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Radio Journal

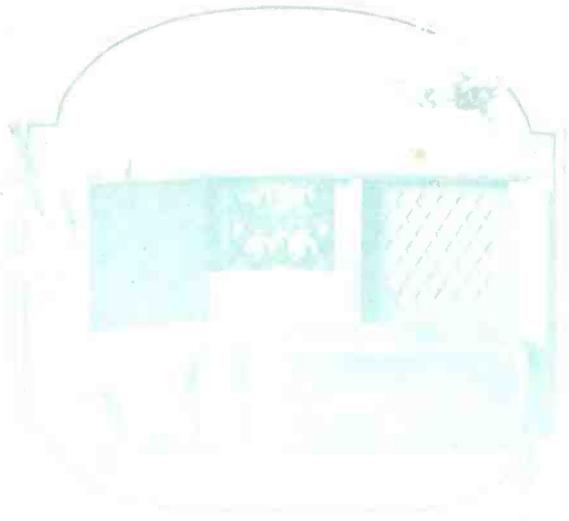
Los Angeles, California



What's a Hootnanny? The New Synchronyne. An
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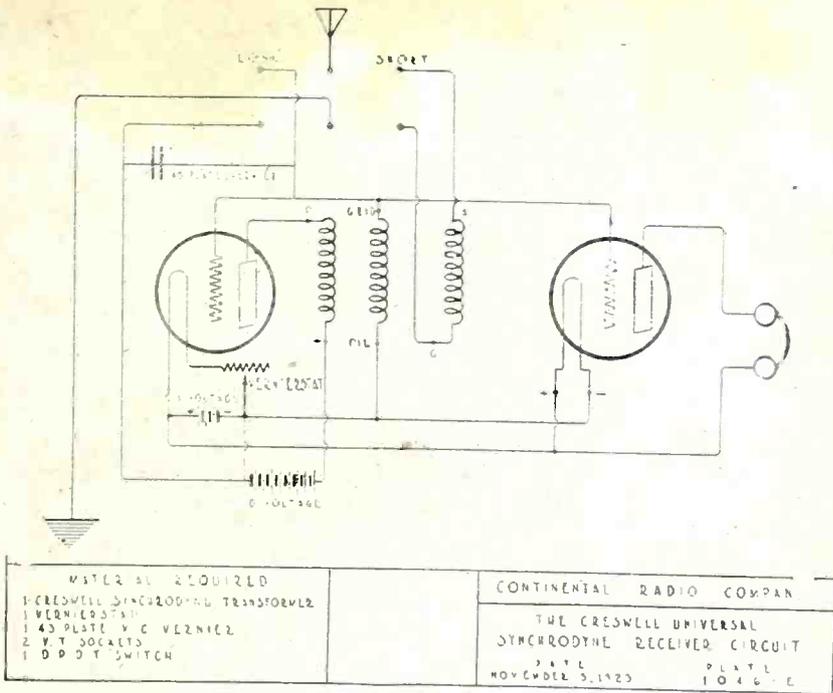
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For the Broadcast Listener as well as the Amateur. Get the Long Distance Station through local interference.

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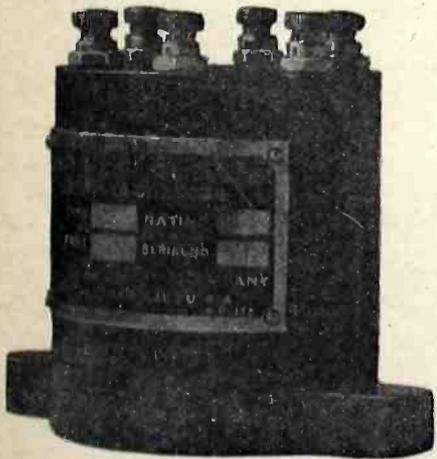
Los Angeles, Cal., Nov. 15, 1923

Am in receipt of your CRESWELL UNIVERSAL SYNCHRODYNE TRANSFORMER and your VERNIERSTAT, and after hooking the set up the first station I heard was WOC. Since that time I have had the pleasure to hear 46 broadcast stations and 356 amateur in the two weeks I have had it. The one pleasure I get out of the set is to copy long distant stations through local interference.

Some of the long distant stations include Quebec, Schenectady, Wanamaker, N. Y. KSD? WDAP, WBAP Hastings, Neb. If this record keeps up I expect to "GET THE WORLD BY THE EARS" this winter. Thanking you for the privilege of the use of this circuit, and wishing you the best of success. I am,

Very truly yours, CHAS. E. RICHARDSON.

Here is the Article that will Simplify your Set



Pat. Pending.
Transformer,Price \$8.50

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A perfect Vernier that has no microphonic noises.



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

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 Exposition**

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LOS ANGELES, CALIFORNIA

February 5th to 10th, incl., 1924

Under the Auspices of

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**RADIO DIVISION, MUSIC TRADES ASSOCIATION
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Volume Three

DECEMBER, 1923

Number Five

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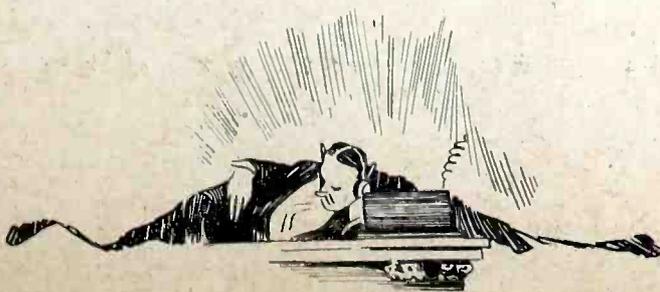
Because of the fact that intense interest in radio is sweeping the entire country, causing a flood of inventive and research work, much of which will be duplicated, it is necessary to state that in the event of expressions of opinion and various statements from contributors and correspondents appearing in Radio Journal from month to month becoming the subject of litigation in courts, or of controversy in scientific circles, and which may involve questions of priority of invention and a comparison of merit of apparatus, the owners and publishers of Radio Journal positively and unequivocally disclaim any responsibility for any such expressions of opinion or partisan statements.

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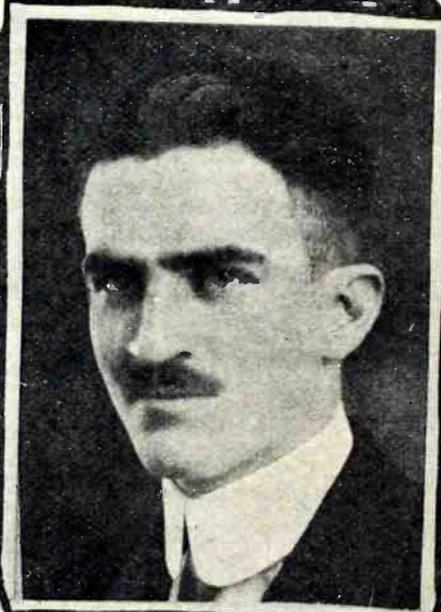
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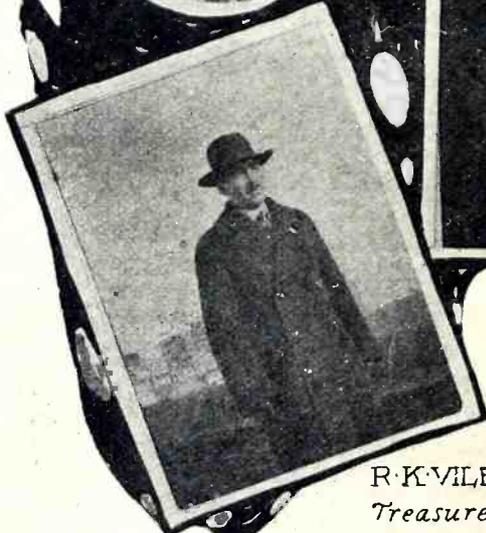
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*New and Retiring officers Twin City
Radio Club ~ Minneapolis, Minn.*

Editorial Comment

Going After Congress

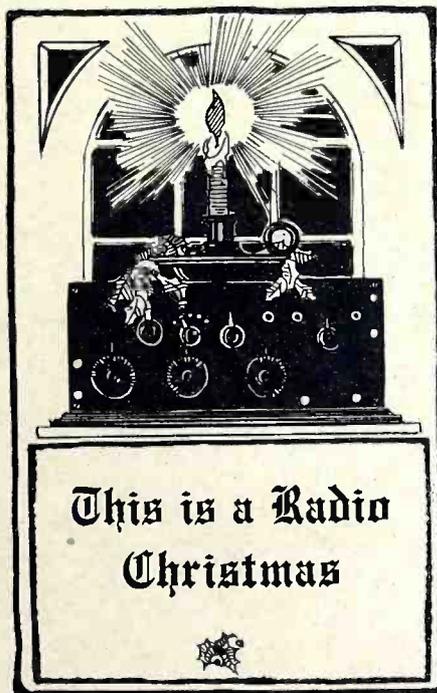
The San Diego Radio Club took a step which, in one way or another, should be taken by every radio organization in these United States. It adopted a resolution calling upon members of Congress and the Senate to give their earnest attention to needed radio legislation, to the end that suitable laws can be enacted at once. It is not our purpose to say that the form of legislation advocated by the San Diego club is the right form—that is something which deserves considerable thought and a due admixture of the desires of every section and every grade of radio enthusiast, from B. C. L. to amateur, together with a modicum of equity. But what is needed at this particular moment is some method of convincing Congress that there is a real demand for legislation; in a word that there are several million Americans who want legislation and need legislation; and that if more months pass without legislation the situation may become more acute. The Department of Commerce is at present exercising authority under an antiquated statute and is doing a very good job. But it cannot solve more than the most obvious problems. The failure of radio legislation to receive real congressional attention during the last session was due to the fact that few congressmen considered it as affecting any but a small portion of the nation's voters. That is every radio man's job. Wake 'em up. Resolute all over the place. Formulate definite opinions, get them on paper, and fire them to congressmen, senators, anybody who can help stir up congressional thought. Make Congress think the world is about its ears demanding radio laws—and radio laws we will get. Don't be satisfied with kicking. Think what you want; then go after it.

Honors for Scientist

Honors of more than usual interest have recently been bestowed upon a California scientist, Dr. Robert A. Millikan of the California Institute of Technology. He was awarded the 1923 Nobel prize for physics and the Hughes gold medal by the Royal Society of London for the determination of the electronic charge and other physical constants. Dr. Millikan's work, so often referred to in this Journal, is so powerful, potentially, that it is difficult to predict the far reaching results which will ensue. But his genius, alone, in the work he is doing, is worthy of every honor so far bestowed and indicative of the truly scientific spirit which burns within him.

The Warsaw Experiment

The Radio Corporation of America, on November 1, announced the automatic circuit transmission of the electromagnetic waves between its New York office and Warsaw, Poland. It appears that a total distance was traveled of about 4,500,000 miles in twenty-five seconds of time, or about 180,000 miles per second. As the velocity of light, as calculated by Dr. Simon Newcomb and Prof. A. A. Michelson, is 186,330 miles per second of time and since there may be some error in this calculation, the establishment of a circuit transmission is of greatest scientific importance. Just what the relationship is between the nature and velocity of the electromagnetic and the the nature and velocity of light is, at present, somewhat uncertain. A further verification of the velocity of the electromagnetic is very desirable since information so derived, from a greater length of time and greater distance of propagation traveled, may enable us to identify the medium of this propagation as of electronic or protonic substance and therefrom determine its relative organic arrangement, nature and size. As Dr. Newcomb's and Prof. Michelson's calculations were ingeniously derived from a revolving mirror positioned at Fort Myer, Va., reflecting light to a stationary mirror, set up at the Washington monument, $2\frac{1}{4}$ miles away, it may well be that mechanical variations of speeds, or accuracy of distance or of time or anyone or all of these, that such variations would induce a corresponding variation of 6,330 miles, the difference between 180,000 miles of electromagnetic and 186,330 miles of light propagation. Or it may well be that Newcomb and Michelson are nearer right than is the Radio Corporation of America. At any rate, however, it is a news item of highest scientific importance to our readers.



He Conquered Obstacles

The life of Dr. Steinmetz reminds all of us that man rises or falls in direct proportion to the manner in which he faces and conquers each condition as it arises, or permits conditions to dominate. The great scientist, who recently passed on, traversed paths and clambered over obstacles which would have gotten the best of many of us had we been put to the same test.

Coming to America as one of the poorest of the poor, facing strange people in a strange land with a strange tongue, he forced events to his purpose and rose to heights of achievement for the good of mankind which stand head and shoulders above the common level.

The New Creswell Synchrondyne

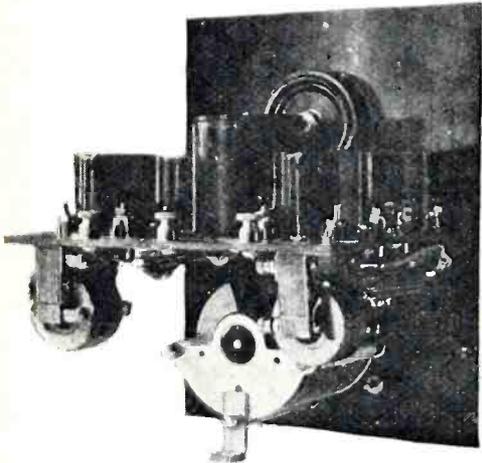
By S. R. FLORENCE, Chief Signal Engineer, Pacific Electric Railway

Nope! There is nothing new under the sun. But once in a blue moon (let us know by wireless if you ever see a blue moon) something trots into our collection of old novelties and nick-nacks which is different. Peculiar thing is that the different things which make radio readers sit up and squint closely, usually trot into Radio Journal's pages first. Think it over anyhow, ladies and gentlemen,—allow us to present something quite out of the ordinary and blamed efficient.

LONG distant radio broadcast reception is becoming more difficult each day by the increased power used by local broadcast stations and the ever increasing number of regenerative receivers. Therefore,

It has been my privilege to become acquainted with a new circuit that uses one control, tunes sharp, and gets the long distant receiver through the interference caused by local broadcasting. This circuit is the product of a well known local radio engineer, and although I will not go into an extended scientific detail, in this article, of the workings of this circuit, I will in a way attempt to show the possibilities of this circuit, and the simple details of the construction of a receiver that any experimenter may be able to build.

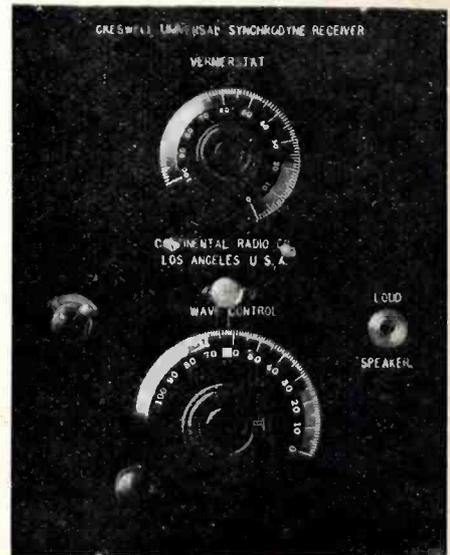
and the like, but the longer the name the more difficult to operate and construct, and of course more expensive to build. This circuit was developed to permanently reproduce the effect of the neighbor's receiver in the experimenter's set, giving him full control of the "phantom neighbor receiver" and amplifying the signals he is trying to receive. All this is accomplished with the use of only one control, allowing the rectifier or detector



BACK OF PANEL SHOWING MOUNTING

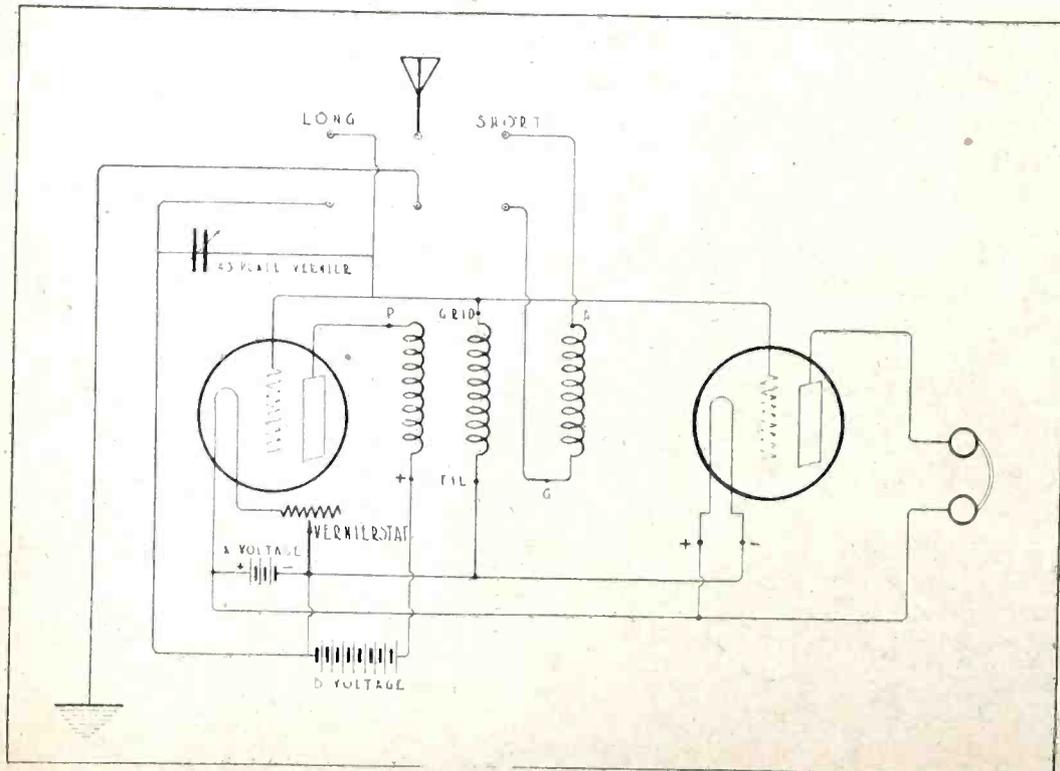
The basic principle involved may be simply explained. The experimenter knows that when a regenerative set is receiving at zero beat in his neighborhood, incoming signals on his receiver are hetrodyned, or in other words, the neighbor receiver is working under pressure and is developing energy. This energy is re-radiated, and the experimenter's receiver is affected by an increase of signals.

This in a simple way is the explanation of the term hetrodyne. A great number of circuits and receivers have been designed and built under the term super-hetrodyne, super-auto-hetrodyne,



TWO DIALS AGAIN EMPHASIZE SIMPLICITY OF CONTROL.

the citizen radio enthusiast is looking for some new style of receiver that will tune more sharply, get the long distant station easily, not be difficult to operate and still be obtained at moderate expense.

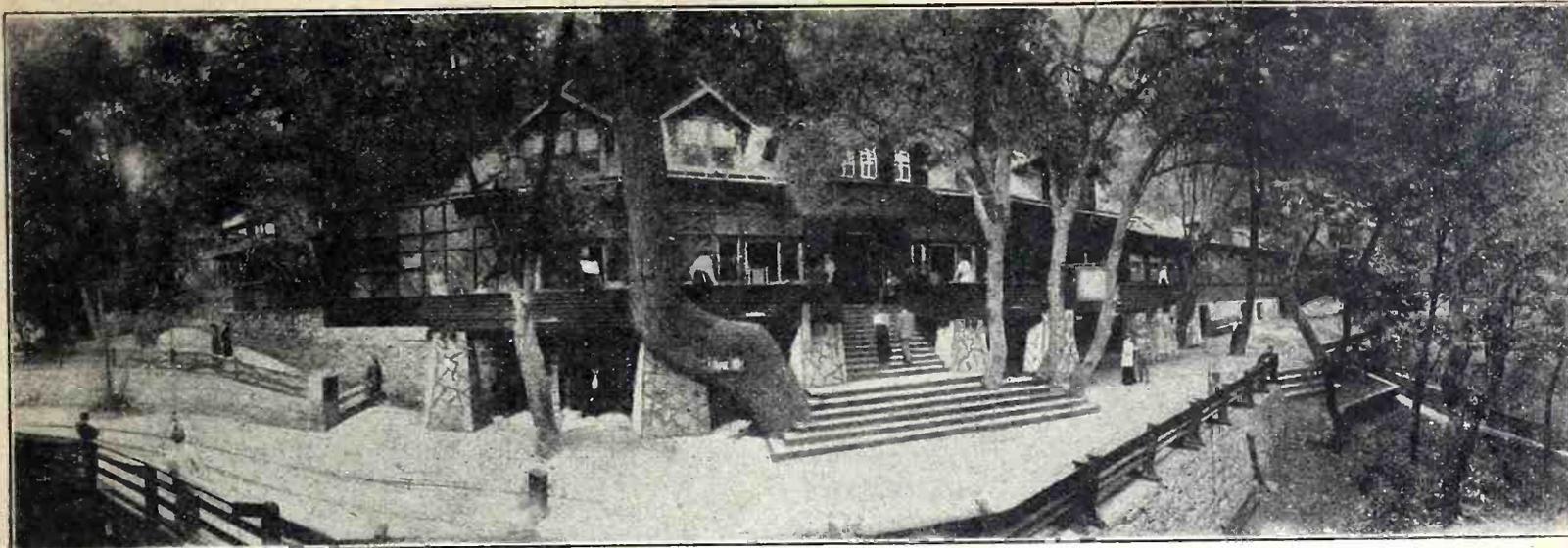


MATERIAL REQUIRED FOR THE CONSTRUCTION OF THIS CRESWELL UNIVERSAL SYNCHRODYNE RECEIVER CIRCUIT FOLLOWS: 1 CRESWELL SYNCHRODYNE TRANSFORMER, 1 VERNIERSTAT, 1 43-PLATE VARIABLE CONDENSER VERNIER, 2 V. T. SOCKETS, 1 DOUBLE POINT DOUBLE THROW SWITCH. THE READER SHOULD COMPARE THIS WITH THE MANY FORMS OF NEUTRODYNE, TO GET A GOOD IDEA OF ITS RELATIVE SIMPLICITY.

end of the set to remain untuned, but still operate in the circuit.

It has been possible with this circuit, in my own home, to receive stations at a distance of eighteen hundred and fifty miles while KHJ, The Times, Los Angeles, was broadcasting on three hundred and ninety-five meters, and KFI Radio Central Station broadcasting on four hundred and sixty-nine meters. KHJ is three miles and KFI is four and a quarter miles from my home. It is not unusual for me to start at the maximum setting of the dial, slowly turning toward the minimum setting and hear KGW, WOC, WRAP, WFAA, KFI, KPO, KHJ, KJS, KLX, KRE, all in turn. This can be all done in an evening and on only one control dial, necessary to this new circuit, and with an antenna of one wire, thirty-five feet high and seventy-five feet long.

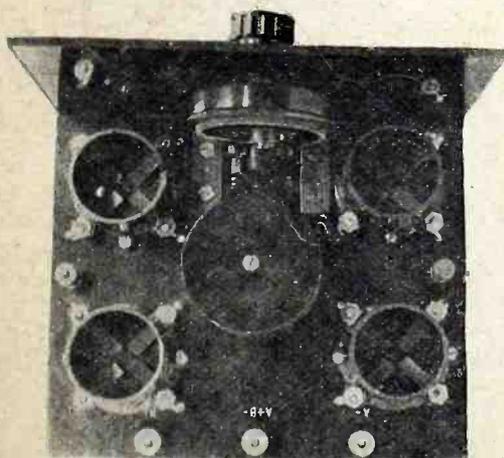
In a recent test of this set, made at The Tavern on Mt. Lowe, with four radio men present, we brought in the following, both broadcast and amateur:



THIS DELIGHTFUL BEANERY IS KNOWN AS THE TAVERN. FOUR OF US SAT UP MOST OF THE NIGHT IN THIS LAYOUT AND PICKED UP BROADCAST FROM WOO TO KPO, AND HAM DX FROM EVERY DISTRICT. OH YES, WE PICKED UP A DANDY STEAK AND A FINE BREAKFAST AND GOBS OF SCENERY, AND A GOOD BED. THE TAVERN IS AT THE TOP OF THE WORLD FAMOUS MT. LOWE ELECTRIC RAILWAY, OPERATED BY THE PACIFIC ELECTRIC FROM LOS ANGELES, AND IS TWO HOURS RIDE FROM THAT METROPOLIS; ALSO IT IS 5000 FEET UP. O. A. SMITH, WHO IS BOSS OF THE PASSENGER END OF THE P. E. IS SOME HOST—AND A REGULAR RADIO FAN AS WELL.

WHAB, KLX, KDM, KSD, KPO, WTAM, KLZ, WBAP, KGW, 3-CAT, 9DFH, 4CN, 7GO, 5CG, 5-AIU, 6AWS, 9BJI, 9CO, 8BDA, 3-AE, 9AEE, 5NN, 1YA, 2AC, 5TJ, 2EG, 7XL, 9CN, 5NN, 6APU, ICN, 9CCZ, 5UC, 1AW, 5UK, 8PD, and many others.

I first became acquainted with Frank Creswell, the inventor of this circuit, about a year and a half ago, at which time he had just completed his modulated receiver. This receiver uses the inverse principle of the transmitter. The modulator tube modulates or varies the amount of current flowing to the oscillator in a transmitting set. Using this principle inversely Creswell



TOP VIEW SHOWING ARRANGEMENT OF PARTS.

designed a circuit that was absolutely distortionless and at the same time developed a receiver that was a wonderful long distance receiver. In the winter months I have easily brought in on the loud speaker with this receiver, KOP, the broadcasting station of the police department in Detroit, Michigan, and many others of the same and greater distances from Los Angeles.

This new circuit, the Creswell Synchronyne Circuit has given better results during the summer months than Creswell's former modulated circuit during the winter months. This new synchronyne circuit, therefore, I believe, is far superior to any other circuit in long distance reception as in the summer time in Southern California, static practically prohibits real long distance receiving on any circuit known at the present time, using an aerial and ground. Mr. Creswell is an engineer of considerable reputation, having been directly connected with the radio business in an engineering capacity since 1908, and having that wonderful chance to get the practical knowledge of radio telephony and telegraphy, which comes with one who grows up with the business. As early as 1912 he attempted to put in operation a radio broadcast station in Los Angeles. Having failed to interest the public and press in his ideas of the possibilities of radio broadcast, he turned his skill to long distant transmission and reception, and in 1913 established the first one hundred mile leg of 200 meter amateur transmission and reception, increasing this until in 1916 he successfully copied at 2 pm. an amateur transmitting station in New York, at his laboratory in Los Angeles. This record will go down in history as the first milestone of organized amateur radio. Mr. Creswell during the war, served in the signal corps of the U. S. A., as Commander Depot Co. L. Later he was loaned by the government to the federal board of vocational education as supervisor of instruction in radio telephony and telegraphy in the city high schools of Los Angeles. It was during this period that Mr. Creswell first conceived the principles of the new Synchronyne circuit. Using the Synchronyne re-

ceiver on his last test, during the recent total eclipse of the sun in September, 1923, at Ensenada, Mexico, the audibility of KHJ increased from 32 to 780 audibilities, while the earth currents dropped from 48 micro-amperes to 2 micro-amperes at totality, increasing again rapidly as the sun came out. While a moderate increase in audibility was noted in other circuits during the period of totality, no records that I have been able to find show such a tremendous increase in audibility as experienced in the Creswell circuit. This would indicate that, when the electro-magnetic shield, due to the intense discharge of the electrons from the sun, is removed, which condition



HERE IS THE FAMOUS MT. LOWE INCLINE RAILWAY, THE ONLY ONE OF ITS KIND IN AMERICA—AND WE BELIEVE IT. WHEN WE RODE UP THIS THING, 1700 FEET OF WHICH IS STRAIGHT UP LIKE AN ELEVATOR WITHOUT THREE SIDES, WE FELT THAT LIFE WOULD LOOK ROSY ONCE MORE WERE WE ON TERRA FIRMA OR TERRA COTTA OR SOMETHING. IT IS SO SCENIC IT MAKES ONE FORGET RADIO FOR A BIT. THE PACIFIC ELECTRIC BUILT THE THING,—IT TOOK A LOTTA NERVE.

partly exists at night time, the Creswell circuit immediately steps up in performance, indicating a high degree of efficiency.

The drawing of the Creswell Synchronyne circuit, Figure One, is self
(Continued on Page 257)

Coming--The Radio Exposition

THE Second Annual Radio and Electrical Exposition, February 5 to 10 inclusive, to be held in the ballroom of the new Biltmore Hotel, Los Angeles, promises to be the biggest radio event staged west of New York city. The exposition is staged under the auspices of the Radio Trades Association of Southern California. Mr. J. C. Johnson is on the ground in charge of the big exposition on behalf of the American Radio Exposition Company, which stages two shows each year, one in Los Angeles for the west, and one in New York for the east.

Plans for the exposition were formally launched at a big banquet at which representatives of the radio trades were present from all over the Southwest. Mr. Johnson was the guest of honor and outlined plans for the exposition and gave a description of the splendors promised for the event.

The securing of the ballroom of the Biltmore for the show is an achievement in itself, as it assures the show of a background which is hard to equal in its atmosphere of dignity and beauty. In this surrounding radio will come into its own.

The exposition is to have several unique features. All demonstrations of apparatus are barred. There will be no blaring discord of competing loud speakers. There will be nothing, in a word, to detract from the really artistic side of radio. Entertainment programs will be a big feature of the six day event.

More than a third of the floor and balcony space has already been reserved and by the first of the year it is expected that no more space will be available.

The show is to be an annual event and is designed, primarily, to afford the industry an opportunity to present and display radio equipment of quality and reliable manufacture to the public under favorable conditions and sur-

roundings. Manufacturers, jobbers and dealers will be represented.

The banquet at which the exposition plans were announced was one of the largest gatherings of radio men ever assembled in Southern California. President Dennis of the Association presided. Other speakers, besides Mr. Johnson of the exposition, were: Se-



J. C. JOHNSON, GENERAL MANAGER OF THE BIG RADIO EXPOSITION TO BE STAGED IN LOS ANGELES IN FEBRUARY.

cretary Farquharson, H. C. Charles, J. W. Boothe, E. P. Tucker, Fred Berg, Al Myers, D. Roney, Claude Chess and A. E. Schifferman.

Mexico has had its first radio show. It has been a most popular and successful show, which could out of sheer brilliancy and beauty compare with

some of the best radio shows in the United States last Winter.

The show was held in the "patio" of the School of Engineering in Mexico City. Booths were installed about the court, and in the center portion, the "Casa del Radio"—the Home of Radio was built. Many firms, including the Siemens Company, Hubbard & Bourlon, J. M. Velasco, R. L. Azcaragga, Beers Electric, and Westinghouse Electric, placed on exhibition in attractive booths some of the most modern radio broadcasting equipment available.

The exposition was officially opened by President Obregon of Mexico, and was the occasion of extensive ceremonies and celebrations. Accompanying the President were members of the Cabinet, prominent officials, and engineers, and M. Rolland of the Radio League of Mexico.

We like to pretend that we are making steady progress in this radio game, but in the business of comparing amateur station records we are not nearly as well off as we were some years ago, says Mr. Kruse in "QST" for November. In the days when everyone had a spark set we knew what power we were using; most of us knew pretty accurately and the rest had some sort of information. When a record was made we could tell how many miles-per-watt it amounted to. The man that covered 1,000 miles with 250 watts had something to be proud of; that was four miles per watt. But there was nothing to make a noise about when some big "thunder factory" covered 1,500 miles by burning 1,500 watts, that was only one mile per watt. This system gave everyone the same chance, in fact it gave the little fellow slightly better chances for if two sets are equally good the one with twice as much power will not work twice as far.

Our first tube men were all mixed up as to the amount of power they were using; in fact there are men today who talk about a "50-watt tube set" when they are really burning 250 watts and ought to rate the thing as a quarter-kilowatt set.

There is no excuse for this—it is perfectly easy to determine the input of a tube set, it is just as easy as it was to determine the input of a spark set; also it will be good for the souls of a lot of us to discover that our wonderful efficiency isn't nearly as wonderful as we have thought.

Let's find out what input wattage our sets are taking by the only sensible method, measuring it, and then let's play fair with the other fellow by talking miles-per-watt.

The real test of a set isn't "How far have you reached?" but "How far do you work consistently?" and the best way of determining the consistent range of a set is daylight work.



ONE SECTION OF THE BANQUET, SHOWING THE SPEAKERS TABLE, HELD IN LOS ANGELES TO ANNOUNCE THE RADIO EXPOSITION. RADIO MEN FROM ALL OVER THE SOUTHWEST WERE GUESTS OF THE RADIO TRADES ASSOCIATION FOR THE EVENT.

My Latest Radio Affinity

By T. E. NIKIRK

As the blase diner, after feasting on Meadow larks' tongues and fricasseed quail for many months loves to return to plain "ham and eggs" occasionally, so we love to revert to the Armstrong regenerative set, occasionally, if for nothing else than to give the beginning worker in tube sets something to work with. For we cannot all build Super-Hetrodyne, Neutrodyne reflexes and the like. And there is plenty of punch in straight regeneration, if one knows how to handle it. As Willie Shakespeare once said "there's the rub."

THROUGH the courtesy of the Southern California Radio Association I was elected its delegate to attend the A. R. R. L. convention at Chicago. One of the speakers on receiving sets, Mr. West, a radio engineer of Chicago, described his idea of an ideal receiving set. Notes were taken on his description. While in Pittsburgh I was fortunate enough to meet Frank Conrad of the Westinghouse Electric and Manufacturing Company and questioned him as to an ideal receiver for short and medium wave lengths. His outline was practically the same as that given by Mr. West, with the exception that he suggested separating the wire between turns by a turn of small cord. Later when I talked to Mr. H. J. Wall, of the Bureau of Standards, Washington, D. C., about this type of receiver, he said that it was his choice of the many present day types. He added, incidentally, that coating coils with the best spar varnish obtainable would give them strength and prevent moisture from causing the tube to contract and expand.

Many amateurs in the vicinity of Richmond, Va., and Atlanta, Ga., were found to be using this same type of receiver, with a few minor modifications. All claimed wonderful results. The receiver which I built on these lines, upon my return, bore out the testimony I heard on the trip.

The coils are wound with No. 24 wire. The spacing between turns was accomplished by winding a piece of cord of approximately the same size as the No. 24 wire side by side with the wire. The coils were wound from left to right, the wire being to the left and the cord being to the right on each turn. When the coil was completed the cord was unwound from the paper tube leaving a space between the turns of wire the width of the cord. Varnishing and baking completed the job, the best of spar varnish being used.

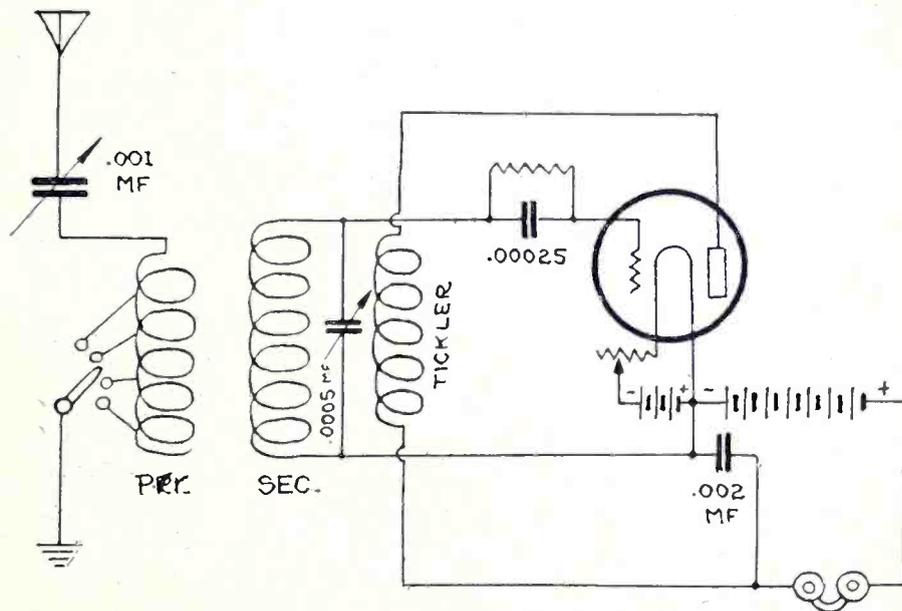
The antenna coil has seventy turns, tapped at each ten turns. A six-inch tube three and a half inches in diameter was wound for four inches. The secondary consisted of 100 turns, a tap being taken at each tenth turn, ten, twenty, thirty and so on. The tickler coil consists of thirty turns on a three-inch tube, also spaced as to

turns as previously described, and tapped at the fifteenth and thirtieth turns.

A forty-three plate vernier attachment condenser was used in series with the primary coil, the condenser being inserted between the coil and the antenna. The secondary variable condenser was a twenty-three plate vernier attachment condenser, a variable condenser of the type that sits three inches behind the panel with condenser and vernier rods of a non-conductive material such as bakelite, fibre,

to secure a much more selective and clearer signal. The individual builder's ingenuity should enable him to follow the diagram out to a successful conclusion.

A .00025 grid condenser, and a grid leak of 1½ to 5 megs. was used. The by-pass condenser described is of .002 mfs. as shown in the circuit. Amplifiers, as previously described in Radio Journal, work wonderfully well on this set. Any reader desiring further information, or experiencing trouble



etc., was used to eliminate any body capacity effect when tuning with the secondary condenser.

The tickler is mounted to slide in and out of the secondary coil much after the style of the old type of loose coupler. This, however, is not absolutely essential. A small section of three-inch tubing, cut as small as possible to hold thirty turns without spacing, at the end of the tube away from the primary coil and it can thus be made to rotate just as the rotor of a variometer or variocoupler does.

The fifteenth turn tap of the tickler coil is all that is needed to make most tubes oscillate over the range of from 100 to 500 meters, the wave range obtainable on this receiver. The complete thirty turns can be used in case the tube will not oscillate on the fifteenth turn tap.

The coupling between the primary and secondary coils was fixed at about six inches, often times much looser, even to eight and ten inches in order

with the construction of this set, should address me care of Radio Journal. I will gladly answer all questions.

New Radio Record

A radio dot recently raced from New York to Warsaw, Poland, and through an automatic signaling device, was by its own force hurled back and forth between the two points in a sort of "loop-the-loop" flight in which it covered about 4,500,000 miles in 25 seconds. The test results announced by the Radio Corporation of America mean that the New York office can know instantly, by pressing a key, the condition of the Warsaw circuit, whether or not the operator is there.

Radio was made to control radio for the continuous signaling over the 4500-mile course to Warsaw without the aid of human hands after a series of tests of the control relay of the system between the two points.

