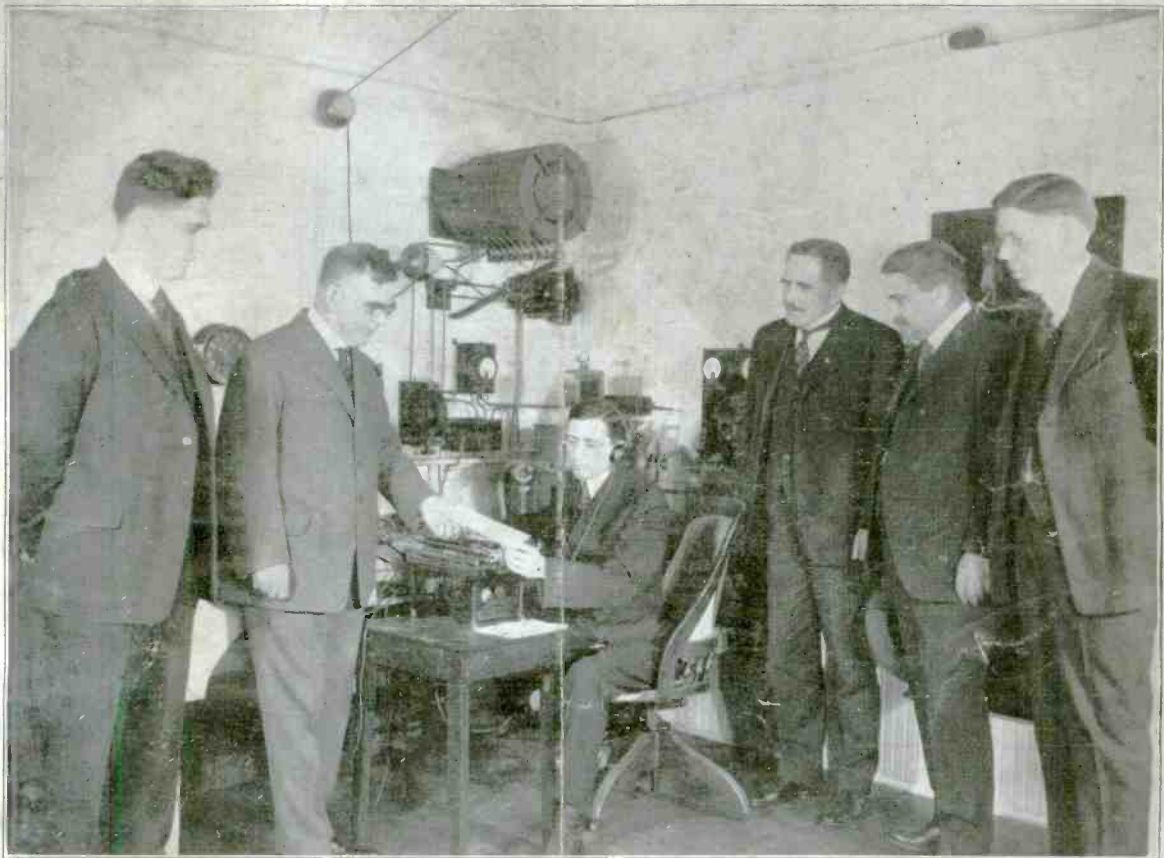


RADIO TOPICS

JUNE, 1921

A Journal of
Human Interest

15 CENTS



WASHINGTON OFFICIALS INAUGURATE NEW RADIO STATION OF THE POST OFFICE DEPARTMENT

Description of Station 8ML, Cleveland
The Popularizing of Summer Radio

ATTEND THE FIRST A. R. R. L. NATIONAL CONVENTION

Published Monthly by The Chicago Executive Council

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DL-100	1.70	DL-750	2.80
DL-150	1.80	DL-1000	3.00
DL-200	1.90	DL-1250	3.35
DL-250	2.00	DL-1500	3.60

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All coils are mounted behind the panel, resulting in a much neater looking set. In addition to the usual fan-wise motion, a turret effect is obtained, thus securing a complete coupling action and greatly increasing the range.

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25	120-250	\$0.40
100	500-1200	.60
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Other sizes at proportionate prices.

Mail orders sent prepaid and filled promptly.

Watch for North Side TELMACO Store, which we expect to open soon.

RADIO SUPPLIES DIVISION

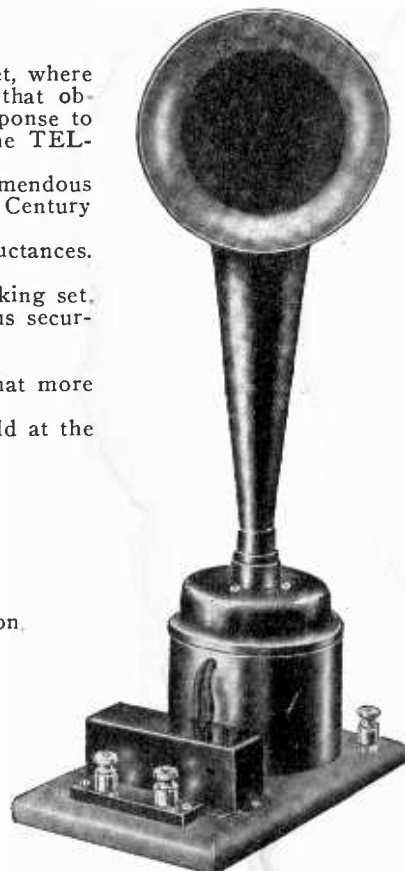
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PUBLISHED MONTHLY

The Chicago Executive
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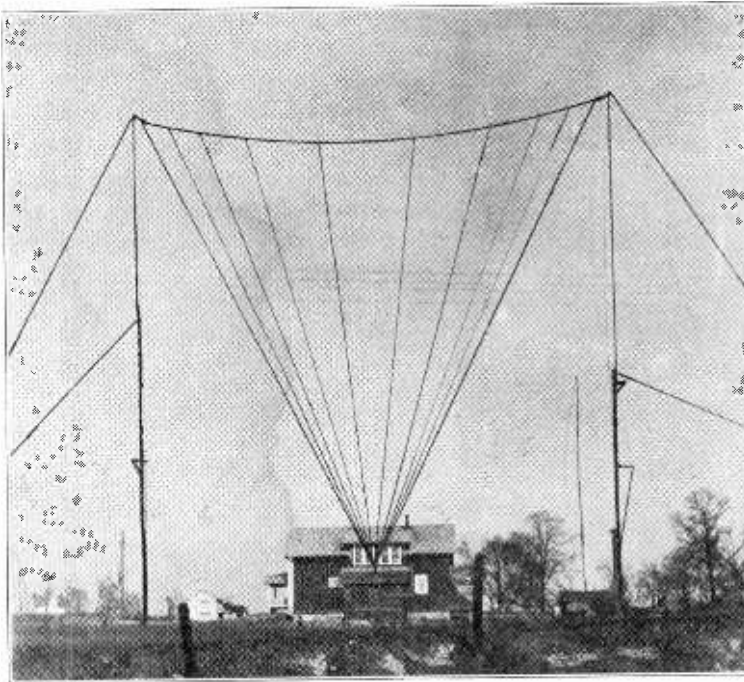
K. E. HASSEL

H. KLAUS

\$1.00 a Year

CHICAGO, JUNE, 1921

Vol. I. No. 5



FAN AERIAL AT 8ML IS 110 FEET HIGH AND CONSISTS OF TEN
WIRES AS SHOWN

AMONG the constantly operated spark stations to whom credit must be given for their continued operation in spite of warm weather is station 8ML of Cleveland, Ohio. The call book lists the owner's name as F. M. Murphy and his local address as Grand Division and Warner road.

There are many things that the call book does not tell about this station and its owner, and that is where we come in to spill the beans.

We didn't publish a picture of the owner, as we have not got one. Anyway, he is married, so we will let it go at that. Might also mention that Mr. Murphy is secretary of the Cleveland Radio Association, member of the board of directors, chairman of membership committee and traffic committee.

We will begin with the aerial. The front mast has sixty-eight feet of round oak rafters, built up of 15-ft. lengths. Short lengths of 2x4's are used as pole steps. The top section is of 2-inch and 1½-inch galvanized steel pipe, put together with an electrically welded coupling. The pipe is fastened to the wood mast with angle iron framework. The total height of the front mast is

112 feet. At each joint there are four guy wires of No. 12 galvanized telephone wire except at the top, where there are five wires of three No. 14, and a spare guy on top of middle pipe joint.

The guy wires are divided into 40-foot sections, with large porcelain insulators. Four dead men made of railroad ties hold all the guys. The rear mast is almost identical with the front except for guying and other minor details. The top wire of the aerial is seven strand No. 20 bronze, and the down leads are seven strand Bates' Jupiter wire No. 22.

