

A DANDY CIRCUIT BY C. WHITE—(In This Issue)

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RADIO

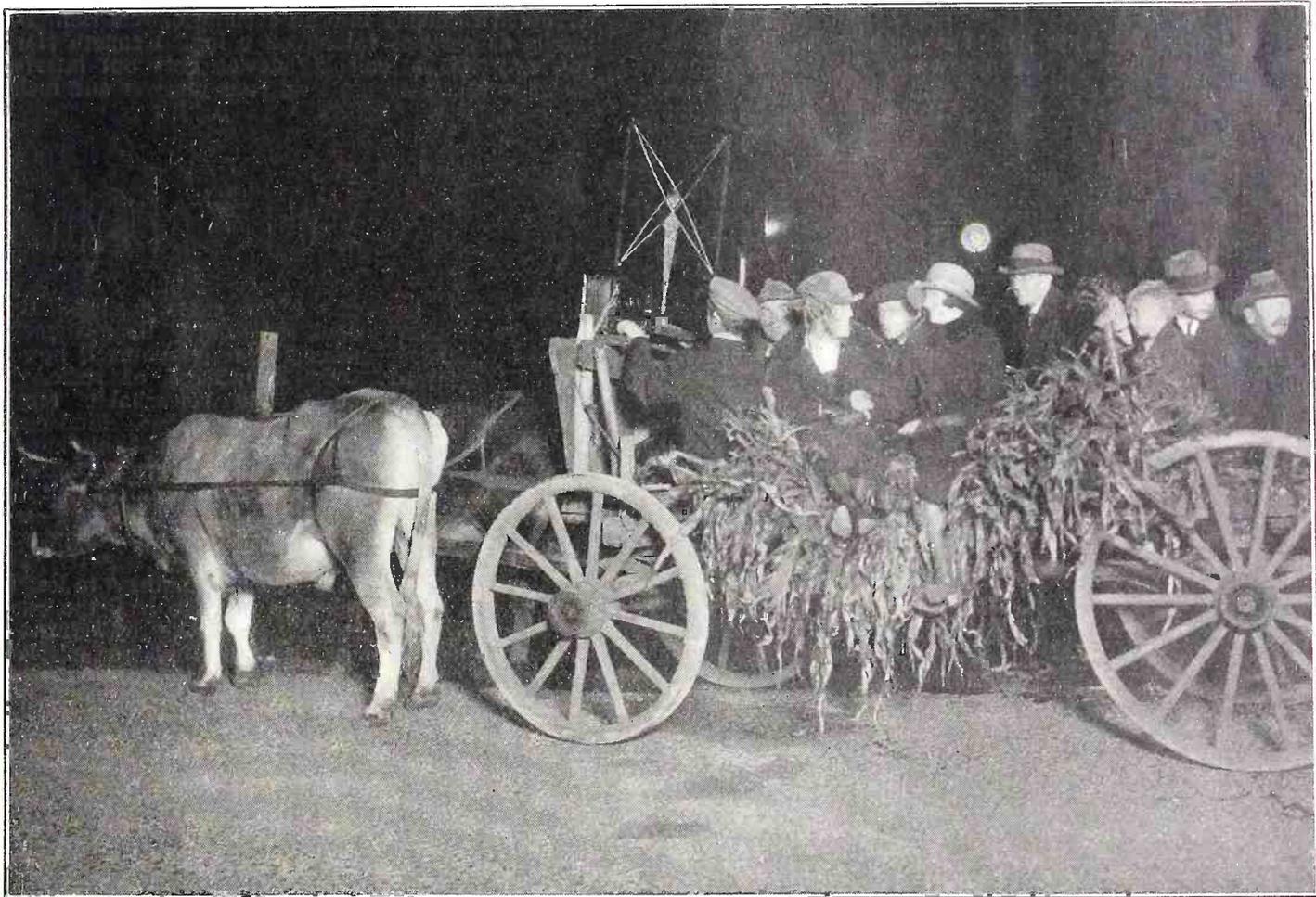
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WORLD

ILLUSTRATED

EVERY WEEK

OXEN HAUL JOYFUL RADIO RIDERS ON HALLOWE'EN



(C. Western Electric Co.)

Radio to the aid of jaded Hallowe'en appetites! Due to the fact that certain broadcasting stations were "shootin'" stories of witches, goblins, ghosts and everything else to make your spine tingle, this Hallowe'en ox-cart ride through the unfrequented road winding up from Bloomingdale, N. J., was a real "cofty gofty" ride. A loop receiver located on the driver's seat, with power amplifier and Western Electric loud speaker, enabled the merrymakers to play mischievous pranks which puzzled the hearers along the roadside. Don Cole, of 379 Virginia Ave., Jersey City, N. J., was responsible for this "Radio Hallowe'en Outing." After the ride, they all tripped the latest foxtrots to the tune of excellent music broadcast by WEA. Some party!

LIST OF BROADCASTERS AND PROGRAMS

Interference Banished!

This amazing book explains new method.

That set of yours can be made so selective you'll think it's a land-line telephone instead of a radio receiver! Yes, sir; your set can positively be made 100 per cent more selective!

How? Kenneth Harkness, famous engineer of the Radio Guild tells you how in his amazing new book "Radio Frequency Amplification." In this book Kenneth Harkness tells you exactly what *causes* interference. Then he tells you all about

his latest invention—the marvelous **Harkness Coupler**—the **interference-banisher!** This remarkable yet simple piece of apparatus will change that nightly fight of yours against interrupted receiving into an evening of real fun. It will make tuning as easy as falling off a log. Kenneth Harkness tells you *why* this astonishing device cuts out interference and shows you how to use it in **your** receiver and make **your** set super-selective.

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With 175 diagrams, drawings and action photographs each step in the construction of 5 different types of receivers and amplifiers is unfolded for you with the graphic clearness of a talking moving picture. More

Advance Radio Made Easy for You

In this comprehensive book Mr. Harkness not only tells you how to banish interference from your receiver; he not only tells you how to build new and remarkable receivers—he also explains the whole theory of radio reception for you. In the first 8 chapters of his book, with

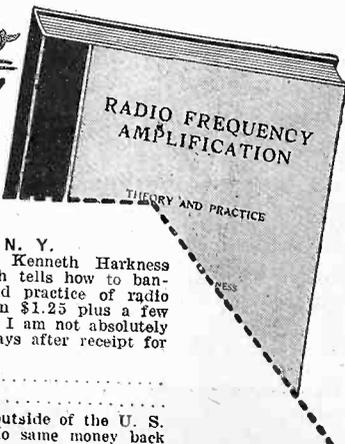
scores and scores of illustrations, he leads you step by step from the elementary laws of electricity to the advanced principles of radio reception. His arguments are so skillfully worded; his explanations are so simple and understandable that you will quickly and easily learn advanced radio.

SPECIAL 5-DAY EXAMINATION OFFER

You always wanted a real, live, practical radio book like this. You can have it for the asking—without paying a cent in advance. In fact, we are so confident that you will be *delighted* with Mr. Harkness' book that we will send it to you for five days' examination and let you judge for yourself! Just fill in and mail the coupon below. Don't send any money—pay nothing until the book is actually in your hands. When the postman arrives deposit with him the full price of the book—only \$1.25

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RADIO WORLD

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How to Change a Tickler Coil Regenerative Set to a Good Loop Set

By C. White, Consulting Engineer

THERE are without doubt many owners of tickler coil regenerative receivers who would like to add radio-frequency amplification to their outfits, and yet incur no heavy expenditure in new equipment. Then again, there are many who desire to get a quieter and more selective receiver than their old single circuit regenerative. Fans in both these classes will welcome the arrangement here suggested since they will not have to set aside one single piece of the apparatus they are now using. A spare tube with its accessories, a loop aerial, and a new seven-plate condenser forms about the limit for the new material. If UV199 tubes are used a separate set of "A" and "B" batteries are recommended, but if storage battery tubes be employed the same "A" battery can be used for both tubes, although a separate "B" battery is still desirable. If you do not wish to use separate "B" batteries the set will operate satisfactorily with taps off a common plate battery.

If your present set has the arrangement of apparatus as shown by the light lines in the diagram it can be adapted to this loop outfit by making the changes outlined in this article. The mark X over a line indicates a disconnection, and the heavy lines indicate the connections and apparatus that must be added. If C in your present receiver be a 23-plate condenser it can be placed directly in the position of C-1, which is the main tuning condenser. But, if C happens to be a 43-plate condenser it will be better to get a smaller one since it will be impossible to tune to short wave lengths with an appreciable sized loop. But if C is an 11-plate or smaller condenser it can be used either in the place of C-1 or C-2. It will be noted you can use the same panel you already have and mount the radio-frequency amplifier on a separate panel in another cabinet. This is another point of advantage. The loop for this receiver should have

about eight turns of wire and measure 3' on the diagonal. Unless you desire to build your own loop it is now possible to purchase good loops at a reasonable cost. Speaking of loops in general, you will experience a great improvement in quality when using a loop although your volume may fall off just a little.

The constants for the circuit are as follows: C-1 is a 23-plate condenser. C-2 is a seven-plate condenser. A micrometer or sharp tuning arrangement will greatly help in securing a critical tuning adjustment. The filament rheostats for the tubes must have sufficient resistance to afford ample current control since the radio-frequency tube is very sensitive in regard to filament current. The potentiometer P allows the

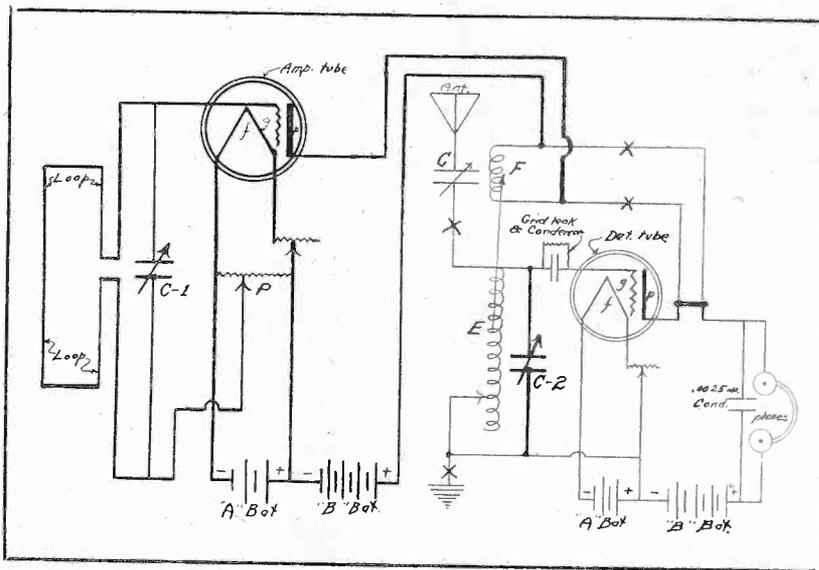
amount of volume and sensitivity of the amplifier to be stabilized. It will be noted that this set can be calibrated accurately for all stations and a log can be kept. In putting the parts together great care should be taken to see that all connections are well soldered and all wires should be insulated with spaghetti tubing.

The operation of this receiver is very simple when a few things are borne in mind. The loop must always be pointed in the direction of the station from which it is desired to

receive. The condenser C-1 will help to tune in the station but C-2 aids in completing this operation. The unit E-F (which is generally a vario-coupler) acts as a radio-frequency transformer when the condenser C-2 is given the proper setting.

A great variety of sensitivities can be had by varying the taps on E and changing the coupling between E and F, provided that E and F form a variocoupler. Of course, this is not necessary since E and F can be two fixed coils; it matters little just so long as E and F are inductively coupled, and such must be the case

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Method of changing a tickler coil receiver into a loop receiver. Heavy black lines denote necessary changes. XX are places where the present circuits should be broken.

Aerials Should Not Be Neglected

By James F. Benton

MOST of us repeatedly change our circuit and our set but never give the aerial the least bit of consideration. After it has once been up and connected to the set it is hardly, if ever, inspected or changed, because in most cases it is very difficult to get at it for inspection. Still, the aerial is one of the most important parts of a radio outfit. Upon its proper construction and installation largely depends the volume and quality of results obtained. Aerials that are poorly insulated are not only leaky, but also quite noisy. Then again, an aerial mounted over a tin roof is apt to be quite noisy at times, especially when a strong wind is blowing and the roof happens to be grounded. A tin roof greatly cuts down the effective height of an antenna because often the roof becomes grounded thus raising the electrical elevation of the ground surface. But many interesting experiments can be conducted where an aerial is mounted over a house with a tin roof. Try grounding the roof, then try using the roof as an aerial itself, and try using the tin for a counterpoise. This is done by connecting the roof to the ground terminal of the set, and operating the receiver with or without aerial.

Many fans take great care to see that all joints in their set are well soldered, but frequently neglect to solder the lead-in wire to the aerial, or the ground wire to a cold water pipe. The set should be grounded to the cold water pipe as close to the ground as it is possible to run the connecting wire. By so doing the resistance of the connection to the ground is minimized and louder and clearer reception is thus obtained.

If your aerial is in a place where it is rocked by strong winds quite frequently, it will pay you to see that the swaying motion is cut down to a minimum. An aerial that sways to a great extent is constantly changing its electrical capacity with respect to ground thus altering the tuning or wave length of the receiving outfit. So severe has been the trouble in certain localities due to strong winds swaying aerials that sharp tuning has become almost impossible. One ingenious amateur devised a clever means of overcoming this trouble in a district that often had strong winds. His system was to use a $\frac{3}{4}$ " brass pipe joined together in sections so as to give an overall length of 100 ft. The pipe was supported at various points by means of bus bar, or porcelain insulators. While this method proved to be rather expensive still it was very effective.

Of all the types of outdoor aerials the inverted L is by far the most common. This type of aerial is nothing more than a horizontal wire with a vertical lead-in at one end or the other. For amateur use and broadcast reception it is indeed an effective aerial, possessing a slight directional tendency. This is more or less pronounced, depending upon the relative length of the horizontal stretch as compared with the length of the vertical lead-in; the longer the horizontal length is compared to the vertical the more directional the aerial will be. If your aerial has a ten-

dency to receive better from stations lying along its line of direction you can try the experiment of placing another aerial at right angles to the one you now have. A selecting switch properly installed will allow you to choose between the two aerials. If you happen to be so situated that plenty of room is available for erecting spare aerials you can try this plan. Erect six aerials, each evenly spaced in degrees so as to form a circular fan effect. From the hub end of each radially pointing aerial bring in a separate wire to a selective switch. This will allow you to select between stations that are in different sections of the country. But in order to derive full benefit from such an arrangement for broadcast reception the length of each aerial should not exceed 100' and the lead-in wires must be as short as possible. Under certain conditions splendid results have been secured by using only 75' of wire in each radial spoke.

Another trick that gives interesting results, if you are now using the inverted L style of antenna, is to bring in a lead wire from the free end of the aerial. Place a tuning element in this lead-in and ground one side of the tuning system. The tuning element can be made up from an old single slide tuning coil and a variable condenser of most any size. Of course, a fixed condenser can be used if a variable is not handy. In reality this is nothing more than placing another set on the far end of the same aerial. For tuning in it is better to disconnect the extra tuning elements until the desired station is clearly heard. Then connect in the tuning element on the other lead-in and tune the same until the station is again picked up. You will soon discover such a device is very critical and will allow you to select stations within a few meters of each other. Another similar trick is accomplished by placing an identical aerial about 2' from the one you already have. To the lead-in of this second aerial connect a tuning device. By carefully adjusting the tuning device of the second aerial interference can be eliminated in most cases, or substantially reduced.

Another type of aerial that is very good for broadcast and amateur reception is the cage. A four-wire 6" cage aerial about 100' long will give marvellous results. It has been found from actual tests that the cage style has far greater picking-up power than a single wire of the same length. Many fans are now using the cage style not only for horizontal aerial but also vertical lead in, hence greatly increasing their antenna efficiency. The general tendency now is toward the use of a short aerial because a short antenna picks up less static and interference than a longer one. For local reception you can erect a short aerial and for distant reception you can use a long one. By looking over your antenna system you will no doubt find many points that can be improved upon. Perhaps it can be shortened, or it can be better insulated. By trying experiments with antenna systems you will arrive at some very interesting and instructive results.

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if F was used as the tickler coil in a regenerative receiver. Changing the setting of the potentiometer P, which should have a resistance of 300 ohms or more, will allow the maximum point of tube sensitivity to be found. If this point is passed a click will be heard, the signal will immediately disappear, or remain as a much distorted sound.

It will also be discovered that the filament rheostat of the radio-frequency amplifier tube affords a similar adjustment, so that there are two methods of controlling sensitivity. The filament rheostat to the de-

detector tube affords a definite control on the quality of the received signal. If a detector tube is burned too bright the music and voice will be slightly distorted and lack depth of tone. If you do not already possess a variable grid I would advise that you purchase one because the addition of one to your set will greatly aid in securing the exact value to give pure tones.

The great freedom from annoying sounds and howls makes this change in your present regenerative set very desirable. If you are suffering from jamming of all sorts and acute interference from nearby sets, the loop aerial with radio-frequency is the ideal solution.

Large Radio Audience Hears Lehigh Endowment Drive Program

By Gerald Crawford

RECENTLY one of the largest audiences which ever heard a single program, listened in on the program given before a meeting of the Lehigh Endowment Fund Drive Committee held in the Machinery Club, New York City, and simultaneously broadcast from WEA, New York; WOO, Philadelphia; KDKA, Pittsburgh and KYW, Chicago. On this program were musical selections by Metropolitan Opera Company soloists and Lehigh University musical organizations, and addresses marking the beginning of the drive for an endowment fund for a Greater Lehigh University.

The broadcasting stations which participated in this event were connected to the Machinery Club in New York by telephone lines, thus making possible the reception of the program throughout the Eastern and Middle Western parts of the United States as well as some parts of Canada. Besides the usual radio audience, alumni meetings held in all the principal cities were listening in. For this purpose receiving sets and loud speakers were installed in the various halls where the meetings were held. The following is a description of such an installation at Lehigh for the benefit of the Home Club meeting, the undergraduates and the townfolk of Bethlehem, Pennsylvania.

Fig. 1 is a map of the campus at Lehigh University

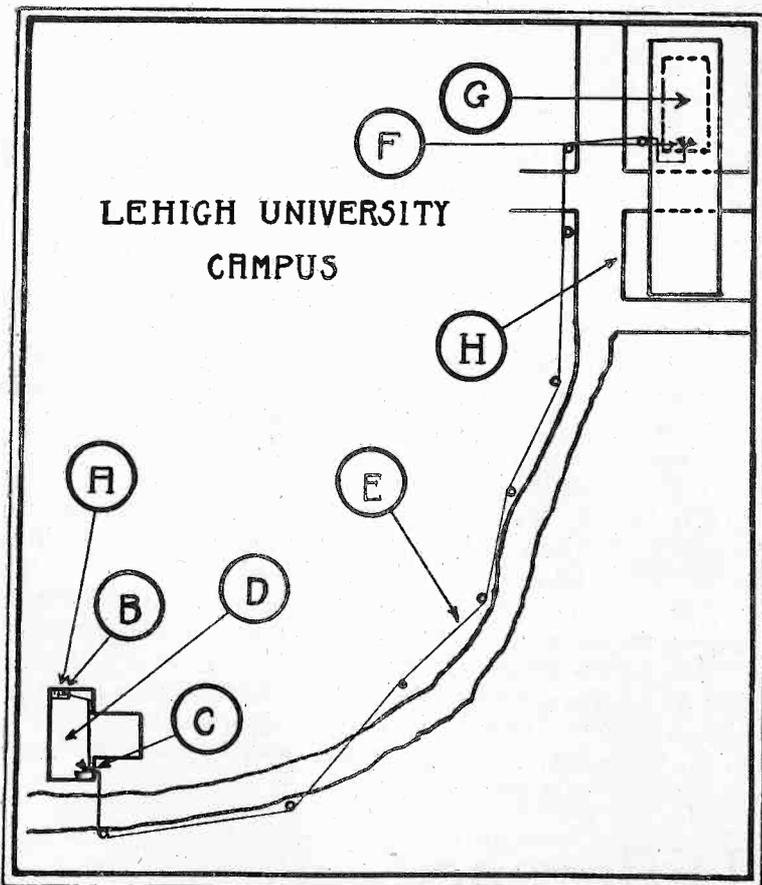
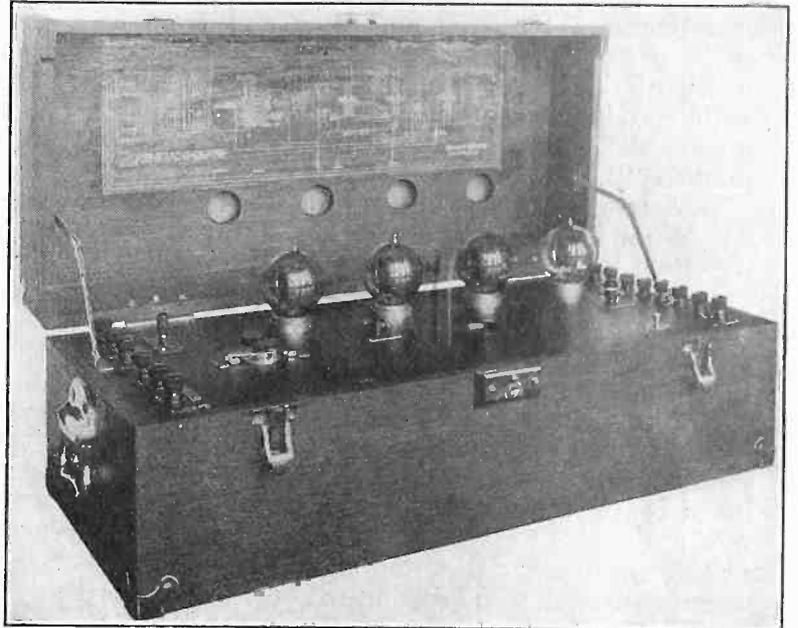


Fig. 1. Plan of Lehigh campus, showing how an entire program was broadcast and, by means of power amplifiers, heard at all points of the Lehigh University grounds.

and shows the relative location of the two buildings which were used by the audiences above mentioned. The building designated as D is the Commons (dining hall) where the Home Club Alumni banquet and meet-

ing was held, while the building marked H is the gymnasium where the undergraduates and the townfolk gathered. These buildings are about one-quarter of a mile apart.

The signals were picked up by a loop consisting of 12 turns of wire wound around a form having approx-



(C. Western Electric Co.)

Fig. 2. The latest portable power amplifier used by radio engineers to allow large audiences to hear programs. It is a No. 3 public address amplifier and is the latest model of this type of apparatus.

imate dimensions of 2'x3'. This loop was situated to the left of the receiver designated as A. Two receivers were so mounted and connected that either could be used for reception. These were the Western Electric Company's most recent models and were loaned by that company for this occasion.

The output of the receiving set was amplified by a power amplifier designated as B in the same figure. This amplifier and the projector-receivers make up the No. 3 public address system, made and loaned by the same company. The amplifier, shown in Fig. 2, makes use of four amplifier tubes connected to give three stages of power amplification. Four projector-receivers, or horns, were connected to the amplifier by means of a twisted pair commonly known among telephone linemen as "bridle wire." This line is shown in Fig. 1 as running from B across the hall to the projectors C and along a telephone pole line E, to the projectors at F.