Two Hookups Stir Big Interest

By A. M. BIRD

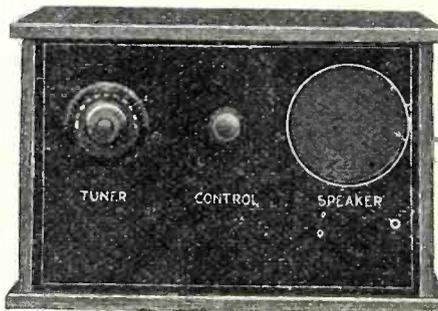
NO two circuits appearing in recent months in Radio Journal's pages have created a third the comment and question as the Roffy Hetro-Trans, and the Neutrodyne with its various variations as described by A. L. Munzig in his several remarkable articles. Since the appearance of these articles commercial sets have appeared employing some or all of the features embodied in these sets and, from the standpoint of design and appearance, should be of assistance to those contemplating the construction of one or the other of these circuits.

On this page is published the hookup employed in the Jewel Concert Receiver, manufactured by the Patterson Electric Company, which employs the Roffy Hetro-Trans four-tube circuit. Builders of this set, who have been curious as to how it will look made up, are here referred to the front panel view of this set. Note the absence of everything save the tuner, control and speaker opening. This set, remember, is built with self-contained batteries and speaker. All that one needs outside the set is the aerial and a short bit of wire about the picture moulding will do the trick for that. Home set builders will please note that a panel can be so handled that even screw heads for mounting need not appear on the front panel. Little tricks like this give the commercial set its finely finished appearance as contrasted with so many of the home built outfits.

Readers of previous issues will note a few slight changes in the Roffy Hetro-Trans circuit here shown to that published in previous issues. There is something to be said, also, about the handling of this circuit. It is

quite critical—and clears up its distance best when a few miles away from a broadcast station. At points like Oxnard, Calif., for example, remarkable results on distance have been secured with just this four tube set.

Some experimenters have made various suggestions, one employing a fixed condenser across the phones with considerable success, another reducing the battery voltage, etc. However all of these suggestions have worked on the experimental sets on which they



HERE IS THE WAY THE HETRO-TRANS LOOKS FROM THE FRONT PANEL, LOUD SPEAKER AND ALL INCLOSED IN THE CABINET. SOME SIMPLICITY, WHAT?

were tried but have not worked uniformly on other sets on which they were tested out a second and third time. However, this is one of the puzzles of radio, three sets built alike will not all work alike.

Incidentally the Roffy layout can be worked on the long outdoor aerial, but the aerial must be tuned if this is done. In other words the aerial must be shortened in one way or another. It will not work on a long aerial, at least in so far as present observations go.

The transformer itself, in which so much interest has been manifested, is nothing more nor less than a fixed

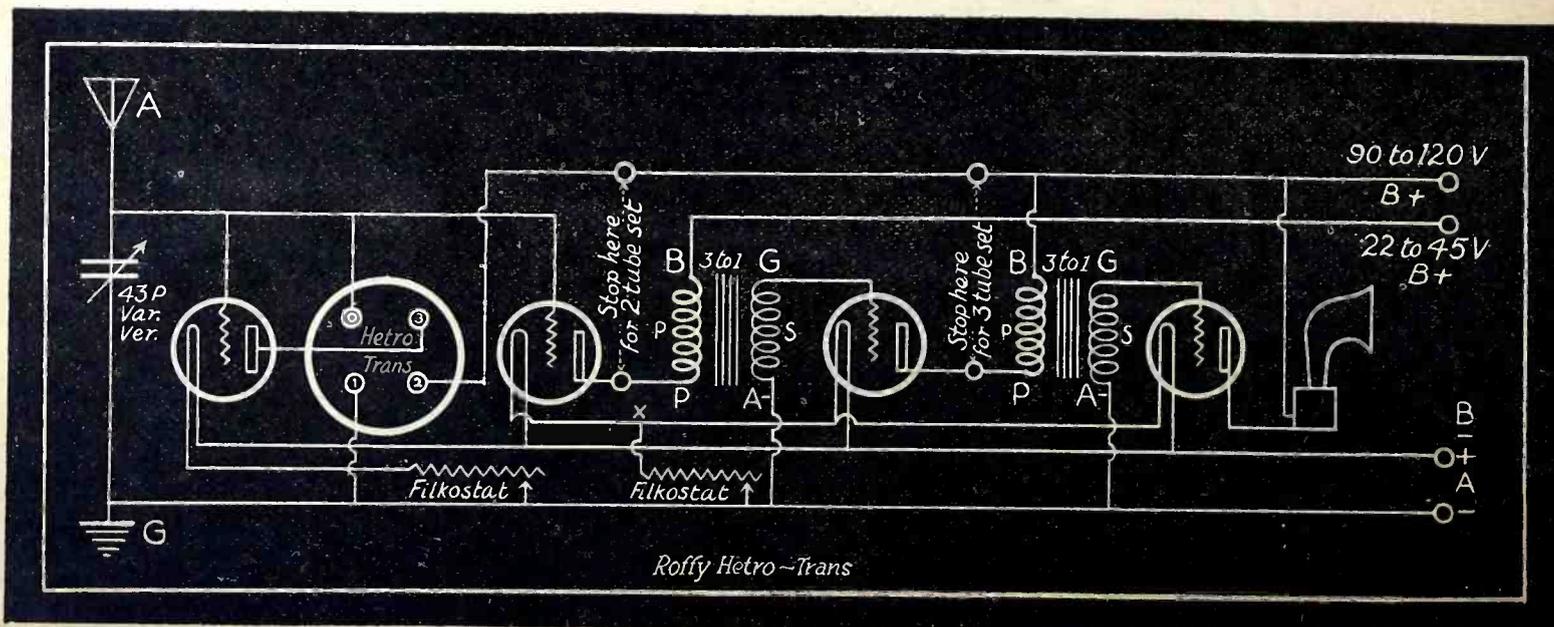
inductance primary and secondary, wound with gauze to furnish the proper spacing. The number of turns is ascertained experimentally by simply winding and rewinding to various lengths.

In assembling a set using this circuit, bear in mind that it is a very sensitive one and ratios and sizes must be strictly adhered to in order to get the best results. The aerial works best at 35 feet and should not be over 55 feet long. If you desire to use a longer aerial or to plug in the light socket, put a 11 or 13 plate variable condenser in series. This is to be installed outside the set and when once adjusted is set for all time for whatever length aerial you are using. Any A tube such as 201-A, 301-A, 216-A and the little 3-volt tube No. 199 and 299 can be used. The W. D. 11 or 12 will not function in the circuit.

At the point marked X, you may take this connection from the three tubes and run to the center tap of the three point Bradleystat if you wish to use one control for four tubes. The two grid leads from the 3 to 1 transformers running to the third and fourth tubes and the No. 3 lead from the Hetro-Trans to the plate of the first tube should not be over two inches in length. For the best results in this circuit avoid square corners and run your leads as direct as possible. Also change your tubes around—the first tube is very critical and sometimes better results may be obtained by selecting the most sensitive one for the first tube.

Mr. Patterson has also done some unusual things with the Neutrodyne, one of which is the marked overcoming of the peculiar Neutrodyne problem, spacing. He has perfected a Neutrodyne using WorkRite parts, in which the parts are mounted in a double-deck arrangement, details of

(Continued on Next Page)



CIRCUIT DIAGRAM OF THE FOUR TUBE HETRO-TRANS WITH SOME RECENT MODIFICATIONS WHICH MATERIALLY IMPROVE RECEPTION.

When Radio and I were Young, Magee

Now that all the proud uncles and aunts and distant cousins and those who "knew him when" are admiring that delightfully lusty youth called Radio it may be of interest to some of us to go back a ways and find out who took care of him when he was an infant and nursed him through spells of the croup and various other infant obstacles which he has overcome to the admiration of all.

IN the early days of radio, following the splendid achievement of Marconi in transmitting the letter S across the Atlantic, scientists and engineers in this country and England believed that reliable long distance transmission and reception could be obtained by increasing the power on the antenna and by building higher antenna masts. As much as one hundred kilowatts were used on spark sets and the masts were sometimes 500 feet high.

J. T. H. Dempster, an engineer in the research laboratory of the General Electric Company at Schenectady, N. Y., and a pioneer in the field of radio, explains that the American amateurs are today communicating with English and Australian amateurs with 1000 times less power than was used with indifferent results twenty years ago.

"Insensitive receiving equipment," says Mr. Dempster, "was the cause of uncertain reception and it was not until the vacuum tube came into its own that rapid progress was made."

Back in 1904, a few years ago after Marconi startled the scientific world with his experiment that promised to revolutionize long distance communica-

tion, the General Electric Company engineers were actively interested in the new art and they like others, tried for a long time to offset the shortcomings of receiving apparatus by boosting the power at the transmitting end. R. A. Fessenden, formerly a professor at the University of Pittsburgh and then head of the National Electric Signalling Company, was engaged to install transmitting and receiving equipment at the Schenectady, N. Y., and Lynn, Mass., plants of the General Electric Company with the expectation that this method of communication would replace the telegraph and telephone lines.

A. A. Isbell, now Pacific Coast manager of the Radio Corporation of America, was placed in charge of the installation by Mr. Fessenden. A spark transmitter of the straight gap type was built. In order to keep the gap from arcing it was necessary to blow air across it at about 100 pound pressure. The power was supplied by a 20 kilowatt transformer charging a condenser composed of steel plates, separated by glass plates, all immersed in oil in a steel tank. A special relay breaking a very large current in the primary circuit was designed by Mr.

Dempster, in cooperation with Mr. Isbell. In operation air was blown across the carbon contacts of the relay. Because of the high potential in the antenna it was possible to draw sparks from any insulated conductor within 100 yards of the masts. The antenna mast was 180 feet high and 95 amperes were used in transmission.

The receiving apparatus consisted of the famous Fessenden liquid barretter, or, in better known terms, the electrolytic detector, which was used in connection with the Fessenden interference preventer circuit. The electrolytic detector consisted of a platinum wire coated with silver. This was known as Wollaston wire. The silver coating gave mechanical strength to the wire which was less than ten thousandths of an inch in diameter. The nitric acid in a platinum cup into which the wire dipped formed the electrolytic. The platinum cup was the other pole of the cell.

The electrolytic detector was a marked advance over the Marconi coherer, but it was still much less sensitive than the crystal detector now in use. Static frequently burned the point from the platinum wire temporarily destroying the use of the detector.

With this equipment sporadic communication was established between the two plants of the company during the cold months but reception was very uncertain in the summer. In efforts to improve transmission more power was used without improving reception. The test signal used by the operator in the two cities was the letter D, a long dash and two shorts, repeated hour after hour at a stretch. This became so tiresome that Mr. Dempster built a motor driven transmitter set for Schenectady and the machine relieved the tedious work of the operators.

The headphones adopted were especially made according to the Navy standard and they were wound for the first time with enameled wire. These phones were about one twenty-fifth as sensitive as the cheapest headphones on the market today.

In the early days of radio the signal acted directly on the receiving apparatus whereas today, by means of circuits and B batteries, the signal is magnified from one to 25,000,000 times, the signal acting as a valve to regulate the B battery current.

which may be published in the next issue. This double-deck close spacing arrangement is entirely free from back coupling, body capacity or any of the troubles with which the ordinary Neutrodyne has been afflicted, and to get away from which the long panel layout had been previously adopted.

It is possible, with such an arrangement of parts, to embody four or five tubes, batteries and even speaker, in one cabinet of not unusual dimensions, which in reality makes a real portable Neutrodyne, something which has been considered almost impossible. All is contained in a cabinet 10x16x10 inches.

From the broadcast listeners' viewpoint the Neutrodyne method of reception is probably creating more interest, with more successful accomplishment, than anything since the Armstrong regenerative set appeared on the scene. The non-critical effect makes it a set peculiarly adapted to the broadcast listener, who, once he gets his dial settings for certain stations is able to repeat reception from these

stations time after time on exactly the same setting. A variation of one point on the dial oftentimes completely obliterates one station or another.

Alfred H. Moses, radio engineer and experimenter of Los Angeles, formerly actively engaged in radio engineering in England, has some suggestions to make on some experiments he conducted with the Roffy Hetro-Trans circuit. He suggests placing a .006 condenser across the phones, although its size may vary a bit with different makes of phones. This being done, he suggests using 45 volts instead of 90 on the plate of the first tube, and around 22½ volts in the phone circuit. Great advantage, after these changes have been made he said, may be secured by cutting down the battery voltage on the first tube. He also claims superior results from using separate vernier rheostats. In searching for stations he found that a slight increase in filament temperature or increase in B battery voltage was sufficient to throw the detector into oscillation.

The Science of Invention

PART IV

By DANIEL NELSON CLARK, LLB.

The fundamental and tremendous value of radio to mankind is hit upon, by Mr. Clark, in his discussion of the universal value of increased educational facilities, universities of the air, teaching all how to think, to reason, to use that faculty which distinguishes man from the animal and which has brought man, step by step, toward the light of true knowledge, the knowledge of truth.

WITH the improvement of language and the art of writing, and the resultant improvement in thought, great progress in civilization was made, although the pages of history have some dark spots, as the Dark Ages, where progress was slow and indefinite owing to superstitious and autocratic influences, if not to actual mental immaturity. But gradually mankind has elevated his head, in the process of evolution, and, at last, with his eyes upturned towards the stars and his mind orientated toward the dawn of an Age of Civilization, he became endowed with a love of, and a desire for, the Eternal Light. And oh, how simple ultimate truth is!—so simple that we oftentimes wonder how came it so long delayed? But what have we accomplished, even now, of which we may justly be proud? Much, when viewed from the aspect of remote degrees and the slow and indefinite processes from whence we came, and yet, little, when viewed from the aspect of possible attainments.

True it is that civilization, such as we now know it, has spread almost around the world, though languages as well as thought remain, more or less, diversified. Yet, owing to these differences in language, carrying differences in thoughts and desires, if not in purposes, individual, as well as national, strife and war still remain with us.

The late World War was a calamity unparalleled in the history of the human race. In this maze of national differences, we hear the question often asked, "What can we do to avoid war"? Some will say, with Mr. Wilson, a "League of Nations," while others this, and others that, but the truth nevertheless remains, as it usually does, more or less obscure.

The only true alleviation of strife is the ingenuous co-ordination of knowledge, science and industry, better stated, perhaps, as a mutual love and understanding among men, largely expressed in terms of unified language and maintained by continuous and swift communication; while the only sure specific against the ravages of war is the unity of people in general, manifested by a common language and expressed and maintained in continuous and swift transportation. These requirements cannot be brought about

by any "League of Nations," nor substituted by any artificial device. Therefore the problem of mankind is simplified to two basic principles, (1) that of swift communication and (2) that of swift transportation—the one sym-

bolized by Radio and the other symbolized by Aircraft; all embodied, perhaps, in a conception of power intellectually guided by the hand of true science.

No Monopolistic Elements.

Radio requires no communicating wires and, therefore, offers no well defined means of capitalistic monopoly, while, on the other hand, Aircraft requires no connecting rails and, likewise, offers no monopolistic potentialities. And we might say, *en passant*, that monopoly is ever and always dangerous, from an economical as from an educational standpoint, as it is ever and always avariciously disposed, just as it was found to be by Queen Elizabeth of England in the seventeenth century, or just as it is found in journalism of today, genuflecting public opinion to its selfish ends regardless of the truth, or just as it may be manifested in the superciliousness of the banker, feigning to know that which he cannot, and thus beguiling the honest investor into the making of loans by the buying of bonds and other like securities discounted by these bankers or listed upon stock exchanges, thus forming a basis of collateral security for the making of further loans by the bank, rather than really making an actual investment in the industries themselves. Thus expressed we have a monetary monopoly. But when we find that journalism is not only combined with banking capital but is, in fact, itself owned and controlled by this same avaricious combination, the economic cancer is aggravated beyond description, thus greatly weakening the industrial body.

But this is not a treatise on political economy, nor a thesis on banking or stock exchange methods. And while we only mention these seemingly irrelevant observations without enlarging upon them, we do so in order to accentuate the need of ingenuousness, and thus pointing out by necessary implication, if not by express inflection with what ingeniousness modern business makes possible the unproductiveness of associations systematized in order that the poor may become poorer while the rich may become richer. However, as we have seen, the Science of Invention must fundamentally deal with all contributory factors involved in human existence from those initia-

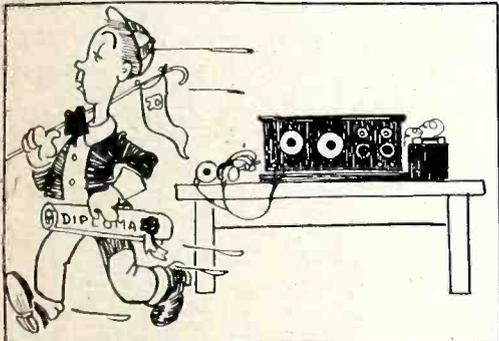
This is the fourth of a series of articles written by Mr. Clark for this publication. Our readers have evinced great interest in the subject matter, and well they should, for these articles cover the widest range of scientific labor and, though comparatively plain, the matter is expressed as accurately as brevity and clearness make possible.

Our readers are convinced, as these articles show, that Mr. Clark exemplifies the ability to "think correctly, fearlessly, independently and alone," as he might put it. Indeed he anticipates, as well as advances, the science of learning along the concourse of philosophy just as true thinkers usually do, that the cause of mankind may be maintained.

We understand that in the next article, which may appear in our next issue, Mr. Clark will outline the organic relation of matter to motions. In its broadest aspect, the development of electricity and the propagation of the electro-magnetic forces, together with heat and light, are all comprehended, since they are inherent effects of this organic relation, and, therefore, are parts of the discourse. We cannot urge too strongly that our readers study the matter carefully, since a keen understanding of these forces is of paramount importance in the science of radio. That this coming article will be an advancement in science we know, just how far this advancement will be we know not, but this we do know, that no chemist, metallurgist, physicist, spectroscopist, biologist or astronomer has ever preceded him in either the ascertainment or expression of this relationship in organic arrangements.

tory of the process of reason to those processes manifested in all organic, or evolutionary, developments of matter and its resultant forces, since no branch of science should be neglected in the true intellectual equilibrium. If it were possible for us to know all, we might more justly acquiesce in, if not actually advocate, the anthropocentric theory as some of our intellectually impoverished liturgical exegetists do.

Therefore, the acquirement and utilization of power, both mechanical and intellectual, is as much the primary need of all development, as it is the primary cause of all evolvments. Then comes the matter of the directional diffusion and a rational use of



GETTING A COLLEGE EDUCATION ON ANY SUBJECT VIA RADIO IS GOING TO BE THE GENERALLY ACCEPTED IDEA ONE OF THESE DAYS.

this power, of which aircraft is the coefficient of the physical, while radio is the exponent of the intellectual. Thus with aircraft supplying the means of transportation and radio supplying the means of communication to every portion of the world, the range of human endeavor, involving the square of human development and the cube of human intellectual enjoyment, will be increased all in geometrical proportions. The resources of the world will be developed beyond all possible enumeration. Operations, such as mining, manufacturing and farming, can be easily, conveniently and enjoyably, carried on at remote places, on islands, over rivers, seas and mountains and from the Equator to the Arctic and Antarctic regions, with both facility and pleasure to those engaged therein. When we realize that aircraft, even now, is passing a speed of two hundred and fifty miles per hour, and when we know that we may travel a distance of a hundred and twenty-five miles in thirty minutes, (the average time taken by persons going to and from their employment each day), and, moreover, when this aircraft is provided with broadcasted information at all times by radio and, doubtless, will eventually be equipped with individual radiophones, we may appreciate the wonderful developments and the wonderful possibilities of civilization.

When Mr. Arthur Brisbane, in a statement published in the Los Angel-

es Examiner on October 5th, 1923, said that "It is quite probable that in the future one day's work will earn the actual cost of a flight around the world" he not only anticipated but he also aptly expressed the probabilities. Even the railroads, with their charges of "all the traffic can bear" type of commercialism, may do well to take notice of the statement of Rear Admiral William A. Moffett, Chief of the Bureau of Aeronautics, Washington, D. C., when he said, after an aircraft trip of 2200 miles, that "If the American people knew what I know, following my trip in the ZR-1 from St. Louis to Lakehurst, railroad stocks would go down several points." The Rear Admiral manifested a keen appreciation of the wonderful possibilities of aircraft and though the political forces, inherently involved in the railroading industry, may seek, through monetary and political methods, to prevent the realization of this vision, the Rear Admiral has, at least, suggested to us a picture of suitable detail and wonderful perspective, from which we may well conclude that the Aerial and Radio age will be historically known by its transformation from the acute stage of "Commercialism" of today (when bankers and other money changers are intimately unioned with stock exchanges, and all of them avariciously believing that the truth is found in debits and credits, and that the value of man is measured in terms of dollars), to that of an *Age of Civilization*, such as we have never had before, wherefrom the truth may be expressed in terms of reason and the value of man measured in terms of intellectual power. Then we may have little fear of human degeneracy, or of destructive wars, since the very statement of the conception of such an Age entails an anticipation of the decentralization of cities and of commercial power, and a concomitant diffusion of wealth. Indeed the open air secured by aircraft will develop in humanity an infinite amount of health and give great longevity, thus relieving the busy, tired, but more often overpaid, doctor. I say "often overpaid" because, in many instances the patient survives notwithstanding the medicine administered. Nor will the quiet assuming doctor suffer all. Courts and lawyers will be dispersed to good effect as the congestion of residences and roads is relieved. Here indeed may be the *sine qua non* of a long hoped for millennium.

Tremendous Possibilities

Statistical information confirms that not exceeding ten per cent of the agricultural possibilities and resources of the world have been developed, much less maintained, and we can only conjecture as to the insignificant portion of the mining and manufacturing potentialities which have been developed

and used, much less discovered. But when we are just beginning to realize that from the Sun's heat and light, and from the waves of the ocean we may develop tremendous power, we can dimly appreciate the wonderful possibilities founded in, and which may be evolved from, the Science of Invention.

Following the manifest line of reason it may thus be said that power, rightly used, and intelligently guided, is essential to all human progress, as it is equally so in all things else even to the movements of the stars. The propagation of the electromagnetic force requires power.

One of the great, if not greatest of all, needs is the knowledge of the means by which the sun's rays, both heat and light, and the power of the waves of the ocean, may be transmuted directly into mechanical and electrical forces. Some very remarkable recent inventions have been made for the conversion of wave motions of the ocean into power. This general line of development in the Science of Invention is wide and leads to great possibilities. But let us, at all times, remember that the knowledge of the means of this transmutation of heat and light and of the waves has its antecedent in scientific understanding infused by reason. Indeed it will not have its accomplishments founded in chance, since it will not come that way.



A LABORER WILL SOON BE ABLE TO EARN ENOUGH IN ONE DAY TO TAKE HIM ON A FLIGHT AROUND THE WORLD.

Therefore, in the Science of Invention, as well as in the Science of Learning, we should have schools, colleges and universities, conducive to, with teachers and professors capable of, the infusion of reason in every student. The mere collection of data, or the collection and memorizing of rules, may help to develop the mind but they more often result in the confusion of the student, if he is not actually lost in a maze of detail, from which only synthetic processes may elevate him and bring him to that viewpoint essential to the acquirement of true knowledge, science and philosophy. Therefore there are two things which

both the tutor and the student should know, namely, (1) *that there is a science of learning* and (2) *that there is a learning of science*. One involves the knowledge of how to find what is wanted as and when it is wanted, and the other involves the mental vigor necessary to the possession, intellectual digestion and assimilation, of the subject matter after it is found. And, thus resolved, true wisdom embraces reason. Every student, worthy to be called such, and every professor and teacher, likewise worthy, should be thus enabled to *think correctly, fearlessly, independently and alone*. He should not be permitted, at any time, to acquire or give the impression that science is simply an arbitrary classifi-

advance from chaos to order. And though every newborn babe in the family of Science may have its complement of critics and skeptics infesting the cradle, like the tenacious serpents infested the cradle of Hercules and though these may be spared the Herculean strangulation yet may they be compelled to retire from the encounter, scarred and bleeding, if not extinguished, by the Macedonian phalanx of reason. Our minds like that of Aristotle should be so truly dredged, like a great harbor, that not only may the small craft have ingress and egress, but, also, that even the Leviathan may pass over the bar without stranding to plough the ways of Intellectual Commerce to all the shores of the

good to the greatest number. But abused, they will become the greatest opportunity ever lost.

Therefore it behooves us, as of absolute necessity, to guard them well. They should be guarded by educational persuasion, if possible, or by *intelligent* legislative enactments, if necessary, so that the use thereof may be conserved that the results attained stand, as it were, as columns in the Palladium of mankind.

With the intensification of vice in, and the allurements of, our cities and with the police force of our nation even now strained to its utmost, none but the inaniloquent, and some of our legislatures, will contend that the solution is found in the increase of legislative enactments or in an increase of police power, *per se*, because these can only relieve the pain of the cracking integument of civilization, just as a true physician, by the wise administration of medicine, may relieve the bodily ailments until such time as the natural forces can remove the cause. Therefore legislation and police power are as poor substitutes for education as nicotine and cocaine are for health.

While the insidious workings of avaricious commercialism conjoined with unwise police power and unwise legislation may equal, if they do not exceed, the nefariousness of mercenary educationalism, yet both of them may serve as illustrations of either the neglected cause, or the lost opportunity, of mankind.

Knowledge and Citizenship.

Neither legislation nor dogmatism can be substituted for knowledge in the making of a good citizen or in the making of a nation of good citizens. And, therefore, it is a regrettable manifestation of impoverished intelligence when we observe some of our well-known exegetically inclined and liturgically disposed enthusiasts conducting a campaign, founded in ignorance and based upon an antiquated anthropocentric theory, seeking to reflect upon the scientists and to impede the progress of science by invidiously contending that the scientific evolutionist is a "sensualist," an "atheist," or "a worshiper of a god of ease" as advocated by Mr. Bryan, when these same anthropocentrists either know, or ought to know, that from the time of St. Augustine, of the Catholic faith, who wrote a thesis on evolution maintaining that the world and even the Universe were developed, or evolved, by the gradual progression from the original elements and natural forces and contending that all were produced from a nebulous mass "*nebulosa species apparent*," becoming thus the first and greatest of all Christian Evolutionists, to those of John Wesley and Henry Ward Beecher, of the Protestant faith, as evolutionists, we may well be convinced that the truest scientist may be,

(Continued on Page 256)



MINING AT THE NORTH POLE WILL BE SIMPLE SOON. THE MINE BOSS CAN HOP IN HIS AIR BOAT AT THE NORTH POLE AND BE AT HIS PANAMA HOME IN TIME TO DRESS FOR DINNER

cation of knowledge; but both should realize (the sooner the better) that science, as mathematics, for instance, is not man-made but, on the contrary, it is an embodiment of the truth expressed in terms of numbers; likewise astronomy, with all the seemingly complicated motions of stellar bodies, is but the material, though awe-inspiring, manifestation (largely, if not entirely, mechanical) of the balanced relation of organic matter actuated in motions. Neither is botany an arbitrary classification of plants, from the lowest of the cryptogamia to the highest phænogamia; nor is biology such a classification, from the lowest amorphous amæba to man; and neither is minerology an arbitrary classification, by elements, from that of hydrogen, the lightest, to that of uranium, the heaviest, in atomic weights: but, on the contrary, all is comprehended in a process of evolution expressed in the organic arrangement of matter to motions and involving, as they necessarily and inherently do, the increasing refinement of this organic relation, through the mineral, vegetal and animal kingdoms, toward scarcer yet nobler forms, if not towards higher Intellectual and Diviner Ends.

Advance of Science.

Metaphorically contrasted, it may be said that kindred of principle does science advance from ignorance to knowledge as does the organized universe

Scientific Seas, that even the lands may be explored from Dan to Beer-sheba.

Education for All.

What a great educational advantage it would be if the Colleges and Universities, and especially those universities maintained by the state and thus supported by the tax-payers and found in every state of the Union, should broadcast their instruction and lectures at definite times and upon specified wave-lengths. This would place intelligence at a premium and within the reach of all, if not bring a university education in every home, and give the general public an educational advantage such as it never had before and it would make possible, without any perceptible increase of expenses, the educational profit and an intellectual dividend to the tax-payer of every state.

Radio is indeed the greatest means of communication and for the propagation of knowledge, and also for the stimulation of intellectual growth, ever discovered, while Aircraft is the greatest means of propagating the social relations of mankind and of stimulating the commercial growth, without avariciousness, that was ever evolved by the Science of Invention.

These two great factors conjoin as the greatest of the inventions and the discoveries of mankind for, when rightly used, they may bring the greatest

Efficient Regenerative Receiver, with 1-step

By A. L. MUNZIG

Never mind the weather. Quit cussin' the high line spill. Cease fretting about the multiple-eight jig saw whang doodle that is spilling hetrodyne all over the street for the cleaners to weep over. Listen, look, light in and learn. That's what we are all doing. Here is something worth trying, if you are athirst to try something different from your present radio love.

IN our enthusiasm for reflexes, new-trodynes, super-hetrodynes and other methods of current fame, let us not forget that the greatest radio-frequency amplification obtainable with one tube is the Armstrong regenerative method. If you have but a small pocketbook you can rest assured that you will get the most for your money when regeneration is used. The only disadvantages are that it is comparatively critical to adjust for maximum results but when once mastered extreme long distances can be conquered with ease.

In Fig. 1 is shown an efficient regenerative receiver that the writer built when broadcasting first commenced. It is equipped with one stage of audio-frequency amplification as this was considered to be sufficient amplification when the head-phones were to be used. If loud-speaker is desired all that is necessary is to connect in the usual manner another stage or two. This was done to operate a Magnavox with great volume.

he better if the experimenter contemplating to build this receiver would buy a ready built variometer or better yet, buy a variometer and inductance combined such as the Ray-Dee-Arcraft Tuning Unit which can be used in

ing about the work shop. The coil mounted on the side of the variometer consists of 50 turns of No. 24 D. C. C. copper wire wound on a cardboard tube 3 1/2 in. in diameter and 4 in. long. A bakelite tube would be better since

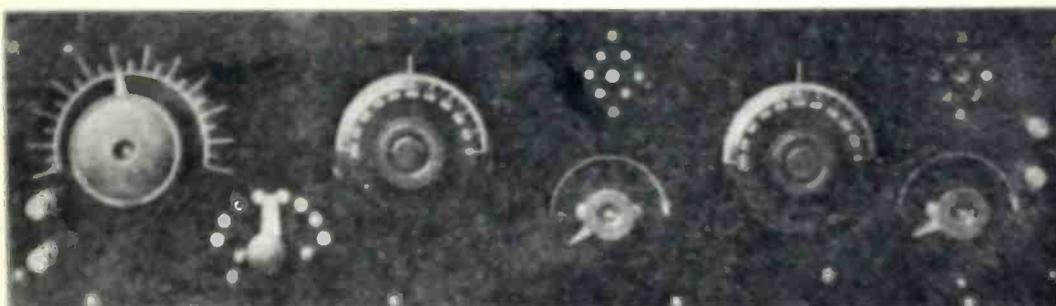


Fig. 1

place of the inductance and variometer herein described. The variable condenser used herein was an old Murdock mounted that was pressed in-to use on the occasion. It would be much better to use a regular unmounted 23-plate variable condenser such as can be found on the market. A New York Coil Co. 23-plate variable is sug-

it is not as susceptible to warping. It is tapped at the middle with a binding post.

A 43-plate variable condenser can be inserted in series with the ground for sharper tuning, if the experimenter so desires. It isn't necessary, however, since tuning of the primary is not as critical as the secondary. The audio-frequency transformer is a Federal and gives excellent results with no distortion. A .001 MF fixed condenser of the Micadon type is shunted across the secondary to by-pass the radio-frequencies. (C3)—

A list of parts for building receiver is given below:

- 1. Parts for building variocoupler.
 - 1 Ray-Dee-Arcraft tuning unit of variometer with inductance mounted on side. The correct spacing between variometer and inductance should be found by experiment unless the tuning unit is used.
 - 1 grid condenser with leak.
 - 2 VT sockets.
 - 1 23-plate variable condenser.

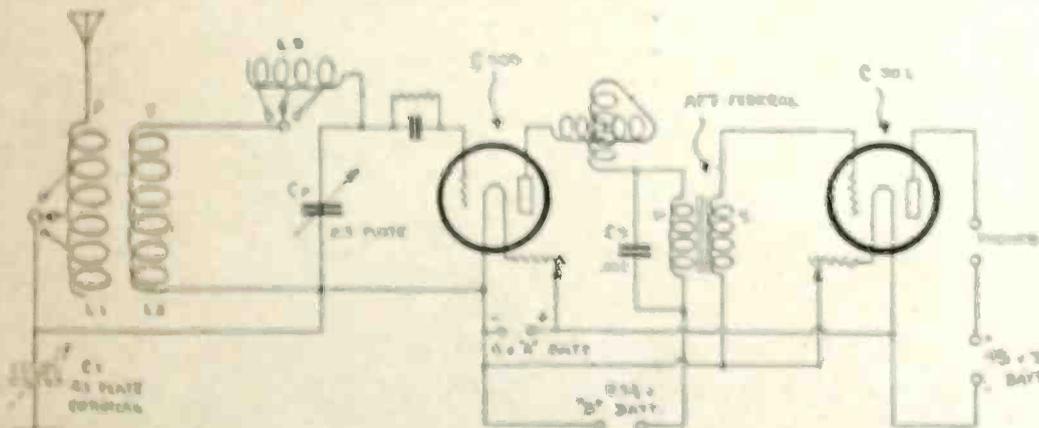


Fig. 2

In Fig. 2 is given the circuit used. It will be immediately recognized as an ordinary Armstrong regenerative receiver with a few novel features. The variocoupler was made as follows: 80 turns of No. 24 D. C. C. copper wire was wound on a bakelite tube 3 1/2 in. in diameter and 3 in. high. Taps were brought out at the 15th, 20th, 25th, 35th, 42nd, 50th, 68th and 80th turns. This variation was considered sufficient and proved to be very satisfactory in actual operation. The rotor consists of a standard variocoupler ball wound full with No. 24 D. C. C. copper wire. The variometer was a homemade affair and proved very satisfactory. However, it would

gested. This receiver is suggestive of what a person with a little initiative can do with a few discarded parts ly-

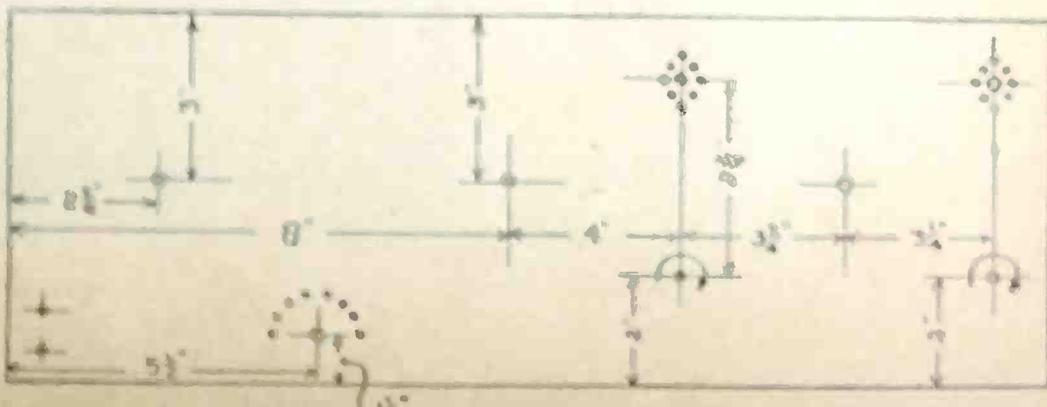


Fig. 3

- 2 6-ohm rheostats to be used with 6 v. 1 amp. tubes.
- 1 C300 Cunningham detector tube.
- 1 C301 Cunningham amplifier tube.
- 1 .001 phone condenser (Micadon).
- 1 Federal audio-frequency amplifying transformer.
- 1 6 volt "A" battery.
- 1 22½ V. "B" battery with variable taps for detector.
- 1 45 V. "B" battery for amplifier tube.
- 1 panel (Bakelite) size 6 in. x 21 in. x 3/16 in.

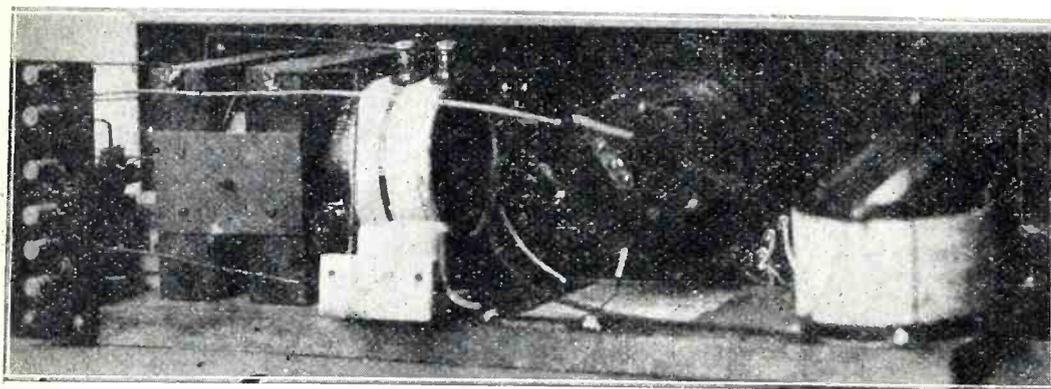


Fig. 4

- 1 soft pine base size 6 in. x 20 in.
- 1 suitable cabinet.
- 3 3in. dials for tuning.
- 1 switch arm.
- 8 contact points.
- 10 binding posts.

Referring to Fig. 1 again, an idea will be had of the panel layout. The control on the extreme left was made by using a large knob and pointer with a scale scratched on the polished panel. It is much easier to use a dial than to go to the effort of scratching a scale suitable for the panel.

A detailed panel layout is given in Fig. 3 so that the experimenter can take dimensions from this.

Fig. 4 shows a rear view of the receiver. The builder can get an idea how the respective parts are arranged. Use bus for connections and a neat job will result. The photograph doesn't show a very good wiring job but it has been changed and arranged around in different positions until the original wiring has been obviated. Results are what we want—not so much looks.

This receiver can of course be used with any type of tubes—drycell tubes included. If drycell tubes are used, however, it will be necessary to make connection to positive (+) side of the filament "A" battery instead of the negative as shown. Just reverse the "A" battery connections as given in Fig. 2.

You can always feel at liberty to write me regarding any point that isn't clear in any of my articles—especially those on the construction of receivers.

to pick up more radio frequency energy than a low one; however the high aerial, beside being able to pick up fainter signals, also collects more static, which may seriously interfere with reception, so that too high an antenna is to be avoided. It is the effective height of an antenna that counts; not always the height above ground, but 10 feet above a grounded tin roof, would have an effective height of 10 feet, not 50 feet.