The Round round ground system is employed and consists of eight sheets 3 by 8 feet, No. 24 gauge Armco iron galvanized, buried six feet deep in a trench twenty-one feet in diameter (sixty-five feet circumference), with six inches between ends of plates. The ground trench was left about a foot below the regular ground level, so that the discharge of water from both the roof and the house supply keeps the ground system well moistened. Two ground leads of No. 10 R. C. S. wire lead from each plate to the center of station, where all are soldered to a common circular copper ground plate,

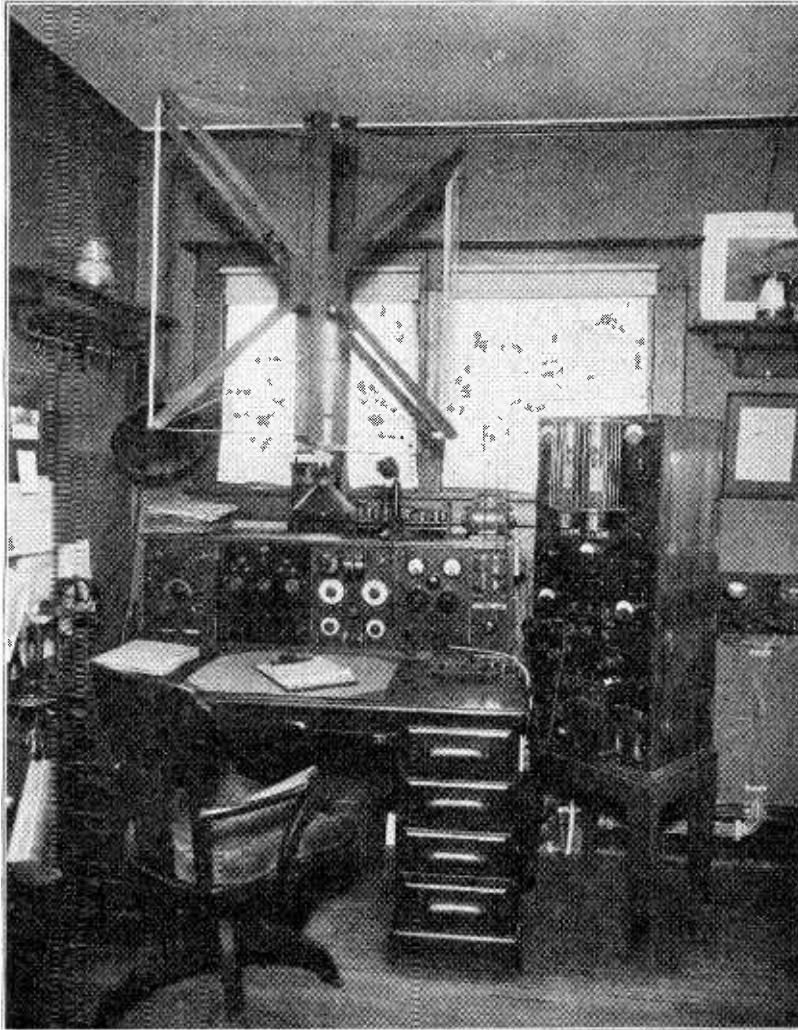
Station 8 ML of Cleveland

from which braided and ¾-inch copper tubing leads to the oscillation transformer.

The station containing all transmitting remote control
(Continued on page 16)



Operating room with receiving set and transmitting remote control



This is the latest photo of station 2XX, from which the first vaudeville show via radio was transmitted. The transmitter shown at the right is the new DeForest 1 kilowatt set which uses two one-half kilowatt oscillion tubes. This splendidly equipped station has been heard over a distance of 2,000 miles.

The First *Radio* Vaudeville Show

How the Idea for it Originated, its Preparation and the Successful Results That Were Obtained.

By R. F. GOWAN*

THE idea for a vaudeville show by radio was originated one night when Mr. Dunbar Adams, 2ASH, took the writer to a party in New York at which the Duncan Sisters were the guests of honor. We were so fortunate as to be seated next to the Duncans, who became very enthusiastic about singing by radio telephone when the idea was suggested to them, and accepted an invitation to do so without hesitation. In this way plans were made to have them come to 2XX in Ossining to head the first radio vaudeville show.

These young ladies, who contributed in no small way to the success of the affair are headliners in Fred Stone's latest show, "Tip Top," where

they take kid parts as the "Terrible Twins." They write their own songs and are particularly talented in playing the piano and guitar. So great has been their success this year that next season they are to have the lead in the "Heavenly Twins," a new musical comedy now being written especially for them. If you have not seen these two little artists, you are advised to get seats for "Tip Top" at your earliest opportunity, that you may understand what a real treat the radio world had when they listened in on March 13.

Although staging a whole show by radio telephone predicted no small amount of work and worry, no proportionate conception of the real trials

and tribulations was formulated at the start.

The first problem that presented itself was that of modulation. Endless experiments with the assistance of Lounsberry, 2BB, were made in order to get enough speech into the modulation circuit of the transmitting set when one talked in the vicinity of the microphone and not directly into it. The microphone was placed in the focal center of an ordinary chopping bowl, which was later hung over the piano. We tried every microphone we knew of, from the multi-button type to the supersensitive type used in dictaphones. The Magnavox microphone won out. At the start it was felt that

*Chief Engineer, DeForest Radio Tel. Co.

a voice amplifier of some kind would be necessary, and connecting the output circuit of a 3-stage Magnavox amplifier directly to the modulating circuit of the transmitter was tried. This was very satisfactory, except that it necessitated burning the tubes very brightly in order to prevent distortion in the last stage, and it happened that during the performance several of the tubes burned out and had to be replaced.

The transmitter was the latest model 1 K.W. De Forest oscillion type. This C model of the type OT-201 is a development of the old type OT-200 set, which was used last winter in the author's long distance record tests. It has the same circuit, but is very different mechanically—much more flexible and fool proof. It is also more efficient, as many of the circuit losses have been done away with. This is evidenced by reports that speech from 2XX has been heard under the same poor aerial conditions of last winter in Colorado Springs this year, as against Valley City, N. D., the low power record for speech last year. This model has also apparently broken the record for short wave CW telegraphy recently, when an amateur at Avalon, Catalina Island, copied XF1, one of these sets in the air service in charge of Lieut. E. H. Guilford at Langley Field, Va. At the time this set was radiating only 3.5 amps on a wave-length of 285 meters.

For the vaudeville show the transmitter at 2XX was tuned to a wave-length of 400 meters. This set, as shown in the photo, employs two large tubes, each capable of handling $\frac{1}{2}$ k. w. In order to provide for a reasonable factor of safety and stability, the radiation was kept at 4 amperes, though it is possible to put out as high as 6 amperes without excessive overloading.

After Lounsberry had adjusted the transmitter several times for the best modulation a schedule was arranged with Matthews at 9ZN and some experiments on the reproduction of music was attempted. The piano came through well, although it was difficult to get rid of a tinny sound. The first test with Matthews resulted in a telegram from him as follows: "Terrific lightning storm prevented all reception tonight." This seemed to be the point at which Fate, disguised as Static, started to pit itself against our efforts.

While experimenting nightly on the voice amplifier and transmitter, arrangements were made with Mr. Charles D. Wagner to bring up his famous New York orchestra. Attempts were made also to get hold of Irvin S. Cobb, the famous author and humorist, who lives in Ossining, but it turned out later that he was out on the Pacific coast and could not be present. We had also hoped to get a whistler, but lack of time prevented, and later Frank Sangster was booked to round out the bill with a monologue. Broadcasting announcements of the show and arranging with others to QST it also took considerable time.

A rehearsal of music, using only piano and xylophone, was next held with Charles Wagner and Donald Briggs, an expert mirimba and xylo-

phone artist. The xylophone was tried out in every corner of the room before it was finally located practically behind the chopping bowl. There seemed to be a beat set up between the xylophone and piano notes in such a way that on the lower and higher scales they could not be heard at all; whereas in the middle registers the notes came through well. Part of this difficulty was overcome by heating the resonators of the xylophone to bring them into better tune with the piano, which was tuned to international pitch, while the xylophone was tuned to concert pitch. Attempts to have the piano raised to concert pitch were frustrated by the Steinway Company's refusal to do it on the ground that it would break the strings. The hardest part, however, was to get some one to play the piano after midnight, in order to test with 9ZN. Attempts to get the writer's sister to do this every other night for two weeks were not what one might call entirely successful.

This difficulty was bad enough, but the most discouraging thing was to hear the static increase as the tests progressed. It grew worse and worse until Saturday night when NSF was worked it seemed to reach a climax. It was worse than any static heard in the summer time and had a very bad fading characteristic. In reply to a question NSF would almost completely fade out before he had said three words. It was not strange, therefore, that he complained about our modulation, as apparently he was getting the same thing when we spoke.

But Sunday, March 13, dawned clear and the prospects for a successful performance looked good until about 1 o'clock, when Adams called up from New York to say that he had arrived at the Duncans' apartment to escort them to Ossining, only to find that Vivian, the younger sister, was in bed with an attack of tonsillitis, and with the doctor's orders to stay there. After recovering somewhat from the shock, a detailed discussion of the awkward situation with Rosetta, the older sister, followed, with the result that half an hour later they bundled Vivian up, put her in the car and reached Ossining about 4 o'clock. She was so ill that she had to be put to bed when she arrived, but was sport enough to get up about 9:30 and did her part in the performance just as she does it in "Tip Top" every night.

The starting of the show was delayed a few minutes in order to give the orchestra a chance to tune up, but after once getting started things went nicely and Lounsberry had no difficulty with the radio end other than the burning out of the amplifier tubes, as mentioned previously. He kept careful watch by listening in on a wave-meter and could detect no signs of change in the intensity of the modulation.

After the performance the whole world seemed to be calling 2XX. Congratulations and thanks were received from everyone. Lester Spangenberg of Newark, 2ZM, extended the thanks of his audience to the Duncans by radio telephone, as did Jack High, 2GR, and his mother at Riverdale. The

Duncan sisters answered the radio telephone calls and enjoyed making stage door dates with the unseen strangers. Everyone apparently had a good time at 2XX, as they did not go home until almost midnight, and the sick Miss Vivian announced that she was feeling much better when she left.

The reports from those hearing the performance were very interesting, because of their inconsistency. In several cases stations in adjoining towns sent in entirely opposite results in reception. Passaic, N. J., apparently had good luck, in spite of the static, whereas Newark, its neighbor, had a great deal of difficulty. Stations in New York City seemed to be entirely out of luck, as was 2XG at High-bridge, where it was practically impossible to receive any of the music.

About 100 reports were received, the majority of them being in the form of enthusiastic letters. These represented a recorded audience of approximately 1,000 listeners. The actual audience was, no doubt, several times those figures. At some of the reported stations there were as many as twenty-five listening.

No great distance was reported, although Matthews in Chicago got fair results through the static. He did not, however, get volume enough to relay it as originally planned. The results throughout western New York and Pennsylvania were fair, but Ohio, with the exception of Cincinnati and one or two other places, apparently did not get much, on account of the especially severe static existing in that locality at the time. Bath, Maine, was the farthest point north, and Washington, D. C., with a station in West Virginia, the farthest points south reporting.