The two projectors at C were connected in series across the twisted pair, while the projectors at F were connected in parallel, thus allowing for line losses between C and F and allowing more volume for the large hall G than for the small hall D. The projectors C were mounted about 20' above the speakers' table so that the sound might be well distributed throughout the hall. The projectors at F were mounted at one end of the long gymnasium G and about 30' above the floor.

The reception with the above apparatus was remarkable in every way. There was no inter-station or local interference and no static was noticeable.

No Radio Trust for England

By Washington R. Service

WASHINGTON, D. C.—The British postal authorities have succeeded in stopping what threatened to become a radio broadcasting trust, which also would have controlled the sale of sets, refusing listening-in licenses to all except those whose sets were stamped "B. B. C.," including home-made sets.

The letters "B. B. C." stood for British Broadcasting Company, which through a recent arrangement between the government and the radio manufacturing industry, was to have exclusive right to broadcasting in the British Isles. This company was to be financed from tariff payments on manufactured receiving apparatus and from license fees to be paid by listeners to the post office. It was a condition of the license that the apparatus of foreign origin, with certain exceptions, would not be available for use under the scheme—all British-made apparatus being marked "B. B. C."

In a report made to the Postmaster-General on August 23, Major General Sir Frederick H. Sykes, chairman of the British Broadcasting Committee, says: "The system of marking apparatus and deriving revenue from broadcasting service from royalties on such apparatus gave the company a privileged position; we have had no proof that they have made any improper use of it; but the system is open to objection from several points of view, and should be abandoned as soon as possible." The report admits that the company successfully established a broadcasting service of considerable merit, despite many difficulties, and was partly successful in insuring that the demand for receiving sets during the initial period should mainly benefit British manufacturers, who established the service. But the scheme "has broken down in certain respects," the report adds, "largely owing to the unforeseen facility, cheapness and popularity of the construction of home-made sets."

Important among many recommendations made in the report which favors broadcasting, but does not want the government to run it nor a single company to do so exclusively, is the recommendation that a broadcasting board be established by statute to assist the Postmaster-General. The broadcasting should be done under government license, it is believed by the committee, which agrees that the service of the B. B. C. should be continued for a definite period, subject to modifications of the license. "The government should keep its hands free to grant additional licenses," the report avers.

No part of the cost of broadcasting should fall upon the taxpayer, and the government should not endeavor to make a profit on the administration, the committee suggests. Revenue should be derived from receiving license fees of 10 shillings per annum, of which 7s. 6d. might be allocated toward broadcasting expenses.

New licenses, simple and uniform in type, are recommended to be placed on sale at post offices without formalities. They would prohibit the use of "back-coupling" but put no other limitations on the apparatus allowed to be used, the report recommends. Statutory powers to enforce such licenses are recommended to aid the Postmaster-General.

The committee urges the removal of the restricted hours allotted to broadcasting, and that the wave be increased from between 350 and 425 meters to two bands—300 to 436 and 461 to 500 meters.

Possibly tact restrains the committee from recommending any protection for the national radio manufacturers against foreign competition; the report admits that this must be dealt with by Parliament as part of the fiscal policy of the country.

Census of Receiving Sets Being Made

By Carl H. Butman

THE question, "How many radio receiving sets are there in the United States?" may soon be answered if a scheme under consideration by the officials of the Department of Commerce works out.

As an experiment, the Radio Section of the Bureau of Navigation permitted the two local Class B Broadcasters in Washington (WCAP and WRC) to request all residents of the District of Columbia who have receiving sets to report to the Department of Commerce by dropping a postal card. This self-taken census will give an accurate return, it is believed, as well as save the government considerable time and money by eliminating the need of enumerators.

Those possessing receiving sets have a certain pride therein, it is said, which should hasten the reports. The Radio Section will classify and enumerate the cards, but that will be enough, it is pointed out, considering that no

added personnel is available now or in the near future.

If the test radio census of the District proves accurate, the plan will be extended through all the states, in an effort to learn just how many sets there are in operation, and what percentage are tube and crystal sets.

The latest authoritative estimate as to the number of receiving sets in this country on June 1, 1923, was 2,250,000, but it is not exact and is not official. Later predictions state that by June 1, 1924, a million more sets will be in use, making the total three and a half millions.

The first day's mail following the broadcast of the census announcement brought the department 46 postals.

The sole purpose of the census is to ascertain the number of receiving sets in the country and to gain an idea of the popularity, value and extent of broadcasting. There is no intention to levy a tax on receiving sets, as is done abroad, officials declare.

A Decided Difference

MANY times the home builder, fan, enthusiast, radioist, reads articles and notices that the writer always talks about "the best apparatus obtainable." If you are handicapped (as most all of us are) by the pocketbook being deflated, stop and consider. There is a difference between cheap apparatus

and inexpensive apparatus. The division between the two is so wide that it is impossible to compare them. Just because the dealer says it is cheap is enough to make the wise buyer turn it down. It may be a good imitation, in looks, of a standard make, but that is all it is—an imitation in looks.

Build Your Aerial Mast "High, Straight and Solid"

By La Verne T. Ryder

BEING an ardent radio fan and a regular reader of RADIO WORLD I notice your requests for radio pictures. In all my reading I find very little that will help the amateur in one of his big problems—the erection of a prac-



(C. Kadel and Herbert)

David Lloyd George before the microphone at the Metropolitan Opera House, New York City, where he made his farewell speech which was heard by millions. Besides being broadcast, the talk was run on special land lines to points in New York and by means of powerful public address systems huge crowds were enabled to hear his speech.

tical and substantial mast for aerial support.

While loop reception is fast replacing the good old outside aerial I for one like best to receive on an outside wire and in looking over the masts that I have seen here and through the East have been surprised at the flimsy and makeshift masts that one sees.

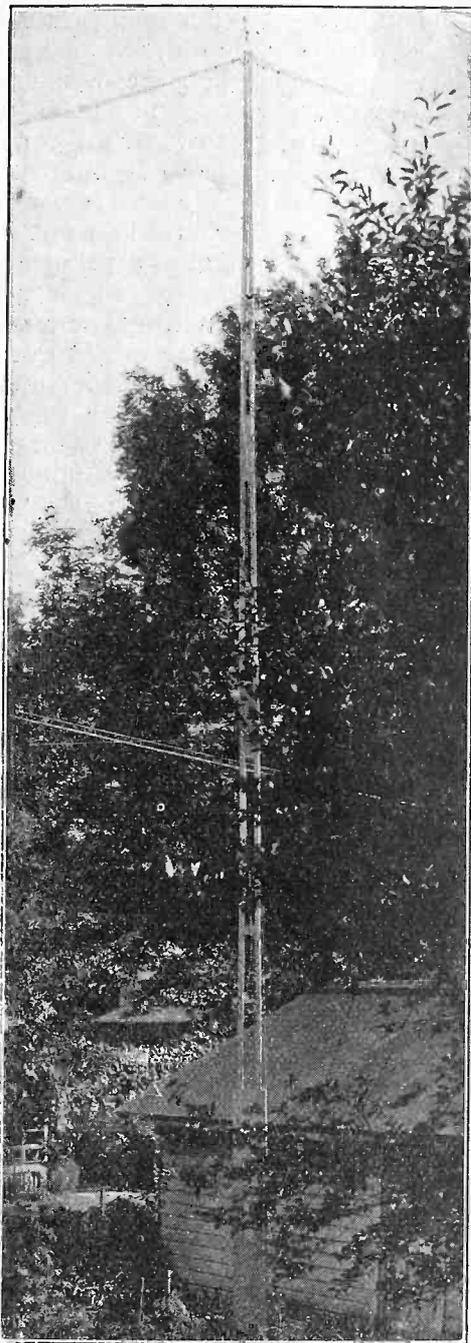
I may have missed what has been written on their construction, but so far in magazines for the last year have seen but one article and from it, with changes that I thought were improvements, built the mast of which I am sending a picture.

The mast is 50' high and is held 2' from the ground by a post set in concrete (the post is 4" by 4" and put down 5') making the top 52' above the ground. Three guy wires are taken off at 20' up and the top guys are galvanized 3/16" cables pulled tight by turn-buckles. The aerial wire does not help support the mast, as I have seen on many installations, but does pull in line with one pair of guys. These can be seen running directly away from you in the picture.

The construction of the mast can be plainly seen in the photograph and needs little description. The sides each consist of two 20' and one 10' 2" by 4" with the joints staggered, bolted with four bolts and on the joint side a plate 3" wide and 1/8" thick to brace the joint. The lower 10' is doubled on each side

and the mast straddles the post to which it is bolted with three bolts. One bolt was put through the mast and post and used as a hinge on which to swing the stick when it was raised. The cross bracing and reinforcement at joints can be plainly seen in the picture.

The other end of the aerial is fastened to a 6' pole on the roof of the house, which gives me a nearly level wire 70' long. The house may seem



(C. Radio World)

Mast erected and used by La Verne T. Ryder, 1141 N. Church St., Rockford, Ill. Extremely neat and good looking, to say the least. It is 50 feet high and solid enough to be climbed by a man.

high but it is 37' and stands on a terrace 8' above the base of the mast. The wire is 51' at the house end and 52' at the mast.

The mast is painted a medium gray and is straight, plenty solid enough to climb, and instead of being an eyesore as most are is quite a professional looking outfit even if it was designed and built by an amateur carpenter.

The cost was some \$30 under the price wanted for a steel mast of the same height, while the labor of building and raising it was no more than would have been necessary for the steel—in fact, the mast was easily swung up by five of us with the aid of pike poles borrowed from the local electric light company's pole gang.

I cannot understand why the average fan will take every precaution to build a fine set and then put up a tenth rate mast and a poorly hung aerial. I am sure the results obtained fully justify the most careful aerial construction, for while I have only a single circuit and an ultra audion both with two steps regular audio and two-step push and pull (from the article in RADIO WORLD last Spring by Mr. White) I have heard over 150 stations from Calgary to PWX, Havana, and from the West coast to the East with an amount of volume which is surprising. So I can, I think, safely say "build them high, straight and solid."

News Via Radio for Army

FOR several years the ships of the navy and outlying naval stations have been able to get the news daily from what is known as the Navy Press, which goes out by radio from NAA at Arlington each night. A similar scheme is now under consideration by the War Department for sending news, especially army news, to its forces stationed at foreign ports and posts out of the regular news channels.



(C. Foto Topics)

How the office of Foto Topics, New York, keeps up to date on all matters pertaining to radio and can therefore supply the latest in radio news photos. A six-tube loop receiver with loud speaker is used.

If the present plan goes through, army posts at Hawaii and the Philippines will receive news bulletins at least once a week from a high-powered Pacific Coast station.

What the Broadcast Listener Is Up Against in England

By the Editor of Wireless World

IN the last issue of *Wireless World* we referred editorially to the report of the Broadcasting Committee, and expressed the view that, taken altogether, the report and the Postmaster-General's statement must be considered as a satisfactory solution of the immediate difficulties, and that it would be accepted with appreciation by almost every interested party.

A further study of these two documents, however, leaves one at a loss to understand the reason for a clause in the Postmaster-General's statement regarding the present experimental license. The wording, it will be remembered, is as follows:—

"The existing Experimental License, at an annual fee of 10s., will continue to be issued from the General Post Office to persons who are able to satisfy the Postmaster-General that they desire the license for bona fide experimental purposes and are qualified to conduct experiments, and who will sign a declaration to the effect that they will not use the broadcast programs except for experimental purposes."

It is quite reasonable that, since the introduction of a Constructor's License, the Postmaster-General should call for satisfactory evidence that the applicant for an Experimental License requires it for bona fide experimental purposes, and is qualified to conduct experiments, but we would like to know the reason why owners of Experimental Licenses must "sign a declaration to the effect that they will not use broadcast programmes except for experimental purposes."

To begin with, this is a restriction which can never be enforced, as it would be impossible to check whether the broadcast programs were being used for experimental purposes or otherwise, and secondly, we cannot see that any unfairness to any interested party would result if this clause were not included. After all, it is no fault of the experimental license-holder (unless, perhaps, for the reason that he originated broadcasting in this country) that broadcasting should fill the ether between certain hours daily; in fact, although it is a boon to the majority, it is often very much the reverse to the genuine experimenter, to whom alone the ex-

perimental license will be issued in future; but nevertheless, if it should happen that during the course of his experiments some other members of his household take pleasure in listening in to snatches of music, the experimental license-holder, if he has a conscience, should, we suppose, remember his declaration made when the experimental license was issued to him, and, by some means or other, prevent any portion of the broadcasting program from becoming audible in the sense of constituting entertainment.

We can quite understand that, if the Postmaster-General had not introduced the constructor's license to meet the requirements of those who are primarily interested in broadcasting, and in the hobby of constructing their own apparatus, then the experimental license might get into the hands of persons other than genuine experimenters, but now that there is no occasion for the Postmaster-General to issue experimental licenses, except to those who satisfy him that they desire to conduct genuine experiments, we cannot see that there is any question of evading contribution to the B.B.C. which, in our opinion, would have been the only reason for the insertion of such a clause.

If the right exists now for a clause to be inserted prohibiting the experimenter from listening in to broadcast transmissions, then the same right must certainly have existed in the days before broadcasting for commercial companies to insist that the amateur should not listen in to commercial transmissions. The experimenter and the experimental license existed many years before broadcasting, and it is difficult to understand what circumstances have arisen now to justify the necessity for such a declaration as is called for in the issue of future experimental licenses. The only purpose which we see in the demand for this new declaration (if indeed it has a purpose) is to discount the value of the experimental license and after a time serve as a means of indicating, so far as statistics are concerned, that the number of genuine experimenters is declining and that he is therefore a factor of less importance for consideration in future legislation.

Radio Convention Will Include Initiation

AT LANTA, GA.—The Royal Order of the Wouff Hong, which is a secret organization of amateur radio men, will once more predominate as the feature of an American Radio Relay League convention when amateurs of the Fourth District meet in this city for three days December 27, 28 and 29th for a great "hamfest," according to the announcement of a tentative program by H. L. Reid, manager of the League's East Gulf Division. An initiation into the weird order will take place on the last night of the radio convention.

In order to hold this initiation it was necessary for the program committee to obtain permission from the supreme council of the Wouff Hong at Flint, Mich., and League Headquarters at Hartford, Conn. The ritual for this organization was prepared by a group of amateurs at Flint and was polished up for final approval

at the Second National American Radio Relay League convention in Chicago last month.

About 1,000 candidates were initiated in the Wouff Hong at that time and it was agreed then through special arrangement with originators of the order that such initiations should be held only at district, state or national league conventions. The forthcoming radio meet here will be the first since this recognition.

The headquarters for the Atlanta convention will be the Ansley Hotel, the management of which has agreed to turn over its Roof Garden for banquets, technical meetings, initiation, and registration which are to be centralized at this point. Arrangements have been made whereby many visitors and delegates will be entertained at the homes of local radio amateurs, or at special hotel rates.

Radio Primer

WHY SOME SETS FAIL—Every once in a while a howl of disgust goes up from some fan who has made a receiver or has had a friend, who has had such wonderful success with one of the same type, make one for him. The blame thing doesn't "perk." The same circuit has been used, and maybe the original wiring on the successful receiver has been copied, but—nothing doing, or else what is doing is so weak that you look in derision on all radio experimenters. Of course, you or your friend followed the plans exactly. You may have followed them to the letter, but it is not the circuit that is at fault, nor the workmanship, but the apparatus used.

Every fan likes to keep the cost down. Every production cost is subject to a final revision, when it comes time to buy the parts and you are persuaded that "Oh, sure! The others charge more, but this is just as good. I just finished a set using them and they work."

Probably one of the most common slip-ups is in the purchasing of condensers, both fixed and variable. Your friend in constructing his own set probably used a well-made mica dielectric type of condenser that was finished in a moulded case, or a pressed metallic case. Did he use a cheap looking paper condenser on yours? If so, change it! Are you using good variable condensers? There is a type that uses well-moulded, shiny looking composition. It looks pretty, but examine the plates, their spacing, their bushings, their method of fastening. Is the shiny composition moulded bakelite, or just a tar composition which is made to look pretty, but which has a low dielectric value, and consequent high losses?

Is your grid leak the best that you could get? Is it the proper value for the tube you are using, or is it just one picked at random from any number of values?

Are your connections all well soldered? Is it a neat job? Or has the soldering paste run rambling down all over the wires, forming shorts and leaks?

Are you using a good socket? Do the prongs make positive contact with the lugs of the tube?

These are just a few questions to ask yourself when trouble arises in your new set. A manufacturer always turns out a uniform product because he always uses the same make of apparatus. He tested out numerous makes first, found the best, and then bought quantities of them so that all his product would be the same.

Test your condensers. If you can squeeze them, there is a liability that they are poor. If the plates of your variable condensers are of thin, paper-like aluminum or brass, there is a great chance that the entire condenser is poor. Variable condensers should have sturdy looking plates, well-made or pressed spacers, machined bearings and uniform spacings. A condenser is made for hard use, probably harder and more constant wearing use than any other component part of the machine, so get one that is sturdy.

Maybe, in the zeal of construction, the panel has been shielded. Every back inch of the panel surface is carefully covered with a nice, smooth layer of tin foil, or sheet metal. When mounting your apparatus on this nicely shielded panel have you taken care to see that none of the screws, or parts touch it?

There is also the chance of poor inductances. Have home-made coils been used? They look nice, in their shiny coat of shellac, which is probably the worst thing that could happen to a coil designed to work in a radio circuit. Maybe larger coils than necessary have been used, or neat bank-wound tapped coils and couplers have been incorporated in the set. Do the specifications call for such windings? An extra hundred turns or so of wire on a coil may not look dangerous, but the "dead-end" loss, or current lost by the extra wire in the circuit eating up the energy, will make itself known by signal strength loss, or broad tuning.

Theatrical Stars of Yesteryear Enjoying Radio



(C. Kadel and Herbert)

Retired theatrical stars who have in the past thrilled many an audience, now living at the Actors' Fund Home, Staten Island, N. Y., listening with interest to their new radio receiver. Left to right they are: Zittella Flynn, Ben R. Graham, Fred R. Runnells, Liza Hudson Collier, Blanche Plunkett, Mary Preston, Florence McCarthy, Mrs. Frederick Bernard, Minnie Oscar Gray, Leon J. Vincent, C. W. King, Jane Donovan, Wm. Payne, Alice E. Adams, John Chas. Cheviot, Mrs. John Chas. Cheviot, Virginia Buchanan, Jennie C. Miller, Virginia Vane Adams, John E. Dudley, Nannie Cotter. The receiver was given to them by the Theatre Assembly.

Simple, "Fool-Proof" Sets Here Soon Says Gen. Squier

By Carl H. Butman

THE near future will see small, compact and portable radio receivers, practically self-operating, in every home, according to Major General George O. Squier, Chief Signal Officer of the Army, and one of the most advanced thinkers along lines of radio development. There will be no outside antennae, no complicated wiring, and no batteries in the ideal "fool-proof" set soon to be sought by up-to-date householders who will demand radio "service," just as they do telephone service today.

General Squier believes what he terms the "second stage" of radio development has arrived. When an invention first becomes popular, there are always a lot of energetic mechanics or electricians, both professional and amateur, who delight to tinker with the new apparatus. Some of these constructors have aided in the perfection of radio receiving sets, the general points out, but today the chief demand is for efficient sets which will be practically self-operating and will approach the ordinary telephone receiver in simplicity, taking their power and broadcasts from a single source or at least a central distributing point.

It would be impossible for every tenant in an apartment building or a hotel to have an individual antenna. The roof of the hotel would be literally covered with aerials. The elimination of lead-in wires and batteries is also desirable, so that sets can be taken from room to room and plugged in. Naturally some local company, probably the power company, must furnish either the broadcasting by wired-wireless and at the same time the power for operating the tubes of subscribers, or erect its own main antenna on the outskirts of a city and distribute the broadcasts by wire locally. This scheme would involve combining Squier's wired-wireless system of transmitting

over light or power lines and the regular radio transmission.

That broadcasting would not operate so successfully over a telephone system, was quickly shown by General Squier when he pointed out how the system of phone wires was constantly being broken down and rebuilt between different points, whereas the light wires remain a stable network running to every hotel, home, and store.

General Squier anticipates the development of local broadcast distributors who will collect radio entertainment and news for re-distribution or who will establish wired broadcasting for local subscribers. Coincident with the establishment of this system, will come the standard receiving set capable of being moved about the house and plugged in like a vacuum cleaner or electric fan, he believes. Some listeners-in are already using the electric companies' lines to receive on instead of aerials, through a special condenser plug. Many possessing tube sets are utilizing inside loops, and dry batteries are replacing storage batteries where space available is small. Practice is tending toward simplification and reliability in service, the general insists. There will always be a few real fans who want to build and rebuild their sets, but most of us aren't mechanics and prefer ease in operation, reliability and compactness to continual experiments.

"Hideous skylines covered with wire spider webs and rooms criss-crossed with wires will soon disappear," General Squier said, calling attention to some of the larger hotels and steamships which have already undertaken to serve their patrons with continuous radio broadcasts, from a central system. "The indispensibility of broadcasting will make consolidation and simplification a necessity," the general concluded.

France Increases Ship Radio Requirements

THE near future will see small, compact and portable extending the range of transmission 50 miles, also affect all foreign ships touching at French ports since October 6. The French radio decree, signed last spring, but which only reached this country last month, provides that all vessels of 2000 gross tons, all ships licensed to carry 50 passengers including the crew, and also all craft having as many as 12 passengers aboard, must be equipped to send and receive wireless messages by day up to 150 nautical miles.

Merchant ships between 500 and 2000 gross tons, licensed to carry less than 50 persons, or with less than 15 passengers aboard, must be capable of receiving radio signals up to 2800 meters and preserve a watch for emergency calls.

In establishing the minimum of 150 miles for first-class ship radio transmission, 50 miles farther than the regulations of the International Convention of London in 1914, the American law of 1910, and the British regulations of 1919 provide, France has taken a step forward in making for better protection of life at sea. The increase of 50 miles is not at all out of proportion, however, with the progress made in radio telegraph transmission during the past 10 years.

The French decree of 1923 makes it mandatory upon the master who receives a wireless distress call, to proceed to the ship's aid; this decree also increases the number of responsible ships by requiring all French merchantmen and fishermen over 500 tons to carry radio receiving equipment even though not equipped with transmitters. This involves a practical acquaintance with wireless signals by at least one of the crew, who must be certified by the government. It is a self-denying ordinance, but is in the interest of humanity in general; obviously the master getting an "SOS" call must start for the scene, although he could not himself issue such a call for aid. The masters, however, are benefited by receiving meteorological, time and position signals and in keeping in touch with world events, depending upon the skill of his wireless watcher.

The new French regulations will make it practically necessary for other nations to adopt the same transmission limits and minimum tonnage. The International Convention will also be concerned in an effort to preserve uniformity of radio laws.

It is understood that the State Department Committee on Electrical Communications, which now meets frequently, will consider the phases of this law which affect United States ships.

The Radio Woman

MY DEAR, have you really a radio set in your home?" was the question put to me the other day by an old friend of mine whom I haven't seen lately due to her sojourn in Europe. "Well, when are you inviting me over to hear it?" she queried. "Does it work every single night?" It just proves how out-of-date a person may become when not on the scene of activities. She lost little time in visiting me and her delight at the instrument was beautiful to see.

* * *

One of these bright days she expects to invite me over to her domain and let me hear the latest jazz music.

from a set she will buy. She prefers the loud speaker to the ear phones and that's the kind she will undoubtedly purchase.