The antenna wires should be kept as far away from the aerial supports as possible. The antenna insulators should be of a good grade, and should be so designed, so that they do not absorb water, and have low capacity between their terminals. Glazed porcelain insulators are the best with genuine Electrose second. Avoid purchasing porous or unglazed porcelain, or cheap imitation composition insulators. Keep the antenna insulators clean and preferably replace them every year; they don't work so well when dirt gets an inch thick on them. The long thin shaped insulators are better than short thick ones, as the capacity is much lower. See that the lead-in enters the house through a good porcelain tube, and that it does not touch the house other than at insulated points.

The antenna should be a wire conductor of large area and should be selected with care. Flat copper ribbon, copper stranded cable and large size copper wires are all good. Don't use iron wire that has a mere film of copper plating on it. Copper plated iron wire is used much, but in view of the fact that copper wire is so cheap, it would be advisable to use number 12 or 14 copper wire throughout the entire antenna system. Insulation on the antenna wires is beneficial in-as-much as it prevents corrosion to the wires, and does not detract from the general efficiency of the aerial.

Take Heed of Thy Antenna

By BEVERLY B. DUDLEY

A short antenna has the advantage over a long antenna inasmuch as the shorter antenna permits sharper tuning, i. e., the short antenna permits the operator to select the desired station more readily than a long one would. For this reason, owners of short antenna often get results superior to those obtained on a long antenna. For the reception of broadcasting stations operating below 360 meters a shorter antenna than was formerly used is necessary. It would be a very good idea to keep the total length of the antenna—this includes lead-in and ground lead—under 100 feet so that amateur signals from American Radio Relay League stations may be received as well as amateur code. For best results the antenna should not exceed 120 feet for broadcast reception, or 80 feet for amateur reception.

Apparently the height of the aerial makes little difference to most radio fans.. A very high one will be able



EXECUTIVE OF THE NATIONAL ASSOCIATION OF BROADCASTERS DURING THE ANNUAL CONVENTION, HELD AT THE COMMODORE HOTEL, NEW YORK CITY, AT THE TIME OF THE NEW YORK RADIO SHOW, EXAMINING THE RESULTS OF A TEST MADE TO DETERMINE APPROXIMATELY THE SIZE OF THE LISTENING AUDIENCE AT ONE STATION. UPON A CERTAIN REQUEST BEING MADE OF THE LISTENERS, FOUR THOUSAND TWO HUNDRED AND EIGHTY-FOUR PAID TELEGRAMS WERE RECEIVED WITHIN FOUR HOURS AT AN AVERAGE COST TO THE SENDERS OF 75 CENTS. AUTHORITIES CONSULTED ESTIMATE THAT NOT ONE IN ONE HUNDRED WOULD SEND A TELEGRAM AT A PERSONAL EXPENDITURE OF 75 CENTS. THEY THEREFORE BELIEVE THAT THE LISTENING AUDIENCE OF THIS STATION IS WELL OVER FOUR HUNDRED THOUSAND

The Bohr-Atom--Fundamental Conceptions

By PROF. H. La V. TWINING

This article concludes Mr. Twining's discussion of the Bohr Atom, and his next article will go into its mathematical characteristics of some other fundamentals, leading up to a well defined application of what has already been considered, to radio. The presentation of the manner in which each formula is arrived at, step by step, we believe has never been attempted on so comprehensive a scale before.

ON page 436, March, 1923, of the Radio Journal the radius of the dextron was given as 10^{-16} . This radius was estimated or rather computed on the assumption that an electrical entity having 18.45 times the mass of another would have 1/1845 the radius, or vice versa, assuming that mass depends upon the distribution in space of material that constitutes it. This estimation was based on the Rutherford-Bohr atom and it is only an estimation. Recent experimental evidence indicates that the radius of the dextron is much larger.

In the last issue the radius of the dextron was calculated on a different basis or assumption, as (2) (10^{-13}) cems, the same as the radius of the levulon. This latter computation is close to recent experimental results. In an article in the Philosophical Magazine, No. XXVII, page 923 to 940, under the heading "Collisions of Alpha Particles with Hydrogen Nuclei," by J. Chadwick and E. S. Bieler, Dec. 1921, issue, the following language is used. "The alpha particle behaves in these collisions as an elastic oblate spheroid of semi-axis (8) (10^{-13}) and (4) (10^{-13}) moving in the direction of its major axis." This would indicate that the nucleus of the hydrogen atoms that compose the alpha particle, has a radius (2) (10^{-13}) cms.

A slight error crept into the previous calculations. On page 13, of the July, 1923, number, formula (12) should read

$$\frac{m}{m} \frac{b-S}{b-S} \text{ instead of } \frac{S-b}{S-b}$$

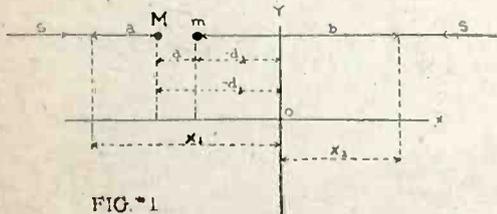


FIG. 1

The error in the algebraic signs in the denominator arose because of a neglect to take the vector relationship into consideration. In the fall of the charges toward each other there are three cases that arise.

In order to analyze physical relationships it is necessary to choose an origin to which everything is referred.

In the first case, see Fig. 1, let O be the origin and X and Y the axes of

reference. Suppose the two bodies M and m to have fallen distances a and b along their paths S and s. Then their distance apart is (b-a). Let the charges fall parallel to the X axis and come together on the left of the Y axis. Let their distances from the Y axis be $-d_1$ and $-d_2$ as shown in Fig. 2.

Then

$$a = -x_1 - (-d_1) = -x_1 + d_1$$

$$b = x_2 + (-d_2) = x_2 - d_2$$

$$\frac{M}{m} = \frac{x_2 - d_2}{-x_1 + d_1} = \frac{x_2 - d_2}{d_1 - x_1}$$

In the second case, see Fig. 2, let

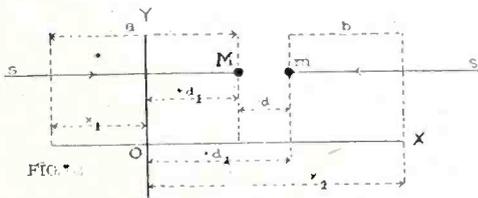


FIG. 2

M and m be on the right of the axis of y and d distance apart, then

$$a = -x_1 - (-d_1) = -x_1 + d_1$$

$$b = x_2 - (+d_2) = x_2 - d_2$$

$$\frac{M}{m} = \frac{x_2 - d_2}{d_1 - x_1}$$

the same as in the first case.

In the third case let M and m be on opposite sides of the axis y; see Fig. 3. Then

$$a = -x_1 - (d_1) = -x_1 + d_1$$

$$b = x_2 - (+d_2) = x_2 - d_2 \quad \text{and}$$

$$\frac{M}{m} = \frac{x_2 - d_2}{d_1 - x_1}$$

The same as in the first and second cases.

This formula (12), page 13, should read

$$\frac{M}{m} = \frac{s-d}{s-d}$$

$$\frac{m}{m} = \frac{b-S}{b-S}$$

in the notation that is given there. The relation between the two notations is $x_2 = s$ and $d_2 = d$ $x_1 = S$ and $d_1 = b$

The bodies are moving in the opposite directions; and hence they differ vectorially in sign. On page 79 of the August number in equation (12) the small s in the denominator should be a capital and it should read (b-S). This will not change the mathematical development given there, but the result is slightly different in this, that the expression (M-m) changes to M+m so that in equation (26), page (79) of the August number

$$W_1 + W_2 = Wt = \frac{Ee}{(b-d)}$$

as the total energy of fall and Ee

$$2(b-d)$$

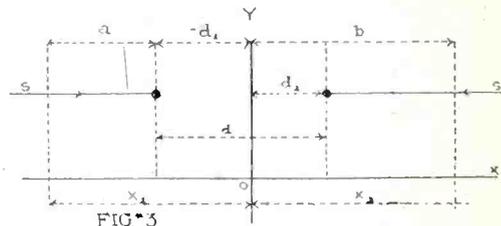


FIG. 3

as the total energy radiated. One of these is exactly $\frac{1}{2}$ the other. This simplifies the formulas but does not change the numerical results appreciably. In the September number, page 119, B^2 and B^3 drop out of all formulas since in equations (1) and (2) $M+m$

$$\frac{M+m}{M+m} = 1$$

Equation (28) then becomes

$$W_1 - W = hf = \frac{2\pi^2 Mm E^2 e^2}{h^2 (M+m)} \left(\frac{1}{T_1^2} - \frac{1}{T_2^2} \right)$$

which agrees with the final formulas given by Bohr. Such an error is really inexcusable but the computations are not given in any book that I have access to. Only the results are given, so that the computations had to be worked out. In the last issue no changes need be made since the value of B^2 and B^3 are very small.

The hydrogen lines are now easily calculated from the formula

$$f = (3.29) (10^{15})$$

$$\frac{1}{T_1^2} - \frac{1}{T_2^2}$$

Various values may be assigned to T_1 and then various values to T_2 . In every case a series of theoretical lines are obtained which converge to a limiting value.

If T_1 be taken as 2 and various values be assumed for T_2 . The Balmer series is obtained. This series is actually found existing in the visible spectrum of hydrogen at ordinary temperatures and pressure. The calculations are as follows

$$f = (3.29) (10^{15}) \left(\frac{1}{4} - \frac{1}{n^2} \right)$$

$$(3.20) (10^{15}) \left(\frac{1}{4} - \frac{1}{4} \right) = 0$$

$$(3.29) (10^{15}) \left(\frac{1}{4} - \frac{1}{9} \right) = (2.48) 10^{15}$$

$$(32.9) (10^{15}) \left(\frac{1}{4} - \frac{1}{16} \right) = 0$$

- 1—(3.29) 10¹⁵ (1/4—1/9)
= (.4569) 10¹⁵
- 2—(3.29) 10¹⁵ (1/4—1/16)
= (.61687) "
- 3—(3.20) 10¹⁵ (1/4—1/25)
= (.6909) "
- 4—(3.29) 10¹⁵ (1/4—1/36)
= (.7311) "

from crystals as discovered by Barkla and worked out by Barkla and Mosley is closely connected to the hydrogen spectra by the following simple relation.
 $f = N^2 R (1/12 - 1/22)$
 where N is the atomic number and R is the Rydberg constant.

of perfection at the completion of the course. Two courses have been arranged at the beginning—one intended primarily to interest men and boys, the other intended to interest women. If the original courses are received with enthusiasm, other courses will be offered from time to time.

These are the arrangements which have been made. For the men a course will be given in "Radio Reception and Transmission." It will be sufficiently elementary to appeal to those radio enthusiasts who are interested chiefly in the results that they can get with their own sets, and who do not care to go very deeply into technical details. At the same time, it will be broad enough to furnish a sound foundation for a more advanced and technical study of the subject. If a sufficient number of people show interest in this first course, a second and more advanced one may be given later in the year.

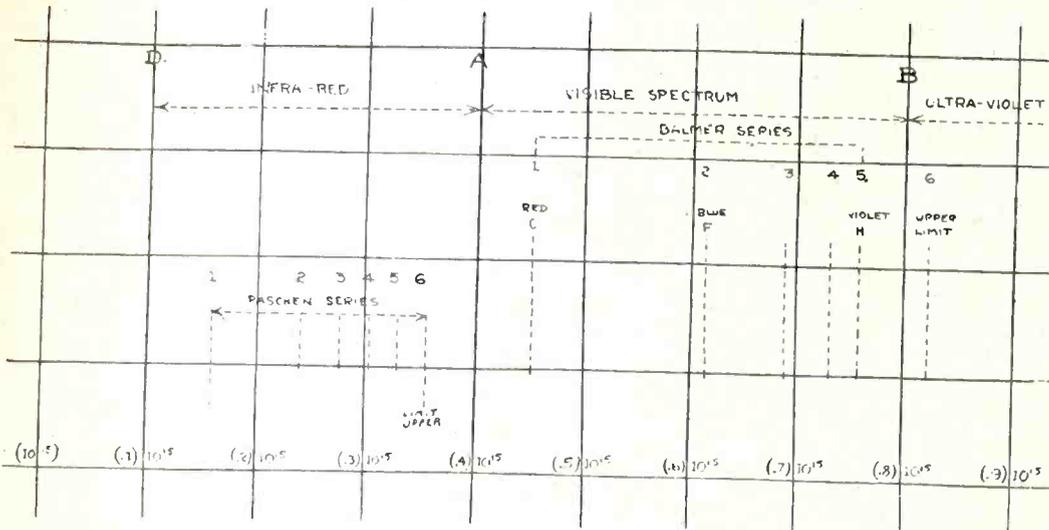
The course will consist of ten lectures, one to be broadcasted from this station by Edward H. Goodrich of Springfield, each Wednesday evening, from 7:00 to 7:20 p.m. The first lecture was given on Wednesday evening, October 3.

For women, the Division will broadcast a course in "Household Management," consisting of eight lessons and given each Tuesday evening from 7:40 to 8:00 p.m., beginning on Tuesday evening, Oct. 16. The instructor will be Miss Agnes H. Craig, teacher of domestic science in the Springfield School Department. The arrangements for this course are similar to those for "Radio Reception and Transmission."

Radio amateurs are urged to apply their lessons of the past to the future in a message from Hiram Percy Maxim, President of the American Radio Relay League, which was read at the official opening of the Second National A. R. R. L. convention at the banquet in the grand ball room of the LaSalle Hotel, Chicago. Mr. Maxim's message reads in part as follows: "This convention is without question the most important event that has yet happened in amateur radio. It comes after two of the most active years radio has ever seen, and it precedes two years which are unquestionably destined to produce achievements many times broader than have gone before."

"We have already been asked to help out the Australians, English and other amateurs and it is my belief that the time has come for the calling of an international convention and the organization of a world's amateur radio league.

"It is the biggest thought that has presented itself to us, and I urge that you give it your thoughtful attention so that our board may have the benefit of a general study when it comes to consider the matter."



THE HORIZONTAL LINE GIVES A SCALE EXTENDING OVER THE 10¹⁵ REGION FROM 10¹⁵ TO (9) 10¹⁵. THE VISIBLE SPECTRUM IS INCLUDED APPROXIMATELY IN THE REGION AB. AD IS INVISIBLE. IT EXTENDS BELOW THE RED THROUGH AN IMMENSE SERIES DOWN TO 10⁶ WHICH BRINGS US WITHIN THE REGION OF RADIO FREQUENCY. THE HYDROGEN LINES OF THE VISIBLE SPECTRUM, AS COMPUTED AND MEASURED, ARE SHOWN AS C—F—3—4 AND H. They CANNOT GO ABOVE THE UPPER LIMIT 6 IN THIS SERIES. THE PASCHEN SERIES IS SHOWN IN THE INFRA-RED

- 5—(3.29) 10¹⁵ (1/4—1/49)
= (.7551) "
- (3.29) 10¹⁵ (1/4—0) = (.82) "

See Fig.

This series of hydrogen lines shown in plate 1, is within the visible spectrum. This series is known as the Balmer series since he was the discoverer of this relationship in 1885 as expressed in the formula

$$1/Xn = R (1/4 - 1/n^2)$$

where R is a constant and n a whole number.

The above five calculated lines are of course easily found experimentally in very exact agreement with theory. They were known long before any existing theory was developed.

Ritz assumed that lines would be found which satisfied the following equation

$$f = R (1/9 - 1/n^2)$$

and Paschen observed the first two of these in 1909.

- First lines 1, 3.29 10¹⁵ (1/9)
= (.16) 10¹⁵
- 2, " (1/9—1/25) = (.234) 10¹⁵
- 3, " (1/9—1/36) = (.274) 10¹⁵
- 4, " (1/9—1/49) = (.29) 10¹⁵
- 5, " (1/9—1/64) = (.33) 10¹⁵
- Upper limit " (1/9—0) = (.36) 10¹⁵

These lines are located in the infra red, below, the visible spectrum as marked in Plate 1.

The high frequency spectra as shown by the reflection of X-Rays

This gives the K group of the X-Ray spectra, giving a frequency 4 times that of hydrogen. The L group is given by

$$f = N^2 R (1/22 - 1/32)$$

These two formulas carry us into the ultra-violet. This indicates that all the elements are made of hydrogen as the basic material. It would be unprofitable to pursue this subject further here, as it leads to spectra of the other elements which is of course an almost endless subject.

The spectra of the radio is of course situated far below the infra red, and this subject may be taken up later if the further development of this series of articles in their application to radio phenomena seems to warrant it.

Further investigation of the phenomena as applied to radio-frequency and audio-frequency will require experimental investigation of frequencies radiated from mechanical systems, such as an antenna and its attendant parts, which are very different from an electron oscillating around a central positive charge but which may be brought into close mathematical relationship and hence be subject to the same mathematical analysis.

Study Radio by Radio

In order to further extend the use of radio so that it may be put to utilitarian uses, Westinghouse Radio Station WBZ at Springfield, Mass. has arranged with the Massachusetts Division of University Extension for a number of courses in which the successful student will obtain a certificate

Hootnanny Oscillating Transformer

By P. N. MAYNARD

Here is some real dope from an old-timer. Mr. Maynard, formerly 9MN and 9A00, who had the good fortune to send the final armistice message, now 6CCH and operator at KUS and 6CMR, has figured out a lightning change method for adjusting wave lengths which should enable every amateur to take advantage of every portion of his wave range at will. And how we do crave that "Hootnanny."

THE new regulations giving the "Ham" a band of wave lengths from 150 to 220 meters, open up a new field to amateur communication. No doubt these new regulations are going to be the direct cause of breaking up some of our own QRM among ourselves, to say nothing of the increased amount of traffic we are going to be able to clear. This improved state of affairs is going to be brought about by means of a quick and accurate wave changing outfit. QSY is destined to become one of our most common Q signals and it is hoped it will run a close second to CQ as a favorite conventional sig.

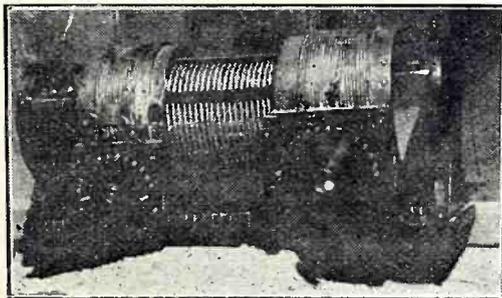
To QSY in spark work would not be so much, but for the modern CW hound who is "busting" up the ether on all the neighboring planets, it involves a little more complication, but at that it isn't so worse, for the following effort will describe a Hootnanny O. T. that is and will cut the buck and then some. This Hootnanny oscillation transformer will play a tune all up and down the line, as far as wave lengths are concerned. The photo shows the Hootnanny O. T. as is. This Hootnanny O. T. has a rapid fire change of wave lengths and can be made, on five seconds notice, to percolate on 185-200-300-360 or 600 meters. Any one of the changes can be made on short notice and the pretty part of the story is that the changes can all be made while the transmitter is hot, in other words, all adjustments of plate, grid and antenna coils; to say nothing of coupling, can be made with the transmitter in operation.

This Hootnanny O. T. has been doing business at 6CCH (KUS on 360) for better than a year and was recently duplicated at 6CMR. It sure eats up this QSY stuff in a hurry. Here at KUS I can make the change from 360 meters down to 200 meters in just five seconds, by the clock. This change covers a wider band of wave lengths than the new regulations have allotted to the "Hams."

The Hootnanny O. T. is used in conjunction with the Meissner circuit, both at 6CCH and 6CMR. This is the same circuit that friend 6JD used on that old space annihilator of his, when he broke the ear drums of the Ausies, during the recent Australian tests. As to the transfer of energy in this Hootnanny O. T., I guess it

transfers a little of that ether 'bustin' stuff too, for 6CMR got through to Australia and was among those present, heard in New Zealand, and for further evidence turn to Mix's report reporting 6CMR off the Greenland coast, in August. (Two 50-watt bottles at 6CMR). However I cannot say how the Hootnanny O. T. would work out on any other circuit than a Meissner, as I have not tried it, but I'll venture a guess that the modern CW hound, found in the A.R.R.L., is the guy that can make this Hootnanny O. T. percolate on about any old circuit.

To get the wave changing down to a system where speed and accuracy are obtained, requires some little experimenting. The set should be tuned with an accurate wave meter and the radiation brought up to maximum on the desired wave and then the settings of every movable part of the transmitter recorded, and this record kept han-



HERE IS THE COMPLETE HOOTNANNY OSCILLATION TRANSFORMER HERSELF. HANDSOME DOOHIKUS WITH A SWEET NAME.

dy for reference. It has been found that once a setting is worked out and recorded it can be depended on to be the same and do the same, today tomorrow and next week, provided the same exact settings are used as per the record of the previous settings.

Antenna Coil

The Antenna coil consists of an UL-1008 Radio Corporation Oscillation transformer, with the base and other supports removed. Only the copper spiral is used. The coil is supported and its shape held by three bakelite strips, $\frac{1}{4}$ in. thick $\frac{7}{8}$ in. wide and 24 in. long. These strips also act as supports and slide rods for the plate and grid coils, which are slid back and forth, to vary the coupling. Slots were cut in these bakelite strips with a hack saw, using a blade the same thickness as that of the copper spiral, the set in the blade will allow ample space

for a snug fit of the copper spiral in the bakelite strip. The wooden support that came on the original Radio Corp. Oscillation Transformer was clamped in a vise along with the bakelite strip and made a perfect templet, and maintained the original spacing of the turns of the copper spiral. The bakelite strips were then slipped over the copper spiral giving the coil its original uniform shape and making it rigid.

The end supports were sawed out on a band or with a coping saw, from one-inch well seasoned oak. One quarter inch slots were hen mortised in each end support, to allow a snug fit for the bakelite strips. This arrangement completes the antenna coil, giving a coil of ample carrying capacity as well as enough turns to cover a wide band of wave lengths and with the strips snugly fitted to the end supports, which are fastened to the base of one-inch oak, giving a very rigid layout.

Building Coils

The tubes of the plate and grid coils could not be purchased at the time of construction, so they were constructed by pasting several layers of thin cardboard together, around a form eight and one-quarter inches in diameter. The form used in this case happened to be a roll of wrapping paper. The diameter of the tubes determined the distance from the windings of the plate and grid coils, to the winding of the antenna coil, which determined the coupling as well as the decrement of the emitted wave to a great extent. This diameter gives about an inch clearance between windings and the emitted wave is extremely sharp. Enough layers of cardboard were pasted on one another, until a tube $\frac{3}{8}$ of an inch had been formed, and in this case the tube was about twenty inches long. The whole shebang was then set away and allowed to become thoroughly dry before attempting to remove the tube from the roll of wrapping paper. The roll of wrapping paper was pretty well mussed up before getting the tube off, but finally the tube was removed and then cut in half and smoothed down to a thickness of a quarter inch, on a sander. It would be very much easier and would simplify matters to a great extent, to purchase bakelite tubes of the desired dimensions, as well as making a better job both mechanically and electrically, to say nothing of the trouble and grief

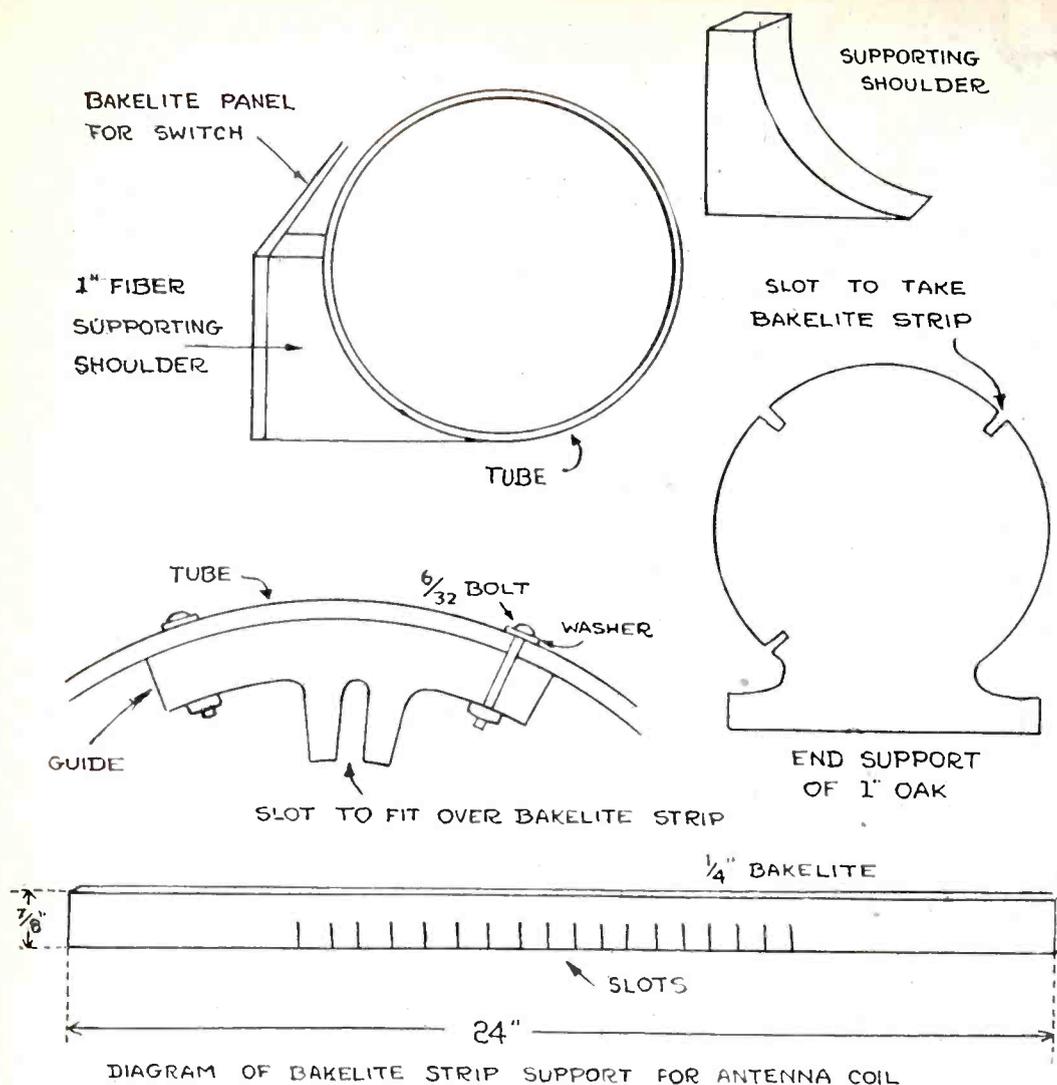


DIAGRAM OF BAKELITE STRIP SUPPORT FOR ANTENNA COIL

encountered in constructing the tubes. The tubes were given a thorough boiling in paraffine after being sanded down to the quarter inch thickness.

The guides were made from one-inch fiber and sawed to the desired shape with a coping saw (see diagram) leaving an ample shoulder to secure them to the inside of the tubes with a $6/32$ brass machine screw, placing a brass washer under the head of the machine screw, outside of the tube. Some difficulty was encountered in getting the guides in the proper position so that the tubes would slide freely on the bakelite strips. It was found that the easiest way to accomplish this was to slide the tubes over the antenna coil and its supports and then slip the guides down the bakelite strips and secure them in position with the guides on the strips. This gave an accurate alignment and allowed the tubes to slide freely over the antenna coil.

The windings on the plate and grid coils are of rubber covered, 19 strand high tension wire, which was purchased from an automobile supply house. The windings are placed on the tube as tight and as close together as possible, making the winding neat and smooth. The wire was then marked with a pencil, where the taps were to be taken off. These tap marks were staggered, so that no two taps would fall next to one another. The winding was then taken off and the insulation carefully skinned where the pencil marks

indicated that a tap was to be taken off.

Taking Off Taps

Leads about twelve inches long, which allowed ample length to reach any one of the switch points on the face of the coil, were carefully tapped and soldered and the joint finished off by taping with rubber tape, making the insulation at the tap equal to that of the rest of the wire. This wire with the taps soldered and taped to it, was then rewound on the tube and the taps fell exactly in the position they were marked with the pencil making them stagger so that no two taps lay next to one another to eliminate any danger of insulation breaking down at the joint. The coils were then given a thorough boiling in paraffine, which after cooling held the windings securely in place. The number of turns on the plate and grid coils had to be determined by experiment for this particular case and cannot be vouched for, to apply to all sets, as the average set does not have to cover as wide a band of waves as is required of a limited commercial station. However, in this case, there are sixteen turns on the grid coil, with twelve taps taken off at single turns. From 200 to 360 meters only four points on the switch are used which means 8 turns as the first four are not tapped, but it is necessary to cut in all sixteen turns to get up on 600 meters. The plate coil in this case has twenty turns with four-

teen of these turns taken off in single turn tape. The switch point readings are 4 points or eight turns for 200 meters, 10 points or 14 turns for 360 meters and all 20 turns are cut in to get up to 600 meters.

The switches are mounted on the face of each of the coils by shaping two supporting shoulders out of one-inch fiber so that the face that supports the switch contact panel is perpendicular and the back side is cut to fit the outside curve of the tube. Then they are bolted to the coils, on the space not occupied by the windings. This makes a support to which the bakelite panel is bolted and a switch of the rotary type is built on this bakelite panel. (see diagram).

The switches are made just like we used to make them for the old loose couplers, we used to use back in the old days in 1910, except that the spacing between the contact points is a little farther and the switch arm is heavier. The switch points are mounted in the usual way on a bakelite panel and the leads from the coils carefully soldered to them on the back side of the panel. The switch knob is necessarily of good moulded bakelite and not "mud" as the knob is used to vary the coupling as well as the capacity and were the insulation to break down one would find he had a whole hand full of the real hot stuff, so this knob must be of the best insulation obtainable. It is soon learned that the fingers and knuckles must be kept clear of the switch arm and switch contacts during tuning or wave changing with the transmitter in operation, as a 'fellers mitt' is right there in amongst the hot stuff and let me say that if a finger or knuckle slips here sure is an awful stench set up, the smoke rolls off the burning skin and it don't take long to become convinced that the stuff is really hot. Variation of the antenna coil in this case is obtained by a single pole double throw switch, but where a greater number of variations are desired it can be easily worked out by incorporating a rotary switch on one of the end blocks, the same as on the plate and grid coils, with a lead running from each switch point to a different clip on the antenna coil. The position of the clips once determined by a wave meter are not altered, but brought out with separate leads to switch points on the end supports, using the heavy rubber covered high tension cable from clip to switch point. It then becomes an easy matter to refer to the recorded setting and, with a simple twist of the wrist, set the antenna coil to any desired wave. Another twist of the wrist and the grid and plate coils are in resonance and the deed is done and the wave is where it was intended to put it.

Number Switch Points

Of course all switch points must be
(Continued on Page 255)

Cat Whiskers

By A TICKLER

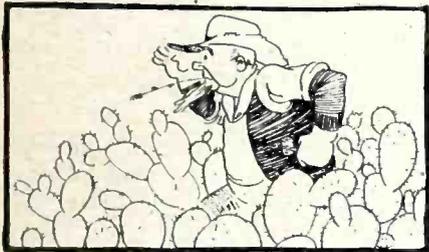
IDYLLS OF COCONINO

The Codger sat on a desert rock
And studied the holes in his tattered
sock.

His battered brain'd had an awful
shock.

It rocked him through and through.

Hank Snodgrass lived in a cactus pile,
From Coconino about a mile.
He bet the Codger quite a pile,
And won it, every sou.



For Hank had bought him a radio set.
The Codger snorted, and then he bet.
If Hank hadn't won he'd be listening
yet.

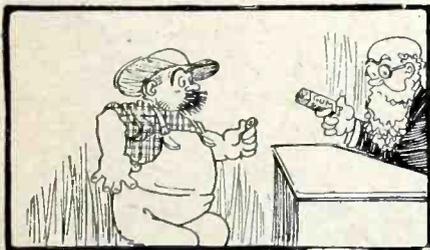
But it made him very blue.

So without his dough and without his
shirt

He sat surveyin' the desert dirt
And great tears cum; he was awful
hurt.

Those tears, they stuck like glue.

"It's much beyond my intellect
"To know just what we can expect
"Or what the heck will happen next
"In this nineteen-thirty-two.



"This desert may be full o' frogs
"And water falls and mushy bogs
"And we may all be breathing fogs
"In nineteen-forty-two.

"Since Ether waves and radio cum
"I've quit terbac and took ter gum
"No longer swig th' demon rum
"I'm feared o' what is due."
'Twas thus he wept and wept and
wept
Great slip'ry tears, and never slept.
Th' tears soaked dust and thus they
kept
And hardened fast and true.



'Twas gypsum dust and calcium white.
It hardened thus throughout th' night.
It hugged th' Codger hard and tight,
A statue out of goo.

And as you drive the desert bleak
You'll see this statue there. A freak
Of nature, some will softly speak.
But the Codger, he is through.

JOIN THE COMMITTEE OF THIRTEEN

Notice: A. Tickler has decided to form a committee of thirteen. A new industry has developed in the radio field, the writing of anonymous letters, and another organization has grasped this golden opportunity by the tail, and calls itself The Committee of Nine. We, as the Committee of Thirteen, propose to twist the tail clear off the said G. O.

The Committee of Nine is already active, but we are going to flood the mail with enough anonymous letters signed by the Committee of Thirteen to make the Committee of Nine look like a hand painted alligator.

When we say the opportunity is golden we mean that it clinks like the side pocket of a bank president. It fairly reeks with undeveloped territory. So far the surface hasn't been tickled by a one-legged chicken.

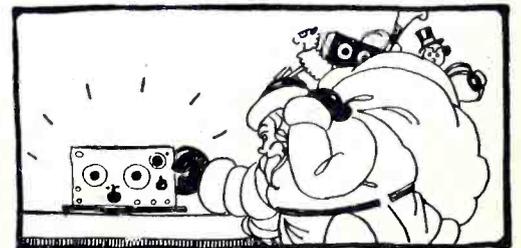
For those who are unfamiliar with the field, it might be well to state that so far our rivals, The Committee of Nine, have written only one bonafide anonymous letter. That was sent to a well known amateur in Southern California and made some paltry threat about taking up his case with higher authorities.

Just think of it! Think what a feeble effort compared with what The Committee of Thirteen can turn out. We can write letters to everybody—even the milkman and Santa Claus, threaten them with everything that is bloodthirsty, call 'em anything we please, and sign The Committee of Thirteen. We can soon become the biggest organization on earth, because every dad-blasted one of us knows

half a dozen folks he would like to write to and tell 'em what he really thinks, if he didn't have to sign it. That is where we come in. He doesn't have to sign it. Just put Committee of Thirteen on the end and "all will be jake" as the girl said to the bill collector who had lost the bill.

Now here is our plan. Simply write an anonymous letter to somebody, sign it Committee of Thirteen, send us the proof that you have written such a letter, and we will send you a hand decorated brickbat from Kolin Kelley's yard, admitting you to membership in this highly erudite and fast growing enterprise. The only condition attached is that you write the letter, send us the proof, and present affidavits to the effect that you do not belong to the Committee of Nine. We must draw the line somewhere. So write the letters and send us the dope.

Yours for the biggest organization of anonymusers in America,
A TICKLER.



A big stocking will make an excellent Christmas receiver.

Dad will experience strong fading effects shortly after Christmas; a case of too many receivers.

It takes more than sugar and smoke to cure the average ham. Ask his family.

Have you joined The Committee of Thirteen, great rival organization to The Committee of Nine? We are going to have an anonymous board of directors meeting and elect anonymous officers as soon as thirteen members are in. Remember, the big advantage of the organization is that you need sign your name to nothing. Just use "Committee of Thirteen." It sounds unlucky but wait and see.

*We sit up nights and listen,
To squawks and howl and yell
Then we love to get up mornings,
Oh yes we do, like Oskaloosa.*

Hundred and Fifty Across to Australia

Despite the possibility of a damaging draught on our immaculate dome we hereby remove our sky piece to the Australian, New Zealand and American Amateurs who put over the second Trans-Pacific test under conditions which would send a fainter-hearted race of men overboard. Despite the rottenest weather conditions possible, it seems, Americans from almost every district pounded through and Australians and New Zealanders copied them.

“WE have logged 150 American stations to date and all reports are not in yet by any means,” writes H. Stanley Love, head of the Australian end of the Trans-Pacific tests, on November 1. “These tests have been a wonderful success and have broken all world records,” he adds. This letter, just received as we go to press, describes weather conditions there as “the worst possible to receive under.”

Maxwell Howden, 3BQ, Victoria, Australia, writes us under the date of November 5, giving the log of his station up to that time.

This log has not been checked, officially, and the report is in no way official, but here are the calls listed as piling into the Victoria station:

October 15,—6CRM, 6CGW.

October 16,—6ZI, 6ALV, 6ZI.

October 17 to 18, closed, bad QRM.

October 19,—6 (? RG), 6CBI, 6I (?), 5LR, 6MO, 6XAR, 6BQL, 5PA, 6CMR, 6ABK, 6CMG, 6LX, 6ZI, 6RX, 7LR, 6LX, 9DFH, 6ASU, 6ALV, 7HG, 6ALW, 7HW, 7EH, 8CGE, 9CHN.

October 20,—6KA (complete message from Radio Journal while sun was shining in Australia), 8PA, 6CGW, 9CGL, 6BSR, 6BUC, 9E(?)Y, 6ALV 6CU, 6CA, 6CM.

October 21,—6KA, 6PCC, 9ZX, 9MC, 9BZI, 9CTR, 7LBP, 9MC, 9BZI, 9KY, 2BM.

October 22,—2AR, 6DBC, 6CFZ, 9MC.

October 23, 6CGW, 6BFC, 6KA, 6CGW, 6CMR.

October 24,—7VH, 9BAK, 6MG, 6CMR, 9BAK, 3YP, 7BZC, 6BJQ, 6PLZ, 6AWT, 6PLC, 9MC, 9DQ, 6BBC, 3AF, 2RV, 9EY.



THIS, FOLKS, IS A CLOSE-UP OF H. KINGSLEY HIMSELF, THE MAN WHO DISCOVERED THE AUSTRALIAN TRANS-PACIFIC TESTS. MR. LOVE ORIGINATED THE IDEA, TOOK IT UP WITH AMERICAN AMATEURS, AND PUT IT OVER. TO HIM BELONGS THE REAL CREDIT FOR DEVELOPING AN IDEA OF TREMENDOUS IMPORT TO AMATEUR RADIO.

