the call 6ZX. He will reopen shortly with a general amateur license. 6GR is now known as a static buster and also a QRM creator; a couple of 250's will bust and create most anything. 6GF is also making a noise but not much of it on the air. 6AK is building a new shack to house a 200-watt set. 6AGE has a young Eiffel Tower in back of his house, and gets out FB on only 20 watts.

The boys of Woodland and Roseville selected August as a vacation month, thus there has been little, if anything, in the radio line, doing there the past month.

6CRS is ready to open up with a couple of 50's. We have heard little from 6GX and 6DD, although from their message check they must be doing something.

ROANOKE DIVISION

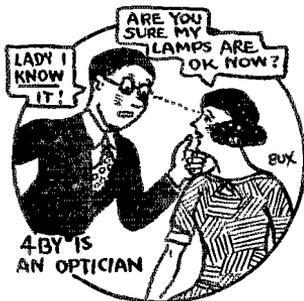
W. T. Gravely, Mgr.

NORTH CAROLINA—Dist. No. 1: 4FA is doing some very good work on fone, but the rest of the stations are fixing up for winter work.

Dist. No. 2: 4KC is now running district No. 2. All men in and around Asheville line up with him and do some more of that fine work you did last winter. 4KC reports some traffic and some very good DX work for this season of the year.

Dist. No. 3: Fellows in district No. 3, around Charlotte, will please note that Mr. H. F. Wylie, Tyron St., Charlotte, is now D.S. Report traffic to him, please. His call is 4SF, 4LA, (ex-4EG) and 4RR, are now located in Charlotte and will help out.

Dist. No. 4: In district No. 4, 4BX is lining things up. He reports wonderful prospects for



fall and winter. While 4BX is temporarily out of commission, he is standing watch at 4FT, which station is working the west coast with 15 watts. 4EA is planning on 500 watts. We are sorry to learn that 4NT is moving to the west

coast. Things in the state are looking up all around, and North Carolina will give the rest of the division a race for the messages record. The old "pep" thermometer is rising.

VIRGINIA—We want to open up the Colleges of Virginia this fall. V.P.I. has some excellent material and likewise, V.M.I. At the recent maneuvers and reenactment of the Battle of Newmarket, the Marines used radio to advantage, but no mention of V.M.I. having used their equipment is made. The two schools have lots of Government junk and we certainly hope that they will get under way with two real stations this year.

Dist. No. 2: This district has just about the liveliest bunch in the state. 3AUU is getting some wonderful results with 100 watts, and 3BMN is threatening to use 100 also, although he is doing fine work with 15. 3BCH and 3ATB are both rebuilding. Although 3SG has been sick and also blowing tubes right and left, he is now back on the air and turns in a report of 66 messages.

Dist. No. 3: 3AJG walks away with the honors, turning in a grand total of 1521 messages which is hard to beat. 3BVL is working all around the lot and likewise 3VO. Both are now keying in the supply lead and report improved results. 3CEL has just performed the miracle of erecting an 80 ft. stick at a total cost of \$5.00 (How does he do it) 3CFV, 3MO and 3JY are handling some traffic, but 3BLI and 3EFW are conspicuous by their absence.

Dist. No. 4: 3TF is the only station working, but he is heard in England and all over this country.

Dist. No. 5: 3BUY is getting out exceptionally well for this season of the year. 3ROF is coming right along. 3IW lost all his "pep" when the big P tube went Blooley but he is planning a better station and a whole flock of operators for the station this winter.

Dist. No. 6: 3BHL had the hard luck to lose his mast but immediately stuck up another and is now using a small vertical antenna. This is the section in which the 200-watt and 300-watt schools are located and we should have more dope on them next month.

Dist. No. 7: This district should also be better next month for the same reason.

Dist. No. 8: There is not much traffic moving in district No. 8 since 3APR left for West Virginia. He was the old stand-by and he is certainly missed. 3BZ has now returned from his vacation and expects to be on the air more this winter than ever before.

Dist. No. 9: The entire gang is remodeling and getting things into shape, and the same is true of 3AOV in the 10th district. We hope.

WEST VIRGINIA—Things seem rather slow all over the state with three districts making no report whatever. However, we know that things are shaping up and we are expecting some fine work this winter. In the first district 8SP is almost ready to come back on the air and if the outfit works as well as it looks it will be a good one.

Dist. No. 5: 3CXM has a fine traffic report of 104 msgs. and 8ATP likewise has some fine work to his credit.

Dist. No. 6: D.S. Morris, is now in the commercial game and is chief op. on the SS Virginia, bound from New York City to Frisco. He will be gone at least a year.

ROCKY MOUNTAIN DIVISION

N. R. Hood, Mgr.

COLORADO—Colorado again takes the first place for the most messages handled per station. The Hathaways again take the box seat for most messages per individual.

Denver Dist: J. L. Hathaway, C.M. 9DHI is still running coastwise on the Pacific Coast. 9AMB is still at it hard and handled 305 msgs. He has put up a combination counterpoise and garage. Boy, page the Technical Editor and let's have the secret. 9BJI, 9CUC, 9EKH and 9FV persist in slumbering as far as reports go. Remember

the Sword of Damocles? 9BXA is a father and son station. 9BJK has joined the League and we welcome you. 9COW is not in operation. 9EEA, Paul M. Segal, the newly elected A.D.M. for Colorado, is hard at work reorganizing the state. (Get behind him gang, he's your meat.) 9BUN is again at it and 9CAA is at it hard. (Good work 9CAA, you will have the box seat if you keep it up. Let the Denver district buzz, gang, there are lots of them on our trail.)

Dist. No. 1: 9AZG reports his set in operation October 1st. 9BVO already reports school QRM, but is at it as hard as he can remodeling, which shows he's a real ham. 9CFY says that Indian Summer is not improving receiving conditions in the Pikes Peak country. 9XAQ, our HE station at the Colo. University, is at this writing, receiving its final tuning and we will certainly welcome the bang of this old stand-by on the air again. 9CPU (not O.R.S.) is handling traffic thru Boulder also and will be welcomed on the traffic routes. 9DTE is heard on 5 watts but sent in no report.

Dist. No. 2: There are now five stations in this district which shows a good gain over last year. We still need stations down here so make your whereabouts known to the D.S. at La Junta. 9EAE put thru 35 and 9CDE 16. QRM 9CDE from convention! Hi!

UTAH—H. C. Wilson, A.D.M., reports that Utah has started off for the season and the traffic totals tell. Also there will be some cancelling of O.R.S. certificates if there is not a bit better reporting. (Step on it gang, we need your help.—D.M.) 6RM put thru 100 messages, and 6CBU slipped thru 115. 6AJA, with 6, and 6CJB with 5, also 6BUH with the same number. Your line-up of C.M.s and D.S.s is now complete so do your reporting to them and on time, and let's get the most messages handled report for this state.

WYOMING—7DH our wonder 5 watter, has left the division and we regret to lose him. 7ZD, also 7LU has completely rebuilt, as has 7ZO and 7ZY. These stations now constitute the gate way to the Pacific Northwest, so let your traffic come this way. Some one is QSO the coast at all times. Wyoming, at this writing, is just getting into her stride and not much to report.

WEST GULF DIVISION

F. M. Corlett, Mgr.

72 stations report the movement of 3,267 messages during the operating month of August 20th to September 20th. This is a gain over the preceding month of 3 stations reporting and 5 messages. Northern Texas Section shows a gain both in number of stations reporting and in the movement of messages, 8 additional stations and some 324 msgs. Southern Texas Section, compared with the previous month, lost 5 stations and shows a decrease of 42 messages handled. Oklahoma Section gained 2 stations reporting, but the message totals decreased by 250. New Mexico Section also shows a decrease from 2 to 1 station reporting and 17 less messages moved. This decrease in message totals is to be expected as most every station is refusing the rubber stamp variety of messages, or where they are handled they are not counted in the report as "messages handled." Then, too, we have shown what some stations can do in running up a large message total, but after all it doesn't mean so very much because the messages themselves were of no great importance. Now that we have had a demonstration of what we can do, quantitatively, let us set about to do as well qualitatively. If we improve the type of messages handled, messages of some importance, the problem of message DELIVERY will be solved, for who will not bend every effort to effect the delivery of a worthwhile amateur radiogram?

NORTHERN TEXAS—The A.D.M., R. L. Clinkscapes, 5IE, has moved from Dallas to Amarillo, Texas. His address for the time being will be in care of F. A. Hardy & Co., Amarillo, Texas.

Dist. No. 1: Denison, 5AHC, reports an even dozen and 5AMB clipped off 32. Greenville: 5DW just got going on the 9th of September. 5AL is in a new location, 2202 Wellington. He has spark

going, temporarily. 5GN leads the town with 60 received and 72 sent and 5ACQ comes second with a total of 78. Grand Saline: 5ALI is on with a new M.G. set and takes 'em for here. Texarkana: 5AER is out of commission, M.G. trouble. Commerce: 5RW is going to school, O.R.S. discontinued. Terrell: 5OI and 5FX are holding down the relay game as usual. Denton: 5NW is now a bottle set. He moved 56. 5NY passed 36, then an R.C.A. socket prong passed the plate battery to the filament. He has another socket and tube and is OK now.

Dist. No. 2: Waxahachie: 5QT is a new O.R.S. 5AJT leads with 71 and traffic is increasing and moving OK, and adds that C.W. will shortly replace the spark. 5TD is a new call for this place, assigned to James Lowery. He is using a 5-watt tube and moved 53. Waco: 5ZAF is out of commission, his antenna being down, but he will be going soon. 5CV received his license the day his report was mailed, but managed to slip along two, 'tis John S. Braun, new O.R.S., 3110 Lasker Ave. 5SD is also a new O.R.S., owned by Thomas Harris, 1317 South 7th St. and leads the city with 47 messages. 5QW is a close second with 35. 5XAK, Jackson's Radio Eng. Lab., is also a new O.R.S. Cleburne: 5AFH will be assisted by 5ANH (ex-5FI) who has moved to Cleburne for the winter. 5UY will be on Friday, Saturday, and Sundays only. Jacksonville: 5OW, Lovelady, the regular night operator, will be off and school will keep Whitaker off except for Friday and Saturday, 50-watter going, radiation 6.5 amps. Tyler: 5PH, a 5-watter, will be a 20 soon. He has moved 18. Nacogdoches: 5ADV is moving all the traffic that comes that way. He handled 20 and wants more. West: 5FA's traffic is picking up. He moved 67. He is QSR Waco, Austin, Ft. Worth and Dallas. (This district is coming right along. FB, fellows —D.M.)

Dist. No. 3: 5UO, D.S., did not send a single report. ('smatter fellows?)

Dist. No. 4: Ex-5XAJ is D.S. Dublin: Baxter passes the information along that the radio inspector says "X" calls are not for handling relay traffic," so application is in for general amateur station license. Before the "EX" became a reality, 5XAJ moved 46. Grandbury: 5NS is off to A. & M. College, leaving Lynn Hiner with the key to hold—moved 36.

Dist. No. 5: 5ZH is D.S. Lubbock: 5AIF handled 27. He lost a mast on the 17th but has another one up now, also a tube went WEST, but he will have another one soon. He works Washington, California, Minnesota and Illinois stations with ease and is QSR to west coast any time, and he wants the gang to know there is a relay station here for any direction. Plainview: 5WV is a new call assigned to E. Lee Dye, Jr., 416 Beach St. Amarillo: 5ZH is bothered with local electrical storms. He moved 14. 5IE has moved here from Dallas but is not in commission yet. Dallas: 5AJJ, C.M., has been getting a M.G. set going. He has been off the air for 10 days, but moved 32 and was reported by 1FB, Portland, Maine and 2AJG, Richmond, Va. This was one night's operation. 5IX leads the bunch with 255, "tried to spunk up for the last month, going to A. & M." (Sure hate to lose you OM, good luck to you.) 5HY has a Rect. going OK now. He reports QRM from school but handled 57. 5JJ reports 42 relayed and 15 delivered, locally. 5AIC has changed from spark to C.W. and says he gets out much better. He handled 21. 5WA is using C.W., I.C.W., fone, and spark. He reports 16 passed along their way. Three new A.R.R.L. stations for the city during the month, are 5AKN, 5AKV, and 5MJ. 5CT of Vickery (formerly CQ Texas) did more relaying and less CQ-ing and boosted his message report to 48. (atta boy, Doc.) 5AHW has been out of commission on account of antenna failures. He is using one that will just "pass" now. There is a better one coming up, also the $\frac{1}{4}$ -K.W. spark will be replaced with a 6-watter now under construction. He handled 12. 5LR, (a rejoined A.R.R.Ler) has completed his skyscraper mast. He has been doing some work but hasn't told us about it. Ft.

Worth; 5MN takes first honors in number of messages handled for the division with 227 to his credit. He has worked all districts in the U.S., 34 states, Mexico, Canada and Alaska, his best DX being 2000 miles. 5LC has broken back into the game with a 5-watter and reports 28 messages. 5MZ, however, takes second place in the city with 75 passed along, using 1DH circuit, "S" tubes for rectification, and gets 1.5 amps. radiation. 5SF has a new QRA, 1926 Patton Court, but we understand that he is in the east somewhere attending school or working. Ex-9CYG, C. F. Meyers, has moved to "Cow Town" and his QRA is 1434 W. Rosedale, Grapevine; Also comes under the Ft. Worth C.M., and we have 5TP, a new A.R.R.L. relay, owned by A. L. Foster. He also operates 5OD at Richardson, Texas. 5AMJ is moving his station and has been off the air since the 10th. He will be going again soon. He moved 27 before he tore her down.

SOUTHERN TEXAS SECTION—5YK is A.D.M. Dist. No. 6: 5VY, now 5ZG, D.S. Houston; 6NN seems to lead in the number of messages handled, reporting 65, C.W. of course. 5FI comes second with 47 and adds that all were delivered. He is ready for traffic any time. 5PB is a new A.R.R.L. station owned by Jim Greenwood, 9218 Main St., and handled 19, all C.W. He is using 1250 V. D.C. on plates of a couple of 5-watters, 3 amps. 5JK has a new QRA, 445 Hawthorne Ave. 5ZX works mostly on Sundays during daylight. 5JF on only a few mornings, handled 17. He worked 5MT during the eclipse on September 10th and his sigs were as strong as night. Galveston; 5ZG used to be M. L. Prescott, Norman, Okla., but is now assigned to H. C. Sherrod, Jr., ex-5VY. He celebrated by handling 138, would have been more but some QRM from the YL's. (The YL's must have the other Galvez stations closed up—D.M.) Port Arthur; 5XV, before showing off to the convention, handled 52. Orange; 5AMA, operated by E. M. Doane, sent 55, received 60, QRM and busy.

Dist. No. 7: 5ZU is D.S. Austin; EN reports 27 handled and 10 on the hook for Houston, Galveston, etc., and complains of being unable to QSR to these points. He also reports bad harmonic on 200-300 meters from WOAI who is 80 miles from him. (Some of you Houston and Galveston fellows hook up with 5EN—D.M.) 5ALR attended the convention and only handled 9. 5RN operator out of town. Beeville; 5GR reports things picking up. His 110-foot mast is completed and D.C. layout nearly so. He is trying to keep the hook clear with A.C. and a single wire, but its very NG. 5AMK will be on with 20 watts to help him soon. New Braunsfels; 5YK just got back home. He was taken sick but will be on the air by October 1st.

Dist. No. 8: 5ZAE is D.S. San Antonio; 5ZAE is taking a rest down on the coast and in his absence, 5AEN, is acting as D.S. 5VO reports 2 and both sockets empty. His last UV203 went up while calling 5VY. He is moving to 225 Halliday Ave. and expects to be back on the air soon. 5KG tops the list with 33 and Canadian 4DY reports his sigs. San Angelo; 5GE is closed until the holidays. He is attending A & M College and pushed 16 along their way before leaving. 5JC handled 47 during 11 days of operating. His tube failed after that, but he will be back on again soon. San Benito; 5ADI moved 4. He has a 20-watt I.C.W. and fone going good and wants schedules.

Dist. No. 9: 5ADB is D.S. El Paso; 5DE is on every night from 10:30 to 12:00, working on 190 meters, 3 T.C. amps., but is having trouble raising 'em. 5ADB sent 25 and received 30. He is QSR on the west coast, Minnesota, North Dakota, St. Louis and Frisco, and wants all the west coast traffic you want to send him.

OKLAHOMA SECTION—5ZM is A.D.M.

Dist. No. 1: 5ANF is D.S. Enid; 5PA leads the city with 152, and incidentally the Oklahoma section. Three new A.R.R.L. stations were added during the month, 5JE, 5CE, and 5PA. 5CE was second in traffic handling with 146. 5JE reported 14. 5ZM says he is too busy blowing 5-watters to handle much traffic but reports 41

passed along. 5SR has just started in the game of relaying messages and starts off with 75 5ANC, an ol' timer, handled 63, Oklahoma City; 5ZAV attended the convention, but handled 105. He blew a 50-watter, rebuilt his antenna and lined up another operator. (Incidentally, his O.R.S. appointment is hereby re-issued—D.M.) 5KW cleared his hook of 31. School and rebuilding his transmitter caused a drop off. 5AHR, is a new A.R.R.L. station, Edmond; 5AAI, is a new A.R.R.L. station at this point. Pawhuska; 5AOH, gives this place another A.R.R.L. station.

Dist. No. 2: 5BM, is D.S. Tulsa; (Rather expected a censorship on amateur activities from this point by the Governor, but he must have overlooked it—D.M.) 5GA leads with 22 and reports he will be going from now on with a 100-watter. 5XBF just added a dynamotor for plate supply. 5JF is back on the air, but no report. OM. 5QE is about ready to QSR again. 5QQ has remodeled and handled 21. He is getting out in fine shape and his QRA is William M. Rice, 817 S. Boston Ave. 5SG received 9 and sent 10, and just did get his report in on time.

Dist. No. 3: This district is minus a D.S. therefore no reports were received. Gov. Jack or the Ku Klux must have got 'em all.

Dist. No. 4: 5DS is D.S., but no report has been received from him for the last two months. Altus; 5AHD has a new mast, a 110-footer, 6 wire cage. He is QRV for the winter; let 'er come and shoot your traffic his way. He received 25 and sent 24. Norman; The wind blew down 5UM's 78 foot mast, but he is about to have it restored and will be back again pronto.

NEW MEXICO SECTION—5ZA is A.D.M. (No report) 5LG, the only station reporting, handled 23. He is going to the State College but probably will be on once in a while on week-ends and holidays, and maybe will work 5XD at State College once in a while.

MEXICO—BX handled 5 msrgs. with the states and visited in the states for three weeks. He is rebuilding his transmitter and will have a 50-watter with 1000, 1500, 3000 volts Sync-Rectified plate supply. (I recently visited 5MT, 5VY (5ZG) and 5AIV. They treated me royally, and 5MT saved me from being turned back into Mexico by proving that I had not been in Tampico during the previous three weeks they had Yellow Fever—BX)

"AX" operated by J. M. Velasco, gives us some interesting information. "JH" has been testing and establishing communication all summer. "DB" has been off the air temporarily, but is now adjusting a new 20-watt set. "AX" is building a new 20-watt set that is going to be heard everywhere. "AX" also has a special permit for an experimental station to be installed for the local club. He is going to put in a 250-watt set with the intention of competing in the Trans-Atlantics, Trans-Pacifics and Trans-Continentials. Hi! All existing Mexican amateur calls are to be changed and standardized.

HAWAIIAN DIVISION

K. A. Cantin, Mgr.

Dist. A—Honolulu: Relay traffic dropped to zero for the month. 6CCR with his new 20-watter has been logged by many mainland stations. 6ASR has been QRW picking up coast signals. 6CMH co tries to experiment with his 100-watt C.W. and phone. 6TQ is on again after a general overhauling of his station.

Dist. B—Hilo, Hawaii: District Superintendent Smith reports his station, 6CEU, is QSO with the mainland and is QRV for traffic. He is using 20 watts D.C. C.W. and was first worked by 6CKC of California. Signals are reported as QSA.

Lihue, Kauai: C. J. Dow, who was working under the call 6BPR has moved and is off the air again.

ONTARIO DIVISION

C. H. Langford, Mgr.

Well, gang, this is our first meeting. Several good ideas are taking form in Ontario.

We now have a real division publicity manager in Gowan, 3DS. Everyone is requested to gather news items of interest to the A.R.R.L. members and forward same to Gowan. This dope will be used in the League publicity work by the city publicity managers, who will get it printed in their local papers. Nominations are in order for city publicity managers. (Come on, gang, let's put some real publicity in front of the BCLs.)

Another thing, listen for the official A.R.R.L. broadcast stations in Ontario on Saturday and Sunday nights at 10:30 P.M. Don't forget our traffic. Work up a schedule with each other, and keep the traffic coming. Chicago isn't the only place to have a night of mystery; altho we had a great time that night. Remember the one on the left? Keep your ears on the job for a Canadian stunt that will make 'em sit up and take notice.

In Eastern Ontario, A.D.M. Donnelly, 3HE, reports Henderson of 9CC, Ottawa, has been appointed C.M. and is very active. 3AFP of Ottawa is also on with 5 watts. (FB) 3MP of Cornwall is continuing his good work of the spring, and is QSA on 10 watts. Phippen and Daly, Napanee, will soon be using 40 watts.

In Central Ontario, Bill Choat, 3CO, has been appointed A.D.M., but he has not put in a general activity report. 3BP is making lots of noise. 9AL promises to be on the air in November with a new station.

The Niagara district is doing well, with the old stand-by 3XX leading as usual. 3TL is also working hard. Several BCLs are reported building C.W. sets. (FB)

In Western Ontario Byerlay reports 9BW working and 9AE, ex-3GN, on soon. Gurd, 3LW, has been appointed C.M. Howe, 3UJ, is city publicity manager, and 3TB is a new C.W. station with all kinds of juice. The St. Thomas gang 3IA, 3OM, 3EG, 3ABG and 3UD, are giving the ether little time to rest. 3UD is C.M. in Kitchen-er. 3DS, 3YH and 3BQ are all on early and often.

In Sutton's Northern Ontario district, we have another real HE station in 9CE operated by the Laurentide Air Service as a fone station, and 3UL of Sudbury will be on with it on C.W. He is QSA all over Ontario and will be of great value. A.D.M. 3NI is back with a real punch to his sigs, and tops the Ontario gang in traffic handling. Two new comers are 3WS and 3AAZ, the former making considerable noise in Southern Ontario.

MARITIME DIVISION

K. S. Rogers, Mgr.

The state of radio down here is improving very fast, in the eastern part of the division in particular. No traffic reports have come to hand, but Nova Scotia is reaching out in great style. 1AR particularly, is distinguishing himself with his ability to reach Ontario stations, and 1BQ also hopes to handle many a message this fall. 1DD is on regularly, while there are several stations in St. John who would be real brass pounders with a little more application. (Come on, fellows, show a little life down here, and show them that a "Blue-Nose" means something more than the effect of the Scott Act.)

VANCOUVER DIVISION

The Vancouver Division is somewhat disorganized by the resignation of Mr. North from the job of D.M. A new man will no doubt be on the job soon.

ALBERTA SECTION—In the Alberta section 4CL is using his 100 watts to great effect, and works both east and west easily. 4IC and 4IT are both on with REAL C.W., using batteries on plate with beautiful tone. 4IO has rewound generator, put up cage aerial and a new counterpoise, and will be real busy this winter. 4CW is also increasing his power, and promises that the guy to beat him in traffic handling will be some boiled owl. 4AB is rebuilding and will also have pure

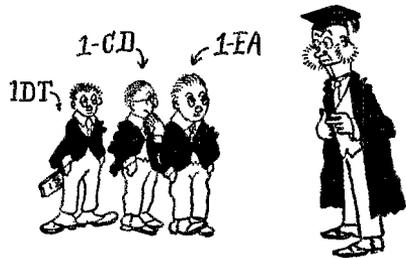
D.C. 4DQ is waiting for a plate transformer, and has a new "sheeny" aerial (Cohenical) and a 20 wire 60' wide counterpoise. OI OII

1OAG in Calgary has taken a holiday. (How about a little brass pounding there, OMs.) 4OC hankers after some 100 foot pine trees which he saw in the mountains this summer. (Go after 'em, Doc.)

QUEBEC DIVISION

J. V. Argyle, Mgr.

Traffic has kept up consistently with considerable increase over any previous month in this division, this being the work of the usual trio, 2BN, 2BE and 2CG. 2AM and 2EK are getting out much better and will make good relay stations this season. 2AM would get his appointment as an O.R.S. were he to keep his wave down



Gm. 1DT, 1CD and 1EA ARE STUDENTS. THEIR FAVORITE TEXT BOOK IS Q.S.T. - Ho!

where it should be. The D.M. is particularly pleased with the work of 2EK as it has opened up the eastern section of the division in fine shape. However, we must get more regular relay men on the job. Let's hear from 2AF, 2FB and 2HG, all past stars and now fast asleep. 2BN was heard by 6BRF three nights in succession. 2CG was heard by VGBF when 400 miles off Ireland, and later worked 9AOY with one UV201A, spark coil on the plate. The gang intend to put over Transcons every night this fall. Communication with 3NI and 1AR is very easy these days.

WINNIPEG DIVISION

J. E. Brickett, Mgr.

SASKATCHEWAN—4ER and 4DG are the only stations operating. 4FN, 9BX, 4CB, 4DN, 4AO, 4IH and 4IW are just putting the finishing touches on their transmitters. 4HH is standing by for the arrival of a brand new 50-watter, and is overhauling his aerial. 4BR, with 4FV and 4AJ should be able to hold Regina's end up OK this winter. 4ER built a fine twin cage aerial and is doing fine work with a 5-watter, and is adding 5 more shortly. 4IX and 4IQ are working back and forth with fone most every night.

MANITOBA—4CN is rebuilding. 4CR has ordered a 1200-volt generator and talks strong of 50s. He sure has been FB with his 20-watter. 4DY, on 10 watts is moving traffic and is also QSO east or west. 4AW is working on his 10-watter. 4DE will be on the air this fall with a 1/2-K.W. Marconi tube. 4FZ is on with 5 watts and pushing some traffic through. 4CO will not be on for a while yet. 4DK's 20 watts is rarin' for that new C.P. 4EA has a fine new cage up, also 4AG and 4FZ. When 4DY goes out doops now, he does it with his eyes closed, and says "is it up or is it down." He's been right three times now. (I'll tell the world that those self-supporting poles are a source of worry.—D.M.)

Who's Who in AMATEUR WIRELESS



Special Edition

Average Circulation 60,000

The Inkslingers

RADIO SECTION

ESTABLISHED 1923 VOL. I. SATURDAY, SEPTEMBER 15, 1923 PRICE 2 CENTS

Radio Fans Will Race Sun Across Continent, Relaying 10 Messages

TO-MORROW'S START OF AMATEURS' RACE WITH DESTINY

May Have to Be Repeated Hundreds of Times

SQUARE DEAL FOR KELLEY, RADIO MAN

L. A. LAIZURE, MIDWEST DIVISION

Amateur Bill Relay Message of Donald R. MacMillan, etc

LITTLE INTERFERENCE CALLED BY AMATEURS

RELAY CONVENTION STIRS ALL CHICAGO

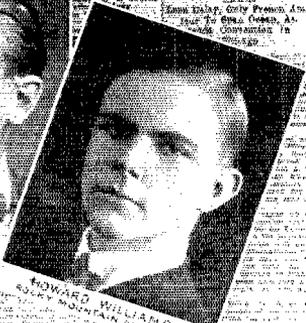
FRENCH AMATEUR HERE TO STUDY NEW METHODS



L. A. LAIZURE
MIDWEST DIVISION



E. S. HILLEGAS-BAIRD
CENTRAL DIVISION



HOWARD WILLIAMS
SOUTHWEST DIVISION



A. R. R. L.
AMATEUR RADIO RELAY LEAGUE
CONCERT TO BE HELD TONIGHT AT 7

BEEN noticing lately, fellers, how the ol' League gets mention in the daily papers much oftener than it used to, and how the things we do in amateur radio are being put before the public in a square and interesting manner?

The A.R.R.L. Publicity Department is responsible for this rapid increase in the prestige of the ham, O.M. The hard-working conscientious amateurs who make up this department leave no stone unturned in spreading the news and doctrine of amateur radio.

There's a Division Manager of this Department in each Division of the Operating Department; a corking good amateur who sees the need for spreading news, goes after it, and gets results. His results are counted, not in number of messages handled, but by putting all of his newspaper clip-

pings together each month, end to end, and measuring their length with a mile-stick. In addition, each Division Manager has scores of hams around him who enthusiastically work with him for the common cause. We couldn't possibly introduce all of them to you on this page of QST so you'll have to be content this month with meeting only four of the Most Exalted Penpushers of the Order of Inkslingers.

It was in Mollala, Oregon, in 1913 that Royal V. Howard, 7LR and the League's news hound in the Northwestern Division, got his start in radio. He put up a nice four-wire flat top like the one the kid down the street had, from his barn to his house, and expected to hear wonders. Curtain rod tuners were the snake's hips then, but the thing failed its purpose so they resorted

to a telegraph line. During the war he moved to Albany, Oregon, but the radio junk stayed packed.

When Uncle Sam lifted the ban on transmitting, the squeek box first lifted its mournful cry above the station of our budding genius. Progress from then on was rapid. The call 7LR was drawn and the equipment changed from spark coil to spark set. Then came C.W., first using an amplifier tube, then one five-watter, then two, until now one fifty-watt tube is used at 7LR to heave signals into Alaska, Central America, New Zealand, Australia, Mexico, Japan (off the coast), Hawaii, and our forty eight states. Then came a commercial ticket, and the glory of building KFAT. Then the greater glory of joining with the rest of the League's news hounds in spreading the gospel of amateur radio. This, together with school, the YL's, and KFAT, takes all of his spare time, but he still finds an opportunity to keep 7LR up to snuff with the rest of the Official Relay stations in traffic work. Oh, yes, born August, 1905.

L. B. Laizure, 9RR, got his start in 1912 by walking under the antenna of a local ham in Lawrence, Kansas, one wet morning on his way to school and hearing peculiar buzzing sounds. This led to an investigation, and a visit to the station, copying the hook-up. Two weeks later his station consisted of one B.O. spark coil, the call LBL, and an unknown wave length. Two months later he borrowed a complete $\frac{3}{4}$ -kilowatt spark set and tried sending on a single wire 300 feet long. In two weeks more he was the proud owner of the fourth audiotron in town. Then began his assault on OM DX.

His wartime duty was in the navy, mostly at NAE, Cape Cod, which is now dismantled. Coming home in September of 1919, he got in on the ground floor with the call 9RR. He moved to Kansas City in 1920 and set up his station again with the usual history, adding C.W. in December of 1922.

Interest in A.R.R.L. work was officially started last summer with the result that he is now holding three appointments: City Manager of Kansas City, Mo., Dist. Supt. of Western Mo., and Division Publicity Manager for the Midwest Division. His station is not on the air at present, so he pounds typewriter keys instead of brass, ranking near the first in hams of the country for letter-writing ability, and his letters always contain real dope and good ideas that help the gang immensely. His pet a hobby is staging "boiled owl" performances; pet aversion, night-hawk broadcasters; and pet ambition, to rake in enough money to maintain 9RR "better and better." He is also a loyal member of the B.O.'s, the G.A.S., and the Key Klux Klan.

L. S. Hillegas-Baird, the fellow with the artist's necktie, narrates his earliest experience with radio or electricity as being along in 1909 or 1910. At that time he was presented with a Morse telegraph sounder and key in recognition of his vain but humorous attempts to read and understand textbooks on electricity. A friend loaned him some books on wireless, which he dived into even more enthusiastically. Soon he, like all of us, erected a crude antenna above his shack and connected it to a very simple home-made receiving set.

In 1914 he moved from Los Angeles to Milwaukee and there he met the operators of the Milwaukee Marconi station, WME. By way of avoiding answering his many questions they referred him to several books on radio. Pre-war 9UJ, A. J. Neumann, was one of the first Milwaukee amateurs he met, and it was through him that he got acquainted with the local gang.

In January, 1917, he and his friends started the Milwaukee Radio Amateurs' Club, and he was its first president. This club is now perhaps the liveliest radio club in the country. It has never been his pleasure and honor to own and operate a regularly licensed amateur station. That continues to be a much-anticipated future pleasure. His hobby is radio clubs and organization. Just after the war he served another term as president of the above mentioned club, one as chairman of its Board of Directors, and at present he is its business manager. During the winter and spring of 1922 he was chairman of the program committee and made all arrangements for the club's series of lectures which attracted so much attention in the magazines and papers throughout the country.

Because of his wide experience he is able to act as News Manager of the Central Division in an efficient and capable manner. In addition to being a member of the I.R.E. and the A.R.R.L. he is Chairman of the Radio Committee of the Aero Club of Wisconsin. In private life he is a Letters and Science College student at the University of Wisconsin, and a Facilities Engineer for the Wisconsin Bell Telephone Company.

Howard Williams, 9BXQ, began his radio career by venturing to put in a requisition for a "complete sending and receiving wireless outfit with a sending range of five to ten miles" which was advertised in a certain boy's magazine for the sum of \$3.50. Needless to say, this request was turned down flat and rejected in its entirety by the financial secretary of the Williams' household. Having thus failed, he was content for a time with a detector made by placing a pencil-lead across two needles and connecting a battery in the circuit. Not long afterwards he spent two dollars for some "number 14 aluminum wire and an

(Concluded on page 63)

Radio Communications by the Amateurs

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



A Good Idea!

Oakland, Calif.

Editor, *QST*:

Due to the fact that we are required to have C.W., and pure C.W. at that, if we wish to obtain a special license, I feel that some means must be found whereby it will become easier to pick up distant stations.

The suggestion that occurred to me was to have a slogan given publicly by *QST* to "listen on your own wave length." This will necessitate our being able to adjust our transmitting wave length a little one way or the other so when we call CQ any station hearing it and desiring to answer it will put his transmitter in resonance with his receiver and give the call.

For instance A in Iowa sends out a CQ on 220 meters and B in California hears him and desires to get him. B's receiver is on 220 or he wouldn't hear him so he proceeds to put his transmitter in resonance with his receiver. This will put it on 220 meters and in resonance with A. A is following the slogan and, listening on his sending wave, hears B in California and the deal is on. There probably are reasons why this scheme won't work but with the larger band of waves recently granted by the government, amateur stations will be scattered all the way from 150 to 220 meters. This will relieve the congestion around 200 meters but will increase the difficulty of getting in communication with the other fellow on our sharp transmitters. With the distance records that are of daily occurrence these days some means ought to be found whereby dependable work could be accomplished between distant stations.

W. A. Hammond, 6ALX.

Towel Racks!

Wilkesburg, Pa..

Editor, *QST*:

The fellow that put the dope in the July issue about using pickle bottles sure started something but he didn't go far enough with his research. No sir!

For some time past I have been wondering if I could persuade my second operator and also better half to QRT about a fall bonnet this year so I could get some of those nice porcelain insulators that

stood the A.R.R.L. tests so well. Then this gentlemen from Ohio, I believe it is, suggests pickle bottles. That's all well and good, but having a single-wire antenna and a two-wire counterpoise, I'd need five bottles. And I could never eat five bottles of pickles. Too much money and too many pickles. Might as well buy porcelains. But the other noon, during lunch hour, "Birdie" Ross, a real ham ex-8BKR and ex-8MI, now one of the guys who keeps KDKQ percolating, and I were wondering what KaDy's antenna would look like with pickle bottle insulators. We were just grinning to ourselves like, when someone gave me a wallop on the back. I picked myself up out of the cinders and the darnphule was chuckling to himself and saying "Towel Racks."

"Towel Racks?" sez I.

"Towel Racks," sezzee.

When I finally got it through my ivory I realized that he'd hit upon a good idea. Most everyone is familiar with the glass towel racks that you buy at the five and ten cent store; ten for the rod and ten for the fixtures. The rod is about eighteen inches long, almost a half an inch in diameter, and at each end is a nice knob for a clamp to hold 'em with. Insulators already made to order!

Now, just as a further refinement, why not get some rods made from Pyrex glass? I can't say what the tensile strength of a 1/2 inch glass rod would be but it would be enough to hold and they're 18 inches long. The next time the A.R.R.L. runs some tests on insulators they won't be complete unless glass towel racks are included.

F. E. Burke, 8DGE.

Re Quiet Hours.

Department of Commerce,
Bureau of Navigation,
Washington, D. C.

Mr. F. H. Schnell

Traffic Manager, A.R.R.L.

Sir:

The Bureau has received your letter of the 4th instant requesting a clearer interpretation of the new regulations governing the operation of amateur radio stations during local church services on Sundays.

The regulation is intended to apply to the amateur transmitting stations in a city

or locality where a broadcasting station is transmitting church services. Where there is a variation in the time such services are broadcast the amateurs will no doubt be informed as to the hours of broadcasting and will observe the silent period during which the church services are being broadcast.

As a matter of fact it is the opinion of the Bureau that very little interference has been caused by the amateurs with the reception of church services and it does not appear to be necessary to extend this regulation outside of the cities or localities from which church services are being transmitted.

D. B. Carson,
Commissioner of Navigation.

How About It, Gang?

Bogota, N. J.

Editor, QST:

Sa, OM, I've got a real kick to make and I'm feeling punk about it. A few months ago I finished my Reinartz tuner and began to hear many stations over 1,500 miles away. Being anxious to verify the reception, I sent out over 15 cards. What happened? I received exactly 2 replies! Some appreciation I'll say! I have since spoken to other amateurs about it and their experience has been the same. 2CTD sent approximately 150 cards and received 50 replies. 2CRR sent 11 cards and received 3 replies.

There is a station near me who is doing some good DX work and usually finds at least one card when he arrives home at night. He tacks it up on the wall, mentally congratulating himself, and then proceeds to forget all about it! Now he is complaining about fellows being too "cheap" to write him. There is surely something wrong somewhere, as sending a card is rendering a fellow amateur a service, the very thing our A.R.R.L. is founded upon. Isn't there some way to remedy this situation?

C. W. Guyatt, 2CXE.

Northern Lights?—We'll Say So!

Jack Wade, Alaska,
(just inside the Arctic Circle).

Editor, QST:

A stray in the July QST says the Northern Lights are a halo. —Yes, and then some. I live right under them. Northern Lights is the name. Aurora, etc., is never heard here when speaking of them.

Northern Lights are as fickle and changeable as a sixteen year old school girl. One style starts out on the horizon to the northward in searchlight fashion; darts and zig-zags; spreads out in fan shape, sweeps, floats, or any other adjective you care to use can be applied to them. The colder the night the quicker the action, and always

the motion is fast, although not as violent as lightning. At times the lights show all colors of the spectrum. As you know, these northern countries are in almost continual darkness in winter. The lights, when busy, are as good as a lantern. Sometimes the lights stay steadily fixed overhead for hours and they cut the darkness into two walls, the light showing the trail for miles with a black wall on either side. Apparently they are not over 1500 feet above the valleys and on the mountain trails the travellers can get right into them. One time I was coming from Steel Creek to this place (about 16 miles) along a high mountain trail with the mail man for this route. It was 9 P.M.; we got a late start. He had seven pack horses and the riding horses. We got into the lights for an hour. A light crackling sound could be heard (as when a cat's fur is rubbed the wrong way) and at times the horses would show blue fire at their ear tips. They seemed not to mind it, however. The other packer and myself felt no untoward sensation except possibly a slight warmth, for it was 34 below zero that night. (We get 75 below here often, and once 86 below, government reading.) The brighter the lights, the colder the weather. They show up from 4 P.M. to 8 P.M. usually, and from September to April, although April is getting rather warm for them and late. They are always so different in their appearance from day to day that it is hard to describe them. They never fail to attract attention, even to the old timers who have been in the north since '98. We have men here who came in 1882, 1887, 1896 etc., and one old man, H. Ludeker, still living, raised the American flag when Russia sold out in 1867.

—T. E. Phillips, Member A.R.R.L.

The Blessing of Radio

Shreveport, La.