The consensus of opinion seems to have been that the first radio vaudeville show was a success. If the static had been a little more kind to us it would have been a much greater success. The degree to which it was successful depended entirely upon the remarkable co-operation of the amateurs. It was said that at 9 o'clock March 13 one might "hear a pin drop," and as George Hunt of Newark wrote, "it was so still we could hear the trolley cars running in New York." The most remarkable part of it all was that even the commercial stations stood by until it was all over, which would indicate that they enjoy music also. Matthews of 9ZN had the west so quiet that one would think there was a transcontinental relay. The broadcasts from his station, together with all the radio publicity given it here in the east by 2ZM, 3DH, 2XK and a host of others, made the stunt possible and endowed it with the degree of success it attained.

The writer wishes to take this opportunity to thank particularly those men who helped so much and to express his appreciation to all the amateurs in general who co-operated so kindly in standing by during the performance. This type of assistance instigates a desire to do even better, and it is hoped, therefore, that performances of this kind may become a popular means of entertainment.

Power Calculations *in* Electric Lines

(ARTICLE IV)

Simplified Calculations and Their Application to Radio Transmitters.

By HARVEY M. ANTHONY

WE have had several articles on voltage, current, and resistance. It is the aim of writer at this time to say a few words concerning power, carrying you on from your study of the May article, and considering how the unit of power is handled in commercial electrical practice. You may wonder why these articles are just now being devoted to electricity rather than radio. You are radio men and of course are interested in the radio phase of electricity. Remember, however, that radio is only advanced electricity, therefore you must be well acquainted with these big, broad underlying principles of general electricity before you venture into the technicalities of radio itself. Several issues of Radio Topics which will appear in the future will bring to you the concrete application of what the writer is now giving you. Getting ready for the future is the aim at this time. We are now discussing direct current and are dealing with Ohm's Law in simple circuits. When we come to the radio articles we will be dealing with alternating current, which involves the present principles. Then we will use Ohm's Law, not only as it is being used just now, but it will then have a few modifications. Let's prepare, therefore, for what is to come, following each article very closely month after month.

In order to learn the calculation of power in electric circuits, it may be best to dive right into a problem and discuss the problem. This will show the various steps involved and we will waste no time. Let us say that we need a motor installation. This motor is going to furnish us power to operate a machine, for instance, a big lathe or an elevator which carries us up and down a tall building. It is not necessary to discuss the use of this motor. We are all familiar with the use of motors and the general principles of their operation in giving out power. The first thing we encounter is the term "horse-power." In the early days when the steam engine was invented it was necessary to give it some kind of a power rating so that it could be said the engine was able to do a certain amount of work in a certain time. The unit of power which was adopted was the "horse-power." The unit of time was taken at one minute. If the engine could do as much as the average horse could do in one minute, it was rated as a one horse-power engine. If it could do the same amount of work that could be performed by ten horses, the engine was dated at ten horse-power. Then came the time for the invention of the electric motor and it soon became necessary to give this a rating. The horse-power was again taken as the unit, and if an electric motor could do the same amount of work in one minute that the steam engine

This article, written by Mr. Anthony, is one of the best practical treatments of what a man should know when dealing with electric lines that has ever appeared in electrical magazines. The article is a synopsis of a well known lecture given by the writer on "POWER CALCULATIONS IN ELECTRIC LINES." It is impossible for Mr. Anthony to write up his entire lecture because of its length and the many modifications which enter into alternating currents. He wishes in this chapter to take a simple problem and carry you through step by step, in a logical manner, the various factors entering into the study of power lines. The principles involved apply to radio circuits as well. However, for the present, he wishes to not discuss alternating currents on account of the slight change necessary to make in Ohm's Law. This is a technical lesson and requires your closest attention from beginning to end.

As your editor, will you kindly write me and tell me if you would like to have more articles like this written by Mr. Anthony. He hesitates at times to go into the technical side so deeply because he does not wish to remove your interest in his course. Please write the editor of RADIO TOPICS, 4533 North Sawyer Ave., Chicago, Illinois, and express your idea of articles of this type. We want to please you and if you will write we will know what you want. Remember that Mr. Anthony offered a grand prize for the one student who finishes his course with the highest honors. This man will have his traveling expenses to and from Muncie, Indiana, all his books, tools, slide rule and tuition furnished him free and will receive a nine months' course in a most comprehensive study of Applied Electrical Engineering under Harvey Mitchell Anthony, Consulting Electrical Engineering of Muncie, Indiana. The equivalent of a three year college course is free to you for your best efforts in these lessons in RADIO TOPICS each month.—Editor.

could do in one minute, the electric motor was rated accordingly. That is, if the steam engine could do ten horse-power of work in one minute, and should the motor be substituted in the place of the steam engine and the same amount of work could be performed, the electric motor was rated at ten horse-power.

If we apply to an electric motor line a pressure of 100 volts, we will find that there is a current flow of 7.46 amperes passing through the line wires leading to the motor. (The writer is neglecting efficiency for the time being; this will be brought out later.) Since we have learned that power is measured in watts, and since watts is the product of the volts times the amperes, it naturally figures that in this case the power used will be 100 volts times 7.46 amperes, which equals 746 watts. This is the wattage, which is equivalent to one horse-power of electrical energy. In other words, it takes 746 watts to perform one horse-power of work and the motor taking this wattage may be substituted for the one horse-power steam engine and will produce equivalent power. Let us simply bear in mind from now on that one electrical horse-power means 746 watts of electrical energy. Always remember this number as long as you study electricity. You will meet it many

times. It is suggested that you refer to any good standard electrical text book for a more comprehensive treatment of the unit "horse-power." It is impossible to say much in these few lines. Only the general idea can be given here.

Now let us take a specific numerical example of a motor which is furnishing power. Let this motor be rated at 5 horse-power, direct current, 110 volts. This machine will do practically the same as five average horses, if these horses all pull together for one minute. Here is a very important point which you must learn now so as not to become confused with this idea of horse-power of a motor. This 5 horse-power machine is rated at 5 horse-power because this is the amount of work it can actually do; that is, this is the available energy at the pulley of the motor and is useful in doing work. But we must remember that it is impossible to actually get out of any kind of a machine as much as we put into it. There are losses in a motor due to friction of the bearings and electrical losses in the windings. Therefore, it is necessary that this point enter into our calculations for figuring power and power lines. You can plainly see that if we actually have 5 horse-power of useful energy at the motor pulley, we must put into the motor a little more than 5 horse-power in order that some of this input may be used in overcoming these losses, yet having delivered at the pulley the motor rating. If we got out of any machine just what we put into it we would have 100 per cent efficiency. This would develop perpetual motion and thus far there is no such animal and very likely it will never be born, at least not on this earth during our time.

Large motors are, as a rule, more efficient than small motors. It is obvious that a ten horse-power motor need not necessarily be of ten times the mass of copper and iron that is used in a one horse-power machine. The bearings need not be of ten times the surface, etc., so the real friction losses decrease as the motor horse-power increases. Think this over. It is not at all difficult to understand this. The average efficiencies of motors are as follows:

1 H. P., 70 per cent; 3 H. P., 75 per cent; 5 H. P., 80 per cent; 10 H. P., 85 per cent; 50 H. P., 90 per cent.

Now to go back to our motor example where we had the 5 H. P. motor to install. If we multiply 746 watts by 5, we have 3,730 watts. This motor output would not be expressed in watts, however; just simply 5 H. P., but its equivalent is the 3,730 watts. We call this output. Now it is possible for us to find the input if the motor is 80 per cent efficient, the average as noted above for a motor of

this size. Write this formula carefully in your note-book:

$$\text{EFFICIENCY} = \frac{\text{OUTPUT}}{\text{INPUT}}$$

If you wish to make this into a little "nutshell" formula, write it like this:

$$\frac{\text{OUTPUT}}{\text{EFFICIENCY}} \times \text{INPUT}$$

Place your finger over the value you wish to find and multiply or divide accordingly. For instance, output equals efficiency times input; efficiency equals output divided by input; input equals output divided by efficiency. Let us find the input into this 5 H. P. motor. We know it will be necessary to put into it a little more than 5 H. P., because it is only 80 per cent efficient. Since input equals output divided by efficiency, we have in this case 3,730 watts (5 H. P.) divided by 80 per cent or 0.80. This gives 4,662.5 watts. Hence, we send into the motor 4,662.5 total watts, lose 20 per cent or 932.5 watts in overcoming friction and electrical resistance, and deliver the rest, or 80 per cent, to the pulley, 3,730 watts or 5 H. P. Now, since we know the total wattage we must put into the motor, and since this energy is to be delivered at a pressure of 110 volts, it is very easy to calculate the current which the motor will receive. Use the formula as explained in May Radio Topics, current equals watts divided by volts. We will here divide the input power or 4,662.5 watts by 110 volts and the answer will be 42.4 amperes. If you were going to install this 5 H. P. motor and use the 110 volts pressure to operate it, you must look up in your wire table and find the size wire necessary to carry this current. The National Electric Code specifies that the wiring to motors should be rubber covered, and the table gives the safe-carrying-capacities of wires of all sizes. The wire to be used in this case will be No. 7, Brown & Sharp gauge, which will carry the above current without overheating. In most installations, when the load on the motor varies, a 25 per cent overload wiring is recommended by the rules, hence, if we wired for this overload we would wire for 53 amperes; this would mean a No. 5 Brown & Sharp gauge wire. It is best to wire for the overload and use the larger wire, for then the resistance of the line will be cut down and less power will be lost in the wires conducting energy to the machine. The experienced electrician will always consider this idea of lost energy, for it means a great deal in operating expenses of a power line.

The writer will now lead you a step farther. We will discuss lost power in this circuit. We have found the size of wire necessary to pass a current of 42.4 amperes. Let us see the result of using this wire. For the sake of bringing out the point we will use the No. 7 wire and not the No. 5. You can get in on the No. 5 wire calculation yourself a little later. Useful power and lost power are two different things. Of course, in our motor itself we had both useful and lost power. We had the useful power which was delivered to the pulley; the lost power being spent in overcoming motor losses. Now we have

exactly the same thing in the line carrying the current to the motor. We put a certain amount of power in watts into the line at the service voltage, lose some of it in overcoming the resistance of the line, and have what is left to give to the motor. Thus the line itself has an efficiency factor.