* * *

I have received the following interesting communication from Mrs. W. S. Robins, Monessen, Pa., which I am glad to pass along to my readers:

"Say, what meaneth all this fuss in the last issue about getting DX in summer? My sets—home-made and three of them—operate on an average of four hours per day, the whole year. I have listened to Texas, Kansas, Missouri, Minnesota, Georgia, Alabama, Tennessee and Cuba all summer, besides all near-by States. I had not thought I was doing anything unusual. I build my own sets but do not use more than one tube at a time, though I have four."



(C. International)

Earl Latham, well known electrical expert, has given the electrical and radio world something to talk about. He inaugurated radio dictation in America. His secretary is located on the floor below his office and by the use of special apparatus and an ordinary tube receiver he is able to call her and dictate in perfect privacy.



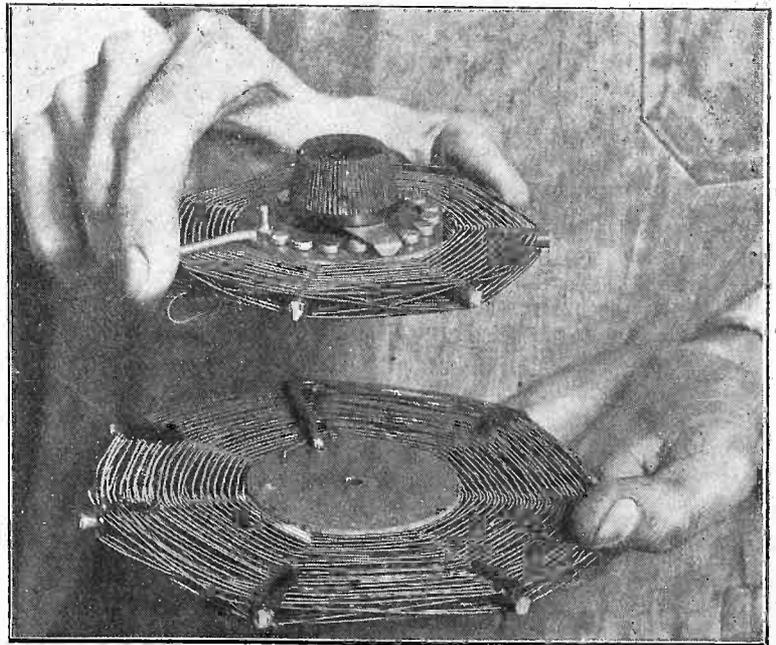
(C. Kadel and Herbert)

Fans have wondered why it is that in the middle of an interesting program all the stations will shut down just as if some monstrous hand had clipped the wires. Here is the solution, and incidentally the man who is responsible for it. He is the commercial operator who constantly sits at a receiver listening not to the programs, but to the ships, and he "pulls the switch" the moment an "SOS" call is heard.



(C. Kadel and Herbert)

The use of a single loud talker headphone as a loud speaker unit is a practice that is common enough in the realm of radio. The main trouble is that a hideous tinny rattle persists if more than one stage of audio-frequency is used. This can be eliminated by following the illustration and dropping a speck of candle wax or shellac over the little metal couple that connects with the center of the mica plate.



(C. Kadel and Herbert)

Every week or so some one pops up with a new type of the old-style coupler. The most radical change yet seen in this field is the coupler shown, which consists of two spiderweb coils, tapped and wound by a special method designed to prevent the losses prevalent in the couplers now in use. They are mounted on a special rod, the coupling of which is varied by a worm screw, giving extremely fine tuning.

Radio Sentinels of the Capital

By Carl H. Butman

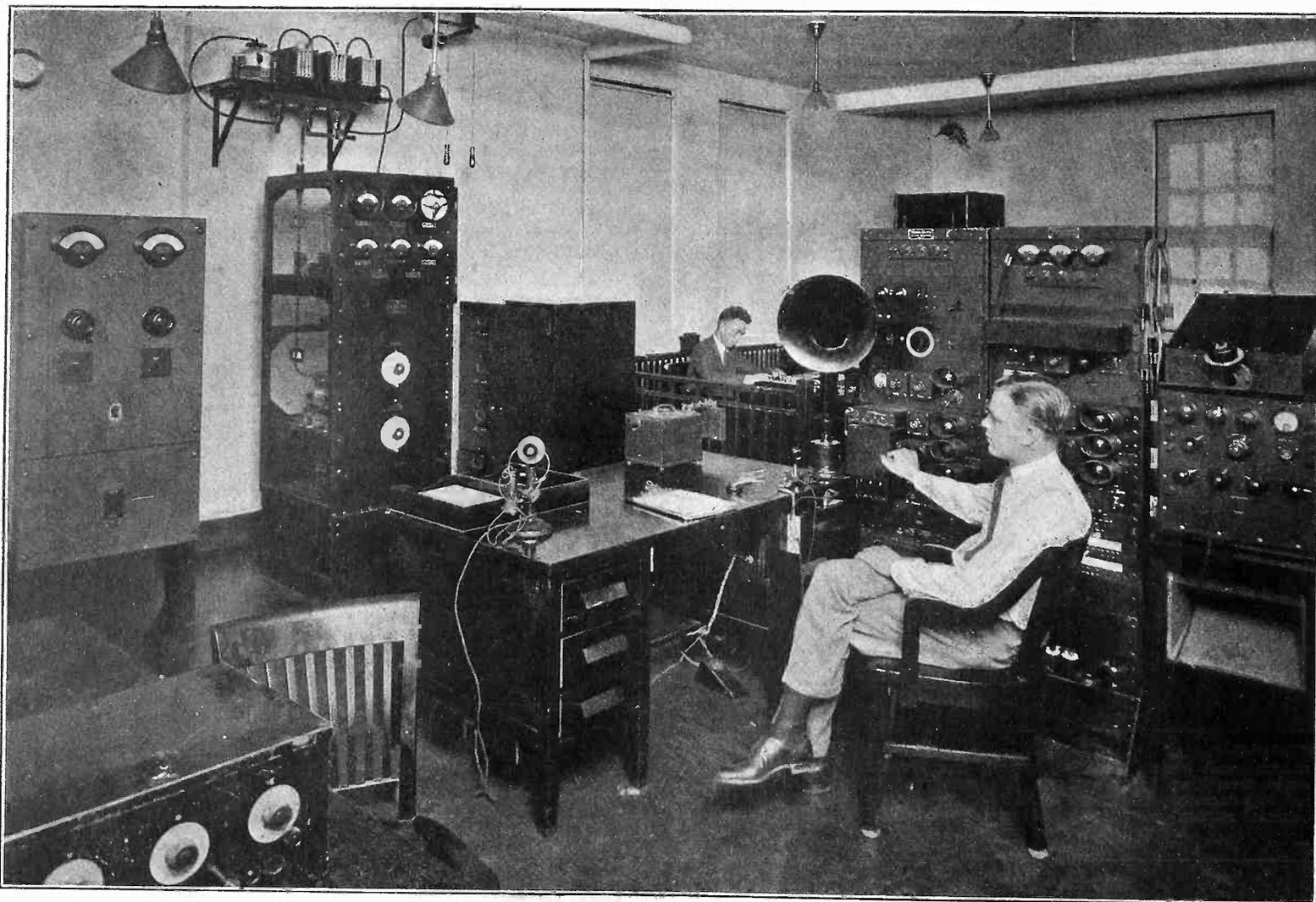
WASHINGTON, D. C.—Broadcast fans within “hearing” of the two aerial spokesmen at the Capital City, certainly those living within 1,500 miles of Washington, may rest assured that they will be informed immediately by radio of any important events affecting the country.

Two Class B transmitting stations are on watch here constantly. Like sentinels, they see that all is well, ready to call out the guard, so to speak, in any emergency. Throughout the twenty-four hours watch, one or the other sends out items of national interest, news, music, entertainment and many unique features.

Popular NOF, the old Naval station at Anacostia, later succeeded by NAA at Arlington, has been relieved of

naval orchestras and bands and has just inaugurated a series of talks by government officials and heads of national organizations. Both stations, it is seen, are handling matters never before available outside Washington.

The Washington station of the Radio Corporation, initialed in monogram-style WRC, went on the air last August and is now known in practically all states of the union. Reports from listeners-in have come from as far north as Maine and Canada; Miami, Fla., in the south; San Antonio, Tex., in the southwest; Lexington, Neb., in the west, and Lake City, Minn., on the north. The whole plant was overhauled recently by engineers from the New York office, and transmission now ranks “A-1,” even naval experts admit.



(C. Tenschert and Flack)

Elaborate control room of Station WCAP, the Chesapeake & Potomac Telephone Co.'s broadcasting station at Washington, D. C. It is here that the re-transmission of signals originating at the WEAJ studios in New York City are handled by means of power amplifiers and re-broadcast. Station WCAP also has accommodations to handle large orchestras and meetings similar to many of the other large stations.

most of its unofficial broadcasting, including the transmission of the Army, Naval and Marine Band Concerts, by two limited commercial stations of high-class and power, WCAP of the Chesapeake & Potomac Telephone Co., and WRC of the Radio Corporation of America. Working alternately, these two stations, each having unique facilities, will keep the country in close touch with all phases of the government's activities, bringing from time to time the voices of the White House and Capitol to the listeners' ears.

By way of current examples of what is going on: WCAP broadcast Lloyd George's address recently, and on November 10, ex-President Wilson's first speech since his illness. WRC is transmitting music from military and

Among the new features introduced by WRC are: instruction in radio, including code practice, three times a week, the inauguration of a weekly midnight show carrying entertaining features. The midnight entertainment will be new in the east, where it will fill a long felt want, since all eastern stations, most central and some of the mid-western stations have closed down by twelve p. m., Eastern time. One of the most popular forms of entertainment by WRC is the daily children's hour. Other broadcasts include lectures from representatives of the National Geographic Association and Smithsonian Institution on travel, exploration and scientific events, talks on automobiling by experts from the A. A. A., and Navy nights, when officers hold forth with tales of the sea and air. Fashion, fact,

finance and fiction are all included on the daily schedules, besides the regular instrumental and vocal musical numbers.

WCAP, of the Chesapeake & Potomac Telephone Co., while without a studio for transmitting, is unique in that by means of its land lines and field radio truck it can broadcast practically anything which happens in the Capital. Already the open air concerts of the Marine Band have been made available to the country. So with other meetings and functions. If there is anything to hear, WCAP plans to send it, whether it is in the White House, State Department or Capitol building.

The President could in a very few minutes talk to the whole country if necessary with the aid of the telephone company's engineers and WCAP.

WCAP has been heard in Lancaster, England, on the Pacific Coast, in San Salvador, Central America, and in every state in this country, according to messages received.

A more extensive program is planned with local talent when the studio now being built is finished. This station

motor truck and other apparatus will be used in sending speeches from the Capital this winter.

Since WCAP started broadcasting, local interest has increased materially, particularly among the telephone company employees, nearly all of whom now want sets. To illustrate rural interest, one letter from a little town in Virginia across the Potomac River says:

"We wish to thank you for a wonderful evening's entertainment which we received last night on a dinky little crystal set which cost about \$1.35 and was set up by my son. He is 15 years old. We live two miles from Falls Church on a little farm and very seldom go to the city. We have no moving pictures and few neighbors, so any pleasure we have with your concerts and other things, such as speeches, believe me, is most appreciated."

Broadcast Changes

Three New Class A Stations

Call	Station	Frequency Wave		Lgth	Power
		Kcys	Meters		
KFLQ	Bizzell Radio Shop, Little Rock, Ark....	1150	261	20	
WWAB	Hoenig, Swern & Co., Trenton, N. J.....	1330	226	10	
KFLR	University of New Mexico, Albuquerque, N. M.	1180	254	100	

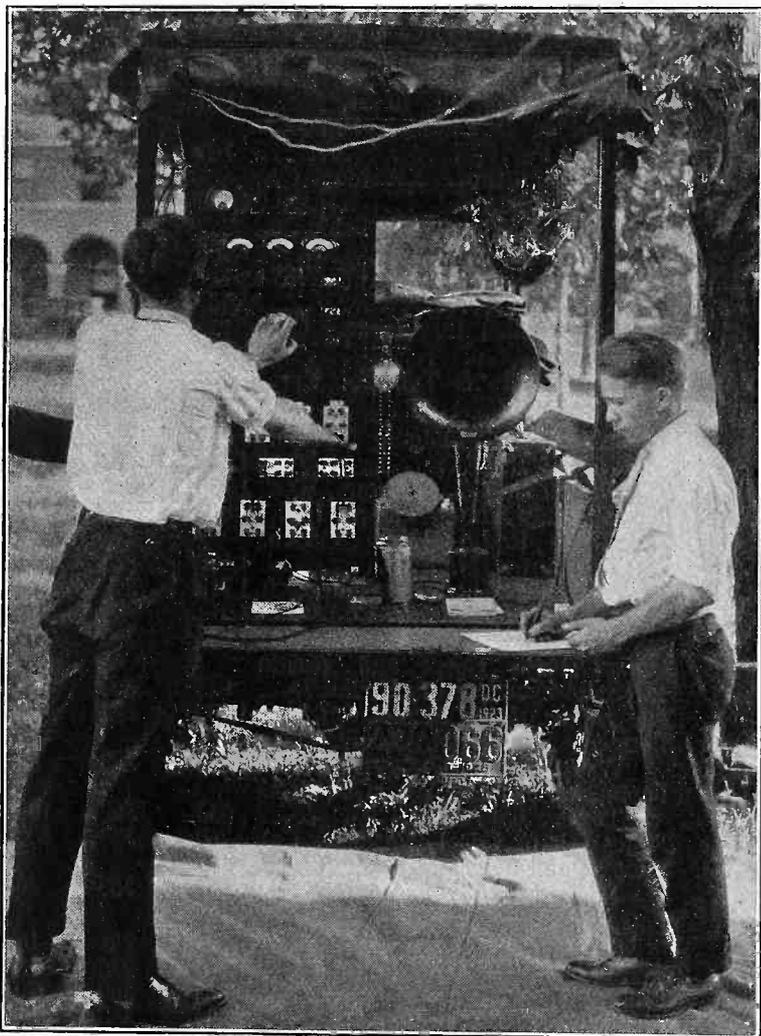
Two Transferred from Class C to Class A

WKAV	Laconia Radio Club, Laconia, N. H.....	1180	254	50	
KFAY	W. J. Virgin, Medford, Ore.	1060	283	50	

Broadcasters Off the Air

A list of 14 limited commercial stations deleted during October, 1923, follows:

WMAM	Beaumont Radio Equip. Co., Beaumont, Tex.
WSAU	Camp Marienfield, Chesham, N. H.
KFHI	Dixon, Charles V., Wichita, Kansas.
KFGY	Gjelhaug's Radio Shop, Baudette, Minn.
WHAO	Hill, F. A., Savannah, Ga.
WOAR	Landskow, Henry P., Kenoska, Wis.
KFHY	McEwan, R. S., Trinidad, Col.
WBAT	Middleton, Fred M., Mooretown, N. J.
WRAS	Radio Supply Co., McLeansboro, Ill.
WGF	Register & Tribune, Des Moines, Iowa.
WAAP	United Elect. Co., Wichita, Kansas.
WOAB	Valley Radio, Grand Forks, N. D.
KFJQ	Valley Radio Div. of Elect. Construction Co., Grand Forks, N. D.
WIAY	Woodward & Lothrop, Washington, D. C.



(C. Tenschert and Flack)

The "pick-up" truck of Station WCAP, Washington, D. C. It is by means of this truck that the broadcasting of all large meetings and happenings in Washington are broadcast through the station. Installers and operators testing out the apparatus preparatory to broadcasting an address in a public park.

is materially increasing the fame of the American Telephone and Telegraph Company's station WEAJ through the simultaneous broadcasting of the New York program carried to Washington on a land line. Talent not available in the Capital is thus broadcast farther south and with better results than WEAJ can alone achieve.

In return WCAP picks up concerts and, besides broadcasting them here, wires them to New York for further distribution. An interesting piece of portable apparatus, known as the "pick-up truck," is used in the transmission of music and important speeches. This apparatus gathers in and boosts the sounds, relaying them by wire to the station for radio transmission. It is expected that this

May Call Another Radio Conference

THE first two radio conferences in Washington aided the Department of Commerce so materially, it is probable that another representative gathering may be called this spring, with a view of making the conferences annual affairs. One thing in particular that the conference accomplished was the eliminating of interference through wave allocation. Officials of the Department of Commerce believe that broadcasters, amateurs and commercial stations are now keeping on their wave lengths pretty well. This is essential if we are to have a minimum of interference. Representatives of the department in every district are listening in all the time and measuring the waves emitted by transmitting stations, warning offenders when they are too far off their waves.

Corrected Official List of Broadcasting Stations in the United States

FOLLOWING is the sixth installment of a corrected list of commercial broadcasting stations in the United States as issued by the Department of Commerce. The list will be continued in next week's RADIO WORLD:

Call	Station	Frequency Kcys.	Wave Length Meters	Power Watts	Call	Station	Frequency Kcys.	Wave Length Meters	Power Watts
KNJ	Roswell Public Service Co., The, Roswell, N. M.	833	360	200	KFAP	Standard Publishing Co., Butte, Mont.	833	360	50
WMAF	Round Hills Radio Corp., Darts- mouth, Mass.	833	360	100	WEAB	Standard Radio Equip. Co., Fort Dodge, Ia.	833	360	150
WTAU	Ruegy Battery & Elect. Co., Tecumseh, Neb.	833	360	10	KDYX	Star Bulletin Pub. Co., Honolulu, T. H.	833	360	50
WCAD	St. Lawrence University, Canton, N. Y.	1,070	280	50	KFHR	Star Elect. & Radio Co., Seattle	1,110	270	100
WEW	St. Louis Univ., St. Louis, Mo.	1,150	261	100	KFAE	State College of Washington, Pull- man, Wash.	833	360	500
KGY	St. Martin's College, Lacey, Wash.	1,160	258	5	WHAA	State University of Iowa, Iowa City, Iowa	1,060	283	100
KFDD	St. Michael Cathedral, Boise, Idaho	252	1190	10	WBAX	Stenger, John H., Jr., Wilkes- Barre, Pa.	833	360	50
WCAL	St. Olaf College, Northfield, Minn.	833	360	250	WBAD	Sterling Elec. Co., Minneapolis, Minn.	833	360	100
WPAT	St. Patrick's Cathedral, El Paso, Texas	833	360	10	WBBC	Sterling Radio Equip. Co., Ster- ling, Ill.	1,310	229	50
KFCD	Salem Elect. Co., Salem, Ore.	833	360	20	WCK	Stix-Baer-Fuller, St. Louis, Mo.	833	360	100
WCAO	Sanders & Stayman Co., Balti- more, Md.	833	360	50	WFI	Strawbridge & Clothier, Philadel- phia, Pa.	760	395	500
WQAF	Sandusky Register, Sandusky, Ohio	1,250	240	5	KFAR	Studio Lighting Service Co., Hollywood, Cal.	1,070	280	200
WWAC	Sanger Bros., Waco, Texas	833	360	50	WPAL	Superior Radio & Tel. Co., Columbus, Ohio	1,050	286	100
KMJ	San Joaquin Light & Power Corp., Fresno, Cal.	1,100	273	250	WTAK	Swan-Bower Co., Steubenville, Ohio	1,130	266	20
KDYM	Savoy Theatre, San Diego, Cal.	1,190	252	100	WHB	Sweeney School Co., Kansas City, Mo.	730	411	500
WIAO	School of Engineering, and Mil- waukee and Wisconsin News, Milwaukee, Wis.	833	360	100	WNAN	Syracuse Radio & Tel. Co., Syra- cuse, N. Y.	1,050	286	100
WHN	Schubel, George, Ridgewood, N. Y.	833	360	100	KGB	Tacoma Daily Ledger, Tacoma, Wash.	1,190	252	50
WQAN	Scranton Times, Scranton, Pa.	280	1070	100	WBL	T. & H. Radio Co., Anthony, Kan.	1,150	261	100
WFEQ	Scroggin, J. L., Oak, Neb.	833	360	150	WDAE	Tampa Daily Times, Tampa, Fla.	833	360	250
KDZT	Seattle Radio Assn., Seattle, Wash.	833	360	10	WRW	Tarrytown Radio Research Lab., Tarrytown, N. Y.	1,100	273	50
WHAQ	Semmes Motor Co., Washington, D. C.	1,240	242	10	WRAD	Taylor Radio Shop, Marion, Kan.	1,210	248	10
KFFA	Shelton, Dr. R. O., San Diego, Cal.	1,240	242	50	KDYL	Telegram Publishing Co., Salt Lake City, Utah	833	360	150
WSAP	Seventh Day Adventist Church, New York, N. Y.	833	360	250	WNAS	Texas Radio Corp. and Austin Statesman, Austin, Texas	833	360	100
WEAN	Shepard Co., The, Providence, R. I.	1,100	273	100	KFJH	The Sugar Bowl, Selma, Cal.	1,100	273	10
WNAC	Shepard Stores, Boston, Mass.	1,080	278	100	KFBU	Thomas, Bishop N. S., Laramie, Wyo.	1,060	283	50
WLAQ	Shilling, A. E., Kalamazoo, Mich.	833	360	20	WHAB	Thompson, Clark W., Galveston, Texas	833	360	100
WNAY	Ship Owners' Radio Service, Balti- more, Md.	833	360	10	KHJ	Times Mirror Co., Los Angeles, Cal.	760	395	500
WNJ	Shotten Radio Mfg. Co., The, Albany, N. Y.	833	360	50	WFAM	Time Publishing Co., St. Cloud, Minn.	833	360	20
KDZB	Siefert, Frank E., Bakersfield, Cal.	1,250	240	100	WTAL	Toledo Radio & Elect. Co., Toledo, Ohio	1,190	252	10
WDAU	Slocum & Kilburn, New Bedford, Mass.	833	360	50	WMAL	Trenton Hdwe. Co., Trenton, N. J.	1,170	256	15
KFFO	Smith, Dr. E. H., Hillsboro, Ore.	1,310	229	5	KDYS	Tribune, Inc., The, Great Falls, Mont.	833	360	250
KDYW	Smith-Hughes & Co., Phoenix, Ariz.	833	360	20	KLX	Tribune Pub. Co., Oakland, Cal.	833	360	250
KNI	Smith, T. W., Eureka, Cal.	833	360	50	WDAH	Trinity Methodist Church, El Paso, Texas	1,120	268	100
WGAZ	South Bend Tribune, South Bend, Ind.	833	360	100	WAAC	Tuland University of Louisiana, New Orleans, La.	833	360	400
WCAT	South Dakota School of Mines, Rapid City, S. D.	1,250	240	100	WLAL	Tulsa Radio Co., Tulsa, Okla.	833	360	100
KFDY	South Dakota State College of Agri. and M. Arts, Brookings, S. D.	833	360	100	WKAU	Turner Cycle Co., Beloit, Wis.	1,240	242	10
WQAB	Southwest Missouri State Teach- ers' College, Springfield, Mo.	1,270	236	10	WOAF	Tyler Commercial College, Tyler, Texas	833	360	20
WSAB	Southeast Missouri State Teachers' College, Cape Girardeau, Mo.	833	360	100	WRL	Union College, Schenectady, N. Y.	833	360	500
KDPT	Southern Electrical Co., San Diego, Cal.	1,230	244	50	WJAX	Union Trust Co., Cleveland, Ohio	770	390	500
WOAI	Southern Equipment Co., San Antonio, Texas	780	385	500	WKAH	United Battery Service Co., Mont- gomery, Ala.	1,330	226	20
WBT	Southern Radio Corp., Charlotte, N. C.	833	360	500	WAAP	United Elec. Co., Wichita, Kan.	833	360	150
WGAR	Southwest American, Fort Smith, Ark.	833	360	20	KFDH	University of Arizona, Tucson, Ariz.	833	360	250
WGAD	Spanish-American School of Radio Telegraphy, Ensenada, P. R.	833	360	500	KQI	University of California, Berkeley, Cal.	833	360	250
WFAF	Spratley, Henry C., Poughkeepsie, N. Y.	833	360	100					

(To be continued. Readers who preserve these install-
ments as they appear in RADIO WORLD will have a complete
and up-to-date list of broadcasters in the United States.
The publication of this corrected list began in RADIO WORLD
for October 13, 1923.)