Editor, QST:

Ever since I received the attached letter from my country kin-folks I have threatened to send it to QST and write a little squib about it, for no other moral than to show what a wonderful pleasure radio is to all of us and in particular to those who are isolated from the higher things of life and society.

Last Christmas my uncle and I sent an Aeriola Senior set out to my uncle's father and my grandfather at Madison, Miss. My grandfather is 82 years of age, never took to the modern scheme of things and lives twelve miles from the nearest town. He has no telephone, no refrigerator, no screens on the doors or windows, and everything about the place is primitive, to say the least. After he received the radio and after much correspondence with me, he finally got hooked up—with results as set forth in the enclosed letter, which is

written by his daughter. Note how enthusiastic she says he is over the thing. Imagine farmer-folk, whose bedtime is with the chickens, sitting up until 3 o'clock in the morning listening in on a radio program! There must be something to it!

But the thing I really wanted you to know about was the new way of telling when the "air is right" without tuning in. Note the last paragraph which reads:

"When the guineas go to roost making a lot of noise we know the atmospheric conditions will interfere with listening in. If they go quietly to roost, we know there is to be a fine evening for radio!"

Now isn't that something new for the radio bugs to ponder over?

I am only a B.C.L. so far, but the bug has bitten me bad and I am thoroly inoculated with the germ. Pretty soon there will be another "5" on the air, relaying in real style. I am an old Morse line-wire operator, and the International Code comes mighty easy to me.

I thoroly enjoyed *QST* this month—as I always do for that matter—and anxiously await the new copy. Wonder if you fellows couldn't arrange a twice-a-week publication?

Willie Anthony, 5ZS, is planning a new 100-watt C.W. outfit for the next season and will soon be on the air knocking 'em cold. Was out to see him last night and found him busy reconstructing a Reinartz receiver for a friend.

Best regards to the gang
—Bradford Hearn.

Re Our A.R.R.L. Broadcasting Service

(The following letter from the Bureau refers to the broadcast service carried on for the information of our members by appointed stations of the Operating Department, as mentioned in our October issue.—Ed.)

DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
WASHINGTON

Sept. 1, 1923.

Mr. E. B. Warner, Secretary,
American Radio Relay League,
Hartford, Conn.

Sir:

The Bureau has received your letter of the 30th ultimo concerning the application of the endorsement on amateur radio station licenses which prohibits the broadcasting of news, music, sermons, lectures, or other forms of entertainment.

This endorsement is intended to apply to radio telephone broadcasting only.

The Bureau sees no objection to the practice proposed and heretofore followed by the American Radio Relay League in having amateur radio telegraph stations broadcast news items of interest and value

to the amateurs and in some cases to the public, such as changes in radio regulations, police information, announcements of amateur conventions and other amateur activities, flood warnings and other emergency items.

A copy of this letter has been sent to each Supervisor of Radio.

Respectfully,
(Signed) W. M. Lytle,
Acting Commissioner.

Amen, Brother,—Amen!

S. S. Tomalva,
Rotterdam, Holland.

Editor, *QST*:

After waiting considerable time for the CQ situation to show signs of improvement, and no ditto in sight, I just gotta blow off,—steam or condensers, and steam's lots cheaper than condensers—so here goes. The gang made it known through *QST*'s columns a while back that reports of calls heard at sea would be welcomed. FB for that part of it; we commercial ops are all willing to shoot a list along whenever the opportunity arises.

But after straining my ears, patience, and vocabulary t'other night while following an Endless Chain of See Kews that never sined, or faded just before the psychological moment, I decided that things ain't what they used to be. Having cast my decision, I proceeded to cast the remains of the Remington at the ship's cat, (don't possess a Corona as per 6ZZ). Missed the cat and hit the 3rd mate on the knee and he QSL'd with a right hook to the jaw that would have done credit to Jack Dollarksy himself. He has no sense of humor, I guess, 'cause how was I to know it was his lap the cat was sleeping on? But that's a different story.

All this riot was caused by a bunch of CQ hounds warming up the air, and all proud of the fact that they can synchronize their transmitter with the fading spells and sign just at fading time. Don't these endurance hounds realize that the listener will grow weary of waiting for their sine and hunt for a less ambitious brother? It is not a case of "forgive them for they know not." I presume that the vast majority of the offenders have eyes that see, ears that hear, and yet if they read *QST*, and listen to the other fellow doing his CQ-ingest, you must admit that I have good cause to wonder if their eyes and ears are not teetotally different than those of the three wise men who "see no evil, hear no evil, and speak no evil."

What is more disgusting than to be about 2,000 miles off shore, fine radio weather, set all tuned to a fairly strong signal, then a period of waiting from 2 to 20 minutes for him to sign? What's worse? I don't know. Besides the QRM such a

station causes, he is holding us up on this end as our time is limited to about three hours of darkness and the farther east we go the shorter is our listening period. Ship's time is anywhere from 4 to 6 hours fast of E.S.T. Figure it out for yourself and see if you can make it longer. I wish you could for I could then bag more calls for the Calls Heard Department.

There have been numerous articles in *QST* commenting on this famous indoor sport. For instance 9ZT gives you some good suggestions for eliminating a good part of the jamming that occurs. 9BRA in July *QST* not only touches the CQers but includes rotten fists in his article, and presents some darn good hints in regard to calling.

The only suggestion I will add is this: If these well-oiled-never-get-hot calling fists *must* use plenty of electricity in their atrocities, and if they *must* have their nightly code contamination, why not encourage 'em to include a generous sprinkling of signs in that long CQ.

If they would claim to be good operators, why not inoculate them with a desire to put some snap into their calling and sending? Snap does *not* mean burning up the ether with a bug, or any other anumule of the same species. A high speed key when used right is "pretty stuff" but how many are used right?

Don't pull the line that you can't break through without being a rabid CQ-ist. 2AGB proved different by handling over 500 messages in one month *without a single CQ*. Incidentally, he hung up something for you fellows to shoot at. Who is the man that *can* duplicate his record? How many will?

Much has been said about this ceaseless, senseless, endless CQ-ing. Much more remains unsaid. Open up your eyes, you sufferers, and organize a Cee Coo Canners Club. I noticed that when the gang got together they practically eliminated the "rubber stamp" messages. Why not get together on the equally important question of CQ's and start something? A refusal to report rabid CQ-ists in your Calls Heard Department might help to bring 'em around. The circuit used here for eliminating CQ-ologues is the well known sure-fire Ground Circuit, via the lightning switch, and I can vouch for its effectiveness.

And now, Eddy, the steam pressure has gone down. And by the time that these few gentle lines filter through the minds of DC's (dumb craniums) I will be well aware of the fact that although I may live to be a hundred years old, I will remain unhonored, unsung, unwept, and maybe unhung.

Yours for less CQ's,

F. M. Keefe.

The A. D. A. R. F.

Cedar Rapids, Iowa.

Editor, *QST*:

So long ago as July, 1921, an article was published in *QST* announcing the nationalization of Alpha Delta Alpha Radio Fraternity. This article has been the cause of many queries from your readers, and we believe they would be interested in the present status of the fraternity.

Alpha Delta Alpha was organized at Coe College, Cedar Rapids, Iowa, in 1920, as a radio fraternity. In 1921 the fraternity was nationalized, and Beta Chapter, University of Iowa, Iowa City, was admitted. In the spring of 1923 Gamma Chapter, Iowa State Teachers College, Cedar Falls, was admitted.

It was believed that a growing demand existed for a national fraternity of this kind, and the founders were far-seeing enough to provide a stable organization capable of indefinite expansion. Members with numerous fraternal affiliations pronounce the ritual second to none. Honorary degrees for notable achievements in science and in radio are provided.

The conditions for issuance of a charter to a new chapter are similar to those imposed by other college fraternities. Organizations in any university or college of

THE THRILL THAT COMES ONCE IN
A LIFETIME ---



BLUX JUST DISCOVERS HE HAS BEEN DRAWING
"THE OLD MAN" WITH A DIFFERENT SET OF
FEATURES FOR EACH NEW "OLD MAN"
STORY PUBLISHED IN QST !!

good standing are eligible to make application for a charter. These applications are considered at the annual National Conclave.

As the membership had come to embrace many whose primary interest was in sciences allied to radio, it was thought best at the last National Conclave to change the designation of the fraternity from "Radio" to "Technological". This constitutes the only change from the original plan and

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were suitably coupled. In Fig. 4 of the last article it was shown how the oscillating energy supplied by the tube could be transferred to the antenna circuit or other load circuit by means of suitable coupling. Note the similarity between Fig. 4 of the previous article and the Meissner circuit shown in Fig. 3 on the next page. The only difference is that the antenna and ground, which really constitute the plates of a condenser, are substituted for the condenser C^1 , and the coil in the antenna circuit is divided into two parts. One of them is coupled to the grid coil and one to the plate coil. When the Meissner circuit is used, it is essential that the grid and plate

side coil is shown alongside of the other for clearness. A variable condenser is almost always connected across the grid coil.

The Colpitts circuit has the same general appearance as the Hartley except that a condenser forms the medium of coupling between the plate, grid, and antenna coils instead of an inductance. It is therefore called a capacity-coupled circuit and differs greatly in action from the rest of the circuits described.

For further information on the comparison of the different transmitting circuits the reader is referred to Ballantine's "Radio Telephony for Amateurs" which deals with the subject more in detail.

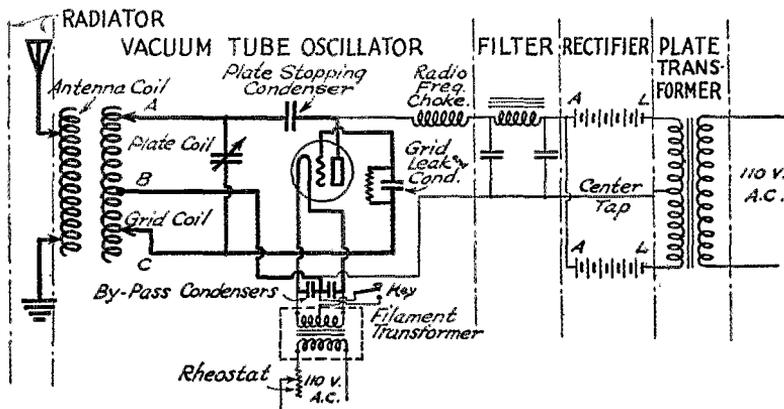


FIG. 1 A TYPICAL CIRCUIT (Coupled Hartley)

coils be coupled to the antenna coils and not to each other. To accomplish this one antenna coil and the grid coil to which it is coupled are placed at right angles to the other two coils.

It is not always necessary that the circuits in a tube transmitter be inductively coupled, although this is the preferred arrangement. They can also be conductively coupled, which means that one inductance can be made common to two circuits. For instance, if the coils in a Meissner circuit are conductively coupled instead of inductively coupled, the circuit becomes practically the same as the Hartley, shown also in Fig. 3.

A Hartley circuit can be changed to a coupled Hartley circuit by the addition of a separate antenna coil and a variable condenser across the main inductance. Or, the Hartley circuit can be changed to the reversed feedback arrangement by turning the part of the inductance below the filament tap around and poking it back inside of the rest of the coil. When this is done, the leads to the grid coil must be reversed so the coupling between the two coils will be in the right direction. Hence the name, reversed feedback. In the drawing the in-

As we have often said before, every amateur ought to own this book. In amateur stations it has been found that the difference in results between any of these circuits is not astonishingly great. Sometimes one circuit works better than another because the correct adjustments are found more easily, but this does not prove that one circuit is materially better than another. In all cases considerable care must be taken to get the correct number of turns on the coils and the correct coupling between the various circuits before the full benefits of any particular arrangement can be had.

By-Pass Condensers and Choke Coils

Leaving the subject of transmitting circuits for a moment, the Junior Operator should gain a good knowledge of choke coils and condensers. In this connection, the article in the September issue, especially pages 56 and 57, should be reviewed. The important facts to remember are: (a) Current of high frequency flows through a condenser more easily than a current of low frequency, while a direct current (zero frequency) does not flow through a condenser at all. (b) Current of low frequency flows

through an inductance or choke coil better than a current of high frequency and a direct current flows through a choke coil the easiest of any. (c) An alternating current, no matter what the frequency, will flow through a large condenser more easily than through a small one. (d) An alternating current, regardless of the frequency, will flow through a small choke coil more easily than through a large one.

It is these factors that make choke coils

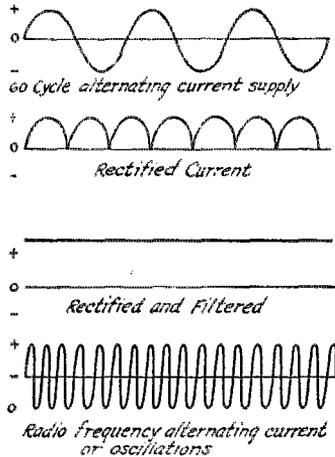


FIG. 2

and condensers so valuable when dealing with alternating currents, whether they be of radio frequency or not. If there is a place in a circuit where we desire alternating current to flow, but wish to stop direct current from passing, a condenser is inserted at that point. It is then called a stopping condenser. If there is a place in a circuit where direct current is to flow and alternating current is to be prevented from passing a choke coil is inserted at that

alternating current that is being dealt with. By-pass condensers for radio frequency currents of 1,500,000 cycles (corresponding to 200 meters wave length) are usually from .002 to .005 microfarads in capacity. By-pass condensers for audio frequency currents are usually .5 microfarad or larger in capacity. Inductances use as choke coils are usually about 3 millihenries (three thousandths of one henry) in inductance for 1,500,000 cycles, while those for preventing the flow of 60-cycle current have inductances of 50 henries or more.

A condenser for by-passing radio frequency current in an amateur transmitter can easily be constructed by referring to the condenser design data given last month. A radio frequency choke coil for use on 200 meters may be best made by winding 200 turns of No. 30 D.S.C. wire on a tube three inches in diameter in a single, smooth layer. If this winding becomes warm at the end nearest the plate of the tube, wind the first thirty or forty turns with wire two sizes larger.

The filter shown in Fig. 1 is a good example of choke coils and condensers in practical use. The current supplied by the rectifier is a pulsating direct current. This is, in effect, a steady direct current with an alternating current superimposed upon it. The alternating part of the current is by-passed by the condensers and choked by the inductance. The direct current part, however, does not pass through the condensers and become short-circuited, but flows easily through the choke coil and passes on to the plate circuit of the tube.

Series and Parallel Supply

There are two methods of supplying the plate current to a vacuum tube transmitter. These two methods, in conjunction with the skeleton of the Hartley circuit, are shown in Fig. 4. The heavy lines represent

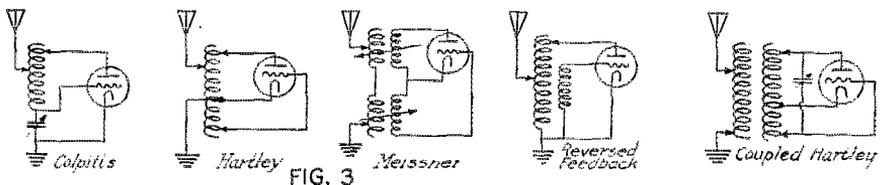


FIG. 3

point. Many times it is desirable to make a short and direct path for the alternating current in a circuit or detour the alternating current around an inductance or other piece of apparatus that would offer resistance to its flow. A condenser will accomplish this very well, in which case it is called a by-pass condenser.

In each case the size of coil or condenser must be appropriate for the frequency of

wires carrying radio frequency current.

In the series supply method a radio frequency choke coil is connected in the positive lead of the high voltage supply next the plate. This choke coil permits the direct current supply to enter the tube, but keeps the radio frequency energy from backing up into the supply. It is essential that it be prevented from doing so, as any radio frequency current lost in this manner

never gets to the antenna. To prevent the plate coil A from being a direct short circuit of the high voltage supply, a condenser is inserted in the lead from the plate to the inductance as shown in Fig. 4.

The series supply method consists of opening the plate circuit at some point and inserting the source of supply. This is the method commonly used in connecting a B battery to a receiving set. To obviate the

the negative charges will build up and maintain the grid at a high negative potential. If the leak is of low resistance, the charge will be allowed to leak off as fast as it builds up and the average potential will be near zero. For every tube there is a certain value of grid potential that gives best results. This is found by using the proper size of grid leak and condenser. The latter is usually fixed at about .002 microfarads and the grid leak varied until a

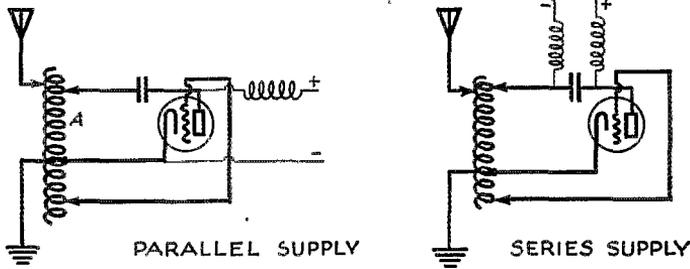


FIG. 4

necessity for the radio-frequency current in the plate circuit having to go back to the source of supply in order to complete the circuit, a by-pass condenser should be connected, at the set, across the high voltage terminals. To insure further that some of the radio frequency energy does not enter the supply wires, a radio frequency choke coil is placed in each high-voltage lead.

Of the two methods, the parallel supply method is generally the one to be preferred. When using the series method be sure that the positive side of the high voltage supply is not grounded, for if it is, the full plate potential will be impressed between the secondary and primary windings of the filament transformer with probably disastrous results.

The Grid Condenser and Grid Leak

In last month's article the action of the grid leak and grid condenser was explained, when used with a detector tube. The negative halves of the incoming oscillations build up a charge in the grid condenser, but the positive halves are prevented from doing so by the rectifying action of the tube. Between the groups of oscillations the charge is allowed to leak off through the grid leak. A brief review of the previous article will fix these facts firmly in mind.

In a continuously oscillating transmitting circuit the action is somewhat different because the oscillations do not come in groups. Here the purpose of the grid leak is to establish a certain average grid voltage and it does this by allowing part of the charge to leak from the condenser at each half oscillation. If the leak resistance is high

proper adjustment is found. A resistance of 5,000 ohms is about right for most tubes.

In some cases the results are best when the average grid voltage is zero. No grid leak or condenser will be required at all if that is the case. The other extreme case would be presented if the grid leak were omitted entirely. If this were done the negative charges would build up to such a high potential in the grid condenser that the plate current would be reduced to zero, oscillations would stop, and the tube would become "blocked." Advantage of this action is sometimes taken in sending code with a C.W. set. The key is connected in series with the grid leak. When the key is pressed the grid leak is connected and the tube oscillates. When the key is raised the grid becomes blocked and oscillations immediately cease.

The grid leak may be connected either across the grid condenser or directly from grid to filament. When the latter connection is used a radio frequency choke

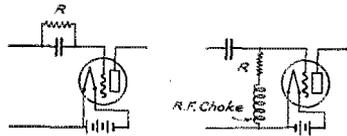
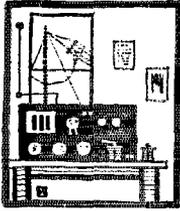


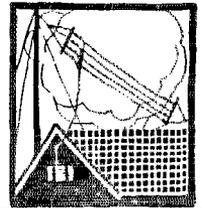
FIG. 5

should be connected in series with the leak resistance as shown in Figure 5. This choke coil prevents the radio frequency current in the grid circuit from following the grid-leak current from grid to filament. In the Colpitts circuit the leak cannot be con-

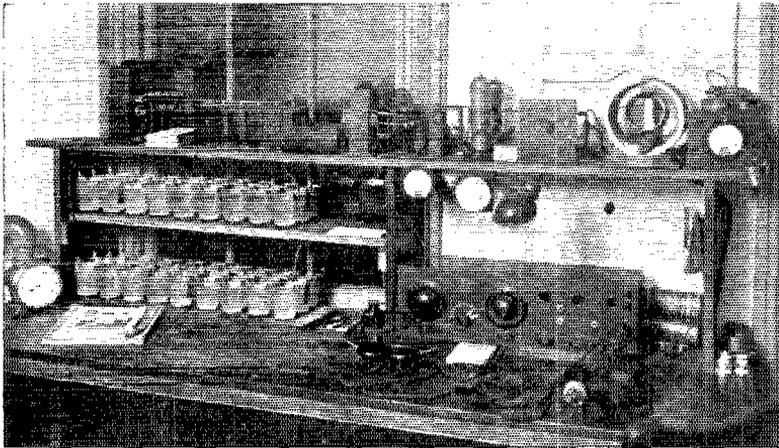
(Concluded on page 63)



Amateur Radio Stations



3SU, Washington, D. C.



During the past six months, relay stations in the National Capitol have had a hard time to keep pace with 3SU, the station of A. B. Chism, located at 3320 M Street, N.W., Washington, D. C. Only since the event of summer static and fading has 3SU's traffic fallen below the "500-msgs-per" mark, and Chism is still regarded as the "sleepless wonder."

Although 3SU has no remarkable distance records to its credit, the station has repeatedly shown its ability to get through almost everywhere at any time, having been heard in every district and worked all but the Sixth.

The antenna is a five-wire cage, 28 inches in diameter on bicycle rims, 65 feet long and 60 feet high in the form of an inverted "L." The lead-in is a five-wire fan, tapering to a width of four inches for the lower twenty feet of its length. Nine wires seven feet off the ground and 60 feet long constitute the counterpoise.

The station is exceptionally neat and well arranged. The transmitter, which uses two 50-watt tubes in a reversed feedback circuit, is mounted on a shelf above the

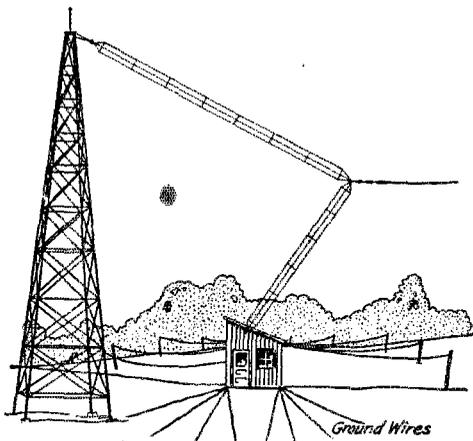
operating table with the power transformer to the left. The apparatus is then arranged progressively from left to right, ending with the antenna ammeter at the right hand end of the layout. A 56-jar chemical rectifier with borax solution in jelly glasses can be seen to the left of the receiver. Six one-microfarad condensers are connected across the output of the rectifier as smoothing condensers, succeeded by two radio frequency chokes, each made by winding 240 turns of No. 28 D.C.C. wire on an old dry-battery carton. The maximum antenna current with 1500 volts at the A.C. side of the rectifier is 5.6 amperes.

Two receiving antennas are used but the one of somewhat novel design most constantly used is a six turn "open-ended loop" wound on tacks on the station wall. This antenna is about ten feet square at the outside turns, the turns being spaced six inches. Results with this antenna are equal to, if not better than, those obtained with one wire 100 feet long strung outside. Several receivers have been in use at 3SU, but the present one, a conventional single circuit-detector-two step set, has given the best results.

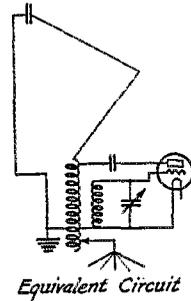
1ANA, Chatham, Mass.

No sooner had WNP, MacMillan's arctic exploration ship, started on its voyage northward in June than 1ANA, the station of Mr. R. B. Bourne at Chatham, Mass., rose to prominence by handling most of the press reports with WNP and outdoing most of the other stations who had planned to carry on this work. Mr. Bourne, who is a receiving engineer for the Radio Corpora-

tion of America, justly deserves recognition. Sticking on the job night after night copying lengthy press reports is more hard work than pleasure. Not only that but it takes a good station and a good operator to do what 1ANA did; to keep the MacMillan expedition in touch with the world via amateur radio.



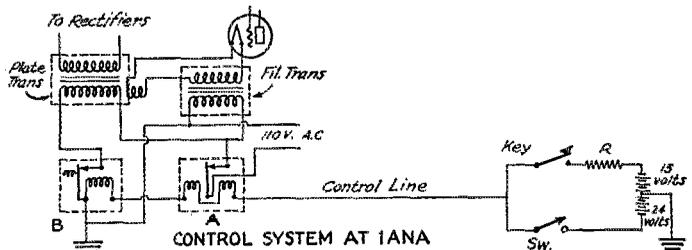
1ANA's ANTENNA SYSTEM



tion of America, justly deserves recognition. Sticking on the job night after night copying lengthy press reports is more hard work than pleasure. Not only that but it takes a good station and a good operator to do what 1ANA did; to keep the MacMillan expedition in touch with the world via amateur radio.

The station has several unusual and interesting features, one of which is the antenna system. The general arrangement can be inferred from the drawing. An eight-inch four-wire cage runs upward for 45 feet from the small house that shelters the transmitter. It then turns sharply to the left for 70 feet, forming the top section of an inverted "L" which is attached to a 100-foot steel tower. The queer part is that the set is grounded to the tower, among other things, which makes the antenna and tower a huge single-turn

loop, with the insulators at the top being the dielectric of the condenser in the loop circuit. A counterpoise and ground is used in addition as with an ordinary antenna. The ground wires run to the salt water bay, and the clip on the inductance is carefully located at the proper point. The total antenna resistance is 14 ohms of which 9 or 10 ohms is radiation resistance.



CONTROL SYSTEM AT 1ANA

The receiver that was used to copy press reports from WNP is a specially designed Reinartz with one stage of audio amplifica-

tion. The coil is wound in such a manner that the minimum wavelength on which it is possible to receive is 75 meters. General Radio .005 variable condensers are used for tuning and feedback. The receiving antenna is a single wire 30 feet high and 60 feet long. Unfortunately a photograph of the transmitter could not be taken because the apparatus is installed in a small house on the beach without windows and which is only

large enough to shelter the apparatus itself. A description only, therefore, must suffice. One 50-watt CG-1144 tube is used with a plate voltage of 1600, furnished through a Kenotron rectifier and partially filtered. The familiar reversed-feedback circuit is employed and the antenna is worked near its fundamental of 175 meters, the emitted wave being 185 meters. The usual antenna current is three amperes. Separate plate and filament transformers are used and, a compensating winding of two turns of wire on the core of the plate transformer, connected in series with the filament, keeps the filament voltage constant.

The transmitter is located several hundred feet from the receiving station and the set is controlled entirely by *one wire* with a ground return, allowing break-in operation. The connections are as shown in the diagram. A is a polarized relay (a relay that closes a circuit when a pulse of current travels through its windings in one direction, leaving that circuit closed until it is opened by a pulse of current through the windings in the opposite direction). B is a relay key, opening and closing the primary circuit of the plate transformer in accordance with the transmitted signals.

The action is as follows. At the first press of the transmitting key both relays are closed, thus heating the filaments of the tubes and applying the plate voltage *as soon as the filaments are heated.** After the first pulse relay A remains closed but B opens. Keying is then accomplished in the regular manner. When the transmission is finished the set may be shut down by pressing the strap key S once. This puts a pulse of current over the line in the opposite direction which opens the contacts of the polarized relay that controls the power supply.

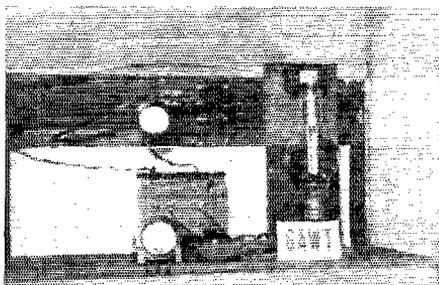
Since writing this we have learned that 1ANA has been dismantled because of Mr. Bourne's being transferred to Marion, Mass. Nevertheless, the station has made history and will be remembered for the good work it did in communicating with WNP during the early stages of the Bowdoin's voyage.

*This is an automatic safety feature of Kenotron rectification. Using any other rectifier the plate and filament current will both be thrown on the oscillator tube at the same time when the key is first pressed and both relays are closed. Some means must be taken to prevent this when Kenotrons are not used for if the filament is not heated before the plate voltage is applied, a momentary but heavy strain on the tube results.

6AWT, San Francisco, Calif.

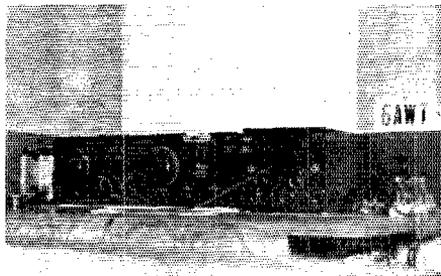
Did it ever occur to you how nearly every large city has some one amateur station that, because of its power and consistent long distance work, becomes unconsciously associated with it in the minds of us amateurs? Mention Los Angeles to a radio amateur and he immediately thinks of 6KA. With Minneapolis it is 9ZT. With New York it is either 2OM or 2FP and with Chicago, old 9ZN. Mention San Francisco and it's 6AWT, the station we are now telling about.

The first transmitter at 6AWT was put



into operation in August, 1921, at 653 Union Street, the location of the present station. From that day on B. Molinari, the owner, has steadily improved his station. The four five-watt tubes soon gave way to

a larger set and several arrangements were tried with increasing success. The present transmitter was installed in March of this year and, within a week and a half afterwards, it had been reported heard in all districts, and stations in all but the first, second, and third districts had been worked.



At this writing 6AWT has been heard in 41 states, all districts, all Canadian provinces except two, in Hawaii, Cuba, China, Alaska, Mexico, Panama, and several times by ships at sea over 4,000 miles from San Francisco. During the May transpacific tests 6AWT was one of the loudest stations to be reported in New Zealand and was heard in Australia.

The transmitter, as can be seen in the photograph, is simple but effective. It em-

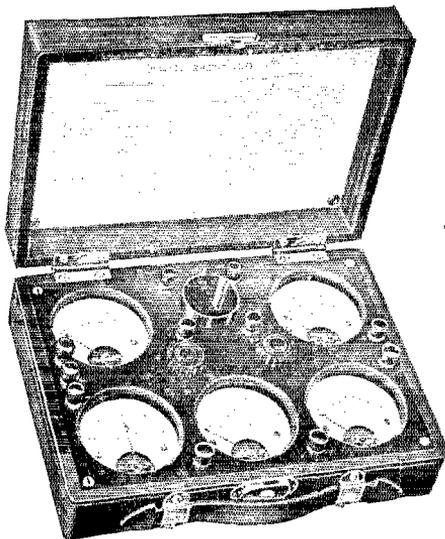
ploys one 250-watt tube in a Hartley circuit with parallel supply. The plate transformer supplies 2500 volts A.C. which is rectified by a 120-jar chemical rectifier and applied to the tube. The grid leak, grid condenser, and radio frequency choke coils are mounted behind the panel supporting the tube. A normal antenna current of from 14 to 16 amperes is obtained.

Power is supplied the station at 220 volts with a three-wire system. The filament transformer is operated from one side and the plate transformer from the other, thus doing away with any change in the heat of the filament when the key is pressed.

A nine-wire conical cage, 80 feet high at the free end and 55 feet at the near end, constitutes the upper part of the antenna. This section is 40 feet long and tapers from four feet in diameter to two feet. The lead-in is also a conical cage, tapering from 1½ feet in diameter at the upper end to three inches at the entering insulator. It is 55 feet long. The spreader hoops in the top section of the antenna are of ¾ inch copper tubing and those in the lead-in are made of ⅝ inch tubing. A fan counter-poise of 50 wires, covering an area of 1000 square feet, is suspended below the antenna, ten feet above the ground.

The receiver is a Grebe CR-8 with a home-made two-stage audio amplifier. A Western Electric power amplifier and loud speaker are used to make DX signals "very QSA." Needless to say, all districts have been heard. Traffic is handled mostly on one stage of audio with Baldy phones.

slope, which means they will make good amplifiers. "Soft" or gas-content tubes will show an irregular curve, sometimes with a very sudden increase in the plate current for a small increment of grid voltage. These sudden changes are due to gas ionization and it is at these irregular points that we get the marked sensitivity of a critical detector tube. Detector tubes may be compared in this respect if desired and the best tube for critical detection will be the one with the most sudden increase in plate current at one of these irregular spots.



The Radio Test Set

VACUUM TUBE CHARACTERISTICS

(Continued from page 34)

Mutual Conductance

The mutual conductance in micro-mhos is 1,000 times the slope of this curve, the slope being taken in terms of plate milliamperes and grid volts. In the diagram above the grid voltage is taken with respect to the negative end of the filament; if the tube is actually going to be worked with still more negative grid potential the slope should be figured at that point corresponding to the actual grid voltage with respect to the negative end of the filament. As to actual values, the mutual conductance will vary from 200 in the case of the older tubes, to as high as 700 for the more recent amplifying tubes, and several times this for the tubes used in power amplifiers for loud speakers. The slope of the above curve at 0 grid potential is .6, and the mutual conductance is, therefore, 600 micro-mhos. (See Fig. 3 for method).

Gas Tubes

If a number of curves are taken on different tubes, it will be noted that "hard" tubes show a comparatively straight line

Amplifier Tubes

Going back to the amplifier tubes, the amount of negative grid potential advisable for use on the higher voltages may be readily seen. Negative grid potential should be applied to work the tube at the lowest portion of the straight-line slope of the curve. Too much negative grid potential will cause the tube to work on the lower knee of the curve and distortion would result; work with just a little less negative grid voltage, and maximum results will be obtained.

Among other things that are gained by using the proper negative grid potential will be a materially reduced current draw on the plate batteries and a correspondingly reduced IR drop in the external circuit.

To get the other constants of the tube, it is necessary to take an additional reading at a slightly different value of plate potential and using the normal value of grid potential with which the tube will be worked. This second value of plate potential should not differ by more than a few

(Concluded on page 63)



Teaching the Code at WSB

Veteran Amateur Club Uses Atlanta Journal Auditorium to Instruct Advanced BCL's

A NEW phrase has been coined among amateurs ever since the Chicago Convention when some of our southern friends showed their admiration for the League by a most unusual gift. "Live as an alligator" is the term referred to in connection with the East Gulf Division. This may have grown out of an inspection of the antics of one of these creatures in a bath-tub at the Edgewater Beach Hotel, or the speed in which it was removed to the local zoo when Assistant Manager Thomas discovered its presence. All this is aside from the question except to point out that "alligator" is by popular vote demonstrative of the spirit and punch which has been developed in this division, thru Henry J. Reid, Manager. Look, for example, at the code school established by the Atlanta Radio Club with the approval of Station WSB, the Atlanta Journal.

For a long time there has been discussed at Headquarters the advisability of starting a series of stations thruout the country with the avowed object of teaching the International Morse code. Our President, Mr. Maxim, was one of the first to see the advantages of this and for several months he carried on the instruction at 1AW. This you will understand was simply a trial to discover whether the public was really interested in such a course. Letters testified that they were. Useful as it might be, there were many things which made the scheme impractical for national adoption and it was laid on the table until such time as the expense and general League policy justified the action.

Meanwhile our friend the alligator down in Atlanta was snapping his jaws impatiently with the result that on September 2nd the *Atlanta Journal* announced in an eight column headline that a "Free Radio School for Public Will Open Wednesday," operated by the Atlanta Radio Club. Not only is the code being taught but, thru the courtesy of this newspaper in offering the use of their broadcast auditorium, the school is endeavoring to give instruction in all branches of radio includ-

ing principles of transmission and reception, the building and operation of transmitters and receivers, and other features covering the theory and practice.

"There will be a 'question and answers department'", to quote *The Journal*, "for the solving of any difficulty encountered by veteran amateurs, advance broadcast listeners or novice crystal setters. There will be demonstrations of transmitting and reception. Dr. McIntosh Burns, president of the Atlanta Radio Club, will preside at the first session. Any Atlantian wishing to take advantage of the course is invited to be present. No formal application is necessary. The auditorium is on the fifth floor of The Journal building where WSB's equipment and studio are located.

"The institution is doubtless the first of its type established in the United States. It is warmly endorsed by Captain Walter Van Nostrand, U. S. radio supervisor for the Southeast who will play an active part in serving as one of the expert instructors. Aside from WSB's equipment, the Atlanta Radio Club will install apparatus needed for teaching the wireless code, the language of dots and dashes used by wireless operators thruout the world. Altho the radio public is not generally acquainted with the fact, there are numerous efficient amateur radio telegraph and telephone sets in daily and nightly operation in the city. These stations communicate with one another on a low wave length and with power that makes the message in the air inaudible to a majority of receiving sets.

"According to Dr. Burns, Captain Van Nostrand, and other leaders of the project, the new school is capable of accomplishing wonders in promoting the welfare of the radio public thru eliminating undesirable conditions caused by misunderstanding or lack of technical knowledge."

Surely all amateurs who appreciate what this means to the radio fans in Atlanta will compliment The Journal for its co-operation and officers of the Atlanta Radio Club for their enterprise.

—J.K.B.



To our foreign members:

This is your department of QST. The A.R.R.L. wants you to contribute news, photographs, and other information relating to amateur radio in your country at any time. Amateur radio is world-wide in its scope. Your co-operation is needed to help make this department a meeting place where amateurs from all countries can exchange ideas to their mutual benefit. It is not exactly necessary that your letters be in English, although it is desirable, for we can translate them without trouble if written in a foreign language.

Get the A.R.R.L. spirit and write us today!

New Zealanders Turning to Short Waves

The advantages of short wave transmission are shown by the results of some tests recently conducted by two New Zealand amateurs and described by Mr. R. J. Orbell, New Zealand 3AA, in *New Zealand Wireless and Broadcasting News*.

"Official licenses are in the process of being granted to New Zealand amateurs and they are turning their attention to getting their transmitters down to the band between 140 and 200 meters.

"In this connection the results of some two-way tests between Mr. F. D. Bell and myself are of interest. The distance between the two stations is approximately 150 miles. The wave length allotted to my station was 175 meters but permission was obtained for the use of 200 meters for some special tests. Mr. Bell tested on several different waves in order to discover what difference, if any, resulted in his signal strength at my end on the various adjustments.

"Tests were first conducted on 265 meters, then 205, 180, 160, 150, 140, 135, and finally 130 meters. The input to Mr. Bell's transmitter remained practically constant at 40 watts throughout the various wavelength changes. To our surprise (not to mention relief) it was found that the signal strength and modulation actually increased greatly as the wave became

shorter, the speech on 135 to 150 meters being too loud for comfort in the head receivers. The strength on 135 meters was quite three times that on 265 meters.

"The interesting part, however, is the fact that Mr. Bell's antenna current fell from 1.3 amperes on the longer wave to only .5 ampere on 130 meters and yet the strength of signals increased. These results show that the antenna current is not a reliable indication of the power when wave length changes are made. The increase in strength cannot be attributed to decreasing capacity in the receiver secondary, because my tuning alterations were done with inductance, the capacity being very small throughout, just sufficient for fine tuning, the maximum capacity of my secondary condenser being .0002 microfarads. The natural wavelength of Mr. Bell's antenna was 135 meters."

Broadcasting Conditions Becoming More Unsettled in England

When broadcasting entered England over a year ago, every precaution was taken to inaugurate a system that would prevent a recurrence of the chaotic conditions that existed in this country at the inception of broadcasting. The British Broadcasting Company, abbreviated B.B.C., was formed and given a monopoly in broadcasting. Only sets built by the authorized manufacturers and stamped with the letters B.B.C., indicating the payment of a tax, could be sold. In addition to this tax on each set, the broadcasting company received one half of the license fee paid the government for the receiving license. All of the sets sold were non-regenerative and covered only the band of wavelengths used by the English broadcasting stations. No foreign apparatus was permitted to enter the country. In return for the above monopoly, the British Broadcasting Company built about eight broadcasting stations and furnished the programs.

During the past year there has been tremendous opposition to the B.B.C. from every quarter. Thousands of experimenters have built their own sets and evaded the payment of the tax. Indeed, it has now come to the point where the government has entered the argument and is

conducting an inquiry into the whole subject of broadcasting. The franchise of the British Broadcasting Company expires at the end of next year and it is believed that in return for the extension of the monopoly the government will require the waiving of the objectionable parts of the present agreement between themselves and the British Broadcasting Company. If this happens, the present prohibition of non-regenerative sets will cease and any type of set can be manufactured and sold. Obviously this unsettled condition of things puts the manufacturers in a quandary, for they are entirely unable to make plans for the future.