Let us say our 5 H. P. motor is located 100 feet from the switchboard. The motor, we will assume, is out in the factory where machinery is operated. Since the motor is 100 feet from the switchboard supplying the electric power, we must make a careful survey of this situation and be sure that the motor will receive its proper pressure of 110 volts at this distance. Reviewing for an instant what the writer has explained about the resistance of wires carrying current, you will remember that length and cross-sectional area of wires are two very important factors. The longer the wire the greater will be its resistance; the smaller in cross-section the greater will be its resistance. Now we will figure how much voltage we will lose by using the wire size No. 7. Before we can find the voltage loss it will be necessary to find the resistance of the No. 7

TUITION, books, material and traveling expenses to the Muncie High School E. E. Course will be the prize of the highest student in this course. Read the details in the last issue.

wire. This involves another formula which you should also put down carefully in your note book:

$$10.8 \times \text{Length in Feet} \\ \text{Resistance} = \text{---}$$

Circular Mills

This 10.8 is a constant for copper wire, and is the resistance in ohms for one mil-foot of copper wire at ordinary temperatures. A mil is one-thousandth of an inch or about the diameter of a hair in your head. The mil-foot is this wire of one-thousandth inch in diameter and one foot long. Think about this for a moment, a copper wire about the diameter of a hair and one foot long. This little section of wire has the resistance of 10.8 ohms. The length in feet of the power line does not mean the distance just one way, but the total length of the circuit. In this case for the wiring of the 5 H. P. motor, the motor is 100 feet from the switchboard where we are going to attach our line wires. Then the total length of this circuit will be 200 feet, since we must run the line to the machine and back again. The circular mils in the formula means the cross-sectional area of the wire under consideration, which is in this instance the No. 7, the cross-sectional area being 20,816 C. M. You can find these circular mil areas by referring to any wire table for Brown & Sharp gauge, this being used in electrical practice when copper wires are employed for

lines. By working out this formula we find the line resistance will be 0.1037 ohm.

Now we have accomplished a very important step, and this resistance value will enable us to find the voltage drop on the 200 feet of wire, also the power lost in watts. From this watt loss we will be able to determine the money loss, as will be shown. As for the voltage loss, this is a simple process. Just use Ohm's Law. Voltage equals current times resistance. We figured the current to be 42.4 amperes and the resistance to be 0.1037 ohm. Therefore the voltage drop in this line is 4.4 volts. This 4.4 volts means that it takes this much pressure to pass the current of 42.4 amperes through this resistance of 0.1037 ohm. This 4.4 volts loss in the line is not unusually large for this type of an installation, for often 5 per cent of the service voltage is permitted to be lost in the power leads to electrical machinery. The point of it all is this—the motor must get its 110 volts if it operates up to its rated 5 H. P. If it does not get the 110 volts it will not deliver the 5 H. P. Hence, you can plainly see that if we lose 4.4 volts in the line wires it will be necessary to have this much added to the 110 volts which the motor is to receive. That is, the switchboard voltage must be 4.4 volts higher or 114.4 volts, the line using up the 4.4 and the remaining 110 going on to the motor brushes.

Now let's pass on to another step and study about the power in watts and see how this works out in this installation. A simple matter, indeed. Watts equal volts times amperes. So in this case the watts lost in the line will equal the amperes flowing in the line multiplied by the volts lost in the line, or 42.4 amperes times 4.4 volts, which equals 186.56 watts. Since you must lose this voltage of 4.4 in the line, and since you have to pay for it as energy loss, you can easily see why voltage drop is a matter of extreme importance in power installations. If your power rate is 5 cents per kilowatt-hour you can figure the actual dollars and cents you spend on your line loss alone. A kilo-watt is 1,000 watts. We have here a loss of 186.56 watts or 0.18656 kilowatt. For one hour of operation of this motor we can calculate the expense not only of the motor's useful power, but also of the line loss power. First, let us take the cost of useful motor power. The 5 H. P. machine drew from the line 4,662.5 watts or 4.6625 kilo-watts. If the rate is 5 cents per kilo-watt-hour and the motor runs at full load, every hour of running will mean an expense of 23 cents. We find this by multiplying the kilo-watts by the number of hours by the rate per kilo-watt-hour. If you operate for ten hours per day for 300 days per year, this motor will cost you close to \$700. But this is not all. Here we only considered the motor itself. Remember that the line running to the motor is not 100 per cent efficient. We lost some power in it. Let us see how this works out.

We lost 4.4 volts in the line in overcoming the 0.1037 ohm. We had

a current of 42.4 amperes flowing in the line when the motor was running on full load. Then the watts lost in the line being equal to volts times amperes is 186.56 watts. This represents some more money. At the same rate of 5 cents per kilo-watt-hour, we have 186.56 watts or 0.18656 kilo-watt multiplied by one hour multiplied by the rate 5 cents. This equals 0.009328 or nearly one cent money loss per hour every hour the motor is running at full load and drawing its 42.4 amperes. If this continues for 10 hours per day for 300 days per year, we see the yearly expense of lost power in the line equals \$27.98. This is really considerable loss. Suppose you had five or six of these motors all operating like this and each one costing this amount for line loss alone, you would soon begin to wonder what was the matter.

This condition actually does exist, however, in many factories and shops where the electrician is not technically trained and does not understand the method of handling such problems. Money is a big thing in plant operation and close tab must be kept at all times on such things as these. Right before our eyes big financial losses occur because of unnecessary resistance of conductors. It all evolves from this idea of efficiency. A simple illustration is this:

You pour into a bucket exactly one gallon of water; you empty the bucket and do you get out exactly the same gallon you poured in? Exactly not! Some of the gallon sticks to the inside of the bucket. There is no machine or no power line which will deliver out the exact amount of energy it takes in. Some is lost. What determines this loss? Simply this—efficiency. So in our study of electricity we will deal constantly with power lines, be they running to motors, lights, radio apparatus, or anything else. We will always meet efficiency face to face. Resistance is the big thing we must watch in our electrical work. Small wires use up voltage. If we increase the size of our conductors a trifle we would get greater results from our circuits. In the above problem, if we had wired this 5 H. P. motor with a slightly larger wire, the No. 5 Brown & Sharp, we would have saved some of the voltage drop in the line, consequently saving some power in watts and money. The writer is giving you the problem of determining this amount.

Think over this article very carefully and see if you can connect its idea up with your radio station. You may often wonder why your transformer output is not what it is supposed to be. Have you stopped to consider the distance your transformer is from the electric light mains?

Have you stopped to consider the size wire running to the primary of your transformer? Do you understand why the better trained electrical or radio man tells you that your line loss is rather large? To understand this article in its fullest degree you must read it and reread it; study it carefully. You will then thank the writer for giving you this little bit of information and starting you in on one of your first steps into real electrical engineering.

Problems

1. Referring to the article just discussed, if we would have used the No. 5 Brown & Sharp wire instead of the No. 7, what would have been the following results for the 5 H. P. motor installation, yearly cost of lost energy on the line alone, assuming the five-cent rate; also, what would have been the necessary switchboard voltage in order that the motor could have received its 110 volts exactly? Show all your figures.

2. The transformer in your radio station is 150 feet from the electric light company mains. These mains carry a pressure of 110 volts exactly. When you press your sending key the ammeter in the primary circuit to your transformer reads 8 amperes. The line leading from the light mains to your transformer is No. 14 Brown & Sharp wire, the cross-sectional area of this size wire being 4107 C. M. Since the mains are carrying a pressure of 110 volts, and your branch line into your transformer is No. 14 wire, what actual voltage will you lose in the line, to your transformer? What voltage will your transformer receive? How can you increase the voltage input into your transformer? Use the method given in this article.

3. State exactly, in your own words, just what you understand by voltage drop. Also explain the difference between useful energy and lost energy. How can these factors be remedied and how would you go about it if you were an expert electrical man?

4. A motor is rated at 15 H. P. It operates on 220 volts and draws 60 amperes. Calculate its efficiency. How much would it cost to run this motor for one hour if the rate is 8 cents per kilo-watt-hour?

5. If we have a motor which is said to be extremely inefficient, what probable causes would you give for this inefficiency? Name everything you can think of which will lower the efficiency of this motor.

Start to work out these problems this very day and get your answers to Mr. Anthony at once. When your answers reach him late it is impossible to get your name in the next is-

sue of Radio Topics. Address your solutions to Harvey Mitchell Anthony, Muncie, Ind. Remember the year of free electrical engineering education for the best student in this course.

The Following List of Students Have Turned in Surprisingly 100 Per Cent Perfect Examination Papers and Deserve Great Credit.

John F. Allen, Orlando, Fla.
Rudolph W. Martin, West Bend, Wis.
Loyal Worden, Chicago, Ill.
Harry Monson, Chicago, Ill.
Lester L. Smith, Tekoa, Wash.
Frederic Allen, Defiance, Ohio.
Russell J. Stier, Chicago, Ill.
Lawrence J. Birkel, Springfield, Ohio.
Paul F. Johnson, Altadena, Calif.
Warwick Andersen, Chicago, Ill.
Howard Mills, Fremont, Ohio.
A. L. Hall, Utica, N. Y.
Milan James Baex, Green Bay, Wis.
Oba R. Garrett, Fort Worth, Tex.
Walter Kjellstrand, Chicago, Ill.
McKenzie Cottrell, Morenci, Mich.
Richard Parker, Chicago, Ill.
George S. Turner, Independence, Mo.
Lawrence E. McDonough, St. Paul, Minn.
Elmer R. Hagelin, Chicago, Ill.
Owen Barton, Conneaut, Ohio.
Students Who Made Above 90 Per Cent on Examination of May in Radio Topics. Don't Forget the Free Scholarship Offer, to Be Awarded to the Man Who Makes the Highest Grade in This Six Months' Course.
Theron A. Green, Sycamore, Ill.
Edgar Morford Knepper, Maitland, Mo.
Milton Born, Oak Park, Ill.
Charles Lampel, Indianapolis, Ind.
Vernon D. Wood, Oshkosh, Wis.
Lester W. Landt, Chicago, Ill.
C. J. Bartling, Taylorville, Ill.
Fred Becker, Boone, Ia.
Leonard Vaughan, Ladysmith, Wis.
Herman Muller, Bayside, Long Island.
George Birdsall, Hampton, Iowa.
C. H. Campbell, Bridgeport, Conn.
Harry E. Turner, Chicago, Ill.
Maurice Clark, Jacksonville, Fla.
Albert Rosenbaum, Fulton, Ill.
Sidney Irving Doroff, West Haven, Conn.
Peter Andricepoulos, Chicago, Ill.
C. H. Clark, Jacksonville, Fla.
Ira Williams, Jr., Maitland, Mo.
Carlton Marsh, Glencoe, Ill.
Willard Cooper, Boone, Iowa.
Norman E. Carlson, Chicago, Ill.
Victor O. Tresidder, Chicago, Ill.
Owen K. Williams, Muncie, Ind.
Michael Knezevich, Buchanan, Mich.
Sterling Gullborg, Chicago, Ill.
M. C. Poor, McAlester, Okla.
Charles Wise, Hopkins, Minn.
Fred DeLong, Reading, Pa.