October 25,—6DCH, 6DKG, 6NG, 6AON, 7UY, 8AQ, 6AVV, 5EC, FINCA, 2BY, 6BVG, 7DT, 6AT, 6TS, 5ZS, 7AJ(?), 6KA, 9BAK, 9RK, 6ARB, 6BBC, 6ALV, 6PL, 6BBC, 6PLC.

October 26,—9MC, 6MB, 6PLA, 6KA, 6CGW.

October 27,—6AUU, 6KA, 6CGW, October 31,—6BQC.

November 1, 6AOS, 6BVG, 6VJT, 9AVU, 8AGN, 6BBC, 6WK, 6AOS, 6CMP, 6CKR, 6BBC, 6ABO, 9ZT, 6CPG, 6GBK, 9BRK, 6ALV, 9CK, 6ARB, 6GKN, 6AF.

November 3, 6ARB, 6CWE, 6BBW, 8AQO, 6CWE, 6KA, 6CHV, 8AQO, 8FZO, 6BBC, 8GZ.

Mr. Howden verifies Mr. Love's statement as to rotten weather conditions. Static and interference were present at all times.

A mass of informative detail and comment on various American stations, their signal strength, conditions during specific reception, etc., will be published in the next issue of Radio Journal, together with, it is hoped, the official report.

Too much can not be said in praise of the Australian receivers who spent liberally of time, ingenuity and money in a determined effort to log every possible American station under conditions which would have disheartened many other amateurs.

Several days after the tests started, Radio Journal gave 6KA a special message to H. Kingsley Love of Melbourne, Australia, asking Mr. Love to cable conditions and strongest station. The cable came promptly reporting 6KA himself as strongest, but giving us the bad weather tip. It is confidently expected that in this, the second test, the biggest list of American amateurs yet logged in the great circle will be forthcoming.

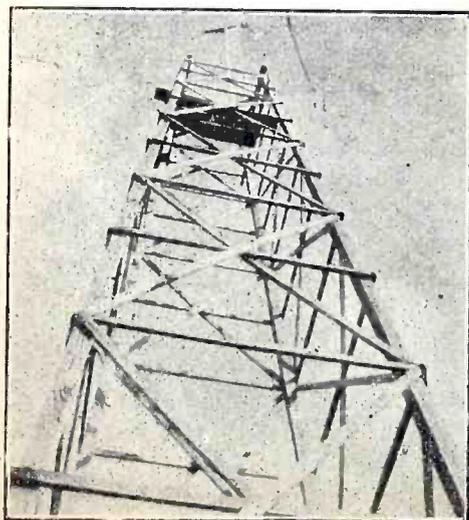
Everyone gave hearty support to the tests. The A. R. R. L. and QST were behind them solidly from start to finish, they handling the entries from the eastern half of the country, while Radio Journal and the South-

Last minute reports on the listening end of the Australian Trans-Pacific tests: 3GM, 3DW and 3BQ believed to have been heard but data for checking not available at the present writing.

Reports on American reception in Australia and New Zealand are not compiled, but should be in in ample time for the next issue. F. D. Bell of Pamperton, New Zealand, reports 6PL, 8BDA early in the tests. J. W. Worthington of Auckland, N. Z. logged 113 American calls early in the test.

The next Australian and New Zealand test with America may include phones. New Zealanders are certain they can read American phones.

R. Slade of Timaru, N. Z., is calling 6JD, V. M. Bitz, every night at 10:30 to 11:15 p. m. Pacific Coast time. Bitz passes this along so other hams can listen in about 230 meters.



WHILE THIS IS THE MAST OF THE FAMOUS AUSTRALIAN STATION 3BM, IT IS ALL MADE OF AMERICAN OREGON PINE AND IS 70 FEET HIGH. NOTHING LIKE PICKING UP YANKS ON YANK STICKS.

ern California Radio Ass'n handled those from the western half.

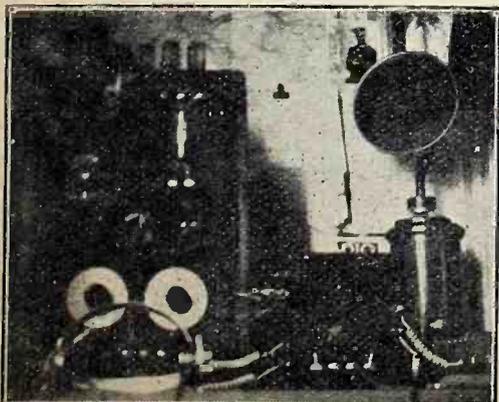
While credit is being given, it should be remembered that practically every amateur in the United States did his best to help and that Canadian amateurs and Canadian amateur publications did their part with a will.

On the Australian side too much cannot be said on behalf of the work done by H. Kingsley Love and his associates in organizing Australia, New Zealand and others of the great circle group. Mr. Love is the man who originated the Australian-Trans-Pacific idea, sort of the "Grand-daddy" of the Trans-Pacific as it were, and has given every bit of his energy to the successful conclusion of the first and second tests.

On the receiving end, the reports, so far, are meagre. Groups of amateurs, particularly along the Pacific coast, rigged special stations for reception of Australian signals and several have been logged, it is believed, but official time and code words are not yet at hand from Australia to check with. The Australian stations believed to have been logged are 3BW, calling California test MBD, 3BJ and several others not so definitely determined.

The next big project on tap is the South African tests for sometime next spring. Arrangements are being completed with the Radio Society of South Africa, a very large and strong organization of amateurs, for a test for the reception of American signals next spring. All that remains to be announced are the dates and times. This will be an early evening test for American amateurs, transmission to take place before the broadcast period begins. It will be, by many thousand miles, the longest range test ever attempted, as was the Australian up to this time. Projects are already under way for a definite series of Australian tests, possibly limiting power both at the receiving and sending ends.

Wallie A. Gee, well-known amateur of Devonport, New Zealand, who has featured receiving American stations



WALLIE A. GEE, OF NEW ZEALAND, KNOCKED OVER A BATCH OF AMERICAN SIGNALS WITH THE SINGLE TUBE LAYOUT. HE IS GOING TO BE AN AMERICAN HAM SOON.

on a detector tube only, plans to move to America. His letter to Radio Journal, with a description of his set, is interesting.

"At the present time I am selling up my gear as, in May, I am going to San Francisco to live and hope to be "Ether Bustin" with a transmitter under American regulations shortly after I arrive. I am a jeweller by trade and providing I can get employment I will be there to stay; I will certainly look up some of the San Francisco hams I have been receiving and tell them how their sigs come in down here.

"The Government regulations are very unfair in this country and they are very slow at issuing licenses, consequently very few trouble transmitting, also wireless gear is about three times the price here comparing it with U. S. A. They sure are profiteers in that line here. Nevertheless I have

Test with South Africa next Spring! That's the dope, men. Radio Journal has secured the cooperation of the Radio Society of South Africa for a test to be staged early next spring, the days and hours to be announced later. This will be the longest range amateur test ever staged. American amateurs put over the Australian-New Zealand tests in great style—and there will be more. Now for South Africa, where some hundreds of British amateurs will pick up American signals. The Southern California Radio Association is behind Radio Journal on these tests, as it was during the Australian tests—and they are going over. Are you in?

devoted all my time to receiving. I do not have what one would call a Parlor set, being an experimenter through and through, but the set I am receiving the Yank Hams on, is built in a cabinet form and the appearance equals any factory made gear and the wiring will stand inspection. The gear in it is the best procurable here and the panel is bakelite. The circuit is the usual single circuit, using Giblin Remler coils to which I have attached long extension handles to overcome body capacity. Condensers are, 1 Murdock .001 and Coto Co. .0007 mfs. both of which give every satisfaction, Klosnier vernier Rheostat has been substituted with a Bradley stat. B Battery is home-made. Wet cells, tapped and finely adjusted. Valve is an old type two filament audiotron, with about 16 to 16½ volts on the plate. Phones are Brown's 8000 ohm which compare favorably with Baldwin's best. Regarding antenna I find that the one in use now is the best all-round antenna for reception, 45

ft. high 100 ft. long, 12 ft. lead in single wire, inverted L. The other amateurs in this country except Slade of Timaru, receiving Yank Hams are using four and five valves, but I have only used one bottle throughout, so I guess this receiver is up to standard.



H. KINGSLEY LOVE, ORIGINATOR OF THE AUSTRALIAN TRANS-PACIFIC, AS AN AVIATOR DURING THE WORLD WAR.

I am sending a list of calls heard here during and since the Trans Pacific Test—also a small snap of the set used. With this same mail I am sending in my application for membership into the A. R. R. L. so before long I'll belong to the "Gang."—WALLIE A. GEE, c/o Gee and Beck, Devonport, Auckland, New Zealand."

Here are the calls heard by Mr. Gee on one tube:

3YO, 3CL, 5AEC, 5FT, 5GJ, 5PX, 5ZAS, 5XAJ, 5SF, 5ZB, 5BG, 6KA, 6ID, 6AVR, 6PD, 6AVD, 6PL, 6PD, 6GG, 7SC, 6XAD, 6CN, 6BJQ, 6B-PB, 6CGW, 6APW, 6AWQ, 6AVN, 6BM, 6BED, 6BUM, 6BG, 6GD, 6-KU, 6XBC, 6ZG, 7BJ, 7GS, 6ASR, 6ARB, 6BEG, 7PF, 7ZU, 7SF, 7SC, 9AUL, 9APW, 9BED, 9CXP, 9CUD, 9HRL, 9LG, 9ARU, 9AWS. Pleased to hear from any ham who is a jeweller.

An increase in radio DX work during the past year has made the "logging of Yankee amateurs" one of the favorite sports in New Zealand. Interest in radio is moving forward here to a surprising degree, one amateur having heard many stations in the U. S. A., Canada, Japan, India, South Africa and Egypt. Ever since their successful participation in the first transpacific tests, New Zealand radio

(Continued on Page 259)

Who Will Broadcast What, Which, How?

By REX CARRELL

A feller once owned a bear and a club. A friend wanted a bear and he asked first feller how he got his. "Hit 'im over the head and drug him in unconscious," sez first feller. Second feller sez, "I would like to go and do likewise. Lend me your club." So first feller loans him club. "Come along and show me where b'ar is," says second feller. So first feller goes along, second feller swinging club, and then second feller wallops first feller with club and goes back to first feller's house and gets his bear, which has already been drug in. He gets his bear and hogs competition. The foregoing, however, has nothing to do with what followed.

THE battle between the American Society of Composers, Authors and Publishers, and the National Association of Broadcasters is waxing warm and more is to be heard from this contest, we believe, in the months to come. Many Radio Journal readers, without any desire to wade through a lengthy exposition of all the details of the case, want a summary of the new movement designed to "remove the vests from the vested interests," so here goes:

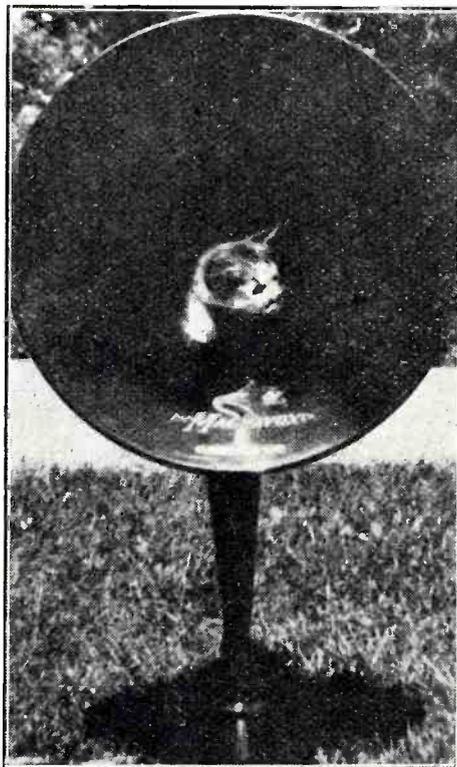
The American Society started the Killarney holiday by demanding pay for broadcasting of material on which the copyright was held by its members. The broadcasters, naturally, were flabbergasted. Prior to their receipt of this bundle of war arrows and war wampum they had been laboring under the hallucination that they were making a lot of popular songs more popular and thereby enriching the members of the American Society. Some were mad as a hatter, however mad that may be, and some were even madder when this demand hit them and a meeting was at once called at the Drake Hotel in Chicago, last April.

The general manager of the American Society was invited in to tell his intended victims, the broadcasters, all about the new shackles being forged for them. He did so and his remarks were so unfavorably received that he and his associates were asked to withdraw from the meeting, according to a report latter issued by the broadcasters.

The broadcasters then and there decided that "united they broadcasted, divided they went blooey," so the national association was forthwith formed. Paul B. Klugh, who organized the Music Industries Chamber of Commerce very successfully, was put in charge, counsel was retained, and the war was on in toto, ad infinitum, etc.

The platform of the broadcasters' organization is set forth in its constitution and by-laws, as follows: To foster and promote the development of the art of radio broadcasting, and the interests of those engaged in any business, profession or industry relating or pertaining to radio broadcasting; to reform abuses relative thereto; to se-

cure freedom to its members from unjust and unlawful exactions; to procure uniformity, equity and certainty in customs and usages of trade and commerce relating thereto; to settle differences between the members and to promote a more enlarged and friendly intercourse between members; to secure co-operative action in advancing the common welfare of its members, and proper consideration and concentration of opinion upon questions relating thereto; to advocate the enactment of just and equitable laws pertaining to or affecting radio; to



WHERE DOES THE CATWHISKER COME FROM? W. S. WIGGINS, 6CHZ, of LOS NIETOS, PUT THIS KITEN IN THE HORN TO FIND OUT.

support every movement to advance the radio art; and to encourage and aid in the development of musical and literary genius, especially where such genius has not proper and just recognition.

The broadcasters, in their official statement, announce the result of a survey of the composers, authors and publishers organization, with the following conclusions: membership, with but few exceptions, included a small percentage of writers of popular stuff, words or music; composers such as the

following were not members: Harry Rowe Shelley; Harvey Worthington Loomis; Henry K. Hadley; Arthur Foote; Carrie Jacobs Bond; Horatio Parker; Charles W. Cadman; Rubin Goldmark; Williams Arms Fisher; W. J. Baltzell; Nathaniel Irving Hyatt; Homer A. Norris; Clifford N. Page; Henry F. Gilbert; Victor Harris; Charles Fonteyn Manney; Arthur Farwell; H. Leighter-Clough; John P. Marshall; David Stanley Smith; James H. Rogers; G. W. Chadwick; Ward Stephens; Samuel Richard Gaines; Cecil Forsyth; John H. Densmore; Mary Turner Salter; Alexander MacFadyen; W. H. Neidlinger.

Nor were prominent American authors members, such as Sinclair Lewis; Edna Ferber; Joseph Hergesheimer; Irvin Cobb; Fannie Hurst; Mary Roberts Rinehart; Sherwood Anderson; Fitzgerald; Carl Sandburg; Ernest Poole; Gertrude Atherton; Lee Wilson Dodd; Edgar Lee Masters; Samuel Hopkins Adams, Douglas Mallock, and Edith Wharton.

Nor were renowned and long established publishing houses members, such as Boosey; Doubleday-Page; John Church; Putnam; Ditson; Dutton; Schirmer; Scribners; Fischer; Doran; Pond; Presser; Schmitt; Schubert; Summy; White-Smith; Wood, etc:

Their published membership showed 253 names of Authors and Composers out of a known list of over 5000.

Their membership of publishers showed 33 names out of a known list of over 1500.

The music of many popular songs has been written by song-writers who were not members of the American society of composers, authors and publishers, proving beyond question that well known "hits" originate among the great number of song writers who are not members of the American Society. A few recent instances are:

"Three O'Clock In the Morning." "Dardanella." "Yes, We have no Bananas." "Love Sends a Little Gift of Roses." "Carolina Mammy." "When Will I Know." "M—A—Double—M—Y." "Wonderful One."

(These songs were quickly gobbled up by the publisher members of the

American Society. If they, however, take over any songs which have been released by The National Association of Broadcasters, it must be subject to radio rights previously conveyed to the broadcasters).

After digesting this, the broadcasters decided that they could put songs over, "plug them" is the technical term, better than any other agency; in a word make them so popular that everyone would want to buy them in sheet, player roll or phonograph record, so a bureau of music release was formed, and publishers and song writers were invited to send in their stuff. A big response was forthcoming. The broadcasters bureau now releases standard compositions, as distinguished from jazz and dance music, for broadcast without any financial return. The jazz and dance music is released under special contracts with the author or publisher whereby varying degrees of what are known as "mechanical royalties" are conveyed to the broadcasters association. Such royalties are provided for in the copyright act which assesses each player roll or phonograph record two cents. Funds derived from its share of such royalties on purely "commercial" music, will be apportioned to the broadcast members, which is the first step taken so far to solve the problem of "who will pay for broadcasting."

And there you are, folks. Some of the publishers say to the broadcaster, "you must pay us for using our stuff. What if you do advertise it. We do not ask for the advertising and prefer to advertise when and how we please." The broadcaster says, "we popularize your music for you. We will dicker with you and make it worth your while, but we will not pay for the privilege of rendering a service." Zip! Zowie!

Officers Elected

The first annual convention of the National Association of Broadcasters took place at the Commodore Hotel, New York City, October 11 and 12th. Prominent broadcasters from all parts of the country were in attendance and for two days exchanged ideas on the theoretical, mechanical and practical phases of broadcasting.

The following officers were elected for the ensuing year:

President: Mr. Eugene MacDonald, Jr., Station WJAZ, Zenith Edgewater Beach Hotel, Chicago. Vice-President: Mr. Frank W. Elliott, Station WOC, Palmer School of Chiropractic, Davenport, Iowa. Vice-President: Mr. John Shepard III, Station WNAC, The Shepard Stores, Boston, Mass. Secretary: Mr. J. Elliott Jenkins, Station WDAP, Board of Trade, City of Chicago; Station WLW, Crosley Mfg. Co., Cincinnati, Ohio. Board of Directors: Messrs: Harold J. Power, William S. Hedges, Henry A. Rumsey, W. S. Harris, Robert Shepard, Bowden Washington, G. Brown Hill.

Mr. MacDonald was escorted to the

Chair, and thereupon took charge of the meeting. Action was taken upon the following subjects:

Amendment of the by-laws to provide for a listeners' membership. Full debate on this matter; referred to committee to develop and complete plans to be submitted at next meeting.

Organization of music publishing company. Full debate, referred to executive committee for immediate attention.

Extension of tax free music service to hotels, theatres and moving picture shows. Favorable action and plan of procedure authorized.

Legislative requirements debated and procedure determined upon, with full authority to proceed.

Here is an offer which should appeal to every lover of good broadcast. Here is action for you on that so-called "interfering amateur." If your concert reception is broken up at any time by what you believe to be an amateur transmitter in your neighborhood, write at once to W. S. Wiggins, secretary of the Southern California Radio Association, Los Nietos, Calif., and he will at once refer your complaint to your nearest traffic officer who will see that investigation is made promptly and thoroughly. The Southern California Association is taking the initial step in this venture in the effort to help the broadcast listener and avert much of the misunderstanding which may have existed in days gone by.

News service for members referred to Executive Committee, with authority to provide best service obtainable so that members may be placed in the position to broadcast bulletins of late news first.

Record manufacturing company. Action postponed; referred to Committee.

Bureau of Music release activities reviewed. Over 100 numbers released in three months. Less than 10 per cent of music submitted has been released. Authorization given to expand agencies for collecting MSS, to include Europe and South America.

Vote of appreciation to radio press for loyal support in broadcasting problems.

An afternoon of addresses and banquet in the evening closed the session.

Radio in Africa

The Wireless Telegraph Company of South Africa, (Ltd.), has been recently organized to provide international telegraphic service for the dominion. The principle high-power station is to be located at Klipheuvel Sta-

tion, Cape Province, about 30 miles by rail from Cape Town, according to advices to the department of commerce. The site comprises about one thousand morgen (2,110 acres) of farm land and is so located as to be about 10 miles distance from any mountains. It is estimated that the station will be in operation in about 18 months. The power of the new station will be 750 kilowatts and it is probable that it will operate on a wave length of about 16,000 meters. The aerials will be supported by 16 towers 800 feet in height, arranged in the form of a circle having a diameter of 1-1/2 miles. Beneath this circle an earth screen will be supported on 250 towers 40 feet in height. The use of the earth screen was determined as the result of experiments carried on at the Marconi station at Carnarvon, Wales. This South African installation together with the stations planned for Canada, Australia, and India and the existing stations in England and Egypt, will form an Empire wireless system, each one being designed to communicate directly with the mother country or with any of the other dominions.

Business circles in Constantza are much interested in a projected wireless telegraph plant. The present radio station at Constantza is used for little more than the distribution of shipping intelligence. The bankers and shippers generally want not only telegraph and telephone (wireless) connection with Western Europe, but also with Constantinople, the Piræus, and Odessa. The project for the construction of such a station has secured the approval of the Bulgarian ministers of communications, finance, and industry and commerce, and, with a certain supply of German material now on hand, it is expected that the new enterprise will soon take definite form.

Not only in farm machinery is the rural dweller being brought up-to-date, but he is also being introduced to many other lines of activity at the annual state fairs which are fast growing beyond the loud toned barker and "wild-man" stage. At several of the big fairs this season, it was demonstrated that a radio barker could do all the shouting that was needed to draw a crowd and what is more a whole lot longer and noisier. Loud speakers switched in and out at the fair headquarters direct crowds from one point of attraction to another with the same ease that a modern movie director shifts the scenery for a great mob picture.

Doctor Donald M. Gildersleeve of Brooklyn, N. Y., writes: "I am a comparatively new subscriber to your excellent publication and find it very solid and enjoyable."

Messing Up the Dear Old Ether

By HOWARD E. CAMPBELL

Mr. Campbell, author of this article, is chief radio engineer for The Detroit News, whose broadcast station is WWJ. The material he presents and the questions he raises are decidedly pertinent. Every once in a while it is worth something to pause, in our contemplation of the present, for a one-eyed squint into the future.

WHAT place is held today in the United States by regenerative detector receiving sets? Why is the use of regenerative detector receiving sets prohibited by law in England?

It is estimated that three-fourths of all vacuum tube receiving sets in use today in the United States operate on the regenerative detector principle. There are more of these sets in operation than there are crystal detector sets. Why? Because at a relatively small expense the old crystal detector set can be rebuilt or replaced by a single-tube outfit which will enable the radio amateur to hear stations from 10 to 20 times as far distant. Because the idea of making a single tube perform the double duty of detector or rectifier and amplifier, appealed almost universally to the shrewd American public.

With the advent of vacuum tube radio telegraph transmitting sets, code signals were sent in "CW," which is an abbreviation of "continuous waves" of radio frequency. Crystal detector sets could not distinguish these modern signals, but a regenerative tube detector can; hence its popularity with amateur radio telegraphers.

About Interference

These statements answer to a certain extent the first question, but there is another side to the question which is demanding universal attention. Simple as these regenerative sets are, they have a characteristic fault. In regeneration they act as miniature transmitters and send out into space an interference during the entire time they are in operation which is picked up by other receiving sets within a radius of from two to three city blocks to 18 to 20 miles, depending on the circuits used in the regenerative receiver interfering and the sensitiveness of the sets picking up the interference. If one set does this, hundreds and thousands of them in a large city generate a veritable bedlam of interference which affect each other and every other type of receiving set, from the cheap crystal outfit to the thousand dollar six to nine-tube outfit.

This interference is a hundred times more extensive and dangerous to the future development of the art than most radio enthusiasts realize. The average experienced operator of such a set will tell you that he never allows

his regenerative tube to oscillate, and therefore does not retransmit or send out interference. He means that he has passed the experimental or amateur stage where the tube "spills" or oscillates violently in his crude attempts at tuning and does not send out those disagreeable whining sounds which we all know so well.

Tubes Oscillate

It will, therefore, come as a distinct shock to such enthusiasts to be told by radio engineers that no tube will regenerate without oscillating, and that unless he makes adequate provision in his circuit to prevent retransmission, his set will send out a constant interfering wave of noticeable intensity even while it is considered stably adjusted to receive a program from a certain station. This interference is very sharp; that is, it covers a very small band of frequencies, but given from three to ten sets in an immediate locality all receiving a program from one particular station, it is a foregone conclusion that each set will be tuned just a little differently from all the others with the result that the entire band of audible frequencies from this station is blanketed, and any super-sensitive receiving set in that neighborhood is completely and effectually barred by interference from receiving this program. Furthermore, it is entirely too much to expect that these retransmitting receiving set operators will all stick to the program from one station and send out a band of interference on that wave length alone. They will have different tastes, and divide their attention about equally between all stations within range which are broadcasting, thus blanketing all of them.

The example of the effect upon a super-sensitive receiving set is cited, because it foreshadows the dire result imminent unless the growth of this evil is checked and finally eliminated. The super-sensitive set will pick up an amount of interference today which the average set would not pick up for a year or two to come when the number of sets in operation is double or treble, and providing, of course, that retransmitting sets are then used in their present proportion.

Concentrate on Station

With the average set in operation today, a lot of dissatisfaction with the quality of transmission of programs from distant stations is directly due to

distortion caused by interfering waves from neighboring re-transmitting receiving sets, and finally a lot of more or less momentary periods of inaudibility of programs from distant stations, which is generally attributed to the phenomena of fading, is in reality caused by pronounced periods of interference as explained above, when a number of operators are concentrating on that particular broadcast.

The idea is not supported by proof, and the suggestion would no doubt cause general surprise that possibly certain stations locally noted for pronounced fading may in reality be so near the middle of the tuning range, and so popular, that they draw this concentrated fire of radio receiver interference. Trouble due to fading from natural causes is serious enough at certain times of the day without its being increased by artificial means.

The above indictment is written around the regenerative detector single tube or triple tube sets where two stages of audio frequency amplification are employed, because they are by far the most numerous offenders, but retransmission is not confined to them entirely. Freely oscillating radio frequency amplifiers, ahead of any type of detector with or without audio frequency amplifiers, create disturbances of various degree, according to the size of the antenna or loop system used in conjunction with them.

All of the above statements which are made positively are supported by fact. The questions raised are of extreme importance to all radio enthusiasts and amateurs, and if you, for one, are not satisfied that they are true, then investigate until you are convinced, and govern yourself accordingly.

Fans Must Solve It

Are we individually going to allow the radio engineer or manufacturer of radio equipment to solve this problem for us? They can only take care of new installation and new equipment. We must take care of our own existing equipment, and call an immediate halt on this woeful impediment to progress. We must do it now for mutual protection, and not wait until the whole structure of radio business topples over from sheer lack of a sound foundation or defective first story.

This citing of conditions, causes and effects, would not be complete without

(Continued on Page 253)

Two Real Winners



The Freed-Eisemann. NR5 Neutrodyne Used with a Magnavox.....

will bring you *pleasing* and complete satisfaction.

Will consistently bring in far distant stations without howl or fuss, even when local stations are on the air---with wonderful volume and unexcelled tone quality.

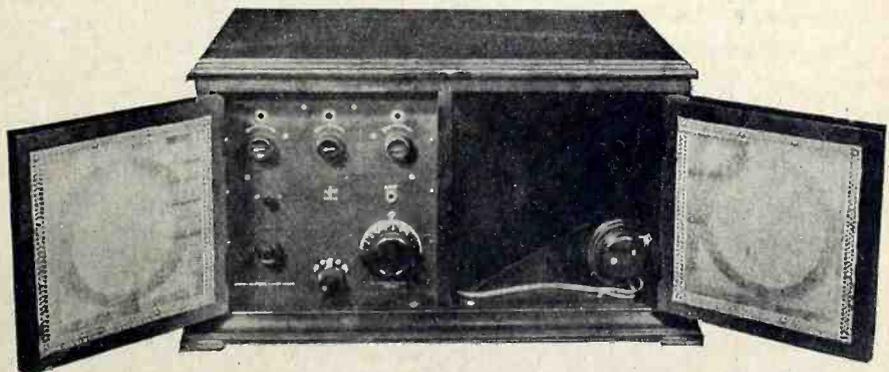
The NR5 is a five-tube radio frequency set, handsome in appearance, simple to operate and as dependable as your phonograph.

Ask the man who owns one

Complete with Accessories \$270

The Precision Ace, Model 3C Consolette

A remarkably efficient three tube regenerative receiver---completely self contained in a beautifully finished mahogany cabinet, with all batteries and wiring concealed.



A piece of furniture that will be an ornament to any home.

A satisfactory performer at a wonderful price **\$178**
---with all accessories - - - - - only

THE BRAUN CORPORATION

Southwestern Wholesale Distributors

363 New High Street

Los Angeles, Calif.



The Marvel of the

Delightful Benefits

If you possess a radio receiving set, there are a multitude of *delightful benefits* and advantages to be drawn freely from the air.

You can enjoy music, if you are musically inclined, and listen to either vocal or instrumental selections, rendered by the very best artists. You can hear instructive talks and lectures, delivered by those who know what they are talking about. Celebrated preachers broadcast sermons, and numerous authorities on all sorts of subjects, from the latest news of the day, to facts of ancient history, can be heard.

Within the privacy of your own home, without dressing up, without using the family flivver, you can enjoy the orchestra music of the leading metropolitan hotels. No haughty head waiters to tip, no transportation to pay—the simple turning of a dial brings the music to you out of the air.

Neither time, effort or expense is being spared by the larger broadcasting stations in the preparation of their programs. Rivalry is keen between different stations, and each is on the alert to out-do the other. The public benefits.

To neglect the opportunity of "listening in" on these talented programs, offered freely and without cost to all who possess receptive mediums, is obviously unwise.

HAYDEN'S ELECTRIC SERVICE,
Mail Order Dept.
1177 W. Jefferson Street
Los Angeles, Cal.

Gentlemen:

Kindly send full information about your "Greyhound of the Air."

Name

Street No.

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

The Greyhound of the Air is a new assembly of the very latest type.

It is extraordinary in its performance. Long distance comes in with unbelievable clearness. The reproduction is simply marvelous, every shade of inflection, every blend of tone, being faithfully and accurately transmitted.

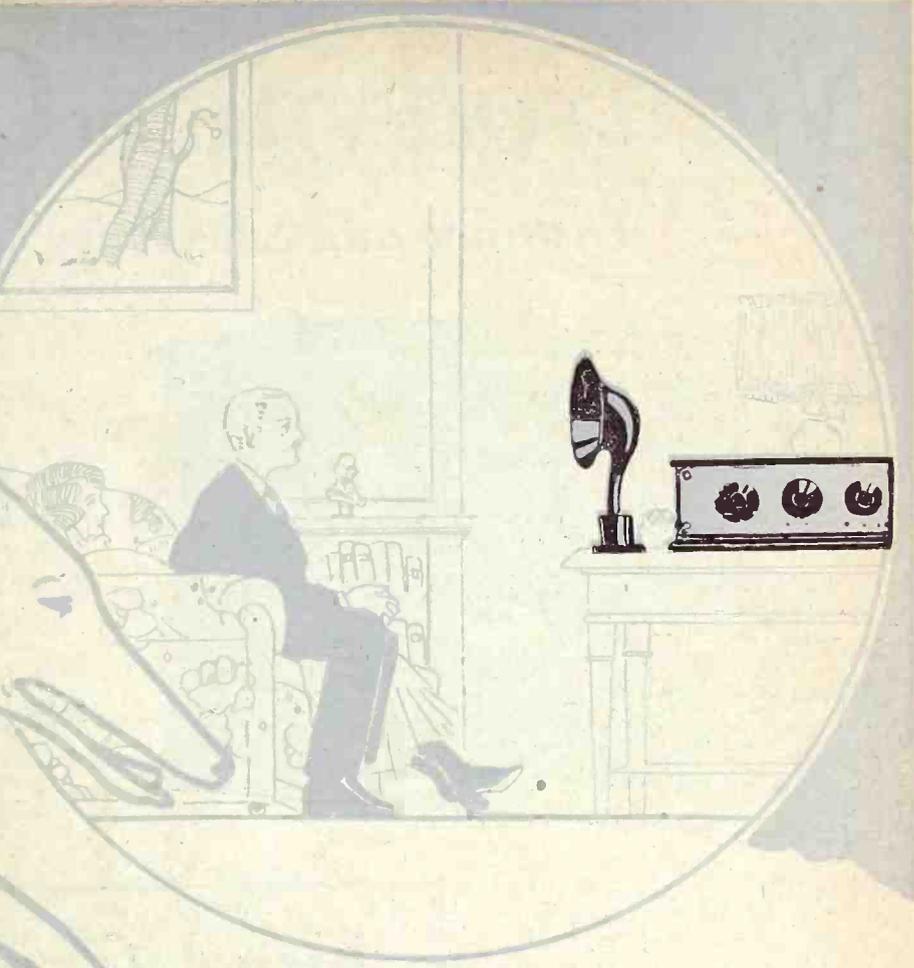
Comparisons with any and all other makes on the market are cheerfully welcomed. Demonstrations can be arranged for at any time.

Sold on Easy Terms
only \$70 down
balance easy monthly payments

Call, telephone or write for further details

Hayden's E

Inquiries from all parts of the United States and



THE AIR

Age

Entertainment-Instruction—Profit

A good Radio Set is something you need every day for entertainment, instruction and profit.

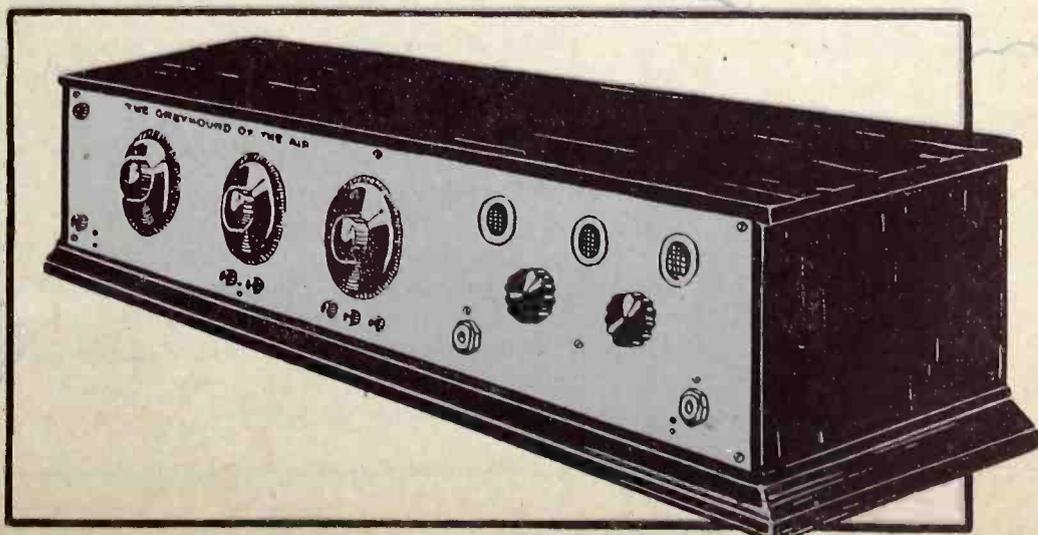
It furnishes high-class entertainment for your family and your friends.

It gives you "constructive lectures, sermons, etc. on the air" continually.

You can profit in many ways from the various helpful hints that are broadcasted daily.

All these advantages are FREE, if you but have an adequate receiving set.

The simplicity and efficiency characterize Hayden's Radio productions.



Electric Service

TWO STORES:

506 West Washington Street

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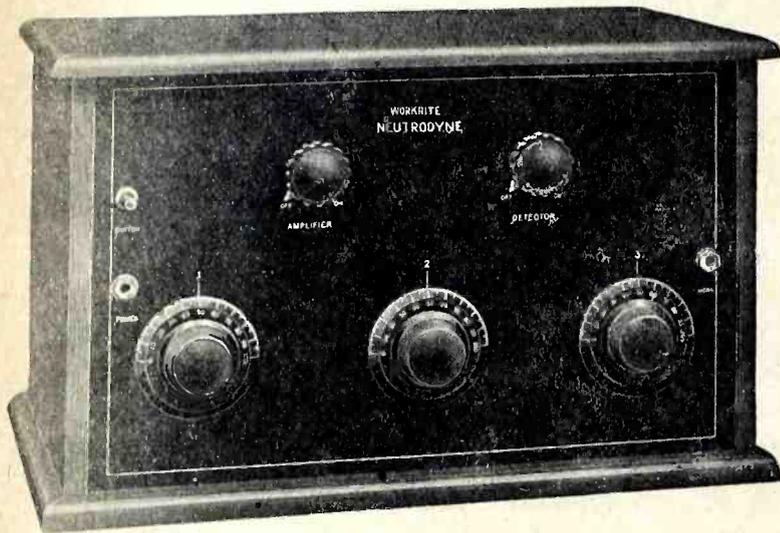
Los Angeles, California

Foreign countries will receive prompt and careful attention. Kindly address all communications to our Jefferson Street store.

Neutrodyne for Christmas

Distance and Selectivity Guaranteed

(Licensed)



**WorkRite
Neutrodyne
Model 201A**

Price Complete \$175.00

---and we mean complete

IF YOU LIVE at a point 20 blocks or over from any broadcasting station, we will guarantee to bring in Portland and San Francisco through local reception at a volume within 10% of that of the local station. Distance is unlimited with this set. National reception is assured. Please do not confuse it with the long, unsightly assemblies thrown together by the amateur. It is factory built and to very rigid specifications. Come and see for yourself!

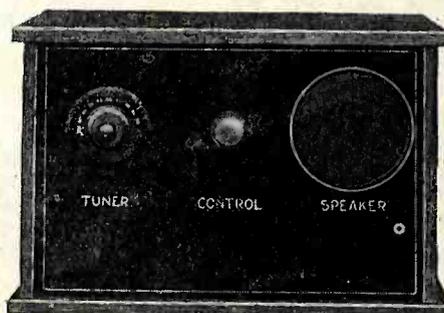
A complete receiver comprises the following:

- 1 Neutrodyne Set, in genuine walnut cabinet, size 10x16x10.
- 5 Cunningham 301-A Tubes.
- 1 Westinghouse, Exide or Willard Battery and Charger.
- 1 Trutone Loud Speaker.
- 1 Speaker Plug.
- 4 Large 22½-volt Ever-ready B Batteries.

NOTE—These sets are made especially for us to our specifications by Kruger & Company Western Factory Branch of Workrite Mfg. Co., Cleveland.

Jewel Concert Receiver

Using Roffy Hetro-Trans 4-Tube Circuit



**Distance—Volume
Quality—Selectivity**

Complete in cabinet—only 2 controls—battery and loud speaker within the walls. The most complete and convenient receiver on the market—and the simplest to operate.

Because we buy everything in large lots—leaving nothing for you to get—this Jewel Concert Receiver sells at an amazingly low price.