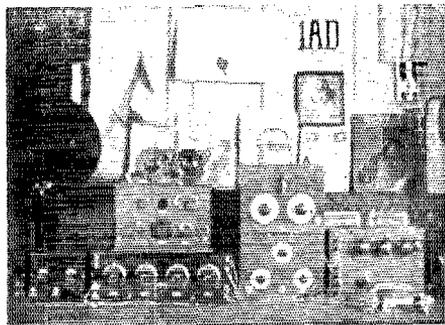
At this time all England is awaiting the report of the investigating committee, and it looks as though the final outcome will be that broadcasting will be carried on in much the same manner as it is now in this country.

English amateurs are going to run the Australians and New Zealanders a close race for the honors in receiving American amateurs this winter. As a starter, just cast your eyes over the splendid lists of signals heard in England that appear in the Calls Heard Department of this issue!

French SAE, described in the August QST is not really SAE, but is SAE, (accented E). This is sent; ----- .. .

PHILIPPINE 1AD

Another part of the world heard from! Edward Martin, 668 M. H. del Pilar, Manila, Philippine Islands, is receiving signals from the U. S. A. and is installing



Philippine 1AD

a transmitter employing two Marconi 110-watt (input) MT-1 tubes with which he expects to be in communication with Honolulu and Australia this winter!

His station, 1AD, was one of the first amateur stations in the island. Several kinds of receiving equipment can be seen in

the picture, as the main interest until now has been in that direction. Upon learning of the success of the recent Transpacific Tests, Mr. Martin and other members of the "Amateur Radio Club of the Philippines" became imbued with great enthusiasm at the prospect of themselves being able to participate in future tests.

Mr. Martin also operates a twenty-watt C.W. and phone station for the Pacific Commercial Co., under the call 1AV. This set has been heard by many ships far out at sea.

He would appreciate letters from the gang, especially from fellows who would like to arrange tests or "chew the fat." The address given above will reach him.

"Code Boom" on in Argentina

Interest in C.W. telegraphy in the South American countries is increasing by leaps and bounds, according to a letter received from Mr. P. I. Acuna of the *Revista Telegraphica*, a Buenos Aires radio magazine. Formerly all transmission was by voice, but upon learning that if any real long distance work to this country was to be done they must turn to telegraphy, many of the amateurs began the study of the code. The governmental radio commission has proposed some new radio regulations which, if adopted, will require a knowledge of the code before a permit to transmit is granted. This is also responsible for the sudden interest in the code. We are pleased to see that Argentine amateurs have similar tastes to ours, as many articles on amateur transmission from the past issues of QST appear in Spanish in the South American radio magazines.

Vacuum tubes of almost any kind, including French, German, Dutch, English, and American, can be obtained in Argentina for prices which, in our money, range from \$1.85 up. The favorite tube for transmission is the Telefunken (German) tube called the RS, 5-10 watts (output).

Many stations are covering good distances with low powered phone sets. Several of the Buenos Aires amateurs have been heard in Valparaiso, Chile, a distance of 850 miles, crossing the Andes mountains, which are very high and rugged. Home-made apparatus is much in evidence, as parts are cheap because of the competition between the various foreign manufacturers.

Mr. F. D. Bell, of New Zealand, owner of the "best amateur receiving station in the whole world," wants to remind the gang of the difference in time between his country and the U. S. This has caused much confusion in checking up the time and dates on which calls have been heard. New Zealand time is 4½ hours behind Pacific Time, only on the next day. This

means that 11 P.M. on Thursday the 11th in Los Angeles would be 6:30 P.M. on Friday the 12th in New Zealand. Another way of getting at this is that New Zealand time is $11\frac{1}{2}$ hours ahead of G.M.T. whereas our time varies from five to eight hours behind G.M.T.

VACUUM TUBE CHARACTERISTICS

(Concluded from page 59)

volts from the original value, as a large difference will give a distorted value to the constants.

Plate Resistance

Having taken the value of plate milliamperes for a different value of plate potential, we can get our plate resistance (or output impedance in the case of audio-frequency amplifiers) by dividing the change in plate voltage by the change in plate amperes; that is, if we take the new value at 10 volts less plate voltage and have a current draw of .0008 amperes less, our plate resistance is 12,500 ohms. Theory and practice both tell us that for maximum efficiency the plate circuit should feed into a circuit having approximately the same impedance as the internal plate impedance. At audio frequency this is equal to plate resistance, which simply means that the impedance of the primary of the audio-frequency transformer at average voice frequency (800 cycles) ought to equal the plate resistance of the tube which feeds into it.

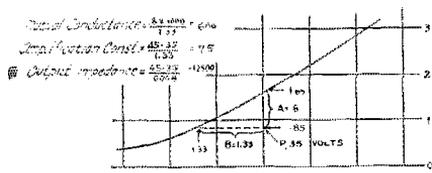
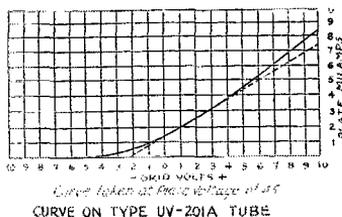
Amplification Constant

The amplification constant is defined as the ratio of the change in grid voltage to the change in plate voltage which will produce the same change in plate current. In the above example a 10-volt change in plate voltage changed the plate current .8 of a milliampere. By referring to the curve, it will be noted that it will require 1.33 volts change on the grid to give this same change in plate current. The amplification constant then is 10 divided by 1.33 or 7.5.

These three values, the mutual conductance, the plate resistance and the amplification constant, are the three primary characteristics of a vacuum tube; many other constants are obtainable, but they are of less common importance and will not be mentioned here. Other curves, however, are very interesting and may be plotted between filament current and filament voltage, this curve showing a vast difference between tungsten and coated platinum filaments. The variation of plate current with filament voltage will also show a very marked difference between coated filaments which emit electrons in copious quantities and the plain tungsten filaments which have

to be forced fairly high to give saturation. The variation of plate current with plate voltage will show the possibilities of plate voltage increase such as used in the last stages of amplifiers.

All of us are studying circuits to a considerable extent, and our literature shows



Enlarged portion of Curve showing method of obtaining constants
FIG. 3

this tendency. It is believed that a more intensive study of the vacuum tube is entirely possible and that with a better knowledge of the relations of the various electrical quantities concerned with a tube, we can build better and more efficient apparatus.

WHO'S WHO

(Concluded from page 47)

E.I. Co. 1,000 ohm single pole receiver." Thus armed, plus the usual array of Meccano, a ford coil, and other junk, he began to build what is now 9BXQ.

The present set includes a fifty-watt transmitter, a 75-foot mast, and a receiving set that is subject to change without notice. His chief joy is to get a card from the first or third district. His chief bore in life is getting cards from the sixth. As chief news man for the A.R.R.L. in the Rocky Mountain Division he fills the position in an able manner and puts forth the truth about the ham and the League.

THE JUNIOR OPERATOR

(Concluded from page 55)

nected across the condenser because the variable condenser used for coupling will prevent the charge from leaking to the filament. Otherwise, there is little to choose between the two arrangements. The best way is to try both of them and see which gives the best results.

Strays



At the Chi convention a cop stopped 9CA and asked him what all the big signs, badges, and fuss was about. "Big A.R.R.L. convention," replied 9CA, "and there's a ham here all the way from France."
"The h--l yez say," quoth the cop, "and are there any here from Ireland?"

Fifth District Hams Take Notice

Say! you fifth district "static eaters!" Since everybody now-a-days seems to be having a convention, what say if we have one for our district at, say, New Orleans, or some other place that is centrally located? If interested, drop a line to Thomas S. Lynch, Secy-Treas. of the Mobile Radio Club, 762 Washington Ave., Mobile, Ala.

Reverend John W. Chapman, of Anvik, Alaska, whom the League helped to get together a 50-watt set, is now installing the apparatus at his mission and will probably be on the air any night. The operators of the Army stations at Nulato and Holy Cross are helping him and, as the latter station with 50 watts has been QSO Can. 9BP and others, we ought to be passing traffic into the interior of Alaska at any time now. Dr. Chapman's call and wave are not known but will be announced soon. He'll be around 200 somewhere, though.

The sad news of the death of Sidney Winston, 2CIM, of the Bronx, New York, came as a shock to all of us. While swimming at City Island on the afternoon of Labor Day, he was seized with a severe attack of cramps and, despite the frantic efforts of Nathan Scholl, 2AQQ, with whom he was bathing, went down.

Winston was only nineteen and one of the best liked radio men in the Bronx. He was an active member of the Bronx Radio Club, and a charter member. His unseen friends, from Canada to Cuba, will mourn his passing and miss his call from the air.

Aha! The Truth Will Out!

Say, you doubting Thomases at the Convention banquet! Do you really want to know what was on that card Charlie Service had? Well, here's the dope. It didn't blow away or anything of the kind; it was bought by a fellow not 20,000 miles from Chicago who said he needed it in his business, whatever that might be. Although he made me promise not to tell his name, you don't have to burst a blood vessel guessing. I can't read much French, but as near as I could make out, here's what it said:

"I don't belong to the A.R.R.L.

I don't believe in Radio.

Before I see myself a ham

I'll see myself in Hadio."

However, I may be all wrong and if you want to make sure, go after the fellow who has the card now—but pack a mean wouff-hong and keep on the safe side.

—C.A.S., 1CKP's "CS"

When the eclipse of the sun cut its path across lower California recently, astronomers at the temporary observatory on Catalina Island used the time signals from NPG, San Francisco, received via 6XAD-6ZW, to check their chronometers. About a dozen chronometers were parked for several days at Mr. Mott's station where they were checked with the time signals each noon. Just prior to the time of the eclipse the telephone company ran wires from the radio station to the temporary observatory that had been erected on a high hill five miles away. The output of the Western Electric power amplifier was fed into these wires and the signals were clearly heard at the observing station.

And then heavy clouds completely ruined the whole plans!

Amateur radio is growing fast and the problem of measuring the distance between two points on the globe is one that has many of us guessing. The simplest and best solution is to go to a school supply store and obtain one of the small globes six or eight inches in diameter that are used for class room demonstrations. It will give you a much better idea of the relative distances than a map drawn on Mercator's projection.

After you have measured the distance between the two places you desire to know, with a piece of string on the surface of the globe, place the string on the equator and gage the distance in degrees on the equator. There are 60 nautical miles, or a fraction under 70 statute miles, to a degree.

Polar News Broadcast

At midnight Central Standard time of each Wednesday, there will be sent from 9XN on 448 meters a special MacMillan Polar Expedition broadcast, and an attempt made to communicate with MacMillan's station WNP. Transmission will be on voice from 9XN and with the usual 500-cycle tube set from WNP. 9XN is located in the old 9ZN shack at 5525 Sheridan Road, Chicago, and is heard earlier in the evening as WJAZ, Zenith Broadcast Station.

Correcting an Oversight

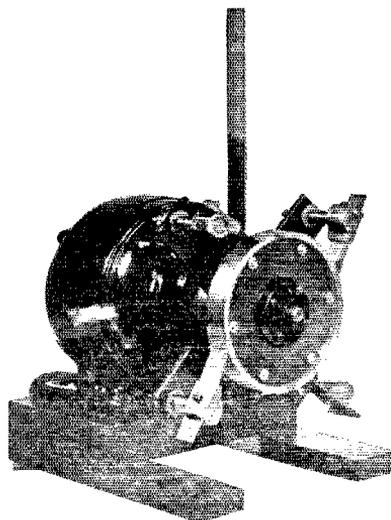
In the advertisement of the Unity Manufacturing Co., appearing in the September issue of this magazine, the word "Chicago" was omitted in the signature address. We have received many requests for the address of this company, and to those who wish further particulars of their rheostats, we refer you to their advertisement on page 83. Both the Unity Vernier and Unity Cartridge Rheostats have aroused considerable comment and interest among radio enthusiasts. Both instruments are very practical and convenient.

One of the many prizes that excited considerable comment from the gang at the Chicago Convention was the Stahl Synchronous Rectifier, pictured below. This rectifier will handle up to 5,000 volts and the brushes will safely carry one ampere, although it is not recommended that high voltage and heavy current be used at the same time. A good rating is $\frac{1}{2}$ ampere at 5,000 volts. It will therefore surely fill all requirements in rectifying the plate supply for any of our stations.

The insulation between the segments is mica and tests show that it stands up fine. This allows the use of laminated copper brushes and does away with the awful rattle that would occur if the brushes had to jump in air from one segment to the other. An extra long handle projecting at the top enables the operator to shift the position of the four brushes without danger to himself. The brush rigging is rigidly constructed and easily handled. The same motor can be fitted with a smaller disc and the rectifier used for charging storage batteries if desired. When thus equipped it will handle fifteen amperes without a sign of sparking.

Another piece of apparatus that should find its place in many stations is the Leyden jar condenser manufactured by the same company for ozone discharger work. When

used for that purpose it is plated only on the inside and is encased in an aluminum jacket with about a thousand points against the glass. The bush discharge takes place at these points and gives off ozone. The condenser stands this treatment continuously and thrives on it. When used as



radio condensers they are of course plated on both sides.

The jar is two inches in diameter, ten and one quarter inches long, and has a capacity of .00019 microfarads. One is used as the antenna series condenser at 9AAW and the five amperes of radio frequency current that pass through it do not warm it in the least. One of them makes a nice series condenser for a big tube and several in parallel make a plate blocking condenser that will not puncture.

The Stahl Rectifier Co., 1455-1459 W. Congress St., Chicago, will be glad to tell you more about these two pieces of amateur transmitting apparatus.

COMMUNICATIONS

(Concluded from page 51)

purpose, however, and our organization continues to "promote two things..... the science for the development of which it was founded, and the fraternalism of its members. One without the other would not justify our existence."

Inquiries may be addressed to the National Secretary, Cedar Rapids, Iowa.

Very truly yours,

C. Leonard Albright,
Secretary, Alpha Chapter.
By H. N. Misenheimer,
Master of Ceremonies,
Alpha Chapter.

Calls Heard



Another Change

At the meeting of the Division Managers in Chicago during the recent Convention, it was decided that too big a step was being taken in limiting Calls Heard to those only over 1,000 miles distant; that it would be better to try and publish calls over 500 miles from a station. Accordingly, this will be our policy, beginning as soon as possible.

Because of the immense number of good lists being received it is absolutely necessary that you have your lists in proper form so we can send them direct to the printer without delay in re-copying them. Please observe the following when preparing your list for QST:

1. List the calls on a separate sheet of paper; *do not embody them in a letter.*
2. Arrange the calls as they will appear in QST: across the page, numerically by districts, alphabetically in each district, Canadian and foreign calls listed separately, state whether spark or C.W., and give period of time covered by the list.
3. Forms close on the fifth of the month preceding the date of issue of QST. Make you lists cover the period from the first of one month to the first of the next if possible, but don't let your list come in late.
4. List only calls over 500 miles distant.

HEARD DURING SEPTEMBER Unless Otherwise Specified

Heard by 5ZL at Sea

Aug. 13th, 940 mi. E. N.Y.: 1ACF, 1ADN, 1AUR, 2ADT, 2BIR, 2CLU, 2CQN, 3BG, 3GC, 3SU, 3ZO, 3BUC, 4BY, 5MN, 8GZ, 8VE, 8VQ, 8YZ, 8ZZ, 8AMB, 8AXN, 8APY, 8BNO, 8BCL, 8CKV, 9UC, 9AJH, 9AWK, 9CHE, 9CTV, 9DCR.

Aug. 14th, 1155 mi. E. N.Y.: 1FB, 1FM, 1IV, 1ACU, 1GAB, 1CDM, 1CMP, 2ACD, 2BRC, 2CEI, 2CJP, 2CQN, 2CQZ, 2CXL, 3FS, 3GC, 3RNU, 3BVL, 3NB, 3VQ, 3ZZ, 3AMM, 3BFH, 3BNO, 3CSJ, Can. 2BN, 3BP, 3CO.

Aug. 15th, 1430 mi. E. N.Y.: 1KV, 1ABS, 1ALJ, 1AJP, 1ANA, 1AMF, 1BBO, 1BCG, 1BES, 1BKQ, 1CMP, 2IW, 2KR, 2WR, 2AJW, 2BRB, 2BYC, 2CEI, 2CJI, 2CIM, 2CPD, 2CPK, 2CUI, 3AB, 3FS, 3IW, 3JJ, 3WF, 3AUR, 3BVA, 3AMA, 3HV, 3UE, 3VQ, 3AMP, 3AWP, 3APN, 3BCL, 3BDU, 3BNP, 3BFS, 3BFH, Can. 3BP, 3IA.

Aug. 16th, 1665 mi. E. N.Y.: 1ZE, 1AJP, 1ANA, 1BBO, 1CKP, 2WR, 2AFP, 2CEI, 2CUI, 2COW, 3JJ, 3BVV, 4GL, 8FM, 8AIO, 8AQO, 8APY, 8AWP, 8BFH, 9AWW, Can. 3BN, 3BP, 3XN, WVV.

Aug. 17th, 1788 mi. E. N.Y.: 1ER, 1FB, 1RR, 1ABS, 1ANA, 1AMF, 1CDM, 2BRC, 2BUM, 2CIM, 3HH, 3BVA, 3HV, 3JU, 3AOL, 3AMM, 3BCL, 3BHF, Can. 1AR, 2BN.

Aug. 18th, 1853 mi. E. N.Y.: 1GV, 1RR, 1UJ, 1ZE, 1ABS, 1ANA, 1AMF, 1BBO, 1CCZ, 1CDM,

1CQL, 1CMP, 1CMX, 2RB, 2AFP, 2AJA, 2ANA, 2BRC, 2BYC, 2CUR, 2CEI, 3BG, 3KM, 3IW, 3VO, 3ZO, 3BUC, 3CBM, 4MB, 8TC, 8VQ, 8BNO, 8AMM, 8BFH, 8CEI, 9MC, 9ZT, 9AIM, 9CCS, 9DDN, Can. 1AR, 2BN.

Aug. 19th, 770 mi. W. Lizard's Pt., England: 1JQ, 1FM, 1ABS, 1ANA, 1AJP, 1ASI, 1BBO, 1BDM, 1CKP, 1CPO, 1CMX, 2EL, 2PD, 2WR, 2BRC, 2BSC, 2BNU?, 2CQZ, 2CUI, 3FS, 3VO, 3ZO, 3AWH, 3AWS, 3APN, 3RNU, 3BVA, 4GL, 5GM, 8GZ, 8VT, 8YV, 8AVL, 8AMM, 8AFD, 8BCL, 8BPN, 8CDG, 9IG, 9MC, 9VL, 9ZG, 9AIM, 9AJH, 9BMU, 9BYE, 9CVC, 9CVS, 9AJA, 9AAW.

Aug. 20th, 550 mi. W. Lizards Pt., England: 1AJX, 1BES, 1BFS, 1BWJ, 1CDM, 2LV, 2AGB, 2BCB, 2BOL, 2CEI, 2CBC, 2CIM, 3AV, 3BG, 3CC, 3AB, 3JJ, 3ZO, 3AWH, 3BFU, 4GL, 3HV, 3KG, 3VT, 3AXN, 3BCL, 3BIS, 3BPN, 3BTM, 3UC, 3AAU, 3AMB, 3AWK, 3AWS, 3CFY, Can. 3DS, 3BP, AN6.

Heard at Sea by "FK"

Sept. 14th, 1,000 mi. W. of Lands End, England: 1ACU, 1BGC, 1CRW, 1GV, 1FM, 2AH, 2BQU, 2CFD, 2WA, 3AB, 3BP, 4FT, 4JG, 4XJ, 5NJ, 8APY, 8AWP, 9CVS, British: 6NI (Liverpool).

Sept. 15th, 750 mi. W. Lands End: 1BDV, 1CKP, 1CQO, 1IL, 2BZV, 2CQZ, 3JY, 3ZO, 3BV, 3WA, 3ZO, Canadian: 1AR.

Sept. 16th, 475 mi. W. Lands End: 1CMP, 2AGB, 2CFB, 3AHP, 3ED, 3SU, 3ZO, 4GX, 8AWP, 8CTP, 8EP, 8VT, 8ZO, Canadian: 1AR.

Sept. 17th, 225 mi. W. Lands End: 1AJA, 1BKQ, 1BWJ, 1FB, 1MY, 1OW, 1RR, 2AB, 2AGB, 2BQU, 2RS, 3KO, 3ZO, 4BY, 8ADG, 8AHD, 8AWP, 8BBI, 8BCG, 8HV, 8KG, 8UF, 8VQ, 8ZZ, 9OX, 9EKF, Canadians: 3CO, 3HE, Dalite (early A.M.); 1FB, 2RS, 2AGB, 3VQ, 9EKF.

Sept. 18th, 50 mi. E. Lands End, (in English Channel), French: 8BM, 8CM, U.S.: 2AGB, 2CCX I.C.W., 2RS I.C.W., 3ZO, 8APY, Canadian: 2AM.

Sept. 19th, 75 mi. S. London: 1CMX, 1BBO, 1FB, 2EL, 2KF, 2RS, 2WA, 3AB, 3IW, 3MO, 3ZO, 3LR, 3BCP, 3CTP, 3HV, 3UF, 3ZZ, Canadian: 1AR, 3BP.

W! qsl queries rdgst abv if rdgst bi crd. Adx-Kecfe, Box 380, Galveston, Tex. 738.

S. S. W. D. Anderson at Sea

Aug. 30, 1450 mi. E. Cape May, N. J.: 1ABS, 1CMX, 2AFP, 2AGB, 2BNZ, 2CJP, 2CJR, 3AHP, 3AGJ, 3ACN, 3GZ, 3ZL, 3ZZ, 3BTL, 9IG, 9QR, 9ZY, Can.: 2BN, 2CG.

Aug. 31, 1100 mi. E. Cape May, N. J.: 1ABS, 1ACU, 1AJP, 1CRW, 1OJ, 2AFP, 2NBZ, 2BMR, 2CUS, 2BN, 3AHP, 3AHW, 3GK, 3ZO, 3ACN, 3BNO, 3CDD, 3GZ, 3ZAE, 3ZZ, Can. 3BP, 2BN.

Sept. 1, 875 mi. E. Cape May, N. J.: 1ABS, 1ACU, 1ADN, 1AIG, 1AUR, 1CMX, 1CMK, 1CTP, 1EZ, 1JQ, 1KX, 2AAR, 2AFP, 2BMR, 2CBG, 2CPH, 2CUS, 2EA, 2PV, 3AUG, 3BGT, 3BOF, 3BSC, 3XN, 2BN.

3BUC, 3BVA, 3CEJ, 3CHG, 5EK, 3ABX, 3AWP, 3BCL, 3CNW, 3GZ, 3PD, 3UP, 3ZZ, 9ZT, Can. 3DS.

Above heard on one tube.
QSL to R. W. Barrington, 3KW, Merchantville N. J.

G. W. Williams, 2JF,

9 South Castle St., Liverpool, England

Sept. 23rd: 1AW, 1ER, 1ZE, 1BCF, 1BCU, 1BWJ, 1CMX, 1CMY, 1CPN, Can. 1AR, 2AH, 2KK, 2AGB, 2BMR, 2BQH, 2BRB, 2BSC, 2CCX, 2CEI, 2CXL, 3MO, 3AAG, 3AFS, 4UQ?, 5AMA, 8AH, 8FS, 8GZ, 8HV, 8SP, 8TT, 8AIR, 8KZ, 8BZC, 8CKO, 8CJL, Heard at 25Z: 1UH, 1BCF, 1BSC, 1BWT, 1OMS,

2AH, 2FM, 2WA, 2AGB, 2BQH, 2BQK, 2BLH, 3AB, 3ALN, 5NN, 8GZ, 8HU, 8HV, 8FR, 8CKO.

F. L. Hogg, 2SH,

37 Bishop's Rd., Highgate, London, England

Sept. 18th and 21st: 1CMP, 1CMY, 1CPN, 1CRW, 1CVS, 2AGB, 2AJF, 2ARF, 2BP, 2CCX, 2RB, 4FT, 6BN, 8EXH, 8UF, 8ZO.

Above calls heard on one stage R.F. and detector tube. Please listen for me on Friday Evenings, 1 K.W. of C.W. around 200 meters.

A. G. Davies, 2PC,

Redcot, Park Road, Timperley, Cheshire, England

Sept. 7th: 1ANA, 1BCG, 1BWJ, 1CBM, 2BRB, Can. 1AR, 3IW, 3BY, 4FB, 4BNI, 4FT.

Sept. 16th: 1ACQ, 3BFU, 8ZZ, 1ZE.

Sept. 23rd: 1AW, 1GV, 1PA, 1PW, 1UH, 1OL, 1BCF, 1BWJ, 1BSJ, 1CPN, 1CMX, 1LLN, 1PUS, 2AH, 2WA, 2KK, 2BMR, 2BQH, 2CXL, 3AB, 3SU, 3BDO, 3BQH, 3AA, 3GZ, 3OL, 3HV, 3SP, 3AIB, 3BKZ, 3CDB, 3CSJ, Can. 1AR 3BW.

One valve set used.

A. H. Fielding,

32 Stanley Avenue, Birkdale, Lancashire, England

Sept. 5th & 9th: One tube: 1ABS, 1ACU, 1AN, 1ARF, 1AKU, 1AW, 1AWF, 1BBO, 1BCG, 1BDT, 1BES, 1BFN, 1BW, 1BWF, 1CMP, 1CPO, 1CPS, 1CPW, 1GV, 1SN, 1UJ, 2ANA, 2AW, 2AWF, 2AWH, 2BQH, 2BY, 2CJ, 2CPO, 2DOF, 2FP, 2IG, 2IM, 2IU, 2JEB, 2RM, 2WR, 3BFU, 3BGT, 3BOF, 3CBF, 3CBM, 3CBX, 3CDK, 3EM, 3HH, 3OF, 3TJ, 4FT, 4GL, 4GX, 5HL, 5KG, 7NR, 8AM, 8BC, 8BDU, 8CTP, 8HV, 8HW, 9AAV; Can. 1AR.

B. L. Stephenson, 5IK, 12 Sheringham Road,

Withington, Manchester, England

Sept. 9th: 1ABS, 1ACU, 1AWP, 1BDT, 1BWF, 1BCG, 1CPN, 2WR, 2FP, 2H, 3BG, 3TJ, 3BGT, 2AFP, 4FT, 3HV, 8CNW, 8BCL, 8XAN, 8MC. Receiver, 1 R.F. and detector, tuned impedance arrangement.

F. J. Dinsdale, 2ZS,

14 Highfield View, Stoneycroft, Liverpool, England

Aug. 25th: 1AJP, 2AFP.

Aug. 26th: 1AJJ, 1ACU, 2BFU, 8GZ, 1BB, 8DV, 1ANA, 2AGB, 8HV.

Aug. 27th: 1ABS, 1ACW, 1RB, 3TJ, 9BWF.

Aug. 28th: 1ACU, 1BBO, 1BCG, 1AJP, 1CDM, 1CKP, 2AFP, 3BFU, 4BQ.

Aug. 29th: 1ANA, 1ACU, 2RB, 4GX, 3BNU, 8BDU, 8DG.

Aug. 31st: 1RP, 1BCM, 1BQT, 2AFP, 2AGB, Can. 3XN, 5AQ, 8GZ, 8ZZ, 8AWP, 8DAT, 8WV, 9QR.

J. H. D. Ridley, 5NN, c/o Bursdept Ltd.

Blackheath, S.E.5, London, England

Sept. 9th: 1AW, 1BD, 1ACU, 1ARF, 1BDT, 1BWF, 1CMP, 1CPN, 1BSF, 2AG, 2WR, 2SP, 2H, 2FP, 2AGS, 3TJ, 3BDB, 4FT, 4GX, 5EV, 8GA, 8ASL, 8BCL, 8CBO.

Sept. 10th: 2DK, 2FP, 3GT, 4FT.

J. A. Partridge, 2KF,

22 Park Road, Colliers Wood, London, S.W. 19

Sept. 19th: 1FB, 2RB, 2RS, 3KG (phone), Can. 1AR.

Sept. 20th: 1AS, 1UH, 2RS, 2UA, 2AH, 2DA, 2EL, 3NI, Can. 3XN, 1AR.

Sept. 21st: 1CVS, 2RB, 2CCX, 2BSC, 2BQH, 4FT, 8FR, 8UF, Can. 3BP.

W. R. Burne, 2KW,

Springfield, Thorold Grove, Sale, Cheshire, England

Sept. 3th: Receiver 1 valve, hi! 1CRW, 2BMR, 2BY, 2DWN, 2FP, 2QA, 3AJG, 3BNU, 8CLJ, Can. 1AR, 3QA.

Sept. 9th: 1AW, 1GV, 1SN, 1ABS, 1ACU, 1AHK, 1AJA, 1ARF, 1BDT, 1BLN, 1CKP, 1CMP, 1AJD, 2FP, 2WR, 2AGB, 2AFP, 3SH, 3TJ, 3CTP, Can. 3BP, 4FT, 4GL, 4GX, 5EK, 5MA, 5ZA, 5RV, 5BCL, 8FM, 8HV, 9AAU.

Sept. 5th: 1IV, 1JV, 1MY, 1ZE, 1ABC, 1ABS,

1ACA, 1ACU, 1ANA, 1BBO, 1BES, 1BCG, 1BDL, Can. 1AR, 2BY, 2FP, 2HT, 2IG, 2KE, 2KN, 2TS, 2RN?, 2ASP, 2AWH, 2BQH, 2BSC, 3BOF, 3BP, 3CBM, Can. 3HE, 4GL, 5HL, 5BCL, 8CSJ, 9BQ.

Sept. 6th: 1ACU, 1BWF, 1CPO, 2AWH, 2BNU, 2PV, 4DX, 4BY, 8AL, 8BKM, 9FM.

Strength of 5ZA was great. Also heard an A.R. R.L. broadcast station and copied convention dope.

J. S. Worthington,

Byron Ave., Takapuna, Auckland, New Zealand

Aug. 16th: 6BV, 6PE, 6AOA, 17th: 6ALU, 6AUY, 6ARB, 6BUY, 7WM, 7AFO, 7AGV, 7LY, 18th: 6BVG, 6CFJ, 19th: 6FF, 6JX, 6AFO, 6AGF, 6ARB, 6BUY, 6BPZ, 6BJQ, 6BQC, 6CFZ, 7AGV, 9BET, 9ACG, 9CVC, 9DLI, 24th: 5MVA, 6AOS, 7LW, 26th: 6ARB, 31st: 6BCM, 6BKI, 6BPZ, 6BVG, 6DAB.

Sept. 1st: 2AFP and 9ZT wkg. Both readable OK.

2nd: 6BJK, 6ZH, 9ZT, 5th: 6BQC, 6th: 6ARB, 7th: 9ZT, 9th: 6AAK, 6ARB, 6BVG, 9ZT.

L. S. Spackman,

10 Ardmore Road, Ponsonby, Auckland, N. Z.

1AAC, 1AJP (twice), 1EL, 2ADO, 2OM, 2ZA, 3BLE, 3AB, 4FP, 4FT, 4ZF, 5FP, 5MD, 5ZAC, 5ZW, 6XAD (in test with myself and Australia, 5 times, QSA), 6ZW, 6ZJ, 6ZAC (twice, QSA), 6ZAF, 6XAC, 6JX (vv. QSA, 10 feet from fones with det. and 1 stage Audio), 6ZZU (?), 6AR (vv. QSA on Det.), 6ZG, 6JD (QSA with Det & 1 stage. Audio, in test with Australia, three times), 6BED, 6CGW (?), 6CYO, 7AC, 7AW, 7ZZ (?), 8AIO, 8AQO, 9ZF, 9TS (in daylight during summer), 9APW.

WNP Hears 546 Stations, Including Every District

Aux. Sch. Bowdoin, WNP

(Received via 9BP, Prince Rupert, B. C. Sept. 21 and 22.)

July 28th to 31st, Godthaab, Greenland: 1CCZ, 8APN, 8BJZ, 8DCZ, 8OE, 9AUY.

July 31st and Aug. 1st, 65 N. Lat. 58 W. Long.: 1CRE, 2BQH, 5APR, 3ZS, 8BDU, 8BXX, 8CED, 8DIA, 8PX, 8NB, Can. 1DD.

Aug. 1st, 66 N. Lat. 55 W. Long.: 3ZS, 8PX, 8NB, 9APS.

Aug. 2nd and 3rd, 69 N. Lat. 55 W. Long.: 1CMP, 1EE, 2AXK, 3ZM, 3AME.

Aug. 3rd, 71 N. Lat. 56 W. Long.: 1AQM, 1BAC, 1UH, 2AWF, 2CQZ, 3CGU, Can. 3DJ, Can. 3GK.

Aug. 6th and 7th, 77 N. Lat. 71 W. Long.: 1AJP, 1AYZ, 1BRQ, 1TS, 2BUM, 2CUR, 2CKD, 3BDO, 3BNU, 8CSJ, 9DCE.

Aug. 8th to Sept. 20th, Refuge Hbr., Greenland, 78.30 N. Lat. 72.30 W. Long.: 1ABS, 1ACU, 1ALT, 1ANA, 1ARF, 1AW, 1CKP, 1CPO, 1ER, 1CDM, 1BVR, 1BES, 1BCG, 1BBO, 1FB, 1FM, 1UJ, 1ZE, 2ACD, 2AFP, 2AGB, 2AJW, 2ALM, 2AWH, 2BRB, 2BRC, 2BSC, 2BYC, 2BZV, 2CBC, 2CBG, 2CJL, 2CLA, 2COA, 2OM, 2RB, 2RS, 2WR, 2FP, 3AB, 3APT, 3BFU, 3BG, 3BVA, 3BVL, 3IW, 3ME, 3VO, 3ZO, 4BY, 4CH, 4FT, 4GL, 4GX, 4HS, 4KU, 4QU, 4RH, 5ACR, 5ADB, 5ADO, 5ABC, 5AEU, 5AGJ, 5AIC, 5AIJ, 5AIU, 5AJJ, 5AKN, 5AKY, 5ALE, 5AMA, 5BM, 5DW, 5EK, 5FC, 5GA, 5GE, 5GM, 5GP, 5HL, 5IN, 5JF, 5KY, 5LG, 5LL, 5LR, 5MM, 5MN, 5NN, 5NS, 5NU, 5PB, 5QE, 5QQ, 5QR, 5RM, 5UK, 5UO, 5VA, 5WG, 5XV, 5ZA, 5ZAV, 6AAK, 6ABK, 6AC, 6ACG, 6AGE, 6AIV, 6AJD, 6ANB, 6AOL, 6AOS, 6AOU, 6APH, 6ARB, 6ATC, 6AVV, 6AWT, 6BBC, 6BBH, 6BRW, 6BCL, 6BGV, 6BGY, 6BIC, 6BTH, 6BJQ, 6BKH, 6BLY, 6BLY, 6BOU, 6BPZ, 6BQB, 6BQC, 6BQL, 6RRF, 6BUO, 6BVE, 6BVG, 6BVS, 6BWZ, 6CAL, 6CAT, 6CBU, 6CCU, 6CCY, 6CET, 6CFI, 6CFZ, 6CGD, 6CGW, 6GHE, 6GHL, 6CHV, 6CID, 6CKF, 6CKH, 6CKP, 6CML, 6CMR, 6CMU, 6CNL, 6DD, 6ET, 6FH, 6FY, 6HP, 6HV, 6JX, 6KA, 6KM, 6NB, 6PL, 6RM, 6TU, 6TV, 6UA, 6UO, 6UX, 6VK, 6ZAH, 6ZAR, 6ZK, 6ZP, 6ZX, 7ABF, 7ACI, 7ACM, 7ADH, 7ADR, 7AEL, 7AGL, 7AGV, 7AHV, 7AK, 7BG, 7BJ, 7BR, 7CF, 7DC, 7EI, 7FD, 7GE, 7GI, 7GO, 7GP, 7HG, 7IO, 7JY, 7JE, 7KS, 7KV, 7LH, 7LN, 7LR, 7LY, 7QY, 7SF, 7SZ, 7TK, 7TO, 7TQ, 7UD, 7WE, 7WM, 7WS, 7YA, 7YL, 7ZD, 7ZF, 7ZL, 7ZN, 7ZU, 8AAB, 8AAJ, 8AB, 8ADA, 8AEG, 8AFP, 8AIO, 8AME, 8AMM, 8AMP, 8ANP, 8APT, 8APY, 8AQ, 8AQO, 8ASV, 8AVD, 8AVN, 8AWP, 8RRI, 8BCL, 8BDA, 8BDU, 8BDV, 8BFH, 8BJV, 8BLX, 8BVT, 8BXH, 8CCR.

8CDD, 8CDZ, 8CEI, 8CKO, 8CPP, 8CQH, 8CRB, 8CTP, 8CUR, 8CWU, 8CXM, 8CYZ, 8DAT, 8DIG, 8DJJ, 8DJF, 8DKM, 8ES, 8FT, 8GZ, 8HN, 8HV, 8IG, 8IJ, 8KG, 8KJ, 8RJ, 8RY, 8UE, 8UK, 8VN, 8VQ, 8VT, 8VW, 8VY, 8XH, 8YV, 8ZC, 8ZZ, 9AAL, 9AAQ, 9AAU, 9AAV, 9AAW, 9ACK, 9AEC, 9AHJ, 9AHZ, 9AIC, 9AIM, 9AJA, 9AJH, 9ALB, 9ALX, 9AMF, 9AMI, 9AML, 9AMS, 9AOG, 9APE, 9APF, 9APQ, 9APW, 9AVG, 9AQK, 9ARC, 9ARZ, 9AUA, 9AUI, 9AVC, 9AVI, 9AVN, 9AVP, 9AVZ, 9AWG, 9AWK, 9AXX, 9AYL, 9AYL, 9AZX, 9BAF, 9BAN, 9BAV, 9BBW, 9BCH, 9BDB, 9BDH, 9BDS, 9BE, 9BEZ, 9BFI, 9BFC, 9BHD, 9BHQ, 9BJK, 9BK, 9BKK, 9BKR, 9BMU, 9BMX, 9BPV, 9BQJ, 9BQQ, 9BQY, 9BRK, 9BRS, 9BRX, 9BSG, 9BSZ, 9BTL, 9BTT, 9BUN, 9BVO, 9BWF, 9BXC, 9BYC, 9BYT, 9BZE, 9BZI, 9CAA, 9CAH, 9CAJ, 9CCS, 9CCZ, 9CDR, 9CDV, 9CE, 9CFK, 9CFY, 9CGA, 9CH, 9CC, 9CTL, 9CIP, 9CJS, 9CKA, 9CKS, 9CLN, 9CTE, 9CTN, 9CTV, 9CVC, 9CVI, 9CVO, 9CVS, 9CXH, 9CXC, 9CZW, 9DAT, 9DAW, 9DBH, 9DCR, 9DCT, 9DCW, 9DDT, 9DEK, 9DGE, 9DGV, 9DGW, 9DGH, 9DHN, 9DHP, 9DHS, 9DJF, 9DKJ, 9DKQ, 9DKY, 9DLI, 9DQC, 9DQE, 9DFF, 9DPE, 9DQE, 9DQH, 9DQM, 9DQU, 9DRK, 9DRO, 9DRE, 9DSW, 9DTE, 9DWM, 9DXR, 9DYZ, 9EAE, 9EBP, 9EBT, 9EEA, 9EEV, 9EHN, 9ELV, 9EKF, 9EKT, 9EKY, 9ELE, 9ELD, 9ES, 9GD, 9GK, 9HK, 9HM, 9HW, 9IG, 9IH, 9JF, 9JZ, 9MC, 9MF, 9NU, 9PN, 9QL, 9UC, 9UH, 9XN, 9ZG, 9ZT, 9ZY. (9BDH Spk.)

Canadian: 2BN, 2CG, 3BP, 3NI, 3XN, 4CL, 4DQ, 4ER, 6CN, 6CT, 5GO, 5HB, 5HG, 9BP.

Alaskan: 7IT.