A Regenerative Loop Aerial

By Leroy Western

THE above title may seem rather misleading to the amateur who is familiar with the standard forms of regeneration. However, it tells exactly what takes place in the circuit diagram illustrated herewith. There are, as most people connected with radio know, several means of obtaining regeneration and oscillation in a vacuum tube circuit. These may be listed somewhat as follows: The feed-back method wherein an inductance coil is placed in inductive relation to another coil and the energy from the plate circuit is "fed back" to the grid circuit. This is the form used in the so-called single circuit tuner. Another very familiar type is that known as the

tuned plate method wherein some means is used to tune the plate circuit to resonance with the grid circuit whereupon regeneration will take place. Still a third method, but one which is very seldom used in the present day circuits, is known as the "ultra-audion" connection. This method of causing oscillation was first developed by Dr. Lee de Forest and was used in various ways in the infancy of the vacuum tube. However, it was finally discarded in favor of the more stable circuits such as the other two mentioned above. It has recently come back into use to a

be wound on hard rubber strips so that it will be as efficient as it can be made. Throughout the construction of such a set, it is always necessary to keep efficiency as high as possible and losses at a correspondingly low point so that the best results will be obtained.

Values for the grid leak and condenser are given on the circuit diagram, but when different tubes are used, it will be found necessary to vary these two constants to the best point. The grid condenser can probably be left at a capacity of .00025 mfd., but the resistance of the leak should be varied.

When the set is used in a place where a ground connec-

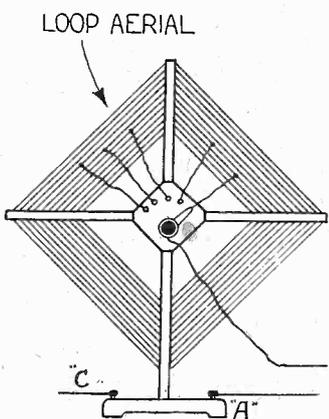


Fig. 1. Details of the tapped loop, with wires corresponding to "A," "B" and "C" in the circuit. Tap "B" is the center wire attached to the switch.

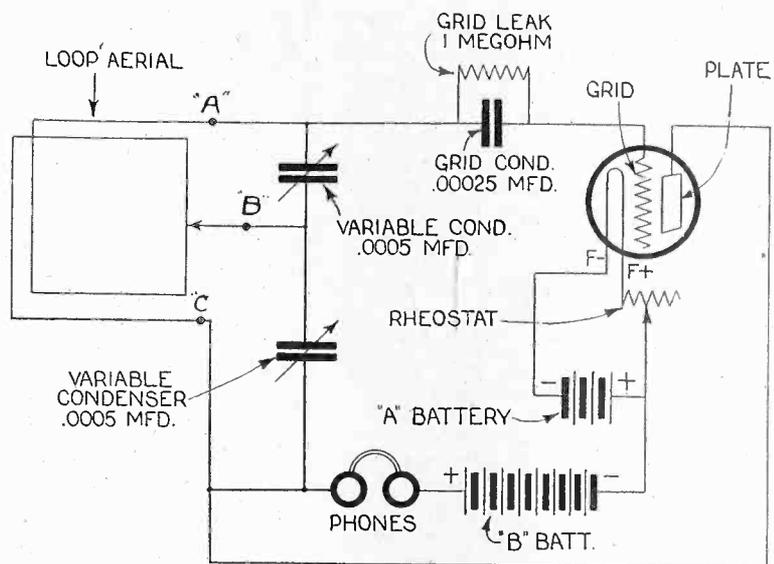


Fig. 2. Circuit with all constants marked. Note the location of the three wires from the tapped loop, corresponding to the letters in Fig. 1. Tuning is accomplished by the two variable condensers, the tap on the loop being used to afford absolute selectivity and freedom from all interference. Swinging the loop gives the directional effect necessary.

certain extent in the well known four-circuit tuner and also in the circuit illustrated herewith.

Here it will be seen that a loop antenna is used with only a single tube. The use of this circuit is therefore confined to districts within a short range of a good broadcasting station. However, under such conditions it gives very good reception and is the ideal compact set for the broadcast listener. It varies from the ultra-audion circuit, however, in one respect, in that the oscillations can be controlled by means of a variable condenser. The ultra-audion principle depends upon a direct conductive connection between the plate and the grid condenser. This is provided in the diagram herewith and a center tap from the loop gives control of the wave-length and regeneration. A variable condenser will be seen shunted from the center tap to one side of the loop and another from the tap to the other side of the loop. Thus the grid and plate circuits are controlled.

In this circuit a soft detector tube may be used whereupon 22½ volts, approximately, will be applied to the plate. If a UV 199 or a UV 201A is to be used, plate voltages suitable for these tubes should be applied. It is well to try reversing the "A" battery after connecting up the circuit in order to ascertain which connection gives the best results.

In the construction of the loop, it is well to remember that the larger the loop the better the results. However, in any case approximately 11 turns should be wound on the form with the tap at the fourth, fifth, sixth, seventh and eighth turns. These taps should be brought off to a five-point switch and the switch arm connected to the common lead between the two variable condensers. Thus it will be seen that the loop is divided up into two sections, both of which are tunable by means of variable condensers.

As in all single tube loop circuits, the two variable condensers should be of the best quality obtainable so that the losses will be as low as possible. The loop should preferably

tion is available, it is often found advantageous to connect the negative filament lead thereto. Sometimes also the plate lead may be grounded with an increase of efficiency. Never, however, use more than one ground connection at a time, as a short circuit is liable to result.

RADIOGRAMS

"Pa, what does broadcasting mean?" asked Clarence.
"Telling a secret to a woman, son," replied Pa.—Cincinnati Enquirer.

* * *

A cablegram from Melbourne, Australia, says that remarkably strong signals were received in Melbourne on the night of October 24 from American amateur radio stations.

* * *

The Westinghouse Electric International Company has received orders for electrical apparatus to be used in reconstruction work in Japan totaling well over a million dollars. Other orders are in course of negotiation which will bring the total amount to approximately two million dollars. It is understood that the power plants in the quake zone were not seriously damaged but that the distribution systems were practically destroyed.

* * *

With the hunting season at hand, the electric companies are facing again an annual problem which causes them much trouble, costs considerable money and inconveniences thousands of users of electric service. This is the hunter who, having nothing better to shoot, shoots insulators off the transmission line poles. The inconvenience to the users of electricity resulting from a single broken insulator on a long-distance line is, from the point of view of the companies, more serious than the expense of repairs involved.

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IMPORTANT NOTICE

While every possible care is taken to state
correctly matters of fact and opinion in technical
and general writings covering the radio field, and
every line printed is gone over with a scrupulous
regard for the facts, the publisher disclaims any
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NOVEMBER 17, 1923

A Wise Movement

THE National Radio Chamber of Commerce has issued a call for a series of conferences to promote a better understanding among radio manufacturers and broadcasters and to unite the industry in a co-operative whole for the purposes of aggressively advancing all measures of value as well as to repel the attacks of those who in the future may seek to exploit radio for selfish interests. This is a wise movement undertaken at just the right time and warrants the support of every individual and firm in the radio field. Experience in other industries has shown that in the matter of "strike" legislation or attempts to enact laws conceived in ignorance, the presentation of a united front at Washington, or at any state capital, has gone a long way toward defeating such injurious movements. A firmly united industry can come pretty near getting what it wants or denying what it doesn't want, all within reason and right.

Lloyd George and Radio

THE radio audience is indebted to the American Telephone & Telegraph Company for the very excellent transmission, through Stations WEAJ and WCAP, of the Hon. David Lloyd George's farewell address at the Metropolitan Opera House, New York City, on the evening of November 2. The modulation was perfect, showing that the pick-up, power amplification and line transmission previous to the actual broadcasting had been skilfully worked out and tested for 100 per cent. results. A mark was set on this occasion for the engineers of other broadcasting stations to strive for.

Mr. Lloyd George's talk at the Lotos Club on the previous evening was broadcast by Station WJZ. This and his other radio experiences during his visit to the United States led him to refer in his address to the wonders of radio. His remarks on the subject are quoted elsewhere in this issue of RADIO WORLD.

The American people have been extremely favored in hearing the stirring and impressive words of so eminent a man as the Hon. David Lloyd George. He is a great orator. He had a message to deliver and he got it across to his hearers with simplicity and convincing sincerity.

It is fortunate for him, for his chosen cause and for the public that radio was ready at hand to multiply his audiences into millions. No human being ever before talked directly to so many others at the same instant. This event, which promises to be epoch-making, presages the marvellous influence radio is certain to have on world affairs.

Publicity Grafters

EVERY new industry attracts its quota of tricksters, fake financiers, fly-by-night merchants and other sorts of easy money sharps. The radio industry is no exception. It has suffered from most of the old games and some new ones, but up to date no very serious harm has been done. Radio manufacturers and merchants have been forced to exercise special care in the matter of credits which, of course, is a good thing all around.

But the publicity grafter has descended upon the radio field in cold blood and with malice aforethought. Our readers would be surprised if we printed the names of companies which are apparently of some repute in other industrial fields, and which have flooded the radio press with laudatory articles

describing their products. When asked to use the advertising columns, legitimately the place for their purposes, they have suavely but coldly asserted that they had no intention of advertising and were shocked and surprised that the radio papers should refuse to use their flaming publicity as "news."

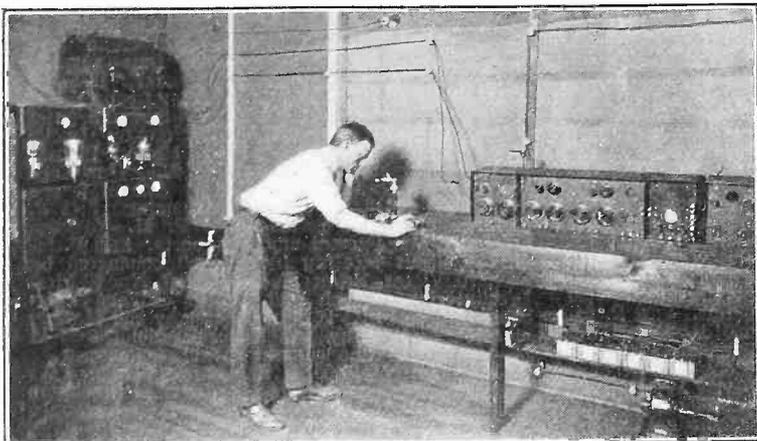
Another favorite stunt of these publicity grafters is for an official of the company to be all smiles and politeness to the press representative up to the point where advertising is solicited. Then he is informed that a certain advertising agency has entire charge of this important matter. A call at the advertising agency results in such a rude rebuff that the press representative cannot with any self-respect repeat the visit with its attendant possibilities of insult.

It naturally goes almost without saying that a manufacturer who descends to such a questionable practice as grafting publicity cannot have much faith in his own product or he would be willing and glad to avail himself of known channels of advertising which it has paid others to use. It is probable that we shall have always with us the grafter in one form or another, but the infant industry is his favorite nesting place when it comes to getting free advertising.

PERFECT and certain selectivity in the transmission and reception of messages, either code or voice, is a goal toward which several eminent engineers and inventors are working. Marconi permitted an announcement in the press some months ago that he was experimenting toward this end. Alexanderson is known to have recently devoted his energies to the same problem and the Patent Office applications undoubtedly would disclose the names of others. It is to be regretted that necessary secrecy is thrown around the records of the Signal Corps of the United States Army in the World War. They are believed to contain a great deal of valuable information on this important question, much of which was developed by amateur radio men serving in our overseas forces. When selective transmission becomes an actuality it is possible that it may be known as "point-casting" as distinguished from broadcasting.

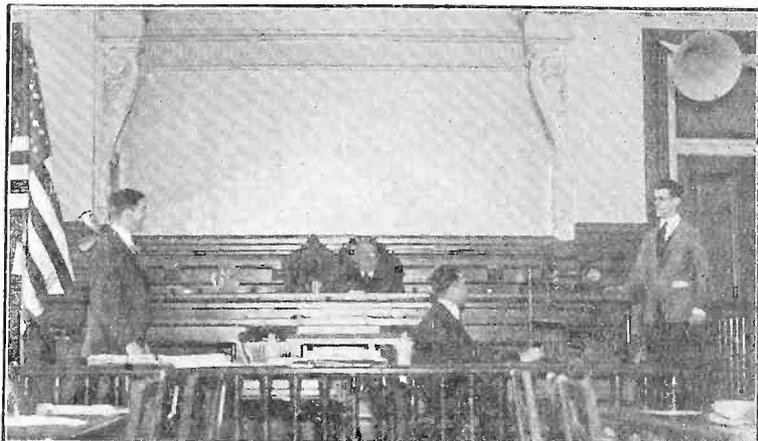
COURAGE is the least of the qualities required of a prophet in the radio field. And yet we venture to predict that the next great advance on the practical side of radio receiving will concern the source of current supply.

Bits of the Radio News Pictured



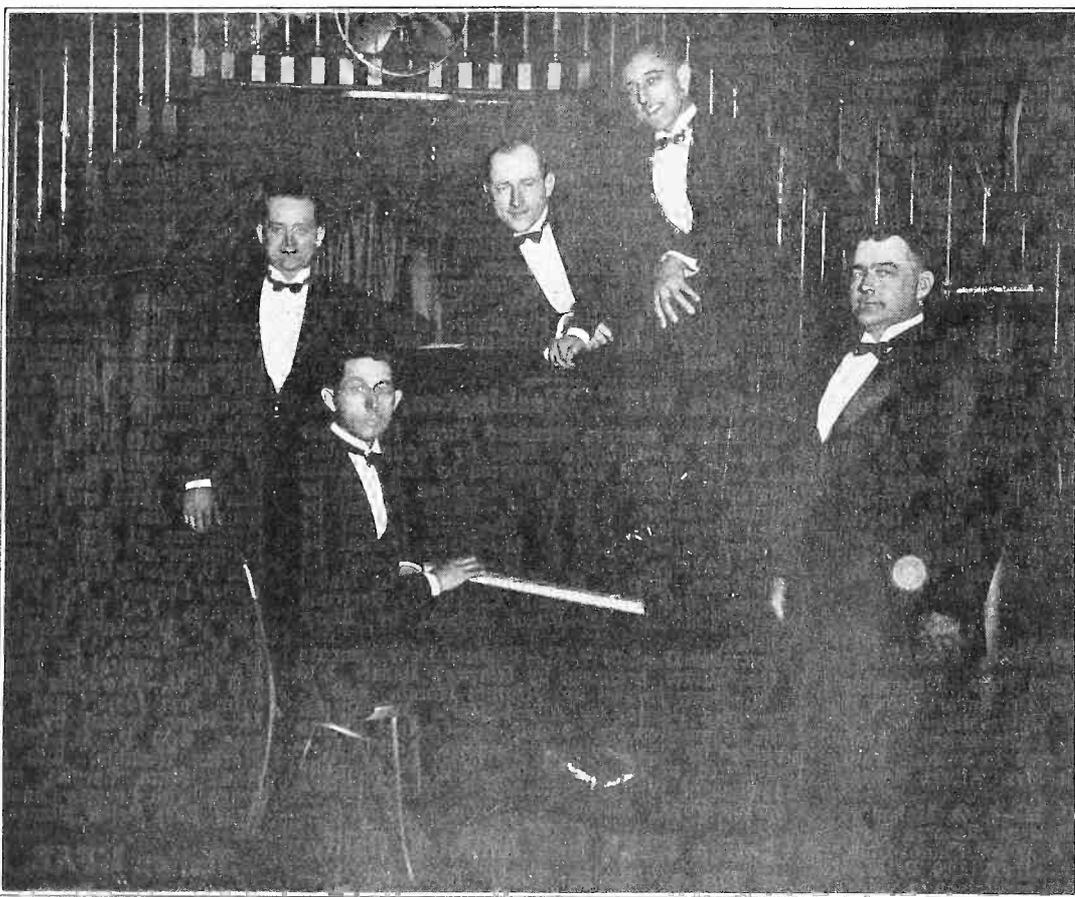
(C. Keystone View)

High-power telephoning over radio is now possible. It has been accomplished out in Michigan, where they have to be shown. Two-way conversation and bell ringing is all accomplished by the regular dial system, each number having a different frequency. It has been tested on several lines with success. Photo shows the new radio-telephone line central, connecting up two parties. The only drawback is that any one can listen in.

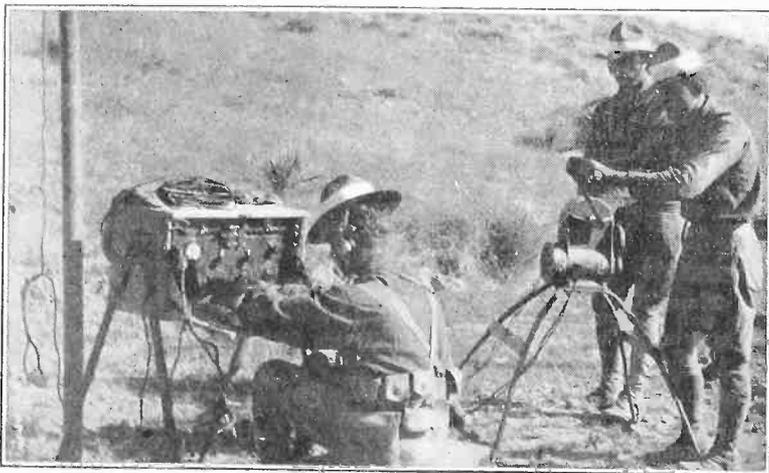


(C. Underwood & Underwood)

Radio to the aid of Justice! After trying in vain to find means of remedying the poor acoustics of the U. S. District Court Room, in Philadelphia, a power amplifier and microphones were installed, and now every word is heard throughout the entire room. A regular power speech amplifier with three horns was used in accomplishing this. The microphones are located on the witness stand, jury box and judges' bench.



The Bergen Male Quartet, a frequent feature of Station WEAJ. The quartet consists of William Davies, first tenor; Harry Sayre, second tenor; Thomas Sayre, first basso; William Burns, second basso. The unusual success which this group of singers has had is due to the remarkable blend of their voices, the result of years of singing together.



(C. Underwood & Underwood)

One of the new portable field sets in action. During the recent mimic warfare, or sham battles, held in Marfa, Texas, the portable field set shown proved to be an invaluable aid in keeping the men in touch with the commanding forces. A hand-driven generator is used to furnish power.



(C. Fotograms)

Radio "OGN" (Raymond F. Guy), of WJZ fame, operating the portable speech amplifier, which is used when broadcasting from points outside the immediate vicinity of the station itself. This is the apparatus used when WJZ operates from theatres, halls, or other distant places.

Here Are Good Broadcast Programs

Station WOC, Davenport, Iowa

484 Meters. Central Standard Time. November 16.—10:00 A. M.—Opening market quotations. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12:00 Noon—Chimes concert. 2:00 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program—Lecture by C. C. Flanagan. (Musical numbers to be announced.) 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 7:00 P. M.—Education lecture—"Y. M. C. A. Activities." Speaker: Leland Ashe, boys' Y. M. C. A. secretary, of Monmouth, Ill. 8:00 P. M.—Musical program (1 hour)—Erwin Swindell, musical director. Program presented by a group of artists from Maquoketa, Iowa.

November 17.—10:00 A. M.—Opening market quotations. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12:00 Noon—Chimes concert. 12:30 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program—Lecture by C. C. Hall. (Musical numbers to be announced.) 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. P. S. C. Orchestra, Gerald M. Barrow, director; V. B. Rochte, baritone soloist. Featuring "Don't Waste Your Tears Over Me," "Baby Brown Eyes," "Where the Old Savannah Flows," "My Rose Is Only You," "Where the Clover Blossoms Blow," and "Neath the Old Hawaiian Moon." Popular selections released through the National Association of Broadcasters, of which WOC is a member.

Station WBZ, Springfield, Mass.

337 Meters. Eastern Standard Time. November 16.—11:55 A. M.—Arlington time signals, weather reports; Boston and Springfield market reports. 6:00 P. M.—Dinner concert by the WBZ Quintette. 7:00 P. M.—A dramatized story from the Youth's Companion. 7:30 P. M.—Twilight tales for the kiddies. Current Book Review, by R. A. MacDonald of the Court Square Book Store. Farmers' period, furnished by the Eastern States Farmers' Exchange. Bedtime story for grown-ups, by Orison S. Marden. 9:55 P. M.—Arlington time signals. 11:00 P. M.—Program of Chamber Music by the WBZ Quintette; Leslie Mason, tenor.

November 17.—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield market reports. 3:30 P. M.—Organ recital by Arthur H. Turner, Municipal organist. 7:00 P. M.—Dinner concert by the Hotel Kimball Trio Geerts, violinist and director; Angela Godard Lon Geerts, violinist and director; Angela Godard Lon organ, cellist; Paul Lawrence, pianist. 7:30 P. M.—Twilight tales for the kiddies. "Bringing the World to America," prepared by "Our World" Magazine. 8:00 P. M.—Concert by Mrs. Carrie E. Goodell, soprano; Mrs. Robert A. Case, accompanist; Paul Clark, violin; Russell Day, accompanist. 9:00 P. M.—Bedtime story for grown-ups, by Orison S. Marden. 9:55 P. M.—Arlington time signals.

Station WFAA, Dallas, Texas

476 Meters. Central Standard Time. November 16.—12:30-1:00 P. M.—Address, Dr. Robert Stewart Hyer, Southern Methodist University, on the Sunday school lesson, "Jesus, a Missionary." 8:30-9:30 P. M.—Dallas Male Chorus in recital, Paul von Katwijk, director, with Mrs. Albert Smith, vocal soloist.

November 17.—12:30-1:00 P. M.—J. O. Mahoney, Principal Night Schools, "How to Become Educated." 8:30-9:30 P. M.—W. A. Green Choral Club, Earle D. Behrends, director. 11:00-12:00 P. M.—Florida Morrison and assisting musicians in voice, violin and reading.

November 18.—2:30-3:30 P. M.—Radio Bible Class, Dr. William M. Anderson, Jr., pastor First Presbyterian Church, teacher. 9:30-10:00 P. M.—City Temple Singers. 10:00-11:00 P. M.—Britling's Cafeteria Orchestra, Lou Goldberg, director.

Station WGY, Schenectady, N. Y.

380 meters. Eastern Standard Time, Nov. 16.—11:55 A. M.—Time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 12:45 P. M.—Weather forecast. 2:00 P. M.—Music and household talk, "Home Made Oriental Rugs" (Courtesy of Modern Priscilla). 6:00 P. M.—Produce and stock market quotations; news bulletins. 6:30 P. M.—Children's program. 7:35 P. M.—Health talk, N. Y. State Department of Health. 7:45 P. M.—Musical program and travelogue; WGY Orchestra; travelogue address on Bermuda, Dr. Sigel Roush. 10:30 P. M.—Musical program.