To the readers of my articles in Radio Topics: I wish to express my sincere appreciation for your close attention and interest you are taking in my efforts to place before you the essentials of practical electricity in a manner easily understood and so treated that you are able to grasp the fundamentals without having to read page after page in a book in order to learn a point. Keep up your good work and end this course with the same enthusiasm with which you started. My unbounded interest is with you at all times. Write to me if you have difficulty with the problems. You will be favored with an immediate reply. Faithfully, your instructor,

HARVEY MITCHELL ANTHONY.

Outlining the Fundamental Technic of Display Advertising and Its Application to the Radio Field. Popularizing Summer Radio

By N. E. WUNDERLICH

GES, it pays to advertise, and with advertising, like everything else, there is one right way of doing it and a million wrong ways. There are two right ways of learning—one by experience and the other by learning from those who know.

It is quite apparent that the average advertiser in the radio periodicals of today gives little concern to the wording or layout of his copy.

Ingenuity and new ideas play an important part in putting the advertisement over. The cleverer and more novel the advertisement is, the more attention it is bound to attract.

It is very advisable to get away from the stereotyped form of advertising. You do not necessarily have to have your copy profusely illustrated, but make it snappy, sensible and to the point.

When advertising a particular piece of apparatus, arguments should center about a single selling point, the advantages of some particular part of the product. Various selling points may be distributed over a series of advertisements. It's like getting all the energy into the peak of just one curve, which is much more effective than a series of lesser curves.

More and more advertising campaigns are being built around a single sales point. It is found that driving one point home produced more satisfactory results, for then it is not forgotten. When a number of points are emphasized, not as much attention is likely to be attracted, and then there is danger of creating confusion in the minds of prospective purchasers.

You will find that some of the most successful advertisers never put but one idea into their copy. It has been

The number of dealers and advertisers in the radio field are rapidly increasing, and we feel that this article will stimulate and improve the present sales conditions by better advertising and should interest every advertiser and the general reader. The Editor would like to receive the opinion of both the advertiser and other readers as to the advisability of our publishing further articles of this nature.

found that the more you illustrate this idea and the less you say about it, the better the advertisement pays. The idea of service may be featured, one particular use of your product, or the importance of the genuine article may be pointed out.

The Chicago Radio Laboratory has run a series of advertisements illustrative of this, through all of which it tells of some one of their products, but in each of which some one different point is emphasized.

Make your advertising say something! Don't just publish an itemized list of the products you handle, stick your name on the bottom and expect maximum results. The fellow on the next page is probably doing the same thing, and while it serves very well for local distribution, that is all.

Inject some color and local element into your copy. Hitch it up with some event about to take place or with one just passed. The American Radio and Research Corp. advertising is a good example of this particular point. They have gotten their gap users interested in a relay route and their ads carry reports and material of interest to the consumer.

And change your copy every month. Running the same ad month after month will cause it to become monotonous and it will quickly lose its power of attraction. It will be recalled that a few years ago the Manhattan Electrical Supply Co. always ran the same stereotyped copy, displayed the same buzzer outfit. If this ad ever caused anyone to become interested in radio I never heard tell of it.

Maximum Radio Interest the Year Around

Seasons change, so should your advertisements. And right here there is something vitally important for every dealer to consider.

It was only a short while ago that pleasure motoring during the winter was almost unheard of. Automobile dealers, garage and repairmen all realized that their business dropped off very appreciably during the cold weather. As their expenses continued to go on in this period they decided that the way to solve the problem would be to popularize winter motoring—and they did, by advertising. By advertising their service, winter tops and the joy and health benefits of winter pleasure touring, they did the trick.

Now, why shouldn't there be a movement to popularize summer radio? You can do it by applying the same method.

It is up to you, Mr. Advertiser, to get up an ad for summer radio—and get some color and snap into it. Just think what this year around business will mean to you, with its increased sales. So instead of an idle summer both for dealer and consumer, let us see a real campaign for popularizing radio work during the summer.

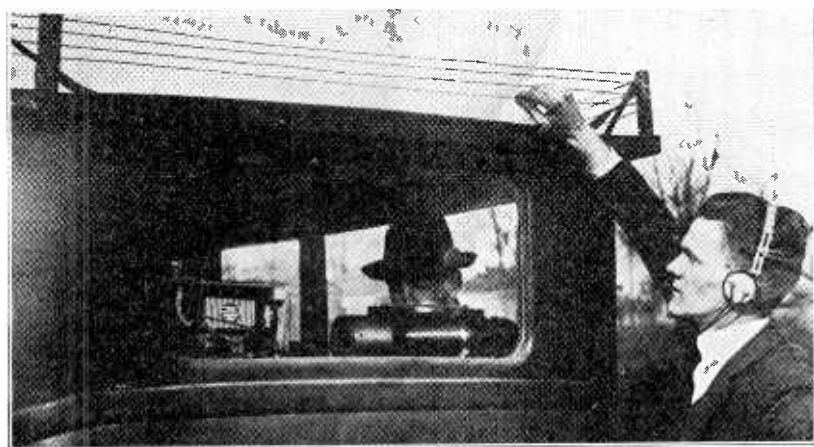
Increase, Not Decrease, Your Advertising

No steps should be taken to decrease your advertising space, as it is false economy to cut down advertising at a time when business is in need of a stimulant to keep it alive. Your advertising should be regarded as an investment and as business insurance rather than an expense.

Remember, it pays him to advertise who advertises right. Remember also that repetition is necessary to successful advertising. And be truthful. An untruthful advertiser commits suicide.

Having obtained a customer, don't make the mistake of forgetting him. Drop him a postal, letter or circular and let him know that you want to continue to serve him not only through the winter months but all the year around.

This sort of procedure produces good will, and that, after all, is what brings in future orders and, best of all, a satisfied customer—the finest kind of advertising.



Take a portable outfit with you this summer on your auto trips. Here is a very neatly arranged loop on the top of a car. The instruments will take up very little room and a small CW outfit may even be taken along

Editorial Expressions and Timely Comments

A RANK INJUSTICE

Why can't some of these city councils find something worth while to do instead of drawing up ordinances that are not worth the paper that they are written on and which often cause a good deal of trouble for those whom the regulations are aimed at?

Being located in Chicago as we are, we thought that we had heard of about all the foolish city ordinances that any council body could think of. No longer. The honor now goes to the city of Salem, Mass., whose city council had the nerve to pass an ordinance which reads as follows: "No person shall set up, install or maintain a wireless apparatus connected with or intended to be connected with a current of electricity."

Can you beat that? Positively, that is the present law in Salem, which they slipped through while our mutual friend, F. Clifford Estey, was out of town to do organization work for the radio clubs around the country.

We are willing to bet that those men that voted on that ordinance do not know what wireless apparatus is and that they are surely not aware of the national government regulations. How anybody can murder such a wonderful science as the art of radio communication is beyond us.

Messrs. Councilmen of Salem, do you realize what an injustice you have done in passing this regulation? How would you or your family like to cross the ocean without the ability to communicate with the shore? You wouldn't feel very safe. And think of the millions of people that travel each year on thousands of boats. Think of the many boats and lives that are saved each year through this connecting link, wireless communication. Would you discourage such a fine thing, for that is what you are doing. Ninety per cent of the radio operators on board boats today got their training through amateur apparatus. The supply of operators is low enough as it is, so why cut off the training of those in Salem? And please also bear in mind that the present development of the art of radio communication is due greatly to the experimenting that you wish discontinued.

And why was this ordinance put through without giving the owners of wireless apparatus a single hearing?

It is a rank injustice and an insult to the greatest science of today. We hope that no other city will ever pass such regulations, and surely it cannot remain a law in the city of Salem, Mass.

May the next issue of Radio Topics carry the news of the repealing of this ordinance.

With the A. R. R. L. August 30 to September 3

Only three months more, fellows, and then you will find yourself attending the affair of a lifetime, the first national A. R. R. L. convention and radio show. No matter whether you have attended every other convention held, this national convention will be such a pleasantly radical departure from any of those others that you would never forgive yourself for failing to attend.

Convention headquarters will be located at the most beautiful and exclu-

any boy or girl, man or woman, attends this ultra convention and fails to have a super wonderful time, it will be no one's fault but their own.

The speakers and their subjects have both been well chosen, and the methods to be employed in the holding of lectures and meetings will surely be a pleasant surprise to you. In addition to having the chance to meet every station owner that you have ever heard you will have the pleasure of hearing a real orchestra, composed entirely of radio men.

If every manufacturer and dealer in radio supplies could realize what this radio show will be and what it means to them, we don't know where we would put them all. Maybe this will bring it out clearer. This radio show will be held in an immense new armory and will equal in splendor those shows given by the automobile industry. It will be widely advertised in the daily newspapers, which will result in 5,000 to 10,000 of interested people reviewing their apparatus daily.