Hawaiian: 6CEU.

Mexican: 3H.

Can. 4GL, Edmonton, Alberta

C.W.: 1BES, 1BQG, 2AGB, 2BMR, 2ES, 3AJG, 3BN, 3ZM, 4DB, 4DN, 4KU, 4OA, 4ZA, 5AG, 5AH, 5ACR, 5AGJ, 5AIV, 5AME, 5EK, 5FC, 5GA, 5GM, 5HL, 5IF, 5KG, 5KK, 5LR, 5MO, 5QL, 5QQ, (5ZA), 5ZM, 5ZAV, 5PV, 5AKN, 6AHU, 6AIV, 6ALV, 6AOS, 6ARB, 6AVP, 6AVV, 6AWT, 6BCL, 6BIC, 6BON, 6BRF, 6CGW, 6CHL, 6COU, 6ET, 6FF, 6FY, 6GR, 6NX, 6OH, 6TV, 6ZAH, 6ZAR, 6ZIA, Numerous 7's, 8AGP, 8ALA, 8AMM, 8AVN, 8AWG, 8BDA, 8GZ, 8VL, 8WA, 8ZC, 9AAW, 9AIN, 9AQI, 9AOG, 9AUI, 9AVN, 9AVZ, 9AWM, (9AYI), 9BEZ, 9BFB, 9BJS, 9BOL, 9BQQ, 9BSQ, 9BSZ, 9BTL, 9BZE, 9BZI, 9CAJ, 9CVC, 9CVV, 9CYS, 9CZV, 9CZW, 9DAW, 9DJM, 9DKX, 9DLM, 9DOC, (9DRK), 9EAE, 9EBT, 9EEA, 9EHJ, 9HK, (9IG), 9RC, 9ST, 9YY, 9ZG, 9ZT, 9ZV, 9ZY.

Can.: 3GE, (3NI fone), 9BOC.

Spark: 7NE, 9AUI.

Can. 2CG, Montreal, Que.

4HR, 5GA, 5GM, 5UP, 9AAU, 9AJH, 9AQZ, 9AUA, 9AUC, 9AVP, 9AXX, 9BBR, 9BTZ, 9BRK, 9CHE, 9CYQ, 9DOE, 9DXL, 9DYI, 9FAU, 9EKF, 9EKY, 9EI, 9HK, 9IH, 9PW.

ICPN, Worcester, Mass.

4AF, 4BX, 4DB, 4DX, 4EB, (4FT), 4GL, (4JK), 4KM, (4MY), 5EM, 5EK, 5FC, 5HL, 5JC, 5LR, 5QQ, 5TR, 5ZA, 5AKN, 5ZAS, 6TO, 6ZH, 6AWT, 7LU, 7OX, 7YL, 9CR, 9IG, 9UR, 9LD, 9MC, (9MF), 9NU, 9PN, 9PO, 9QL, 9RC, 9UM, 9UX, (9ZG), 9ZT, (9ZY), 9AAC, 9AAL, 9AAU, 9AAV, 9AAZ, 9ABB, 9ADM, 9AHZ, 9AIC, 9AJH, 9AIB, 9APS, 9APV, 9AQZ, 9ARC, 9AUI, 9AVG, (9AVN), 9AWA, 9AWG, 9AWK, 9AWS, 9AWZ, 9AXX, (9AZX), 9BAR, 9BAV, (9BUR), 9BLZ, 9BMU, 9BMX, 9BQQ, 9BRK, (9BSZ), 9BWA, (9BWF), (9BZT), 9BZC, 9CAA, 9CAJ, 9CCN, 9CCS, (9CDV), 9CEE, (9CFK), 9CGS, 9CHE, 9CHN, 9CIC, 9CLX, 9CNG, 9CVC, 9CVS, 9CXH, 9CJL, 9DAF, 9DAW, (9DCE), 9DCT, (9DGV), 9DIS, 9DKC, 9DKY, 9DOE, (9DQA), 9DQM, 9DSW, 9EAX, 9EDO, 9EKF, (9EKY), (9ELD), WNP.

Iawe, 25 Phillips St., Providence, R. I.

5AGE, 5AUI, 5AO, 5EK, 5GN, 5HK, 5LR, 5QL, 5QQ, 5UK, 5UP, 5VY, 5ZA, 6BBI, 6CBU, 6PL, 7LU, 9AEC, 9AHZ, 9AMB, 9AMU, 9AWA, 9AXX, 9BFB, 9BFI, 9BKO, 9BQY, 9BRS, 9BZI, 9CAA,

9CAJ, 9CBJ, 9CCS, 9CFY, 9CIP, 9CNB, 9CPU, 9CTO, 9DCE, 9DDJ, 9DGI, 9DGV, 9DGW, 9DKW, 9DKY, 9DNN, 9DOE, 9DSL, 9ECV, 9HG, 9MF, 9ST, 9ZT, 9ZY.

Can. 5GO.

1BWJ, Natick, Mass.

4FS, (4OM), 4XJ, (5ABT), 5ACQ, 5AJJ, 5AMH, 5AOK, 5BM, 5EK, 5EN, (5FF), (5GA), 5GI, 5GN, 5HL, 5KG, 5KR, 5LR, 5MN, 5NO, 5PB, 5QL, 5QQ, (5RE), 5SL, 5UR, 5XG, 5YV, 5ZN, 6AWT, 6BCA, 6BHU, 6BUR, 6CGW, 6LA, 6ZAH, 7WP, 7WS, 7YA, 7ZD, 7ZU, 9AAL, 9AAU, (9ARC), (9AUA), 9AVN, 9AWJ, (9AWS), 9BAN, (9BAV), 9BCK, (9BFT), 9BJK, (9BSG), 9BTL, (9BUI), (9BZI), 9CAA, 9CBJ, (9CDV), 9CEE, (9CTE), 9CVC, 9CVO, 9DAN, (9DGE), (9DGV), (9DGM), 9DKY, 9DNN, (9DSW), (9DTT), (9DVM), 9EKF, 9EKY, (9OT), 9ZT.

Can.: 5CN.

2WR, Hilton, N. J.

4DN, (4DX), 4FA, (4GX), 4HR, 4JK, 4KC, 4KU, 4LJ, (4MB), 4NA, 4RH, 4EK, 4HL, 4PB, (5UP), (5ABT), 5AEC, 6BVG, 6CGW, (9AE), (9CR), 9FP, 9LZ, (9MM), 9OT, (9OX), 9QI, 9UZ, (9ZG), 9ZT, 9ZV, 9ZY, 9AAR, 9AIC, (9ALB), 9APS, (9ARC), 9AUS, (9AUY), (9AWG), 9AWM, (9AXX), 9AZX, 9BAZ, 9BJR, 9BKO, 9BRK, (9BTT), (9BWF), 9BZI, 9CDB, (9CDV), (9CFK), 9CII, 9CYS, (9DGV), (9DKY), 9DOE, (9DQA), 9DQE, (9DYI), 9EDN, 9EEV, (9EKY), 9ELD, 9ELD.

2BZJ, Farmingdale, N. J.

C.W.: 5AC, 5BE, 5DW, 5EK, 5EN, 5GA, 5JF, 5KE, 5KG, 5KR, 5LR, 5PH, 5QL, 5QQ, 5QY, 5SK, 5UK, 5VY, 5AFT, 5AGO, 5AKN, 5AMA, 5AMH, 5ZAS, 6UH, 6ARB, 6AWT, 6BQC, 6BRF, 6CBU, 6CFI, 9BQ, 9JG, 9YU, 9AAU, 9AGN, 9ALX, 9ARC, 9AUI, 9BFI, 9BLG, 9BHM, 9BQQ, 9BSP, 9BZI, 9CCW, 9DAW, 9DGV, 9DKQ, 9DKU, 9DVK, 9DZS.

Spark: 5XA.

One tube used.

3BAU, Glenside, Montgomery Co., Pa.

4DB, 5ABT, 5AFS, 5AGD, 5AUI, 5AKN, 5AMH, 5BE, 5BP, 5EN, 5GP, 5JR, 5KG, 5KM, 5LL, 5LR, 5MN, 5QL, 5QQ, 5SK, 5UK, 5UO, 5UP, 5VA, 5XV, 5ZAV, 6BVG, 6AAL, 9AAU, 9AGN, 9ALK, 9AQZ, 9ARI, 9ATN, 9AWM, 9AWS, 9AXX, 9BBW, 9BFI, 9BIS, 9BPY, 9BQY, 9BRS, 9BTL, 9BTT, 9BWW, 9BZI, 9CCS, 9CCW, 9CDV, 9CEE, 9CIC, 9COC, 9CTE, 9CVJ, 9CVO, 9DAW, 9DCE, 9DCW, 9DGV, 9DKY, 9DLF, 9DOE, 9DSW, 9DVK, 9DYZ, 9DZS, 9EKY, 9ELD, 9MF, 9YY, 9ZG.

Can.: 3NI, 3OM, 3SI.

3BMN, Petersburg, Va.

1ER, 1HX, (1HO), 1ON, 1VU, 1ACU, (1BKQ), 1BWJ, 1CPN, 4EL, 4BY, 4GL, 4HS, 4RR, 5DW, 5MN, 5UO, 5QL, 5QQ, 5ZA, 5AGJ, (5AIR), 5AAM, 5ABT, 5AJP, 5AMB, 5ACQ, 5GR, 6AWT, 6CBU, 9AE, 9CD, 9RC, 9QI, 9YU, 9ZT, 9AAU, 9AAV, 9AAW, 9AEP, 9ALB, 9ALX, 9AXB, 9AXX, 9BED, 9BEL, 9BSM, 9BZI, 9CCS, 9CEE, (9CFK), 9CLV, 9CVO, 9CVS, 9CTR, 9DAW, 9DEJ, 9DGV, 9DIS, 9DLW, (9DQA), 9DQU, (9DTJ), 9DZS, 9DZY.

Can.: 1AR, 2BNO, 3AA, 3BP, 3DE, 3DS, 3DE, 3OH, 3SI, 3TB, 3XN, (3ADN).

Sunlight: 1AW, (4HZ), 5LR, Can. 3ZS.

5AC, Mobile, Ala.

1ACU, 1AJP, 1AW, 1BCG, 1BVB, 2AGB, 2BJ, 2BO, 2BRB, 2CPD, 2TS, 2VO, 2WA, 3AB, 3AJG, 3AS, 3AUI, 3BD, 3BE, 3BJ, 3BOF, 3BSB, 3BUY, 3BVA, 3BVL, 3CDK, 3GE, 3JY, 3MO, 3SU, 6AWT, 6BBC, 6BPZ, 6BRF, 6CMI, 6IF, 7LU, 7LY, 8AMM, 8ARG, 8BCI, 8BDA, 8BDE, 8BDU, 8BFB, 8BNH, 8BRM, 8BY, 8CEI, 8CEJ, 8CHJ, 8CP, (8CVE), 8CVG, (8DKM), 8GH, (8GZ), 8HN, 8IG, 8SF, (8TH), 8ZAE, 8ZC, 9AAU, 9AAW, 9ACI, 9AHR, 9AHZ, 9AIM, 9AMS, 9ANY, 9APS, 9ARC, 9ATP, (9AUS), 9AVN, 9AWG, 9BAB

(9BBW), 9BCF, 9BDU, 9BED, 9BEZ, 9BGY, 9BIJ, 9BKO, 9BMO, 9BQY, 9BRI, (9BSH), 9BSZ, 9BUN, 9BZI, 9CAJ, 9CCS, (9CCZ), 9CEE, (9CFK), (9CHO), 9CLN, (9CTE), 9CTM, 9CVO, 9CVS, 9CXO, (9CZW), 9DCR, 9DIS, (9DJB), 9DKY, (9DMJ), 9DQE, 9DTS, 9DUG, 9DZS, 9DZY, 9EAD, (9EBP), 9EDO, (9EFZ), 9EJA, (9EKY), 9EIL, 9HG, 9HK, 9KD, (9LZ), 9MC, 9NU, 9OX, 9PW, 9SK, 9US, 9VM, 9ZT, 9ZV, 9ZY,

Canadians: 9ADA, 9BP.
Mexican: AS.

6ASR, Honolulu, T. H.

1BCG, 5CN, 5CR, 5GA, 6KA, 6MB, 6MK, 6OD, 6TV, 6WR, 6ZH, 6AIF, 6AOS, 6ARB, 6AWT, 6BAV, 6BBC, 6BEC, 6BNI, 6BNU, 6BPZ, 6BUR, 6BVG, 6BVS, 6CAI, 6CCU, 6CFZ, 6CKU, 6CMI, 6CMS, 6CNI, 6CPZ, 7GO, 7SF, 7ZN, 7ZI, 7ABP, 7ADJ, 7ADP, 7AGU, 9LT, 9LD, 9ZT, 9ZY, 9AMB, 9CA, 9EKY.

Use QSL to W. C. Chock, P. O. Box, 1837, Honolulu, T. H.

6CEU, Hilo, T. H.

1CDM, 1BCG, 1ABS, 2FP, 2RS, 3AB, 3BNU, 4CS, 4GN, 5AE, 5ADO, 5MN, 5UN, 5ZAV, 5AMA, 5QQ, 5CN, 5SG, 6ANB, (6ARB), 6BWP, 6BJQ, 6IK, 6PL, 6PF, 6CKZ, (6CKC), 6BCL, 6CKR, 6BUY, 6CFZ, 6ZI, 6AIF, 6AOS, 6AJD, 6FY, 6CBU, 6XBJ, 6ZH, 6BPZ, 6CA, 6NB, 6ANY, 6DD, 6ASN, 6BVE, 6ORE, 6BQL, 6BVG, 7ADP, 7ZF, 7ZN, 8VY, 8AWP, 8GZ, 8APY, 9AIM, 9ZT, 9CCS, 9AHZ, 9ME, 9AHI, 9BTT, 9BZI, 9DLI, 9BQO, 9AEC, 9BJK, 9AVC, 9AEY, 9DJB, 9BP, 9DRK, 9AWM.

QSL to Roland Smith, 113 Uluani St., Hilo, Hawaii.

Hawaii AGN QSO & QRV For Buz Thru Me. Give all msg for Hawaii To 6CKC and 6ARB.

6AOC, Campbell, Calif.

5AIU, 5AJ, 5AKN, 5LR, 5MN, 5QW, 5SG, 5SK, 5UO, 5ZL, 8CP, 8CYZ, 9AAB, 9AFT, 9AMB, 9AMC, 9AXX, 9BTT, 9BQO, 9BUN, 9BZI, 9CAA, 9CCZ, 9CPV, 9CVC, 9CVG, 9CVO, 9DAM, 9DAW, 9DGE, 9DGW, 9EKY, 9ZT, 9ZY.

7AEB, Walter Hemrich (7SC) Kukuk Bay, Alaska

1ER, 3BVL, 5BVA, 4GL, 5CEB, 5CGO, 5FC, 5ZAK, 5GP, 5UO, 5IN, 5LG, 5KG, 5ADO, 5NN, 5GM, 5AKN, 5MO, 5GI, 6ADM, 6OD, 6BFG, 6AUP, 6BIP, 6BCR, 6BVG, 6TV, 6HP, 6CFI, 6BCR, 6BPZ, 6MHL, 6BBU, 6BIC, 6PL, 6CC, 6BVS, 6CEU, 6HRF, 6BBU, 6ARB, 6BMD, 6ZI, 6ALY, 6ATV, 6AFV, 6GR, 6AOL, 6ET, 6AWT, 6BEG, 6BRY, 6BUY, 6REZ, 6RQC, 6DRO, 6KA, 6RM, 6BIG, 6GHL, 6BJQ, 6AIF, 6CBA, 6AOS, 6CBU, 6EA, 6FH, 6CAS, 7NN, 7WE, 7QJ, 7LY, 7SZ, 7QY, 7PF, 7LH, 7EB, 7AFO, 7LN, 7WM, 7ADP, 7QT, 7JE, 7AGE, 7ADS, 7BR, 7AGI, 7WS, 7ZY, 7AKV, 7AHG, 7CF, 7LR, 7TO, 7GO, 7KM, 7BH, 7FD, 7ZD, 7EL, 7SA, 8BUX, 8XH, 8AIO, 8APT, 8BZ, (or 9BIZ), 9CIP, 9CAA, 9AMB, 9APE, 9LT, 9ABU, 9BQO, 9AUU, 9CCV, 9CGA, 9BAN, 9CAF, 9DLI, 9BKJ, 9AIC, 9ZT.

Kukuk Bay is just behind Kodiak Island.

J. N. Smith, Mile 7, Cordova, Alaska

(Sept. 22nd only)

4MB, 4DW, 5BE, 5EN, 5CT, 5GM, 5ADB, 5AIU, 6FY, 6SU, 6VD, 6ZH, 6ANB, 6ABX, 6AGE, 6AHU, 6AJA, 6AOL, 6AWT, 6BBC, 6BBU, 6BIC, 6BJQ, 6BQC, 6BQL, 6BRF, 6BVG, 6BVS, 6CBD, 6CGW, 6CHI, 6CHL, 6CHD, 6CKF, 6CMI, 6ZAR, 7DC, 7EL, 7FD, 7KS, 7LD, 7OH, 7QU, 7SU, 7TU, 7WP, 7ZU, 7ADS, 7AFE, 7AGE, 7AJT, 7AKV, 8IJ, 8TT, 9UH, 9ZT, 9AFP, 9ATN, 9AVZ, 9RPA, 9BRI, 9CAA, 9CDB, 9CTN, 9EAU, 9EBT, 9EFQ.

Canadian: 5AH, 5CN, 9BP.

7IY, Vashon, Wash.

(Aug. 17-Sept. 10)

1BCG, 1BJF, 1CDM, 1BWJ, 1CMP, 1XB, 2AFP, 2BY, 2BQV, 2CDC, 2FP, 3SU, 3AR, 3AIW, 3BDO,

3BP, 3NT, 3TB, 4AL, 4BQ, 4FT, 4GX, 4NA, 4KC, 4KU, 5AGJ, 5AU, 5ADO, 5AMA, 5DN, 5EK, 5HR, 5LG, 5MN, 5MO, 5NJ, 5PB, 5QQ, 5SK, 5SL, 5UK, 5UN, 5XV, 5ZAX, 5ZAV, 5AMM, 5AXN, 8APT, 8AB, 8AWP, 8ATV, 8AIO, 8APY, 8ADI, 8AVD, 8AGO, 8ALU, 8AHG, 8BJF, 8BAN, 8BPN, 8BCL, 8BJV, 8BDA, 8BXH, 8BLX, 8BCP, 8BDS, 8BOA, 8BCF, 8CTP, 8CY, 8CQO, 8CG, 8CDD, 8DAT, 8DIG, 8DKM, 8DO, 8FM, 8GD, 8GG, 8GZ, 8HV, 8HA, 8IJ, 8KG, 8PD, 8RM, 8TT, 8UT, 8VT, 8WG, 8WV, 8WX, 8ZW, 8ZZ, 9AAU, 9ACK, 9AIY, 9AXX, 9AVC, 9AWG, 9AUS, 9AZO, 9AZX, 9AAW, 9ARZ, 9ARC, 9AMA, 9AIM, 9AWK, 9AWP, 9AOU, 9AVN, 9AMP, 9AHJ, 9ANY, 9AJH, 9AOS, 9AWS, 9AAV, 9RRI, 9RYO, 9BSG, 9BMX, 9BQO, 9BUX, 9BQY, 9BKM, 9BUN, 9BAN, 9BTT, 9BJK, 9BTL, 9BQJ, 9BUJ, 9BIZ, 9BAV, 9BCW, 9BYJ, 9BGU, 9BRC, 9BZE, 9BJS, 9BDR, 9BSZ, 9CC, 9CVC, 9CIP, 9CAJ, 9CDV, 9CUS, 9CAA, 9CCZ, 9CVS, 9CFY, 9CIL, 9CFK, 9CGA, 9CTE, 9CHC, 9CP, 9DLI, 9DHP, (9DAW), 9DPF, 9DCH, 9DIS, 9DQM, 9DHN, 9DCT, 9DCR, 9DWN, 9DOE, 9DKB, 9DQA, 9DRO, 9DYZ, 9DJB, 9DKY, 9DGY, 9DTE, 9EKY, 9EKF, 9EEV, 9EBT, 9GD, 9GK, 9HK, 9IG, 9LZ, 9MF, 9NA, 9PN, 9QL, 9UU, 9UB, 9UH, 9VE, 9VM, 9YU, 9ZG, 9ZY, 9ZU, 9ZT.

Can.: 3NI, 3XN, 3ZS.
Can.: 3NI, 3XN, 3ZS.
Spark: 9CKA, 9AAU, 9BDH.
1500 foot Beverage wire used.

B. W. Powell, 419 N. 12th St., Corvallis, Ore.

1BBO, 1BCG, 1BWJ, 2AFP, 4DN, 4KU, 5AAG, 5ADO, 5AE, 5AFQ, 5AGJ, 5AHD, 5AKN, 5DW, 5EK, 5HL, 5LG, 5LR, 5MN, 5QQ, 5SK, 5UO, 5ZAS, 5ZAV, 5ZAX, 8AJH, 8AMM, 8APT, 8APY, 8BCL, 8BDA, 8BLX, 8CUR, 8DAT, 8DHA, 8DKM, 8HV, 8JU, 8KG, 8WA, 9AAR, 9AAU, 9AAW, 9AE, 9AIC, 9AIM, 9AMB, 9AOA, 9AFP, 9AUS, 9AUU, 9AUW, 9AVU, 9AVZ, 9AWM, 9AXX, 9BAF, 9BAN, 9RAV, 9BBR, 9BHD, 9BJK, 9BMX, 9BQO, 9BSQ, 9BUN, 9BXA, 9BZI, 9CAA, 9CBJ, 9CCS, 9CCZ, 9CDV, 9CFY, 9CKW, 9CLD, 9CR, 9CVC, 9CVS, 9DDE, 9DGY, 9DUS, 9DJQ, 9DKY, 9DOC, 9DRK, 9DSW, 9EBT, 9EEA, 9EKF, 9EKY, 9GD, 9IR, 9LZ, 9NU, 9OX, 9QL, 9QR, 9VE, 9YM, 9ZT, 9ZG, 9ZV.

Canadian: 3GE, 3NI, 3XN, 4CL, 4DQ, 4ER, 4HF.

7SE, Langley, Wash. (Sept. 3 to 9)

1BCG, 2FP, 2RB, 2BUM, 2CUR, 3FV, 3CBM, 4CA, 4FT, 5EK, 5HL, 5MT, 5NK, 5NS, 5NZ, 5AGE, 5ALR, 5ZAV, 5DO, 5HV, 8IJ, 8KG, 8WV, 8AFD, 8AFN, 8AMT, 8APY, 8ATX, 8BDA, 8DIG, 8DLB, 8ZAE, 9CE, 9CR, 9HK, 9JF, 9LZ, 9MF, 9AAU, 9AAW, 9AIM, 9AKX, 9ALB, 9AOG, 9ARZ, 9AXX, 9AYL, 9BAN, 9BBR, 9BQO, 9BSZ, 9BZE, 9CCS, 9CDV, 9CIL, 9CIP, 9CVC, 9CZW, 9DAU, 9DCW, 9DES, 9DKY, 9DNX, 9DQM, 9DRK, 9DRO, 9DSL, 9EAR, 9EKG, 9YM.
QSL to 7ABB, Everett, Wash.

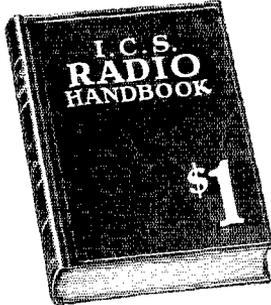
Geo. Geyser, 1784 W. 48th St., Cleveland, O.

(Two-foot loop-no R.F.)

1ABS, 1ACU, 1ADN, 1ALJ, 1ANN, 1ARF, 1BAS, 1BBO, 1BCG, 1BOM, 1BQT, 1BVR, 1CCZ, 1CMX, 1CVS, 1FB, 1GV, 1MY, 1UH, 1VN, 2AD, 2AGB, 2AGK, 2AJG, 2APD, 2BRB, 2BRC, 2CCX, 2CVU, 2DX, 2HF, 2IU, 2JEB, 2RS, 2SQ, 3WR, 3AB, 3ADE, 3ADV, 3AJG, 3AJP, 3ATG, 3AVG, 3AVR, 3AWH, 3BDO, 3BFU, 3BG, 3BHL, 3BJI, 3BKA, 3BLU, 3BME, 3BRF, 3BUC, 3BUY, 3BVA, 3BVL, 3BVT, 3CM, 3CCU, 3CDN, 3CEV, 3CFV, 3HD, 3JJ, 3KM, 3SU, 3TA, 3TJ, 3WF, 3XN, 3ZO, 4AL, 4FT, 4GL, 4HS, 4IR, 4KF, 4MB, 4NA, 5AAG, 5ACI, 5AIU, 5ALJ, 5AMA, 5EK, 5GA, 5GM, 5HL, 5QQ, 5SG, 5SL, 5UP, 5ZA, 5ZAS, 5ZAV, 5ZE, (too many eights), 9AAV, 9AAW, 9AEM, 9AHJ, 9AJH, 9AKD, 9ALB, 9AMF, 9ANW, 9AOY, 9APE, 9APS, 9ARC, 9AUS, 9AYY, 9AVP, 9AWA, 9AWG, 9AWK, 9AWM, 9AUX, 9AZX, 9AYI, 9BBR, 9BDS, 9BEZ, 9BGU, 9BHC, 9BHD, 9BMV, 9BRK, 9BSD, 9BTL, 9RWF, 9BZE, 9CAH, 9CAO, 9CBJ, 9CCK, 9CDT, 9CEE, 9CFK, 9CHC, 9CHE, 9CIP, 9CR, 9CTT, 9CWE, 9CXH, 9CZL, 9CZS, 9DAW, 9DCJ, 9DDN, 9DEK, 9DGE, 9DIS, 9DK, 9DMJ, 9DOE, 9DQA, 9DQH, 9DSQ, 9DST,

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Canadian: 3BP, 3CO, 3HE, 3NI, 3OH, 3ZS.
Spark: 9AU.

8AAJ, 217 Washington St., Port Clinton, Ohio.
1ACU, 1AYT, (1BES), 1BCG, 1BOM, 1BOQ, 1BQI, (1BWJ), 1CKP, (1CMP), (1ER), (1FM), 1GL, 1IL, 1KC, 1KX, 1MY, 1YB, (2ANA-QRA?), (2BBX), (2BMR), (2BQB), (2CQZ), 2CLU, (2DX), 2FP, 3AAO, (3AHP), (3AJG), 3APR, 3AKY, (3AUV), 3BRF, 3BVA, (3BVL), (3CBL), 3CDK, (3CFU-QRA?), (3CHG), 3AB, 3JJ, 3TJ, 3VO, 3ZO, 4AF, 4AL, (4AY-QRA?), 4AZ, (4BK), 4BQ, 4BX, 4BY, 4CY, (4DB), (4DX), 4EL, 4EQ, 4ER, 4FA, 4FG, 4FS, 4FT, 4GW, 4GX, 4JK, 4KC, 4KU, 4LJ, 4MB, (4MY), 4RH, 4ZA, 5ACQ, 5AEC, 5AGJ, 5AHJ, 5AIU, 5AJP, 5AKN, 5AMA, 5AMH, 5EK, 5DA, 5GA, (5GN-QRA?), 5HL, 5KC, (5KU), 5LL, 5NS, 5QL, (5QQ), 5UK, (5UP), 5VV, (5ZAV), 5ZB, 6AWT, 6BQC, 6BPZ, 6BVG, 6CGW, 6PL, 7SC.
Can.: 2BN, (3ADN), (3ET), (3KQ), (3NI), (3OH), (3XI), 3XN.

9BFZ, La Harpe, Ill.
1BES, 1BWJ, 1CMP, 1CPN, 1CVS, 2DX, 2RB, 2WA, 2WR, 2BQC, 2BQH, 2BSC, 2BYC, 2CNK, 2CQR, 3GE, 3IW, 3IS, 3MO, 3TB, 3ZO, 3BOF, 3RUV, 4RI, 4CG, 4DD, 4EB, 4FT, 4GW, 4JK, 4KU, 4MB, 4PB, 4RH, 5AV, 5BM, 5DY, 5EK, 5FT, 5GA, 5GL, 5GM, 5GN, 5HL, 5IL, 5MM, 5NK, 5NO, 5PV, 5QL, 5SR, 5UA, 5UK, 5UP, 5WA, 5WV, 5ZA, 5ABT, 5ACR, 5AFQ, 5AIU, 5AJP, 5AKI, 5AMA, 5ANB, 5XAB, 5ZAS, 6ZAV, 6VH, 6ZT, 6CFZ, 7ZU, 8FP, 8PL, 8UF, 8VQ, 8ZO, 8ZZ, 8ABX, 8AGP, 8ALT, 8ALW, 8AMM, 8AVD, 8BFC, 8BCW, 8BKJ, 8BLX, 8BPZ, 8CHB, 8CSJ, 8CTP, 8CUN, 8CUV, 8CWU, 8YAE.
Can.: 3DH, 3NI, 3TB, 3ZS, 4CR, 9BW, 9BX.
Daylight: 3BOF, 4RN, 5HL, 5QL, 5UP, 5WV, 5AIU, 8ALW, 8CWU.

9ZT, Minneapolis, Minn.
(1AW), (1ER), 1JZ, 1UH, 1ABC, (1ABS), 1ACU, (1ADN), 1AJP, 1AKE, (1AV), 1BBO, (1BCF), (1BCG), 1BKQ, 1BOM, 1BSJ, 1BVB, 1BWJ, 1CKP, (1CMP), (1CPO), (1CRW), 2FP, (2GK), 2RB, 2RM, 2RS, 2AFP, (2ABG), 2AWH, 2BMR, 2BQH, (2BRB), 2BSC, 2BYC, 2CCX, (2CFB), (2CQZ), 2CVU, 3GS, 3HE, 3IW, 3TJ, 3TM, 3ABW, 3BJ, 3BVA, (3BVL), 3CCU, (3CHG), 4AF, 4AD, (4CS), 4DX, 4EB, 4FT, (4KU), 4MR, (5FX), 5GA, 5GE, (5GM), 5GN, (5LR), 5MN, 5MO, 5PB, (5QL), 5QQ, 5SF, 5TO, 5SK, (5ZA), 5ABM, 5AFN, 5AGJ, 5AIC, 5AIU, (5AKN), 5AMA, (5AMB), 5ANF, 5XAD, (5ZAV), (5ZAX), 6EC, 6FP, (6KM), 6PL, 6AGG, (6AGE), (6AJJ), 6ALK, (6ALV), (6AOS), (6ARB), 6ATZ, (6AWS), (6AWT), 6BKE, (6PZ), (6BQB), (6BRF), (6BRU), 6BUO, (6BVG), 6BVN, 6BYU, (6CBU), (6CFZ), 6CGD, 6CGW, (6CHL), (6CPY), 6CPZ, (7BJ), (7DC), 7DW, (7ED), (7LY), 7WP, 7YA, 7YL, (7ZD), (7ZF), 7ZL, (7ZN), 7ADD, (7AFE), (7AGV).
Can.: 2BN.

9EEV, Milwaukee, Wis.
1AEZ, 1ABS, 1AW, 1BBO, 1ADN, 1CBG, (1ACU), (1BWJ), 1BES, 1BLN, 1BWO, 1CKP, 1CDN, (1CMP), 1CPN, 1CVS, 1CVO, (1ER), 1FB, 1TS, 2ACD, 2AFA, 2AFP, 2AH, 2ANA, 2AQB, (2BNZ), 2BQC, 2BRB, 2BY, (2CEE), 2CEI, (2CQZ), (2CXD), 2FP, 2GK, 2KK, 2OR, 2RS, 2WA, 2WR, 3ACY, (3AJG), 3ATG, 3AUV, (3AWH), 3BBL, 3BBV, 3BDO, 3BIT, 3BMN, 3BRF, 3RUC, (3BVA), (3BVL), 3CEL, 3CBL, 3JJ, 3OE, 3SG, 3TJ, 3VO, 3ZO, (3CDK), 4AL, 4BQ, 4DX, 4EB, 4EL, 4FS, (4FT), 4GL, 4GZ, 4HS, 4HZ, 4KU, 4NA, 4OM, 4QP, 5AAG, 5AAM, 5ABT, 5ABN, 5ACQ, 5AEC, (5AFQ), 5ADB, 5AMA, 5AMH, 5AGJ, 5EN, 5FC, 5GI, 5GO, 5GP, 5HL, 5IN, 5GM, 5KC, (5LL), 5LR, 5MN, 5NS, 5NW, 5NZ, 5NK, 5QQ, 5PH, 5RE, 5UK, 5VA, 5ZAK, 5ZAS, 5ZAV, 5ZB, 5ZC, 5EK, 5ARB, 6AWT, 6BVB, 6BIH, 6BQL, 6BVG, 6CB, 6CPI, 6CKR, 6ZAH, 7GJ, 7HG, 7SF, 7WM, 7WP, 7ZU, AN-5, WWV.
Can.: 2BN, 3BN, 3BP, 3HE, 3NI, 3OH, 3SI, 3ZO, 4DY, 5CN, 5GO.

We are sorry, fellows, that the Convention Story forced some good technical articles out of this issue. They will come through in the December number, though, and we expect it to be a hum-dinger.

By-the-way; the Directory of Personnel of the Operating Department was misplaced this month; you will find it on page 129.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.
Of QST, published monthly at Hartford, Conn., for October 1, 1923.

County of Hartford } ss.
State of Connecticut }

Before me a Notary Public in and for the State and county aforesaid personally appeared K. B. Warner, who, having been duly sworn according to law, deposes and says that he is the business manager of QST and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The American Radio Relay League, Inc., Hartford, Conn.; Editor, Kenneth B. Warner, Hartford, Conn.; Managing Editor, (none); Business Manager, Kenneth B. Warner, Hartford, Conn.

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

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

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

5. That the average number of copies each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

Sworn to and subscribed before me this 25th day of September, 1923.

K. B. Warner.

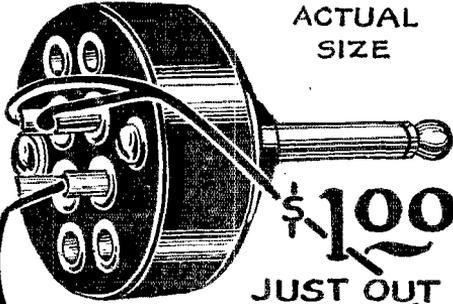
Wm. Lacey Wells, Notary Public
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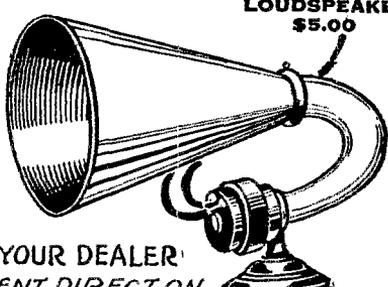
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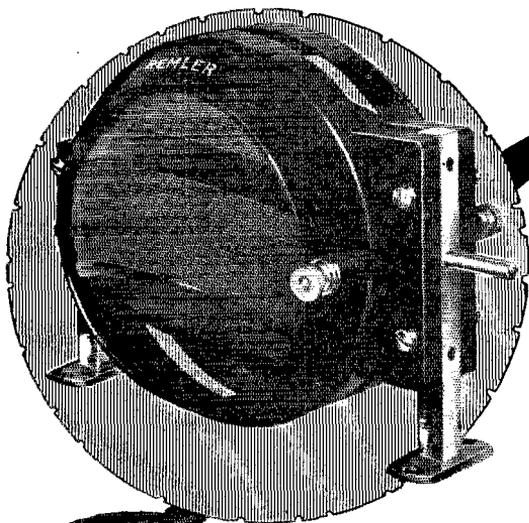


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'A Laboratory Product'

Good dealers everywhere recommend and sell Burgess Batteries

BURGESS BATTERY COMPANY

Engineers—DRY BATTERIES—Manufacturers
Flashlight—Radio—Ignition—Telephone

General Sales Office:

Harris Trust Building, Chicago

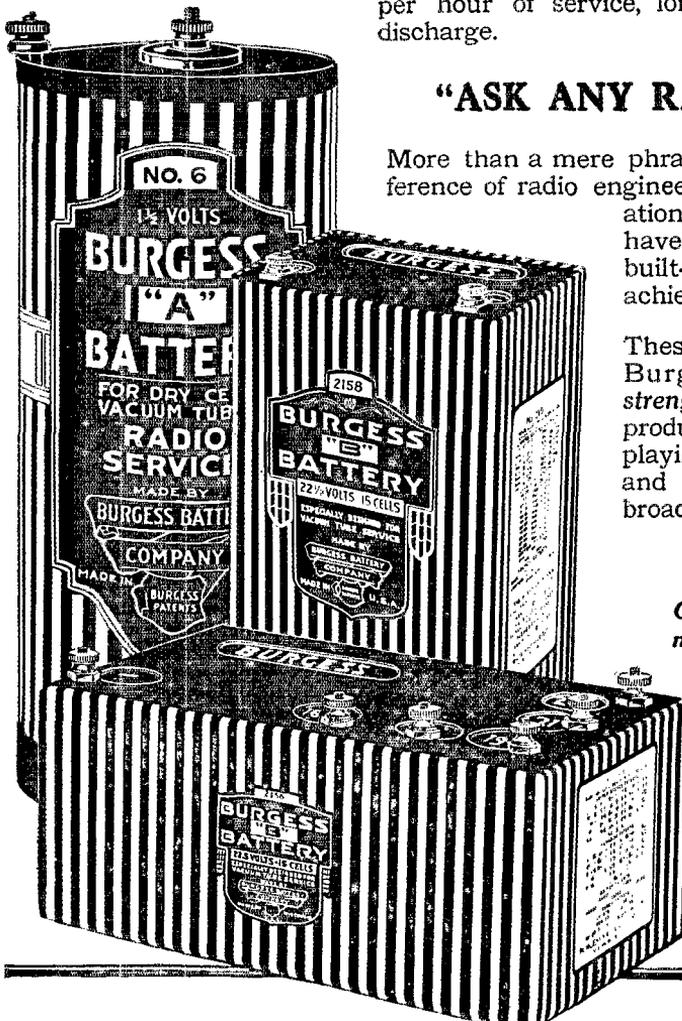
Laboratories and Works: Madison, Wisconsin

Branches:

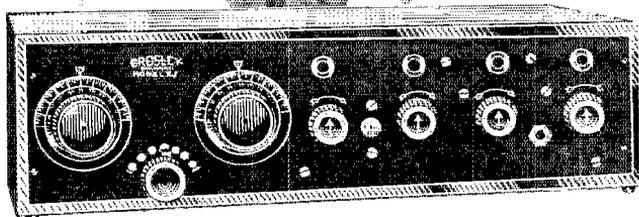
New York Boston Washington St. Paul
Kansas City New Orleans

In Canada:

General Offices and Works: Niagara Falls, Ont.
Branches: Toronto, Montreal, Winnipeg, St. John



"Abroad at Home"



WHERE SHALL WE GO TONIGHT?

CROSLEY
Better-Cost Less
Radio Products

List prices on our equipment west of the Rockies 10% higher. In Canada add duty.

Write for
Free
Catalog

To New York, Cuba, Atlanta, San Francisco or perhaps Honolulu? Far distant stations are continually being brought in clearly and distinctly with a Crosley Model X-J. Unsolicited letters from users telling of new distance records are received daily. You, too, at a very small cost, can enjoy the many pleasures and conveniences that this new Crosley Model affords.

CROSLEY \$65
MODEL XJ

A 4 tube radio frequency set, incorporating one stage of Tuned Radio Frequency Amplification, Detector and two stages of Audio Frequency Amplification, with jack to plug in on three tubes for head phones; new Crosley multistats, universal rheostats for all makes of tubes; new condenser with molded plates; filament switch and other refinements of detail. This receiver is exceptionally efficient in long range reception. It will bring in stations at almost unbelievable distances clearly and distinctly.

We unhesitatingly claim the Model X-J is the best radio receiver ever offered, regardless of price.