Nov. 17.—11:55 A. M.—U. S. Naval Observatory time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 9:30 P. M.—Phil Romano's Rain-bo Orchestra at the Kenmore Hotel (Albany, N. Y.)

Station KSD, St. Louis, Mo.

546 Meters. Central Standard Time. November 16.—8:00 P. M.—Program by Mrs. J. Stoddard Robertson, contralto; Irene Moriarity, pianiste; Adelaide Blase, violinist, and Marie Louise Bulte, reader.

November 17.—8:30 P. M.—Orchestra concert, organ recital and vocal and instrumental specialties broadcast direct from the Missouri Theatre.

Station KYW, Chicago, Ill.

536 Meters. Central Standard Time. November 16.—9:30 A. M.—Late news and comment of the financial and commercial market. 10:00 A. M.—Market reports. 10:30 A. M.—Late financial news and comment. 10:58 A. M.—Naval observatory time signals. 11:00 A. M.—Market reports. 11:05 A. M.—Weather report. 11:30 A. M.—Late news and comment of the financial and commercial market. 11:35 A. M.—Table talk by Mrs. Anna J. Peterson of Peoples Gas Co. 12:00 M.—Market reports. 12:30 P. M.—Late financial news and comment. 1:00 P. M.—Market reports. 1:20 P. M.—Closing market quotations. 2:15 P. M.—Late financial comment and news bulletin. 2:30 P. M.—Closing stock quotations, Chicago Stock Exchange. 3:00 P. M.—Late news and sport bulletins. 4:00 P. M.—News and sport bulletins. 4:30 P. M.—Late news and sport bulletins. 5:00 P. M.—Latest news of the day. 6:30 P. M.—News, sports and final market. Financial summary furnished by the Union Trust Co. 6:50 P. M.—Children's bedtime story. 10:00-11:30 P. M.—Late show: Herbie Mintz, pianist; Sallie Menkes, pianist; A. W. "Sen" Kaney, specialty act, Other artists and program will be announced by radio-phon.

Station WIP, Philadelphia, Pa.

509 Meters. Eastern Standard Time. November 16.—1:30 P. M.—Official weather forecast. 3:00 P. M.—Artist recital by artists from the Remick Studio. 6:00 P. M.—Official weather forecast. 7:00 P. M.—Uncle Wip's Bedtime Stories and Roll Call for the Children.

November 17.—1:00 P. M.—Organ recital by Karl Bonawitz on the Germantown Theatre Organ. 1:30 P. M.—Official weather forecast. 3:00-4:30 P. M.—Play by play report of the football game at Franklin Field. 6:00 P. M.—Official weather forecast. 7:00 P. M.—Uncle Wip's Bedtime Stories and Roll Call for the Children. 8:00 P. M.—"The Great American Rubber Industry," talk by Dr. J. W. Strumer, Dean of Science, Philadelphia College of Pharmacy and Science. 8:15 P. M.—Artist recital by Newell Robinson, pianist; Albert Zinger, violinist; George R. Miller, baritone. 9:00 P. M.—Academy Mixed Quartet, Lillian Hasenius, soprano; Regina C. Marsh, contralto; Henry A. Winder, tenor; Harold W. Neeld, baritone; Blanche Sylvis Copes at the piano, 10:15 P. M.—Charlie Kerr and his Orchestra from the St. James Hotel.

Station WRC, Washington, D. C.

469 Meters. Eastern Standard Time. November 16.—6:00 P. M.—Children's Hour by Peggy Albion. 8:00 P. M.—Travel Talk prepared by the National Geographic Society. 8:15 P. M.—Song Recital by Herman Fakler. 8:30 P. M.—Violin Recital by Mabel Sweeney. 8:45 P. M.—Song Recital by Gertrude Misel. 9:00 P. M.—Piano Recital by Mary Coolidge. 9:15 P. M.—Song Recital by Ruth Peter. 9:30 P. M.—Violin Recital by Mabel Sweeney. 9:45 P. M.—Song Recital by Gertrude Misel. 10:00 P. M.—Piano Recital by Mary Coolidge.

November 17.—3:00 P. M.—Fashion Developments of the Minute, prepared by Harper's Bazar. 3:10 P. M.—Song Recital by Virginia Horen. 3:20 P. M.—Violin Recital by Albert Hart. 3:30 P. M.—Farm Home Reports. 3:40 P. M.—Current Events prepared by The Review of Reviews. 3:50 P. M.—Instruction in Code Practice. 4:00 P. M.—The Magazine of Wall Street. 6:00 P. M.—Children's Hour by Peggy Albion.

Station KHJ, Los Angeles, Calif.

395 Meters. Pacific Time. November 16.—12:30-1:15 P. M.—News items. 2:30-3:30 P. M.—Matinee musicale. 6:45-7:00 P. M.—Children's program. 7:00-7:30 P. M.—Organ recital from First Methodist Episcopal Church. 8:00-10:00 P. M.—Program presenting Monrovia Trio. Walter F. McEntire will lecture. 10:00-12:00 P. M.—Broadcasting Art Hickman's Orchestra, by line telephony from the Los Angeles Biltmore Hotel.

November 17.—12:30-1:15 P. M.—News items. Music. 2:30-3:30 P. M.—Matinee musicale. 6:45-7:30 P. M.—Children's program, presenting Oscar Sandstrom, pianist, 12 years of age, pupil of Ruth Thomas. 8:00-10:00 P. M.—Program presenting Franklyn K. Matthews, Chief Scout Librarian, will speak. Hi Dab will appear through the courtesy of the Suburban Estates Company. 10:00-12:00 P. M.—Broadcasting Art Hickman's Orchestra, by line telephony, from the Los Angeles Biltmore Hotel.

Station WLW, Cincinnati

309 meters. Central Standard Time, Nov. 16.—10:30 A. M.—Weather report and business quotations. 1:30 P. M.—Business reports. 3:00 P. M.—Stock quotations. 4:00 P. M.—Special matinee arranged by Margaret Spaulding, modern American poets and composers. No evening program.

Nov. 17.—10:00 A. M.—Weather forecast and business reports. 1:30 P. M.—Business reports. 8:00 P. M.—Special program by Esberger's Band, picked up from the Auto Show at Music Hall.

Nov. 18.—9:30 A. M.—Sunday School service conducted by the editorial staff of Sunday school publications of the Methodist Book Concern. 11:00 A. M.—Church services of the Church of the Covenant, Rev. Frank Steven-son, minister. No evening program.

Station KDKA, East Pittsburgh, Pa.

326 Meters. Eastern Standard Time. November 16.—10:00 A. M.—Music. Union Live Stock Market report from the National Stockman and Farmer. 11:55 A. M.—Arlington time signals. 12:30 P. M.—Music. Weather forecast. 12:50 P. M.—United States Bureau of Market Reports furnished through the National Stockman and Farmer. 6:15 P. M.—Organ recital by Lucile Hale, organist, from the Cameo Motion Picture Theatre, Pittsburgh, Pa. 7:30 P. M.—"Our Lord Jesus a Missionary," the Sunday School lesson for November 18, by Dr. R. L. Lanning. 7:45 P. M.—The children's period. 8:00 P. M.—National Stockman and Farmer market reports. 8:15 P. M.—"Boy Scout Meeting by Radio," conducted by Richard Victor, Scout Master, Troop No. 1, First Presbyterian Church and No. 32 Calvary Episcopal Church. 8:45 P. M.—Concert by the Morgan Quartet, assisted by Leo Kruczek, violin. 9:55 P. M.—Arlington time signals. Weather forecast.

November 17.—10:00 A. M.—Music. Union Live Stock Market report from the National Stockman and Farmer. 11:55 A. M.—Arlington time signals. 12:30 P. M.—Music. Weather forecast. 12:50 P. M.—United States Bureau of Market Reports furnished through the National Stockman and Farmer. 1:30 P. M.—Concert by Daugherty's Orchestra from McCreery's Dining Room. 2:30 P. M.—Pitt-W. & J. football game from Forbes Field. 6:00 P. M.—Football scores. 6:15 P. M.—Dinner concert by the Westinghouse Band under the direction of T. J. Vastine. Program: March, "Fairest of the Fair," Sousa; excerpts from "Lucia Di Lammermoor," Donizetti; "Galop De Concert Infernal," Keler-Bala; Manana "Chilian Dance," Missud; selection "A Waltz Dream," Straus; clarinet solo "Air Varie" (Vinetta), Strong; Overture "Mid-Summer Morning," Barnhouse; "Balid Wonderful Child," Hearst. 7:00 P. M.—Football scores. 7:05 P. M.—Dinner concert continued. 7:30 P. M.—"Bringing the World to America," prepared by "Our World." 7:45 P. M.—The children's period. 8:00 P. M.—Feature. 8:30 P. M.—Concert by the Westinghouse Band under the direction of T. J. Vastine, assisted by Norman Porter, humorist. 9:55 P. M.—Arlington time signals. Weather forecast.

Station WJZ, New York City

455 Meters. Eastern Standard Time. November 16.—3:00 P. M.—Organ recital on the Hotel Astor Organ, program played by Leo Riggs, by direct wire from the Hotel Astor. 4:00 P. M.—Fashion developments of the minute, prepared by "Women's Wear." 4:05 P. M.—Recital by Zella Buell, soprano. 4:45 P. M.—Violin recital by the pupils of A. Sinigalliani. 5:30 P. M.—Closing reports of the New York State Department of Farms and Markets; Farm and Home reports; closing quotations of the New York Stock Exchange; "The Conditions of the Leading Businesses," by the Magazine of Wall Street; Evening Post News. 6:00 P. M.—"Kiddie Stories," sung and played by Agnes Leonard. 7:30 P. M.—Anne Robinson, lyric soprano. 7:45 P. M.—Looseleaf Current Topics. 8:00 P. M.—Anne Robinson, lyric soprano. 8:15 P. M.—"Sports," by William J. Slocum. 8:30 P. M.—Piano recital by Josephine Hartman Vollmer. 8:45 P. M.—The King Sisters, formerly of "Irene," "Jim Jam Jems," and "Letty Pepper." 9:05 P. M.—Piano recital by Josephine Hartman Vollmer. 9:20 P. M.—Children's Book Week, by Marian Humble. 9:30 P. M.—Joint recital by Anna Pinto, harpist, and Loretta Federici, soprano, with Loretta Connor, pianist. 10:40 P. M.—Near East Relief Dinner.

Station KFAE, Pullman, Wash.

330 Meters. Pacific Time. November 16.—The Modern Battleship, Prof. R. D. Sloan. Books for Winter Readings, Miss Alice L. Webb, News Editor. Orchard Thinning, Prof. O. M. Morris. Entertainment program by girls of the Theta Upsilon Sorority, including soprano solos by Alice Pike, Spokane; violin solos by Ruth Coates, Spokane; readings by Gladys Huebner, Yakima.

November 19.—Fattening Lambs, Prof. Howard Hackedorn. Musical numbers. What is Geology? Prof. O. P. Jenkins.

November 21.—Natural Aptitudes and Vocations, Dr. D. W. Hamilton. Food Fallacies and Truths, Miss Leila W. Hunt, home economics. Are Spreaders Economical in Orchard Spraying? Dr. A. L. Melander. Musical numbers.

November 23.—High Cost of Poor Roads, Prof. H. E. Phelps. A Chat on New Books, Alice Webb. Artificial Light to Increase Winter Egg Production, a talk by L. W. Cassel. Musical numbers.

Station WGY, Schenectady, N. Y.

380 Meters. Eastern Standard Time. November 16.—11:55 A. M.—Time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 12:45 P. M.—Weather forecast. 2:00 P. M.—Music and household talk, "Home Made Oriental Rugs" (Courtesy of "Modern Priscilla"). 6:00 P. M.—Produce and stock market quotations; news bulletins. 6:30 P. M.—Children's program. 7:35 P. M.—Health talk, N. Y. State Department of Health. 7:45 P. M.—Musical program and travelogue. 10:30 P. M.—Musical program.

November 17.—11:55 A. M.—U. S. Naval Observatory time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 9:30 P. M.—Phil Romano's Rain-bo Orchestra at the Kenmore Hotel (Albany, N. Y.)

Yes, We Have Some Records!

DX Nite Owls, Attention!

THE DX season is now upon us.

All faithful DXers are requested to get ready for the fray and prepare themselves for the night vigil.

Send your records to the DX Editor of RADIO WORLD.

Write only on one side of the paper and write clearly.

Give full particulars of your location, your set, your aerials and other items of interest.

A Neat Acknowledgement Card

From W. H. Morris, D.D.S., 57 Glen Street, Glen Cove, N. Y.

The enclosed card may or may not interest you.

The set I am using is a 3-circuit tuner of the two variometer, variocoupler type with two stages of audio-frequency amplification. I have heard over 100 stations.

KWQ, Norman, Okla.; WAAP, Wichita, Kan.; WBAP, Fort Worth, Tex.; WDAF, Kansas City, Mo.; WOQ, Kansas City, Mo.; WHB, Kansas City, Mo.; WHA, Madison, Wis.; WHAS, Louisville, Ky.; WOC, Davenport, Iowa; 5XAJ, Dublin, Tex.; WMAV, Auburn, Ala.; WSB, Atlanta, Ga.; PWX, Havana, Cuba; WCAE, Pittsburgh, Pa.; WLAG, Minneapolis, Minn.; WWAC, Waco, Tex.; KSD, St. Louis, Mo.; WMC, Memphis, Tenn.; KFI, Los Angeles, Calif.; KDYS, Great Falls, Mont.; WHAB, Galveston, Tex.; KFAF, Denver, Colo.; WMAQ, Chicago, Ill.; WLW, Cincinnati, Ohio; KZN, Salt Lake City, Utah; KHJ, Los Angeles, Calif.; WGM, Atlanta, Ga.; WHAH, Joplin, Mo.; WDAJ, College Park, Ga.; KWH, Los Angeles, Calif.; WFAA, Dallas, Tex.; WDAP, Chicago, Ill.; CHBC, Calgary, Can. Grand total, 20,935 miles!

MAGNAVOX Radio Products



A1—\$27.50

MAGNAVOX Audio-frequency Power Amplifiers

THESE instruments offer the most ideal method for amplification of audio-frequency waves before they are reproduced into sound.

Wherever ordinary audio-frequency is replaced with Magnavox Power audio-frequency, stations previously out of range can be reproduced in excellent volume.

The new one-stage Magnavox Power Amplifier A1, illustrated above, is just what is needed in many cases to bring in the distant stations.

Magnavox Reproducers

- R2 with 18-inch curvex horn \$60.00
- R3 with 14-inch curvex horn \$35.00
- M1 with 14-in. curvex horn. Requires no battery for the field . \$35.00

Magnavox Combination Sets

- A1-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 1 stage of amplification \$59.00
- A2-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 2 stages of amplification \$85.00

Magnavox Power Amplifiers

- A1—new 1-stage Power Amplifier \$27.50
- AC-2-C—2-stage Power Amplifier \$55.00
- AC-3-C—3-stage Power Amplifier \$75.00

Magnavox products can be had at Registered Magnavox Dealers everywhere. Write for new 32-page catalogue.

The Magnavox Company
Oakland, California

New York Office: 370 Seventh Avenue

Canadian Distributors
Perkins Electric Co., Ltd., Montreal

LISTENING INN STATION — WHM

W. H. MORRIS, D.D.S. :: :: GLEN COVE, N. Y.

Receiving Station 1940, Bureau of Standards, located at Sea Cliff, N. Y., 18 miles from the Atlantic Ocean. Paragon R A 10—Antenna—Inverted L—110' high—110' long—70' lead-in.

Distance records with detector only. Verified reports from KPO, KFI, KHJ, KGW, KDYS, CFCN, CJCA, WKAQ.

It was my pleasure to hear your program.....
E. S. time. I thank you. An acknowledgment would be appreciated.

WEAK
STRONG
VERY STRONG
FADED
VARIED
STATIC
WEATHER

Air line to you.....miles.

A nice easy way of letting a station know that you heard him, as it only takes a few seconds to fill in the card.

Pacific Coast stations have been coming in for the past three weeks.

Not a Bad Running Start!

From Wayne Hancock, La Mesa, Calif.

I am a constant reader of your RADIO WORLD and I note with interest that you are coming back with the DX column. I always read this column as I like to see what other people do. I live in La Mesa, just ten miles south of San Diego, so you see I am in about as tough a place as can be found, yet I have done some very good work with the single circuit regenerator set I built myself. I use detector and two step. I have received over fifty stations and I am sending you the most distant: Chicago, WMAQ, 1900; WDAP, 1900; Minneapolis, WLAG, 1600; Kansas City, WDAF, 1350; Omaha, WOAW, 1300; Calgary, Can., CFCN, 1300; Dallas, Tex., WFAA, 1230; Fort Worth, WBAP, 1200; Fort Worth, WPA, 1200; San Antonio, WOAI, 1175; Pullman, Wash., KFAE, 1100; Great Falls, Mont., KDYS, 1060; Tacoma, Wash., KGB, 1050; Portland, Ore., KGW, 925; Portland, Ore., KGG, 925.

Nice Work!

From J. Kennedy, Purcell, Okla.

I am greatly interested in your DX Nite Owl section and am sending you a list of 33 stations, in 22 different states and provinces, among which are seven stations above 1,000 miles and 20 above 500 miles, which I heard on the evening of March 17.

"Atta Boy, Wallace!"

From D. C. Wallace (9ZT), 54 Penn. Ave., N. Minneapolis, Minn.

Two weeks August over 1,000 miles—

CW—1ER, 1BBO, (1BCG), 1BES, 1BSJ, (1BWJ), (1CRW), 2BNZ, 2BRC, 3AB, 3BV, 3IW, 3SG, 3BRF, (3BVA), (3CHG), 4EB, 4GL, 5GJ, 5GN, (5GP), 5NJ, (5NS), (5SK), 5UC, 5UO, (5ABA), (5ACQ), 5AJJ, (5AKN), 5AMH, 5XAB, (6HP), (6KM), 6TV, 6ARB, (6ARU), (6AWT), (6BJQ), (6BVG), (6CBU), 7ZN, (7AGV). Canada—2BN, MEX, JH. September—CW—(1AW), (1ER), 1JZ, 1UH, 1ABC, (1ABS), 1ACU, (1ADN), 1AJP, 1AKE, (1AVA), 1BBO, (1BCF), (1BCG), 1BKQ, 1BOM, 1BSJ, 1BVB, 1BWJ, 1CKP, (1CMP), (1CPO), (1CRW), 2FP, (2GK), 2RB, 2RM, 2RS, 2AFP, (2AGB), 2AWH, 2BMR, 2BQH, (2BRB), 2BSC, 2BVC, 2CCX, (2CFB), (2CQZ), 2CVU, 3GS, 3HH, 3IW, 3TJ, 3TM, 3ABW, 3BJI, 3BVA, (3BVL), 3CCU, (3CHG), 4AF, (4AI), (4CS), 4DX, 4EB, 4FT, (4KU), 4MB, (5FX), 5GA, 5GE, (5GM), 5GN, (5LR), 5MN, 5MO, 5PB, (5QL), 5QQ, 5SF, 5UO, 5SK, (5ZA), 5ABN, 5AFN, 5AGJ, 5AIC, 5AIU, (5AKN), 5AMA, (5AMB), 5ANF, 5XAD, (5ZAV), (5ZAX), 6EC, 6HP, (6KM), 6PL, 6ACG, (6AGE), (6AJD), 6ALK, (6ALV), (6AOS), (6ARB), 6ATZ, (6AWS), (6AWT), 6BKX, (6PZ), (6QBQ), (NBRF), (6BRU), 6BUO, (6BVG), 6BVN, 6BYU, (6CBU), (6CFZ), 6CGD, 6CGW, (6CHL), (6CPY), 6CPZ, (7Bj), (7DC), (7DW), (7FD), (7LY), 7WP, 7YA, 7YL, (7ZD), (7ZF), 7ZL, (7ZN), 7ADP, (7AFE), (7AGV). Canadian—2BN.

Answers to Readers

I have a set of phones that do not function. There is no marking on them except the word AUTH. Who are the manufacturers of these phones?—Walter Spranger, 310 Elmswood Ave., Davenport, Ia.

These phones are made by the Auth Electric Specialty Co., 422 East 53rd Street, New York City.

* * *

In RADIO WORLD for Sept. 29, you published a diagram of a two-tube loud speaking receiver, by B. C. Caldwell. In the diagram he states that the best parts should be used. What parts did Mr. Caldwell use in this circuit?—John W. Son, Jr., 275 Elm St., Albany, N. Y.

We cannot name or recommend competitive apparatus through these columns. You may write to Mr. Caldwell. His address is 235 Lamartine Street, Boston, Mass. He will be glad to tell you the names of the parts he used.

* * *

I would like to build a home-made rectifier for charging a six volt storage battery from 110 volt 60 cycle current. How is it connected? What type of plates is used? What solution should be used? Where can pure aluminum be obtained? How can the charging rate be varied? How can the charging rate be approximately figured?—John J. Martell, R.F.D. 1, Gladstone, Mich.

* * *

We refer you to RADIO WORLD for October 27, where you will find a complete article on the charging of storage batteries. The connections for both the 6 volt type, and the B battery type are shown. The four jar lead and aluminum type is described, which is efficient enough for the purpose. Several solutions are named. Pure aluminum comes in sheets and wire and can be obtained in any large hardware store that handles metals. The charging rate is varied by the number of lamps that are used in the circuit. Figure on this ratio: One 100 watt lamp is capable of passing approximately 1 ampere. Therefore, if you want to charge at 6 amperes, you would have to place six 100 watt lamps in series-parallel with one side of the line.

* * *

I have constructed a three tube super-regenerative receiver according to plans that one of your advertisers submitted with my apparatus. It works well, bringing in distant stations very nicely on a loop. The only trouble is that there is a continuous high whistle which at certain times is very audible and annoying. This is especially true when trying for distance work, as on the nearby stations it seems to be drowned out by the volume of the signal itself. What can I do to eliminate this?—Jack Bronson, Cary, Okla.

The whistle you notice is the variation frequency. When this whistle is not present the receiver is not functioning correctly, so it must be present. You can, however, get it to such a high pitch that it will not bother you, as it will be outside the range of audibility. You can do this by the proper manipulation of your capacities and couplings of the plate and grid condensers, leaks and inductances.

* * *

I enclose a circuit I desire to build (three tube Erla reflex circuit using Erla parts). The circuit calls for a 23 and an 11 plate condenser. I have on hand a good 45 plate and a 19 plate condenser. Can these be used in place of the ones mentioned? If so, will I have to change the capacity of any of the fixed condensers in the circuit? If I cannot use these as they are will it be expedient

to remove the necessary number of plates to make the condensers conform with the specifications? I intend using UV199 tubes throughout. Should "C" battery be used in the audio-frequency circuits, as specified in other circuits using these tubes? If so what voltage should it be? I intend using from 90 to 130 volts on the plate. Where should the battery be inserted? Would a potentiometer help in the circuit? Should the panel be shielded? Why does this circuit use only two radio-frequency transformers while using three tubes? What wave length will this receiver respond to with a single wire antenna 100' long and 40' high? In the diagram you will note that the antenna connects to one tap arm switch and the ground connects to the other. Which is which?—D. J. Smith, Box 171, Blackfoot, Idaho.