\$97.50 ---and there's nothing else to buy.

- 2-tube set assembled complete in cabinet, panel engraved (less tubes, batteries and loud speaker)..... **\$27.50**
- 3-tube set assembled complete in cabinet, panel engraved (less tubes, batteries and loud speaker)..... **\$34.00**
- 4-tube set assembled complete in cabinet, panel engraved (less tubes, batteries and loud speaker)..... **\$38.50**

**THE NEW ROFFY HETRO-TRANS
SELLS at \$8.50**

Build your own set. Save over \$90 and have your apparatus so simply constructed that it is hard to put it out of order. Get clearer tones—more distance—greater volume—better quality and perfect selectivity. Write us today if your dealer cannot supply you.



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for Christmas

the

STENTOR

Super-Speaker

CHRISTMAS JOY comes from making others happy. A Radio Set equipped only with a pair of ear phones is selfish entertainment. Add a worthy Loud Speaker to your set and it becomes a medium of happy entertainment for your family and friends.

You could not buy anything for a Christmas present for your family and your friends that would bring more joy than the Stentor Super-Speaker. It will make for Christmas cheer for many years to come and will be a constant and beautiful reminder of your unselfish love and esteem.

The *Stentor Excels* in . . .

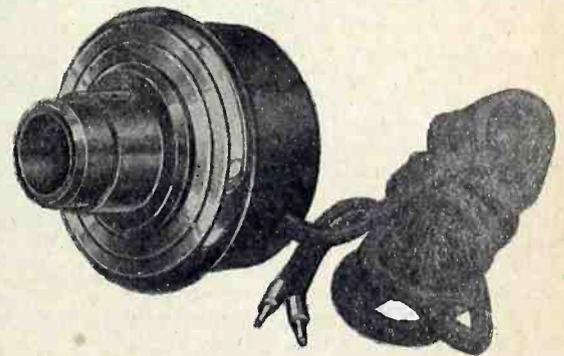
Tonal Quality---Audibility---Sensitivity

It has a rich resonant tone. It is clearly audible and will not rattle or distort. It has a wonderful range of sensitivity from the most delicate shadings of the human voice to the thunder of the pipe organ.

This Super-Speaker embodies a new and novel application of the cantilever principle which is mechanically and scientifically correct. It is made of the highest grade of magneto-tungsten steel. The diaphragm is of non-metallic construction and its factory adjustment is permanent and fool proof. The horn is made of wood pulp and is absolutely neutral. The Stentor can be used with a horn or, by using the adapter which comes at 50c extra, it can be quickly and easily fitted to any standard phonograph.

The Stentor meets all requirements, from one stage of amplification to a power-panel. It is equally supreme for the home where a moderate amount of tone volume is desired, and for dancing or outdoor speaking, where a big volume is necessary. It meets both needs with clarity and richness.

On account of the extreme super-sensitiveness the Stentor can be used for tuning-in long distance reception in many cases where it would be impossible to get as good results with a pair of ear phones.



Price \$22.50 with horn and base complete.

\$10.00 for unit only

.50 extra for adapter.

Manufactured by the

STENTORPHONE COMPANY

627 South San Pedro Street

LOS ANGELES

CALIFORNIA

With the Western Amateurs

A Department Conducted by A. L. Munzig

It is the purpose of this department to establish a meeting place, figuratively speaking for the Western Amateur. In this department of the Western States in regard to current events which particularly interest those on this coast. We want you to feel that this is *your department*—so don't be backward in voicing your opinion of the idea! If there is anything about your transmitter or receiver that you would like to know, shoot it in to this department and we will see that you are informed.

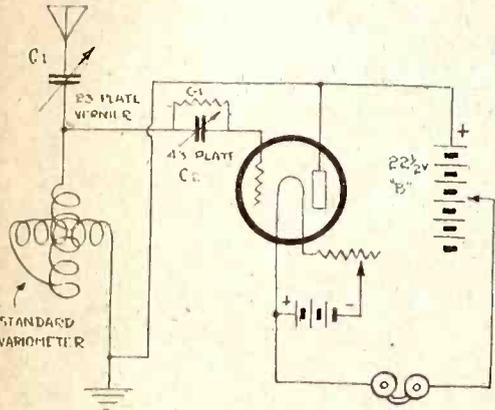


Fig. 1

We want the *Western Amateur Department* to go hand in hand with the A. R. R. L. of which we practically all are members. But whether you are a member of the A. R. R. L. or not we want your co-operation to promote a spirit of goodfellowship and co-operation with the amateurs of the Western States.

First of all we want to chronical the activities of the Western Amateur. In order to do this we must get the information right from the Amateur himself! If you are doing any handling of traffic and believe that some of the congestion that occurs can be helped or entirely obliterated,—then let's hear from you!! Don't think that whatever you suggest will be ignored!! If it appears logical to you then surely others would like to hear about it.

What kind of a set have you got? What type circuit are you using? Does it eat up distance? What is your greatest DX record? What receiving circuit do you believe to be the best for CW reception? Do you believe that the spark transmitters should be obliterated? What do you think of the present no transmission period between 8 and 10:30 p.m.? Let's get your opinion on these few points of interest! Send us your calls heard over 1000 miles.

Friends of Ralph Smith, 5ZP will be glad to hear that he has located in Redlands, Calif., and expects to do a great volume of traffic handling and DX work this coming Winter. His address is 222 Buena Vista St.

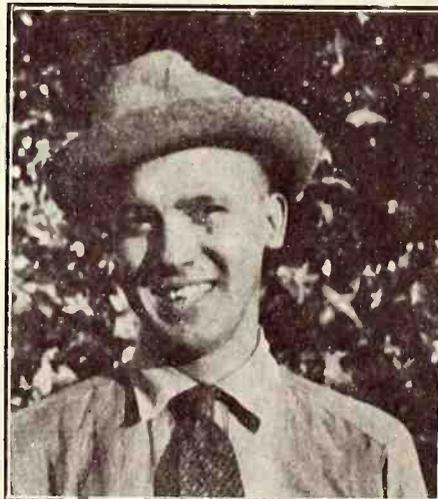
A very good circuit for reception of CW signals on 150 to 250 meters is given in Fig. 1. Tuning is done with the 23-plate variable condenser C1, and oscillations are generated by the variable grid condenser, C2, which consists of 43 plates. A grid leak (GL) can be employed to advantage but the correct amount depends on the type tube used. Try this circuit and you will throw your present CW receiver out the back window!!! For simplicity this circuit can't be beat—only one control!!!

The Atlantic ocean will again buzz with the calls of amateur transmitting stations

during international DX work when the fourth series of transoceanic tests under the auspices of the American Radio Relay League are undertaken from December 22, 1923, to January 10th, 1924. Believing that the efficiency of their transmitters was proved adequately last Winter, American amateurs will not transmit, but will listen throughout the entire period of twenty days for signals from stations in continental Europe.

The number of amateur transmitting stations in European countries has increased on account of these tests in recent years and the American radio men have decided to do them the courtesy of devoting the whole time to logging transmitters across the "pond." To facilitate receiving, French and British amateurs will transmit on alternate nights, the French starting the tests on Dec. 22.

With amateur stations in this country keeping silent air between the nightly transmission hours, 8 p.m. until 1:00 a.m., Eastern Standard Time, there will be positively no interference with broadcasting, and code transmission in this period may be attributed only to commercial or such successful foreign stations as "get across." However, most of their signals will be so weak that only finely tuned ham receivers can hear them.



HOWARD C. SEEFRED, 6EA OF LOS ANGELES WEARS A RADIO GRIN.

Radio 6BUY

Radio 6BUY, 2732 Prince St., Berkeley, Calif.—Antenna consists of two five wire cages one foot diameter on sixteen foot spreaders, 65'x' high and 60 feet long. The lead in is a six wire cage one foot diameter at top and tapering down, which is 30 feet long. Counterpoise is 23 wires delta shaped, 50 feet long and 12 feet above ground.

The transmitting set is ten watts using the modified Hartley circuit. The plate supply is 750 volts rectified by a chemical rectifier of twenty quart jars. The receiving set is the standard regenerative circuit employing honeycombs. Only one step audio frequency is used.

During the months of May, June, July, and August, the C. W. sigs of 6BUY have been reported in the following: New Zealand, Australia, Hawaii, Mexico, Alaska, Somoa Islands, and Canada. In July and August my sigs were hrd by 8BYH in Penn.

I forgot to say that the radiation varied from two, to two and eight tenths. I hope I will put out more power this winter with my new fifteen watt set.

6EA Rebuilds

Editor, Radio Journal:—Enclosed is a photo of myself for your magazine. It was taken in August, so same is not very old. Hi! No radio news to speak of now concerning our stations. We are moving our house from the front of our yard to the rear. There is lots of excavation and cement work to be done. Our antenna, counterpoise and one of our poles are down, so we are out of commission for a couple of months, but expect to be back again with higher poles and more power. The best DX I have done this past winter was to work twice with 2FP of Brooklyn, N. Y., and to be heard three times by VLB in New Zealand.—H. C. SEEFRED,—6EA. 343 S. Fremont, Los Angeles.

Anent A. R. R. L. Branch

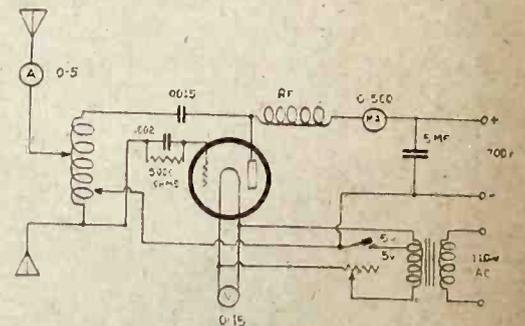
The following letter from Director Babcock is self explanatory.

Editor, Radio Journal.—At the last radio convention held in San Francisco on the 13th of October, a resolution was passed requesting the American Radio Relay League to establish a branch office in San Francisco, in charge of an official to be responsible to Hartford Headquarters for all American Radio Relay League activity on the Pacific Coast. This resolution has been forwarded to headquarters at Hartford and will be acted upon formally by the Board of Directors at its next meeting.

The remarks of one of the speakers in discussion, were taken by those present to mean that this plan had been discussed at Hartford, decided upon, and that he had been authorized to present it to the convention.

Because it is highly improbable that the resolution would have been adopted by the convention without such an understanding, it is necessary to state officially that while the plan was discussed at Hartford, it was not considered favorably, and that no authorization was given to present it to the convention.

A. H. BABCOCK, Director, American Radio Relay League.



THIS IS TRANSMITTING HOOKUP AT 6BUY.

6CHZ recently worked 9BZI during daylight hours at 9BZI. This was done on 10 watts and a single wire aerial. 9BZI reported clear reception ten feet from phones in broad daylight.

Call 6AQD has been issued to E. S. McGaughey, 200 So. Avenue 56, Los Angeles.

Speaking of distance on ten watts, W. S. Wiggins, 6CHZ, of Los Nietos, California, was read by 9BZI, Ackley, Ia., and 5XAD—5AMA, Orange, Texas, using ten watts. This again calls to mind the question of not how far, but how far on how much power.

6th District Convention

The Sixth District convention, held at San Francisco October 13, discussed a number of things of interest to the entire amateur fraternity. D. B. McGown, assistant supervisor for the Sixth District, presided. Past President Fass of the San Francisco Radio Club introduced President Tattenham who welcomed the delegates.

The Pacific Plan, which has now become famous throughout the country as the only plan officially recognized by the federal government, was amended to conform to the new government regulations. The fifteen minute operating restriction was eliminated and several other minor changes made. Director Babcock of the A. R. R. L. read a letter from the Hartford Headquarters which deplored any movement to split the Sixth district into two, one north and one south. It asked the convention to vote on two assistant division managers, one for districts 1, 2, 3 and 4 and another for districts 5, 6, 7 and 8. The northern delegations at once took a ballot and elected 6TU for the northern assistant.

M. E. McCreery, one of the Southern California Association delegates to the convention was asked to have his organization select the southern assistant and forward the name to Mr. Babcock. Considerable discussion as to the division managership then followed, M. E. McCreery finally being assured by Mr. Babcock that all difficulties would be ironed out.

Messrs. McCreery, Dickow and Babcock were named as a committee to go into the A. R. R. L. as a whole and suggest improvements in method and organization.

A resolution was passed urging the A. R. R. L. to open and maintain an office in San Francisco, said office to operate as the headquarters for all A. R. R. L. activity west of the Rocky Mountains, its action to be under the general control of the Hartford offices. Salt Lake is the geographical center of this territory but San Francisco was selected as being more nearly in the center of radio activity.

The assistant division managers were asked to appoint news disseminating stations in every community deemed large enough to warrant one. These stations are to broadcast the A. R. R. L. bulletins, notices and any other information of interest to amateurs. Wednesday night was added to Saturday and Sunday, 7 to 7:30 p.m. and 10:30 to 11 p.m. as regular A. R. R. L. dispatch nights.

At the request of Australia the following stations were named as official Australian relay stations: 6AAU, 6ZH, 6CHL, 6NX, 6CMR, 6ALK, 6PL, 6KA, 6BVG, 6AWT, 6ARB, 6AUU and 6CGW.

Santa Barbara was selected for the next convention. A general discussion on filters, receiving sets, chemical rectifiers and other gear followed.

Logs WNP

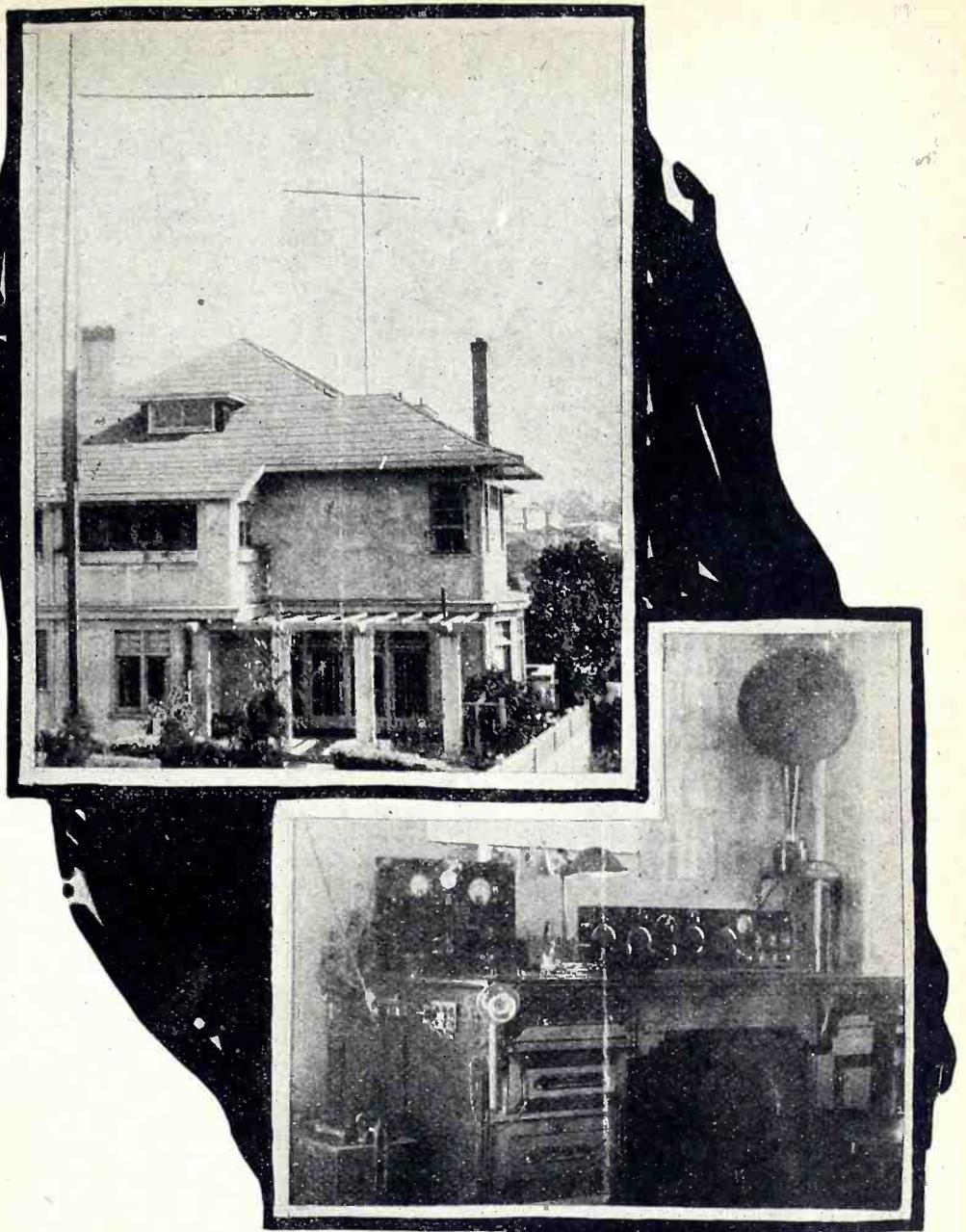
Editor Radio Journal: Am writing you at the request of Mr. S. F. Wainwright, 6VBG Los Angeles, about reception of signals from WNP. WNP's signals were logged September 7th as we lay at anchor in San Pedro Harbor. His signals were QRK on the Paragon RA-10 and one step audio which was used. His QSB was that of ICW. Following is the log taken from September 7th to September 13th. Sept. 7: CQ de 9ZT, 11:07 p.m.; 4KY de 9ZT, 11:17 p.m.; 9ZT de 5MN, 11:28 p.m.; 7DC de WNP, 11:31 p.m. says:—"Lat.78:30 (several times)..... (QRM)tell me evy nite."

7DC de WNP 11:34 p.m. says:—"Tell gang listen for me evy nite QRA lat 78:30" 9BUN de 5LR 11:54 p.m.

Sept. 8. 9HG de 5KG, 10:17 p.m.; 9APS de 5KG, 10:21 p.m.; 5XAD de 9DUG, 10:31 p.m.; 5FC de 5KG, 10:32 p.m.; CQ de 5AKN 10:37 p.m.; 8HN de 5LR, 11:09 p.m.

Sept. 12. CQ fm 3BP, 10:40 p.m.;

Sept. 13. 9AWK de 2RS, 10:39 p.m.;



WE HAVE WITH US HEREWITH 6ATZ, F. W. MORSE, JR., OAKLAND, CALIF., OPERATOR. ANTENNA IS 4-WIRE FLAT TOP ON 12-FOOT SPREADERS, 40x50x48 FEET. COUNTERPOISE 12-WIRE TEN FEET HIGH, 40X30X10 FEET. 2 FOUR-WIRE CAGES 50X 40X24. INTERIOR SHOWS TRANS. PANEL ON LEFT, METER RAD. MILLI. LOW VOLT. SWITCHES CUT MILLI IN AND OUT PHONE, CW, ICW, 4-TAP IS ANTENNA WAVE-LENGTH. REC. PANEL ON RIGHT. CR5 CIRCUIT WITH 3 STAGES AUDIO. TRANS. CONTROLS ON TABLE ARE THREE MAIN LINE 110-60 AC FOR CHARGER, MOTOR GENERATOR AND TRANS. FIL. KEYS DOUBLE ACTION STRAIGHT CW, BUZZER FOR TRANSMISSION AND PRACTICE.

QSB ICW 2RS wrkg 9AWK, 10:43 p.m.; (2RS vry QSA. Like a Six.

Must say that the watch I logged WNP was later found to be approximately 30 minutes off. Hoping this log will interest you I will now sign off, Very truly yours, A. B. LOPEZ. 6AAK.

Oakland 6ATZ

The neat and compact amateur station, 6HTZ, photo of which appears in this department, is owned and operated by F. W. Morse, Jr., and is located at 522 Grand Ave., Oakland, Calif. It was two so-called 5-watt tubes in a reversed feed-back circuit. A Robbin's and Meyer's two-unit motor generator supplies 450 volts DC, with 150 milliamperes to the plates. Plain CW, buzzer, ICW and phone may be used. The regular working range of the station is 1000 miles, with a 400 mile range on phone. A station 2000 miles distant was recently worked.

The radiating system consists of two conical cages, 50 feet long, by 4 to 24 inches in diameter in an inverted "L." The counterpoise is 12 feet high, 30 feet long and 20 feet wide with 12 wires. The receiver is

similar to a CR-5 circuit with detector and three stages of audio frequency amplification. The entire apparatus is controlled by seven small switches. The owner deserves credit for the appearance and operation of this station.

2KK Makes Australia

Anent the logging of 3KK in the first Australian Trans-Pacific tests, it appears that this was a case of error for which Robert H. Horning, 2KK, 34 Westfield Avenue, Roselle Park, N. J., is in part to blame. The log indicates that 3KK was read in Australia on this date. 2KK, however, was not on the air at the time, nor had 2KK (La Frantz Jones, Wilmington, Del.) been on the air for many months. 2KK, however, went on May 5, and from many confirmatory reports from coast to coast, was getting a real "kick" on May 17. He writes, "When I changed from a 1KW spark to CW, I included a 'bug' key." The result was that several DX stations insisted on calling 3KK after he had raised them. Log, time, hams and confirmatory reports indicate that 2KK has the honor.

Trans-Atlantic Tests

The fourth series of transatlantic tests of the American Radio Relay League between December 22 and January 10, will be a receiving contest as far as American and Canadian amateurs are concerned. They will keep their transmitters silent during the entire period listening for signals from European operators. Believing that their skill in transmitting has been tried and proven, amateurs on this continent are now going to show the European radio men the courtesy of allowing them to do the sending, while their own sets and ears are sharpened and tuned to catch the incoming signals.

During the first three transatlantic tests North American amateurs were determined to get their signals across the water. Transmission was the big thing and meant everything to them. Even last year when signals from U. S. transmitters were hurled across the ocean by the hundred, there was only a mild interest in the receiving end. This was a great disappointment to the French and British hams.

With the conditions for the present tests changed and the motives practically reversed everything depends on the receiving, and the time previously used by each operator in getting his entire apparatus into trim, will now be given almost wholly to the improvement of the receiving circuit. This opens the way for the free-for-all-two-way tests which immediately follow the last day of the transatlantics.

The program that has now been arranged by F. H. Schnell, traffic manager of the A. R. R. L., calls for transmission by the British amateur and French operators on alternate nights between 8 P. M. and 1 A. M. Eastern Standard Time, with the latter starting on December 22.

Reaching Both Ways

To be heard simultaneously in two remote parts of the world in summertime, and on different dates is a rare occasion but such is the case reported by 6BVG, S. F. Wainwright, 1926 Delta St., Los Angeles, Calif. Radio 4BL at Lake Cand, Florida and Mr. C. D. Maclurcan in Sydney, Australia, both report copying 6BVG, calling 9ZT, in Minneapolis; the former logging 6BVG at 5:08 a.m. E. S. T., August 20, and the latter at 6:24 p.m. Melbourne S. T. August 19. A 50 watt Radiotron in a Hartley circuit with an advance synchronous rectifier, were used. The antenna current was about 4 amperes.

Here is the letter from Mr. Maclurcan of Sydney, Australia:

I have to report that at 6:24 p.m. yesterday, Sunday August 19th, I heard a C. W. Station calling 9ZT and signing 6BVG. The signals were nicely readable with one tube. We have no such calls in our part of the world, so there is no doubt that the signals originate on your side. Would you be good enough to convey this information to the owner of 6BVG Station. I hope soon to be on the air with a larger set, using 2-50 Watt Radiotrons. The wavelength will be 240 metres and should be readable on your side. I have just concluded some tests with K. A. Cantin, Honolulu, using these tubes, but in a self rectification circuit. I have not heard from him as to the result as yet.

Tests are also arranged with 6XAD for the latter end of September or October, also with B. W. Cockran, 4EB. Sooner or later we must establish two way work and when this comes to pass I will send you greetings direct by radio. Yours faithfully, C. MACLURCAN.

The letter from Florida follows: Your CW sigs. were heard here at about 5:07 or 5:08 a.m. on August 20 calling 9ZT. We also heard you again on a.m. of August 23 calling 9CAA at about 4:55. We think this is pretty good work OM, because we are using only one wire 12 feet high and

100 feet long with one tube. We have a 4000 M navy coupler in crazy hookup and manage to get some kind of fake 200 m oscillations. Your sigs. were ORK and no ORS.—THOMAS and LUCIUS BRYANT, FD and LB, 4BL.

Twin City Hams

In calling amateurs attention to the pictures of the retiring and new officers of The Twin-City Radio Club of Minneapolis, appearing as a frontispiece in this issue, it may not be amiss to note that some of the best known amateurs of the country are included. M. G. Goldberg, 9ZG ex 9APW has been heard in New Zealand and has a national reputation because of his work on filter systems. He is district supt. for the A. R. R. L. D. C. Wallace, 9ZT, former president, has been heard in eleven countries, has worked every district, and worked the Pacific Coast forty-seven times in one month this past summer. He is assistant division manager for the A. R. R. L. L. C. Smeby, 9AUL, has been heard in thirteen countries from Australia to England and France. Each of the group has distinguished himself in amateur radio in one way or another, and it is "hats off" to Minneapolis.



Wouff Hong Busy

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 Atlanta, Ga., December 27, 28 and 29th for a great "ham-fest," according to the announcement 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.

International Call

Looking forward to the time when radio amateurs of all nations will communicate with one another as easily as do amateurs in the several states of our own country, the American Radio Relay League through its Assistant Secretary, Charles A. Service has prepared an international amateur call letter plan, that is to be launched for trial on midnight, December 15, of this year.

By this is meant a system of intermediates to be inserted between the call of the station addressed and the station sending, definitely locating the stations according to their respective countries. The plan has been so simplified that, in most instances, the initials of the various countries are used for this intermediate sign. For example, if French 8AB was calling Canadian 3BP he would send "3BP 3BP 3BP cf 8AB 8AB 8AB k" and the answer would come back with the intermediate letters reversed 8AB 8AB 8AB fc 3BP 3BP 3BP k."

Whenever possible the initials of the various countries have been selected as the intermediate, but when conflicts have occurred, arbitrary initials have been selected, phonetically suggestive of the country, which makes it that much easier. They are:

A—Australia. B—British Isles. C—Canada. I—Italy. M—Mexico. N—Netherlands. O—South Africa, (the exception). P—Portugal. Q—Cuba, (phonetic). R—

Argentine, (phonetic). S—Spain. U—United States. Z—New Zealand.

Here's a world beater of a message, folks: "6CEU to K. P. Warner, A. R. R. L. I worked WNP November 15. Please advise if this is world's record. 15 watts used here." From Honolulu, T. H., to W. N. P. is quite a distance at that for fifteen bottles.

Canadian Relay

That radio amateurs in Canada may soon have a system for relaying private messages across the continent, which is equally efficient as that of American operators across the border, was indicated with the announcement that five crack stations had sent an eight word message from ocean to ocean and almost completing the return in an hour and ten minutes, beating all previous Canadian Records.

The peculiar feature of the incident is that the test was entirely impromptu and was made on the suggestion of an amateur in Toronto. It is regarded as a coincidence that several of the best stations in the Dominion were "on the air" at the same time, otherwise the test would have been a failure, for coast to coast work is still uncommon.

WNP in the Yukon

Here is a letter from the Yukon: It may interest you to know that I have heard 6CMR quite often during the last two months.

Will you please let it be known through the columns of your magazine that Mr. MacMillan's arctic ship, the "Bowdoin", was heard at my station about 11 o'clock, Alaska time, September 8. This corresponds with their schedule. The "Bowdoin" was transmitting on about 220 meters W. L. to amateurs. I got scraps of messages, but owing to terrific QRM it was impossible to read much. The signals were very clear and distinct with a pleasant note to them.—LYLE GEARY, Whitehorse, Yukon, Canada.

All message reports for districts 1, 2 and 3, Division 6, A. R. R. L., should be in the hands of M. E. McCreery, 7322 Maie Avenue, Los Angeles, before December 5, and before the 5th of each month thereafter. This department will, each month, carry further reports as to the operating organization being formed at the present time.

6CCH could hardly believe his eyes when his new license arrived. It permitted transmission anywhere between 176 and 2000 meters. But one cipher was a typographical error.

J. R. Winn, member of the Venice, Calif., Club, spent the summer as second operator aboard the Admiral Farragut, coastwise passenger and freighter, plying between San Diego and Seattle. Mr. Winn is now chief operator at the Venice high school station.

Q.R.A. 9AWV ex 9AWS is George E. Zembal, 406 Buchanan St., N. E., Minneapolis, Minn. He writes "please Q.S.L. Will answer all cards."

The following came via 6OD and 6BVG: Editor Radio Journal, Congratulations to the Sixth District amateurs on handling the transpacific.—J. R. MAXWELLS, Winnipeg, Manitoba.

Questions and Answers

Q.—I have read your columns on "tuned R. F." and would like to have you give me a little data on sets No. 7 and 13. Will 13 work better with tuned R. F. than a Reflex Transformer? I think I would prefer a vario-coupler in No. 13 if it is possible to do so instead of the straight coil of 50 turns. Will either one of them tune off local broadcast and receive "distance" broadcasters? Which one is the best? I am very much interested in these circuits and would like to make my own R. F. trans. I have a Wireless shop audio trans., which works very good on a one stage "C. R. 5," (when I have an extra tube lying idle).—RICHARD ROBERTSON, Los Angeles, Calif.

A.—The single tube reflex circuit given in Fig. 13, page 62, will work much better than a single tube reflex of conventional design using untuned R. F. transformers. It would be better to use another Tuned RFT instead of a variocoupler in the antenna circuit for it is much simpler and cuts down the controls. The efficiency is the same. A variocoupler will work very well also if you desire. The single coil of 50 turns will be a little more susceptible to local broadcasting but you should not have very much interference. Another Neutroformer is the best of the arrangements. Your Wireless Shop audio transformer should give good results with this single tube Tuned Neutrodyne reflex.

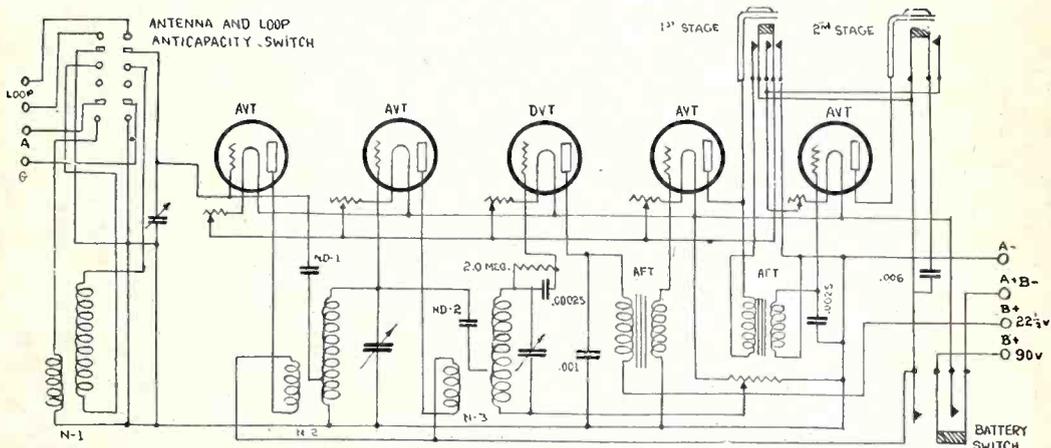
Q.—I am interested in building the circuit in Fig. 8 Mr. Munzig has described in Radio Journal for August. I would be glad to have any other information you may have in regard to kind of parts used, etc.—R. T. WORLEY, Albany, Ore.

A.—The parts used in the construction of the Neutrodyne receiver given in Fig. 8 are as follows: 3 Fada VT sockets, 2 UV201A's, 1 C300 detector, 3 Ray-Dee-Arcraft Rf Tuned Neutro-Trans mounted on 23-plate condensers, (275 to 600 meters), 2 Ray-Dee-Arcraft Neutro-Capacities, 3 Framingham Rheostats, Brandes Telephones, Everready "B" batteries.

Q.—Mr. Munzig's article in the August Radio Journal was to me more than interesting and especially the Super-Hetrodyne Neutrodyne circuit (Fig. No. 14). Will this operate a 14 in. Magnavox, using a loop for antenna? I have just completed a Four tube Reflex set giving three stages Radio F amplification, a detector and two stages audio frequency amplification, and a Magnavox works very well on this. I have many radio parts such as moulded variocouplers, moulded variometers, FADA sockets 23 and 43 plate condensers, many various capacities of mica-don fixed condensers, 1-2 doz. UV201A, 3U-V200, 9 Bradleystats, 3 RCA RFT, 2 RCA audio trans, 2 Thordarson audio trans, high and low ratio Baldwin phones, magnavox, many switches, coils, milliammeter, am. meter, 7 ohm meter and much other stuff belonging to Radio. I have built several good sets and given them away. I have many batteries. I use Willard for A, B, and C batteries. I have a double set and as I use from one, I am charging the other one. I am an engineer on board a steamship, and being chief I have much time to devote to amusing myself with radio. I want to make some single tube sets to give to some

kids. What do you know about the six Zee Jay circuit, where can I buy the wiring diagram and special parts if any special parts are needed.—J. E. LaMoore, Freeport, Tex.

A.—In the October issue of Radio Journal appeared a complete constructional treatise on the Super-hetrodyne using Tuned RF Transformers in the intermediate frequency amplifier. This will operate a Magnavox when a step amplifier is added, or in the case of one tube being reflexed a single stage of audio-frequency is sufficient to operate it effectively. A loop can be used very satisfactorily.



D. S. HOOKER ASKED FOR THIS HOOKUP.

Q.—In response to Mr. Munzig's invitation I am asking a little information. I am working on a Neutrodyne set and am enclosing a hook-up which is nearly like the "Fada" parts hook-up, the windings on the Neutroformers. Am trying 6 turns No. 24 D. S. S. on primary spaced to 16 turn tap on secondary of 66 turns of the same wire. 2 3/4 and 3 in. Bakelite tubes. Using 11 plate variable condensers. Cut-outs potentiometer—One rheostat for Radio. One for Detector. I for audio, with 201A tubes throughout—Variocoupler not used. Will the addition of one more Neutroformer or 3 steps radio amp. be at all desirable.—D. S. HOOKER, Fort Worth, Texas.

A.—In regard to the Neutroformers, you might try this and see what luck you have. However, you may be disappointed in not being able to properly neutralize the set. Try different ratios and turns until you get results. I have not tried a Neutroformer of this type but it is similar to the FADA type. The addition of one or more stages of Neutrodyne RF will help very materially in bringing the elusive DX broadcasters. Respective stages should be shielded similar to Fig. 17, p. 63 Radio Journal, (Aug.). It isn't necessary to shield top and bottom.

Q.—After reading Mr. Munzig's article in Radio Journal for August I have decided to build the set he describes under Fig. 7, using two tubes, as I have two WD-11 tubes would like to use them if they will be satisfactory. In the antenna circuit I can not tell if you use a variocoupler or transformer? Will a variocoupler with units and ten tap be all right? Would also like to make the Radio frequency transformer using No. 24 DCC wire of which I have a great deal. Please give the size of coils

and number of turns for 300-600 meters. My vario coupler has 80 turns on the stator, tapped at every eighth turn for nine taps and at every turn for eight taps. If this can be used, is the C3 condenser in the ground connection necessary? Also intend adding another tube a little later.—C. E. WILSON, Eagle Rock, Calif.

A.—The 2 WD-11's that you have will work very satisfactory in the Neutrodyne circuit you are contemplating building. A variocoupler such as you suggest will be satisfactory for the antenna circuit. However just as efficient results will be had if a Neutro-Trans is used in its place. As

shown in Fig. 8 of Aug. issue, page 61, a Neutro-Trans is used in the antenna circuit. A ground VC is not necessary if a variocoupler has a one turn variation such as you have. In regard to building the RFT's suggest that you get one of the standard types which will give you correct results without experimenting.

Q.—I am making a radio set according to the instructions in the article on "Hazeltine's Neutrodyne Receiver" by A. L. Munzig, in the August issue of "Radio Journal." I am following figure 7 and wish to get information on making the tapped tuner which is connected between the aerial and the ground in figure 7.—EUGENE REINBOLD, St. Paul, Minn.

A.—The construction of transformer used between aerial and ground connections is as follows: 80 turns No. 22 DCC wound on form 3 1/2 inches in diameter and 4 1/2 inches long. Tapped every 15th turn. Rotor ball to rotate inside this consists of approximately 50 turns of 20 DCC. Standard rotor ball is 3 inches in diameter. It would simplify tuning considerably if another Neutroformer was used in its place. The efficiency is the same, if not better. And it is very selective. This is shown in the antenna-grid tuning method of Fig. 6.

Q.—I contemplate building a neutrodyne three tube set and would like to know: 1. What tubes to use? 2. If dry cell tubes would be as satisfactory as any other? 3. If it would be possible and practicable to convert your receiver to the C. W. receiver by cutting in a variometer in the plate circuit by means of a switch? 4. How should this variometer be arranged in the set? 5. If local and closer stations could be heard

on a loud speaker (not Magnavox) using no audio-frequency amplification? 6. How to shield the set more specifically than described in the Radio Journal.—H. DUMONT, Denver, Colo.

A.—The "A" type amplifying tubes give the best results with the neutrodyne. Dry-cell tubes will work very satisfactory. A switch can be arranged as you suggest to obtain regeneration with a variometer. Put the variometer at the right of detector tube in the plate circuit. It is quite possible to hear local stations very satisfactory on a loud speaker without the addition of audio frequency amplification. It is not necessary to shield the set when using but two

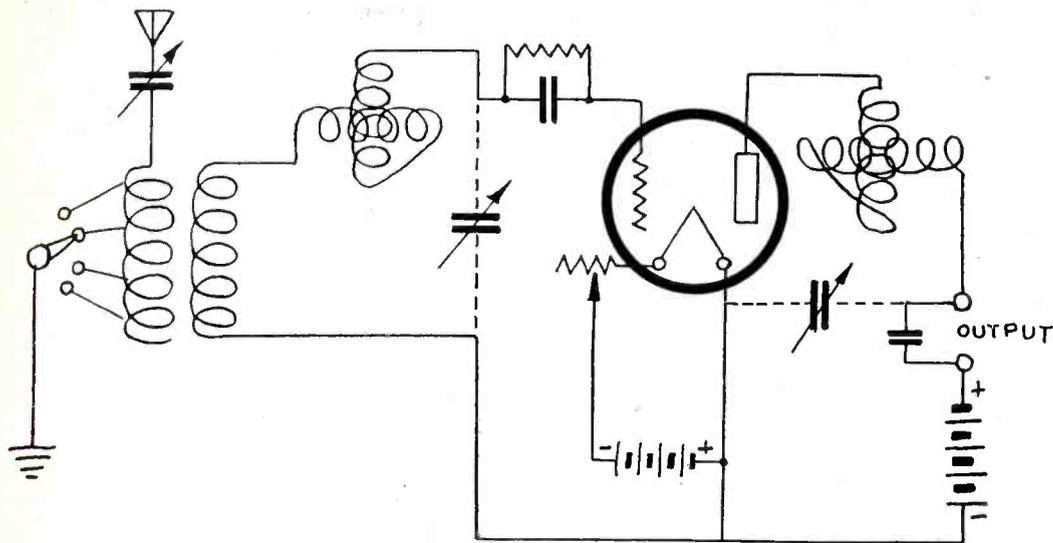
The parts I want to use are: 1 WD12 tube, 1 variocoupler or honeycomb coils, 1 variometer, 1 variable grid leak, 1 .001-43 plate condenser, 1 eleven-plate 1.00025 condenser. I get a hum or a purr no matter what I do. There are no A. C. power lines nearby. The antenna is 100 feet long. Will I be able to cover 100 miles with this tube. Can you furnish me with diagram, etc.—WALTER HENNER, Spreckles, Calif.