The Crosley Model X-J together with the complete Crosley line of receivers ranging in price from \$28 to \$150 are for sale by best dealers everywhere.

CROSLEY MANUFACTURING COMPANY

Powel Crosley, Jr., President

1118 ALFRED STREET,

CINCINNATI, OHIO

Pleasant Evenings in Camp With a Crosley Portable

No matter how far into the wilds you go on your vacation, you can keep in intimate touch with the outside world and enjoy its pleasures in the evening.

Crosley Portable Radio Outfits have made this possible. Absolutely complete in their compact cases, they may be easily carried and quickly set up.

After a hard day's motoring, fishing or canoeing, get out the old pipe, sit before the camp fire and listen to music, plays and innumerable other interesting things. Get a Crosley Portable and take it with you on your vacation. It will afford you the least expensive pleasure you have ever enjoyed.

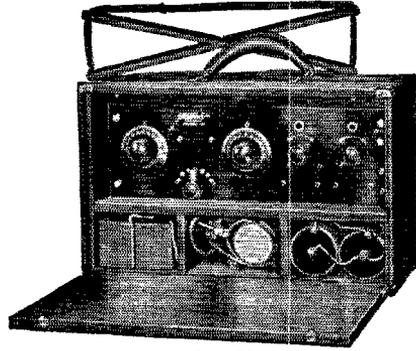
CROSLEY
Better—Costs Less
RADIO

List prices on our equipment west of the Rockies 10% higher. In Canada add duty.

CROSLEY MANUFACTURING CO.

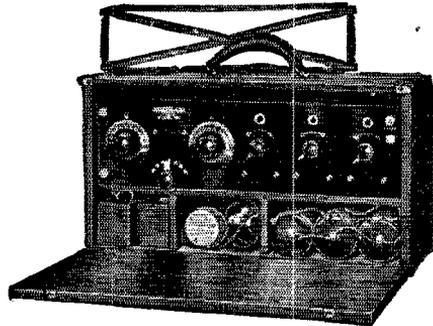
1118 ALFRED STREET,

CINCINNATI, O.



Crosley Model VI Portable

Consists of detector and one stage of tuned radio frequency amplification. Compact compartments are built into this set for batteries, phones, etc. Thousands of users have testified as to its satisfactory performance. Price without tubes, batteries or phones.....\$40.00



Crosley Model VIII Portable

Consists of one stage of tuned radio frequency amplification, detector and one stage of audio frequency amplification. This set has the same general construction as Model VI Portable, but performs even more efficiently.

Price, without tubes, batteries or phones.....\$60.00

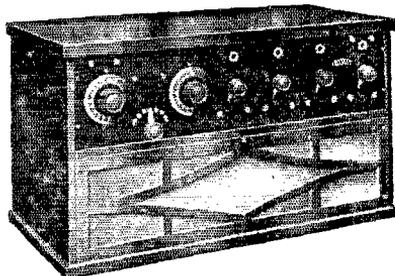
Free Catalog on Request

Three Beautiful Cabinet Models

The Last Word in Crosley Efficiency

CROSLEY MODEL XX

(Below)



CROSLEY MODEL XV

(Above)

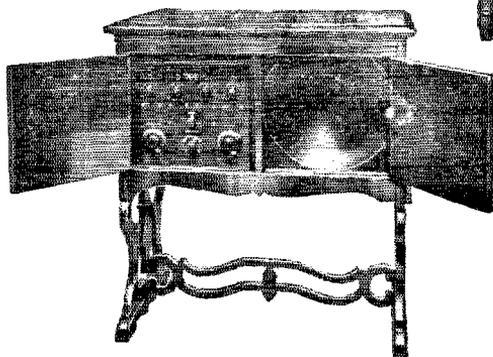
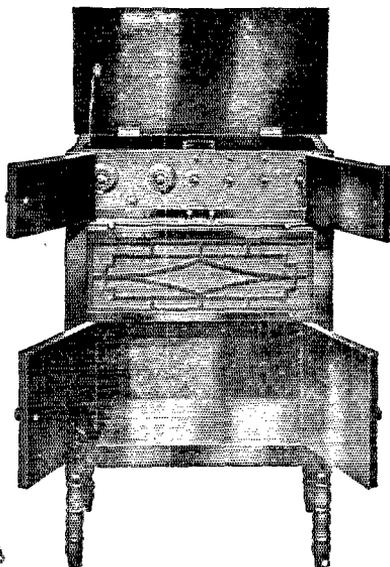
The receiving apparatus in this model is the same as that in our cabinet Model XX. The cabinet contains no place for the batteries, however, placed on a mahogany table or stand, it forms an attractive piece of furniture. Price without tubes, batteries or phones.....\$70.00

CROSLEY MODEL XXV

(Below)

We can conscientiously recommend this console model as the most beautiful and efficient model offered today. The receiving apparatus contains the same units as our model X though differently arranged. The cabinet of mahogany, exceptionally well finished is arranged to take the model R-3 Magnavox and also contains space for "A" battery, "B" battery and battery charger if desired. Guaranteed to bring in broadcasting stations 1000 miles or more distant so that they may be clearly heard all over the room. Price without tubes, batteries or phones.....\$150.00

This attractive model is our model X built into a highly polished mahogany cabinet. A hinged lid, when raised allows the operator access to every part of the receiving apparatus. A sliding board under the receiving apparatus forms a desk for the operator when desired. The lower compartment is made to take care of the batteries and the middle compartment contains a loud speaker which makes it possible for music, speeches, etc. to be heard clearly by everyone in the room. As a beautiful piece of furniture, this model is an addition to any room. Price without tubes, batteries or phones.....\$100.00



~~CROSLEY~~
Better—Costs Less
RADIO

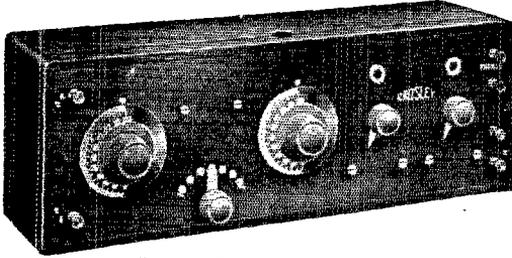
List prices on our equipment west of the Rockies 10% higher. In Canada add duty.

CROSLEY MANUFACTURING CO.
1118 ALFRED STREET, CINCINNATI, O.

Crosley Radio Parts and Sets

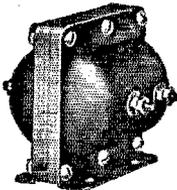
Popularity Proves Their Worth

The fact that innumerable favorable comments are received daily from people everywhere who have used Crosley parts and sets with entire satisfaction leads us to believe that you too will find that they will fill your every requirement.



Model VI—Price \$28
range reception. Hundreds of testimonials have paid tribute to its efficiency.

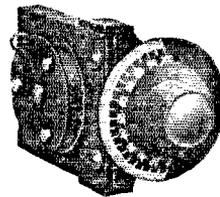
This Model contains the stage of tuned radio frequency amplification brought to 100% perfection by the Crosley Company. For its price and size, it gives surprising results in long



**CROSLY
SHELTRAN
TRANSFORMER**
Price\$4.00

The Crosley Sheltran is a completely shielded transformer. Embodied in it are all the characteristics so essential to obtain maximum amplification from the modern vacuum tubes used in radio work. Tests have proven the design to be correct to insure maximum efficiency.

The Crosley Radio Frequency Amplifying Tuner consists of an inductance coil and a Crosley book type variable condenser. It can be tuned to any wave length between 200 and 600 meters. When used with non-regenerative sets it will increase the range many times.



**CROSLY
AMPLIFYING TUNER**
Price\$4.00

List prices on our equipment west of the Rockies 10% higher. In Canada add duty.

CROSLY
BETTER-COST LESS
RADIO

For Sale By Good Dealers Everywhere

CROSLY MANUFACTURING COMPANY
1118 ALFRED STREET, CINCINNATI, O.



ACE TYPE V

Formerly called
Crosley Model V

ARMSTRONG REGENERATIVE RECEIVER

\$20

Licensed under Armstrong
U.S. Patent No. 1,118,119

The Ace Type V Armstrong Regenerative Radio Receiver is without doubt the most popular of all sets. Its low cost is not indicative of its efficient service because it performs equally as well as any one tube set at any price.

The very first evening you enjoy the Ace Type V you'll wonder how you ever did without it.

Under ordinary conditions you can pick up stations from coast to coast one after the other, with this long range regenerative receiver. A loud speaker can be operated in connection with the Ace Type V by simply adding an Ace Type 2 B, a new two-step Audio Frequency Amplifier, which sells for \$20.00. This makes it possible to hear the evening's entertainment all over the house.

This set is so low in cost that everyone can now afford to enjoy radio. Don't be without radio entertainment any longer—listen to the world's best talent—both instrumental and vocal with the Ace Type V.

The Precision Equipment Company

Powel Crosley Jr., PRES.

1118 Vandalia Avenue, Cincinnati, Ohio

Prices do NOT include batteries, tubes, or headphones. Buy these from your Dealer.

Be sure to visit us at the Grand Annual Radio Exposition, Coliseum, Chicago, Booth No. 78 on the Colonnade, November 20 to 25th.

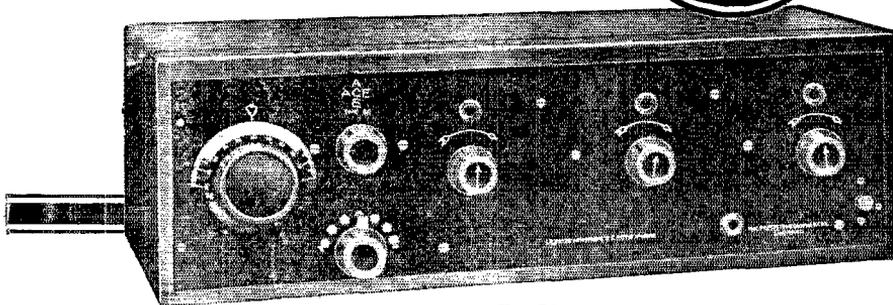
"List price west of the Rockies 10% higher. In Canada tariff added."

ACE

3B

THREE TUBE
ARMSTRONG
REGENERATIVE RECEIVER

\$50



Manufactured under
Armstrong U. S. Patent
No. 1,113,149

For Use with 6 Volt or 1½ Volt Tubes

Prices do not include batteries, tubes or headphones. Buy these from your Dealer.

If your dealer cannot supply you, order direct, mentioning his name. Ask for "Simplicity of Radio." Your copy is Free.

"List price west of the Rockies 10% higher. In Canada tariff added."

Do not compare this set with others selling at a similar price because the Ace Type 3B is surely one of the most efficient sets ever designed. It is equal to a combination of the Ace Type V and the Ace two-stage amplifier. For volume and distant reception it out-performs most sets costing a great deal more.

The new Ace Type 3B has a filament switch which eliminates necessity of turning out rheostats when set is not in use.

You may be listening to a station and turn off the set by throwing the switch—then come back later to the same concert without retuning. Has telephone jack between first and second stage of amplification. This is for use for those who desire to use head phones instead of a loud speaker. Crosley Multistats, universal filament control rheostats for all makes of tubes are also used in the Type 3B. Sells for only \$50.00, but worth much more. Has genuine mahogany cabinet with engraved panel.

DEALERS: Write on your letterhead for attractive sales proposition.

The Precision Equipment Company

Powel Crosley Jr., PRES.

1118 Vandalia Avenue, Cincinnati, Ohio

New!

Westinghouse

CRYSTAL CASE

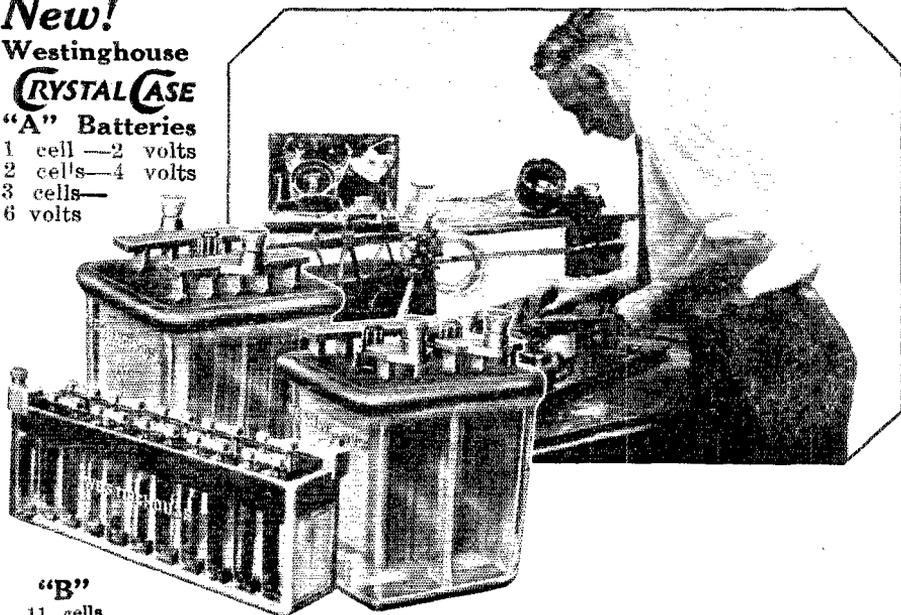
"A" Batteries

1 cell—2 volts

2 cells—4 volts

3 cells—

6 volts



"B"

11 cells
22 volts

Are You Improving Your Set This Fall?

NOW that radio broadcast reception has emerged from the nearly development stage natural with all great inventions; now on the eve of a long winter of radio treats more elaborate and finer than ever, thousands of radio fans are rebuilding or re-equipping their sets with units that have thoroughly proved their worth.

Batteries. You can't be too critical in choosing them. Westinghouse rechargeable storage batteries have won high favor everywhere. Even-powered, full-powered, slow-discharging, they've demonstrated their superiority for fine tuning, signal-holding, sound volume and operating economy. See your dealer and ask for Westinghouse **CRYSTAL CASE** Batteries. The line is complete—a type and size for every popular radio use.

WESTINGHOUSE UNION BATTERY CO.
Swissvale, Penna.

Westinghouse
"A" Batteries

One-piece glass case, with solid glass plate rests. Neat and durable. Visible interior—liquid level readily inspected. Easily recharged.

Westinghouse
CRYSTAL CASE "B" Batteries

The 22-MG-2 (22 volts) is a marvel for steady, noiseless, full-powered service. Long-lasting—easily recharged. Larger types, too.

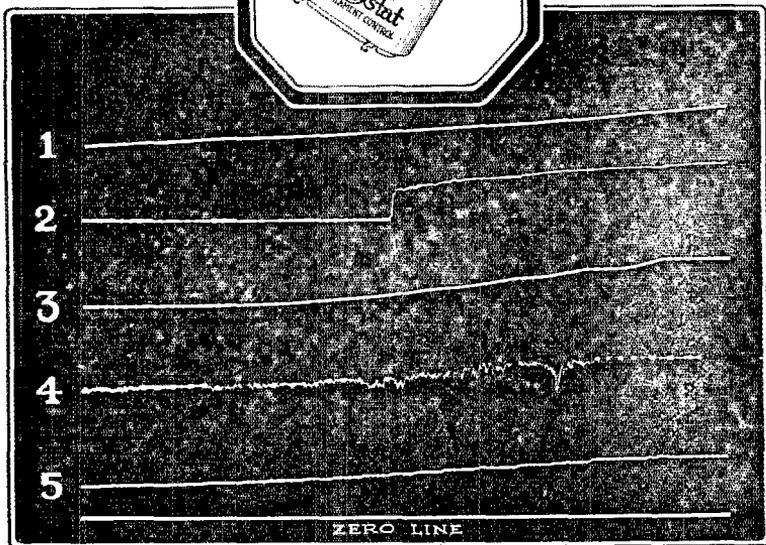
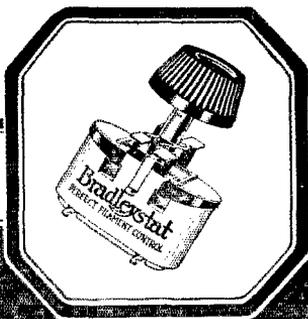
WESTINGHOUSE

Radio "A," "B" and "C"

CRYSTAL CASE BATTERIES

STEPLESS · NOISELESS

COMPACT · PERMANENT

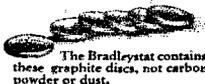


The Graphite Discs in the Universal Bradleystat Surpass All Other Resistors for Perfect Filament Control

SUBSTITUTES have been offered, from time to time, for the scientifically-treated graphite discs in the Universal Bradleystat. Carbon powder, dust, flakes and other materials have been tried without success.

For a time, such materials appear to give satisfactory service, but they soon pack into a solid mass and the filament control is destroyed.

The Allen-Bradley Co. has built graphite disc rheostats for over twenty years for battle ships, mines, rubber plants, textile mills and other places requiring smooth, stepless control. This wide experience has made possible the Universal Bradleystat, backed by a guarantee of excellence and performance which assures every Bradleystat purchaser of a filament control that is perfect and permanent.



The Bradleystat contains these graphite discs, not carbon powder or dust.

LABORATORY tests are made frequently to compare the performance of the Bradleystat with other types of filament control. A recent oscillograph test made at the University of Wisconsin is shown above to demonstrate conclusively the superiority of graphite discs over other resistance materials.

Curve No. 1 is the smooth perfect control of the Universal Bradleystat.

Curves No. 2 and 3 show the control of carbon powder or dust rheostats. Observe the unreliable and irregular control obtained.

Curves No. 4 and 5 illustrate the control of two types of wire rheostats.

Remember—The Universal Bradleystat can be used with any receiving or amplifying tube, and with 5-watt sending tubes.

Retail Price \$1.85
In Canada \$2.50

Allen-Bradley Co.
Electric Controlling Apparatus
277 Greenfield Ave. Milwaukee, Wis.

All Reliable Dealers
Sell the Bradleystat

THE ALLEN-BRADLEY CO. HAS BUILT GRAPHITE DISC RHEOSTATS FOR OVER 20 YEARS

The "A" Battery's Power in Your Radio Receiving Set

THIS IS NUMBER TWO OF A SERIES

THE sole purpose of the "A" Battery in your Radio Receiving Set is to furnish current to heat the filaments of the tubes.

And this can be done satisfactorily only by an "A" Battery that supplies an adequate steady current.

Anticipating the popularity of the dry cell tube in Radio, and realizing that it required a Dry Cell capable of standing up under service conditions differing from what dry cells are called upon to meet in other fields, the National Carbon Company developed the Eveready Radio Dry Cell specifically for this new use.

A dry cell gives its maximum service only when designed especially for the work it is intended to perform. There are for dry cells several uses which are so alike that one type of cell serves for all. This is the field covered by the ignition or general purpose dry cell.

The conditions encountered in Radio are different from the conditions grouped together under the term "general purpose." And while the general purpose dry cell performs well as an "A" Battery, it was found possible to produce a Dry Cell "A" Battery capable of delivering more service on Radio loads.

Thirty years of dry cell experience and an immense research organization resulted in the superior Eveready Radio Dry Cell. One of the outstanding features of this special cell is that while it will last much longer when used as an "A" Battery, it is no larger than the standard dry cell.

The increased service life of the Eveready Dry Cell "A" Battery greatly offsets the slight increase in cost; so this battery is not only the best, but it is the most economical you can buy. "The Story of Eveready Dry Cell Radio 'A' Batteries," which tells how to use Dry Cells to the greatest advantage with the various dry cell tubes now available, will be sent to you free on request.

* * * *

The "A" Battery gives power to your Radio Receiving Set. Eveready Batteries—especially made for Radio—serve better, last longer, give better results.

Note: This is number 2 of a series of informative advertisements which will appear in this magazine. They are designed to help users get the most out of their Batteries and their Radio Sets. If you have any battery problem, write to G. C. Furness, Manager Radio Division, National Carbon Company, Inc., 124 Thompson Ave., Long Island City, N. Y.



POWER for Your Radio Set

Eveready Dry Cell
Radio "A" Battery
(No. 7111)

Directions and wiring on the jacket tell just how to use this battery with the different dry cell tubes.

This special Radio Cell is also available in two and four cell multiple batteries for receiving sets employing from two to four WD-11 or WD-12 tubes.

Other Radio Batteries

Eveready Storage "A" Batteries—best suited for filament heating of all Radio Tubes not especially designed for dry cells. The quality storage battery with the long life plates, \$15 to \$20.

Eveready "B" Batteries—the life of your Radio.

Eveready "Three" Battery—3 cells, 3 purposes.

Manufactured and guaranteed by
NATIONAL CARBON COMPANY, Inc.

EVEREADY Radio Batteries

—they last longer

The Best Vernier and Non-Vernier Rheostats

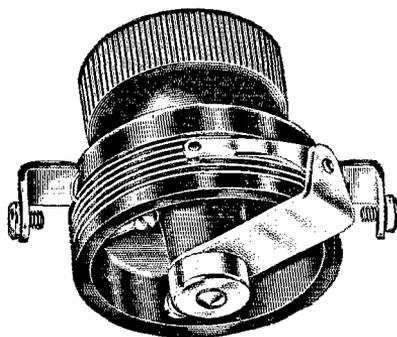
Where a vernier rheostat is desired, the Unity Vernier Rheostat produces results and a refinement in tuning adjustment, far surpassing any rheostat on the market. It is by far the highest type electrical instrument made for controlling resistance.

The Unity Vernier permits the most infinitesimal adjustment, and a feature exclusively Unity and one which you have no doubt often desired, is a cut-out switch operating with absolutely no change in tuning adjustment.

Specifications: Bakelite Base—Nichrome wire—Phosphorous bronze contacts, replaceable wire; permitting adaption to any tube. Made in any resistance. Stocked in 6 ohms, 25 ohms and 40 ohms. All capacities \$1.75 list.

The Unity Vernier Rheostat

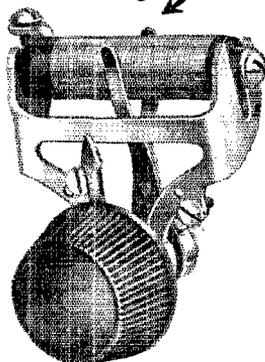
(Successor to the Jenkins' Rheostat)



Price \$1.75

The Unity Cartridge Rheostat

Interchangeable Resistance Cartridge



Assembled	80c
Bracket	45c
All Cartridge	35c

Where a non-vernier rheostat is sufficient, the economy, convenience and reliable performance of the Unity Cartridge Rheostat make it the choice of the experienced radio enthusiasts. Nothing like it has ever been offered. It has been endorsed by many of the leading radio engineers and manufacturers in the country. This is the best non-vernier rheostat made and outwears two of any other type. In addition, is the feature of being able to install any resistance cartridge desired without removing the rheostat from the panel.

Specifications: Phosphorous bronze fork contact insures minute adjustment and absolute control of resistance changes. Nichrome Wire Cartridges are made in any resistance. Stocked now in 6 ohms, 20 ohms, 40 ohms; 10-ohm and 30-ohm cartridges if desired. Cartridges for any tube fit the Unity brackets. All cartridges 35 cents.

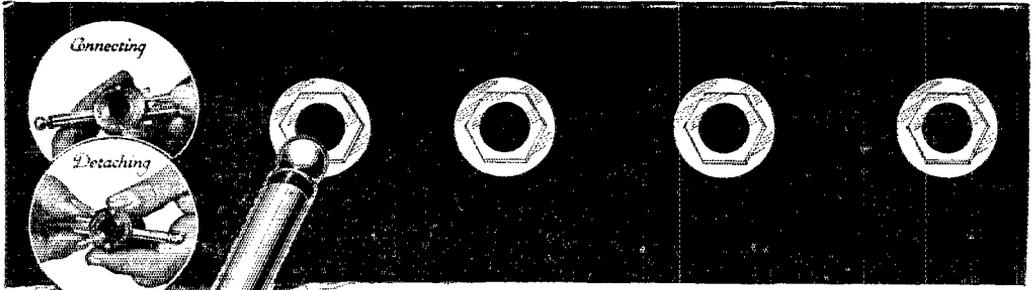
If your dealer has not yet received a supply we will mail your order promptly upon receipt of your check or money order, together with your dealers name.

Hear a Set that uses Unity Rheostats

Unity Manufacturing Company

224 North Halsted Street, Chicago, Ill.

Automatic Screw Machine Products, Stampings, General Manufacturing on Contract or Royalty



The Plug You'll Welcome

A real innovation in a Radio Plug—made by a concern whose reputation and standing, as the leading authorities in the electrical instrument field, has been unquestioned for 35 years. To YOU—it means the convenience of being able to connect or detach your phone cables instantly—without tools or broken fingernails. To connect merely shove in the cables—to disconnect, press the triggers and pull the cables out. Perfect contact always. Saves time in transferring from one set of cables to another—and consequently often the number of plugs required.

Initially designed for this concern's own exclusive use in its experimental laboratories—but now obtainable by you. No up-to-date outfit today is complete without it.

AT ALL DEALERS—\$1.00

Your order will be filled direct by mail if your dealer cannot supply you.

WESTON ELECTRICAL INSTRUMENT CO.

158 Weston Avenue,

Newark, N. J.

Branch Offices in All Principal Cities

Electrical
Indicating
Instrument
Authorities
Since 1888

WESTON

STANDARD - The World Over



Stromberg-Carlson Head Set Coils are wound a layer at a time with a wrapping of tough insulating material between layers. This high grade construction is revealed by sawing through a section of a coil taken from the—

Stromberg-Carlson

HEAD SET

It's the only head set construction which will stand up under the high plate voltages now prevalent for loud speaker hook-ups.

Therefore, it's the only head set construction which ensures permanent sensitivity.

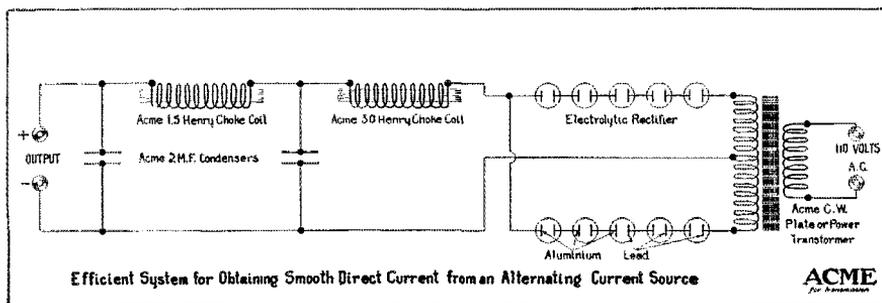
It's a construction which is an exclusive feature of Stromberg-Carlson Head Sets.

Ask your Dealer
STROMBERG-CARLSON TELEPHONE MFG. CO.
ROCHESTER, N. Y.



Don't annoy your neighbor

*How to avoid interfering
with the broadcast listener*



*Follow this diagram and you can make an
efficient filter for your set*

IN most cases where a complaint has been entered by a broadcast listener against an amateur using a straight C.W. transmitter, it has been found that the trouble has been due to an inefficient filter system. This interference is caused by a sixty cycle or motor-generator commutator frequency modulating the output.

The Acme Apparatus Company has always been interested in the amateur and offers this filter as a solution to the adverse criticism directed against him.

We do not say that the other filters will not work, but we have found the one shown above to be economically efficient.

The connection for an electrolytic rectifier is also shown. It is essential that the rectifier have sufficient jars, (1 per 75 volts) be properly formed, and be kept clean at all times. Use pure materials.

If tube rectifiers are used the same diagram may be used, substituting one rectifying tube for each series of jars. Acme Apparatus Co., Cambridge, Mass.

Send to Dept. 32 for Bulletin T on transmitting apparatus

Specifications of Acme Choke Coils

Henries	Current	Type	Prices	Henries	Current	Type	Prices
1½	.150	Single	\$4.00	6	.300	Single	\$14.00
1½	.150	Double	6.00	6	.600	Single	18.00
1½	.500	Single	6.00	30	.150	Single	18.00
1½	.500	Double	8.00	30	.300	Single	25.00
6	.150	Single	10.00	30	.600	Single	33.00

ACME - for transmission

To Our Readers Who Are Not A.R.R.L. Members

Wouldn't you like to become a member of the American Radio Relay League? We need you in this big organization of radio amateurs, the only national amateur association that does things. From your reading of *QST* you have gained a knowledge of the nature of the League and what it does, and you have read of its purposes as set forth on page 6 of every issue. We would like to have you become a full-fledged member and add your strength to ours in the big things we are undertaking for Amateur Radio, and incidentally you will have *QST* delivered at your door each month. A convenient application form is printed below—clip it out and mail it today.

.....1923

American Radio Relay League,
Hartford, Conn.

Being genuinely interested in Amateur Radio, I hereby apply for membership in the American Radio Relay League, and enclose \$2.00 in payment for one year's dues. This entitles me to receive *QST* for the same period. Please begin my subscription with the.....issue. Mail my Certificate of Membership and send *QST* to the following address.

.....

.....

.....

Station call, if any.....

Grade operator's license, if any.....

Radio Clubs of which a member.....

Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may write to him too about the League?.....

.....Thanks.

EACO ALKALINE STORAGE "B" BATTERY

(24 Cell Size)



The "B" Without a Buzz.

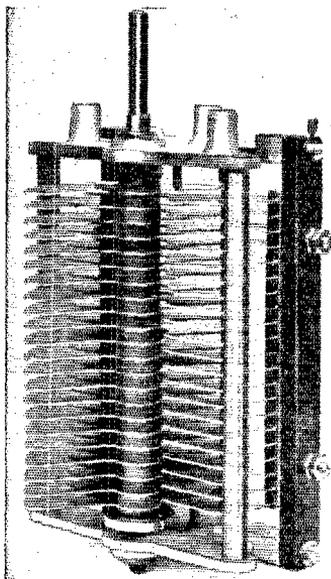
Absolutely noiseless. Cannot be damaged by overcharge or short circuit. Container is glass, constructed to nest neatly.

A winner for DX work
Price \$6.00

F.O.B. Shipping Point.
(Discount to Dealers)

**ECONOMIC APPLIANCE
COMPANY**
Irwin, Penna.

The ONLY Variable, Air, Transmitting Condenser on the Market!



EVERY operator knows that extremely high losses are introduced by using solid dielectric condensers in the transmitting circuit. These losses increase tremendously on short wavelengths and make really efficient transmission at 200 meters or lower almost impossible.

Cardwell variable, air transmitting condensers have negligible losses even at amateur wave lengths. The dielectric is air with the insulation practically outside the electrostatic field. Furthermore, the amount of surface contact between the insulated stator and the support has been reduced to the smallest possible area.

These condensers will operate in any transmitting circuit in which the voltage across the condenser does not exceed 3,000. The maximum capacity of Type 147-B is .00045 Mf. There are 22 rotor plates (grounded to the frame) and 21 stator plates. Clearance between plates is .023 inches. The rotor, in addition to its ample bearing contact with the frame, is connected by pig tail. End stops are provided. Calibration for capacity is practically straight line with a minimum of 27 Mmf. (not Mf.) The overall length from panel to end of the condenser is 6.125 inches with an overall diameter (plates in or out) of 4.0 inches.

For sharp tuning, low losses and consequent long distance range, Cardwell condensers offer the only practicable air type condenser for transmitting purposes. Dead end losses involved in coil tuning can be avoided by the use of the Cardwell variable, rotor-grounded transmitting condenser.

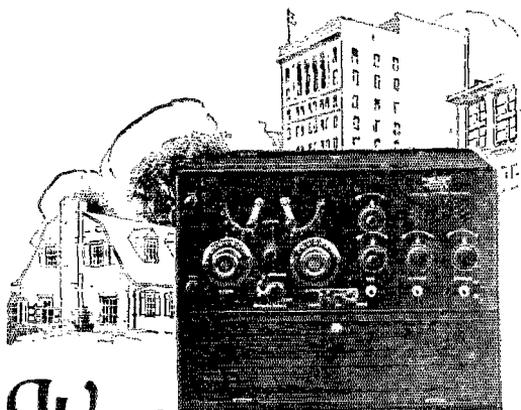
Type 147-B \$15.00

Used By Many Broadcast And Amateur Station Operators

Write for
Circular

ALLEN D. CARDWELL
Manufacturing Corporation
Brooklyn, New York

Four Types
Of Receiving
Condensers



Works everywhere -city or country-

Here is a set which brings distortionless speech and music to you no matter where you live. The Moon is operated by simply grounding to a water pipe or radiator—no antenna, loop or indoor wire is necessary.

Stations within a conservative 1000 mile radius are regularly received with a non-power loud speaker on this set.

It is the ideal set for use in apartments, automobiles, yachts or railroad trains where an antenna is not practical. Extremely sensitive, unusually selective, yet simple to operate.

Write today for our folder
"California or Neu ark"

DEALERS: Ask About Our Franchise

MOON RADIO CORP.

501 Steinway Ave.

Long Island City, New York

In Canada, Continental Equipment Co., Ltd.
New Birks Bldg., Montreal, Quebec

MOON
Satterlee
antennaless
RADIO

Less Distributed Capacity. No Distortion. 40% More Amplification because

Samson
HW-A1
AUDIO FREQUENCY
Transformer has

HELICAL WOUND COILS

Radio set owners all over the country have learned that SAMSON Transformer superiority proves out under actual operating conditions. Here's an extract from a letter by an authority: "The Samson Electric Company have apparently 'rung the bell' with their transformer. Several of the men here in headquarters and one or two commercial radio laboratory experts have had occasion to use and test out the transformer and they are all very high in their praise of it."

Helical Windings in BOTH primary and secondary coils have revolutionized transformer efficiency. And only Samson Transformers can have Helical Wound Coils.

Helical Winding lays the wire in layers at right angles to the core. Adjacent wires are fewer turns apart; consequently the electrical pressure is less and capacity effect is reduced to a minimum.

To make your set operate at its best use SAMSON Transformers. Write for Report No. 22 and Chart of Tests.

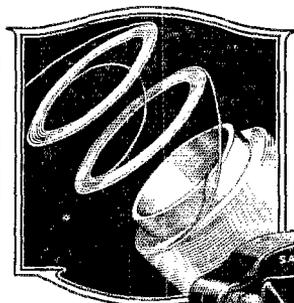
Made by

SAMSON ELECTRIC COMPANY

Factory: Canton, Mass.

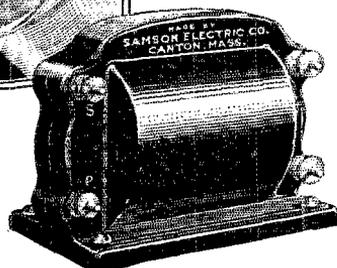
Sales Offices:

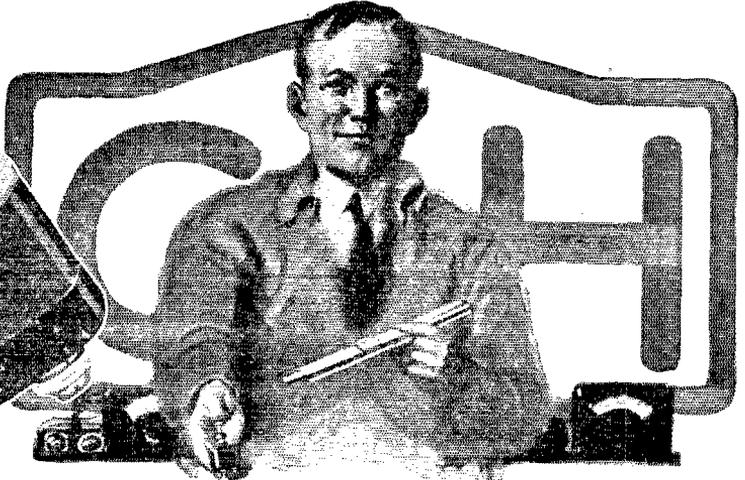
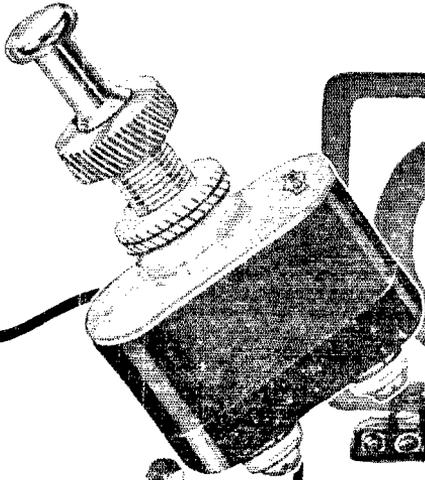
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Cleveland Detroit
Indianapolis
St. Louis
Minneapolis
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Los Angeles Seattle
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Montreal and Toronto



Ratio 6 to 1

Price \$7
at dealers





A Switch by the Master Builder for Your Radio Panel

*Beautiful Appearance
Correctly Designed—Easily Installed*

In the radio world the name Cutler-Hammer and its symbol the famous C-H trade-mark have become guide posts to quality. In only a few months after their introduction more than a half million radio rheostats with the little mark of approval of the master builders of all electrical control apparatus were purchased.

Now these specialists offer another necessity for your panel, the C-H Radio Switch embodying the same careful design and workmanship to provide more pleasant, convenient reception and protect your expensive equipment at a negligible cost. Its sturdy knife blade mechanism that snaps—not merely slides—is capable of carrying 3 amperes at 110 volts, yet is built with a precision that enables you to use it in your most delicate circuits without any microphonic noises.

It will control your "A" battery to positively indicate whether the tubes are *on* or *off*—your "B" batteries—parts of circuits—condensers—battery charger—practically any demand you may have for current control. It is fully adjustable for panel thickness and can be installed in any set in a few minutes—only a single $\frac{1}{8}$ " hole is required. Carried by dealers everywhere—if yours has not yet been stocked, send 60c plus 10c carrying charges and you will be supplied direct.

THE CUTLER-HAMMER MFG. CO.

Member Radio Section, Associated Manufacturers of Electrical Supplies
MILWAUKEE - WISCONSIN

Disconnecting a battery lead is one way of shutting off a radio set, but many tubes and batteries have been ruined by putting it back on the wrong post. A C-H Radio Switch costs 60c—if you use only a few dry cells it quickly earns its cost.

What do you do when the phone rings? Just push the C-H Radio Switch button—answer the phone—pull the button and the same program is back on. No turning back rheostats or disturbing your delicate settings when you have C-H convenience.

With the new tubes that operate at a dull red it is easy to forget to turn off the "A" battery—there is nothing to indicate whether the set is ON or OFF. The nickel button of a C-H Radio Switch sticks right out to say "I'm ON—don't forget me!"



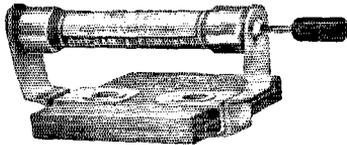
RADIO SWITCH

Well, what did you think of the A.R.R.L. Convention?

Lots of good dope, we'll say, with a "good time enjoyed by all." And now for putting some of the stuff into practice. Little Omega Durham and his friend Dubilier stand ready to make your tubes just about fall over frontwards reaching for the super-extra DX. If the rest of your outfit is up to snuff, the DURHAM one-finger grid control will keep you busy sending postcards—to broadcast artists, or to wall-paper the ham transmitter shacks.

Varied uses for variable resistance

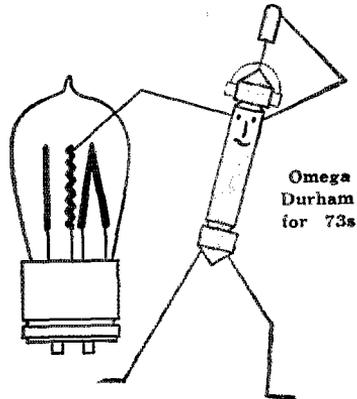
Most of the new circuits—particularly the r.f. stuff—call for 1,000 to 100,000 ohms or more across transformers, etc. DURHAM Variable No. 100 is the type to use.



Your choice of values

\$1.10

Complete



DURHAM
Variables

No. 101—0.1 to 5 megs.
No. 201— 2 to 10 megs.