Where the diagram calls for specific capacities use them and do not try to save a few cents by false economy. Use what the engineers call for—nothing else. Do not try to re-make condensers as it is an impossible job. You do not need "C" batteries in reflex circuits. The natural impedance of the transformers and their arrangement takes care of the grid bias. A potentiometer would be of no especial value in this receiver. If the designers of the circuit had considered it necessary they would not have hesitated to place it in the circuit. Figure these little points out for yourself once in a while. Two radio-frequency transformers are all that is necessary in this circuit, due to its construction. The first tube is coupled to the receiving variocoupler and thence to the transformer, leaving the second transformer to function between the second and third base, and rectifying through the crystal which follows the third tube. The same is true of the audio-frequency. Trace your circuit and see. With a proper coupler this circuit will cover all broadcasting stations now transmitting. With the antenna you mention you will have some trouble in getting down to the lower waves around 230 and 245 meters. Suggest that you use a 35' or 40' antenna, about the same height as yours is now, and shorten your ground lead as much as possible. The shorter the ground lead, the sharper the tuning and the better the set will work all around. Connect the antenna to the tap arm that goes to the top leads (generally the single turns) and the ground lead to the switch arm connecting to the bottom leads (group turns). You may use copper coated steel wire for an antenna with this circuit, or any circuit. It is of fairly high conductivity—almost the same as pure copper. The very slight loss (not noticeable except in very fine laboratory experiments) is due to hysteresis.

* * *

Is it in conformity with your policies to allow readers to communicate with your various contributors and writers? If so what is the address of Richard B. Wilbur, author of "A Long Distance Crystal Receiver," published in RADIO WORLD for July 28, 1923?—E. F. Hittenger, 111 Central Avenue, Albany, N. Y.

You may write to any of the contributors or authors in our magazine. Either address your letters to RADIO WORLD for forwarding, or write to R. B. Wilbur, Box 564, Peabody, Kansas.

* * *

I built the receiver described by Mr. Teeter in RADIO WORLD for September 8, 1923. I have had very good results with it, and desire to add two stages of audio-frequency amplification. Will you give me Mr. Teeter's address?—Peter Grosskoff, 245 West 66th Street, New York City.

The address of Mr. Teeter is 81 Maiden Lane, New York City. Any of the authors you wish to communicate with may be reached by writing to us. We will forward letters.

* * *

I recently bought an Aeriola Jr. receiver. It was a combination sale, a pair of N & K phones coming with the receiver. I cannot seem to get anything outside of strictly local stations, and when two or more are on at the same time, I am bothered with not being able to separate them sufficiently to hear one clear and undisturbed. I also have considerable trouble getting anything below WJZ. I cannot hear WHN at all, and WOR just faintly. WJZ comes in on 11 on the dial, and WEAJ on 17 or 19, depending upon the conditions. What is my trouble? My antenna is a phosphor bronze wire, 310' long, from far end to my window. Should I make it longer? Is there any way I can use a loud speaker on this receiver?—Jake Kumlinsky, Neck Road, Brooklyn, New York.

Your main trouble lies in a long antenna. Your antenna is entirely out of proportion to the receiver used. A single wire 75' to 100' long is all that is necessary. The shorter an antenna is (within reasonable limits, of course), the sharper the tuning is. This receiver was designed for an antenna of about 75' long. This length is best for the set, or for any set, even a single or double circuit tube receiver. The manufacturers of your present set make a two stage audio-frequency amplifier which can be used with this receiver. As a matter of fact it was designed for the Aeriola Jr. and Sr. Get in touch with a dealer handling Radio Corporation apparatus and ask for a demonstration.

* * *

I purchased a neutrodyne receiver. Is there any way in which radio-frequency amplification can be added to this to make it better? If so how can it be done?—Maris Cushman, 910 West Street, Brooklyn, New York.

The neutrodyne is a radio-frequency receiver of the highest type. If you wish to add additional tubes, suggest that you add another stage of audio-frequency. Adding more radio-frequency is not advisable as the tuning becomes too complicated.

* * *

I am enclosing a diagram of my detector and one stage of audio-frequency receiver. It works fine on the detector, but I do not get very good results on the amplifier. What can you suggest?—Miss M. Thompson, 40 Sibley Street, Detroit, Mich.

You have your amplifying rheostat in the wrong lead of the battery to commence with. Shift it. You do not state what make of transformer you are using. If it is a cheap one, change it and use a good one. Make sure that you are connecting the right sides of the transformer to the right places. There is a certain secondary lead that goes to the grid and another that goes to the filament. Make sure you have them all right.

* * *

What is the cause of a constant clicking sound in my receiver, every time the electric cars pass through our street? There is no power house on the block, and the cables are laid under the surface. I am also about 60 feet distant from them.—Carl Hankeman, 2934 Amsterdam Ave., New York City.

Your receiver must be extremely sensitive to pick up clicks from the underground rail system of the surface lines. Your trouble is probably caused by the feeder rail being pitted and as the shoe passes over it, it arcs. This would cause clicks, but in none but very sensitive receivers. If your antenna runs parallel with the tracks, change it to right angles and see if that does not stop the interference.

Broadcasters Release Music

THE National Association of Broadcasters last week released to its members, under agreement with the copyright owners, 16 pieces of music for broadcasting purposes. Two other songs were also released through the courtesy of the Oliver Ditson Co., music publishers of Boston.

KELLOGG RECEIVERS



Very light!

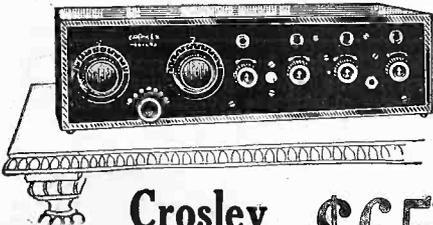
flexible and easily adjusted

Mother, granny and little Willie who hangs on to his end until he is gently guided to bed by the ear—even Dad himself stays until the furnace fire is low and the house is as silent as a morgue—they all appreciate this dandy little head set with wide receiving range and unusual sensitiveness because it is so light and easy on the ears. Not hard to take at all! Band is especially adaptable; receivers are instantly adjustable. Dispense with your "heavy artillery" and get this light, flexible, easily adjustable Kellogg head set. The price? Oh, \$10.00, but don't worry about that if you are after better results.

Use—Is the Test

KELLOGG SWITCHBOARD & SUPPLY COMPANY

CHICAGO



Crosley Model X-J \$65

Dispel dull care during the fall and winter evenings with a Crosley Model XJ radio receiver. Enjoy, nightly, the concerts, speeches and other amusements that are sent out from New York, Honolulu, Cuba, Cincinnati and hundreds of other places.

For bringing in distant stations clearly and distinctly, no set can excel a Crosley Model X-J. It is a 4 tube radio frequency set, combining one stage of tuned radio frequency amplification, detector and two stages of audio frequency amplification.

Actual tests have proven it the most remarkable radio receiver ever offered, regardless of price.

See this beautiful instrument at your dealer's. Complete catalog describing the entire Crosley line of instruments and parts will be sent free upon request.

WRITE FOR IT TODAY

Crosley Manufacturing Co.

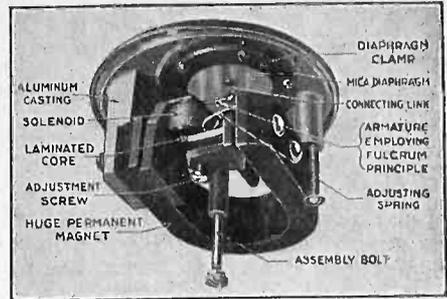
Powel Crosley, Jr., President
11403 Alfred St. Cincinnati, Ohio

THE TRINITY LOUD SPEAKER



TYPE "A1"
21" FIBER HORN
\$25.00

TYPE "B"
(For Phonographs)
\$12.50



INTERIOR CONSTRUCTION

An ear phone is an ear phone no matter how fancy the horn that covers it may be, and, due to the delicate construction of an ear phone it is utterly incapable of giving true tone reproduction, especially, when relatively large currents are passed thru its coils, such as the output of a two-stage or power amplifier.

The Trinity Loud Speaker element embodies the well-proven and tested principles of the phonograph reproducer with the soundest principles of electromagnetic design best adapted for loud speaker operation. It is not an ear phone when placed on a head band and a loud speaker when covered with a horn. It is a sturdy loud-speaking element ALWAYS.

Send for Literature.

TRINITY RADIO CORPORATION

446 TREMONT STREET, BOSTON, MASS.

EVERY RADIO FAN

Should Attend the

SECOND ANNUAL

CHICAGO RADIO SHOW

COLISEUM, CHICAGO

NOVEMBER 20th-25th

The Greatest Exposition of RADIO DEVELOPMENT Ever Held in Any Country

30,000 SQUARE FEET OF EXHIBITS

Speakers of National Prominence

Broadcast Artists

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FILL OUT AND MAIL NOW

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RADIO WORLD

RADIO WORLD

1493 Broadway, New York City

Please send me RADIO WORLD for months, for which

please find enclosed \$.....

SUBSCRIPTION RATES:

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Three Months 1.50
Six Months 3.00
One Year, 52 Issues 6.00
Add \$1.00 a Year to Foreign Postage; 50c for Canadian Postage.

Radio Merchandising

Advertising Rates: Display, \$5.00 an inch, \$150.00 a page. Classified Quick-Action Advertising, 5 cents a word. Phones: Lackawanna 6976 and 2063

Radio Trade Notes

Reliable Radio Supply Co. has opened a radio supply store at 17-19 Fairfield Ave., Bridgeport, Conn., and would like to hear from jobbers and distributors.

* * *

The Circle Electric Supply Co., New York City, has had confirmed a composition with its creditors on a 15 per cent. basis.

* * *

The Western Electric Company has leased, for a term of years, a manufacturing plant on Westside and Claremont avenues, Halstead Street and along the Central Railroad in Jersey City, N. J.

* * *

J. D. Henderson, Carmongay, Alberta, Canada, is in the market for radio parts and loud speakers.

* * *

R. E. Decker, 555 Halifax street, Petersburg, Va., is starting a local radio business.

* * *

Charles L. Eidlitz, Chairman of the Board of Governors of the Electrical Board of Trade of New York, at the first public meeting of the board recently announced that Thomas A. Edison had been elected the first honorary member of the organization.

New Zealand Radio Distributors

RADIO, Limited, Strand Arcade, Auckland, New Zealand, inform RADIO WORLD that they would like to hear from American manufacturers who are desirous of opening up business in New Zealand. Their letter says:

"We should like to state that this firm was the first to commence operations in radio material in New Zealand. Realizing that radio has come to stay we have on our staff only those who have a thorough knowledge of electricity in general and wireless matters in particular. By doing so we can render the very best service to our clients and the public. We think we can safely say we are the only firm in the Dominion who make a specialty of wireless and wireless goods."

Why Not a National Radio Day?

MURRAY HULBERT, acting mayor of New York City, has proclaimed November 19 as National Motion Picture Day—at least in his bailiwick.

By the same token, why not have a National Radio Day, during National Radio Week, November 25 to December 1, proclaimed by Governor Smith, of New York, and all other governors? The executive committee of the Radio Trade Association ought to be able to accomplish this.

New Radio and Electrical Firms

Nulite System, Wilmington, Del., renewing filaments in electric incandescent lamps, \$2,500,000. (Corporation Trust Co. of America.)

Federal Telephone Manufacturing Corp., Buffalo, 200 shares common stock, no par value; P. Swift, M. Potter, A. R. Martin. (Attorneys, Swift & Potter, Buffalo.)

Salon Battery Co., Wilmington, Del., manufacture, \$2,000,000 (Corporation Trust Co. of America.)

H. B. Battery and Ignition Co., New York City, \$3,000; A. Hicks, R. H. and L. Abrown. (Attorneys, J. H. Goggin, 2806 Third Ave., Bronx.)

Bonded Radio Corp., New York City, 200 shares common stock, no par value; H. Cohn, W. H. Lee. (Attorney, E. Cohn, 29 Broadway.)

Vactophone Engineering Corp., New York City, make radio machines, \$20,000; W. Scadron, L. Isaacs, I. Sickler. (Attorney, L. Scadron, 1540 Broadway.)

Radio Productions, New York City, theatrical, \$10,000; L. K. Tully, S. Michelman, J. Oppenheim. (Attorneys, Cohen & Cohen, 11 East 42d St.)

Coming Events

BOSTON RADIO EXPOSITION, December 3-8, Boston, Mass.

NATIONAL RADIO WEEK, November 25 to December 1, 1923.

SECOND ANNUAL RADIO SHOW, Los Angeles, Calif., February, 1924.

SECOND ANNUAL RADIO SHOW, Coliseum, Chicago, November 20-25.

SECOND ANNUAL NEW JERSEY RADIO SHOW, Robert Treat Hotel, Newark, N. J., November 14-17.

Phonograph Shops for Sale

EVIDENCE seems to be accumulating to corroborate the fact that radio is making inroads on the phonograph and record business. One day last week a prominent New York newspaper published several advertisements offering for sale stores operating agencies for well-known phonograph companies.

Radio Literature Wanted

Manufacturers of and dealers in radio apparatus and accessories are notified that literature and catalogues describing their products have been requested, through the Service Editor of RADIO WORLD, by the following:

Reliable Radio Supply Co., 17-19 Fairfield Ave., Bridgeport, Conn. (Retailers.)

Perrin Sales Co., 613 Second St., Fort Madison, Iowa.

Thos. V. L. Fahnestock, 347 W. Stone Ave., Greenville, S. C.

Harry E. Leavitt, 7531 So. Green St., Chicago, Ill.

William Divil, P. O. Box 22, Smithfield, Pa. (Interested in radiophone and CW apparatus.)

E. D. Smith, Box 670, Santa Fe, New Mexico.

Dalton Atherton, P. O. Box 87, Fullerton, Orange Co., Calif.

D. Thurer, 146 Fifth Ave., Brooklyn, N. Y.

W. L. Orvis, P. O. Box 713, Balboa, Canal Zone.

Henry C. Chessman, Indiana Masonic Home, Franklin, Ind.

Wm. Leeson, 24 Wing St., Glens Falls, N. Y.

Cecil Price, R 12, Lebanon, Ind.

Lester Routh, R 12, Lebanon, Ind.

Max Moon, Mount Desert Ferry, Me.

Joseph Schwartz, 3409 Benilton Ave., Detroit, Mich. (Builds and repairs sets.)

M. G. Donermeyer, 2720 Shirley St., Omaha, Neb.

Alvin P. Nippen, Nippen Bldg., Chillicothe, Ohio.

Marvin Guise, 1014 Ewing Ave., Chicago, Ill.

The Ansonia Radio Shop, New York City, has filed notice of dissolution.

Wikoff Machine & Repair Co., Hagerstown, Indiana.

W. E. Spencer, 2686 Vicksburg Ave., Detroit, Mich.

G. W. Kotts, Box 166, Hope, North Dakota.

V. H. Kurtz, 409 N. Market St., Thorntown, Indiana.

Radio and Electrical Business Opportunities

Rate: 40c a line. Minimum, 3 lines.

LET US BE YOUR FACTORY

Do not use your funds to buy machinery and equip a plant; we have one of the most complete manufacturing plants in New York and broadest experience in designing and building dies, tools and automatic machinery for economical production; we will make your parts or build your entire device, and attend to packing and shipping if desired; you can use our facilities and experience profitably. Interstate Mechanical Laboratories, 521 West 57th St., N. Y. C.

RADIO—Electrical business, repair and battery shop sacrificing thriving business account ill health; heart of business section. 900 Bedford Av., near Myrtle, Brooklyn, N. Y.

SHELTONE LOUD SPEAKER

This NEW Pyralin-SHELTONE, made by DUPONT, gives greater volume—better tone and is more beautiful in appearance.

AT ALL DEALERS

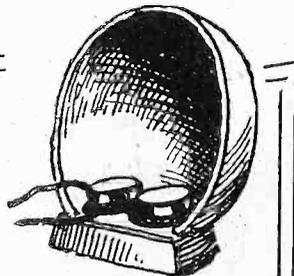
Use the SHELTONE with ANY good phones and get wonderful results. We are distributors for Nath. Baldwin phones and the new Baldwin Loud Speaker.

THE SHELTONE CO.

185-189 Clinton Avenue

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\$3.00

**Talk, Write, Phone, Wire, Boost for the Success of
National Radio Week, November 25 to December 1, 1923**

Sta-Fix Detector



PRICE
1.25

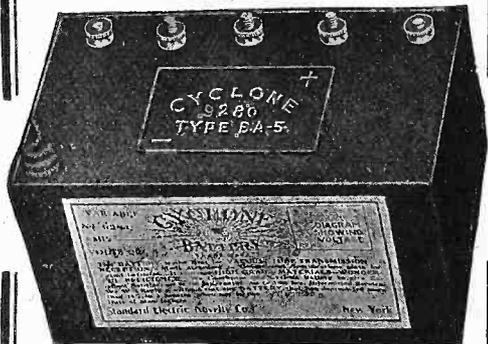
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GUARANTEE

THIS Detector is guaranteed to be perfect in every detail and properly adjusted to be clear in tone and volume, and subject to FREE exchange if found imperfect, provided it has not been tampered with or glass broken, by presenting your sales receipt where purchased.

Dealers and Jobbers Write for Your Discount.
Electric Service Engineering Co.
337 West Madison Street Chicago, Ill.

Cyclone



WORLD'S BEST

"A" and "B" BATTERIES specially built for your Radio Set in all types. Highest quality GUARANTEED for DISTANCE, CLEARNESS, and LONG LIFE.

Standard Electric Novelty Co.
NEW YORK CITY

Best proposition for Jobbers and Dealers. Some territory still available for New Distributors. Write for details at once.



NEW ELECTRAD DIODE
Replaces crystal in all circuits. Gives greater volume, greater selectivity and steadies the circuit. No adjustments for change of wave lengths. Real results. Guaranteed. Send purchase price and you will be supplied post-paid. Socket 50c extra.

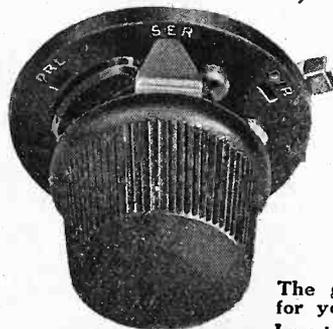
ELECTRAD, Inc.
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The Marvel-Switch

THREE-WAYS

Series, Parallel, Direct-Ground

Dial-Mounted



Patents Pending

Strictly anti-capacity. Offers the best arrangement for switching from long to short waves, or from short to long waves. The greatest value for your money. Instructions for mounting given with each instrument.

List Price \$1.25

Attractive discounts for dealers and jobbers. Write for descriptive circular.

IF YOUR DEALER CANNOT SUPPLY YOU, SEND PURCHASE PRICE TO

MARVEL-SWITCH CO.

28 WEST 25TH STREET NEW YORK



An Appreciated Gift

Charges Radio and Auto Batteries at Home Over Night for a Nickel

For a friend who owns a radio set or auto, what would be more appropriate than a gift which would eliminate the inconvenience and expense of taking his battery to a service station every time it requires recharging? The



is such a gift, appropriately dressed up in a beautiful package. It charges any Auto, Radio or "B" storage battery in the quickest, simplest and most efficient manner possible. Connects to any lamp socket—operates silently—requires no watching. Fully automatic in operation—absolutely safe. Beautifully finished in mahogany and gold. Unqualifiedly guaranteed. Over 125,000 already in use.

At all good dealers, \$18.50 complete (\$25.00 in Canada,—no extras to buy.

FREE: Ask your dealer or write direct for free copy of Homcharger list of broadcasting stations and GOLD SEAL bulletin.

Insist on the GOLD SEAL



It's your guarantee against substitution and appears on name-plate and package. No other charger is just as good.

Automatic Electrical Devices Co. 135 West Third St., Cincinnati, O.
Largest Manufacturers of Vibrating Rectifiers in the World

Radio World is \$6.00 (52 issues), \$3.00 six months, \$1.50 three months, 15c. single copy. Radio World, 1493 Broadway, New York City.

FADA

Complete markdown parts for the 5-tube Fada Neutrodyne Receiver, including drilled engraved Bakelite Panel and Base Board\$65.00
Absolutely guaranteed on our money-back basis.

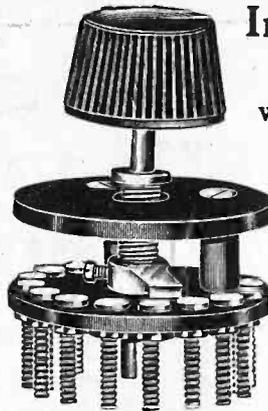
Amperite—Automatic Filament Control.
Unmounted \$0.70. Mounted\$1.10
Langbein and Kaufman Variometers\$6.00
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Our stock consists of a most complete line of all standard radio apparatus. Just let us know what you want and we will ship it to you immediately at regular manufacturers' prices.



23 Warren St.
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Aetaco Back Mounting Inductance Switch



Will Not Absorb Moisture

12 Points Sure Contact

This switch is NOT made from fibre.

For convenience in mounting the set and for continued reliable service, the AETACO back

mounting inductance switch is unsurpassed. The AETACO trade mark is sufficient guarantee of its quality and workmanship.

12 Point Back Panel Mounting Inductance Switch, Special Bushing\$0.75
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Indoor Spring Wire Aerial\$1.00
Standard 4-Prong Socket\$0.50

CONDENSERS

43 Plate Condenser\$1.75
23 Plate Condenser\$1.50
17 Plate Condenser\$1.35
11 Plate Condenser\$1.10
5 Plate Condenser\$0.90
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Postage Must Be Included in All Orders.
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American Radio Stores
235 Fulton Street, New York City

Natural Re-PRODUCTION



Atlas
AMPLITONE
LOUD SPEAKER

The radio sceptic is I-N-S-T-A-N-T-L-Y convinced by the Atlas re-PRODUCTION. The patented "double diaphragm" responds to the full range of vibration cycles. Adjustable to your set and to receiving conditions. Hear the ATLAS Loud Speaker demonstrated at your dealers. Write for Booklet S.

COMPLETE WITH CONNECTING CORD

\$25

What have you accomplished with your Atlas Loud Speaker? Tell us about it.

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Multiple Electric Products Co. Inc.
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Announcing

DX-ALENA

The Powerful Long-Distance Crystal

DX-ALENA is a phenomenal, all-sensitive, synthetic crystal that positively outclasses all others. DX-ALENA is broadcast tested and guaranteed absolutely without an equal for loudspeaking and long-distance reception. Fans report extraordinary success with DX-ALENA. Order one of these wonderful crystals today for your crystal or reflex set. By mail, 50 cents. DX-ALENA is made by The Chemical Research Co., Dealers and Jobbers. Write for prices.

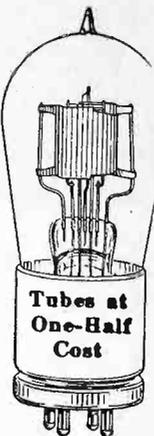
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Radio Equipment of Quality

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The Star is the great American illustrated theatrical weekly. It contains pictures of some of the radio entertainment favorites. 10c. a copy. \$4.00 a year. Trial subscription for three months (13 issues) \$1.00. New York Star Co. 1493 Broadway, New York City.

**Guaranteed Tube Repairs**

WD-11\$3.50
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All tubes positively guaranteed to be satisfactory.

Special discounts to dealers.

Tubes returned P. P. C. O. D.

HARVARD RADIO LABORATORIES

200-204 Old Colony Ave. So. Boston Mass.

Send \$6.00 for RADIO WORLD and get 52 issues without a break.