A.—Herewith diagram of CR5 which should answer the purpose and get your distance for you. It is decidedly elementary but will work and do the job well, particularly in your locality. Your hum trouble may be an open secondary circuit some-

well as the four sides? (2) In a set with two tubes of radio amplification, let me know which set of coils should be included in the compartment with the first tube. In the first set of coils, that is, the set the primary of which is connected to antennae and ground left without the compartment and is it the second set of coils, or what I would denominate the first neutroformer, that is included with the first amplifying tube in the first compartment, and is it the third set of coils, or what I would denominate the second neutroformer, that is included in the second compartment with the second amplifying tube? (3) Your figures 16 and 17 do not show the tuning condensers. Mine, of course, are mounted upon the panel and are mounted on a level with the tubes which set on a sub-panel. I wish to know if the tuning condenser for the secondary of each neutroformer is included in the respective compartments or if it is left on the outside with shielding between it and the tube and coil? In other words, can I make the back side of my panel one side of the shielding compartment by lining it with tinfoil and leaving the condenser within the compartment? (4) Panel 16 shows a connection from the neutrodon to the plate; figure 17 shows that connection to the grid. My understanding has always been that the connection should be from the grid of one tube to either the grid end or the grid return end of the coil on the next tube. I thought perhaps figure 16 was a misprint in showing a plate connection. Is that connection shown correctly? (5) Am I to understand that in constructing the set shown in figure 8 only two shielding compartments are used and that one set of coils and one condenser which I construe to be the first, are to be left unshielded? (6) I am using UV199 tubes and, as I say, getting very excellent results, but not what I think I should. Should it be possible, with these tubes, in bringing in long distance, to eliminate altogether all whistling and howling, or when tubes are crowded to full capacity will there necessarily be, even with perfect neutralization, a howl? —KENNETH FLOURNOY, Independence, Mo.

A.—It is not necessary to shield your receiver unless you have crowded the parts so that they magnetically effect each other. If shielding is desired it is only necessary to enclose the front, sides and back. Referring to Fig. 8, p. 61, the first RF transformer functioning in the antenna-grid circuit, the first tube and second RF transformer are shielded. The second tube and third transformer are shielded. It is not necessary to shield the detector. The tuning condenser for each transformer is included in the respective compartments. The back side of your panel can be one side of the compartment. Figs. 16 and 17 are given to illustrate the two methods that can be used. Fig. 2 (A & B) are similar. The use in practice is the method shown in Fig. 17. Don't let these illustrations confuse you. The illustration you should follow is given in Fig. 17. When proper neutralization is obtained perfect elimination of all squeals, whistling, etc. should be secured. If tubes are crowded there will no doubt, be howling, etc., as they are over taxed in the emission of electrons.

Q.—I am thinking strongly, of building a receiver after Mr. Munzig's plans as presented in August number of the Radio Journal. Fig. No. 8 interests me mostly with later addition as in Fig. 10. Would you kindly give me the kind and value of the coils used in primary and secondary? Would G. R. coils do? As I understand it No. 300 is for from 300 to 600 meters. What tubes do you recommend? I am using at present a 3-G. R. coil set with two stages of audio frequency. Would a set as per Fig. 8 be any easier to tune, and cut out any more of local interference of spark sets. Any information on tuning and building Fig. 8



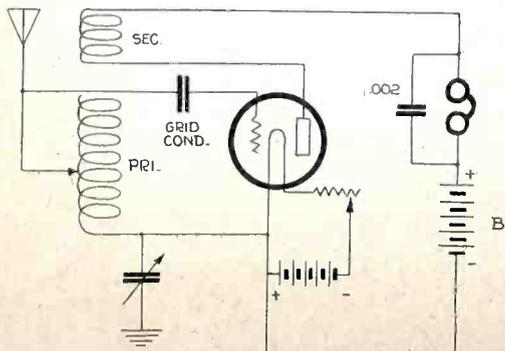
THIS HOOKUP IS FOR W. ANDERSEN.

stages of radio-frequency amplification. Shielding exactly as given in Fig. 17 is necessary when using multistage RF amplification.

Q.—A. L. Munzig, I was very much interested in your excellent description of the Hazeltine neutrodyne receiver, in the August number of Radio Journal. I have a receiving set consisting of one step of tuned radio frequency, detector and two steps of audio frequency. A potentiometer is used to prevent oscillation in the radio frequency amplifier. In the diagram of my circuit would you please tell me where I could connect a neutralizing condenser to prevent oscillation and increase the effectiveness of the set.—DR. W. P. BLAKE, Mare Island, Calif.

A.—Glad that my article interested you as it has hundreds of others, judging from the letters, etc., received. In regard to the circuit you enclose, it is impossible to neutralize capacity coupling of this circuit submitted for you are using a single impedance coil in the RF transformer. In order to neutralize capacity coupling it is necessary to change the phase of the voltage. To do this it is necessary to use a transformer. See the circuit given in Fig. 7, p. 61, of Aug. issue. Another Tuned Neutro-Trans can be used in place of the variocoupler thus simplifying controls to only two.

Q.—Is there any special circuit for the WD12. I have tried 25 hookups, but have failed to find one where it would work.

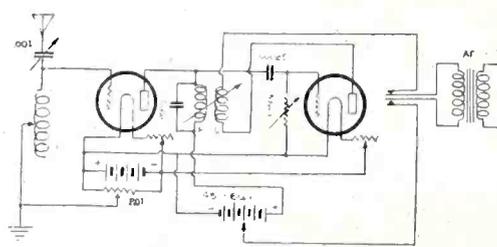


HERE IS HOOKUP FOR WALTER HENNER.

where. Also make sure that the contacts in the socket firmly touch the prongs of the tube. If this hookup does not work send us further details and questions. We are here to help you.

Q.—Will you kindly give the writer a hook-up using the following parts, 2 variometers, 1 variocoupler, 1 variable condenser, grid leak, detector and an Atwater Kent two-step amplifying unit?—W. ANDERSON, San Pedro, Calif.

A.—Herewith find diagram using parts you describe. The amplifying unit can be attached at the point marked output. This circuit, by the way, is highly efficient and very selective, although not so easy to tune. One has to "learn the knack" as it were.



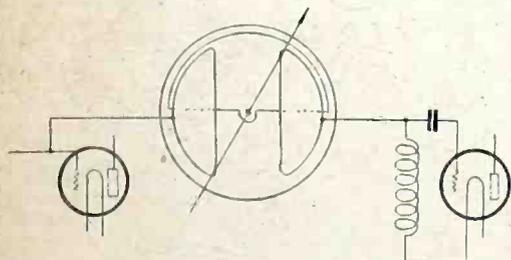
DR. W. P. BLAKE SUBMITS THIS.

Q.—I have been at work for several weeks upon a Neutrodyne receiver such as you describe in your Figure No. 8. Have rebuilt it quite a number of times, so, you may know I am working with pains on the proposition. I am getting very excellent results now but have never succeeded in adjusting both neutrodon so as to perfectly neutralize the circuits. The first one, or what I term the first one, being the second removed from the detector tube, I am able to adjust perfectly so that no sound comes through from a loud signal on a cold filament. The other neutrodon seems to have little effect upon the circuits and I have experimented to that extent, that I feel nothing but shielding would solve the problem and I write you to understand a little more fully your plan of shielding. (1) Am I to understand that your shielding compartments are enclosed completely. That is, on top and bottom as

set will be gratefully received.—EARL HIMBERGER, Seattle, Wash.

A.—In Fig. 8 the transformers used are of special construction, the exact construction I cannot give you. Honey comb coils would not do in this case for the RFT's but could be used as primary and secondary in the antenna circuit similar to a variocoupler. "A" type amplifying tubes are recommended. Drycell tubes give very good results. A receiver constructed on the order of Fig. 8 will be very much easier to tune if properly constructed, than the 3 coil regenerative receiver. Far greater distances will be obtained, with no distortion. In building any neutrodyne receiver don't crowd the RF transformers—separate them at least 8 inches and place the VT between for convenience.

Q.—Very much interested in your article on "Hazeltine's Neutrodyne" in August issue of "Radio Journal." Have also read answers to questions in the September issue. Have taken quite an interest in Radio, and have made several of the receivers published in the Journal and in other publications, with considerable success. Have just finished a Hazeltine Neutrodyne, using FADA instruction book in connection with other published information. After the set was finished, August Radio Journal issue came to hand, with your article. I had originally placed my Neutrodon condensers near top of panel, on the back, running connections to the fixed plates of the three 23-plate Var. condensers. Was not able to tune them in that position, so set them on bakelite platform (2 inches above bottom of set,) and two inches back of other wiring, connecting them direct with grid wire, and running to 14th wire from top of the secondary of neutroformers, as per FADA diagram. Cannot now seem to tune them properly. Neither by taking tube out, and putting paper on one A lead, and replacing, tuning with Rheostat turned on; nor by leaving lamp in and turning Rheostat off. My Neutrodon's are made as in diagram herewith. Wires held in place with 6/32 brass bolts, with copper terminals set under heads to take leads to set. No. 9 copper wire, over which is glass insulator, and over that 1½ inch brass sliding tube to tune. Will you kindly inform me if the Neutrodon is right, if not, what would you suggest? I have the 5 lamp set. Can hear local very clear and loud—better than any other set I have made. Have not caught any distance except Los Angeles KFI and Portland KGG, but have not given much



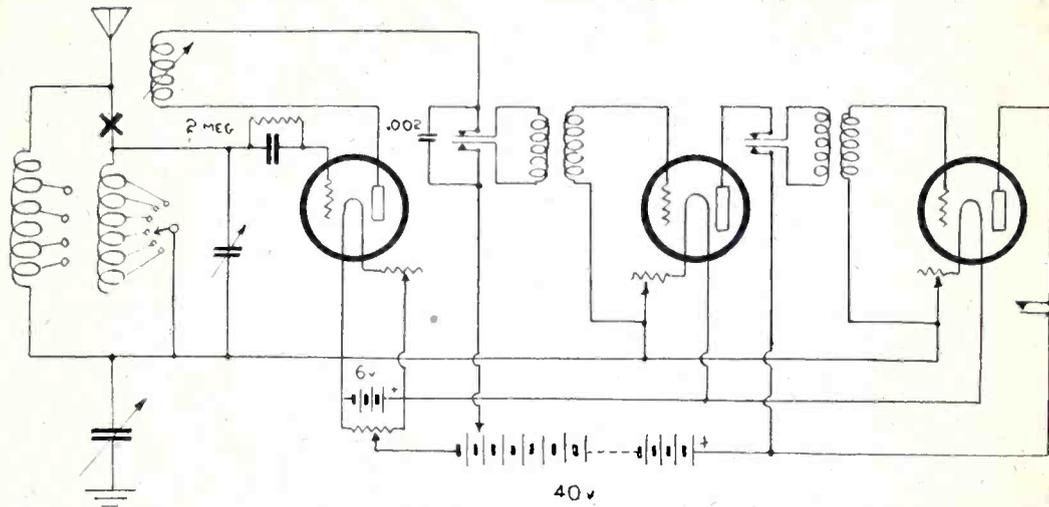
THIS IS FROM P. N. EMIGH, OF INDIAN CREEK.

time to it as yet. Am troubled with oscillation, which I wish to correct first. Set is carefully made, Neutroformers set at 55 degrees. Ought to get good results if I can tune properly. Do you advise tuning with paper on contact and Rheo. on, or in working order with Rheo. off?—GEO. H. HOOK, San Francisco, Calif.

A.—Your Neutrodon's are evidently too large in capacity. Instead of separating 1/8th inch try separating 1/2 inch and 3/4 inch. This may remedy your troubles. Adjust the balance condensers exactly as the Fada booklet instructs. When using their Neutroformers adjustment of the balance condition must be followed as they state. If oscillations still occur try adjusting Neutro-capacities until oscillations stop. Take your hand off the Neutrodon each time and if

the receiver is enclosed in a cabinet close the lid after each adjustment.

Q.—As a confirmed "hook-up hound" I am always trying something new and Hazeltine's receivers hit me just right. I have built up a one step and detector somewhat after Fig. 8, page 61, Radio Journal, Aug. 1923, and am getting satisfactory results but I want some comparative data. For instance, using this set, two tubes I can bring in Broadcast 1575 miles so that it is audible



HOW MR. GUENTHER CAN CHANGE HIS CR5 INTO A THREE CIRCUIT TUNER.

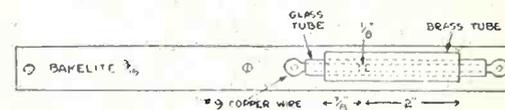
on loud speaker (type C and Vic). I find however, that on different wave-lengths I have to adjust the neutralizing condenser, cutting in for long and out for short-wave. This refers to 250 to 600 meters. However I can duplicate the above results by other means and using other methods of R. F. amplification. In fact I often hear your local station KHJ, 2300 miles. To get down to tacks, I often get them on my "Emigh Special" a one-tube set on a 6x8 panel. This set is not a "Super" as commonly spoken of, as there are no H. C. C. nor big (.006) condensers, nor is it a single circuit outfit. However I want to know if my Hazeltine is percolating properly in receiving up to 1575 miles on L. S. using only two tubes, as compared to other sets using this hook-up. If I used a three element condenser as a neutralizer about what would be the physical dimensions. Using the type sketched below, about what diameter, etc. Well, I hope you will answer these questions. I am not in contact with other fans much and for that reason I can not compare my set with others.—PHILIP N. EMIGH, Indian Creek, Pa.

A.—In regard to results you are obtaining, you are getting very good results. I have heard Calgary using one stage of Neutrodyne RF without the use of regeneration. On the other hand have used regeneration with but one tube and done the same thing. The Neutrodyne method, however, was much easier to tune and was not critical of adjustments as in the case of regeneration. My conclusion is that one stage of Neut. R. F. is equal to regeneration in one tube. The advantages of the neutrodyne are obvious. Shift a few of your tubes around in your neutrodyne and see if the trouble you are having won't be remedied. This trouble will be had if a center balance point is not found for 250 to 600 meters. Your neutro-capacity must be very critical to adjust or you would have less trouble. A variable neutro-capacity would be ideal and would be very easily constructed. Your sketch of miniature condenser can assume dimensions somewhat as follows: The two stationary plates should have a separation of at least one inch and should not be more than one inch in length. The rotor should be of the same size but the distance between it and the stationary plates should be variable. In fact have the whole works so that it can be varied by means of an adjustable set screw.

Q.—I have a single circuit CR5 hookup. Am using one variocoupler, one 23-plate condenser and a two step. What do I have to change to make a two circuit out of my set. Or, how will I be able to sharpen tuning. My aerial is 65 feet high on one end and the lead-in end facing east is 44 feet high and about 70 feet two-wire aerial. Here is my circuit.—OTTO GUENTHER, Orange, Calif.

A.—If a variocoupler is now being used a coil, the same diameter as the outside of

the variocoupler, should be wound 60 turns of No. 22 wire, tapped every ten turns. This coil should be placed end to end with the outside end of the variocoupler. The antenna and ground should be disconnected from your receiver at the points marked X. These are attached to the new coil in the same manner that they were attached to the outside of the variocoupler, with the variable condenser in either antenna or ground. A variable condenser connected from the grid end of the coil to the filament will tune the secondary circuit. Either a 23 or 43-plate condenser can be used. This circuit then becomes a three circuit tuner, permitting regeneration. It is very selective. The remainder of the circuit can remain as shown in the diagram you submitted.



GEORGE HOOK'S IDEA OF IT.

Q.—I desire to thank you for the answer to two questions which I put up to you a short time ago. This time I am taking advantage of Mr. Munzig's invitation to forward questions to him on his article on the neutrodyne contained in the August number of the Radio Journal, in your care. After reading Mr. Marx's article in the Radio Digest on the construction of a neutrodyne receiver and finding the set there outlined a little too advanced for me in the present state of my novitiate, and after considering other articles, your magazine's article by Mr. Munzig above referred to seemed to be more within my grasp. I am just starting out on the building of the set shown by figure 10 on page 62 of your August number. I note that no fixed condensers, other than the grid condenser and the two neutralizing capacities, are shown in the diagram. Was any particular treatment of the wiring necessary in order to dispense with these? Mr. Marx in his diagram uses three additional fixed condensers and "Fada" uses two. Mr. Barnes and I both desire plugs in the detector and first audio circuits. Any suggestion as to them? We are also using Workrite RFT's with New York 23-plate condensers. I would be grateful for any suggestions, and would rather learn before building the set than through failure after.

—MERTON A. ALBEE, Los Angeles, Calif.

A.—No condensers are necessary other than those used for the neutralization of capacity coupling and the tuning of the RFT's and the grid condenser. The necessary amount is shown in Fig. 8, 9, 10, 11, etc. No special treatment of wires are necessary unless multi-stages are to be used. Figs. 16 and 17 suggest this. Connect the plug and jacks as would be done with ordinary audio frequency amplifiers. CAUTION: Don't crowd your parts!! If you are going to use five tubes put it on a long panel.

Q.—In hooking up Roffy Hetro-Trans where does rotor of condenser go to? What is type of rheostat? How about an outside aerial?—A. E. CROSS, Puente, Calif.

A.—In hooking up be sure and put rotor of condenser to ground. Use three connections Universal Bradleystat as in diagram, or use individual Rheostat hooking them in series with the filament of the negative side of A Battery. When Bradleystat is used hook first tube so that it receives the resistance in full causing the temperature of it to be less than second tube. If aerial of over 40 feet is used, use a .00025 condenser or 11 Plate Variable in the antenna circuit. In tuning keep tube below oscillating point. After station is tuned in turn up filament to increase volume.

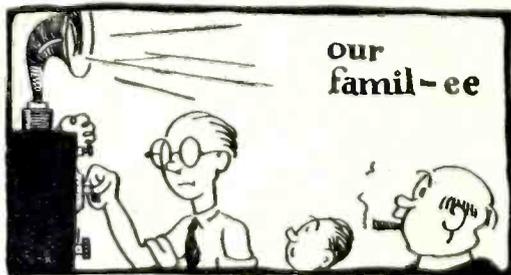
Q.—Referring to figure 7, page 61, Aug. Radio Journal, will you please give specifications for the inductance coils P and S—diameter, size of wire, number of turns, how many taps, etc. (2) Using only two tubes do you think that circuit is better than any other circuit for distance? If any other better, what? I want to make two and if necessary to get desired results, three sets; one for home use local broadcasting where volume of sound is the most important thing, one portable and one for distance. Not more than two tubes in each. Storage battery can be used at home. (3) What would you recommend for the portable to be good for 130 miles (KHJ and KFI) What tube? (4) Will that neutrodyne with radio amplification give the volume for local broadcasting that some other circuit will give using audio amplification (only two tubes)? (5) Will C299 tubes give as good results as 301A or 300 used as detectors? It seems to me that at home where I can use storage battery the large tubes would be better but I don't know. When used as a detector will the 299 give as loud signals as the large ones? I am using one 299 now but want to get more volume. (6) Please name the tubes you would use in each of the sets I want to make.—JOHN V. FREDERICK, Los Angeles, Calif.

A.—The variocoupler given in Fig. 7 can consist of Pri. 80 turns No. 22 SCC tapped every 15 turns. Sec: standard coupler ball wound full with No. 26 or 28 SCC. A Neutroformer will work just as efficiently and simplifies controls—one control only being necessary then. For clear undistorted DX reception I unquestionably believe that circuit to be ideal using but two tubes. If a variometer is inserted in the plate of detector tube the range will be trebled but will be harder to tune. Try it. One Tube would be all that is necessary for the portable, with regeneration and an outside antenna. Radio frequency amplification is not the same as audio in the case of the neutrodyne. The signals are amplified before they reach the detector tube. Audio frequency gives volume and nothing else. For local reception use two tubes without regeneration, one as detector and one as audio amplification. A 9 to 1 ratio transformer will give lots of volume. The C299 will not give as good results as 301A or 300 when used as detectors. For local reception use: C300 as C300 as detector with C301A as amplifier. For DX: Use C300 as detector with C-

301A's as amplifiers. Portable use C299 as detector and if audio is wanted use same type tube (C299). Fig. 7 grid leak: .00025MF.

Q.—A. L. Munzig: I am a constant reader of the Radio Journal and I would, if I could, get some information from you in regards to the neutrodyne circuits. I have built a neutrodyne using "Fada" parts and have had fair results, I have tried and used the very best parts that could be bought to go with the Fada parts in constructing the receiver. The receiver is fair when it comes to DX work, but I think it could be vastly improved and one of my troubles is selectivity. For instance when W. O. A. W. at Omaha and W. C. X. at Detroit on wave length of 527 and 517 meters are broadcasting at the same time it is nearly impossible to do any thing with them and also with any other two stations of nearly the same wave lengths. It is nothing doing until one signs off and then the reception is fair. Would a variocoupler to tune with decrease the efficiency of the set, if not what make would you suggest to me. What I want is a more selective and more powerful receiver with the neutrodyne and if there is anything that you can suggest to improve it both ways, I will surely appreciate it.—JOE MARTIGNONI, Kansas City, Missouri.

A.—A variocoupler used in the antenna circuit would undoubtedly increase the selectivity of your Neutrodyne receiver, without materially affecting its range. The Ray-Dee-Arcraft Variocoupler is a good type



to use for it can be used very selectively or with tight coupling optional. The beauty of the Neutro-Trans is that if the experimenter does not care to use the neutrodyne principle all that is necessary to change to a tuned radiofrequency is the insertion of a 400 ohm potentiometer, on the grids of the amplifier tubes, a bias of six volts being obtained. The October issue of Radio Journal had a description of a Superhetrodyne Neutrodyne receiver that is unquestionably the most sensitive receiver ever designed.

—It is impossible to use the variometer in your circuit for a neutralizing transformer. It is absolutely necessary to have a two-separate-winding transformer of special construction to obtain the proper phase relation. A circuit such as you would need is given in Fig. 7, p. 61 August issue of Radio Journal. The variocoupler given as P and S in the antenna-grid circuit, can be substituted with a Neutro-Trans thus giving selectivity as well as obviating ground. This would be as that given in the antenna-grid circuit of Fig. 8. The trouble you are having is very common with the type of tuned radio frequency that you are using.

Q.—A. L. Munzig: I read your good article in the Radio Journal and am writing to get a little more dope on it. Three years ago I thought I knew a little about radio and the circuits that worked best but since then I have been away at school and have paid very little attention to radio, not from the lack of interest but from the lack of time. You can imagine how green I am at it. Your article sure sounds good to me. I would like to try out the hook-ups you have shown in figures 8 and 9 in your article. Would you please state the make of apparatus which you have found to give the best results. I have two of the old

tubular audiotron detector tubes and would like to know if they could be used in the circuits, to a good advantage. Any suggestions as to the proper arrangement of the apparatus will be greatly appreciated. RALPH L. COGGINS, Phoenix, Ariz.

A.—Was glad to hear from you old-timer. Its been some time since we worked each other over the air. I used to operate 6HG here in Redlands and have handled quite a bunch of traffic with 6GQ. Had 6WZ for a while and was then issued 6ZJ. I have used Ray-Dee-Arcraft transformers throughout. The Neutrodyne method of radio frequency is without question the ideal. It will surprise you how easily tuned it is and how the DX stuff will roar in. This Winter I expect to do some real DX reception. What I mean by this is: reception from KDKA WJZ, etc., on a loud speaker. Hear Calgary in the summer time very good—but of course with lots of static to be expected. The tubes you have should give very good results as detectors—but as RF amplifiers I don't believe I would use them, although they may give perfect satisfaction. You might try the circuit given in Fig. 7 using but two tubes with or without regeneration. Use those audiotrons and see what she does. I have a letter from a fellow in Pennsylvania who is hearing our local KFI and KHJ with but two tubes. Separate your parts especially the Neutroformers and mount them at an angle of 45 degrees as shown in Fig. 15 (B). Use a vernier on the detector tube.

Q.—Mr. Munzig: I was deeply interested in your article in the Radio Journal on "Hazletine's Neutrodyne and want to do some experimenting with the neutrodyne myself. I would be very thankful if you would give me some advice regarding one of your circuits. Referring to Fig. 7, showing one stage of tuned radio frequency, is the coupling between coils P and S in the antenna tuning transformer fixed or variable? What should be the number of turns and size of the secondary S?—H. C. TITTLE, Rapid City, S. D.

A.—The coupling can be either variable or fixed, in answer to your question. Any standard type of variocoupler can be used here. However, it is necessary to have an extra control as indicated by the variable condenser in the ground circuit. This control can be obviated by substituting a Neutro-Trans in its place.

The secondary coil "S" can consist of a standard variocoupler rotor wound full with No. 24 copper wire. This would be about 50 or 60 turns.

Q.—Mr. Munzig: Am an amateur in every sense of the word. Fig. 8 on page 61 is of interest. I wish however, to buy the parts and then do the mounting on panel and wiring myself. Would you furnish me with a complete list of the parts required and possibly going into details as to the manufacturer of parts, if any preference. Even your idea as to panel design, etc. would be helpful and appreciated.—HENRY T. LAFRENZ, Auburn, Wash.

A.—The list of parts to build the circuit given in Fig. 8 of August Radio Journal is as follows:

2 UV201A tubes. (amplifier). 1 UV200 detector tube. 2 50 ohm rheostats for amplifier tubes. (Cutler & Hammer). 1 6 volt rheostat for detector tube. (Fada). 3 VT sockets. (Fada). 3 Ray-Dee-Arcraft Neutro-Trans type 3-A mounted on 23-plate variable condensers, \$4.00 each. 2 Neutro-Capacities @ 50c each. 1 pair of Brandes 'phones. 1 6 volts A battery. (storage is best). 2 45 volt B batteries. 1 grid condenser, .00025 MF with 2 meg. leak. 1 6in. by 21 in. bakelite panel. Necessary knobs, switches and tuning dials.

All these parts can be mounted very nicely on this panel. Do not crowd the transformers and tubes. Place the tubes between the transformers.

Radio Club Activities

San Diego Resolution

The San Diego Radio Club, at its regular meeting, November 9, adopted the following resolution:

WHEREAS, at the present time radio communication is subject to serious interference of a preventable nature, and, whereas, it is imperative that the full privileges of radio communication be accorded all parties equally, and whereas, the Department of Commerce is unable under the existing law of 1912 to so administer and control radio communication as to eliminate certain types of interference,

THEREFORE, Be it Resolved by San Diego Radio Club of the City of San Diego, County of San Diego, State of California,, that it is the sense of this Club that immediate action should be taken by the Congress and Senate to the end that adequate legislation be enacted to supercede the law of 1912. Be it

FURTHERMORE, Resolved, that the White-Kellogg Bill which passed the 67th Congress is the most suitable form in which legislation could be written. Be it

FURTHERMORE, Resolved that our Congressmen and Senators be urged to give this matter their immediate attention and that a copy of this resolution be forwarded to said Congressmen and Senators, to the Secretary of Commerce, the Supervisors of Radio, for the various United States Districts, Executive Headquarters of American Radio Relay League, the Signal Officer U. S. Army the Chief of the Bureau of Radio Communication of U. S. Navy and the Press.

Attest: Eugene Daney, President; H. E. Callaway, Secretary.

Bay City Club Grows

San Francisco Radio Club, Inc., was organized in 1912 and amongst its charter members were such old timers as H. W. Dickow, Paul Fenner and others now prominent in the radio world. The club has grown from a handful to a membership of over seventy, practically all of whom are active amateurs. During the war the number was reduced to three, but these three fellows stuck together during the war and out of it made a better and larger S. F. Radio Club.

The club has its own club room at 173 Dolores Street, San Francisco, but the place is growing too small and a larger place is now being looked for.

The officers of the club are: Sydney J. Fass, President, 6KK; H. A. Tattenham, Vice President, 6AUU; W. McBride, Secretary; S. J. Keller, Treasurer, 6BVC; C. Shoemaker, Sgt. at Arms, 6OV.

We receive wonderful cooperation from the radio supervisor and his assistants. Mr. Lovejoy, assistant radio inspector attends nearly all our meetings and keeps us in touch with new rulings, etc., of the department.

The club affiliated with the American Radio Relay League in December, 1922.

At the convention held in San Francisco in 1921, the Pacific plan was formulated by the various clubs present—this plan was the link between the amateur and the broadcaster—and through its efficient oper-

ation, chaos, such as was experienced in the east, was unheard of in the west. This plan, because of its efficiency, was backed by the radio supervisor and later received the endorsement of the Department of Commerce. This was the only plan that received official recognition, and when the new ruling of the department went into effect the Pacific Plan was allowed exemption until its expiration in October.

Twin City First Meeting

The Twin City Radio Club held its first meeting of this winter on the 5th of October in the Mayor's reception room at the Court House, Minneapolis, Minn. New officers were elected as follows:

President J. F. Carpenter—9DX, Vice-Pres., M. G. Goldberg, 9ZG; Secretary, D. C. Wallace—9ZT; Treasurer, R. K. Viles.

Mr. U. C. Hilgedick gave an interesting talk on the Chicago convention, telling us of the wonderful times all of those who attended the convention had. Mr. W. H. Wallace, of Long Beach, Calif., gave a talk on "How It Seems To Receive A Wireless Message From Minnesota." Mr. Wallace very frequently receives messages from 9ZT, his son.

Professor C. M. Jansky of the Radio Department of the University of Minnesota, member of the Hoover Conference on radio, recently of the Bureau of Standards, gave us a most interesting talk on radio sets as a whole. The meeting was adjourned with the announcement that regular meetings would continue on the first and third Thursday of each month.

The meeting of November 1st will be very interesting, as Mr. J. H. Miller of the Jewell Electrical Instrument Company will bring his large meter board, and will give the tube characteristics of any tubes in the audience, and will also give us a very interesting lecture on the different phases of measurements utilizing the different types of electrical instruments in this work.

Milwaukee Elects

Milwaukee delegates reporting on the second national American Radio Relay League Convention, held in Chicago, was the principal feature at the season's opening meeting of the Milwaukee Radio Amateur's Club, Inc. Next was held the annual corporate meeting at which seven directors and one vice-director were elected, who, in turn, appointed the society's five general officers and seven standing committee chairmen. The directors, all prominent Milwaukee radio amateurs, are C. N. Crapo, 9VD, the A. R. R. L.'s local District Superintendent; D. W. Gellerup, 9AOE; E. T. Howell, Sc. M., 9CVI; M. F. Szukalski, Jr., 9AAP; E. A. Cary, 9ATO; F. W. Catel, 9DTK; M. H. Doll, 9ALR, West Allis; and G. F. Metcalf, 9CKW, Wauwatosa. The officers are E. T. Howell, president; M. F. Szukalski, Jr., vice President; C. S. Polacheck, secretary; E. W. Ruppenthal, 9AYA, treasurer; L. S. Hillegas-Baird, business manager; F. W. Catel, assistant treasurer; and the committee chairmen are legal, Attorney L. J. Topolinski, general counsel; publications, H. G. Fawcett; technical, D. W. Gellerup; membership, F. W. Catel; program, E. T. Howell;

publicity, L. S. Hillegas-Baird; and traffic, C. N. Crapo.

At the annual meeting the out-going officers reported a steady growth in membership and an increase in scope of activities. However, the annual membership drive has been launched, and it is hoped that the total number of members will reach two-hundred before the season closes. The West Allis Radio Club, a suburban society, has been dissolved and its members are joining the Milwaukee club. One large radio association for Milwaukee County and make it a real local chapter of the A. R. R. L. is the goal set for this year's activities.

The committees are all in action. The technical one remains a leader, recently giving an interesting report entitled "C. W. Transmitter Circuits." Many lectures by well-known radio men are being arranged by the program committee. Two have already been given; they were "The New Tatum Chemical Rectifier" by H. L. Olsen, 9CSR, Fansteel Products Co., North Chicago, and "Vacuum Tube Characteristics" by J. H. Miller, Electrical Engineer, Jewell Instrument Co., Chicago.

Highgate, England

The first meeting of the Radio Society of Highgate after the summer vacation was held on September 7, when a very interesting lecture was given by Mr. H. Andrewes, B. Sc., A. C. G. I., D. I. C., entitled "Plain Facts About the Armstrong Super." The lecturer described his own experiences with the circuit, as a result of which he considered that the circuit was not so simple as some writers make out. An explanation of the action going on inside the valve was given, it being explained that the valve actually oscillates at high frequency and low frequency simultaneously, the quenching action so much talked about being due to the low frequency oscillations controlling the high frequency. There are a large number of factors which can be varied in the circuit, and the lecturer explained how he systematically set to work to find the best adjustment of each variable. The correct value of high-tension and of grid potential was found by a careful study of the characteristic curves of the valve in use, and the necessary degree of couplings between the large "Armstrong" inductances was found by actual measurement of the low frequency swing, to be 59 volts with the particular valve in use.

Another very curious result obtained by experiment was that the amplification produced was inversely proportional to the strength of the received signal.

A programme of lectures for the next three months is now ready, and may be obtained from the Hon. Secretary.

It is with very great regret that we have to report the death of Mr. J. Gregory, a member of this society. Mr. Gregory, on September 30, was climbing a tall tree for the purpose of erecting an aerial, when he lost his foothold and fell to the ground, breaking his neck. The whole society deeply mourns losing one of its keenest members.

The third annual general meeting of the society was held on Sept. 28, when Mr. Philip R. Coursey, B. S., A. F. Inst. P.,

A. M. I. E. E., who dealt with broadcasting and how it affects the experimenter; the proposed revision of the Wireless Telegraphy Act of 1904; and the Broadcasting committee and its long awaited report. The question of the representation of affiliated societies of the committee of the Radio Society of Great Britain was discussed and special mention was made of the proposals put forward by the Radio Society of Highgate in connection with this matter. Many other societies had made suggestions and criticisms but the proposals put forward by this society were of a practicable nature and would be carefully considered by the Radio Society of Great Britain.

The forthcoming trans-Atlantic tests were mentioned, and the preliminary arrangements were explained. Mr. Coursey is responsible for all the arrangements on this side of the Atlantic, and his remarks were listened to with very great interest.—J. F. STANLEY, Hon. Secretary.

An interesting lecture was given on September 14th by Mr. J. L. Jeffre, F. R. A., entitled "Freak Circuits." The lecturer explained the action of the Reinartz circuit, the Lee de Forest circuit, the Cockaday 4-circuit arrangement, the Round Reflex circuit, and finally the S. T. 100 circuit.

This was followed by a short lecture by Mr. C. H. P. Nutter, F. R. A., entitled "Hints and Tips." Mr. Nutter dealt with drilling ebonite, lacquering brass, soldering, etc., and gave much helpful advice.

On Sept. 21, Mr. G. A. V. Sowter gave a lecture on "a portable receiver." This receiver was entirely self-contained and was built into a small attache case. Several different circuits could be used, and the arrangement of the connections was most ingenious. The wiring and mechanical details were of a very high order. Dull-emitter values are used, and give very good results. The receiver was connected to the Society's aerial, and 2LO was received very loudly and clearly using a crystal detector only.

Full particulars as to membership of the Society may be obtained from the Hon. Secretary, Mr. J. F. Stanley, B. Sc., A. C. G. I., F. R. A., 49 Cholmeley Park, Highgate, N. S.

An informal discussion was held on Friday, October 5, the topic under consideration being the Broadcasting Committee's Report and the Postmaster General's Statement there on. The secretary read the report and the statement paragraph by paragraph, and an interesting discussion ensued. It appeared to be the general opinion of the members present that the report was on the whole satisfactory, and that the compromise as regards licenses which the P. M. G. proposed was a step in the right direction as far as the home-constructor is concerned. Strong opposition, however, was taken to the suggestion that experimenters' licenses would be granted subject to the condition, amongst others, that the applicant signs a declaration to the effect that he will not use the broadcast programmes except for experimental purposes. It was considered that this was a condition which nobody could truthfully comply with, and that it was unreasonable to expect anyone to sign such a declaration with a clear conscience. It was hoped that the Radio Society of Great Britain would take action in this matter.

The eighty-eighth meeting of the Society was held on Oct. 12th, when the chairman announced that Mr. F. Stanley, B. Sc., A. C. G. I., F. R. A., the Hon. Secretary, had been elected to the committee of the Radio Society of Great Britain as the temporary representative of the Eastern Metropolitan Societies.

After a few preliminary announcements had been made concerning the forthcoming sale of apparatus on Nov. 16, and concerning the impending change in headquarters of the Society, Mr. F. G. Francis, B. Sc., gave an interesting lecture on "Electric Cells."

The lecturer described the early experiments of Galvani and Volta, and gave an explanation of the chemical actions which take place in various types of primary cells. The question of polarization, and the methods adopted to overcome this trouble were fully discussed, and the actual construction and chemical action of the Bichromate, Lelanche, Grove and Daniell cells was described in detail. The Clarke and Weston Standard cells were mentioned, and finally a brief explanation of the action and construction of various types of secondary cells was given.



So. Cal. Association

With about fifty present, the last meeting of the Association was opened by President Nikirk. The first on the program was a raffle of a 50 watt bottle. The lucky man was A. G. Sundeen, 6MS. As he was previously using a so-called "5" watter, no doubt that the prize will be slightly useful. Congratulations, OM.

On a second drawing, K. Windley, 6BCS, won three months' dues. A C-299 was then captured by E. F. Schmidt, 6BVR, with the second drawing to 6PW, who received a receipt for two months' dues. A. E. Schifferman says that he takes delight (?) in buying expensive parts for other fellows at the raffles. Very nice of you OM. Don't weaken.

McCreery our Asst. Division Manager for the south, read us some dope from American Radio Relay League Headquarters. Among other items, was one of importance to us all.