DUBILIER
Micadons

.00025 mfd.
.00050 mfd

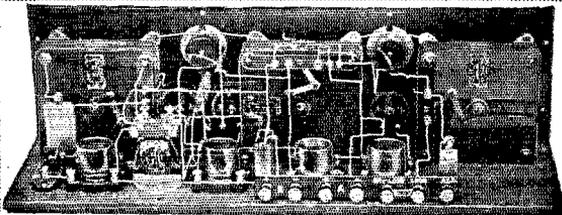
Your dealer has them now

DURHAM & Co.

Radio Engineers

1936 Market St., Philadelphia

Dealers and Jobbers:—The A.R.R.L. Convention started the lads on several new tracks. An increased demand is on for variable high resistance of proved merits.



NEW PRINCIPLE
of
TUNED RADIO FREQUENCY
GIVES
REMARKABLE
RESULTS

With The

MELCO SUPREME

The Radio-Frequency Amplifying Receiver that—

PRICE ONLY
\$140

Complete knock-down parts for Melco-Supreme including drilled engraved Bakelite panel and solid mahogany cabinet.

PRICE \$90

Operates with merely a 10 FT. WIRE—not even a ground necessary.
Offers exceptional CLARITY without the slightest loss of tone quality.
Assures unusual program SELECTIVITY through its single tuning adjustment.
Affords a REAL DISTANCE by covering all Broadcasting ranges from 180 to 610 Meters.

We also manufacture a complete line of parts under the Amsco Brand. Write for our descriptive literature.

AMSCO PRODUCTS, INC.

Broome & Lafayette Sts.

Dept. Q

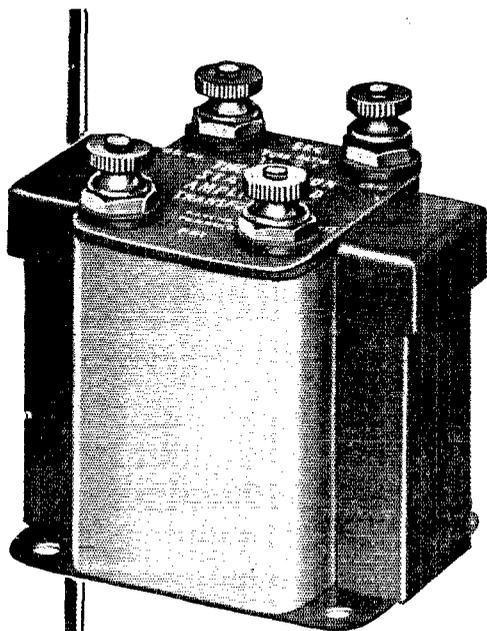
New York City

A LONG AND SKINNY INSULATOR 18 INCHES BETWEEN WIRE HOLES



Highly vitrified high tension white glazed porcelain, tensile strength 1500 lbs.
In Lots of Six or More **ONE DOLLAR EACH**
9DNH SURE FIRE RADIO LABORATORY

Express C.O.D.
MACOMB, ILL.



The New

THORDARSON

Super Transformer

More than a quarter of a century has been devoted by Thordarson engineers to the design and development of power transformers ranging in size from the smallest bell ringer to the first 1,000,000 volt transformer the world ever saw.

That knowledge and practical experience has been intelligently devoted to devising an Audio Frequency Amplifying Transformer that would produce the greatest volume consistent with *true tone quality*.

Here it is—its specifications and efficiency under all atmospheric conditions and over all audible signals, ranging from 100 to 7,000 cycles have been tested and endorsed by the

foremost radio engineers in the United States. Thousands of these new amplifying transformers are daily furnishing the means to greater pleasure and entertainment to discriminating radio amateurs and experimentors.

Developed and manufactured entirely by Thordarson engineers in the Thordarson plant

It is not merely an assembly of bought coils, core iron, etc., as is the case of most audio frequency transformers in the market.

Core is made of .007 highest grade silicon steel, No. 36 gauge, the cross section of which measures $\frac{3}{4}$ inch—twice that of the usual type transformer. Coil is *square layer wound* of No. 40 wire to fit the square core. The winding process and machinery were designed and developed exclusively by Thordarson.

The basic principle and construction of this new Thordarson product are scientifically, electrically, and mechanically correct. Exhaustive tests and experiments have proved conclusively that:

1. Core losses are reduced to a minimum.
2. Over-saturation of the core is eliminated.

3. When in use the resistance of the plate circuit of one tube and the resistance of the grid circuit in the following tube are balanced to a degree heretofore unequaled.

4. The received energy is increased sufficiently to actuate loud speaking devices without distorting the incoming signal.

5. The volume produced is as great as *pure tone quality reproduction will permit*.

The new Thordarson amplifier is the choice not only of thousands of amateurs and experimentors, but an increasing number of leading receiving set manufacturers now specify Thordarson Transformers as standard equipment.

Make your own test

Words nor pictures nor specifications alone can do justice nor prove the superiority of Thordarson products. Let your own ears guide you in your comparison.

SOLD AT ALL GOOD DEALERS

PRICE, MOUNTED ONLY
 6 to 1 ratio transformer . \$4.50
 (with Red Label)
 3½ to 1 ratio transformer 4.00
 (with Blue Label)

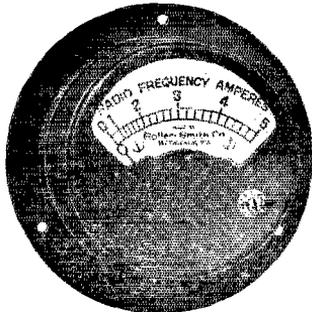
THORDARSON

ELECTRIC MFG. CO.

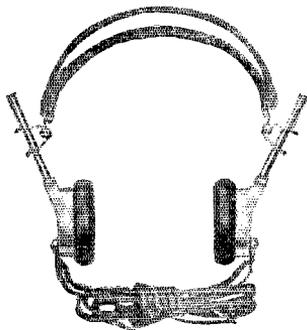
Huron and Kingsbury Streets, Chicago



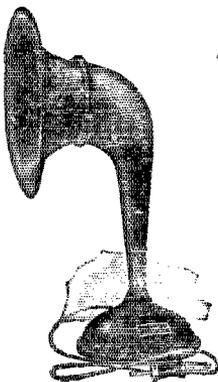
RADIO APPARATUS
for
INDICATION



RECEPTION



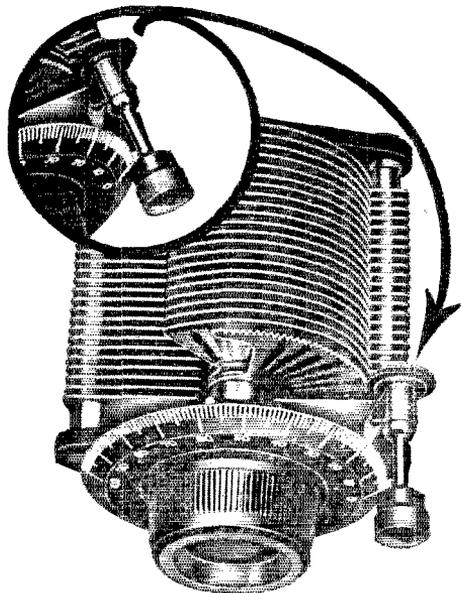
AMPLIFICATION



Send for Bulletins AG-10, AG-20 and AG-810.

ROLLER-SMITH COMPANY
16 Park Place, New York

Offices in principal cities in U.S. and Canada



HEATH'S
Radiant
Condensers

Now the "guess" has been taken out of condenser buying. The source of greatest uncertainty, the plates, by a new process of stamping and tempering in *Heath's Radiant Condensers* are **PERMANENTLY FLAT**. They are as proof against warping and buckling as a steel straight edge. These condensers will keep their fine alignment without any adjusting during their *entire life!*

A Vernier Adjustment
Geared Like a Watch

Ordinary vernier adjustment reduced to micrometer fineness. Extreme delicacy of adjustment. Smooth, positive, accurate as a watch. *Heath's Radiant Condensers* are especially adaptable to the fine tuning required on high amplification.

Write for Illustrated Folder.

LIST PRICES

VERNIER TYPE

- 13 Plate including 2 7/8" dial and knob.. \$5.00
- 25 Plate including 2 3/4" dial and knob.. 5.50
- 46 Plate including 2 3/4" dial and knob.. 6.50

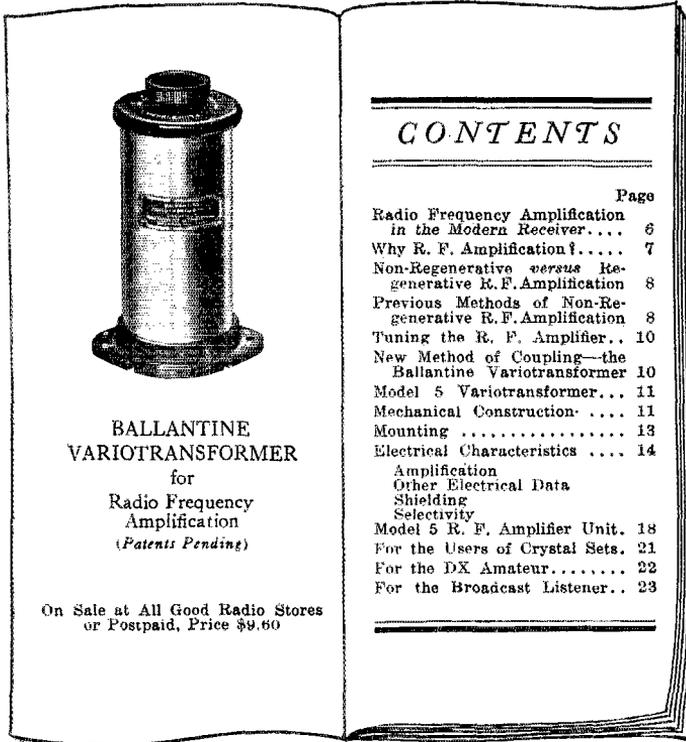
Jobbers and Dealers Write
Immediately for Proposition

HEATH RADIO
& Electric Mfg. Co.

207 First St.,

Newark, N. J., U. S. A.

Tells how to get those stations you read about but never hear



**BALLANTINE
VARIOTRANSFORMER**

for
Radio Frequency
Amplification
(Patents Pending)

On Sale at All Good Radio Stores
or Postpaid, Price \$9.60

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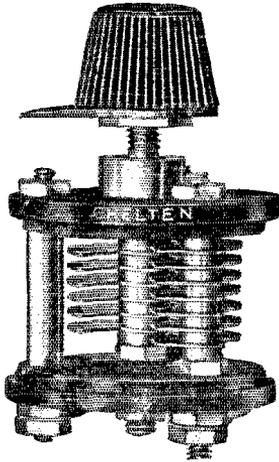
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“Radio Frequency Amplification with the Ballantine Variotransformer”

Here's a booklet that will help you get many stations that you've never heard before. Based on research of the Radio Frequency Laboratories, Inc., it gives the latest developments in tuned radio frequency amplification. Furthermore, it tells how to use the *continuously variable* BALLANTINE TRANSFORMER for both amateur and broadcast wave lengths—with amplification *uniformly high*.

Free for the asking, this 25-page booklet is full of facts, helpful information and practical diagrams. Edition is limited—better write for your copy at once.

BOONTON RUBBER MFG. CO.
124 Fanny Road
Boonton, N. J., U. S. A.



Price \$1.50
 Actual Size
 Patents Pending

**Accurate Vernier Regulation
 With the Chelten Midget
 (A Variable Condenser)**

THE CHELTEN MIDGET furnishes the most accurate Vernier regulation when *shunted* across the plate of the main condenser with minimum body capacity.

By far the easiest and most accurately adjustable *neutralizing condenser* on the market, having a capacity range of .00001 to .000045 MFD., such as required for *Hazeltine's Neutrodyne* and other circuits.

The Chelten Midget Condenser adjustment can be used to replace all fixed condensers regardless of capacity and give a vernier adjustment if required.

The new Chelten Catalogue showing a number of new instruments will be ready for mailing to all recognized jobbers and dealers October 1st. Write for your copy.

Eastern Sales Agents
 H. N. SHEBLE CO.
 4859-65 Stenton Ave.
 PHILADELPHIA

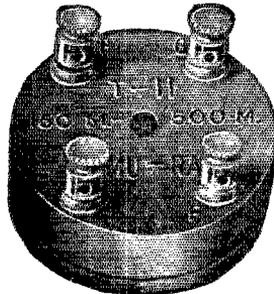
*Since 1910 Manufacturers of
 High Grade Electrical Specialties.*

**Chelten Electric Company
 PHILADELPHIA**



Built for Distance
**Mu-Rad R-F
 Amplifying
 Transformers**

200-600 Meters Air Core



DEVELOPED by Mu-Rad engineers, after tireless research, to contribute to the remarkable distance capacity of Mu-Rad Receivers. YOU can have these same transformers for your set.

Entirely eliminates iron, capacity and eddy current losses. Any Mu-Rad dealer will demonstrate the advantages of Mu-Rad R.F. Transformers.

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DEALERS:

Our dealer cooperative policy is progressive business - building. Write for details NOW.

For UV-199 Tubes
 Use Type T-11 for the First Stage.
 Type T-11A for the Second Stage.
 Type T-11B for the Third Stage.
 For UV-201A or WD-11 Tubes
 Use Type T-11C in all stages with damping coil.

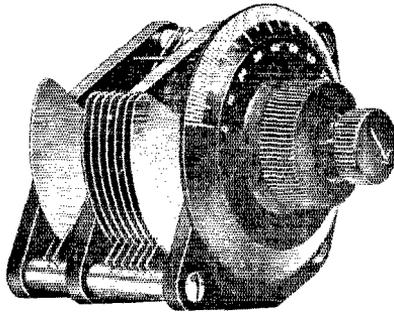
Send 10c for R-F circuit diagrams and treatise on Mu-Rad R-F Amplification

MU-RAD LABORATORIES, INC.
 804 FIFTH AVE. ASBURY PARK, NEW JERSEY



THE IMPORTANCE OF VARIABLE CONDENSERS

New Model
No. 10



23 Plates
\$4.50

NEARLY all modern receiving circuits contain one or more variable condensers. Upon the performance of these vital parts depends largely the degree of success of your receiving set. It is easy to produce condensers which look efficient, but effectiveness in these parts is much more than skin deep.

CHELSEA VARIABLE CONDENSERS

Enable any receiving circuit to give its best. Plates are die cast into solid units giving permanence of electrical and mechanical connections and rigidity at all times. This is the only sure method of construction which avoids corrosion and insures low resistance. Insulating material is the best obtainable—genuine bakelite—molded by Chelsea. This insures low electrical losses. Large brass self-aligning bearings eliminate all play and maintain the proper air gap at all times. Plates are of heavy stock of the proper design. These are some of the reasons why you should use Chelsea condensers to achieve the results you hope for.

Made in eleven styles, they form a complete line in which there is the proper type and capacity for any receiving circuit.

Prices from \$2.50 to \$6.75

OTHER QUALITY CHELSEA PARTS:

Variometers with Vernier... \$8.00	Rheostats \$1.00 and \$1.40
Variocouplers 8.00	Tube Sockets50 and 1.00
Audio Transformers \$3.75 and 4.50	Dials40, .45 and .50

Write to Department 4 for our large catalog, which illustrates and describes the complete line of Chelsea Receiving Sets and Parts

CHELSEA RADIO EQUIPMENT



"REGAL" Radio Products---Fit For a King

New "REGAL" Items for the 1923-1924 Season

New "REGAL" No. 162
Double Arm Inductance
Switch



A 15 point Switch complete in one unit.

No more messy soldering.
No more chipped panels.
No more drilling of holes.
Complete with hard rubber

Knob and Dial.....\$1.50

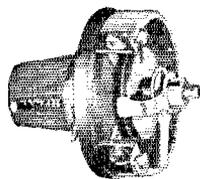
New "REGAL" No. 200
Audio Frequency
Amplifying Transformer



For clearness of tone, amplification of voice and music from nearby and distant broadcasting stations, is unequalled by any Transformer on the market.

3 1/2 to 1 Ratio\$4.50
5 to 1 Ratio 4.75

New "REGAL" No. 120
Vernier
Controlstat



For fine filament control of tubes and super-fine tuning the Regal Vernier stands alone. Nothing just like it on the market.

Complete with Knob.

6 Ohms\$1.25
30 Ohms 1.25

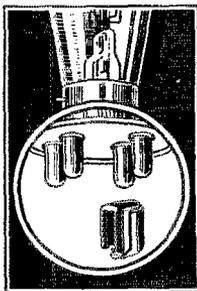
If your Dealer does not carry "REGAL" Products, write us direct.

(Send for catalog No. 26 showing 30 Big "REGAL" items)

THE AMERICAN SPECIALTY COMPANY, Bridgeport, Conn.

GAMBLING?

YOU ARE IF YOUR RADIO
TUBES ARE UNPROTECTED



Your Vacuum Tubes are the most delicate parts of your Radio Set. They are easily blown out—you have probably already had this exasperating experience—it is apt to happen at any time.

"B" Battery wires accidentally crossed for only an instant with the filament leads or sudden excess current from the "A" Battery will do it. You can prevent this and save yourself money and inconvenience and relieve your mind at a trifling cost.

INSTALL

RADECO SAFETY FUSES

on all your tubes. Applied in an instant to one of the filament terminals. Will fit any standard tube going in any standard socket.

Price 50 cents each, sent postpaid and fully guaranteed. Do not delay. Order now. Specify type of tube used.

Dept. 9

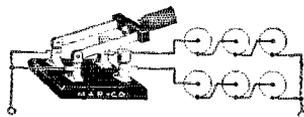
RADIO EQUIPMENT COMPANY

Manufacturers and Distributors of
Standard Radio Equipment

630 WASHINGTON ST. BOSTON, MASS.

New England's Oldest Exclusive Radio House

Dealers:—Write for our proposition



BREAK multiple cell connections with MAR-CO Knife Switches to avoid inter-action and be sure of satisfactory battery service.

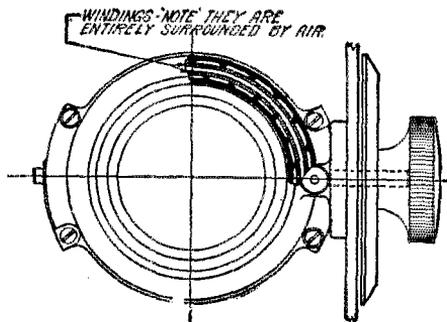
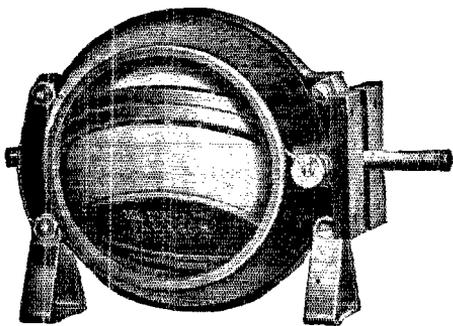
No. 11 single pole single throw...\$0.60
No. 12 single pole double throw... .70
No. 21 double pole single throw... .90
No. 22 double pole double throw... 1.00
No. 31 triple pole single throw... 1.25
No. 32 triple pole double throw... 1.50

Heavy insulation, nickel finish

See them at your dealers.

MARTIN - COPELAND CO.

PROVIDENCE, R. I., U.S.A.



New Paragon \$5.00 Variometer

Assures Maximum Efficiency on
New High-frequency Wavelengths

The new band of wavelengths, recently enforced, involve radio currents of extremely high frequency.

This calls for an inductance unit of exceptional electrical and mechanical excellence.

Any amateur will quickly see why the ribbed design of our new No. 60 Paragon Variometer assures greatest efficiency at these high frequencies.

Material reduction of solid dielectric in the support forms permits us to offer this essential radio adjunct at an extremely reasonable price.

While comparatively lighter in

weight and considerably smaller than most variometers, our new Paragon No. 60 loses nothing in durability and gains much in overall (minimum to maximum) wavelength range.

In rebuilding his receiving equipment to conform with new standards, the radio-wise amateur will take these merits into account and will find it far easier to secure expected results on wavelengths of 150 to 200 meters with an inductance unit of this excellent design, than with any other.

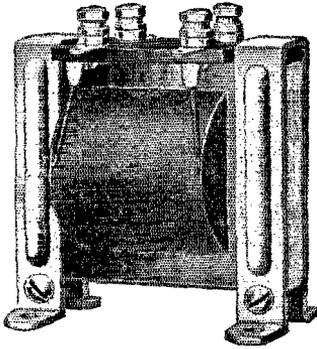
Write for complete catalog of Paragon Radio Products.

ADAMS-MORGAN CO., 4 Alvin Avenue, Upper Montclair, N. J.

PARAGON

Reg. U. S. Pat. Off.

RADIO PRODUCTS



GENUINE

JEFFERSONS

The Standard Audio Frequency Transformers

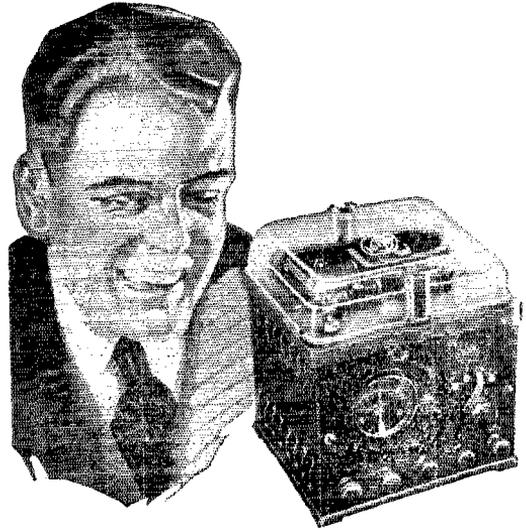
No matter what circuit you wish to complete, there is a JEFFERSON Audio Frequency Amplifier which will insure 100% Amplification, the elimination of distortion and the quiet easy tuning so eagerly sought after.

FIVE JEFFERSON TYPES

to choose from—manufactured by the pioneers in the audio frequency transformer field. Right from the start put Jeffersons in your set—don't experiment—expert Radio Engineers, after careful and exhaustive tests have found them perfect in every detail of construction.

DESCRIPTIVE BULLETIN sent free and our Engineering Department will be glad to make recommendations as to the proper transformer to be used in any circuit.

Jefferson Electric Mfg. Co.
425 S. Green Street Chicago



Simple as A-B-C

—And comprehensive too. The new Valley Battery Charger, Type ABC, is mighty easy to use, and it is the only one which you need for all radio storage batteries.

The Valley Type ABC Battery Charger is made for:

- 2-volt Peanut Tube Batteries
- 6-volt A Batteries
- 12-volt Batteries
- 1 to 4 B Batteries

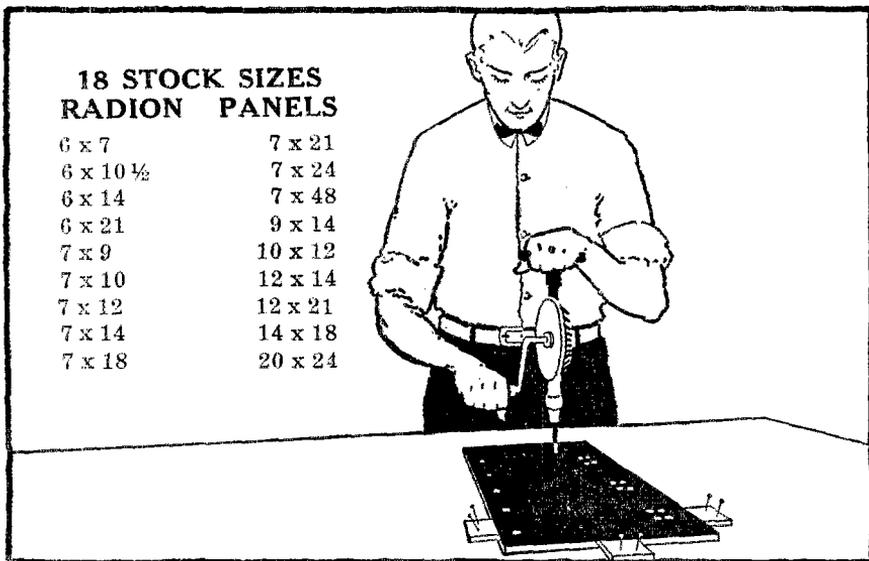
Bakelite panel, glass top. Made so that it fits in with your radio equipment. In fact, it harmonizes with any receiving set.

Plugs into regular electric light socket. Uses a negligible amount of current—a dime's worth for an average charge.

Unfortunately, production is limited. Don't miss out; and don't buy any other until you have seen the Valley Type ABC Charger. At all good radio dealers.

VALLEY ELECTRIC CO.
3157 S. Kingshighway St. Louis, Mo.

Valley Battery Charger



The Supreme Insulation

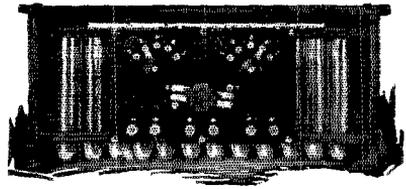
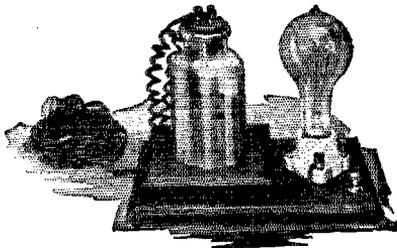
RADION

Panels

**are easiest
to drill, saw
or engrave**

Radion, being an insulation material especially made for wireless use, has the lowest phase angle difference, lowest dielectric constant, highest resistivity and supreme moisture, gas and acid repelling properties.

AMERICAN HARD RUBBER CO.
11 MERCER ST., NEW YORK



**“Satisfaction increasing;
customers want more!”**

That's the message that came across the continent with an order from an Oregon distributor. KICO Batteries always make good. Alkaline type, won't sulphate or buckle. Life unlimited. Not harmed by short circuiting, overcharging, idleness. Panel switches give single cell variations. Recharge from any 110-volt A.C. line with small home rectifier. Charge lasts 3 to 6 mos. in detector plate circuit.

KIMLEY ELECTRIC COMPANY, Inc.
2665 Main Street Buffalo, N. Y.

K I C O Storage “B” Batteries—
long service, low cost

GUARANTEE

Your money back on any KICO Battery if not satisfied after 30 days' trial. Write for full information on “A” and “B” Batteries.

Cells	Volts	Price, Plain	With Panels
16	22	\$5.50	
24	32	7.25	\$11.75
36	48	9.50	14.00
50	68	12.50	17.00
78	100	17.50	22.50
108	145	28.50	28.50

Unmounted Rectifier \$1.00
Mounted Rectifier \$2.50

FROST-RADIO

Ask Your Neighbor

A new vernier rheostat at a right price

The new Frost-Radio metal frame vernier rheostat at 75c offers immense value, correct design, and equals any rheostat made as far as variation of filament voltage is concerned. Fluted bakelite knob, Nickel plated metal parts, 110 and 250 ohms. Your dealer has them. See him for Frost-Radio.

HERBERT H. FROST, Inc.
154 West Lake Street, Chicago, Illinois
30 Church Street, New York

No. 601
List 75c

MAXIMUM EFFICIENCY

THIS new MAXEFF Vernier Variable Air Condenser meets all modern receiving requirements. Its superior mechanical and electrical features give it an unusually low minimum capacity and a greater selection range. Both maximum and minimum capacities are guaranteed as advertised. Ask your dealer or

Write for Free Descriptive Folder

MAXEFF

The Higgy-Avery Co.
1205 Franklin Ave., - Columbus, Ohio

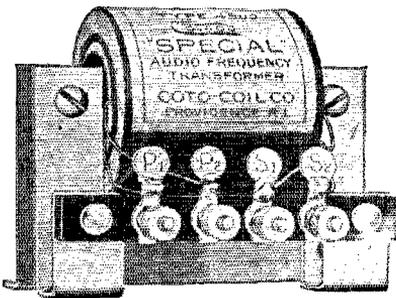
Coto

"Built First to Last"

You Double the Real Fascination of Radio—

When by your own ingenuity and effort, you equal and very likely surpass the best results obtained by ready made radio sets.

Build you own, your personal set. Know the joy of conquering the infinite. And build it right. Coto for compactness, portability, reliability.



Coto Special Audio Frequency Transformer

A triumph of manufacturing economy. Designed to sell at a price but superior in material, in workmanship and in performance. Absolute dependability as your dealer will assure you. Turn ratio 3 to 1. Excellent volume of amplification. Type 4500, \$2.50

JOBBERS! DEALERS!

The Coto line of superior radio apparatus is already on its way to tremendous selling. You deserve a share of this business. Write for folder and price lists.

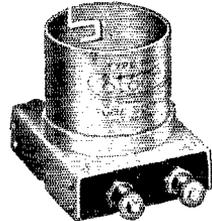
COTO-COIL CO.

87 Willard Ave.,
Providence, Rhode Island

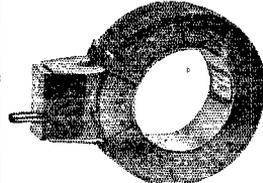
Pacific Coast Branch
329 Union League Bldg.,
Los Angeles

Northwestern Branch
George F. Darling,
705 Plymouth Bldg.,
Minneapolis

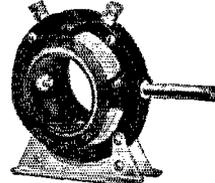
Southeastern Branch
C. P. Atkinson,
Atlanta Trust Co. Bldg.,
Atlanta



Cotogrip Tube Socket
Has unique double positive grip of tube terminal posts. Best hard rubber insulation. Type 7000, 85¢.

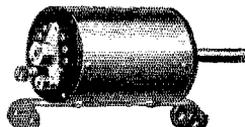


The Original Honeycomb Wound Coils
Popular low priced favorite of the amateur and experimenter. Sold mounted or unmounted.

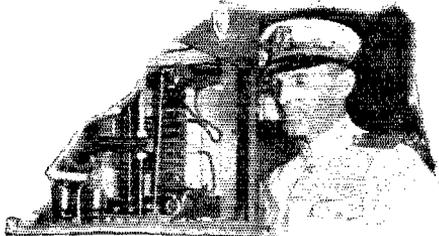


Coto Compact Moulded Variometer

Handsome in moulded bakelite. Stator is honeycomb wound. Range 200 to 600 meters. Size 3½ x 1¼ x 3¼ inches. Base or panel mount. Type 8000, \$5.00.



Coto Tapped Radio Frequency Transformer
Efficiently covers the whole broadcasting range because it is TAPPED. Just turn the switch. Type 5000, \$7.50.



Mr. F. E. Black, Chief Radio Officer, S. S. America—a former student of the Radio Institute of America.

A New ADVANCED Course in RADIO

Advanced amateurs and radio students have demanded this course, featuring C.W., I.C.W., and telephone and radio measurements. Study at home. Understand fine adjustments, radio constants, and the intricacies of tube transmitters or complicated receivers.

This new advanced course is offered by the RADIO INSTITUTE OF AMERICA (formerly the Marconi Institute), conducted by the Radio Corporation of America. That alone means finest instruction—including the very latest radio knowledge. Send for more information today.

Write for Information Today

COMPLETE COURSE for BEGINNERS

The man who knows nothing of radio can prepare, in a few months' study at home for the commercial license that entitles him to a position as radio operator. There are jobs for all, and the future holds unlimited opportunities. Investigate!

RADIO INSTITUTE OF AMERICA

(Formerly Marconi Institute)
Established 1909.

324 A. Broadway, New York City

Indicate by a cross X the course you are interested in:

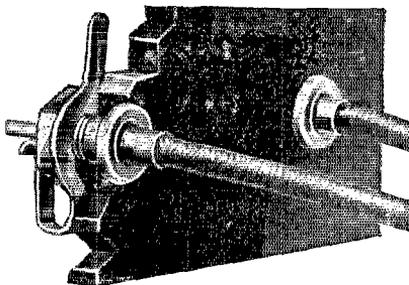
Radio Institute of America,
324A Broadway, New York City.
Please send me full information about your

COMPLETE RADIO COURSE
ADVANCED RADIO COURSE

Name

Address

Quick, Positive Connections UNION RADIO TIP JACKS



Cost Only 25c a Pair

That they give you quick, positive temporary connections is only one of the many big advantages of Union Radio Tip Jacks. Just what you want when you build your own set or experiment with different circuits and hook-ups.

They can be attached to all standard thicknesses of panels. The bushing is $\frac{1}{4}$ " in diameter and fits a $\frac{1}{8}$ " hole. Will grip all wires from 24 B & S gauge up to antenna wire, battery leads, loading coils and vacuum tube lugs.

No parts to chip, lose and deteriorate. All parts heavily nickelled.

Other Guaranteed Parts

Dial adjusters for minute variations in capacities of variable condensers. Price 60¢.

Variable Condensers. Famous for performance. Without dials, 3 Plate—\$1.00; 18 Plate—\$2.00; 23 Plate—\$2.30.

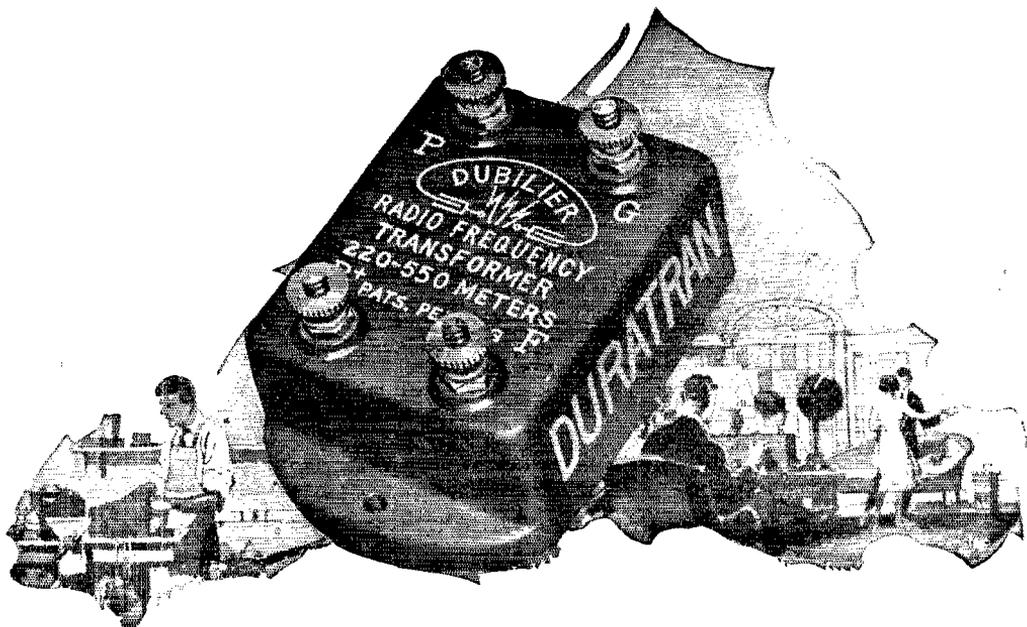
Tube sockets of molded condensite highly polished. Phosphor Bronze contact springs. Reinforced bayonet slot prevents breakage. Accommodates all standard tubes. Price 75¢.

Should your favorite Radio Store not carry Union Radio Tip Jacks and Guaranteed Parts send your order direct to us, also write for copy of "The Union Radio Catalog 'D'."

Retailers and Wholesalers

Samples of our guaranteed, reasonably priced "Quality Products" sent on request. Our terms and trade discounts are liberal. Write for our proposition.

UNION RADIO CORPORATION
200-MT PLEASANT AVENUE, NEWARK, N.J.
NEW YORK OFFICE 116 WEST 32ND STREET
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The DUBILIER *Duratran*—

Radio Amplification on all Wave Lengths

The Dubilier Duratran is the supreme radio-frequency transformer.

It amplifies powerfully and uniformly *over all wave lengths* now used by broadcasting stations.

Price \$5.00. At all good dealers.

DUBILIER CONDENSER AND RADIO CORP.

48-50 West Fourth Street New York City



Dubilier
Micadons
Fixed
Condenser



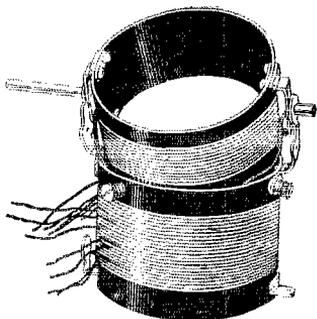
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DUBILIER DEVICES

Closer Tuning—Greater Selectivity with the FEDERAL VARIOCOUPLER, No. 95.



130 Federal Standard Radio parts offer the radio enthusiast a complete line of guaranteed parts of one quality—the best.

THIS variocoupler makes it easy to tune out local interference and bring in DX stations, because the relation between primary and secondary provides selective coupling over a wide range.

Federal engineers made a searching and extended study before determining primary and secondary inductance values—and every detail of construction meets the Federal standard of workmanship.

Improve your set's performance with a No. 95 Federal Variocoupler.



Federal Radio Equipment

Federal Telephone and Telegraph Company

FACTORY: Buffalo, N. Y.

Boston

New York
Bridgeburg, Canada

Philadelphia

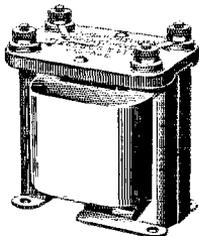
Chicago

San Francisco

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London, England

Volume! Clarity!! Delight!!!



With Kellogg Shielded

Type Transformers

Furnishes distortionless amplification of all audio frequencies. Built complete by the Kellogg Company using highest grade wire, maroon enameled case, and molded Bakelite top.

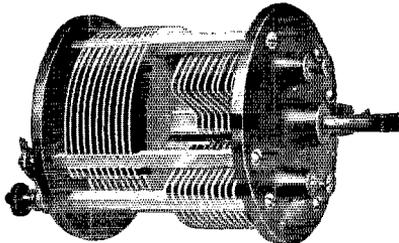
Every Kellogg transformer is thoroughly tested before leaving the plant, and we guarantee the purchaser a product of exceptional efficiency.

No. 501—Ratio $4\frac{1}{2}$ to 1—\$4.50 each

No. 502—Ratio 3 to 1—\$4.50 each

**KELLOGG SWITCHBOARD
& SUPPLY COMPANY**
1066 W. Adams St., Chicago, Ill.

SEXTON CONDENSERS



Instruments Of Beauty As Well As
Perfection In Design And Workmanship

The First—To manufacture a vernier with vernier and rotor plates controlled by single knob.

The Originator—Of the half capacity switch on balanced models.

The Standard—For accurate spacing, obtained by means of milled stator and rotor supports, peened for positive contact.

All Sexton Condensers are Pig-Tailed.

Complete line illustrated by circular sent at request.

The Hartford Instrument Co.
308 Pearl St., Hartford, Ct.



Ask any radio expert

THE first duty of a radio panel is to give satisfactory insulation, as any radio expert will tell you. The wise fan selects his panel with special care and insists on having one that supplies the proper insulation resistance.

Celoron Radio Panels provide satisfactory insulation under all conditions. They have high dielectric strength and great surface and volume resistivity, and do not warp or crack when exposed to moisture.

Cut in standard sizes

For your convenience, Celoron Radio Panels come ready cut in eight standard sizes. Your dealer will hand you the size you want, and you can begin to build your set at once.

Celoron panels are easy to saw, mill, and tap, and will engrave evenly without feathering. Each panel is

wrapped separately in glassine paper.

Select from the following standard sizes the panel that suits your needs:

- | | |
|---------------------------|----------------------------|
| 1—6 x 7 x $\frac{3}{8}$ | 5—7 x 18 x $\frac{3}{16}$ |
| 2—7 x 9 x $\frac{1}{8}$ | 6—7 x 21 x $\frac{3}{16}$ |
| 3—7 x 12 x $\frac{1}{8}$ | 7—7 x 24 x $\frac{3}{16}$ |
| 4—7 x 14 x $\frac{3}{16}$ | 8—12 x 18 x $\frac{3}{16}$ |

If your dealer cannot supply you, ask him to order, or write direct to us. Indicate by number the size you need. We also furnish Celoron in full-sized sheets and in tubes, and can cut panels in special sizes if desired.