WEAF to Broadcast Philharmonic Concerts

WORKING in close co-operation with Clarence H. Mackay, Frederic A. Juilliard and Mrs. E. H. Harriman, Chairman of the Board of Directors, President and Chairman of the Educational Committee of the Philharmonic Society, respectively, the American Telephone and Telegraph Company announces that it will broadcast through Station WEAF the entire series of ten educational concerts to be given by the Philharmonic Society of New York during the coming season, under distinguished conductors, in Carnegie Hall.

The directors of the Philharmonic Society have arranged an extensive educational program which, in addition to the concerts by the Philharmonic Society, will include lectures at school centers by Daniel Gregory Mason of Columbia College and children's concerts given by the American Orchestral Society.

The educational concerts given last year by the Philharmonic Society will be continued along similar lines during the coming season. Five concerts will be given at Carnegie Hall on Monday evenings and five concerts on Wednesday evenings, Willem van Hoogstraten conducting on November 12th, December 3rd and 17th, and January 21st. Henry Hadley will direct the orchestra on December 31st, and Willem Mengelberg will conduct the five Wednesday evening concerts on January 30th, February 6th and 27th, March 19th and April 2nd, all of which will be broadcast by WEAF.

This is the most comprehensive and important educational program in orchestral music yet to be presented to the radio audience. The management of Station WEAF, in line with its broad policy of co-operating fully with the important musical organizations, will make a feature of these Carnegie Hall concerts. The music-loving public is indebted not only to the public spirited directors of the Philharmonic Society, but also to the Victor Talking Machine Company, which has waived its contract rights in order that the educational work may be extended.

Keep Yourself Up to the Minute on RADIO

The one best way to do it is with a Lefax Perpetual Radio Handbook. It grows with every new discovery about Radio. It cannot become old or out-of-date. It gives all known facts and the new ones as they are learned by the authors—Dr. J. H. Dellinger and L. E. Whittemore, Chiefs of the Radio Laboratory, U. S. Bureau of Standards, Washington, D. C. The purchase of a Lefax Handbook makes you a registered owner. That entitles you to complete information on new Radio developments every month, without additional charge for the first twelve months. This information comes to you in printed, punched page form. You add the pages instantly, easily. Included in this fine work is a complete list of broadcasting stations and full information about every one. No radio book is or can be like

LEFAX PERPETUAL RADIO HANDBOOK

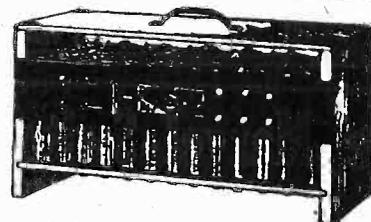
It is pocket size, loose leaf, bound in flexible imitation morocco leather—fine looking and long, long wearing. Type is clear and sharp. Illustrations are clean, finely made and easy to understand. Index tabs are made of linen—tough and strong—plainly marked.

Remember, you have in Lefax a practical Radio guide that will keep you up to the minute on Radio and all that goes with it. Lefax Perpetual Radio Handbook grows with Radio. You get new, useful, authentic information, free, every month. But you pay for your book only once. You don't have to write for new facts. They come to you automatically. Ask your Radio supply man, stationer or bookseller for Lefax Perpetual Radio Handbook.

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Build Yourself a Rechargeable Storage "B" Battery From Edison Elements That Will Last You a Lifetime!

Complete units for making a 100 volts, 1500 Milliampere battery consisting of cabinet, switch, elements, glass tubes, separators, wire, electrolyte and blueprints for assembling, \$12.50. Battery assembled and charged, \$17.50. 140 Volt Battery, \$28.50. Drilled elements, 6c. per pair; glass tubes, 2c. each; separators, 1c. each; nickel wire, 1c. per length; rubber covered switch wire, 2c. per foot. Mail Orders Filled.

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41 JEFFERSON STREET BROOKLYN, N. Y.
Near Broadway and Myrtle Avenue
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FOR RELIABLE UP-TO-DATE**RADIO MAILING LISTS**

Use Our Card Catalog Directory
in use now with over 200
Radio Manufacturers and Jobbers
Your ENVELOPES ADDRESSED
At \$2.00 per 1,000

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For Maximum Amplification Without Distortion and Tube Noises

use the well known

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MORE THAN A LOUD SPEAKER

Bristol Audiophone, Sr., 15-in. Horn...\$32.50
Bristol Audiophone, Jr., 11-in. Horn...\$22.50
Bristol Single Stage Power Amplifier...\$25.00

Write for Bulletin 306-W
The Bristol Company
Waterbury, Conn.

2650 MILES

with ONE TUBE. Broadcasting from Atlantic Coast and Cuba heard in California by users of the CROSS COUNTRY CIRCUIT. This range is due to simplicity of set and operation as only one control is used for tuning. Easily and cheaply built. Dry cell tubes may be used. Complete instructions with panel layout, assembly views, etc., postpaid for 25c. Or further information for red stamp. **VESCO RADIO SHOP, Bx. RW-117, Oakland, Cal.**

You Don't Need Tubes

to get out of town. If you want new stations on your crystal set **WRITE ME TODAY.** Mine works 400 to 1,000 miles without tubes or batteries! Thousands have bought my plans and now get results like mine. **CHANGES OFTEN COST LESS THAN A DOLLAR.** Send self-addressed envelope for further information. **Leon Lambert, 626 South Volusia, Wichita, Kansas.**

THE BULL DOG AERIAL MAST SEAT



Any one, with home tools, can install a firm and rigid aerial mast on any kind of roof.

Made in two types: Hinged sides with holder for "lead in" support. Also plain peaked, without hinged sides and "lead in" support.

For 1 1/2" mast, hinged type \$3.00
For 1 1/2" mast, peaked type, plain 2.50
For 1" mast, peaked type, plain 2.00
For 1 1/2" mast, flat base type 2.50

Check Money Order or Bank Draft
MAST SEAT MFG. CO.

119 5th Street S. E., Minneapolis, Minn.
Jobbers and distributors write for discounts.

Cockaday Coil Set \$2.50

Including full size blue prints of panel layout, complete picture hookup, and fully illustrated instructions for construction and operation.

Coils are fully assembled, made exactly as specified by Mr. Cockaday, D coil bank wound. Far more efficient than any home made coils.

Standard parts for this sensational circuit—panel, coils, condensers, verniers, variable resistance, vernier rheostat, socket, double jack, dials, switch, contact points, posts, busbar, wire, spaghetti, etc. (no tubes or phones).

Complete for \$11.65

Postage additional on all shipments.
Send no Money. **PAY THE POSTMAN.**
All Goods Shipped Parcel Post C. O. D.

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CRYSTAL RECTIFIER

(Patent Pending)
THE PERFECT SYNTHETIC CRYSTAL DETECTOR—SENSITIVE OVER ENTIRE SURFACE
No Hunting for "Spots." Loud and Clear. Endorsed by Thousands of Satisfied Users.

Sensitiveness Price 50c
Guaranteed Mounted

14 K Gold Supersensitive
RUSONITE CATWHISKER, Price 25c
Permanent. Will not Oxidize.

RUSONITE REFLEX CRYSTAL
Manufactured Expressly for Reflex Circuits. Will Stand Up Under Heavy Plate Voltage.

Guaranteed Price \$1.00
Mounted

Order from your dealer or direct from

RUSONITE PRODUCTS CORP.
15 Park Row New York, N. Y.

David Lloyd George's
Lotos Club Address
Broadcast by WJZ

DAVID LLOYD GEORGE, the eminent British statesman, was the guest of the Lotos Club, New York City, at a dinner on the evening of November 1. He made an informal, but interesting and witty, address which was broadcast by Station WJZ, New York City. Mr. Lloyd George said that he had come to the United States to make four speeches and that this was about the seventy-fifth.

"However," he said, "I got on fairly well with the aid of a little machine right there (indicating a microphone), an amplifier and the radio. I believe they are going to revolutionize public speaking not only in your country but in ours as well. I believe they will circumscribe the activities of politicians and give them a little more time to think what they are going to say.

"That is an advantage even to a politician. It is a very great change. I was surprised at the extent to which it had been developed in this country. I tried it in the old country, but without much of a success, but it has been a complete success here. I delivered a speech, I think, in Indianapolis. I got a telegram the following day from Texas from somebody that had been listening to me. I think that was adding a new terror to public life.

"I see my friend there who organized this. (E. S. Griffiths of Cleveland.) I was driving along the streets of Cleveland and I could hear a voice which seemed to be following me around wherever I went, and I found they were testing out the amplifiers for the speech I was to deliver. I do not know how many candidates you have, but if they are anything like ours, and amplify such campaign speeches as we have in England, I should say that when you hold meetings simultaneously and amplify each and every of these speeches simultaneously, it would add something to the perplexities of even a Presidential election.

"However, it has been a very interesting experience to me, a very wonderful experience. I go away with a new feeling of the immensity of this great country, the infinity of its resources, its unlimited possibilities, what it is capable of, not merely here on the soil of the United States, but of the influence which it must have upon the world and upon its effect on the ages that are to come."

**Late Concerts Announced
By WBZ**

PURSuing its policy of innovations in broadcasting and of service, station WBZ has arranged "late hour" programs. The purpose of these programs is to entertain the radio fans who are not at home in the earlier part of the evening, and to give fans located far away, particularly in the Middle West, a chance to listen to the Springfield, Mass., station.

These late programs will be given each week on Wednesdays and Fridays, beginning at 11:00 P. M. On those evenings, WBZ will be silent from 8:00 until 9:00 P. M.

GET THOSE DX STATIONS WITH THE Pat. Pend.

MICRO-COUPLER

**NEW! SENSITIVE!
NOT COMPLICATED!**

Gets those distant stations where others won't pick up a sound.
Use it in any circuit with best efficiency, in place of variocoupler.

Unmounted\$3.60 } Prepaid
Unit Panel\$7.75 } Insured

For sale by

The Amateur Radio Equipment Supply
1504 Federal St., Philadelphia, Penna., U. S. A.

DO YOU WANT PLANS FOR MAKING THE SLEEPER DUOTOL RECEIVER, USING THE SLEEPER TWIN.
—Two Variometers and the fixed Coupler?
SEND 10c for the June issue of RADIO AND MODEL ENGINEERING.

SLEEPER RADIO CORPORATION
88 W. Park Place New York City

Compare the Bel-Canto Adjustable Loud-Speaker with all other makes at any price. It will be a Bel-Canto. List, \$22.50.

BEL-CANTO MFG. CO.

Bensel-Bonis Co., Inc.
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YOU
Are Interested in
PRICES

Here They Are!

	Retails	Your Price
Electric Soldering Iron....	\$2.50	\$1.00
Reinartz Coils.....	1.50	.45
CRL Rheostat.....	1.10	.45
Adjustable Grid Leak and Condenser.....	1.50	.80

Cash with Order or C. O. D.

Write for our full list of Nationally advertised bargains.

North Shore Radio Works, Dept. 14
813 Mulford Street Evanston, Ill.

SEND NO MONEY **Guaranteed!** **39¢** **Money back if they do not satisfy after 5 DAYS TRIAL**

AMBASSADOR
LONG RANGE PHONES

TOWER MFG. CORP., 98 BROOKLINE AVE., BOSTON, MASS., DEPT. A

SEND no money! Order by postcard and pay postman on arrival. If they do not excel any other phones you ever used regardless of price, return them and your money will be refunded at once.

RADIO FANS

Tune in on station
WEAF (New York)

every Thursday at 8.50 P. M. and listen to a story or article selected from

HEARST'S INTERNATIONAL

This is one of the most popular weekly features "on the air"

FREE

Write for Free Copy of the Latest Radio Reprint E. It contains a complete story from Hearst's International Magazine. Address Radio Editor, Hearst's International Magazine, 119 West 40th Street, New York City.

RADIO CONSTRUCTOR plans make set building EASY!

Book of
7 Complete Plans 50c

Reinartz Tuner
One Tube Reflex
Honeycomb Receiver
Long Distance Receiver
Short Wave Regenerative
Two Stage R. F. Amplifier
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FULL SIZE TEMPLATES
list of parts, diagrams, and directions

Any One Plan 25c

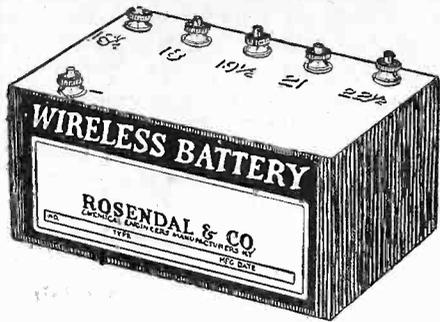
Beware of Imitations. Genuine published only by S. NEWMAN, and enclosed in glassine envelopes.

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THE RADIO CONSTRUCTOR

74 Day Street, New York

WHEN YOU BUY DIRECT



WHEN you buy a "B" Battery from Rosendal, you first of all get it Direct from the Manufacturer. That cuts the price. No middleman to get his profit. Then you get a fresh battery—one that hasn't been on the shelf for a few weeks or a month. That means longer life—for a battery deteriorates whether it is being used or not—and last but not least you get a battery that is guaranteed. Money back if you're not satisfied.

Send M. O. or order for C. O. D.

ROSENDAL & CO.

Chemical and Radio Engineers

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	Large	Med.	Small
22½ V. Plain	\$1.25	\$1.00	\$0.70
22½ V. Variable	1.38	1.13	0.75
45 V. Plain	2.50	1.75
45 V. Variable	2.75	2.00

Ask for Circular on other radio parts

The Chicago Radio Show

THE management of the Second Annual Chicago Radio Show, to be held in the Coliseum, Chicago, Ill., November 20 to 25, have announced that from all present indications this year's exhibition will far exceed previous years. Chicago, being situated approximately in the center of the United States, bids fair to be one of the large radio centers of the country. Its location is ideal for the western farmers, the southern planters, and the Canadian people, and coupled with this is the fact that it has two very powerful stations which are regularly heard throughout the entire United States. A more ideal place for an exhibition could hardly be selected, and the Coliseum, one of the largest exposition buildings in the Middle West, is well adapted to take care of the immense crowds that most surely will attend this year.

Many features of great interest to both the layman and the experienced amateur will be presented. All the notables of the present day who shine in the radio world will be present, including Dr. Lee De Forest, Major Armstrong, Professor Hazeltine, and a host of others.

Among the exhibitors who have booths at this show are: RADIO WORLD; The Bristol Co.; The Columbia Radio Corporation; Kellogg Switchboard & Supply Co.; Alden Mfg. Co.; Federal Tel. & Tel. Co.; Crosley Manufacturing Co.; Precision Equipment Co.; Dalton, Whittier & True and many others.

A Good Broadcasting Imitation

ERNIE GOLDEN AND HIS BAND is an act now traveling over the Keith circuit. One of the features is an amusing imitation of a broadcast program, as received by the listeners through a loud talker. The man with the big oboe sticks the business end of his horn through the front drop, creating the impression of the loud speaker, and gives a splendid impersonation of a broadcast program. The whistles, roars, static, and all the little sounds, even some of the studio noises are "broadcast." After making the announcements through the horn, and with all the noises thrown in, the band behind the curtain plays a number, creating the impression that it is coming through a loud speaker. It is most realistic.

ANNOUNCING—

WORLD'S SUPREME

"SERENADA"

ADJUSTABLE LOUD TALKER

PUT IT TO THE TEST

WHY ADJUSTABLE?

Because no two sets are alike—no two locations are alike and no two sets have the same power, what may be good for one set may be bad for another—What may blast one speaker may be all right for another. The speaker must be matched to the set that's why our "SERENADA" is ADJUSTABLE.

The loud talker has in it a unit that has taken years to construct along principles developed by the inventor. It gives a rich mellow tone—and a volume second to none. It is incorporated in a horn which shape and design that has been nationally accepted as the best. It is finished in a beautiful crystal finish.

Before you stock speakers, write us for our proposition. It will pay you to handle Serenada in your territory.

SPECIAL UNIT FOR PHONOGRAPH ATTACHMENT \$10.⁰⁰ List

RACON ELECTRIC CO., Inc.
537 BROADWAY NEW YORK, N. Y.



\$19⁵⁰
LIST

QUALITY OF A SUPERIORITY LONG SOUGHT FOR

Stands 22" High
19" Bell
6 Foot Cord

DEALERS!

We handle only well known and nationally advertised lines. On top of that we give the kind of service you expect.

And—Our discounts are RIGHT.

Drop us a post card for our 36-page catalog just off the press.

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CHICAGO, ILL.

MEET US AT THE RADIO SHOW

COLISEUM, CHICAGO, NOV. 20th TO 25th.

Due to increase in business activities, it has been found necessary to install two telephone trunk lines in the office of RADIO WORLD. These two trunk line numbers are Lackawanna 2063 and Lackawanna 6976. If one is busy, try the other.



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WEEKLY SPECIAL

THIS WEEK ONLY

12 Years at the Same Spot.

GENUINE GERMAN TELEFUNKEN PHONES	
2800 ohms.....	\$3.75
4000 ohms.....	6.25
Cockaday Coils.....	2.50
43 Plate Condensers.....	1.35
23 Plate Condensers.....	1.10

Farm Lighting Outfits at Bargain Prices.

SUNBEAM ELECTRIC CO.
71 Third Avenue, New York City

ONE

JACK DOES THE WORK OF THREE

Say "PRALL" That's All

ENJOY PERFECT RECEPTION ON DETECTOR, ONE-STEP OR TWO-STEPS WITH THE

PRALL TRIPLE-JACK

\$3.25 with Plug and Diagram

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Bargains in Radio Parts

Write for our Monthly Bulletin of Radio Parts, etc., at greatly reduced prices.

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SAVE ON RADIO

Stop paying exorbitant prices for radio apparatus. We can supply you any standard parts at greatly reduced prices.

- WD11 TUBES, SPECIAL PRICE.....\$5.75
- UV 201A AND C301 A TUBES.....\$5.75
- BRANDES SUPERIOR PHONES.....\$4.95
- 22½ VOLT B BATTERY.....\$1.30

You can save money on the latest and best in radio at our rock-bottom prices. Orders shipped same day received, C. O. D., under absolute money-back guarantee.

We pay postage on orders accompanied by check. Write today for our Price-slashing **FREE** bargain list. **STANDARD RADIO CO.**
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ERMCO-STAT

The one real rheostat of the age. The only compression rheostat on the market recognized by manufacturers of sets—who are using it as standard equipment.

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- 5 Amp., 30 ohms. (4 or more tubes)...\$2.25
- Type "B" for "B" Battery.....\$1.80

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Woolworth Building, New York City

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BURGESS ELECTRICAL SCHOOL

Yerke Burgess, Superintendent
Dept. 1, 748 E. 42nd Street, Chicago, Ill.
Canadian Branch: 201 E. Crawford St., Toronto

POTENTIOMETER DETECTOR INPUT

The above is an actual reproduction made from an unretouched photograph of "Bruno Engravings" applied to an ordinary Radio panel. Put on in a minute they stay on forever having neat, white lettering as shown. They will improve the appearance of your radio set 100%. Your dealer sells them at 20c, 25c, 35c and 50c per package.

If your dealer cannot supply you send his name with your order direct to us.

BRUNO RADIO 300 Water St.
CORP. New York

LEAD-IN TROUBLES GONE



Electrad Lead-In fits right under closed window. Can be bent into any shape to fit ledges. Covered with fire-proof insulating material which prevents grounding of circuits on wet window sills. Takes the place of ungainly porcelain tubes and holes in the window sash. Always presents a neat appearance. At your dealers, otherwise send purchase price and you will be supplied postpaid.

ELECTRAD, Inc.

428-K BROADWAY
NEW YORK

MEET US AT THE RADIO SHOW

COLISEUM, CHICAGO

November 20th to 25th

Booth 94

WITH

"PENBURTHY"
PHONES

"RELIANCE"
CONDENSERS

"DUO SPIRAL"
LOOPS

"STA-FIX"
CRYSTALS

"TINY TURN"
DIAL ADJUSTER

**RELIANCE
RADIO SALES CO.**

MFG. AGENTS

SALES OFFICES:

501 NORTH LA SALLE
CHICAGO, ILL.

RADIO FANS

Frank D. Pearne, Radio Authority, says—
"The only reliable way to determine if 'B' Batteries are still capable of service is by testing with a Voltmeter."

**YOU NEED THE INDIAN
HEAD**

VOLTMETER \$1.50
POSTAGE PREPAID

Tests "B" Batteries 0 to 50 Volts. Guaranteed accurate. Handsome nickle case. Indian Head Ammeter at same price.

If your dealer does not carry it send money order to us. Also name of your favorite dealer.

DEALERS AND JOBBERS

Send for this attractive proposition. This fast selling article gives you big profits.

E. O. JACKSON & COMPANY
Dept. "C" 500 So. State St. Chicago, Ill.

\$3 Brings you a Genuine UNDERWOOD TYPEWRITER

10 DAYS FREE TRIAL Your \$3.00 unconditionally returned if at end of 10 days you are not satisfied with this late model UNDERWOOD typewriter rebuilt by the famous Shipman Ward process.

GREAT PRICE SAVING Direct to you from the largest typewriter factory of its kind in the world by our money saving methods.

EASY MONTHLY PAYMENTS So small that notice it while you enjoy the use of this wonderful machine.

FREE BOOK OF FACTS Explaining Shipman Ward's wonderful system of rebuilding typewriters and also valuable information about the typewriter industry both instructive and entertaining.

Act Today!
Mail
Coupon



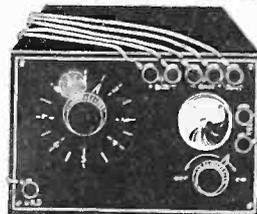
**5
Year
Guarantee**

Shipman Ward
Mfg. Company
3278 Shipman Building
Montrose & Ravenswood
Aves., Chicago

Please send me a copy of your free book of facts, explaining bargain offer.

Name.....
St. and No.....
City..... State.....

FREE RADIO VACUUM TUBE SET



Receives
100 Miles or More
Send name and address. Learn HOW you can get a Vacuum Tube Radio Set **ABSOLUTELY FREE** Write today for Free Radio Plan. **RELIABLE SALES CORP.**
434 Broadway, N.Y. City, D. 597

G. W. 5 Circuit Radio Plug

PATENT APPLIED FOR



PHONES
LOUD SPEAKER
SERIES
PARALLEL
SHUNT

Accommodates
Head Set and
Loud Speaker or
Two Head Sets —
permitting instant
choice of Five Circuits
without removing plug or
changing tips.

Price \$1.50

At Your Dealer or Direct From Us
MADE OF GENUINE BAKELITE

Jobbers Write for Quantity Discounts

Manufactured by

G. E. WALKER CO., Inc.

1926 CHESTNUT ST. ST. LOUIS, MO.

STA-RITE AUTO-RADIO BATTERIES SAVE YOU 60%

This large saving is made possible by coming direct to you, instead of going thru Jobbers, Distributors, Branch Houses, Dealers, Salesmen etc. Sta-Rite Batteries are guaranteed for 2 yrs. in writing and are made by one of the Largest Batteries Factories in the Country, and who have been building batteries for over 8 years.