"At midnite of December 15, 1923, a new interval in place of "DE", "V", and "FM", for all Radio Amateurs of the world will be put in use. American working American will use "U". Canadian working Canadian will use "C". American working Canadian will use "CU", and Canadian working American will use "US". Provisions have been made to take care of every civilized country of the world. The complete list is in December QST. Be sure and study it and use the new interval on the above date."

Vice-President Wainwright, 6BVG read traffic reports. Some of those on the list were present, and gave explanations of their violations. We are glad to know that a few were excusable and that they will not be repeated. It is only fair fellows, that we carry out our part of the rules, and more so when we remember that it is for our own benefit.

A letter was read from the Orange County Radio Association asking if the gang in L. A. had "banded themselves together with the idea of not accepting local traffic." The secretary was instructed to write the O. C. R. A. and express the willingness of the S. C. R. A. to do all it could for them in this

respect. This won't do if we are to "carry on" in true "ham" spirit. What if it isn't DX? It will only take a small amount of time to do these little things and will result in better progress all the way around. Let's go, fellows!

Nominations for new officers were next in order. According to the Constitution, nominations are to be held at the first meeting in December to be followed by the election at the first meeting in January. Nominations were as follows:

President: Open.

First Vice-President: Mr. Wainwright, 6BVG; Mr. Schifferman, 6CGI.

Second Vice-President: Mr. Blodgett, 6ALG; Mr. Leighton, 6CFT.

Secretary: Mr. Wiggins, 6CHZ.

Treasurer: Mr. Fink, 6BRG; Mr. Gilbert, 6AIC; Mr. Dowell, 6BVS.

Sergeant-at-Arms: Mr. Palethorpe, 6CFY.

Chairmen of Committees as follows:

Meetings committee: Mr. Nikirk, 6KA; Mr. Schifferman, 6CGI.

Membership committee: Mr. Blodgett, 6ALG; Mr. W. Hardy, 6CMS.

Publicity committee: Mr. N. E. Brown.

Technical committee: Mr. N. E. Brown; Mr. Leighton, 6CFT.

The nominations were left open until the next meeting. Several were nominated for President, but all declined the nomination with the plea of business. Personally, we think they're bashful. However, pick your man and nominate him at the next meeting.

A few visitors were present and were introduced to the Association. Among those in the third pew were L. Watson, 6BVE, and Wilbur Martin, 6BIC. After 6BVG read their names as traffic violators, they went home to "CQ". (N. B. 6BVG. Don't read reports 'til we sign up new members.) We hope to have all the visitors in our membership, to help us push Radio.

A. L. Blodgett, 6ALG, 6ZBB, says that he will be on soon with "10" watts remote control. He is trying to get some real DC, and is winding a "stillion" henry choke as described by Mr. Brown. He expects to get it wound by a year from Christmas.

New members in the Association are: Mr. A. G. Sundeen, 6MS, and Mr. M. Kingdom Weller, 6SN. Welcome to the Association, OMs.

Anyone got any new calls or changed QRAs? Send 'em in to the Secy, if you have. Here are a few starters; 6AQF (Portable), same as 6BUR; 6ABO (Portable), same as 6CIX; 6ZBB QRA 6ALG; 6AVI (Portable, same as 6CHZ; 6ZZ is rheostat in the lead-in too.

A rather long list of traffic violations (they are always too long) was presented by 6BVG and 6ALG. 6BVG appointed 6AIC as assistant traffic officer and he will use the station 6ALG. The station has been issued the two calls. 6BRF was also appointed assistant T. O., the appointment being approved by the Association. The only violator present of the list read by 6BVG was himself. Page the KOO KOO KLAMS. We'll fix 'im!

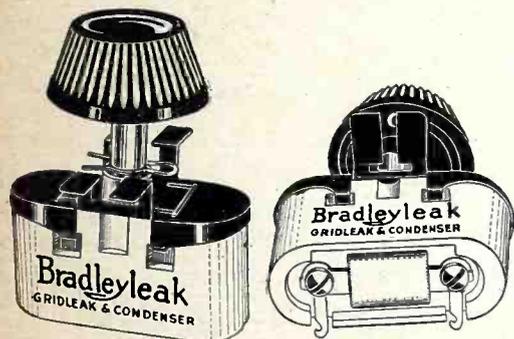
Trade Talk

from
Radio Dealers & Manufacturers

New Bradleyleak

The Allen-Bradley Co. of Milwaukee, Wisconsin, manufacturers of the Universal Bradleystat and Bradleyometer, have added another item to their line of graphite disc radio products.

The new device is an adjustable grid leak known as the Bradleyleak which was developed to meet the insistent demand for a high-grade, dependable grid leak. It is similar in external ap-



THE NEW BRADLEYLEAK SHOWING TYPE OF CONSTRUCTION.

pearance to the Universal Bradleystat and is equipped with an adjusting knob which conforms, in general design, with the approved tapered knob now used in most radio equipment and matches perfectly with the adjusting knobs of the Bradleystat and Bradleyometer.

The Bradleyleak can be adjusted between the limits of 250,000 ohms and 10,000,000 ohms or, as usually stated, between $\frac{1}{4}$ megohm and 10 megohms. The entire range of grid leak resistance between these limits is instantly obtainable without noises, steps or jumps by simply turning the adjusting knob. It is a significant fact that all intermediate values of resistance can be accurately obtained at any time which is a feature not often found in many types of adjustable grid leaks. The Bradleyleak is claimed to be very accurate.

The base of the Bradleyleak is recessed to receive a small fixed condenser which is furnished as an extra attachment, if desired. The grid condenser is adjusted to a capacity of 0.00025 microfarads.

The Universal Bradleystat with three terminals, provides extremely wide ranges obtainable, it is claimed, by using the proper pair of terminal connections.

Teaching Radio

A new method of instruction in radio has been formulated by the American Radio Association, 4513 Ravenswood Ave., Chicago, of which Mr. G. A. Mohaupt is Engineer. The biggest difficulty in teaching radio by mail was the inability of the student to grasp the practical as well as the theoretical side of the subject through the means of charts and pictures alone. The American Radio Association gives, with their course, a radio outfit ready for wiring. The student is taken step by step through all the phases of radio. He works on an actual radio set and his education, therefore, is of practical value. The student having the radio outfit at hand works on his subject with greater interest. Many graduates of the American Radio Association earn considerable money during their spare time by constructing and installing radio sets, it is claimed. Mr. Mohaupt reports that the demand for real radio trained men far exceeds the supply and it is his prediction that the radio field, altho enormous now, will in time earn fortunes for many who are now beginners.



E. B. MALLORY, MANAGER OF THE RADIO SALES DEPARTMENT OF THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, WHO IS LOCATED IN NEW YORK CITY, SERVED AS CHAIRMAN OF THE RADIO COMMUNICATION COMMITTEE OF THE AMERICAN MARINE CONGRESS, HELD IN NEW YORK CITY NOVEMBER 5 TO 10, INCLUSIVE. MR. MALLORY IS NOW CHAIRMAN OF THE RADIO SECTION OF THE ASSOCIATED MANUFACTURERS OF ELECTRICAL APPARATUS.

New Type Charger

The Valley Electric Company of St. Louis is now in full production on the new Valley Type ABC Battery Charger, the improved model which the Company has put out this year. The Type ABC Charger has been designed so that it will charge all radio batteries. It is built on the same principle as the other Valley Rectifiers. The new Valley Charger will charge 2-volt peanut tube batteries, 6-volt A batteries,



and one, two, three and four 24-volt B Batteries. It has a tap for 12-volt batteries and may consequently be used on the radio fan's 6 or 12-volt automobile battery. It can also be used on C radio storage batteries.

In order to make this new and complete radio battery charger harmonize with the home radio receiving set, the Valley Company has adopted a bakelite panel for the face of the charger with fittings and other parts in keeping with the use to which the instrument is to be put.

For a long time, C. Brandes, Inc., have made only their Matched Tone Headsets, but they now announce a new piece of radio apparatus, trademarked "Brandes TABLE-TALKER," which is virtually a loud speaker. The new Brandes TABLE-TALKER is finished in a neutral shade of deep brown with a crystalline finished horn and copper oxidized finish base. The base is felt-padded to protect polished furniture.

The reproducing unit is substantially along the lines of design of the Brandes Superior headset unit with changes which greatly increase the volume of sound obtained.

The Fox Manufacturing Co. of Los Angeles announce a new radio horn, the parts for which are die cut from heavy black card-board, and may be glued together by the radio fan himself in a very short time.

Fall Suits

The trade will be interested in the following letter, from F. A. D. Andrea, Inc., relative to suits filed against the manufacture and sale of neutrodyne sets, alleging patent infringements:

"Early this year our friends and worthy competitors, A. H. Grebe & Co., announced 'A New Spring Suit,' bearing reference to litigation instigated by the Radio Corporation of America.

"We take pleasure in advising the trade that within the past few days 'A New Fall Suit' has been filed by the Radio Corporation of America against F. A. D. Andrea, Inc., the substance of which is alleged infringement of the Rice & Bartley patents Nos. 1334118 and 1183875, respectively, through the manufacture and sale of radio receivers embodying the Hazeltine Neutrodyne circuit, in accordance with the patents and pending applications of Hazeltine.

"This action is most welcome, as it affords opportunity for early adjudication of the validity and scope of the Rice & Hartley patents and the alleged infringements of these patents by apparatus manufactured and sold under the Hazeltine patents and pending applications.

"This 'New Fall Suit' will be defended by F. A. D. Andrea, Inc., with the co-operation and support of the Independent Radio Manufacturers' Inc., of which organization F. A. D. Andrea, Inc., is a member.

"The Independent Radio Manufacturers, Inc., is a group of manufacturing companies who are prominent factors in the radio industry and whose interests are pooled as regards the use of certain patented inventions and the prosecution and defense thereof.

"The trade will no doubt recall the work of this organization last year in connection with the crystal patent litigation, instituted by the Radio Corporation's associate, the Wireless Specialty Apparatus Company, and the action taken by the organization, both as regards the defense and the prosecution of its rights in this situation.

"The Independent Radio Manufacturers, Inc., are represented in patent matters by the firm of Penny, Davis, Marvin and Edmonds. They advise that there is a good and valid defense to the suit started by the Radio Corporation of America on the Rice & Hartley patents.

"From our legal advice we are lead to the independent and firm belief that the defense of our 'New Fall Suit' will result in absolutely no change in our activities in connection with the Hazeltine Neutrodyne receivers, and therefore both at present and in the future the manufacture and sale of

this receiver will continue unabated. Very truly yours, F. A. D. ANDREA, Inc."

Applause Cards

One of the hits of the Radio Show held in New York during the week of October 6th to 13th, was the distribution from the booth of the Dictograph Products Corporation, of envelopes containing five applause cards.

These applause cards have been received with the greatest enthusiasm by the Radio public, as it gives them for the first time, in a simple form, a means of showing their approval or disapproval, as the case may be, of the programs being rendered by broadcasting stations.

The Radio public has become quite critical of the programs which are being furnished and stations, from time to time ask expressions of opinion and approval, in order that they may be able to keep in touch with the public's pulse and in order that they may be able to furnish to the public such entertainment as the majority seem to appreciate and demand.

The applause card was originated by the Dictograph Products Corporation, has been copyrighted and is being distributed by them to jobbers and dealers throughout the country and will be available for further distribution in Radio shops everywhere.



PERMIT US TO PRESENT CLIFF A. TORGERSON

Clifford ("Cliff") A. Torgerson has now established a first class radio shop, known as Ye Quality Radio Shoppe, carrying in stock, he announces, only standard articles, including the new self-contained Radyne dry battery Concert Receiver.

"Cliff", as he is popularly known to the coast radio fraternity, gained his experience in Portland, Oregon, start-

ing at the age of fifteen with a Ford spark coil transmitting set, and in a six months' period had a one kilowatt transmitter, the height of the amateur's ambition in those days.

He has formerly been connected with Radio Supply Co., Coast Commercial Co., Gans Brothers, and for a short period, with Hi-Grade Radio Shop. He now has thoroughly equipped a shop for the construction of radio sets to order, being able to develop or execute any ideas presented by his customers.

WTAM on Air

"Another powerful radio broadcasting station put its opening program into the air recently, when WTAM, the large new broadcasting station of the Willard Storage Battery Company of Cleveland, joined the ever growing ranks of radio transmitting stations," said C. T. Holcomb, manager of the Western Auto Electric Company, Distributors of Willard Batteries. The Company's initial program was heard all over the Pacific Coast.

"On a wave length of 390 meters this company, one of the largest and best known manufacturers of automobile and radio batteries in the country, broadcasted its opening program from one of the most powerful stations yet built.

"The outstanding and unique feature of the Willard station is that it not only has 1000 watts for transmitting but that storage batteries, which have for some time been recognized as the ideal source of power for clear and steady transmission, are being used exclusively.

"It so happens that the Willard Company had just recently introduced to broadcasting stations a new and specially designed battery for broadcasting purposes. For many months this company carefully studied the transmitting problems of the largest broadcasting stations in the country, finally evolving the new broadcasting battery which has a number of improved qualities, including constant voltage and great capacity.

"It is this new type of broadcasting battery with which Willard's new broadcasting station is equipped. And its power for transmission depends on storage batteries alone, no motor generator being used. Through the use of storage batteries, to supply the 2500 volts required by the 1000 watt transmitter, this station bids fair to be the most quiet broadcasting station in the country, as every possible precaution has been taken to prevent interference from any source."

Many local fans have been delighted by their program, which is on the air each Wednesday at 5:00 P. M., and each Saturday at 6:00 P. M. Coast time..

Messing the Ether

(Continued from Page 236)

offering solutions to problems, and remedies for abnormalities. Your attention is invited to the opinions of various reputable radio engineers and designers that the use of "neutrodyne" or compensating capacities across the elements of radio frequency amplifier and regenerative detector tubes will prevent undesirable "feed-back" or regeneration, and resultant retransmission.

A single stage of transformer coupled radio frequency amplification ahead of the ordinary regenerative detector will damp out to a great extent the retransmission of interference, and at the same time increase sensitivity to a marked degree. Other methods for inexpensive improvement of existing retransmitting circuits will doubtless be discovered and developed. Where there is a will there is a way. Every amateur radio enthusiast or expert should appoint himself a committee of one to faithfully consider this problem and become a center of sentiment and promoter of improved conditions in order to insure that radio find and hold its own. When the public is sufficiently and thoroughly aroused to the crying necessity for solving this problem, retransmitting receiving sets will be doomed to almost immediate extinction.

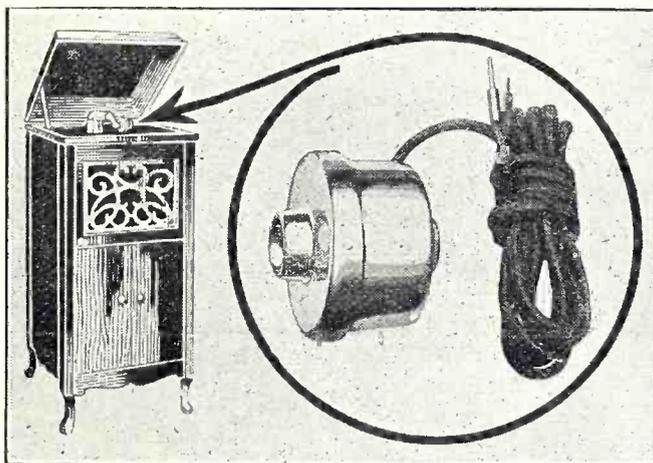
Chicken Radio

You have heard of the Old Timer who can forecast weather conditions by the threatening twinge in his game leg, and not infrequently he has done quite as well as the U. S. Weather Bureau, but are you acquainted with the 82-year-old farmer near Madison, Miss., who predicts radio reception for the evening by the manner in which his guinea hens go to roost! If not, then you do not know that the Old Timer has found a new field of prophecy.

If common practice proves this to be true, we may expect that the radio bugs on the farm will replace chickens with guineas, and the effect may be a change of diet in city restaurants. Bradford Hearn of this place, member of the American Radio Relay League, has just received a letter from his grandfather in Madison saying, "When the guineas go to roost making a lot of noise, we know the atmospheric conditions will interfere with 'listening in', but if they go quietly to roost, we know there is to be a fine radio evening."

Every important army post in the country is now connected with Washington by the recently completed network of the Signal Corps radio service, but the system cannot be properly handled, at present, it is announced because of the shortage of personnel.

The Artists of the Radio are at their best with Morrison Loud Speaker



TRUE tones, sweet and clear, soft or loud, as you wish, are assured you when you use the Morrison Loud Speaker on your phonograph or radio horn. One hundred per cent volume by the turn of the knob on the rear of the Morrison—giving full, true tones without rattle or vibration, even when amplification is extreme—a very desirable feature for use in large rooms or for dancing parties.

If your mood demands soft music or low spoken voices, another slight turn of the knob—and you have it.

Adaptable for use with any bulb set, with one or more stages of amplification.

The Morrison Loud Speaker can not get out of order. It fits the tone arm of any phonograph or practically any make of horn. Any one can connect it in a moment. It functions perfectly thereafter.

The Morrison Loud Speaker is made of finest materials obtainable; each unit is thoroughly inspected for quality and it is sold under an unqualified guarantee.

Should you not be entirely satisfied with the Morrison Loud Speaker we want you to say so and your money will be refunded immediately.

Price \$10 Complete

Get it today — hear it tonight

Western Radio., Inc.
637 South Hope Street, Los Angeles, Calif.

RAY-DEE-ARTCRAFT

Super-Hetrodyne Tuned Radio-Frequency Transformer

TYPE 10-A

Is a Tuned Radio-Frequency Transformer to be used in the Intermediate Frequency Amplifier of the Super-Hetrodyne Method of Reception.

A 23-plate Variable Condenser is used to Tune the Transformers to Resonance.

The use of DRY CELL TUBES IS RECOMMENDED because of their lower filament consumption as well as the fact that no oscillations will occur when the RAY-DEE-ARTCRAFT Type 10-A SUPER-HETRODYNE R-F TUNED TRANSFORMER is tuned to resonance!! This is indeed an achievement of RAY-DEE-ARTCRAFT ENGINEERS!!!

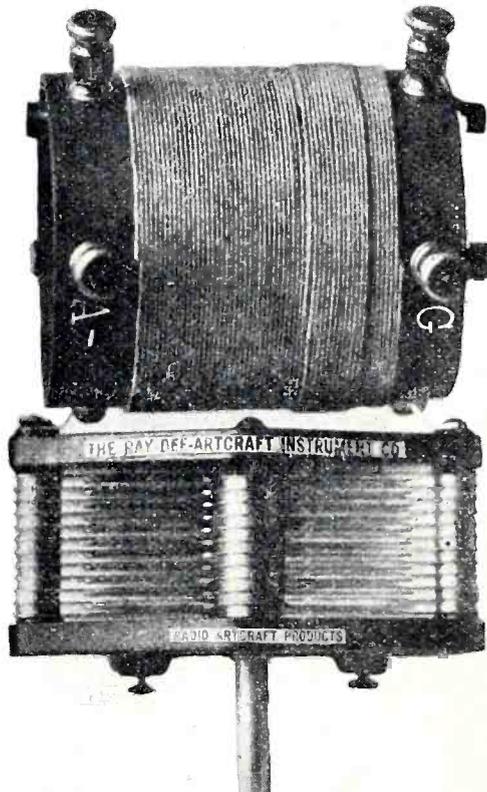
Complete details of the construction of a SIX TUBE SUPER-HETRODYNE RECEIVER using Tuned R-F Transformers appears in the October issue of RADIO JOURNAL. DID YOU MISS IT??

Super-Hetrodyne Tuned R-F Transformer, Type 10-A, \$6.25 each

Ray-Dee-Artcraft

TUNED RADIO-FREQUENCY TRANSFORMER

Type 3-A (275 to 600 Meters)



The Ray-Dee-Artcraft Tuned R-F Transformer can be used in either the Neutrodyne Method of receiving or as Tuned Radio-Frequency Amplification with outside antenna or loop aerial.

ORDER YOURS NOW WHILE THE PRICE IS WITHIN THE REACH OF EVERYONE!!!

ONLY \$1.25

SPECIAL INTRODUCTORY PRICE \$4.00 as illustrated!!

WITHOUT 23-plate variable condenser\$1.25

ORDER YOURS WHILE YOU HAVE THE CHANCE!

Ray-Dee-Artcraft
TUNED R-F TRANSFORMER
Type 3-A-23
PRICE.....\$4.00

There are *no losses* in the Ray-Dee-Artcraft TUNED R-F TRANSFORMER due to excessive distributed capacity, because of the absence of dielectric material having a very high dielectric constant such as bakelite, fibre, formica, etc., This is curbed by winding the Ray-Dee-Artcraft R-F TRANSFORMER on a *specially treated* tube whose hysteresis losses and dielectric constant are extremely low!! Transformer losses are still further reduced by *winding the Primary directly over the Secondary*, thus obtaining a tighter coupling and at the same time eliminating a high constant dielectric (bakelite, fibre, etc.) from the electromagnetic field of both windings!!

Ray-Dee-Artcraft MINIATURE VARIABLE CONDENSER to be used wherever a very small capacity is necessary, such as when Neutralizing Capacity Coupling.....Price 50c.

Manufactured by

The Ray-Dee-Artcraft Instrument Company

1017 TRIBUNE STREET

REDLANDS, CALIFORNIA

Hootnanny Transformer

(Continued from Page 230)

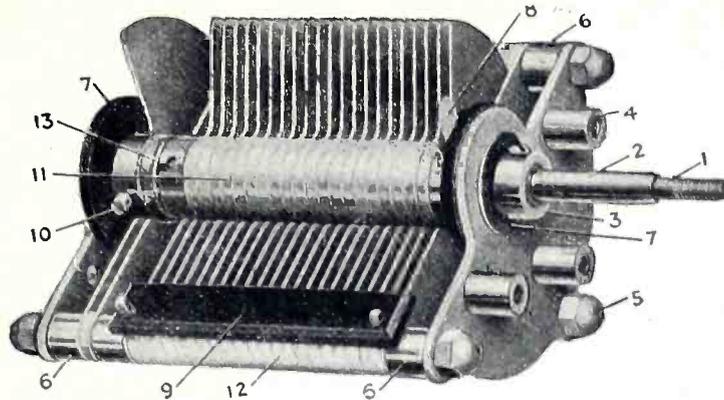
numbered so that in recording the settings it is an easy matter to return to that setting. This saves counting the switch points as I did at first, and also tends to make the wave changes more rapid. The method for recording the coupling setting and being able to return to it in a jiffy was worked out by simply placing an engraved bakelite strip on the face of the Hootnanny under the shoulders supporting the rotary switches, so that this strip also helps to support the grid and plate coils and the supporting shoulders act as pointers on the scale, making it possible to tell at a glance what the coupling is, or setting to a recorded coupling.

As said before this Hootnanny O. T. has been kicking out results at 6CCH for the past year and better and it is an easy matter to jump from 360 to 200 meters or from 360 to 600 or any other wave length that I happen to have setting worked out for, in a matter of just a few seconds. Even while transmitter is in operation, and this is a wider band than the amateur is ever going to be allotted, so there is no reason why his Hootnanny Oscillator Transformer cannot be incorporated in the up to date ham station, and make it possible for him to QSY to any wave the law allows him, in just a very few seconds and to do that means to clear up a lot of QRM among ourselves as well as moving a lot of the traffic that has been hanging on the peg.

Honolulu Broadcast

Radio listeners in the Hawaiian Islands have for some time had the pleasure of listening to programs from "the good old U. S. A.," re-broadcast from the station of the Honolulu "Advertiser." Usually these programs come from KHJ and KFI, in Los Angeles. On the night of September 2, a new record was made with the re-broadcasting of a late program from WHB, the Sweeney Automobile School at Kansas City. The re-broadcasting arrangement is as follows: At the Koko Head station twelve miles from Honolulu, is a receiver consisting of three stages of radio frequency and a standard short wave set, fed from a combination of a Beverage and horizontal antenna. The signal is then amplified with one stage of audio frequency and one stage power amplification, and passed through twelve miles of telephone line to the City of Honolulu, where it is put into the modulating circuit of the Honolulu "Advertiser's" transmitter (KGU). The distant signal thus actuates the local station and provides concert programmes to the enthusiasts in the Islands of the Hawaiian group.

ADVANCE PRECISION CONDENSER



3	Plain plate.....	\$2.00
5	"	2.25
9	"	2.75
11	"	3.00
13	"	3.25
17	"	3.35
23	"	3.50
31	"	4.25
43	"	4.50
53	"	6.85
	Vernier	
11	plate.....	\$5.50
13	"	5.75
23	"	6.00
31	"	7.00
43	"	8.00
63	"	10.00

Mechanically and Electrically Right

The heart of the receiving set must be sound or all the other instruments become useless. The Advance Precision Condenser gives perfect uninterrupted service. The rotors are equipped with star springs which give the same tension at all times. Shunted by a pig tail which eliminates the possibility of any noise while it is being adjusted. Beautiful in design and appearance, all parts being nickel plated.

Made in vernier and plain to meet the demands of those who want the best

SPECIFICATIONS

- | | |
|---|--|
| Stator spacers (12) 3/8-inch diameter. | Vernier shaft (1) threaded 8/32 adjustable by set screw (10) to accommodate any thickness panel or dial. |
| Spring (13) perfect contact and friction for vernier plate. | Bakelite bearing (7) 1/4-inch shaft both ends. |
| Rotor tube (2) 1/4-inch diameter, brass nickeled. | Stop (9) full length of rotor. |
| End collar (3) Adjustable for alignment. | Nickel acorn nuts (5) which insure strength. |
| Mounting posts (4) 5/16-inch round 6/32 so spaced to accommodate any diameter dial. | Rotor spacers (11) 5/8-inch diameter, machine turned. |
| Brass nickeled spacers (6) 3/8-inch diameter accurately machined. | All spacers aluminum to .001-inch insuring perfect alignment of plates. |

ASK YOUR JOBBER.

ADVANCE ELECTRIC COMPANY

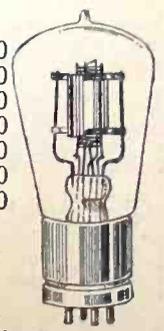
Manufacturers See Us for Panel Engraving Engineers
 Phone Metropolitan 5990
1260 W. Second St. Los Angeles, Cal.

Be Sure to Patronize Radio Journal Advertisers—It will Pay You to do so

We Repair the Following Radio Tubes and Guarantee Them



WD-11	\$3.50	UV-199	\$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-6	3.00	DV-6A	3.50



Mail Orders solicited and promptly attended to
 Dealers and Agents write for Special Discount

H. & H. RADIO CO.

P. O. BOX 22-J

CLINTON HILL STA.

NEWARK, N. J.

Science of Invention

(Continued from Page 224)

and generally is, the truest religionist for the Great Master, scripturally expressed as a "God of Knowledge," will not long permit the ignominious stifling of true knowledge by orthodoxy or by any anthropocentric theorist.

However, this is not a thesis on evolution, nor a treatise on theology, anthropology or cosmology, but we make these observations only to illustrate the destructiveness of predilection in general, though it is difficult for us to pass, without comment, the Bryanian hypothesis of a "permanent relation-

ship in various forms of matter" in a universe of ever-changing environments, or of a "stationary" endowment in a universe in motion, since we might well inquire who is he, of the Epicureans, so bold that he would seek to foster, other than upon such as have a "jungle ancestry," a conception which needs deny the very existence of the grapefruit of his own breakfast table and yet, at the same time, aspire to tell us the story of a Universe evolved by a "God of Knowledge"?

Precipitation Needed.

May the willy-nilly of jazz, so destructive of music, and may the rag,

tag and bob-tail, of ignorance and superstition, so destructive of reason, rapidly precipitate, as residue and sediment in deep water, that the remaining rational contributions found in true educational endeavors, enjoyments and wealths, may stand thus acquiescently purified in the warm Eternal Sunlight, just as the Great Master ordained in the beginning.

Neglect the advantages of Radio, and the advantages of Aircraft, both given to us as the richest legacy, save only that of Intelligence, and we will certainly endanger the future development of mankind as it was never endangered before, even by destructive wars. Moreover a great opportunity, knocking at the gates of Civilization, will be lost just as John J. Ingalls so ably expressed it when he wrote; "Master of human destinies am I!

Fame, love and fortune on my footsteps wait.

Cities and fields I walk; I penetrate
Deserts and seas remote, and passing
by

Hovel and mart and palace, soon or
late,

I knock unbidden once at every gate.
If sleeping, wake! If feasting, rise
before

I turn away! It is the hour of
fate,
And they who follow me reach the
state

Mortals desire, and conquer every
foe

Save death; but those who doubt or
hesitate,

Condemned to failure, penury and
woe,

Seek me in vain and uselessly implore.
I answer not and I return no more!"

India is facing a new broadcasting problem, the diversity of language. Vice-consul Thomas, in a dispatch from Calcutta, reports that a projected broadcast station in Delhi was abandoned when it was found that a proposed news program of 500 words would take twenty-four hours to transmit if it were translated into the many languages of the country. Establishment of stations in the larger centers, such as Bombay and Calcutta for purely home consumption is about the only thing considered feasible at present.

One way out of interference between local stations, for the man with a big set who wants to play with distance occasionally, is to have two aerials. Let the big outdoor aerial stand for long range work if you wish, says a reader, but put up a short one, a vertical lead in of 40 feet will be all the aerial needed, and when receiving local broadcast throw a switch disconnecting the big aerial and throwing in the short lead in. The difference in tuning on local broadcast at once becomes apparent.

Radio Builders Copy Our "Raflex" Receiver

Perfect reception and selectivity, correctly designed and enclosed in elegant cabinet. Complete, \$85.00, or we will sell you the parts and give you diagram and instructions free.



A small payment down, and balance on installments.

We make in our shop everything the Radio Builder needs, on short notice.

Bakelite Panels

Cut and engraved (absolutely perfect.)

Zaponized Cabinets

Any size, 24 hours' notice.

Neutrodyne Condensers and Coils

20 Point Back Panel Inductance Switches (in stock.)

Combined non-capacity Couplers with self-contained 20-point Switches.

Special Bakelite work and Coil Winding. In fact, everything that is needed in Shop Service.

Radio Lab. & Mfg. Co.

215 Court St., Los Angeles, Calif.

Telephone 827-247

Ray W. Scott, Master Mechanic.

H. LaV. Twining, Prof. of Physics and Electricity, Polytechnic High School.

The New Synchrondyne

(Continued from Page 217)

explanatory, but let me say here that by all means use the best insulation obtainable throughout in building the circuit, and always use resin for solder flux.

One of the attractive features of the Synchrondyne circuit is the fact that it will work equally well on any type of tube, and as I am using C299 tubes with only two dry cells for filament voltage, the efficiency of it will readily be understood. The only variation from the windings of the transformer marked "Synchrondyne Transformer" is that for C299 tubes the secondary should be twice the number of turns of that given in figure one. The primary side may be changed according to the kilocycles that this particular winding is to be used on but this circuit designed primary will work from approximately 180 meters to 595 meters. All vacuum tubes and winding should be spaced at least three inches apart to avoid any chance of back coupling. Care should be taken in the choice of rheostats as the experimenter usually gives this the least consideration and it is the cause of fading and instability of signals in nine cases out of ten in the average receiving set. I recommend using a Vernierstat. Another weak point in the set of the average constructor is in the condenser, nothing but mica or bakelite or its equivalent should be used, as inferior insulation gives a chance for leakage. May I say here that one of the several important features of the Creswell circuit is in the fact that there are no inductances that are liable to cause an "ironing out effect" to the overtones of the incoming audible frequencies. This will give the full mellow tones to the signals and will allow long distant stations to come in clear, without the peculiar "long distant fuzz."

In conclusion, let me say that the Creswell Synchrondyne circuit is the first, to my knowledge, that was built particularly for radio telephony, a circuit that, although good for telegraph, was built for the reception of all generally used voice or audible frequencies, and therefore, a real broadcast receiver circuit. I shall be glad to answer all questions regarding the construction of this circuit, addressed to me, care of Radio Journal.

Three important developments of radio have been predicted by Marconi, all of which are being worked on and may be announced as commercially available within a short time; commercial Trans-Atlantic radio telephone service; regular communication between the surface of the Earth and deep mine workings; and the perfection of radio signalling between submarines and the mother ship.

"All great things are simplest. When one man does something big, others say, "Why didn't I think of that?"

The New Marathon

The Price The Kind The Quality

These three things are sending Marathon sales ahead of others.

The Kind

A New Type of Radio Amplification

Simplicity—Wonderful Results.
Made in two models—four and five tube.

The Quality

Life-like reproduction cannot be excelled. Marathon's reproduction is without equal.

The Price

\$94.75

Accessories, as low as **48.50**

Complete **\$143.25**

The highest priced accessories, an additional..... **\$54.75**

Sold only through Exclusive Marathon Factory Agencies—

"AN AGENCY IN EVERY TOWN"

(Our Motto)

To Builders and Dealers:

If there is no Marathon agency in your town write for information. There is no proposition that can touch ours.—Nothing else like it.

Are You a Live One?

N. R. S.

National Radio Service

So. California District Office

1260 West Second Street

Los Angeles, California

Classified Advertising

Follow these advertisements every month. Reliable advertisers from all over the country offer their most attractive specials in these columns.

Objectionable or misleading advertisements not accepted. Advertisements received too late for current issue will be accepted for the issue following.

Name and address must be included at the above rate. Cash should accompany all classified advertisements unless placed by an accredited advertising agency. No advertisement accepted for less than 4 lines.

Classified Advertising Rates, 5c per word. Time discounts for consecutive insertions; 3 times, 5%; 6 times 10%; 9 times, 15%; 12 times, 20%. Minimum charge, \$1.00.

PERSONAL

INVENTORS: PROTECT YOUR INVENTION through A. M. Wilson, Inc., Washington, D. C. Over 25 years of efficient, expert, confidential service. Skilled in Radio-Electrical, Chemical and Mechanical fields. Our new illustrated Patent Book, giving much necessary and very useful information which every inventor should know, will be sent free upon request. Prompt and careful attention. Highest references. Moderate fees. Send sketch or model for our careful opinion and preliminary advice. Write today to A. M. Wilson, Inc., (Radio 3ARH), 325 Victor Bldg., Washington, D. C.

PRINTING

RUBBER STAMP with large call letters 50c; Radiogram and Relay Radiogram blanks 25c per hundred, Post Card 60c hundred. Send us your orders. Carolina Printing & Stamp Co., Wilmington, North Carolina.

CALLS HEARD POSTAL CARDS for DX reports. Station call letters in color. Printed on government or plain postals. 80c hundred up. "Used Everywhere—Go Everywhere." Write for samples. Radio Print Shop, Box 582, Kokomo, Indiana.

RADIO EQUIPMENT

WAVEMETERS CALIBRATED with our Bureau of Standards wavemeters. Send us a good variable condenser and we will make it into a wavemeter. Prices reasonable. Correspondence invited. Radio, 6GI, 465 North Lake St., Los Angeles, Calif.

C.W. AND RADIOPHONISTS:—One hundred Ohio and Wagner 110V. sixty cycle A.C. synchronous motors built in 1/4 A.P. frames with 1/2" shafts are yours for \$18.00 each F.O.B., Buffalo, N. Y. Original selling price \$28.50. We also have the parts to attach to these motors to make synchronous rectifiers which will handle 2000 volts. Kinley Electric Co., Inc., 2665 Main St., Buffalo, N. Y.

COUPLERS, 80 turn \$2.00, 90 turn \$2.25, 110 turn \$2.75; variometers \$1.50; complete tuners \$10.00. We make all kinds of coils to order. Special prices on sets. Stiles-Perry, Deposit, N. Y.

WIRE TERMINALS—150 assorted \$1.00, 20 two foot lengths No. 14 square tinned busbar \$1.00, 10 two foot lengths No. 10 special round busbar \$1.00. Send for samples. Immediate shipment postpaid on receipt of remittance. Radio Engineering Co., 55 Halsey St., Newark, N. J.

RADIO BARGAINS—Any \$6.50 Tube \$5.75; Erla Reflex Transformers, any type \$4.50. Burgess 2156 Batteries \$2.50; Brandes Superiors 5.25; Signal 23 Plate Condenser \$1.75. Everything Guaranteed Perfect. Write for list. Edward Bromley, Jr., Whitewater, Wis.

FOR SALE—Omnigraph, 15 dial, new \$20. Transformers, Audio UV712, Radio UV1714, \$3.50 each. Paragon sockets and type UR542, 50 cents each. Paragon rheostats, 75 cents each. Ellison Thompson, 1301 Findlay Ave., New York.

FOR SALE—Crocker Wheeler motor generator rewind 150 watts, 1000 volts speed 3600 \$75.00. Esco 500 watt, 1000 volts speed 1750 new 150.00. Travis Radio Laboratory, 102 Diaz St., Antonio, Texas.

PACIFIC COAST STATIONS are heard in Pittsburgh with vario-coupler and two Rogers Receiving Radiometers (Condensite molded variometers). Radiometers \$4.00 each. Postage prepaid. Rogers Radio Company, No. 5133 Woodworth St., Pittsburgh, Pa.

CARTER VARIABLE condensers 23 and 43 plate, your choice \$1.00. Automatic Long Range phones 3200 ohms \$3.25. Coryphone headsets 2000 ohms \$3.00, Brach weatherproof outdoor lightning arresters \$1.00. Newyork Efficiency variometers \$1.50. Carter Plugs, handle two headsets \$0.40. American hard-rubber dials 4 inch for 1/4 inch shaft \$0.40. Electrode lead-in bushings 6 inch \$0.80. Powell May, Box 241, Knoxville, Tenn.

EDISON ELEMENTS for storage "B" batteries, six to ten cents per pair postpaid, depending entirely upon quantity ordered. I handle only strictly first grade full capacity elements. A. J. Hanks, 107 Highland Ave., Jersey City, N. J.

A WONDERFUL CRYSTAL SET—Can hear all over Philadelphia, and sometimes outside Philadelphia. Price with phones \$10.00, without phones \$4.00. Receiving sets \$25.00 to \$200.00. Guaranteed or money back. Send money order, Williams Radio, 2339 W. 8th St., Philadelphia, Pa.

FOR SALE

A. B. C. of Radio by Waldemar Kaempffert—over 500,000 copies sold at 25c. a copy. One of best beginners' radio books on market. Special price 16c. each, postpaid. Western-Radio Supply Co., 418 Stimson Bldg., Los Angeles.

MISCELLANEOUS

GERMAN MARKS, 50c per million; other monies; send 25c for samples and particulars. Stimulate sales, advertise something new. Russian, Austrian, Polish, Write Di. Foti Adv. Co., 561 Washington St., Akron, Ohio.