This booklet free

Write for a copy of our booklet, "Tuning in on a New World," which contains a list of the leading broadcasting stations in the United States and Canada, an explanation of symbols used in radio diagrams, and several efficient radio hook-ups. It will be sent to you free on request.

To radio dealers: Send for special dealer price list showing standard assortments

Diamond State Fibre Company

BRIDGEPORT

(near Philadelphia)

PENNSYLVANIA

BRANCH FACTORIES AND WAREHOUSES

BOSTON

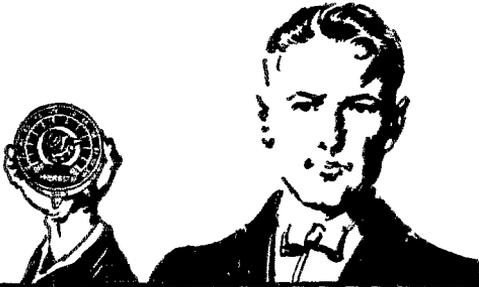
CHICAGO

SAN FRANCISCO

Offices in Principal Cities

In Canada: Diamond State Fibre Company of Canada, Limited, 245 Carlaw Ave., Toronto

CONDENSITE
CELORON
 STANDARD RADIO PANEL



Have your Dealer show you a "MICROSTAT"

A SUPER VERNIER RHEOSTAT

\$3.00 AND WORTH IT

Premier "MICROSTAT" represents the highest state of development yet obtained in the Radio Rheostat field and operates on functions quite different from other Rheostats in that its two resistance units—one low (6 ohms) and one high (40 ohms)—are connected in parallel (not in series) and the vernier adjustment is done on the high resistance while the current flows without interruption through the low resistance unit.

To grasp and understand this principle of the "MICROSTATS" Method of functioning is to concede its unsurpassed efficiency in adjusting and controlling, to the smallest quantity, the current flow through the filament of the tube—a great and important essential in selective tuning.

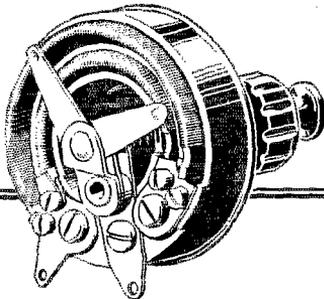
While accomplishing this prime and essential feature an absolutely quiet and noiseless adjustment automatically results for current flow is not—and never can be interrupted—each touch or later results in all Rheostats operating a Vernier in series with a low resistance Rheostat unit and which interruptions produce noises which defeat the true function of a Vernier for accurate selective tuning.

"MICROSTATS" EXCLUSIVE FEATURE
UNIVERSAL IN OPERATION—Controls any tube 1½ to 6 volts from 6 volt battery.
STAYS PUT—Not affected by vibration.
FULL ON—All Resistance cut out.
RESISTANCE UNITS—Genuine "NICHROME" wire—6 ohms low—40 ohms high—connected in parallel—total safe carrying capacity, 3 amperes.
MAIN BODY OR BASE—Bakelite Moulded.
DIAL—Silver etched on black background.
KNOBS—Moulded—Thermoplastic.
MOUNTING—one hole only in panel.
NO MOUNTING SCREWS.

WRITE FOR BULLETIN NO 92

Premier Electric Company

3811 Ravenswood Ave., Chicago, U.S.A.

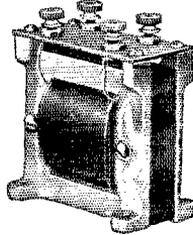


H & H Radio Material

Nutmeg Brand

Based on 30 Years' Manufacturing and Electrical Development Work

Try the new H & H Transformer W306—with a turn ratio of 6 to 1—in combination with our W303: turn ratio 3 to 1. The result will emphasize to you the "why" of this latest addition to the H & H Radio Family!



EVERY H & H (Audio Amplifying) Transformer is tested, before shipping, with 1500 volts potential between the primary and secondary windings; also between these windings and the core. This test certifies to the durability and integrity of workmanship, though technical data will be sent gladly if requested. Price of Transformer—

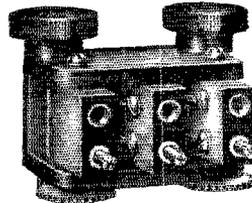
W303, Turn ratio 3 to 1 - - - \$4.50
 W306, Turn ratio 6 to 1 - - - 5.00

Write for new 32-page catalogue showing complete Radio Line and three practical photographed hook-ups.

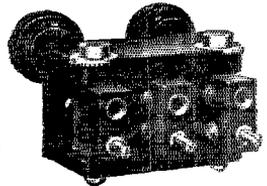
We will carefully fill your order direct if you cannot buy the goods locally. For advising us of your Dealer's name and address you'll receive a photo of an excellent one-step dry cell hook-up, free.

THE HART & HEGEMAN MFG. CO.
 HARTFORD, CONN.

R61—\$5.00



R62—\$6.00



Get Selective Tuning with Branston Honeycomb Coils and New Mountings

Radio experts will tell you that sets using 3 Honeycomb Coils are best for selective tuning. Use Branston Coils and New Branston Bevel-Geared Front Panel or Rear Panel Mountings, with vernier adjustment. Mountings are substantially constructed of genuine Bakelite and are equipped with flexible leads.

BRANSTON D. L. HONEYCOMB COILS ARE THE "STANDARD OF THE WORLD"

Insist on the genuine. Your dealer can purchase Branston Coils and Mountings, and a complete line of Branston Radio Apparatus from his distributor.

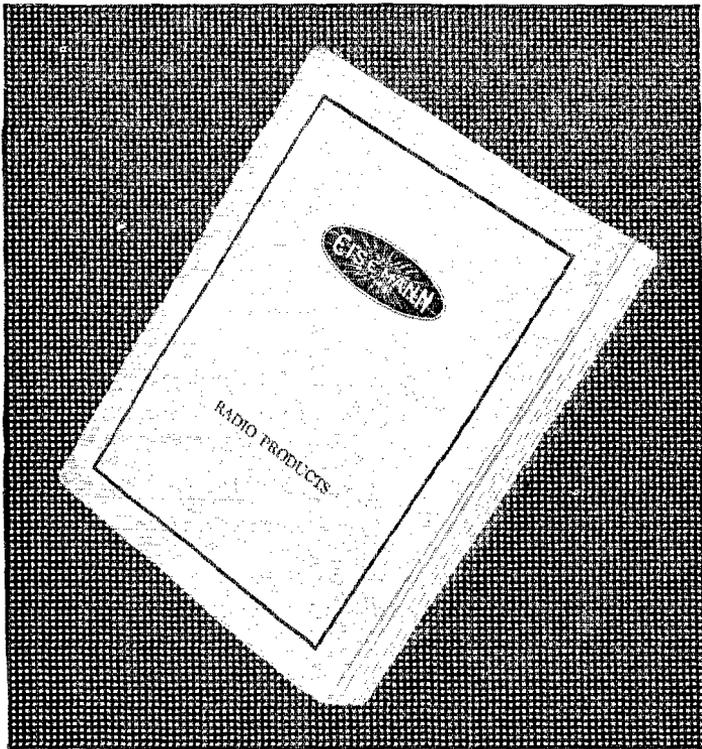
NEW RADIO MANUAL SENT FOR 2¢

Compiled by experts and includes five good Honeycomb Coil "Hook-ups" and complete catalog of famous Branston Radio Apparatus. Write today. Give us name of your radio dealer. If he can't supply you, write

CHAS. A. BRANSTON, Inc.
 823 Main St., Buffalo N. Y.
 In Canada—Chas. A. Branston, Ltd., Toronto, Ont.



BRANSTON
 RADIO



Just off the Press

Upon request, our latest radio catalogue will be sent to those interested in the construction of receiving sets—without charge.

Each part we manufacture is illustrated and described in detail.

Write for it today.

EISEMANN MAGNETO CORPORATION

William N. Shaw, President
BROOKLYN, N. Y.

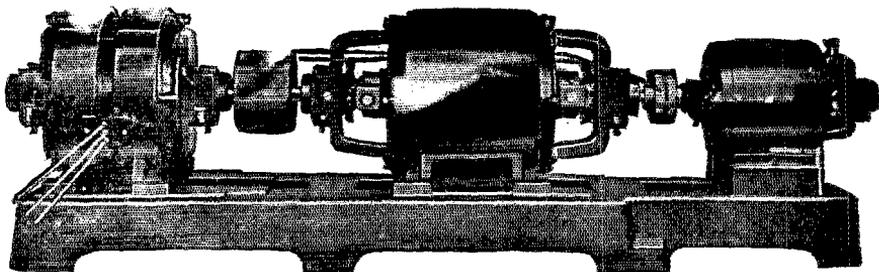
DETROIT

CHICAGO

SAN FRANCISCO

TRADE " E S C O " MARK

The things that have endured for ages were made of quality—The cheap things have passed on—and are forgotten.



" E S C O "

HIGH VOLTAGE MOTOR-GENERATORS STAND PRE-EMINENT Used by leading EDUCATIONAL INSTITUTIONS Everywhere—Also Many Government Departments—Research Labs., Newspapers, Department Stores and Commercial Broadcasting Stations. Bulletin 237A lists over 200 Combinations.

This is our new BATTERY CHARGER. Made in many sizes—with or without panel board.

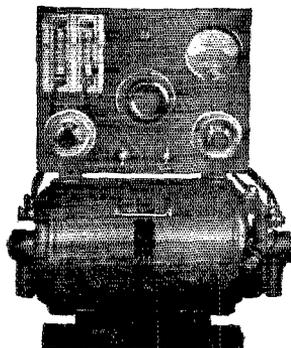
Motors—Dynamotors—Generators—Motor-Generators developed for special requirements. Send us your problems—we'll solve them.

ELECTRIC SPECIALTY CO.

225 South St.

STAMFORD, CONN., U. S. A.

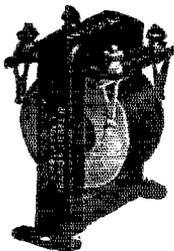
Pioneers in Developing High Voltage Apparatus



"Where ignorance is bliss 'tis folly to be wise"

but that is no excuse for not using the acknowledged best audio transformer—

The AMERTRAN
—REG. U. S. PAT. OFF.—
AUDIO TRANSFORMER



Price \$7

Ask your electrical dealer, or sent carriage charges collect. (Wt. 1 lb.)

Turn ratio, 5:1. Amplification ratio, 30-40 times audibility in the flat part of the curve.

American Transformer Company

Designers and builders of radio transformers for over 22 years.

176 Emmet St., Newark, N. J.

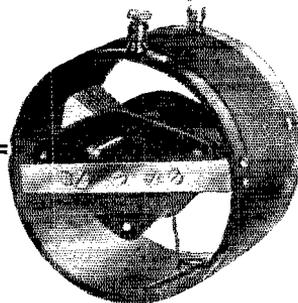
acknowledged by professional radio engineers to be the STANDARD OF EXCELLENCE for audio amplification. The reason for this is apparent in the Amplification Chart shown in our Circular No. 1005.

VERNI-TUNER

(Trade Mark)

3 in 1 Primary, Secondary and Variable Condenser

NO TAPS - - NO INTERFERENCE



No. 453

Price \$4.00

"Razor-Like" Selectivity

Enthusiastically acclaimed by Radio Amateurs. SAVES LABOR—SPACE—MONEY

Main tuning device for all Reflex circuits, all Standard Regenerative Circuits, Tuned Radio Frequency Circuits and the Horne Combined Reflex and Tuned Radio Frequency. Other units for Reinartz, Cockaday, Flewelling and other circuits. Booklet of 14 circuits free with each device.

At your dealer or postpaid on receipt of purchase price. Write for leaflet.

HORNE ELECTRIC & MFG. CO.

Mercer & Colgate Sts. Jersey City, N. J.



How often do you get a new B battery?

THE current from a B battery is relatively small. But it must be always on the job. B batteries that run down quickly are the bane of the radio fan's existence. Your B battery can help you get the most pleasure from radio, or it can be your greatest nuisance. It all depends on the kind of battery you buy.

The wise radio amateur knows it pays to get a good B battery in the first place. And that means an Exide. The new Exide B Battery is built with extra-heavy plates. That is one reason why it lasts so much longer than the ordinary battery. It can be recharged again and again, saving you the annoyance of frequent replacements.

Exide B Batteries give steady, noiseless current. They are strangers to the hissing, frying noises caused by internal discharge. The 12 cells are encased in rubber, with special vents to allow gas to escape when the battery is being recharged. They are designed throughout to prevent electrical leakage.

Two low-voltage A batteries

If your set operates on low-voltage tubes, it will be worth your while to examine the new Exide two- and four-volt A batteries. They are right in line with the latest developments in radio receiving. The one-cell Exide A Battery will heat the filament of a 1.1 volt .25 ampere tube for 96 hours; the two-cell Exide A Battery will heat the filament of a 3 volt 60 milliampere tube for approximately 200 hours.

They are specially adapted to WD-11 and UV-199 vacuum tubes.

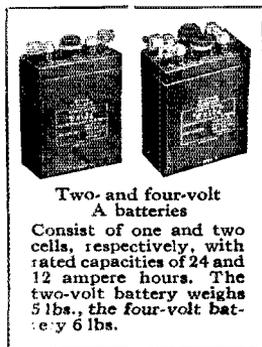
The Exide A Battery for six-volt tubes gives full-powered, care-free service. It requires only occasional recharging. Like all Exide Radio Batteries, it is built of the finest materials available, is sturdy and long-lasting.

When you hook up your set with Exide A and B Batteries, you are sure of getting maximum signal strength. You can reproduce broadcast selections in clear bell-like tones.

Wherever reliable storage batteries are required, you will find the Exide doing its work ungrudgingly. It is recognized as the leading storage battery in every field of industry. A majority of all government and commercial wireless plants are equipped with Exide Batteries.

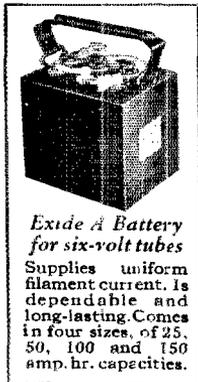
Don't let inefficient batteries spoil your pleasure in radio. Go to any radio dealer or Exide Service Station and ask for Exide Radio Batteries.

If your dealer can't supply you with free booklets describing the complete Exide line, write direct to us.



Two- and four-volt
A batteries

Consist of one and two cells, respectively, with rated capacities of 24 and 12 ampere hours. The two-volt battery weighs 5 lbs., the four-volt battery 6 lbs.



Exide A Battery
for six-volt tubes

Supplies uniform filament current. Is dependable and long-lasting. Comes in four sizes, of 25, 50, 100 and 150 amp. hr. capacities.

Exide

RADIO BATTERIES

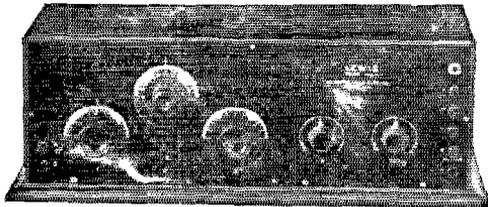
THE ELECTRIC STORAGE BATTERY COMPANY, PHILADELPHIA

Oldest and largest manufacturers in the world of storage batteries for every purpose

Service Stations Everywhere

Branches in Seventeen Cities

9 Z Y Recommends



The W. C. 5

"The W. C. 5 is so efficient, dependable and easy to operate that we recommend it above all other receiving sets," says 9ZY of LaCrosse, Wisconsin. "You can depend on the W. C. 5 to operate without trouble or delay even under the most unfavorable conditions."

You will be surprised with the range and supersensitiveness of the W. C. 5.

Price \$80.00

Wave Lengths 180 to 750 meters

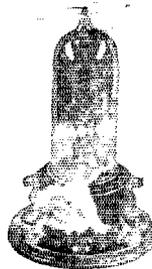
The W. C. 5 is a 4 tube set. One stage of tuned radio frequency amplification is employed ahead of the detector to make it supersensitive. Two powerful stages of audio frequency are used to bring up the volume of signal strength. Simplicity of construction and the elimination of unnecessary parts make this set easy to operate and effective for receiving from long distances.

TO THE A.R.R.L.

We appreciate your efforts in Boosting W. C. sets and are always pleased to furnish full information about them to members who have not yet had the opportunity to operate a W. C. 5. We want every member to know the merits of this efficient outfit. If you are interested we will gladly send you a complete description of the W. C. 5 together with information as to where you can see one in operation.

Just drop us a line and we will see that your enquiry gets prompt attention

WESTERN COIL AND ELECTRICAL CO.
304-Fifth St., Racine, Wis.



Na-ald Special Socket No. 499



DeLuxe Contact



Na-ald DeLuxe Socket No. 400

It's the contact that counts

A careful examination will show that each contact in Na-ald sockets and adapters is of a wiping nature on a broad surface, and of sufficient tension, and so designed that tension is permanent, no matter how often the bulbs may be removed and how much the connecting prongs in the tubes vary. Na-ald sockets are moulded of Bakelite with uniform cross-section cure and other engineering features incorporated, avoiding plate to grid losses and insuring each tube to develop its fullest efficiency.

NA-ALD SOCKETS

- No. 499 Socket, 199 tubes... \$0.50
- No. 429 Adapter, 199 tubes... .75
- No. 400 De Luxe, 200 tubes... .75
- No. 401 Small Space, 200 tubes... .35
- No. 411 W.D., W.D. 11 tubes... .75
- No. 450 Two-in-One, W.D., 11 or 200 tubes... .50

Na-ald Circuit Booklet packed with each Na-ald product. Write for "Why a Bakelite Socket," and other descriptive literature.

Alden Manufacturing Co.

Manufacturers of Sockets and dials for every radio requirement
Dept. M 52 Willow St.
Springfield, Mass.



FERBEND

Wave Trap

TRADE MARK

PATENT APPLIED FOR

The Original Wave Filter

Stops Interference!

Eliminates interfering stations.
Improves the selectivity of the set.
Eliminates local broadcasting.
Selects between conflicting stations.
Simplifies tuning.
Often increases signal strength.
Reduces howling and squealing.
The WAVE TRAP is mounted on a Formica panel in a beautiful mahogany finished cabinet 6x5x6, and is a high grade instrument throughout enhancing the appearance of the most expensive sets.

Ferbend Electric Co.

23 E. SOUTH WATER ST.
CHICAGO

600 Circular on Request

You just bet it does!



Full radio tones will not come from "empty" radio batteries

Even the finest radio instrument will not give results unless the battery is doing its full duty. For complete and satisfying reception from near and far, no other combination equals the reliable storage battery and the Tungar for keeping it tuned up.

With Tungar in the house you are prepared for perfect reception always, without having to move the battery an inch. You renew again and again with Tungar and your regular electric light current.

Tungar attaches wherever there is a lamp socket or a convenience outlet. Just turn it on and leave it, any time, day or night. Its cost of operation is low. There are no moving parts to get out of order.

For years motor car owners have used Tungar for charging their automobile batteries. See one at any good electrical shop, or write for literature. Address Section Q 11.

*Merchandise Department
General Electric Company
Bridgeport, Connecticut*

Tungar Battery Charger. Operates on Alternating Current.

(Prices east of the Rockies)

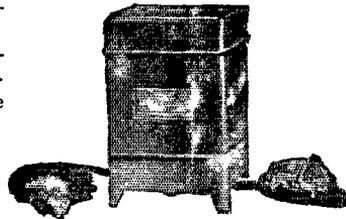
2 Ampere Outfits Complete—\$18.00

5 Ampere Complete—\$28.00

Special attachment for charging 12 or 24 cell "B" Storage Battery—\$3.00

Special attachment for charging 2 or 4 volt "A" Storage Battery—\$1.25

Both attachments fit either Tungar



Charge 'em at Home, with

Tungar

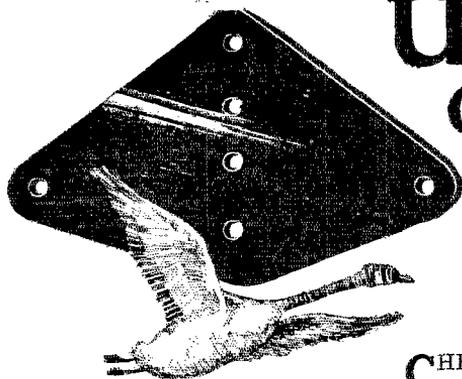
BATTERY CHARGER

3, A—104C

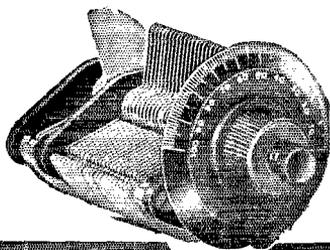
A GENERAL ELECTRIC PRODUCT

U.S. TOOL CONDENSERS

WITH THE PERFECT
END PLATES OF
LAMINATED
CONDENSITE
CELORON

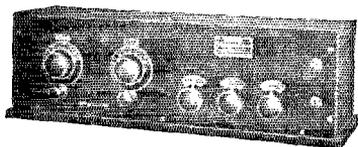


CHEAPER insulating materials might do as well, for ordinary purposes, but our respect for the good opinion of the radio public permitted nothing but the best—CONDENSITE-CELORON. Moisture, which only needs to be retained on the surface to form a perfect path for the escape of radio frequency currents, vanishes from the surface of CONDENSITE-CELORON "like water off a duck's back." Greatest dielectric and tensile strength.



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COMPANY INC.**

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MA-13

Do You Know why the Mu-Rad sells, Mr. Dealer?

Simply because to hear the Mu-Rad is to buy it! One of Chicago's largest radio stores sells the Mu-Rad entirely by demonstration. Their records show that 8 out of 10 demonstrations result in a sale! That's profitable business!

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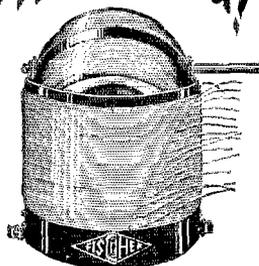
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Approved because:—

Wave length is 550 Meters; 16 soldered leads; straight wound stator on genuine bakelite tubing; kiln dried rotor; Fahnestock spring clip connections; non-conductive adhesive. You can

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SO simple in operation that any Radio user can obtain perfect results—so sensitive and flexible in scope that the professional will find it fully responsive to every requirement—the new Magnavox Combination Set A1-R or A2-R brings a degree of radio usefulness and enjoyment never before attained.

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Equipped with binding posts
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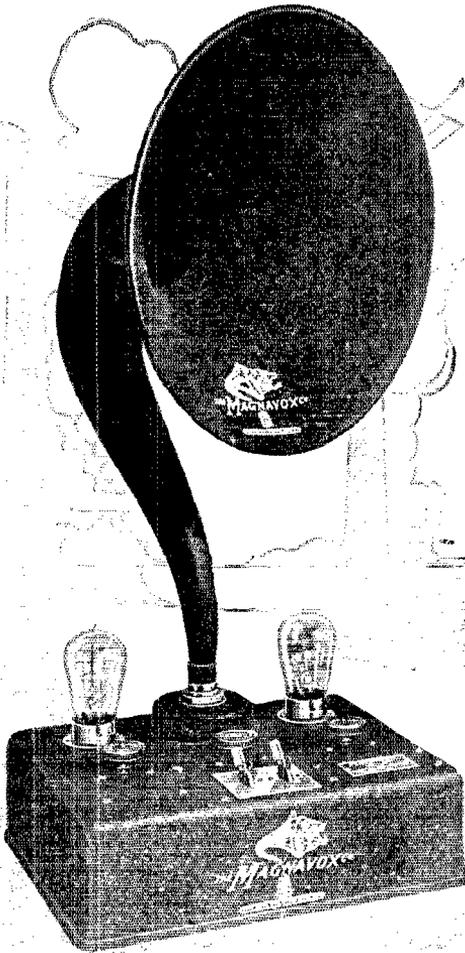
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- A1-R consisting of electro-dynamic
Reproducer with 14-inch curvex
horn and 1 stage of amplification 59.00
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Magnavox Radio Products can be had of good dealers everywhere.
32-page catalog sent on request.

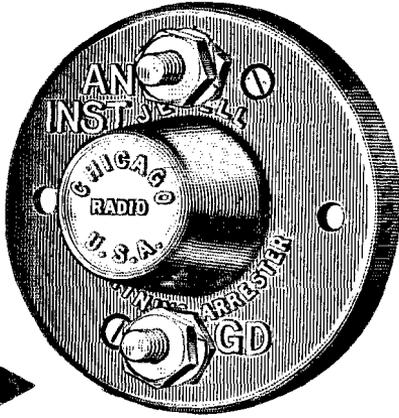


The New Magnavox Combination Sets A2-R [2-stage] and A1-R [1-stage] insure the utmost in convenient, home radio reproduction.

THE MAGNAVOX CO., Oakland, Cal.

New York Office: 370 Seventh Ave.

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APPROVED BY
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The Jewell Arrester has passed all the Underwriter's tests and carries their approval.

The case is made of porcelain with a brown finish that harmonizes with interior woodwork. The price is right.

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Anywhere
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MONEY BACK GUARANTEE
We guarantee the Type B-3 to please you. If it does not, return it and we will return your money.

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75c **GRID-LEAK** 75c

"ADJUSTABLE"

YOUR SET DESERVES ONE!

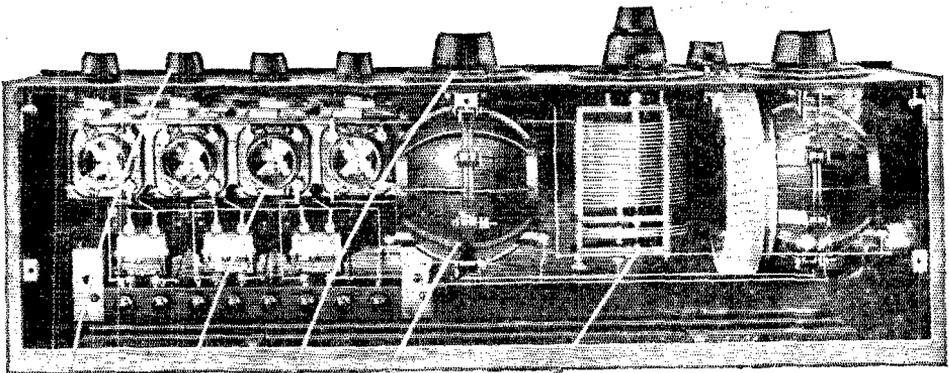
Everybody has fussed with grid leaks to find the one best suited for his tubes and circuit and has discovered many of the variable carbon leaks would not hold their adjustment.

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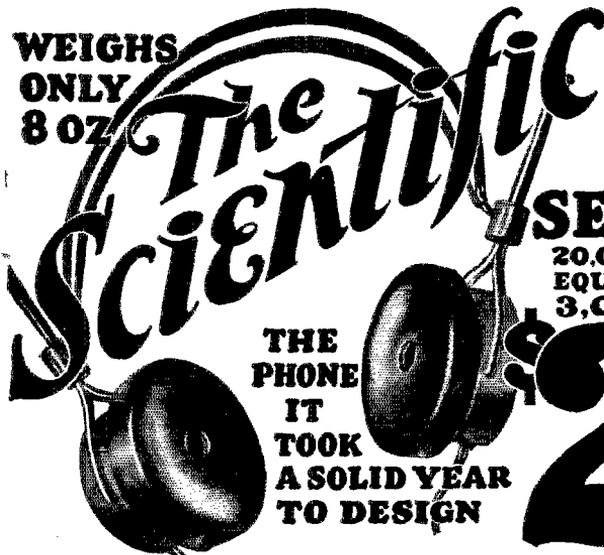
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—outdistance all
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Largest selling transformers in the world. More than a quarter million in service. Standard equipment on the better sets. They work in all circuits.

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Free! Book of tested hook-
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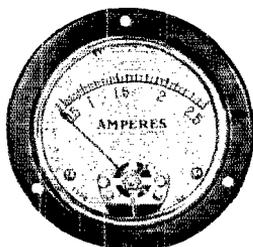
Klaus is authorized distributor for largest manufacturers. Learn how you can become authorized dealers.

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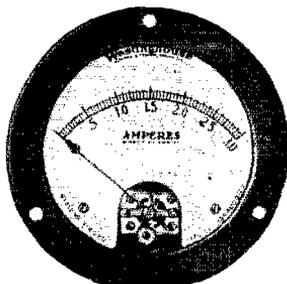
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Authorized Distributors.
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EUREKA, ILL.

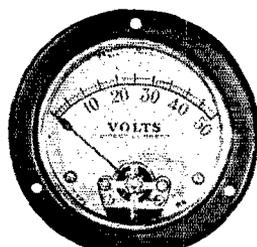
Radio Instruments



Radio Frequency Ammeter
2-in. Dials, 2-in. Scales



Direct Current Ammeter
for Radio Application



Direct Current Voltmeter
for Radio Application



A Type BX Radio Frequency Ammeter in the transmitting circuit will indicate the strength of the current in the antenna, which, in turn indicates the effectiveness and character of transmission. A Type BX Voltmeter, in the "B" battery circuit, tells the condition of the battery and will also detect weak and dead cells of the battery.

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Type CX Instruments have 3-inch dials and 2 1/2-inch scales otherwise they are the same as the type BX.

Accurate
Reliable
Economical

Ask nearest office for Folder 4471-B

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 129 Camp Street, New Orleans, La.

General Electric Dynamotors for C.W. Transmission

Driving Voltage	Plate Voltage	Mills
12	550	130
8	400	90

Made for the United States Army Air Service. Equipped with a Dubilier Filter System. Using 2 1/4 MF. 1800 volts Mica Condensers. Ball Bearings Equipped. All new, in original cases. Price \$29.75 Half cash with order—balance collect.

We also have: CW-936 Sub Chaser Telephone Transmitting and Receiving Sets including:—Remote Control System, Power Amplifier, Loud Speakers, Tubes, Spare Microphone, etc. Can be tuned down to 150 meters.

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Mail orders given special attention.

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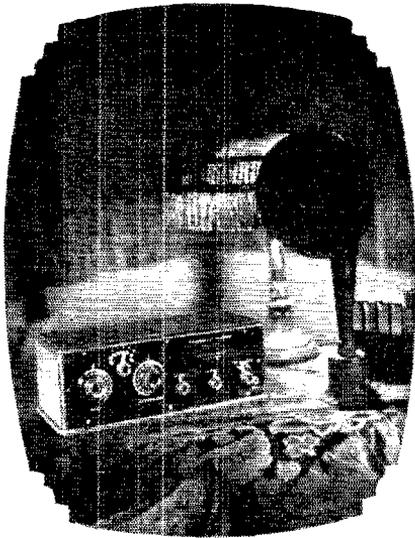
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Positions Guaranteed Graduates

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You needn't know a thing about radio

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Some of the most experienced radio inventors and engineers in this country designed and built the Tuska. It is right, forever, and needs no tinkering. Have no fear that it will become obsolete. A Tuska set bought today will be serviceable for years to come.

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Piano finish mahog-
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Price \$75, without
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Ask for special cir-
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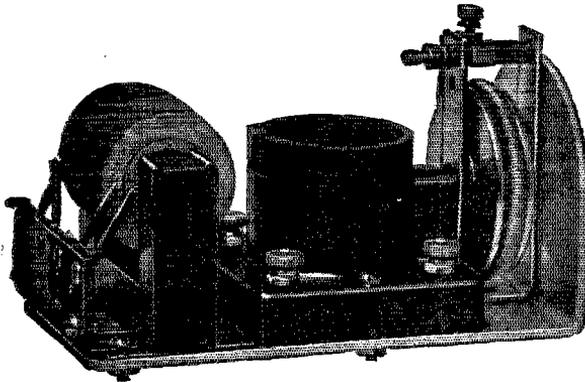
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RADIO



PRODUCTS

USED IN COCKADAY
FOUR CIRCUIT TUNER



DETECTOR UNITS

- Cat. No. 139 Vernier \$3.00
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R. MITCHELL CO.

255 ATLANTIC AVENUE,

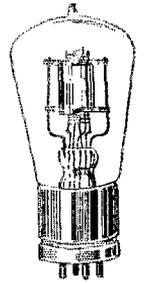
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C-301	3.00	-302	4.00
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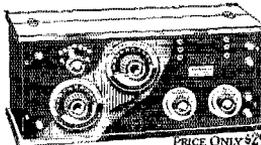
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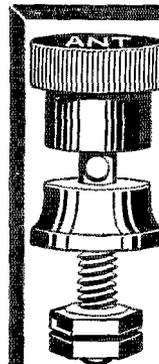
DEALERS and AGENTS—write for proposition quickly—*it's a winner*

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With knobs that won't come off Anyone can "read 'em." All popular styles—Antenna, Ground, Pones, A and B Battery plus and minus—abbreviations of different names engraved on knobs. Ask your dealer for "Read 'em"—the kind for real Radio fans. Set of 10 for \$1.50 postpaid. If your dealer does not have them—write direct.

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Natural
Re-PRODUCTION
Atlas
AMPLITONE
 LOUD SPEAKER

\$25

**Letters from
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What have you accomplished with your *Atlas Amplitone*? Tell us about it!

ALL of the program, natural as the original, re-PRODUCED on the *Atlas Amplitone*. Faithfully responsive, not to just one small range of sound intensity, but to the *full scale* of tone harmonics. The "double diaphragm"—triumph of the radio and acoustic sciences,—automatically accomodates itself to every pitch. Blast and distortion are entirely eliminated. The "double diaphragm" is adjustable to operate most efficiently with individual receiving conditions. Ask the nearest *Atlas Amplitone* dealer for a demonstration. Hear the difference this great innovation makes.

Write for Booklet "D"

Contains a great deal of helpful information.

Sole Canadian Distributors

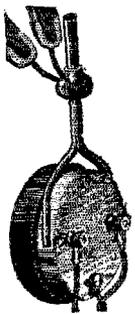
**THE MARCONI WIRELESS TELEGRAPH COMPANY
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Multiple Electric Products Co. Inc.

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**IF YOU CAN'T BUY THEM
AT YOUR DEALER'S
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These remarkable head-sets are made by The Newman-Stern Co., one of the pioneer radio manufacturing houses in America.

JUST OUT

**The new 1924
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\$ 6.50
PER PAIR
Complete

This is the standard 3,000 ohm "Red-Head." The 1924 Model F has eleven improved features: sensitive and fine-tuned; aluminum case; famous brown-red ear caps; military headband; high-grade cord.

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"Red-Heads" sent prepaid on receipt of price if you are unable to get them at your dealer's.

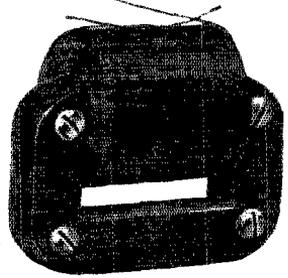
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REAL BARGAINS!**

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APPLIED FOR *Battery Charger*

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Cut exactly to size and a guaranteed 12 hour shipment. $\frac{1}{4}$ " thick .01 $\frac{1}{2}$ " per square inch. $\frac{1}{8}$ " thick .01 $\frac{1}{4}$ ". Made of the highest grade black fibre. This material possesses electrical strength of 200 volts per mil, is inexpensive, unbreakable, easy to work and takes a fine finish. We pay postage.

RADIO INSTRUMENT & PANEL CO., 564 W. Monroe St., Chicago, Ill.

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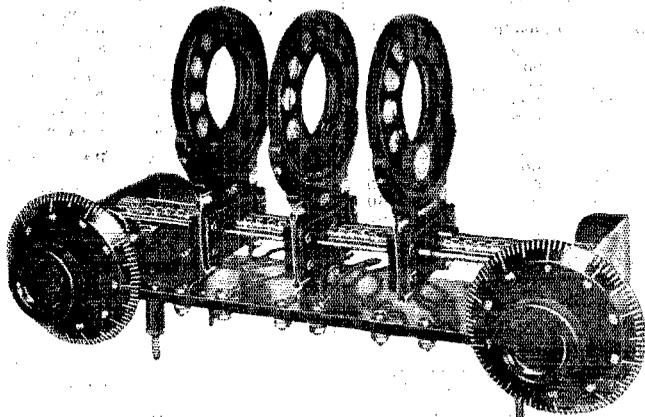
CURKOIDS

THE SUPREME INDUCTANCE

AND BUILD YOUR SET ON A FIRM FOUNDATION

CURKOIDS give you emphatically superior results, for they preserve every iota of energy set up in your circuits by the antenna system, without detrimental resistance losses and parasitic distributive capacity. Having maximum separation between adjacent turns, minimum distributive capacity is secured, *without sacrifice of efficient magnetic field distribution*. The concentrated magnetic field surrounding CURKOIDS permits of extremely loose coupling, which in combination with low distributive capacity and resistance, gives a sharpness of tuning unattainable by any other form of inductance.

CURKOID TWO COIL AND THREE COIL MOUNTINGS give a movement of but 1/400 of an inch for each division of the coupling adjustment dial, giving most critical control of coupling and regeneration. In tuning for distant signals, whether broadcasting or C.W., the selectivity and signal volume will astound the most experienced operator.



These mountings make CURKOIDS available for any circuit. Send ten cents for booklet giving hook-ups and constructional data for tuned and untuned radio frequency circuits, neutrodyne, regenerative, super-regenerative, Cockaday and Reinartz circuits.

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Because it is the only unit which employs CURKOID inductances, giving highest inductive value for minimum distributive capacity and resistance.

Because it is adapted for use with any make of vacuum tube, any ratio of transformation being obtainable with interchangeable CURKOID inductances.

Because it is readily used in tuned radio frequency circuits in connection with efficient variable condensers.

CURKOID PRICES

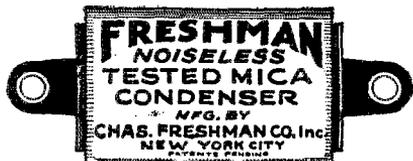
Dual Coupler....	\$4.50
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The proper fixed condenser will make all the difference in the world in the reception, clarity and selectivity your set affords.

Capacity	Each	Capacity	Each
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.00015	.35	.003	.80
.00025	.35	.0035	.70
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.0003	.35	.005	.75
.00035	.35	.006	.75
.0005	.35	.007	1.00
.0006	.40	.008	1.00
.0008	.40	.01	1.00
.001	.40	.015	1.50
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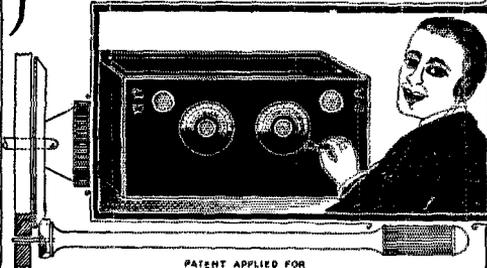
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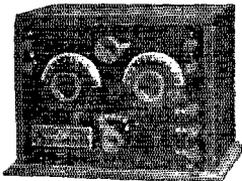
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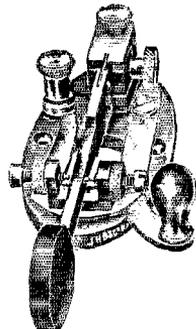
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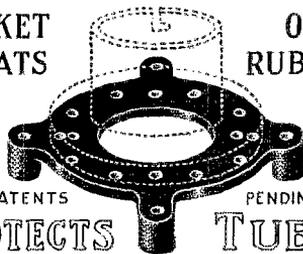
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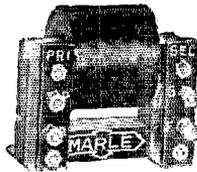
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SELL: Five Radiotrons UV202 new \$4 each; General Radio Company power amplifier type 272 Western Electric loudspeaker 10D together \$63; with Aeriola Senior ninety dollars. Seibt phones \$4. Bradley, 48 Jeffrey Avenue, Jamaica, New York.

RADIO BARGAINS—Any \$6.50 Tube \$5.75; Eria Reflex Transformers, any type \$1.50 Burgess 2156 Batteries \$2.50; Brandes Superiors \$5.25; Signal 23 Plate Condensers \$1.75. Everything Guaranteed Perfect. Write for list. Edward Bromley, Jr., White-water, Wis.