TRY TO BEAT THESE PRICES

- AUTOMOBILE BATTERIES**
- 6 Volt, 11 Plate, Ford, Chev. Hup. Buick Cleveland, Durant \$11.50
 - 6 Volt, 13 Plate, Overland, Nash, Buick, Reo, Page Hudson, Studebaker, Essex, Willys etc. \$13.25
 - 12 Volt, 7 Plate, Maxwell, Dodge, Franklin, \$16.00
- OTHER SIZES ON REQUEST
- RADIO BATTERIES**
- 2 volt for W.D. 11 & W.D. 12 6 volt 60 amp. hr. \$7.90
 - tubes run 300 hours on 1 6 " 80 " " 8.85
 - charge..... \$4.00 6 " 100 " " 10.60
 - 4 volt for U. V. 199 \$7.55 6 " 120 " " 12.10
 - 6 " 150 " " 14.50



All batteries are fully guaranteed in writing and shipped subject to examination. Send 10 per cent. with order, balance on arrival. Deduct 5 per cent. if full cash accompanies order. Shipped same day order received. Act now.

STA-RITE BATTERY CO., Louisville, Ky.

HAVE YOU SEARCHED FOR

- Aeriola Sr. Style Tuner Unit 150-600 Meters
 - Hi-Power Transformer with Split Tapped Winding
 - Neutralizing & Tuned R. F. Cir. Transformers
 - Reinartz Coils "New Static reducing winding"
 - Resonance Wave Coils for Static elimination
 - Wavemeter & Wave Trap combined 150-600 meter
 - Edison (Signal Corps) Batteries & Elements
 - New "Handy" Chargers for any voltage battery
 - 30 Henry Power Amplifier Chokes with 4 values
 - Hi-Power Transformer with variable ratio
 - "B" Bat. Protectors—Prevent filament burn out
 - "B" Battery Voltmeters 0-50 Volts
 - Nathaniel Baldwin New Loud Speakers & Phones
 - 200-300-400-600-800 Ohm Potentiometers
 - 6-10-30-50 Ohm & "Universal" Rheostats
 - Rheostat & Potentiom. Resistance Windings
 - Bishop "Phantom Super" Tuner Units
 - Variable Condenser Plate Cleaner
 - Liquid Copper for Shielding panels
 - Quality Precision Var. Grid Leak 0-10 Meg's
 - Rosin Core Solder (Never use acid or paste)
 - Hi-Quality Mica Fixed Condensers, best made
 - Outfits of parts for any circuit you desire
- SEND FOR NEW DEALERS' LIST
QUALITY RADIO SHOP, Richmond, Ind.

WD-11 and WD-12

TUBES REPAIRED

- WD-11 or WD-12\$3.50
- C-300 or UV-200..... 2.75
- C-301 or UV-201..... 3.00
- C-302 or UV-202..... 3.50
- C-301A or UV-201A..... 3.50
- DV-6 or DV-6A..... 3.00
- C-299 or UV-199..... 3.50

All tubes guaranteed to work like new.

Mail Orders Given Prompt Attention
"24 Hour Service"

RADIO TUBE CORP.

70 Halsey Street Newark, N. J.
TUBES SENT PARCEL POST, C. O. D.

State College Receives Gift of Radio Plant

THROUGH the efforts of Dean Goddard, the New Mexico College of Agriculture and Mechanic Arts, State College, New Mexico, is the recipient of the gift of a new radio station. This will include the equipment for constructing a 100-watt transmitter and the building to house it. The station will be utilized for experimental purposes and amateur relay work under the Government license of 5XD. It will be separate and entirely distinct from the present radio house and its equipment, which will then be used solely for broadcasting service under its present call letters of KOB.

Plans for the new radio house call for a frame building with concrete floor. An operating room will occupy the east end of the building, while a club room for the College Radio Club will be at the west end. The center will contain a work shop and closets for the storage of miscellaneous equipment and batteries.

A site east of the Engineering Department's Forge Shop and south of the Commercial Building has been selected. This site gives plenty of open space about the building, where a new aerial of the T cage type can be easily erected. It is planned to support the new aerial from two 60' A frame towers, spaced 125' apart. A counterpoise system of 20 wires is planned. These will radiate from the roof of the building in all directions to steel post supports at their outer ends.

The transmitter planned is of the reversed feed back type, using two 50-watt radiotron tubes for oscillators. The plate current will be supplied by a kenotron rectifier and filter system. The materials for this have already been purchased, and the set will be constructed by the Radio Club members from designs furnished by Dean Goddard.

When completed, this new station will give the college radio experimental facilities which, combined with its present extensive equipment, will be unsurpassed by any college in the west. The work of the present station has gained a national reputation for the college in this branch of engineering. A number of students are now attending this institution because of the exceptional facilities offered along these lines.

With the wide spread of interest in and use of radio as a means of communication, it is anticipated that the industry will require a large number of electrical engineers especially trained in this branch.

Waiting Artists Hear Others Broadcast

THE reception room at Station WOC, Davenport, Iowa, has been equipped with a loud-speaking horn, so that the waiting artists and friends of those on the program may enjoy the selections being broadcast from the studio adjoining. The circuit is so arranged that the horn operates only when the door to the studio is closed, thus preventing any possible "feed-back" on the microphone.

Reliable
RADIO
Goods

Results Are Sure With RELIABLE Goods
And it's easy to get such goods—anything you want in radio equipment. Big, complete stock—everything guaranteed; quick service; right prices. And you're sure it's reliable when it comes from Andrae. Get our complete catalog—free.

Julius ANDRAE & Sons Co.
115 Michigan St., Milwaukee, Wis.

ANDRAE In Business Since 1860



SELECTO, Jr.

180° Variocoupler
Greatest
Selectivity
200-600 Meters

The Rotor is mounted without the use of any mass of dielectric resulting in minimum losses in selectivity and sharp tuning.

Requires only 2 1/2" of panel width, about one half as much as most couplers, and is ideal for the portable set.

Absolutely guaranteed, which means that if not perfectly satisfactory, your money will be returned without question.

Price \$3.00 net

If your dealer cannot supply you, remit P. O. or Express Money Order and sample will be sent prepaid.

J. E. TAYLOR

202 N. Calvert St. Baltimore, Md.

ACKERMAN RADIO LOUD SPEAKER

Complete, Ready for Immediate Use **\$9.50** Delivered to Any Part of the United States.



For the price of a headset you can have a loud speaker that actually speaks for itself. Not alone that, but a loud speaker superior to many of the much higher priced ones now on the market.

Standing 21" high, with 11" bell and made of heavy metal, eliminating vibration, together with its special loud speaking unit, this speaker reproduces voice and music far beyond expectations. Finished in plain black or brown, also special alligator grain in black and green or black and yellow.

If your local dealer is unable to supply you, send order direct to us and pay postman on delivery.

Sold on a money-back guarantee.

Ackerman Brothers Co., Inc.

301 W. 4th St. (Dept. "RW"), New York, N. Y.

For Clear and Loud Reception INSIST ON Defiance Mica Condensers



Whose Quality is Guaranteed. Made in the full capacity. Mail orders filled.

.001	25c	.0065	20c
.002	30c	.0025	20c
.005	.0025	made with 1/2, 1 and 2	
Meas. G. L.			25c



SHAMROCK CRYSTALS
Three in one, Galena, silicon and iron pyrites sold under a replacement guarantee. All tested. Price 50c each

SINGLE CRYSTALS
Best Tested and Guaranteed

Defiance GALENA	25c
Defiance SILICON	25c
Defiance IRON PYRITES	30c

All individually mounted and boxed. Special quotations on 1000 quantities.

All goods shipped C. O. D. or cash with order. Dealers write for discounts.

DEFIANCE LABORATORY
65-67 West Broadway New York City

IMPORTANT TO ADVERTISERS

RADIO WORLD'S big increase in circulation necessitates earlier and prompt closing. To get good position in first form, advertisements, copy and cuts must be in our hands Wednesday A. M., for issue on newsstands the following Wednesday—Dated the following Saturday. ALL changes in standing ads. must be received at this office on Wednesday for issue of following week. Last form closes each Thursday ten days in advance of date of publication.

RADIO WORLD

1493 BROADWAY

Telephones: Lackawanna 6976 and 2063

NEW YORK

PATENTS
 promptly procured. Trade
 Marks designed & registered
FREE INVENTION RE-
CORDING BLANK
 Phone Vanderbilt 7212

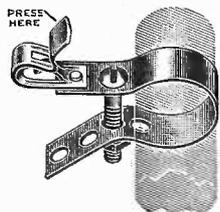
FREE MANUFACTURERS
PATENT CO., INC.
 BOOK 520 FIFTH AVE
 NEW YORK



For best reception
 you need
The Goodman

The niftiest short wave
 tuner on the market. Great
 for present broadcasts, local and DX. Used in all
 parts of the world. Certificates of merit from
 testing laboratories. Pamphlet on request.
 L. W. GOODMAN, Mfr., Drexel Hill, Pa.

IMPROVED GROUND CLAMP



Equipped
 with
 Fahnestock
 Patent
 Wire
 Connectors
 Easily
 Attached

No Soldering—For Radio Use Only

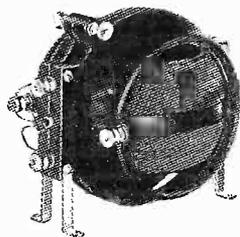
AT YOUR DEALERS
FAHNESTOCK ELEC. CO.
 Long Island City, N. Y.

It Costs You No More
 to Buy

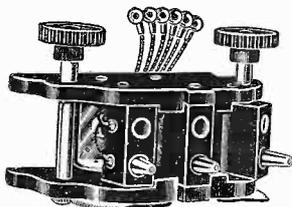
**Columbia Bakelite
 Moulded Apparatus**

The All-Circuit Variometer

The Columbia Variometer is fully bakel-
 ite moulded, green silk, pigtailed, and pro-
 vides for all circuits of today and tomor-
 row; the stators may be split. You can-
 not obtain a finer tuning variometer. Body
 capacity minimized. Regenerative, Ultra-
 Audion, Flewelling, Reinartz and Reflex
 Circuits all provided for. Diagrams with
 each instrument.



Type C109A, Price.....\$5.50



The Geared Coil Mounting you have
 been looking for. Moulded of genuine
 bakelite; geared 5 to 1 reduction; 6 inch
 silk leads. A True Columbia Product.

Type C401, Price.....\$5.00

A Few More Columbia Products:
 Bakelite Moulded Variocoupler, Type C120 \$6.00
 Bakelite 180° Variocoupler, Type C105..... 5.00
 Bakelite 3 Coil Geared Mounting, Type C401 5.00
 Bakelite 2 Coil Geared Mounting, Type C402 3.50
 Inside Coil Mount Geared and "Vernier"
 Type C403..... 6.00
 Coil Plug..... 50
 All Meter 180° Couplers..... 7.00
 and complete line of mounted coils.

All good dealers have Columbia Products.
 Insist on these.

Columbia Radio Corp.
 155 N. Union St. Chicago

WCAP Has Jazz Tube

THE national craze for jazz may affect
 vacuum tubes. This is the latest de-
 velopment in radio broadcasting news. When
 a radio transmitting tube shows unmistak-
 able signs of becoming converted to jazz
 music and develops a blue light which dances
 in perfect cadence and absolute abandon to
 the "blue" notes of a moaning saxophone,
 what chance has the advocate of grand
 opera broadcasting, radio engineers and
 operators ask?

Such is the situation at the Chesapeake &
 Potomac Telephone Broadcasting Station
 WCAP in Washington, D. C., every time it
 broadcasts the music of Le Paradis Or-
 chestra or the Metropolitan Theatre. On
 all other occasions the tube maintains a
 solemn dignity befitting the occasion, and
 performs in a highly efficient manner, it is
 said.

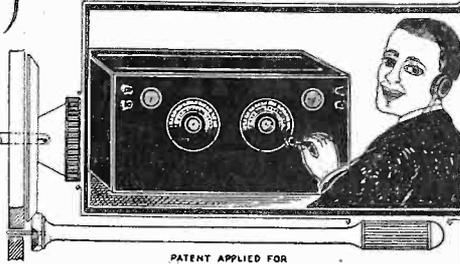
The engineers who carefully avoid dis-
 cussing the ethics of the equipment, rise to
 the defense of the tube to say that the
 blue light is probably caused by a small
 amount of gas which is present in some
 quantity in all vacuum tubes. When the
 tube is working, the gas becomes ionized,
 and if present in sufficient quantity, gives
 off a bluish light. The vividness of this
 light, it is explained, is increased with the
 modulation and with the changes in volume
 of the music. When a heavy chord is struck,
 the light visibly brightens, with the result
 that during a jazz piece the blue light keeps
 absolute time with the music, bringing out
 the beats, thus emphasizing the syncopa-
 tion.

"That's as it should be," say the lovers of
 jazz, "even a radio tube gets a thrill out
 of popular music." The students of Wag-
 ner, Beethoven and Liszt, however, scoff
 at the idea, that "jazz gives the tube the
 blues."

**Station WDT Closed
 Temporarily**

STATION WDT, New York City,
 closed on November 9 at midnight
 Miss Vaughn De Leath, managing direc-
 tor, informs Radio World that WDT will
 open again in a few weeks on a larger
 scale, which will include more hours of
 broadcasting, better programs and im-
 provements in the station itself. WDT
 has been operating on 405 meters and 500
 watts.

**HUNT'S UNIVERSAL HAIR-LINE
 RADIO TUNING DEVICE**



**OVERCOMES
 BODY CAPACITY**

Gives micrometric adjustment outside
 the field of inductivity.

Tested and approved by amateurs and
 experts. Enables you to tune distant
 stations easier and more clearly. Simple
 as A B C. Installed from outside, no
 dismantling of your set necessary.
 Audibility made more natural or less
 distorted by the fine adjustments
 obtained. One Hunt's Device handles
 all dials on set or several sets. Costs
 only one dollar on guarantee of money
 refunded if not satisfied. Ask your
 dealer or order direct from Hunt Co.,
 486 Shrine Bldg., Memphis, Tenn.

**Federal Standard
 Radio Products**

Standard of the Radio World, 130 separate
 units, each fully Guaranteed.
 Write for Catalog.
Federal Telephone and Telegraph Co.,
 BUFFALO, N. Y.



ON APPROVAL FOR 30¢
ZOBEL-STEIN LABORATORIES
 322 9TH ST. BROOKLYN, N.Y. SOUTH 2650

**WE REPAIR
 RADIO TUBES**

WD-11.....	\$3.50	UV-198.....	\$3.50
WD-12.....	3.50	C-299.....	3.50
UV-200.....	2.75	UV-201A.....	3.50
UV-201.....	3.00	C-301A.....	3.50
C-300.....	2.75	UV-202.....	4.00
C-301.....	3.00	C-302.....	4.00
		DV-6A.....	\$3.50

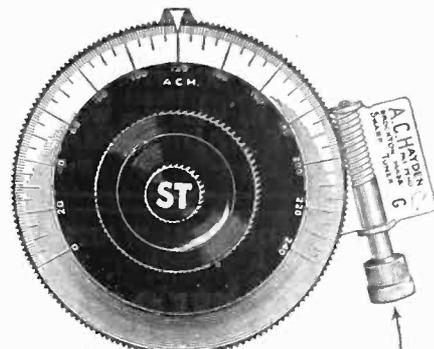
Mail orders solicited and
 promptly attended to.
 Dealers and agents write for
 special discounts.

H. & H. RADIO CO.

P. O. Box 22-B
 Clinton-Hill Station Newark, N. J.

In resetting the advertisement of the H
 & H. Radio Company, P. O. Box 22, New-
 ark, N. J., the compositor made a price in-
 correctly quoting \$2.50 for repairing the
 201A type of tube, instead of the correct
 price, which is \$3.50. This correction is made
 in justice to the H. & H. Radio Co.

**USE A C H SHARP
 TUNER DIALS**



Why the A.C.H. is different

3 in. DIAL (156-T0-1)
 4 in. DIAL (215-T0-1)

Rough tuning with dial or one thousandth of an
 inch in either direction.

MONEY BACK GUARANTEE

Price ACH 3" Dial Complete.....\$2.50
 Price ACH 4" Dial Complete.....\$5.00
 Regular fitting 5-16" hole, 1/4" and 3-16".
 Bushings, 5c. each extra. 10c. for all.

"Enclosed find draft for \$7.80. Send 3 more A. C. H.
 3" dials."
 W. A. Clarke, Toledo, Ohio.

"Can truthfully say that it is the best thing of its
 kind we have ever seen. Send another A. C. H. Dial
 C. O. D."
 D. F. Morantville, Beebe Plains, Vt.

To retain your good will you must be satisfied or money
 back.

The ACH will improve any set.
 Send for circular No. 3 on RV Loud Talker and Detector
 Set. A truly wonderful set.
 All ready for you to put together.

A. C. HAYDEN RADIO & RESEARCH CO.
 Brockton, Mass., U. S. A.
 Mail Orders sent prepaid in U. S. A.

"QUALITY" RADIO PARTS SPELL GUARANTEED RESULTS

YOUR GUARANTEE

NO SURPLUS STOCK OR FACTORY SECONDS, Absolutely GUARANTEED FIRST SELECT grade stock. Every order, may it be ten cents or ten thousand dollars, carries our own guarantee of immediate replacement of any defective part or CASH refund if not found exact as represented. We are not a new Company, but an old Company, Established in 1910, RENOWNED FOR QUALITY MERCHANDISE AND SERVICE.

HEADPHONES	
SELCO, JR., \$7.50 Value, 2200 ohms—	
Price, one	\$4.25
For six	19.50
GENUINE MANHATTAN, \$6.50 Value, 2000 ohms—	
Price, one	\$3.85
For six	17.75
GENUINE MANHATTAN, \$8.00 Value, 3000 ohms—	
Price, one	\$4.30
For six	20.10
ORIGINAL BALDWIN, Salt Lake City, Utah, Make, Type C, Single Unit, 1500 ohms, \$6.00 Value—	
Price, one	\$5.00
For six	22.50
ORIGINAL BALDWIN HEADSETS, \$12.00 Value—	
Price, one	\$9.75
For six	46.80
All Phones complete with Standard Silk Phone Cords.	

QUALITY VARIOMETERS AND VARIOCOUPLERS	
Range up to 600 meters. Green silk wound.	
Price, one	\$1.39
For six	6.00

MOULDED VARIOMETERS AND VARIOCOUPLERS	
Price, one	\$4.15
For six	22.25

GENUINE COCKADAY 4-CIRCUIT TUNER	
Wound in white or Green Cotton Covered wire. 750 meter range.	
Price, one	\$1.95
For six	10.00

QUALITY VARIABLE CONDENSERS	
Precision capacity.	
Plain	Vernier complete with Knob and Dials
3-plate... \$0.77	11-plate... \$2.35
5-plate... .95	23-plate... 2.65
11-plate... 1.20	43-plate... 3.00
17-plate... 1.30	
23-plate... 1.40	
43-plate... 1.70	

ERLA REFLEX TRANSFORMERS	
Radio Frequency No. 1 and No. 2	\$4.65
ERLA AUDIO FREQUENCY TRANSFORMERS	
3 to 1 Ratio	\$4.65
6 to 1 Ratio	4.65

ERLA CRYSTAL DETECTOR (FIXED)	
Price each	\$0.90

COMPLETE LINE OF ERLA PRODUCTS	
NATIONAL TRANSFORMERS	
Audio—3 to 1 Ratio	\$2.65
Audio—5 to 1 Ratio	2.65
Radio Frequency	3.50

BINDING POSTS	
Molded type—per doz.	\$0.75
All metal type—per doz.	.65
Phone tip type—per doz.	.50
SWITCH CONTACTS	
Double Nutted—per doz.	\$0.15
SWITCH STOPS	
Per doz.	\$0.15
SOLDERING LUGS	
Per doz.	\$0.06
SWITCH LEVERS	
1" Radius	\$0.15
1 1/4" Radius	.15
FADA TYPE—1" - 1 1/2", Adjust.	.25

SOLID MAHOGANY WOOD VARIOMETERS	
Wound up to 600 meters	\$2.00
RHEOSTATS	
6 ohm, each	\$0.40
20 ohm, each	.45
30 ohm, each	.50
POTENTIOMETERS	
200 ohms, each	\$0.65
400 ohms, each	.75

TUBE SOCKETS	
Molded of Genuine Brown Bakelite for Panel mounting, each	\$0.35
All Metal, Panel or Table mounting, each	.40
TWO GANG All Metal Sockets, each	.90
THREE GANG All Metal Sockets, each	1.05

METAL TUBE WITH COMPOSITION BASE, Radio Corporation design, each	
U. V. 199 Sockets, Bakelite, each	.45

ALL METAL TUBE SOCKETS		
Single		\$0.45
Double		.90
Three Gang		1.05
ADAPTERS		
W. D. II, each		\$0.45
U. V. 199, each		.45

HONEYCOMB COILS		
Turns	Mounted	Unmounted
25	\$0.75	\$0.35
35	.85	.40
50	.95	.40
75	.95	.50
100	.95	.50
150	1.00	.55
200	1.10	.60
250	1.20	.65
300	1.25	.70
400	1.40	.85
500	1.55	1.10
600	1.75	1.20
750	2.00	1.40
1000	2.10	1.60
1250	2.30	1.80
1500		

INDUCTANCE COIL MOUNTINGS	
Two Coil, each	2.50
Three Coil, each	3.25
COIL MOUNTING PLUGS	
Each	\$0.40

FADA TYPE BAKELITE DIALS	
All with Metal Insert Bushings	
2 inch for 3/16" Shaft, each	\$0.30
2 inch for 1/4" Shaft, each	.30
3 inch for 3/16" Shaft, each	.30
3 inch for 1/4" Shaft, each	.30
Finished in Light Brown, each	.35
QUALITY JACKS	
Open Circuit, each	\$0.25
Two Circuit, each	.35

GRID CONDENSERS	
Well insulated, Paper covered, .00025 mfd., each	\$0.07
HIGHEST GRADE MICA INSULATED, each	
VARIABLE GRIDLEAKS (Pen-cil Type) with nickel-plated Tops, each	.25
WALNUT VARIABLE GRID-LEAKS, each	.90
MARCO VARIABLE GRID-LEAKS, each	1.25
PHONE CORD PLUGS	
For Single Phones, each	\$0.30
For Double Phones, each	.60
WIRE SOLDER, per coil	.10
SOLDERING PAST, per can	.15
ROSIN CORE SOLDER, per coil	.15
AUTOMATIC BLOW TORCH, each	.50
ELECTRIC SOLDERING IRON, Genuine Microme Element, 2 yr. guarantee, each	
	2.25
SOLDERALL, Combination Solder and Soldering Paste, per tube	
	.25
FRICITION TAPE, 1/4 lb	.15
RUBBER SPAGHETTI TUBING, per yd	.10
LIGHTNING ARRESTERS—Under-writers' Approved Type, each	
APPROVED GROUND CLAMPS, each	.15
ANTENNA WIRE—7 Strand No. 22—90% Lake Superior Copper, per 100 ft. Coil	
	.89
ANTENNA WIRE—7 Strand Steel, like others offer for copper, per 100 ft. Coil	
	.45
HOOKUP WIRE—No. 14 Tinned, per 25 ft. Coil	
	.15
ANTENNA INSULATORS	
Molded Type, U. S. Approved, each	.15
BATTERIES	
1 1/2 volt C Grid Battery, each	\$0.30
2 1/2 volt Small B Tapped Battery, each	1.00
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45 volt Combination Tapped, each	3.50
VACUUM TUBES	
Detector, U. V. 200	\$4.50
Amplifier, U. V. 201A	6.00
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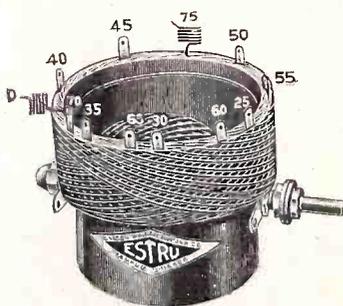
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