The general electrical industry has expressed its desire to participate in this show, as there has not been an electrical show in Chicago for a couple of years. Radio manufacturers and dealers will be given the first opportunity and preference in the matter of show booths. They must act quickly in reserving their space, as the undertaking of this immense radio show project is costing thousands of dollars, and all arrangements must be made well in advance.

We might also mention that it would be well for those that contemplate attending the convention to make their banquet reservations without further delay, as with an attendance of over 2,000 it is best to get your name in early.

Association of Radio Manufacturers

As a result of a conference of the several manufacturers of radio apparatus who exhibited at the recent New York radio show, they have formed a section of the Associated Manufacturers of Electrical Supplies.

It is hoped that this will stabilize and improve the present conditions by establishing definite methods of selling and distributing.

A good honest association would indeed do the manufacturers good, but there are many things to be considered. In the first place, this organization should, in order to be strong enough to carry out their plans, consist of all the big manufacturers and all of the honest minor ones. There are altogether too many fly-by-night dealers and manufacturers in the game, and with a proper association this could be done away with.

(Continued on page 16)



sive hotel in Chicago, the Edgewater Beach Hotel, wherein all of the officials and notables of the convention will reside. The banquet to be held the evening of September 3 will also be at this hotel. The facilities, accommodations and surroundings at this splendid hotel are not to be equaled by any other in this country. It is situated right on the shore of Lake Michigan, making it very convenient for any of the water sports, and the large park-like grounds surrounding the hotel have accommodations for all out-of-door sports, including tennis and golf. Chicago is noted for its wonderful parks and boulevard links and in general the city is a better summer resort than any at which you have ever spent your vacation.

The time will not lag for one single moment at this convention, for there will be something doing from the time you get up until you go to bed again. Every hour of the time has been arranged for, and there will not be any waiting around at your hotel, for when there is not a lecture or meeting, motor and yacht trips, swimming and beach parties, tennis, golf and baseball games are scheduled to keep you going. If



Postmaster General Hays in the Role of a Radio Operator

Chicago Organizes New Society of Radio Engineers

AFTER much unsuccessful effort in an attempt to start a Chicago chapter of the Institute of Radio Engineers, the desire for a higher society of radiomen has been satisfied by the recently organized Chicago Society of Radio Engineers.

The membership of this new society comprises the most learned radiomen in the middle west. Under the present plans a permanent home, including club quarters, office, experimental laboratory, complete station and library will be established in the central part of Chicago just as soon as possible.

An associate membership will also be maintained for those unable to hold regular membership. The regular membership will be limited as well as very exclusive, and there is no doubt but what it will become the greatest and most authoritative radio organization in the country. The intense interest and extensive activity of the present members indicates the greatest of possibilities for this valuable society.

At the present time meetings are held the third Friday of each month at 8 o'clock in room 1121 County Building, Chicago, Ill. At the May meeting Mr. J. H. Miller of the Jewel Electrical Instrument Company gave a most interesting lecture on airplane radio equipment, together with a short discourse on new CW circuits.

It is requested that all those desirous of joining this society obtain application for membership from M. H. Romberg, 6220 University avenue, Chicago, Ill.

Photo as You Radio as You Go

We hope to hear of a large number of fellows who are continuing their radio work during the summer, and there no doubt will be some very unique and interesting application and uses of radio.

For your own remembrance and for the sake of others you should take photos of all that you think interesting and send them in to us, together with a story or description. They undoubtedly will furnish interesting reading. Let's hear what you have done, fellows.

The new radio station of the Post-office Department, to be used in connection with the air mail service, was formally opened today by Postmaster General Hays and Secretary of Agriculture Wallace.

The two departments will co-operate in distribution of a national radio marketgram service and also keep in touch with the sixty-five airplanes of the air mail service. Major stations are located at Washington, Bellefont, Pa., St. Louis and Omaha.

Through these and the fifteen minor radio stations operated by the air mail service, together with more than 6,000 licensed amateur stations, almost every farmer in the country will be able to receive each day market quotations and other reports of government activities of interest to him.

Two eastern colleges will play chess by wireless. There will be fewer casualties that way.

We have heard that it is considerably easier to get Germany "on the wireless" than it is to get "central" aroused in New York.

9XAG of Denver Gives Many Successful Concerts by Radio

Stations within 500 miles of Denver, Colo., should be enjoying themselves these nights through the kind efforts of H. H. Buckwalter of 9XAG, who has been giving numerous concerts, vaudeville performances, dance music and just about everything else that it is possible to do with a good radio telephone set.

Quite recently Frieda Hempel of the Chicago Grand Opera Company sang to the western amateurs from this station. Regular concerts are given from 8 p. m. to 9:55 p. m. every Wednesday evening on 375 meters.

From reports on these various transmissions it appears that most unusually good results are being obtained. The Denver Post is giving the performances most extensive publicity, which is greatly appreciated.

In looking over recent convention photos you probably have been wondering what the matter is with Schnell's smiling countenance. That, dear readers, is merely a good attempt to cultivate a Warner-like foliage on his upper lip.

Topics of the Day

*Being a Little of Everything From Here,
There and Everywhere*

Congratulations in Order Here

Quoting Bill Woods at the St. Louis convention, we take extreme and great pleasure in announcing that R. H. G. Mathews of 9ZN, Ill., is now enrolled in the class of married men. He is now residing in his new home at 5958 North Paulina street, Chicago. We hope you all the luck in the world, Matty.

Mr. K. E. Hassel, operator SF, at 9ZN, has just returned after spending a month in the south on a commercial installation. Fred Marco of 9CD accompanied him for a couple of weeks but returned early to complete his school work.

Our Associate Editor, Mr. M. H. Romberg, will spend the majority of the summer out cruising on his beautiful yacht, the "Quest," which is, incidentally, well equipped with radio. Wendell L. Holst of 9BG is another lucky owner of a splendid sailing boat, the "Rascal," the fastest boat in her class. Our editor is still another who occasionally cruises aboard his boat, the "Rascal II."

The station of 9ZN is being completely remodeled, and visitors at the national convention will see a model and ideal station. It is hoped to have the expansive ground surrounding the station greatly beautified by convention time.

Just a word to again remind you that the first national A. R. R. L. radio convention and show will be held in Chicago August 30 to September 3, inclusive. Make your banquet reservations early, for with an attendance of at least 2,000 it is best to be among the first.

The manufacturers that have not as yet obtained their space had better do so without further delay. The immense radio show will equal in splendor any of the Chicago or New York automobile shows.

If the Shoe Fits, Put It On

The incongruities of nature are well illustrated when a man whose life from the cradle has been one stupendous error points out a small mistake in a magazine and asks the editor why he can't get things straight.

(Continued on next page)

Don't Waste Your Money

in purchasing Radio Apparatus blindly. First make certain the instruments in question will "fit" into your station, that they will give the results you expect, and finally that the price is right.

Buy From Radio Experts

and get full value for your good money. Every individual in this organization is an experienced Radio-Man and is able to give you complete, authoritative information on all types of modern apparatus.

If you already have a station we will tell you how to improve it; if just starting, we will plan the complete installation for you and GUARANTEE results.

Whether you have one question to ask or fifty; whether you want to buy now or later on, we offer our services cheerfully, courteously and without charge.

Saturday Afternoon

is a good time to come and see our new apparatus—largest stock in the Middle West—and more arriving every day.

PHONE HARRISON 1716

Chicago Radio Apparatus Co., Inc.

C. C. Klentz

L. L. Lynn

508 SOUTH DEARBORN STREET (Room 210), CHICAGO, ILL.

BEAT THESE PRICES?

For one month only we will deduct 10 per cent off the list price of any piece of CW and Phone Apparatus listed in Catalog CW-2. If you have not a copy of this CW Catalog send 10c for it today. A few of the bargains as follows:

POWER TUBES		"IDEAL" CW EQUIPMENT	
Radiotron 5 Watt	\$7.20	IDEAL 800 Volt Filter.....	\$15.00
Radiotron 50 Watt	27.00	IDEAL 1 Henry Double Choke	7.00
Singer 37.5 Watt	21.60	IDEAL 1 Henry Single Choke.....	5.00
RADIOTRON ACCESSORIES		MOTOR GENERATORS	
Bakelite VT Socket.....	1.35	500 Volt 100 Watt.....	90.00
5000 Ohm Variable Leak.....	3.00	500 Volt 200 Watt.....	100.00
CW CONDENSERS		1,000 Volt 200 Watt.....	135.00
Wireless Shop .0004 mfd.....	6.00	Z-NITH EQUIPMENT	
Wireless Shop .0006 mfd.....	7.50	Z-Nith Regenerator.....	49.50
Wireless Shop .0008 mfd.....	9.00	Amplifigon Agn-2	85.00
ACME CW APPARATUS		MOORHEAD TUBES	
50 Watt CW Transformer.....	13.50	Electron Relay	5.40
200 Watt CW Transformer.....	18.00	Amplifier-Oscillator	6.30
50 Watt Filament Heater.....	10.80	Rectifier Tube	8.00
150 Watt Filament Heater.....	13.40	EVEREADY B BATTERIES	
Modulation Transformer.....	4.50	22.5 Volt Small.....	2.00
FEDERAL MICROPHONES		22.5 Volt Large	3.15
260-W Hand Microphone	6.30	CONDENSERS FIXED	
262-W Panel with bracket.....	4.75	600 Volt 1 Mfd	1.15
263-W Panel Mounting	4.75	600 Volt 2 Mfd	1.15

IDEAL APPARATUS CO., 1901 East Louisiana St., Evansville, Indiana

Enlistment and Training of Amateur Radio Operators

The War Department, through the Signal Corps of the army, is now making arrangements for the training of amateur radio operators and devising plans for their service should the nation need them in an emergency. These activities will be handled by the signal officer of each army corps area. The United States is divided into nine corps areas. The headquarters of the Sixth Corps area is located at Fort Sheridan, Ill., and embraces the states of Illinois, Michigan and Wisconsin.