HOWDY**SHAKE**GLAD TO MEETCHA. SURE, WE HAVE IT; AND WILL SHIP SAME DAY YOUR ORDER IS RECEIVED, OR ADVISE WHY. EVERYTHING FROM ANTENNA TO GROUND IS OUR BOAST. IN BUSINESS SINCE MARCH 1921. "READ EM AND WEEP" FOR JOY; JEWELL METERS TELL YOU EXACTLY WHAT'S GOING ON, PROTECT YOUR TUBES AND KNOW YOUR "STUFF". THERMO COUPLE AMMETER 0-5 OR 0-10, \$12.00. A.C. VOLT 0-15, \$7.50; D.C. VOLT 0-500, \$15.50; PLATE MILLI 0-500, \$7.50. CHEMICALLY PURE SHEET ALUMINUM 90¢ SQUARE FOOT. A PRODUCT OF THE ALUMINUM CO. OF AMERICA. AMRAD S TUBES IN STOCK \$8.00 EACH, THEY ARE FINE BUSINESS, TRY 'EM. EMERSON 500 VOLT 200 WATT MOTOR GENERATORS PUT PEP INTO YOUR SET, ONLY THREE SETS LEFT AT \$75.00. WE CARRY THE PARTS THAT ARE HARD TO GET. WATCH THIS SPACE EVERY MONTH. WE'LL BE HERE. CORRESPONDENCE SOLICITED. FT. WORTH RADIO SUPPLY CO., 104 EAST 10TH ST., FT. WORTH, TEX.

RUBBER STAMP with large call letters 50¢; Radiogram and Relay Radiogram blanks 25¢ per hundred, Post Card 60¢ hundred. Send us your orders. Carolina Printing & Stamp Co., Wilmington, North Carolina.

8BHN—Reassigned to Don Canady, 3439 West 119th St., Cleveland, O. Pse QSL.

9CBA's 100 Watt C.W. Transmitter for sale. Complete, panel-mounted, DX-6800 MI. Write Kenneth W. Clark, Winchester, Ind.

BARGAIN—10 Watt Transmitter. Write, C. Chamberlain, Berea, Ohio.

BARGAINS—WD-11 tubes \$5.00, UV201 \$4.50. Westinghouse MG storage "B's", \$5.50 each. 6x21 inch cabinets, \$3.50. Clapp-Eastham HR and HZ \$55.00. Chesaning Electric Co., Chesaning, Mich.

FOR SALE: Special 3 stage amp. and Reg. in Cab. det and reg. Hot wire Ammeter, Chi-rad Variometers and Coupler. 9DFX, Lee Center, Ill.

FOR SALE: E2 Marconi 1/2 KW transmitter. 106 Marconi Receiver together or separate. No reasonable offer refused. Connor, 194 Hall St., Brooklyn, N. Y.

QRA-8BRU Lawrence Cook, R. 2, Bryan, Ohio. Pse QSL.

BARGAINS—A great two step audio amplifier with GE and Amertran transformers and C batteries \$25.00; New Bristol 1 step power amplifier \$17.50; Magnavox R3 like new \$25.00; 6-12 volt Valley battery charger for 220 volt 25 cycles \$15.00. Instruments are guaranteed. L. E. Crossman, Ogden, Iowa.

IBIJ has been assigned to Eli Crumb, Ward St., Norwich, Conn. QRK? QSL. All cards answered.

FOR SALE: Grebe CR8 \$50.00; Grebe Rork 2 step Amp. \$30.00; Grebe CR9 \$75.00. First class condition. Radio 2DI, Phone Rhinelander 4725.

FOR SALE: New Western Electric \$161. Loud Speaker for \$110. Grebe CR5 and Rork \$105. Aeriola Senior with phones and tube, \$55. Western Electric VII's \$6 each. Spark coil transmitter complete \$10. Tubes, phones N'everything. Write for prices. Cutler Ellis Radio Station, Sullivan, Ind.

MASTER RADIO CODE in 15 minutes: Ten word speed 3 hours. Our students made these world records. Reports and learning records 100 licensed students 12 districts one dime. Best 40 records free. Verify. Code instructions that instruct only \$2.00. Investigate. Dodge Radio Shortcut, Dept. S., Mamaroneck, N. Y.

SELL: Mounted two hundred watt Acma thirteen dollars; two fifty and twelve fifty duolateral both two dollars; Edison 1.2 volts size thirteen by five inches square, nine dollars. D. Dana, Grantwood, N. J.

FIVE HUNDRED CYCLE Generator Spark Transmitter C.W. Transformer \$35. 6BPF.

FOR SALE: Complete parts for 100 watt C.W. & one set including tubes. Write for prices. 500 watt 1000-1500 volt D.C. Generator \$70; Advance "sync" rectifier \$35; UP1016 Power Transformer \$35. CAHC, Warren Doller, 847 So. Philadelphia, Anaheim, Calif.

GET IN on real bargains. All new goods. Genuine Baldwin units \$5.25. N. & K. 6000 ohm phones (leather covered headbands) \$5.25. Amertran (7 transformers) \$5.35. General Radio No. 231-A transformers \$4.10. \$25 Fada neotrodyne parts \$19.60. General Radio No. 247-H .0005 geared condenser for panel mount \$4.25. Workriteformers (three for neotrodyne) \$4.85. Fada 4" bakelite dials 60¢. 24 hour shipment service. Eveland, Box 295, Newark, N. J.

FOR SALE: 2 RCA 50 watt tubes that have been used but very little and are in absolutely perfect condition @ \$20. 2 sockets @ \$1.85; 1 grid leak \$1.5 filter condensers 1 Mfd 1750 volts @ \$2. Acme plate transformer 500 watts \$18. Acme filament transformer 150 watts \$12. RCA O.T. UL1008 \$9. Weston 0-500 milliammeter \$6. Weston 0-5 Thermocouple radiation meter \$10. Jewell 0-15 A.C. voltmeter \$8. Am allowing 10% off all items offered in ad in September QST which refer to NOW. Everything in perfect condition and so guaranteed. Anything sent anywhere C.O.D. J. R. Dean, 86 Vermont St., Rochester, N. Y.

QRA, 9BSP now Marshall H. Ensor, Olathe, Kansas. All cards answered.

QST—Storage "B" batteries made up from large size Edison elements, 100 volts 1500 milliamperes \$17.50; 140 volts 1500 milliamperes \$23.50. Complete unit pack for making a 100 volt battery consisting of a cabinet, switch, plates, glass tubes, separators, nickel wire, electrolyte, and blueprint for assembly \$12.50. When ordering do not send stamps or checks. Money orders only will be accepted. Roberts Storage "B" Battery, 41 Jefferson St., Brooklyn, N. Y., attention Dept. Q.

WANTED QUICK: Two Western Electric 50 watt tubes. New. Write stating price. Also Benwood Inductance. Kenneth R. English, Coshocton, Ohio.

TO TRADE: For receiving apparatus: 2 50 watt Kenotron rectifiers; 1 WBL wavemeter; 1 Low voltage motor generator; 1 4KW Robbins-Myers D.C. generator; 1 Audiotron double filament. E. N. Ebeling, Atwood, Kansas.

2AAA—Gulian Ellis, 2341 Andrews Avenue, New York City. All cards answered.

BARGAIN: For synchronous rectifiers or gaps; two Wagner 1/2 H.P. synchronous motors slightly used, good as new, list \$30.00, sell \$20.00 each; one Zenith 1/2 H.P. synchronous gap, list \$110.00, sell \$50.00. C. C. Endly, 22 Sturges Ave., Mansfield, Ohio.

CHEMICAL RECTIFIERS. Pure aluminum \$1.50 per square foot, lead \$1.20. Rectifiers designed and built to meet your requirements, complete from A.C. to the plate. Howard S. Frazier, 3WI, 5714 Hazel Ave., Philadelphia.

UV199's \$5, Sockets 35¢, 200's \$3.50. Cash or trade for power trans. choke coil, 0-10 A.C. Voltmeter, filter Cond. etc. Morris Foster, Angleton, Texas.

POSTPAID—201-A's, \$6.00; 201's, \$4.75; bakelite sockets, 40¢; Eveready 22 1/2 volt "B's", \$2.25. Complete list free. Chamberlain Radio Sales, Berea, Ohio.

200 WATT ACME, mounted, \$17.50; rheostats; bulbs; other transmitting and receiving apparatus. Write. William Griffiths, Loudoun Street, Yonkers, N. Y.

GREBE DIALS 1" type, the dial for that new set, \$1.50; Baldwin phones (C) double \$10.00, single \$5.00; DeForest vernier condensers .0015 mfd \$12.00; .001 mfd \$11.00; UV199, WD11, WJ12, UV201A, \$5.75; King Amplitone horns \$7.00; Pathe molded variometer \$3.75; Erla reflex transformer \$4.75; Pathe dials 4" \$1.25; 3" \$1.00; Rheostat dial \$0.90; Thordarson transformers 3-1 \$3.50; 6-1 \$4.15; Federal (new) \$6.75; Acme Radio or Audio \$4.25. Let us quote you prices on everything in the radio line. Everything postpaid. Quick service. Hendrick Radio Equipment, 85 West 181 Street, New York City.

SELL BENWOOD "Sync" motor \$25. Cost \$60. Write Carmon Harris, Ringling, Oklahoma.

QRA-5ABD A. E. Hart, 724 North Market, Chattanooga, Tenn. Correct your call book. Please QSL if heard. All cards answered.

HAMS. Get our samples and price on printed Call Cards, Letterheads and Envelopes. Hinds & Edgarton, 19 So. Wells St., Chicago, Ill.

Want to Trade HR Clapp-Eastham for R-3 Magnavox. J. F. Hladky, Victor, Iowa.

EDISON ELEMENTS for storage B batteries, six to ten cents per pair postpaid, depending entirely upon quantity ordered. I handle only strictly first grade full capacity elements. A. J. Hanks, 107 Highland Ave., Jersey City, N. J.

DYNAMOTOR 600 volts, 100 watts, 8-12 volt primary \$40. Perfect condition. New. Jones, Box 220, Waterford, N. Y.

2 FIFTY WATERS type UV203 \$18 each. Used only 2 hours. 1 250 watter UV204 \$95. New. Everything guaranteed OK. Jones, Box 220, Waterford, N. Y.

FOR SALE—Reinartz tuner, using genuine Reinartz coil, in cabinet \$18.00. Single circuit tuner, det. and two step amp. in cabinet \$22.00. C.W. transformer supplies 500V. for plates, also has two filament windings all with center taps, \$15.00. Arthur Walser, Chesaning, Mich.

MAGNAVOX R3 OR M1. Latest nationally advertised reproducers. List \$35. Introductory \$25. The factory sealed carton is your guarantee. Radio Central, Dept. Q, Abilene, Kansas.

WANTED: Amrad 1/4 KW Quenched Gap, also right hand Vibroplex. SASI, Bennett Kendig, 334 Brown St., Rochester, N. Y.

BARGAINS—3 50 watt tube sockets \$1.75 each; 2 UV203's, new \$18.00 each; 1 variable condenser, Mica Faradon \$5.00; 1 UV204, new \$80.00; 1 Acme 300-watt filament transformer \$12.00; 1 pair UV204 mountings \$1.50; 1 Inductance UL1008 \$7.50. P. R. Kern, 1030 N. 10th St., Reading, Penna.

C.W. AND RADIOPHONISTS. One hundred Ohio and Wagner 110V. sixty cycle A.C. synchronous motors built in 1/4 A.P. frames with 1/2" shafts are yours for \$18.00 each F.O.B., Buffalo, N. Y. Original selling price \$28.50. We also have the parts to attach to these motors to make synchronous rectifiers which will handle 2000 volts. Kimley Electric Co., Inc., 2665 Main St., Buffalo, N. Y.

15¢ LETTERED binding posts, complete set eight 60¢; two sets \$1.00. Prepaid, same day. Stamps accepted. Everything in radio. Ask for quotations. List for stamp. Kladag Radio Laboratories, Kent, Ohio.

CARTER VARIABLE condensers 23 and 43 plate, your choice \$1.00. Automatic Long Range phones 3200 ohms \$3.25. Coryphone headsets 2000 ohms \$3.00. Brach weatherproof outdoor lightning arresters \$1.00. Newyork Efficiency variometers \$1.50. Carter Plugs, handle two headsets \$0.40. American hard-rubber dials 4 inch for 1/4 inch shaft \$0.40. Electro-lose lead-in bushings 6 inch \$0.80. Powell May, Box 241, Knoxville, Tenn.

FOR SALE: Omnigraph No. 2 Jr. with key and sounder \$18; DeForest U100 condenser with leak \$4; Illinois 43 plate condenser in case \$3; Crystaloid Detector \$1; Magnavox type loud speaker 14 in. horn \$18; Everything first class condition. Lowrey, 326 High St., Watertown, N. Y.

FOR SALE: Paragon RA-10 and DA-2 amplifier with tubes for \$30.00, Tungar charger 5 ampere size \$18.00. All used short time and guaranteed like new. Money back if not satisfied. Louis Metcalf, Greenfield, Ill.

RADIO CARDS with red call letters 60¢ per hundred up. Radiograms 20¢ per pad. Send for samples. BIG BARGAIN. Arthur Press, 1453 Arthur Ave., Lakewood, Ohio.

EDISON ELEMENTS 5¢ pair. Letters given immediate attention. Write me. Any quantity. Amos Martin, Annville, Penna.

LET ME PRINT your QSL cards. Large call letters in colors. Printed to order at reasonable prices. Write for samples and price list. 5BP.

NEUTRODYNE—Freed Eiseman parts, 3 coils with mounted condensers and 2 "Neutrodons" for \$16.50. Paul Mills, Woodburn, Oregon.

FOR SALE: New Amrad three circuit receiver, detector and two step, complete with loading coils and tubes. \$90. Nuff Sed. Neal Miller, Webster Ave., Bangor, Maine.

ZAO REASSIGNED to Alfred C. Mills, 57 Linden Ave., Irvington, N. J. Pse QSL.

BARGAIN: Two Western Electric fifty watters, slightly used, twenty-three dollars each. 2APD.

COPPER BRAID—best conductor known for RF circuits. Surface is what counts. Many mechanical advantages over solid wire, ribbon or tubing. Ideal for CW inductances, loops, OT's, pig-tails, lead-ins, etc. Twenty sizes. No. 16 for wiring receivers, fifteen feet for 50¢. 9CZP.

FOR SALE—5 watt transmitter, ready to connect to 110 V. A.C. Has Kenotron rectified plate supply, \$50.00; 2 Radio Instrument DX transformers, \$4.50 each; 2 Murad R.F. transformers \$3.25 each. Arthur Walsler, Cheaning, Mich.

RADIO GENERATORS—500 Volt 100 Watt \$28.50 each, Battery Chargers \$12.50. High Speed Motors, Motor-Generator Sets, all sizes. Motor Specialties Co., Crafton, Penna.

FOR SALE: 12 Units Willard Wet B Batteries 24 Volt— $\frac{1}{4}$ Amp. Address Mr. W. Nebes, U. S. Cartidge Company, Lowell, Mass.

SELL: Regenerative Set with Two Step, Complete, \$50.00; Reflex Set \$20.00. Oswalt, 3219 West 82, Cleveland, Ohio.

STOP CORROSION: Seven strand ENAMELED copper aerial wire \$1.25 hundred ft. postpaid. Eugene Proctor Co., Boston, Mass.

1KW ACME; .007 Dubilier 21,000 volt condenser; Thord, OT; Klitzen Gap—\$85.00. 1ACO, Bath, Me.

GREBE CR-9 receiver amplifier \$85.00; Federal loop receiver consisting of tuner No. 60, two stage radio frequency number 55, Detector and one stage audio-frequency number 8, two stage audio-frequency amplifier number 9. Will sell entire set four units \$100.00. Powell May, Box 241, Knoxville, Tenn.

SELL OR TRADE: Navy IP501 receiver brand new condition \$200; Navy SE95A 250-8000 meter receiver \$150; Crocker-Wheeler $\frac{1}{4}$ KW 500 cycle alternator \$85; Weston A.C. wattmeter \$10; G.E. 250 watt tube \$70; 1 KW tube UV206 \$145; Navy Exide 8 V. 140AH ship batteries, perfect condition \$30; other high power C.W. and 500 cycle apparatus; 6 V. 80AH Willards \$25; 1 KW Telefunken 500 cycle alternator \$100; 500 watt Telefunken tubes \$100. Edw. Page, Cazenovia, N. Y., 8AQQ-BXH.

TRANSMITTERS AND RECEIVERS overhauled, repaired, rebuilt and made to "percolate." Any circuit. Twelve years experience and up-to-date. 9CZP.

FOR SALE: Practically new Paragon receiving set RA-10, DA-2, \$75. Rabezzana, 112 W. Baker, Flint, Michigan.

WIRE TERMINALS—150 assorted \$1.00, 20 two foot lengths No. 14 square tinned busbar \$1.00, 10 two foot lengths No. 10 special round bus bar \$1.00. Send for samples. Immediate shipment postpaid on receipt of remittance. Radio Engineering Co., 55 Halsey Street, Newark, N. J.

CALLS HEARD POSTAL CARDS (for DX reports). Station Call letters in color and description of station printed on Government or plain postals. 80¢ hundred up. Rubber stamps, station letterheads, envelopes, message cards, blanks, etc. Printed by 8AVO, Member A.R.R.L. Write for samples. "Used Everywhere—Go Everywhere." Radio Print Shop, Box 582, Kokomo, Indiana.

SACRIFICE—Three circuit (Atwater Kent variometer) tuner, three steps audio. Range, both coasts. \$75. Seller attending college. Robert Ralston, Tarkio, Missouri.

WANTED—500 volt, 4/10 ampere motor generator set. George Reid, Hillsboro, Texas.

NEW GREBE CR-9 \$100, UV-201's \$5, \$1.50 Rheostats \$1, 75¢ Dials 50¢, \$3 Meyers Tubes \$5. 8DDH.

BUILD YOUR SETS with quality parts and get sure results. Radio Parts Co., Box 56, Dunellen, N. J.

FOR SALE: Z-Nith Regenerator with detector and one step, \$70. Good as new. Oscar Rosel, St. Ansgar, Iowa.

GREBE RORK with 2 VT2, \$40. General Radio wave-meter type 191, \$50. General Radio condenser type 101M, \$8. First Money Order for \$95 takes them. Schuck, 1411 Avenue A, New York City.

EDGEWISE WOUND Copper Ribbon $\frac{3}{8}$ inch wide $6\frac{1}{4}$ inch diameter 15¢ turn, $\frac{1}{8}$ inch wide, 5 inch diameter 12 cents turn, any number turns one piece. Remler Giblin Coils mounted 25-75-100-150-200-250-300-400-500-600-750-1000-1500 turns, half price. Genuine Silicon Transformer steel, cut to order, 25 cents pound, 10 lb. and over, 4 cubic inches to lb. Postage extra. Geo. Schulz, Calumet, Mich.

SELL 10 watt C.W. Set \$25. Less tubes. Ernest Schultz, 1311 Colburn St., Toledo, Ohio.

FOR SALE—Brand new, 8 volt, non-spillable Willard threaded rubber batteries. Shipped charged or dry, \$7.50. In lots of three, \$6.50. 9ASJ, Box 237, Seymour, Ind.

WANTED 6 volt Dynamotor 500 volts. Henry Smith, Route 1, Jamestown, N. Dak.

\$110.00 EDISON CHROME NICKEL Storage A batteries at \$19.85 each. One hundred and fifty ampere hour capacity. The 30 year life battery at a wonderful price. Guaranteed perfect or money refunded. 375 ampere size at \$42.50 each. Edison Type A large size B storage battery plates at $3\frac{1}{2}$ ¢ per pair, 4¢ in lots under 100. Complete B storage battery parts, includes plates, vials, hard rubber separators, special wire and chemical electrolyte with complete instructions for making and charging. 45 volt unit at \$5.60, 100 volt \$9.35, 150 volt \$13.90. B. Q. Smith, 31 Washington Ave., Danbury, Conn.

200-20,000 meter receiver \$35.00. Two step amplifier \$22.00. Baldwin phones \$9.00. Smith, 4416 Market, Philadelphia.

COUPLERS, 80 turn \$2.00, 90 turn \$2.25, 110 turn \$2.75; variometers \$1.50; complete tuners \$10.00. We make all kinds of coils to order. Special prices on sets. Stiles-Perry, Deposit, N. Y.

IF YOU WANT better results use a 9 circuit Combination Primary Condenser Switch. A circuit for every need. Makes ordinary receiver extremely flexible. Blue Prints for building switch, 50¢ per set or 3 for \$1.00. Sell two and get your own free. A. Franklin Starbuck, 569 Franklin St., Whittier, Calif. (6CIY)

FOR SALE: 1500 volt, 400 watt Emerson Motor Generator \$125.00. 50 watt tube with socket \$20.00. Three 5 watt tubes \$5.00 each. 1AZW, Newport, R. I.

WANTED: Western Electric 211-A and 212-A new tubes. Address "Transmitting" c/o QST, Hartford, Conn.

FOR SALE: Omnigraph, 15 dtal, new \$20. Transformers, Audio UV712, Radio UV1714, \$3.50 each. Paragon sockets and type UR542, 50 cents each. Paragon rheostats, 75 cents each. Ellison Thompson, 1301 Findlay Ave., New York.

FOR SALE: Crocker Wheeler motor generator re-wound 150 watts, 1000 volts speed 3600 \$75.00. Esco 500 watt, 1000 volts speed 1750 new \$150.00. Travis Radio Laboratory, 102 Diaz St., San Antonio, Texas.

IZE has the following for sale: First money talks. One special Acme Filament Heating Transformer. Can run from one five watt to three UV204's (quarter K.W. Tubes) Primary 110 volts variable resistance, secondary 5 volts to 12 volts, \$10.00. 1 Acme 1 K.W. Spark Transformer Special closed core 110 volt primary, 30,000 volt secondary, \$10.00. 3 50 watt tubes.

new, \$20.00 each. 1 500 cycle 1 K.W. Crocker Wheeler alternator \$70.00; has a direct current 100 volt dynamo or motor on other end of shaft.

FOR SALE OR TRADE: Single Circuit Regenerator Det. 2-step, in genuine quarter sawed oak hinged top cabinet 6"x26". Formica panel, absolutely best material on market. Gets them all \$120.00, or will trade for transmitting apparatus, M.G. set, meters, etc. Send for photo and description. What have you? C. L. Umberger, 510 N. 24th St., Middleboro, Ky.

INVENTORS: Protect your invention by Experts, skilled in Radio-Electrical, Chemical, and Mechanical fields. New illustrated Booklet, giving much necessary and useful information which every inventor should know, sent free upon request. Write today to A. M. Wilson, Inc., (Radio 3ARH) 310-16 Victor Building, Washington, D. C.

EXCHANGE: General Radio 0-1 Ammeter, Jewell 0-5 TC Ammeter, Jewell 0-130 A.C. Voltmeter, Federal type 300 Choke, 600V C.W. Transformer, "A" Batteries, 2 WE Microphones, etc. All new. WANT Acme 200W C.W. Transformer, 0-300 Milliammeter, cash. H. Walleze, Danville, Penna.

WANTED: Panel mounting milliammeter in perfect condition. State type, scale and price. Welz, 2420 I St., Galveston, Texas.

STORAGE B BATTERIES that are dependable. Genuine Edison chrome-nickel elements used. Complete wired 24 volt battery with paraffined acid proof rack, electrolyte and special rotary switch to charge from your A battery charger \$4.00, 60 volt \$9.00, 100 volt \$14.50, 180 volt special price \$21.00. These batteries are equipt with special rotary series-parallel switches to charge from any A battery charger. Costs less, is quicker, cleaner and more efficient than the electrolytic rectifier. Type A elements drilled 6¢ per pair. Type G elements 3¢ per pair. First grade elements only. C.O.D. orders accepted. All prices F.O.B. Phila. J. Zied, 530 Callowhill St., Philadelphia, Pa.

PROTECT YOUR APPARATUS with small fuse wire in dangerous places. Eighth, quarter, half, three-quarters, one-ampere and larger sizes, three feet for two bits. 9CZP.

WANT old QST's. Write Kepler, 3311 Franklin, Cleveland.

FOR SALE: 2000 volt 500 watt ESCO motor-generator set. NEW with rheostat any voltage from 750 to 2000. Operates on 110 or 220V 60 cycles. Also one Thordarson 900 watt plate transformer 1000 and 1500 sec. voltage. Will handle four fifty watters. Harry S. Weber, 313 Factory St., Dover, Ohio.

TELEFUNKEN AND CROCKER-WHEELER 500 cycle motor generators. 350 volt dynamotrons 12 volt battery supply. Inductances—Dubilier .004 condensers, etc. Henry Kienzle, 501 East 84 St., New York.

IMPROVE your receiving set. Impossible? Try a GOOD variable. And a transmitting model for SERIES work. 8000 volts at highest frequencies. GUARANTEED. Radio 2TU.

FOR SALE: 5 WD11 Tubes, used very little. Special price of \$5.00 each. George Care, Colby, Wis.

10" PORCELAIN INSULATORS ONLY 60¢. INSULATOR #6 MAY QST. EQUAL TO #5 IN TEST AND 1/3 THE COST. LORAIN RADIO SUPPLY CO., LORAIN, OHIO.

HERE IT IS FELLOWS that 8KG C.W. and phone circuit with special speech amplifier application. The 10 watt fone at 8KG getting into Maine, and New York as loud as Chicago Broad-Casting Stations; full conversation copied in Nova Scotia; this and many reports stating "Finest fone I've ever heard" from 24 states in last nine weeks. Circuit recognized by a Capt. in Signal Corp. and many others as most efficient circuit they ever used. Complete circuit diagram with all values \$2.00. J. Wm. Kidd, 404 La-Fayette Street, Niles, Ohio.

SELL: Acme 200 watt C.W. trans., used month, \$14. Radio 9BUK.

PURE ALUMINUM AND LEAD for rectifiers, 1/16"

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS

at \$1.50 square foot. Please include postage. Aluminum weighs 1 pound square foot and lead 4 pounds. Dealers special. Electrical Specialty Company, Valparaiso, Indiana. 9DVK.

SELL OR TRADE: One five hundred volt, one hundred watt General Electric generator. Morris Decker, Baldwinville, N. Y.

WIFE DEMANDS new hat: Must sell following brand new apparatus. Two Remler variometers, one Remler variocoupler, five dollars each. Pair Federal 3000 phones, four dollars. Postpaid anywhere. 1AEL.

CLUBS, LODGES, RESTAURANT OWNERS, ETC. If you're planning on installing radiofone transmitting station of 100 to 1000 watts power or are in need of a 1st class commercial operator with 8 years of experience to operate a broadcasting station of this nature write to, Nowell Rang, 77 S. Spencer St., Aurora, Ill. for particulars. Prefer locations in the middle west.

WE HAVE ACCEPTED a MuRad-MA-13 six tube set (3 Radio, 1 det. & 2 Audio) in payment of an account from a bankrupt firm, which we will sell for \$106.17, F.O.B., Hartford. American Radio Relay League, Hartford, Conn.

SACRIFICE—9DYC's 10 watt C.W. 4000 mile record, complete \$40.00. Must sell, am leaving for school. K. Tracy, 2429 Banks Avenue, Superior, Wis.

NOTICE AND WARNING—An outlaw radio station at Lawrence, Kansas has been using my call "9KW" during the quiet hours and on an illegal wave. My own station has never worked during the quiet hours nor has it ever been tuned above 190 meters and this is fair warning that the outlaw station will not be permitted to give a decent radio call a black eye. The name and address of the outlaw are known—fair warning. Signed—S. Kruse at the real 9KW.

FOR SALE: A few Western Electric 50-100-250 watt power tubes. Prices on request. Also 2 UV203 tubes at \$22. All tubes new. Has anybody heard my 100 watt transmitter? Please QSL. All cards answered. Radio 2AGD.

PARAGON TEN WATT / TRANSMITTER. Perfect condition. Worked excellent distance. Reasonable. Canadian 3SP.

MICARITE CONDENSER—A CONDENSER THAT CAN BE ADJUSTED TO ANY CAPACITY FROM .00025 TO .006 M.F.D.—MICA AND FORMICA INSULATION—FOR TRANSMITTING OR RECEIVING—TESTED AT 2000 VOLTS 75¢ POSTPAID. NELSON RADIO LABORATORIES, 1773 CARLYON ROAD, CLEVELAND, OHIO.

MORE BARGAINS: Following brand new: five ampere Tungar bulb, \$4; Radiola II, with batteries and carrying case, \$65; two UV216 Kenotrons, \$4 each; Weston 0-300 milliammeter, \$5. Following used apparatus: 0-500 Jewell milliammeter, \$4; 0-500 Jewell D.C. Voltmeter, \$4; Warren loop antenna, \$5, three RAC-3 audions, with base, \$3 each. 2AHO.

ABSOLUTELY FREE! A brand new knocked down variometer to any licensed ham in Southern Minnesota who writes for one. Absolutely no charge! C-C Standard Radio Company, Luverne, Minnesota.

400 WATT D.C. generator—1000 volt self excited slightly used, \$40. 9DQ, 77 S. Spencer St., Aurora, Illinois.

INTRODUCTORY BARGAINS—Fones, Baldwin \$10.50, Federal \$7.25, Brandes, \$5.50, Murdock, \$4.75. Electrical Specialty Company, Valparaiso, Indiana. 9DVK.

C.W. PARTS FOR SALE. Write for list. H. F. Mason, ex-7BK, 34 Barnard St., Hartford, Conn.

SA OM! DO US A FAVOR! PSE ALWAYS TYPE-WRITE AND DOUBLE SPACE UR "HAM-ADS" TNX. SIG.—THE ADVERTISING MANAGER AND LINO-TYPER.



RADIO CABINETS

for all sizes and shapes of receivers

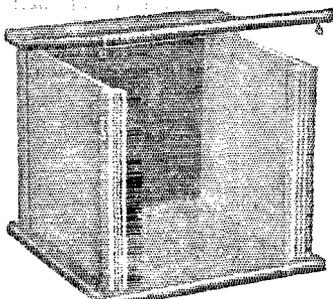
Made of selected gum wood in a rich mahogany finish.

As attractive as they are sturdy.

Furnished either knock-down or regular. K.D. Style has two front posts recessed to receive panel, reducing exposed area of panel $\frac{1}{2}$ inch.

29 stock sizes to choose from. Other sizes will be made to order.

Low list, liberal quantity discounts and the beauty and fine workmanship of these cabinets will make them a quick-selling line. Send for circular.



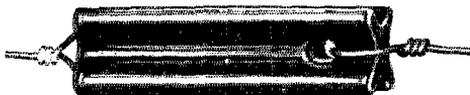
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GENUINE OHIO BRASS CO.



INSULATORS DIRECT FACTORY DISTRIBUTOR

Jobbers and Dealers Write. Retail orders handled when no dealer in territory.

H. N. UMBARGER
65 N. Diamond St., Mansfield, Ohio

A.R.R.L. MEMBERS: When you move, please notify QST Circulation Dept. and your Postmaster of your new address two weeks ahead, if possible.

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3CHG—Elmer R. Gabel, 412 Meredith St., Kennett Square, Penna.

3NY—J. M. Chapple, 664 First Street, Ocean View, Va.

4ZA—Harry F. Dobbs, 427 Peachtree St., Atlanta, Ga.

8CCI—James C. Lisk, 902 So. Elizabeth St., Lima, Ohio

8CXM—Clarence Doty, 519 Naney Street, CharlesTON, West Virginia.

8SR—J. A. Cameron, 134 North Barry St., Olean, N. Y.

8DKI—Nick Geracimos, 12 Hertzal St., Warren, Pa.

9AGL—Howard M. Crosby, 708 Eighth St., Brookings, So. Dakota.

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—FOR YOUR CONVENIENCE—

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ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS

A Brand New Grid Leak

WITH
Stepless Adjustment from $\frac{1}{4}$ to 10 Megohms



September 8, 1923.

ALLEN-BRADLEY CO.
Milwaukee, Wis.

Gentlemen:—

I just received our laboratory report wherein the Bradleyleak is complimented very highly when compared with other adjustable leaks. The Bradleyleak gave smooth, uniform control without sudden alterations of the grid circuit, and is the only device tested in our laboratory which is stable in operation. We found it quite independent of atmospheric conditions, a factor not found in other adjustable leaks exceeding one megohm.

I cannot impress you too strongly with the great necessity of an adjustable grid leak for radio receiving sets and feel confident that the Bradleyleak will find a very popular field as soon as its operation is appreciated.

Yours truly,

CROSLLEY MANUFACTURING CO.



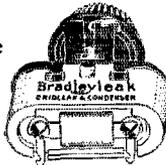
*Crosley Laboratory Enthusiastic
over this remarkable grid leak*

THE Bradleyleak is now ready for you! After months of laboratory research, a new and better adjustable grid leak has been developed which provides a stepless range of resistance from $\frac{1}{4}$ to 10 megohms. This problem has defied radio engineers for a long time, but finally has been solved through the use of two columns of discs of special composition placed under the variable pressure of the Bradleyleak knob. Any conceivable resistance is obtained with utmost accuracy by turning the adjusting knob. When once adjusted, the setting is permanent. [Read the letter from the Crosley Manufacturing Company's Laboratory.]

The radio world has been waiting for a real adjustable grid leak. Here it is! There is no substitute for the Bradleyleak, either in performance or accuracy. It is furnished with a grid condenser, if you desire. Your dealer will get the Bradleyleak for you. Avoid unreliable makeshifts, and improve your tube efficiency by installing the Bradleyleak.

BE UP-TO-DATE! MAIL THE COUPON

Retail Price
\$1.85
P. P. 10c



Condenser
.00025 mf.
35c extra

*Unaffected by atmospheric conditions.
Smooth and uniform in adjustment.*

Bradleyleak

THE PERFECT GRID LEAK

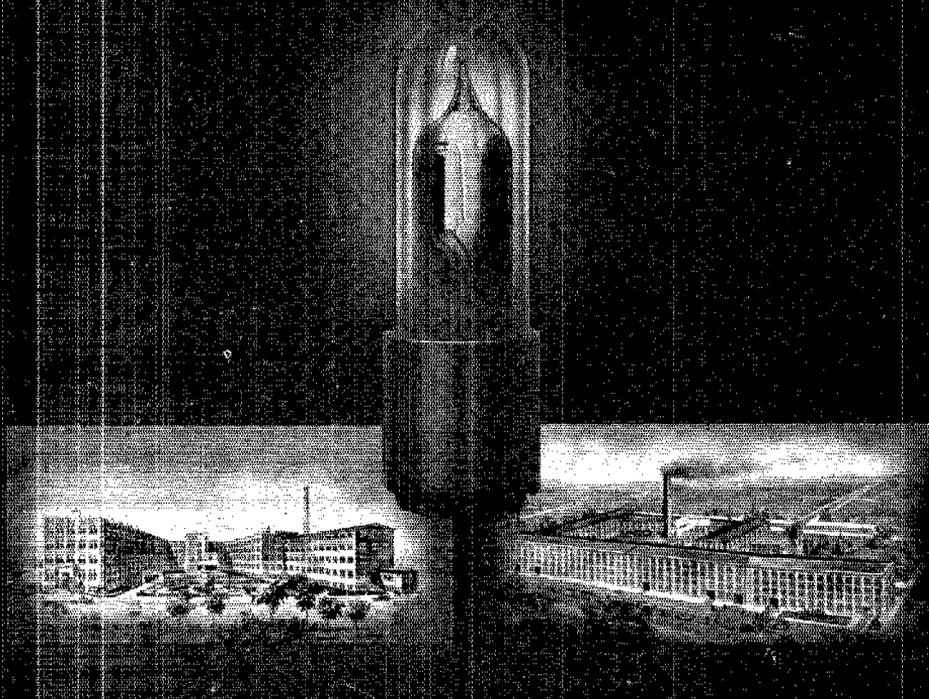
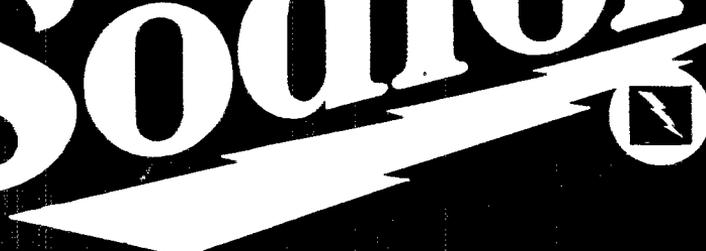
Allen Bradley Co.
277 Greenfield Ave., Milwaukee, Wis.

I am glad to hear that a dependable, adjustable grid leak can now be obtained. Please send me your descriptive folder.

Name _____

Address _____

Sodion



The Plant Behind It

AMRAD

"S" TUBE IMPROVED

(TYPE #4000)

**Increased Capacity
Double Wattage**

Ratings per Tube:

Current: 100 Mil. Amps.

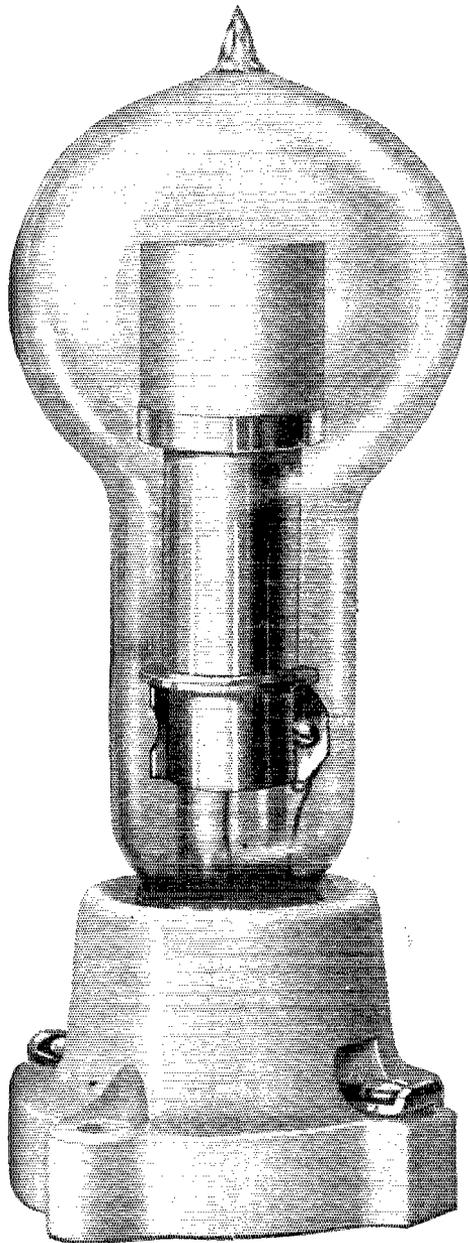
Voltage: Up to 1000 Volts D.C.

Life: 3000 Hours (Very conservative)

Operates C.W. Transmitters utilizing either 5 or 50 watt power tubes.

May be used to charge Storage B Batteries.

Price, each, \$10.00.



AMRAD "S" TUBE (Actual Size)

FROM ICPI, WATERTOWN, MASS.

"Having great success with the AMRAD "S" TUBES, I thought you would be interested in some of the results I have obtained using a 10 watt set, and two "S" TUBES for rectification.

"Since installing the "S" TUBES I have had continual reports praising my note.

"Have worked 25 states, been heard over 1500 miles on C.W. and have worked 600 miles on phone, 600 miles in daylight C.W., 100 miles in daylight on phone, and have continued to work DX through the heavy summer static which is due to the quality of rectification obtained from your "S" TUBES.

"Last, but not least, I worked Donald MacMillan's Ship, The Bowdoin (WNP) off the coast of Labrador, through heavy summer static on July 5 at 2:20 A.M."

*(Signed) W. J. Kelley (ICPI)
26 Windsor Ave., Watertown, Mass.*

This is one of the many enthusiastic letters we are receiving daily from prominent amateurs. Write us *your* results.

NEW BULLETIN J-2

Describes the improved type, giving diagram for connecting Tubes to secure various voltages and current. *Write for copy today.*

AMERICAN RADIO AND RESEARCH CORPORATION

205 College Ave., Medford Hillside, Mass.

AMRAD Dealers in Principal Cities and Towns.