1,000,000 GERMAN MARKS, \$2; 20,000 Austrian crowns, \$1; 1,000,000 Russian rubels, \$1; all three for \$2.50. AMERICAN SALES CO., Box 1278 San Francisco.

FOR SALE—Broadcasting station, KXD, portable type, complete. Will sell transmitter alone if desired. Address, The Modesto Herald, Modesto, California.

FOR SALE—C.W. and Phone Transmitter, 10 watts. Electric Specialty 100 w., 500 volt generator, 110 volt 50 cycle motor; \$100 complete with tubes, microphone, key, buzzer, etc. Address Box B-42, Radio Journal.

FORMS to cast Tin Soldiers, Marines, Indians, Trappers, Hunters, and my Air Pressure Cannon Machine. Moulds from \$1.25 up to \$3.50, casting 3 to 4 pieces at once. Write for catalogue. Ht. Schiercke, 1034 72nd St., Brooklyn, N. Y.

Homespun Tobacco—Chewing—5 lbs., \$1.25; 10 lbs., \$2.50; 20 lbs., \$4.50. Smoking, 5 lbs., \$1.25; 10 lbs., \$2.00; 20 lbs., \$3.50; Farmers' Union, Mayfield, Ky.

MAIL ORDER METHODS—\$50 WEEK, evenings, I made it; mail order business. Booklet for stamp tells how. Sample and plain, 25 cents. Free 12 articles worth \$3. Alraj Scott, Cohoes, N. Y.

WE SHOW YOU HOW TO EARN BIG MONEY easily with our casting forms making Whistling Birds, Wild Animals, Crowing Roosters, Automobiles, Baseball Players, Statue of Liberty, Indians, Toy Soldiers, Cowboys, Barking Dogs, Wag Tail Pups, Miniature casting of Capitol, Bathing Girl Souvenirs and others. No experience necessary. We furnish you with molds and necessary outfit from \$3.50 up. We buy large quantities of finished goods at highest prices. Spot cash. Send for catalogue and information free. The Improved Metal Casting Co., 342 East 145th Street, New York.

LEARN CHEMISTRY AT HOME.—Dr. T. O'Connor Sloane, noted educator and scientific authority, will teach you. Our home study correspondence course fits you to take a position as chemist. See our full page ad on page 295 of this issue. Chemical Institute of New York, 66 West Broadway, New York City.

OPERATE A TIRE REPAIR SHOP!—Big Profits! Oldham made \$2,200 in 4 months. Evans averages \$1000 week. We teach you and furnish full equipment for \$100 up. Write quick. Haywood's 1331 South Oakley Ave., Chicago.

HELP YOUR SET cut out interference by using a circuit for every need. Blue Prints for constructing 9 circuits. Combination Primary Condenser Switch at fifty cents per set or three sets for one dollar. Sell two and get yours free. A. Franklin Starbuck. (6IY) 569 Franklin St., Whittier, Calif.

SCHOOLS

TELEGRAPHY—BOTH MORSE AND WIRELESS taught thoroughly and quickly. Tremendous demand. Big salaries. Wonderful opportunities. Expenses low; chance to earn part. School established fifty years. Catalog free. Dodge's Institute, Cour St., Valparaiso, Ind.

RADIO FANS AND PROFESSIONALS—How many of you know the correct CODIFICATION of all characters, punctuations and signs (such as \$, per cent, etc). We dare say that nine out of ten don't know them correctly! Our instructor who has had 35 years' experience, eight years of which were with Uncle Sam as MORSE and RADIO TELEGRAPHER, has just published the first and only CHART known to give fully a true and correct CODIFICATION of ALL characters used in both codes. This CHART is indispensable to all up-to-date beginners and veterans alike. Fifty cents (money order preferred) will bring CHART, also much information extremely interesting to BOYS and GIRLS; because, with this information and a little PEP on your part, you can qualify shortly (as scores of our graduates have done) and secure positions paying \$1,500 to \$3,000 yearly. (See Civil Service Bulletins 215, 357 and 54.) We are registered with the U. S. C. S. Com. at Washington, and can help you. AMERICAN TELEGRAPHIC STUDIO, BOX 793, WORCESTER, MASS.

AUTOMOBILES

AUTOMOBILISTS—A pair of "Is-It-Lit" reflectors attached to your headlights will tell you when driving whether they are lighted. Two styles \$1.05 and \$1.58 the pair. The H. D. S. Co., 79 Walnut St., Somerville, Mass.

Fords run 34 miles on gallon gasoline. Other cars show proportionate saving. Wonderful new carburetor. Starts easy in coldest weather. Fits any car. Attach yourself. Money back guarantee. Sent on 30 days' trial. Agents wanted. Air Friction Carburetor Co., Dept. 3222, Dayton, Ohio.

11

CALIFORNIA DEALERS AND JOBBERS ARE MAKING MORE MONEY TODAY

Last week they bought

CRYSTALS
DIALS
COILS
SWITCHES
BINDING POSTS
CONDENSERS

From
COLUMBIA COIL COMPANY
Vancouver, Washington

629

CALIFORNIA DEALERS AND JOBBERS ARE STILL PAYING HIGHER PRICES FOR THE SAME GOODS WE SELL FOR LESS

Why send East for goods when we are shipping our products to the largest distributors in Chicago, New York and Philadelphia? Let us prove it pays you to buy on the Pacific Coast. Save the transportation and get immediate shipment.

COLUMBIA COIL CO.
VANCOUVER WASHINGTON

Australian Tests

(Continued from Page 233)

fans have gone in solidly for international DX and the game lately has been reduced to a competition in listening for the "Yanks."

It has been emphasized frequently by ship operators that receiving conditions in the vicinity of New Zealand are as good, if not better, than anywhere in the world and this appears to have been proved by the experience of F. D. Bell, who states that he often hears amateurs in all U. S. districts, and as the evening advances, one district after another will fade out as daylight sweeps slowly across the continent.

"With fifteen amateur stations already installed and others rapidly going on the air for the purpose of entering the transpacific tests under auspices of the Radio Journal, the American Radio Relay League and the Southern California Radio Association," says a dispatch from there, "it is confidently expected that before the tests close the New Zealanders will have established two-way communication with American hams."

The conditions for radiophone work are equally good and Mr. Bell's speech has been heard in New South Wales, Victoria and Tasmania, while CW signals have been reported in Samoa, 2,000 miles, with about 1.7 amperes in the aerial. This is about half way to Honolulu!

H. Kingsley Love, the Australian amateur who originated the Australian Trans-Pacific tests, describes their preparations in a letter written before the fall tests started.

"At my station, 3BM, we have a very special arrangement. 3JO and 3BQ are joining me and we have at least four separate receivers in working order for experimental work on your signals.

"Then again, we have several special licenses for 3BQ to transmit on 1KW. At 3BM we will do the official receiving for the whole test and will communicate with 3BQ on a 5-watt radiophone and he will go back to you on his 1KW.

"The reason for employing four receivers at 3BM is to discover the least number of tubes which can be employed to receive each station. For instance, if we are getting 6CGW on two stages radio and one detector, we will switch to No. 2 receiver and see if he is still audible on one radio and one detector. If he is, we can switch to No. 3 and endeavor to receive him on one 1 valve and so on.

"New Zealand, South Australia, Queensland, West Australia, New South Wales, Tasmania, etc., have all been notified to get ready for the test."

BUY RADIO SUPPLIES NOW

MADERA CLEAR SPEAKERS
C-1 C LOUDSPEAKER
TRUTONE LOUDSPEAKER
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ERLA PARTS
ADVANCE PRODUCTS
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GOLD SEAL HOMCHARGERS
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DEALERS WRITE FOR FREE LIST OF BROADCASTING STATIONS
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WE'RE READY--ARE YOU?

Our stock-room is full of good, fresh, standard radio parts and materials—ready to take care of your wants for this wonderful radio season which is here right now. Our mail order service is better organized than ever—and that means instant deliveries! Mail order with check or money order and we'll get materials to you RIGHT NOW.

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EL MONTE

CALIFORNIA

Opening Announcement

YE QUALITY RADIO SHOPPE

Radiates Quality—Dependable Apparatus Only

Announce the opening of their Radio Department which will be known as

Ye Quality Radio Shoppe

Clifford ("Cliff") A. Torgerson, formerly of Radio Supply Company, and Gans Bros. Electric Company, invites all friends to visit our store for service. Let us help you select your parts or set that will fill all your requirements. We carry a complete line. Sets made to order.

Make your Radio Headquarters at

6278 Hollywood Boulevard

Hollywood, California

Phone 438-304



Mounted 50c Unmounted 25c

[Work in Reflex? Yes! It sure will]

"CATWHISKER" RADIO CRYSTALS

Our standard is set higher than was thought possible, and that is making better Radio reception for all.

Let them all meet our standard, and the day of bum radio crystals is gone!

To make BETTER crystals for you, we are going to MOUNT AND TEST THEM AT THE MINE! Out in the desert, beyond Death Valley, where the static is the worst on earth, EVERY CATWHISKER CRYSTAL WILL BE TESTED ON LONG DISTANCE CONCERTS. Does that mean anything to you? Our nearest station is 400 miles. Our farthest—well, WE HAVE PICKED UP CHICAGO AND FORT WORTH ON A CATWHISKER CRYSTAL! Think that over.

El Picacho Mining Company

LAS VEGAS, NEVADA

Listening In



From 6AOI

Editor, Radio Journal. In last "QST" I see where F. D. Bell, of New Zealand, has logged my signals "6AOI" along with 6KA-6BIC-6RM. Am enclosing the only photos of my station that I have now and a card

"RADIO"	"RADIO"
Bob Hernandez	
<i>Special Sets Made to Order</i>	
Let me quote you on any circuit.	
2034 Sunset Blvd. Phone, Drexel 1142	
Los Angeles, Calif.	

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Radio Journal, published monthly at Los Angeles, California, for October 1, 1923. State of California, County of Los Angeles—ss.

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

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, Radio Journal Publishing Co. (Inc.), Los Angeles, Calif.

Editor, K. P. Frederick, Los Angeles, Calif.
Business Manager, Hugh Harlan, Los Angeles, Calif.

2. That the owner is: (If the publication is owned by an individual his name and address, or if owned by more than one individual the name and address of each, should be given below; if the publication is owned by a corporation the name of the corporation and the names and addresses of the stockholders owning or holding one per cent or more of the total amount of stock should be given.)

Radio Journal Publishing Co. (Inc.), Los Angeles, Calif.

Hugh Harlan, Los Angeles, Calif.
Anna E. Harlan, Los Angeles, Calif.
A. C. Humphry, Los Angeles, Calif.
K. P. Frederick, Los Angeles, Calif.

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

None.

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

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

HUGH HARLAN, Business Manager

Sworn to and subscribed before me this 3rd day of November, 1923.

(SEAL) ANNA B. MOORE, Notary Public in and for said County and State. (My commission expires June 6, 1926.)

with station "dope" on it. Hoping this is what you want, I remain,

In your letter you also wanted some calls heard. These I am sending were logged by me from Sept. 14 1922 to March 21, 1923.

1QP, 1BKA, 2FP(ICW), 3NB, 3NI, 3ZP, 3AGR, 3JL, 3HG, 4OI, 4EL, 4EK, 4IB, 4BY, 4ID, 4EB, 4CG, 4JM, 4KM, 4KF, 5XAD, (5AEC), 5ZADA, 5ZA, 5DI, 5ZAV, 5XD, 5YQ, 5XY, 5KC, 5HB, 5ACF, 5EK, 5ER, 5YQ, 5NN, 5ZAA, 5RV, 5FV, 5AAT, 5TJ, 5NJ, 5ZAS, 5ZB, 5XA, 5XB, 5PO, 5ABG, 5UI, 5ZABA, 5NV, 5ADO, 5MB, 5BM, 5SZ, 5ADB, 5XG, 5XK, 5XV, 5AGV, Sixes, Sevens, too numerous. 8BXH, 8VG, 8AFD, 8ZAF, 8AZD, 8CUR, 8BZY, 8CJP, 8AXB, 8OW, 8FT, 8DAK, 8XAK, 8XAM, 8BAR, 8BGT, 8BOZ, 8VE, 8BXX, 8AGV, 8ASO, 8YD, 8ANB, 8ZK, 8QK, 8XAE, 8ZY, 8AIO, 8ZW, 8IB, 8BCH, 8VD, 8ALT, 8CF, 8BDB, 8ZO, 8BXH, 9DJM, 9PI, 9BDS, 9BNE, 9AR, 9UH, 9CTO, 9DJB, 9FV, 9AWS, 9BTI, 9BDZ, 9UH, 9BTL, 9CKM, 9DXC, 9BXU, 9BSQ, 9CUI, 9AOU, 9DUG, 9AAM, 9XU, 9DFB, 9ZT, 9CW, 9BXC, 9CED, 9CCS, 9AIX, 9BSG, 9DGE, 9CEH, 9DSM, 9BSZ, 9CMD, 9UH, 9BP, 9AHH, 9AJP, 9AZI, 9CDE, 9IJ, 9CDB, 9CBA, 9AVA, 9CT, 9BEE, 9OF, 9AIY, 9AAF, 9II, 9AGV, 9YAI, 9DEV, 9AMB, 9ATM, 9DTE, 9ZAF, 9ANI, 9AC, 9APW, 9BJV, 9AYS, 9AUM, 9BXQ, 9BOG, 9XI, 9BUN, 9BJI, 9XAO, 9BG, 9DSM, 9APS, 9DWK, 9AUZ, 9AL, 9ZN, 9YAJ, 9AMI, 9AUL, 9AJA, 9PI, 9CUS, 9CFY, 9AFR, 9ALG, 9DKY, 9BHD, 9YF, 9DYN, 9DTM, 9CCV, 9ZAH, 9UU, 9AEQ, 9XAC, 9XM, 9YF, 9BVO, 9EAL, 9DEU, 9CZQ, 9AVZ, 9BIK. Canadian, 4EL, 4AC, (4BV), 4HH, 4FN, (4DQ), 5BD, (5EJ), 5CT, (5CN), (5GO), (9BX), 9BD, 3DH, 3GK, 3XN.—Yours truly, C. W. PARK, "6AOI," Riverbank, Calif.

9BFI Reports

Stations Heard and Worked during part of September, 1923 By 9BFI, Leon Mears, New QRA—4511 Colfax Ave., So. Mpls., Minn: 1ARE, 1ASK, (1BWJ), 1CMP, 1BN, 1IL, 1ER, 2BAB, 2BSC, 2BXW, 2CRQ, 2CG, 2GK, 2RY, 3BRX, 3BVA, 3CN, 3SI, 3SG, 3TA, 3ZO, 3TS, 4AI, 4CU, 4DB, 4DX, 4DY, 4CG, 4FT, 4MB, 4MY, 4ARU, 5ABT, (5AEC), 5AGJ, 5AIU, 5AKG, 5AMH, 5AMJ, 5ZAS, 5ZAV, 6ATZ, 6AWT, 6BCL, 6BCZ, 6BDC, 6BQC, 6BVG, 6BWZ, 6CFZ, 6CGW, 6CHL, 6CKH, 6DN, 6NN, 6RM, 6VV, 6ZR, 6PV, (8ADA), 8ADK, 8AGP, 8ALA, 8AME, 8ANB, 8APT, 8PX, 8ABQ, (8AVD), 8AZO), 8BHF, 8BIZ, 8BKY, 8BUX, 8BVR, 8BWZ, 8BOG, 8CED, (8CEJ), 8CER, 8CNW, (8CTP), 8CYO, 8CYT, 8DAE, (8DGC), 8DGE, 8BVX, 8DKC, 8DKJ, 8DKM, 8DSQ, 8AB, (8AL), 8BF, 8CR, 8DO, 8EF, 8FI, 8HV, 8IJ, 8IG, 8PX, 8RJ, 8TR, 8SO, 8VQ, 8UF, 8WY, 8WA, 8ZC, 8ZV, 8ZZ.

Will QSL to any of the above if they request.

Stations Worked and Heard By Leon Mears During August, 1923. New QRA—4511 Colfax Ave., So. Minneapolis, Minn. 1ACU, 7ARF, 1BBO, 1BCG, 1CCG, 1CDM, 1CMP, 1ER, 2AFP, 2AJR, 2ANI, 2AWL, 2BOI, 2BQC, 2BXN, 2BXW, 2CJR, 2CRK, 2CXL, 2BN, 2RJ, 2RP, (2WR), 3ABW, 3AWL, 3BDO, 3BVV, 3BVA, 3CHG, 3CO, 3EL, 3OH, 3OS, 3VO, 3ZS, 4AMA, 4BQ, 4GL, 4GW, 4GX, 4HZ, 4KC, 4KG, 4KF, 4KU, 4MI, 4US, 5ABT, 5ACQ,

5AFQ, 5AKN, 5AWU, 5ZAV, 5EK, 5GA, 5GM, 5GN, 5GP, 5KU, 5KW, 5LL, 5MN, 5MO, 5NS, (5RL), 5VC, 6ATZ, 6AWT, 6BVG, 6CBU, 6CES, 6CGD, 6KA, (7EN), (7HM), 7ZV, 8AAJ, 8AIO, (8AHR), 8AJU, 8AMF, 8AMM, 8AMP, 8AON, 8AJN, (8AKR), 8AEB, 8AAG, 8AJU, (8APT), 8APY, 8ARQ, 8AWS, 8AXN, (8AZO, 8AYE, 8BAH, 8BCI, 8BDA, (8BFH), 8BGE, 8BHY, 8BJV, 8BLC, 8BLX, 8BNO, 8BOG, 8BUV, 8BUX, (8BUZ), 8BXX, 8BZC, 8CCR, 8CED, 8CEJ, 8CNR, 8CNW, (8CPD?), 8CQH, 8CSJ, 8CUR, 8CXM, 8DAL, 8DAT, 8DGE, (8DGC), 8DXG, 8DKM, 8BVA, 8ZAE, 8AB, 8AU, (8ES), 8FM, 8DF, 8GZ, 8HV, 8GW, 8IJ, 8KR, 8SB, 8SE, 8VT, (8VY), 8WG, 8Z. Will QSL crd to any of above if they request them.

6BRF on CW

Calls heard by 6BRF, All CW, Newton R. Wimer, 1420 Le Moyne St., Los Angeles, Cal.: 3APR, 3ABD, 3ZO, 4BE, 4BF, 4BW, 4EA, 4OI, 4TC, 5LG, 5NN, (5PX), 5IK, 5BE, 5EK, 5ZA, 5DR, 5KC, 5TC, 5XD, 5JZ, 5YQ, 5ZB, 5IM, 5SF, 5ZH, (5ADO), 5ZADA, (5ADB), 5AKY, 5AKN, 5AEC, 5AHD, 5GG, 5NG, (6AK), (6AO), (6ET) (6FH), (6FY), (6OX), (6QR with fone), (6HV), (6HC), (6KU), (6RE), (6RM), (6RD with fone), (6SU), (6NX with fone), (6TI), (6AR), (6ZI), (6ZH), (6ADP), (6AWT), (6AIX), (6AJH with fone), (6ALH), (6ARB), (6AOI), (6AMS with fone), (6AOS), (6AOU), (6ATY) with fone), (6ATC), (6ALY), (6ALO), (6AFF), (6ALG), (6AVN), (6AVV), (6ANB), (6AKT), (6APL), (6AVV), (6AUP) with fone), (6ADB with fone), (6BAK), (6BOO), (6BQL), (6BIC), (6BKX), 6BCS, (6BFY), (6BCL), (6BIO), (6BUY), (6BH), (6BMD), (6BRU with fone), (6BNG), (6BIG), (6BUM), (6BOS), (6BLY), (6BSQ), (6BNT), (6ANG), (6CAN), (6CXI with fone), (6CKF), (6CKA) with fone), (6CHL with fone), (6CKP), (6CGG with fone), (6CGD), (6CJE), (6CEJ), (6CCY) (6CIO), (6CMI), (6CHE), 7GP, (7BR), (7LR), (7BJ with fone), (7LW), (7HJ), (7NK), (7TO), (7TQ), 7OT, (7ZO) 7ZN, 7ZV, 7WM, 7WS, 7OH, 7OH, 7JE, 7OT, 7ZU, 7PF, 7SC, 7HF, 7SF, 7NA, 7WY, 7NY, 7JW, 7TT, 7YA, (7ADG), 7AEM, 7ABH, 7AFN, 7ADE, 7AGI, 7AFO, 7AHO (7ADP), (7AGV), 8VY, 8XV, 8ZW, 8BKE, 8BXA, 8BEO, 8BSY, 8BDA, 8BOE, 8AGW, 8XAE, 8BCH, 8CMI, 8BNC, 9UL, 9CR, 9MC, (9ZT), 9OX, 9ZN, 9LL, 9AOI, 9AVZ, (9AIY), 9AWM, 9AFF, 9ASF, 9AVU, 9AYU, 9AES, 9AEA, 9AWE, 9AWU, 9AVA, 9AVC, 9AMI, (9AMB), 9ANQ, (9BJK), (9BUN), (9BKJ), (9BJI), 9BXA), (9BXQ), 9BXM, 9BKP, 9BZZ, 9BJJ, 9BJD, 9BJF, 9CIO, (9CV), 9CAA, 9CTE, 9CIP, 9CJW, 9CEU, 9CFY, 9CNS, 9CAC, 9CAU, 9CAY, 9CJY, 9CGA, 9DGO, 9BRY, 9DKY, 9DSW, 9EEA, 9EAF, 9ZAF, 9YAO.

Canadian—2BN, 3IT, 4DO, 4HH, 5AK, 5GO, 5LA, (5CN), 9BX, 9BM.

Above is stations hrd and wked in last six months. Would appreciate cards from all hearing my CW or fone.

9ZT Record

9ZT, D. C. Wallace, Minneapolis, Minnesota, September report: (1AW), (1ER), 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, (2ABG), 2AWH, 2BMR, 2BOH, (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, 5APN, 5AGH, 5AIC, 5AIU, (5AKX), 5AMA, (5AMB), 5ANF, 5XAD, (5ZAV), (5ZAX), 6EC, 6HP, (6KM), 6PL, 6ACC, (6AGE), (6AJD), 6ALK, (6ALV), (6AOS), (6ARB), 6ATZ, (6AWS), (6AWT), 6BKX, (6PZ), (6BQB), (6BRF), (6BRU), 6BUO, (6BVG), 6BVN, (6CBU), (6CFZ), 6CGD, 6CGW, (6CHL), (6CPY), 6CPZ, (7BJ), (7DC), 7DW, (7DD), (7LY), 7WP, 7YA, 7YL, (7ZD), (7ZF), 7ZL, (7ZN), 7ADP, (7AFE), (7AGV), CANADIAN—2BN.

6BNU Log

Calls heard at 6BNU, David Atkins, Piedmont, Calif., up to October 7: 5CN (Can.), 5ZA, 5LR, 5ZB, 5UO, 5ZAV, 5AMA, 5HT, 5GO (Can.), (6BOU), 6AVR, 6BIP, (6BGC), 6TW, 6BRF, 6AVV, (6BAH), (6NB), 6DD, 6VD, (6CFM), (6CGI), 6CBU, 6ARU, (6BRK), next four during eclipse 6AJD, 6CGW, (6BQB), 6NB, 6CCV, 6BEG, (6OD), 6MH, (6BFH), 6CGD, 6BCQ, 6BIC, (6AHU), 6ZH, (6UD), 6KM, (6CEU), 6MG, 6BUA, 6PF, (6KC), 6PI, 6ZAM, (6BFB), 6ZZ, 7BR, 7AGI, 7JF, 7ADP, 7ADS, 7AKK, 7AGV, 7SZ, (7QJ), 7OH, 7AKN, (7HF), 7ZF, 7ZD, 7ACL, 7LY, (7LN), 7AHO, 7NW, 7IT, 7GE, 7ADM, (7LH), 7ADR, 7ZN, (7YA), 7TO, (7WS), 7ACI, 7YL, 7AGE, (7AJN), 7SF, 7TT, 7AKV, 7SY, 7AKT, 7HJ, 7GI, 8IJ, 8XE, 8APV, 9CAA, 9ZT, 9AMB, (9BJK), 9DLI, 9BUN, 9AAU, 9CBJ, 9AUA, 9EKY, 9APF, 9AVZ, 9BZI, 9DLT, 9DZY, 9CCV, 9DLM, 9EBT, 9CVC, 9AXX, 9AVN, 9CWC. Eights just beginning to come in here.

Heard by 6ALV

Calls heard by 6ALV, Alameda, Calif., Oct. 1st to 31st: 11L, 1ER, 2BLU, 2CQZ, 3AUV, (4EB), (4KU), 4MY, 4BE, (5DW), 5GJ, (5HT), (5LR), 5MN, 5NN, 5PB, 5QW, 5SK, 5TJ, (5UO), 5VV, 5ADB, (5AIU), 5AMH, 5ZAV, 6CEU, 7MN, 8FU, (8GZ), 8JJ, 8NB, 8TT, 8AGO, 8APT, 8ATP, 8BDA, (8BFH), 8BWK, 8BWZ, 8CGX, 8YV, 8YN, 9BG, 9CR, 9MC, (9CP), 9RC, (9VM), 9AIM, 9AOG, 9APF, (9AEM), 9BAK, 9BAV, 9BGK, 9BHZ, 9BMX, 9BQQ, (9BJI), 9AYP, (9CAA), (9CCV), (9CDE), (9CEH), (9CFK), 9CHD, 9CJL, 9CPI, (9CTR), 9CVC, 9DAW, (9DHG), (9DJB), (9DKB), (9DSW), 9DXN, 9DXY, 9EEA, (9EKF), (9EKY), 9YAJ, CAN—4CL, 5CN, 5GO, 9BP, 9BX.

Heard on Yukon

Calls heard by Lyle Geary, Whitehorse, Yukon, Canada, C. W.—6ATV, 6XBJ, 9GD, 9BAN, 5ZAV, (Q. R. A.), 7AGF, 7ADP, 6ADM, 6BVS, 6ADZ, 6CBU, 9DKY, 9BJK, 9DWN, 6BVH, 6BLY, 7LY, 7ZF, 6HPZ, 6VK, 7CA, 6AVV, 6BIC, 9EBT, 5MN, 9BOQ, 6AGJ, 5ZA, 6ZH, 6BBC, 9CAO, 9AVC, 7TO, 9ZY, 9ZT, 9AIM, 5KC, 9AXX, 6CHL, 6BQL, 6DD, 6CBU, 6AJH, 6CAN, 9DPW, 6ANB, 9CKS, 6AHU, 9NR, 6ET, 5ZR, 6BPV, 6XAH, 6XAD, 7AEL, (Q. R. A.), 6CFI, 6BUG, 6BVG, 9CPA, 6CHU, 5AMA, 9CAA, 9YY, 5IN, 6BFB, 6CBD, 5ZR, 5ADO.

Spark—6XBJ, 6TJ, Canadian—9BP, 5CN, 5CT, 4ER, 4HF, 4EA, 5GS, 5AH, 5GO, 4CT, 9BX, 5HG, Howdoin—WNP (Heard three times). Would very much appreciate cards from "hams" who have not received cards from me, as my call book is deficient.

Canadian 4CO

E. Nicolson, 397 Burnell St., Winnipeg, Canada, Can 4CO, two weeks in September: 1BC, 1RR, 1HX, 1-IL, 1JP, 1ADN, 1APZ, 1BES, 1BWJ, 1CMP, 1CPN, 2BR, 2BQ, 2FP, 2OM, 2RC, 2RS, 2ANA,

2BSC, 3AB, 3BQ, 3ADV, 3AJG, 3BDO, 4DR, 4DK, 4DY, 4QF, 5FC, 5GE, 5GM, 5IN, 5JF, 5KG, 5KY, 5LR, 5MN, 5PB, 5QQ, 5RE, 5ZM, 5ADB, 6AT, 6BP, 6BQ, 6IG, 6PL, 6UA, 6AJF, 6ATC, 6ALK, 6ALV, 6ARB, 6AWT, 6BCL, 6BDH, 6BIH, 6BOA, 6ZAR, 6BQC, 6BQL, 6BVG, 6CBU, 6CED, 6CEU, 6CHZ, 7AF, 7BJ, 7BR, 7GH, 7GI, 7IT, 7LY, 7OH, 7SF, 7WS, 7ZN, 7AEL, 7AFG, 7AHI.

From San Gabriel

Editor Radio Journal: The following stations have been heard here during the month of September, using 2CKT tuner with "301A" detector W. E. fones—IER, 3BM? 4OC, 5AKN, 5ZH, 5ZA, 5ADB, 5CN, 5FG, 5LC, 5AIA, 5ZU, 5AKY, 5LR, "5ADO, QSA without heterodyning" 5LR, 5HT, 7ZN, 7IY, 7EK, 7EP, 7LN, 7ZT, 7AK, 7ZN, 7ADP, 7ZU, 7KS, 9EAE, 9BLV, 9CFY, 9ZT, 9BUN, 9CLD. Yours.—W. KRAUSE, 6BSR, San Gabriel, Calif.

Up 6000 Feet

By 6BRF and 6BVF while at Big Bear Lake, Calif., altitude 6000 feet, heard on CR-5 Detector ORN very bad at all times, and most stations QSS as there are no trains to catch hr this is our own time: 8-28-23; 6 P. M.—7 P. M.:—6AFH de 6VD, 6BVG de 6CFM, CQ de 6AIK, 6BVG, test de 6CFL, (6FH de 6BPZ qrk VY), test de 6TU, 6BVG de 6CFY, 6BEG, CQ de 6CFM BX de 6AWX, 6CIA de 6BGC, 6CIA CQ de 6ZX, EX 6BFL, 9—10 P. M.: 9EI, 6VK, 6FY, 6CFQ, 6AWT, 9BUN de 5AMB.

8-29-23 QRM vy vy bad, 9:30 to 10 p. m. (6ZX de 6BIQ pure dc), CQ de 9AVU, 6BIC, 6APH de 6CKF, CQ de 9CCZ, 9BUN de 6ARB, CQ de 6CBU, CQ de 9BUN, 9BUN de 6ABN, CQ de 7LN, CQ de 9CAF, CQ de 6FY, CQ de 6AWT.

8-29-23, 9:30 to 10 P. M.—9DAU, 9BJK, 9BUK de 6BNU, 9BUK de 6BBA, CQ de 9CR, (CQ de 9BVO), 6ANH, 8DEG, 6BQB de 6AOU, (6CFI vy qrk) CQ de 5AKY, 6AWT, 9BT de 9BEZ, 6BNT, CQ de 6BUF, 9CDV, 6BOO de 7ZN, CQ de 9DTE, 7ZN de 6BUO.

8-31-23, QRM still vy bad.—8:00 P. M.: 6CHV, 6BQC, 6UHV de 6AIV, 6JX, CQ de 9CAA, 9CAA de 5ADB.

9-2-31, 4:30 P. M.—5ZA de 6CFZ, 6CBN de 6BVS, 5ZA, 6BVG de 6CFZ, 6CFZ de 6BVG, 6BVG de 6AOI (CQ de 5ZA vy QSA), CQ de 6CIA, 5:00 P. M.: 9BUN, 9TC, CQ de 9AMB, CQ de 6CGC, 5ZA de 6CNH, 6BVG, de 9AMB, CQ de 6BPZ, CQ de 7ACI, 7LY, 9BUN de 6ANI, 6OD de 6TV, 6BNH, 9ZY, 6ADP de 6CEJ, 7ZZ de 6ANI, 6BEZ de 6NB, (7ADP de 6CEJ), 7ZU de 6CBU, 5AIC de 9AMB, (7ZU de 9AVC), CQ de 6BBC, (7ZO de 2BN can tk), 6OD de 6AQU, (CQ de 9CAA) CQ de 7ACZ, 7OT, CQ de 7TA, (5AKY de 9CAA) CQ de 6CFY, 5NN de 6BPZ.

9-3-23, 10 P. M. to 12 P. M.—6UP spk, 6UP de 6AWX, 6BQL, CQ de 6CAX, 6BUK, (WNP de 9ZT), (6ARB de 6CHV) 6BIQ, CQ de 9DQU, 9CIP, CQ de 6CNH, (8HV calls 8?), (CQ SF de 6ANB),

(6BQC), 9AIB de 9EAE, CQ de 9DQE, 9CIA, 9BUN, 9CCZ de 6RM, 9AMB, 9AMB de 7FD, CQ de 9CZZ, 9BUN de 6BGD, 6UA, 6BVG de 6RM, 6TU, (6BQQ (Continued on Page 263)

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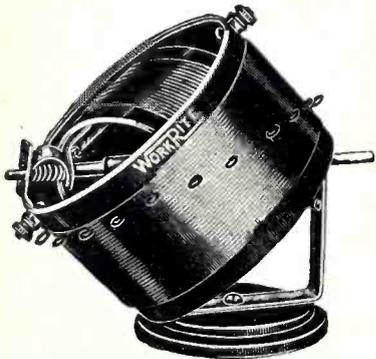
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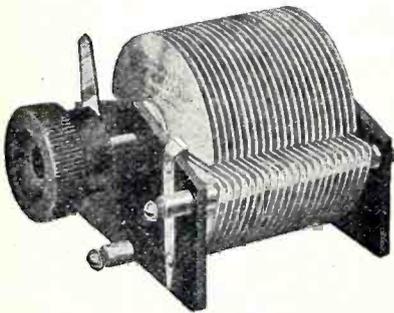
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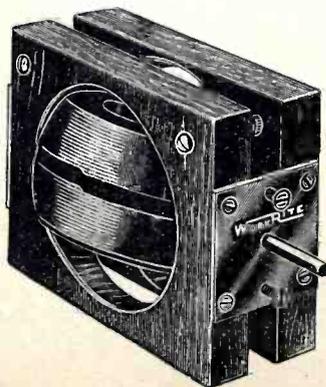
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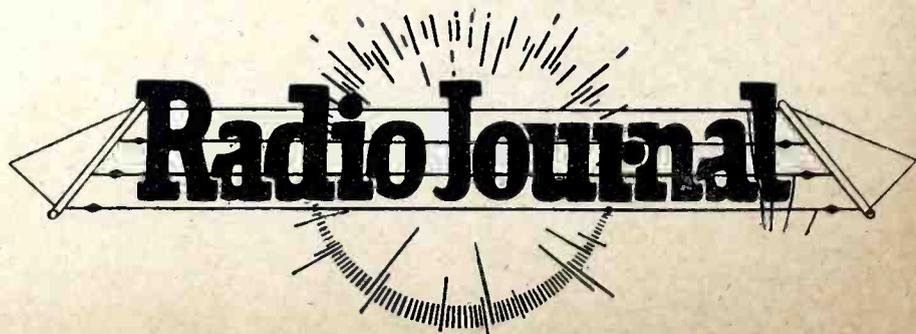
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(Continued from Page 261)

de 7ADP), 6CBU, (6CPU de 6AAK sed qsa) 5MM de 6ARU, 6BHU, CQ de 7BU, 8? de 6ARK, 8DIG, (6OD de 6AGI), (6BEQ de 6BFF), 9CZZ, 7ADP de 6NU. 9-3-23, 8 P. M. to 10 P. M.—9AAU, 5HH, CQ de 4DO, CQ de 6AQA, CQ de 9CEV, 9CVC de 7ADP, 7ADP de 6AVY, 7LN de 9CAC, CQ 9BUN, 6AQA de 9CAE 5AG de 5ADB, 5ZAV, CQ de 6CBL, CQ de 6CNB, CQ de 6BCL, CQ de 6CNB.—11:00 P. M.: 6ARB de 6BJQ, 6AWT de 7LY, (9CVC phone), 5KC, 6ZA Mde 6BVG 7NN de 6BVG, (test de 6BM), CQ de 9EEA, 6CHL. 9-4-23, 8 P. M. to 10 P. M.—CQ de 6CKF, CQ de 9CV, 6ARU, 6BRF de 6CKF, 6CFZ de 6AVQ, CQ de 6BIQ, (CQ de 6ZX), 9CIP de 5AKY, (CQ de 9AIM), 9BUZ de 9AVZ, CQ de 6AIX, CQ de 6ARB, 6AOR, (5ZA de 5KM), 8BAU, 6ZX de 6CJA, CQ de 6AUY, 9DKY (CQ de 8BDA, QSA and steady).

No records broken in reception of sigs but gld to qsl cards to any of above calls. Address crds to either 6BRF or 6BVF.

Station worked by 6CMR, F. L. Wetzel, within past thirty days: 9BEZ (daylight), 9BUN, 9BII, 9CFJ, 9CCZ, 9AVS, 9BLY, 9CAA, 8ZC, 8BNH, 7ABB, 7BK, 7LN, 5GJ, 5ZH, 5ZAV, 5CN(can). Stations heard: 9OG, 9ZV, 9EKY, 9UA, 9BIK, 9XI, 9EE, 9AFF, 9APF, 9AOU, 8ZZ, 8BCG, 8GZ, 8UX, 8CAN, 5AIJ, 5LP, 5JO, 5JF, 5GO, 5ADB, 5AGJ, 5OK, 5OV, 5UK, 4BL (Canadian), 4EB.

Amateur Growth

While the popularity of radio broadcasting may be said to date back to the Winter of 1921, and the expansion has been remarkable considering the vast number of transmitting stations now "on the air" for the entertainment of millions, amateur radio has been advancing steadily, although less rapidly, ever since 1912. It is indeed surprising to many when it is recalled that there were amateur sending stations away back before those days and the enthusiasm of devotees has never waned.

Figures supplied by Chief Supervisor of radio, W. D. Terrell, show that amateur sending stations have advanced steadily and are now at their highest peak. In September of this year there were 563 broadcast stations as compared with 591 in the month of May, regarded as the saturation point. The growth of amateur stations in respect to the several districts is shown by records of the U. S. Department of Commerce as follows:

District	1913	1923
1st	87	2139
2nd	328	2055
3rd	261	2005
4th	32	449
5th	20	948
6th	308	1957
7th	62	864
8th	104	2813
9th	22	3340
	1224	16570

Work has been started on a new 100 kilowatt radio station at Rakovica about 4 kilometers from Belgrade and on a receiving station at Landon Trench, a suburb of that city. The station is being built by the French Wireless Telegraph Company and the total expense is estimated at 38,000,000 dinars (\$402,800 at rate of exchange of September 1). On its completion the entire installation will be taken over by the state and the operating personnel will become employees of the Department of Posts and Tele-

graphs, the company maintaining one engineer as a technical advisor. This particular station will be the first high-power radio installation in the Balkans.

Twenty-one English radio fans wrote WGY, the General Electric Company broadcasting station, announcing successful reception of the Schnectady station's program during the first week in September. WGY and other American stations have been heard frequently by the English fans but trans-Atlantic transmission is rather unusual as early as September.

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