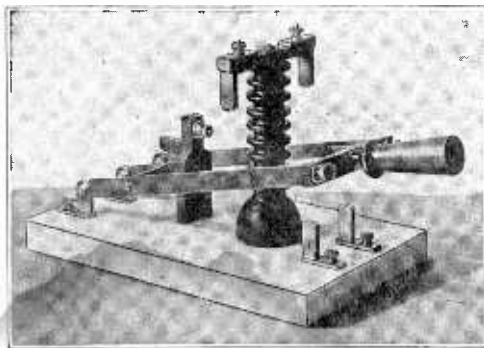
Courses of instruction will be prepared and sent out by radio and by mail. Questions will be received and answered.

Regulations will shortly be published covering the commissioning of reserve officers and the enlistment of personnel in the Signal Reserve Corps for radio duties. Those of the amateur radio personnel desiring to enter the army reserve will probably be called to active service for approximately two weeks' camp during the summer of 1922. This camp will be located either at Fort Sheridan or Camp Grant.

Within a short time a 2KW quenched spark transmitting set will be in operation at Fort Sheridan, and a working schedule for the benefit of amateurs will be inaugurated. By August 1 a medium high power CW radio telegraph and telephone transmitter, using large pliotron tubes, will be in service at Fort Sheridan. This set will have a 1,000-mile range, therefore loud signals will be picked up from this set anywhere in Illinois, Michigan or Wisconsin.

It is desired to secure an expression of opinion from the amateurs as to the methods to be employed in giving these courses in order that a scheme acceptable to the majority may be adopted. A questionnaire, together with an addressed envelope for return, will be sent for your convenience in furnishing information concerning yourself and for your recommendations as to training details and your desires as to joining the reserve.

You assume no obligations in filling out these forms, and those interested are requested to write to War Department, Headquarters Sixth Corps Area, Office Signal Officer, Fort Sheridan, Ill.



"Ranited" Antenna Switch, Type U
Price \$18.00. F. O. B. Chicago

The "Ranited" Switch

Is the first REAL antenna change-over switch on the market.

It is patterned after the old United Wireless Switch, but of much superior construction and it will carry 3 KW.

The base is 1 inch white marble, size 7x11 1-2 inches, the switch parts of copper and brass, and is perfect in operation, a truly splendid switch that will greatly improve your station.

Ravenswood Radio Distributing Company,
MANUFACTURERS AND DISTRIBUTORS
1917 Warner Ave. CHICAGO, ILL.

WITH THE AMATEURS IN THE EAST

By R. W. E. DECKER, 2UA

Station 2UA has added a third operator to the staff, Mr. E. B. Lant, former commercial operator, who is signing "dj" as personal. Over 100 messages were handled by this station last month.

F. Koenig, Old Post Garage at Tarrytown, N. Y., is now installing a 1/2 KW Sperry Arc set and also a powerful radio telephone outfit. Full description and photos of this unique station will appear in Topics soon.

2DK, having had hard luck with his gap, is now doing his squeaking with a spark coil.

2BK is now organizing the Hudson Trunk Line, which will probably include the following:

- Yonkers, 2BK—2DU.
- White Plains, 2UA.
- Poughkeepsie, 2DA—2AR.
- Hudson, 2BM.
- Albany, 2FG.
- Troy, 2SZ.

Old man Static is spending the summer east, but in spite of this there will be every attempt made to maintain communication and the handling of traffic. A summer early morning schedule with all first district stations is now being planned, and we would like to hear from those interested.

Still Another Local Paper

Each month brings a new local paper, and the latest one on the list is one named Static, gotten out by the Houston Radio Club. It has a heading which is very elaborate and attractive, and the body is mimeographed. It is a fine little paper, and we wish that they as well as every other local publication would please publish a list of their staff. Why not let us know who is doing all this fine work?

U. S. Sends Peru Note on British Radio Compact

The award of the Peruvian government of a concession to the Marconi Wireless Telegraph Company of London for operation of the Peruvian wireless, postal and telegraphic services for twenty-five years has been made the basis for representations by the American government.

The American communication has not been made public and state department officials have declined to discuss the matter.

First reports indicated the agreement virtually was a monopoly, but later it was learned it would not interfere with the business between that country and the United States.

Commercial communication via navy radio between the United States and Indo-China by way of the Hawaiian Islands and the Philippines was recently inaugurated.

Plans have been completed whereby commercial messages will be sent from San Francisco by naval radio to Hanoi at 96 cents a word, with additional five-cent charge per word for messages for interior points in French Indo-China.

FILTER CONDENSERS FOR C. W.

The tremendous increased use of C. W. Transmitters has **SHOWN UP** the weakness of the present type of condensers and has forced a demand for **PUNCTURE PROOF CONDENSERS** for filtering purposes. These condensers **MUST** stand up and not blow up. **MUST** have a lower power factor loss. **MUST** smooth the ripples in your rectified A. C. **MUST** decrease the generator hum to a minimum. **MUST** increase your radiation and not eat up half of your power.

WE HAVE IT THE FIRST COST, THE ONLY COST

If the above musts are not fully satisfied, or if any breakdown occurs, we will replace the condenser immediately without any **RED TAPE** to go thru with.

HUNDREDS now in use, giving results beyond expectations.

2 MFD Guaranteed 1000 V. 250 WATTS	\$5.00
5 MFD Guaranteed 1000 V. 250 WATTS	\$10.00
2 MFD Guaranteed 2500 V. 250 WATTS	\$15.00

RADIOELECTRIC SHOP

Department "T," 919 Huron Rd., Cleveland, Ohio

—RADIO DEALERS—

Have you investigated our trade proposition?

Do you know that we are authorized distributors for practically all the prominent lines of wireless apparatus?

Are you receiving our trade letters, bulletins and other literature pertaining to radio material?

It will pay you to communicate with us. We invite your correspondence.

R KLAUS D I O	KLAUS RADIO CO.	R KLAUS D I O
	EUREKA, ILLINOIS	

WHAT YOU GET--

Vacuum tubes that operate at low cost

A supersensitive detector	U. V. 200.....	\$ 5.00
A high vacuum tube amplifier.....	U. V. 201.....	6.50
A 5 watt tube transmitter.....	U. V. 202.....	8.00
A 50 watt tube transmitter.....	U. V. 203.....	30.00
A 250 watt tube transmitter.....	U. V. 204.....	110.00

Accessories made especially for use with these tubes and valuable information on their operation.

We also carry a complete stock of the leading manufacturers' products and can make immediate deliveries on any piece of apparatus desired. Write us your wants and get some real service

From INDEPENDENT RADIO SUPPLY CO.

3716 West Douglas Boulevard CHICAGO, ILLINOIS

Open Evenings, 8 to 10 P. M.
"Better Results With Less Effort."

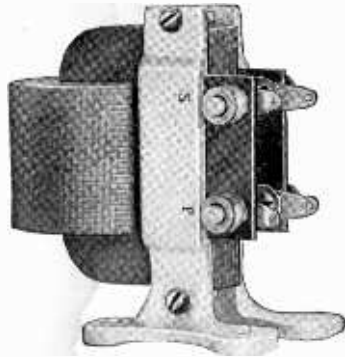
Amplifying Transformers

(AUDIO FREQUENCY)

AA

Unmounted
\$ **4⁰⁰**

Semi-mounted
\$ **4⁵⁰**



Gives
Greater
Amplification

Mounted
\$ **5⁰⁰**

Shipments
made from
stock
prepaid

Sold by the following local concerns:

Chicago Apparatus Co. Chicago Radio Laboratory
Manhattan Electric Supply Co.

ALL-AMERICAN ELECTRICAL MFRS.

815 S. WISCONSIN AVE., OAK PARK, ILL.

Station 8ML of Cleveland

(Continued from page 5)

ing apparatus is located about forty feet from the house and is operated through a remote control system. From the change-over switch a lead of copper braid runs to two .002 M. F. Marconi jars in series and thence to the O. T. With these jars in series the wave length is 190 meters and radiation five amperes. Secondary of O. T. consists of six turns of 2½-inch copper ribbon and the primary four turns of 1-inch copper pipe.

The spark gap used is two ½ KW Amrad gaps in series. The condenser contained in metal tank consists of 22 sheets 8 by 10 inch copper and 46 sheets 11 by 14 inch glass, the tank holding eight gallons of oil and having a capacity of about .007 MF. The transformer is a regulation 30,000 volt "coffin."

The receiving equipment is located in the house and is composed of a Grebe CR3 in conjunction with a detector and two step amplifier.

The map on the wall is marked off with dotted lines to the stations that have heard 8ML and with solid lines to the long distance stations worked. Transmitting records to date include 7ZJ, Vancouver, Wash.; 5ZA, Roswell, N. M.; "DZ," Guatemala and ships 500 miles east of New York.

Association of Radio Manufacturers

(Continued from page 12)

The radio industry now is just what the auto accessory industry was a short time ago. Every Tom, Dick and Harry sold auto accessories until they got organized and handled the distribution through jobbers and bona fide dealers.

There is one big stumbling block, and that is the fact that none of the manufacturers, or at least very few, are rated in credit books. There is no way at present of telling whether the letterhead before you belongs to a real firm or some kids in the basement. It is a big game of chance, this dealing with manufacturer and dealer and consumer. Many a dollar has been lost through dealing with firms without a single asset.

Now, if only this situation could be remedied, then a manufacturers' association could do wonders, just as it has done for the electrical trade. The way things are now any manufacturer is willing to give a maximum discount on a quantity order, no matter who the dealer be, if he thinks there will be any possibility of getting his money.

We really hope that a good association can be formed, for then the magazines can be particular who they let advertise and thus protect themselves as well as their readers from getting stung. It is a big proposition and must be handled by someone who knows both the fine points of such an association as well as the radio end. Some time ago a radio association of manufacturers and dealers was formed by some parties in Omaha. They made an appeal for funds and have not been heard of since. It's no wonder everyone is skeptical of a new thing in the radio field.

But let the right parties get together with those that know what is needed and let this association be truly representative of the entire field, and if handled properly it will without a doubt in our mind be a success. This matter should have immediate attention, and we would like to hear from those interested and concerned.

The New Superphone Transmitter



WATCH THE PLATE METER

A radio microphone especially designed to produce the greatest current change in the modulating circuit.

A HIGH POWER INSTRUMENT that will operate perfectly on from 8 to 220 volts without distortion, no sticking or a burn-out.

Used exclusively at 9ZN, Chicago.

PRICE \$30.00 COMPLETE WITH CORD,
TONE ARM, \$10.00

This transmitter used in connection with concert demonstration, New York to Colorado.

FOR SALE BY

L. F. RANDOLPH
343 S. Dearborn St.

CHICAGO RADIO LAB.
6433 Ravenswood Ave.

CHICAGO

THE "SORSING" "B" BATTERY

A Real "B" Battery, will solve your Battery Troubles

Guaranteed for: Long Life—Dependability—Ruggedness. Careful Workmanship—Moisture Proof—High Grade Materials. Volts 22½—8 in. x 4⅞ in. x 5⅛ in.—Weight 12 pounds net.

PRICE \$4.00 EACH

Under test for 60 hours, drawing 33 milli-amperes at the start, resulted in a reduction in current of but 4 milli-amperes. Compare it. Guaranteed not to depreciate more than 10 per cent in six months.

Send for Circulars describing Sorsing "B" Batteries to

Supremus Radio Lab., Box 61, West Norwood, N. J



**RADIO MEN
Recharge Your
Own Battery**

Average Cost Five to Ten Cents
THOUSANDS IN USE

The F-F Rectifier is designed for the use of the private owner in his home or garage, being entirely automatic and needs no attention. Attaches to lamp socket. Equipped with long extension cord and clips to fasten to battery terminals. Uses carbon electrodes which are good for thousands of hours of service and can be replaced for fifty cents the pair.

Rotary Rectifiers for Battery Stations.

MAIL ORDERS GIVEN
PROMPT ATTENTION

I. J. HARKLEROAD CO.

2204 So. Michigan Ave.

CHICAGO, ILLINOIS

- Type 6— 6 ampere for 6 volt battery...\$15.00
- Type 12— 5 ampere for 12 volt battery... 20.00
- Type 16— 8 ampere for 6 volt battery... 24.00
- Type 112— 6 ampere for 12 volt battery... 24.00
- Type 166—12 ampere for 6 volt battery... 32.00

Above for 60 cycle current only.

Prices F. O. B. Fact. Shipping wt. 11 to 15 lbs.
Write for prices on other cycles and voltages.

**WIRELESS PHONE
SAVES FORESTS
FROM FIRE LOSS**

**Airplanes Are Summoned by Voice
From Sky**

"Fire on the Nechako River!" The words came distinctly out of the air.

"Where?" asked a watcher at the forest patrol station near Prince George. The word whirred off into the sky. Traveling on aerial vibrations, it shot across the forests. Thirty miles away another station caught it.

"Forty-two miles south by east of Stuart Lake," was the answer returned out of the void of space.

Airplane Soon on Scene

An airplane rose swiftly from the Prince George station. Under full power it skimmed through the sunlit silence over the wilderness of spruce and fir. Far off the three men in the fusilage spied a cloud of smoke boiling up from the horizon. Straight as the flight of an arrow they steered for it. Twenty minutes after the alarm was sounded they were on the ground fighting the red track of the flames.

Before a strong wind the conflagration might have turned a hundred leagues of evergreen woodland into a black desert crowded with gaunt skeletons of charred trees. The timely arrival of the fire fighters confined its destructive sweep to the compass of a few square miles. Possibly a million dollars' worth of good timber had been saved by the wireless telephone and the airplane.

Banquet in Peoria, Ill., July 2

Summer radio will be furthered to success by a banquet of amateurs to be held Saturday night, July 2, at Peoria, Ill. The affair is open to all and anybody that can possibly attend is urged to do so.

About fifteen Chicago fellows expect to motor down. Those wishing to come will please get in communication first with Henry Klaus of Eureka, Ill.

**OUR
ABSOLUTE
GUARANTEE**

**What the Guarantee
means to YOU**

- 1—First and foremost, it means that a select number of experienced radio men are writing for you.
- 2—The value of their writings has been the subject of comment among the better class of amateurs.
- 3—It assures you of a radio magazine that stands in a class of its own—none other like it.

*No matter how many
radio magazines you read
we hereby guarantee that
the articles published
in "PACIFIC RADIO
NEWS" will be found
in no other magazine.*

**REGULAR
MONTHLY
FEATURES**

Static Statistics, Radio Fiction, Common Sense Radiotorials, Semi-technical articles, With the Radio Inspector, Amateur News.

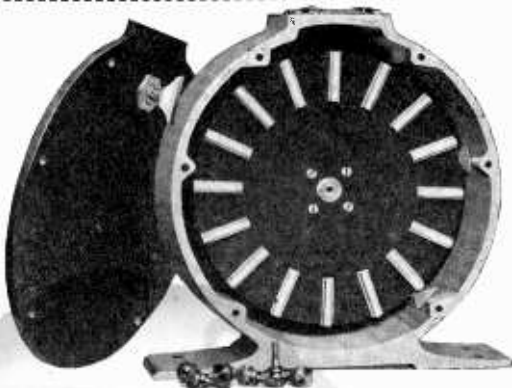
20 CENTS
PER COPY

\$2.00
PER YEAR

**YOUR NEWSDEALER HAS A COPY FOR YOU
"PACIFIC RADIO NEWS"**

PIONEER JOURNAL OF WESTERN RADIO NEWS AND DEVELOPMENT
50 MAIN STREET SAN FRANCISCO

DO YOU EVER ADVERTISE?
Then the article on page 11
in this issue will interest you.



Patent Applied for
Mi-Kerm Rotary Spark Gap

THE MI-KERM ROTARY

A Gap of SPECIAL design, FINE workmanship, and WONDERFUL Efficiency.

Get that desired TONE for best all around the year transmission. YOU can sure do it with a MI-KERM ROTARY.

An IDEAL gap to convert into a SYNCHRONOUS ROTARY, merely direct couple to synchronous motor, making adjustments to synchronism at the coupling on the shafts.

Write for further points on Rotary, read former "ads" in Radio Topics.

Price \$40.00

THE MI-KERM RADIO COMPANY

MANUFACTURERS AND DISTRIBUTORS

430 Harrison Ave.

BURLINGTON, IOWA

Attend--

The First **National A. R. R. L. Radio Convention and Show**



at Chicago

August 30, 31,

September 1, 2 and 3, 1921

*Come to the Greatest Get-together of
Radio Amateurs and Most Spectacular
Radio Show Ever Held*

In Chicago, Illinois, on the above dates, under the administration of the Chicago Executive Radio Council, the American Radio Relay League will hold its First National Convention.

In these five days you will spend the greatest time of your life. Chicago is itself a wonderful summer resort with its splendid facilities for every kind of sport and diversion.

The speakers and their subjects are well chosen, and the trip will be well worth while just to attend these lectures and meetings. Time will not lag. Every hour has been arranged for, and the ladies will also be well taken care of.

Arrange your vacation to fit the convention and we assure you that you will never regret it. By all means attend the big banquet, which will be a spectacle in itself. This will be held the evening of September 3, and reservations should be made at once. Reservations may be canceled at any later date.

During the five days there will be a Radio Show that will equal in splendor any of those given by the automobile trade. It will be immense and indeed a sight worth seeing.

Radio manufacturers and dealers who can appreciate the value of an exhibit which will be reviewed by ten thousand interested people every day of the show are urged to write at once for particulars and booth space.

Banquet reservations at \$5.00 per plate should be made with the reservation manager at once.

N. C. BOS, Res. Manager
118 No. La Salle St.,
CHICAGO, ILL.

Exhibitors Write to
N. E. WUNDERLICH, Show Director
4533 No. Sawyer Ave.,
CHICAGO, ILL.

Summer! The Time for Real Sport With a Radio Set---

ON that week-end auto trip, on your summer hikes or on your boat trips, take a Z-Nith portable set right with you and enjoy the sport of sports.

Don't give up your interest in radio during the summer months; combine it with your other warm weather diversions and you will be sure to find added pleasure.

A loop or even just a single wire is easily used as an aerial and all that you do is to connect onto a Z-Nith Portaceiver, a splendid little instrument, compact, durable and efficient, a ready oscillator and a dandy receiver, tune in either spark or CW waves, and have the time of your life.

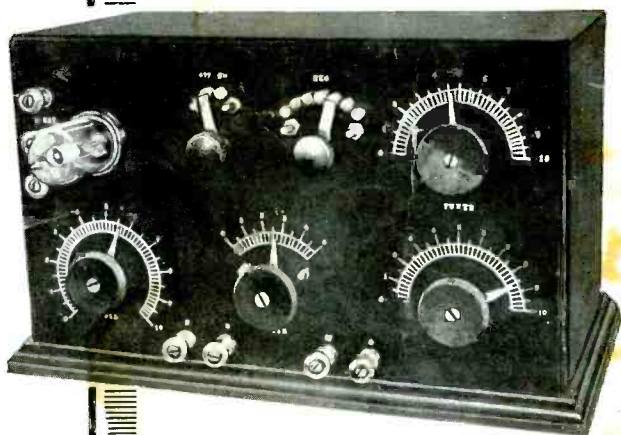
Take one with you to camp or keep up interest in your radio club by taking outings with one of these sets and other equipment. It will prove all you need for winter reception as well.

The entire set is contained in beautiful oak cabinet measuring only 8"x15"x7" over all. This splendid instrument is fully guaranteed, and if you will advise us where you would like to use one we will gladly give you full instructions for use. The set is described in greater detail in our new catalog F-21. Write for one today!

CHICAGO RADIO LABORATORY

Offices and Factory 6433 Ravenswood Ave.
Testing Station 9ZN — 5525 Sheridan Rd.
CHICAGO, ILL.

Z-NITH PRODUCTS THE WORLD OVER



Z-NITH
PORTACEIVER

"Radio as you go"

See our immense exhibit at
The First National A. R.
R. L. Radio Convention
and Show
CHICAGO

August 30 to September 5,
1921