Radio in the Home

Conducted by HENRY M. NEELY

DAVID GRIMES JOINS OUR STAFF

This picture shows radio in the home of H. Rosendal-Dam at Astoria, Long Island. The kiddies in these modern days hear Santa Claus by radio in a way that is much more romantic and convincing than the old-fashioned way.

OFFICIAL ORGAN OF THE INTERSCHOLASTIC RADIO ASSOCIATION OF AMERICA

Christmas Number
December, 1923

In This Issue:
THE NEW GRIMES INVERSE-DUPLEX

THE MULTIFLEX—A Dandy One-Tube Reflex

THE RADIO KINDERGARTEN

HOW TO TAP A VARI ocoupler

STATION WLW

Twenty Cents
The unusual appeal of the voices of the boy choir is carefully carried to you by MUSIC MASTER.

In this wonderful Radio Reproducer, you hear the same clear, beautiful notes that you would if you were hearing the choir itself.

The wood horn of MUSIC MASTER accounts for much of its success. Wood is the only material that can bring out the rich resonance of voices or musical instruments.

Hear MUSIC MASTER, radio's marvelous musical instrument. Ask your radio dealer to attach it to a good set and let it talk for itself!

Dealers Everywhere
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IN THE JANUARY ISSUE

• The new Grimes two-control circuit.
• The Goodreau One-Tube Circuit With Split Variometer.
• The Radio Kindergarten
• The Women's Clubs Hold Meetings by Radio
David Grimes Joins the Staff of Radio in the Home

Of the most important announcements to radio fans is that David Grimes now joins the editorial staff of Radio in the Home. It seems almost unnecessary to give any personal introduction to Mr. Grimes, because his name is about as well known today as any name in radio, due to his invention of the inverse-duplex system. This is frequently spoken of as the inverse-duplex "circuit," but Mr. Grimes wishes it distinctly understood that it is more a system than a circuit and that the principal is applicable to virtually all circuits used in radio today.

By means of this system Mr. Grimes makes one tube do the work of two. He can inverse duplex a straight circuit or a super-heterodyne or a heterodyne or any of the other circuits that are most popular.

Mr. Grimes, whose home is on Staten Island, N. Y., is president of the Grimes Radio Engineering Company, which owns the patent on the inverse-duplex system.

When the patents were first obtained, it was agreed that only twelve of them should be issued. The first one was issued to the Sleeper Radio Corporation, 88 Park place, New York City. The second was issued to the Mercury Radio Products Corporation, Little Falls, New Jersey.

When the Grimes Company approached the Bristol Company of Waterbury, Connecticut, this company at once bought all of the ten remaining licenses. This means that these three companies—the Sleeper Corporation, the Mercury Corporation and the Bristol Company—are the only ones that will be licensed to manufacture apparatus involving this inverse-duplex system. Mr. Grimes is chief engineer for the Sleeper Corporation and is consulting radio engineer for the Bristol Company.

In joining the editorial staff of Radio in the Home, Mr. Grimes does so for the primary purpose of keeping our readers informed of various developments in his system and answering the questions which they may wish to ask about the use of it.

On the next page of this issue we are showing the new version of the first Grimes circuit as published in the June issue of this magazine.

Next month we will show a new Grimes system, using two controls instead of the one shown here. Two of these controls make the tuning sharper, but naturally complicate the operation a great deal, but many fans will prefer it.

We have built the two control system ourselves at Station 3XP, using certain products which are easily purchasable on the market, and Mr. Grimes has also built the set on Staten Island, using other products, and we will show the results obtained by both methods.

This issue gives the first authentic and complete description of the one control system and the January issue will be the first complete and authentic description of the two control system.

Both are extremely fascinating and efficient systems for radio reception and it seems very likely that each one will find its own individual champions.
In beginning this article I am particularly glad to make it a double announcement.

First it is the announcement of the improvement to the Grimes inverse-duplex circuit, and secondly—probably even more important—is the announcement that David Grimes, the inventor of this remarkably successful circuit in radio, now becomes a member of the editorial staff of Radio in the Home and will not only be with you regularly from month to month with articles about the application of his system to other circuits, but will also personally answer all of the questions you want to ask about his system.

Last June I published in Radio in the Home the first Grimes inverse-duplex circuit. This made a tremendous hit with every one who was fortunate enough to be able to hook it up and get success with it. It was, however, about fifty-fifty between the successes and failures and the failures are more or less easy to account for now.

When Mr. Grimes first invented his circuit, which was given in the June issue, it was developed with the old UV201 tubes as amplifiers and functioned beautifully with those tubes.

Unfortunately, about the time of the publication of the circuit, the Radio Corporation withdrew the 201 tubes from the market and substituted the new UV201A tubes.

Now these "A" tubes are undoubtedly better amplifiers than the old 201a, but unfortunately they have such characteristics that the original Grimes circuit does not function very well with them. It has therefore been necessary for Mr. Grimes to carry out a long series of experiments to adapt his circuit to the new A tubes, but with the UV200 as detector, and this circuit as given in this article is intended only for the UV200 and UV201 tubes as amplifiers. It will work with virtually all other tubes, but you will not get anything like the results with it that you will get with the tubes for which it was designed.

This circuit as given here consists of four tubes and these tubes are used in such a way that they give you two stages of radio frequency amplification, detector, two stages of audio frequency amplification reflected through the first two tubes, and another stage of separate audio frequency amplification.

The circuit is what is called in commercial form the "Mono-trol"—that is to say, it operates virtually only one control and that is the variable condenser. Incidentally, let me say that the detector rheostat and perhaps the second radio frequency rheostat will do a great deal to clear up signals. We also found that the variable condenser was so extremely sharp in its tuning that it was wise to "shunt" a Chelten midget condenser on an ordinary 3-plate condenser as a vernier and this gives the finest kind of tuning.

When I say "shunt" I mean that this vernier condenser is hooked up so that you connect the first binding post of your main condenser up to the first binding post of the vernier and you also connect the second binding post of your main condenser with the second binding post of the vernier.

The set operates very finely on a loop and it will undoubtedly prove to be as popular as the original did.

Let me advise all who are going to build this circuit to use nothing but the very finest kind of standard apparatus. In the set which Mr. Grimes brought over to us at station XFP at Delanco, New Jersey, he had a very good make of radio frequency transformer, but our test showed that it operated best on a certain band of wave lengths and that there were other wave lengths on which it did not operate quite so well. In building this set ourselves we used the new Dubilier Duratron radio frequency transformers and all three of us—Mr. Grimes, Ted Volten and myself—agreed that the amplification on these transformers was more even over the entire band of broadcasting wave lengths than it is with almost any other radio frequency transformer that we have used. Consequently we specify Dubilier Duratron transformers in this circuit.

As for the audio frequency transformers, we are
At the top of this page is a view of the Grimes circuit showing how all of the various instruments are placed showing the Geraco for the first two steps. This is a transformer with a ratio of about three to one and we show it particularly because the windings of the transformer are wound around a vertical axis and the magnetic fields are not so likely to interfere with each other.

We first tried one of the best of standard makes of transformer with the windings wound horizontally and with metal "butt-ends" and we found considerable interference in the tendency of the magnetic field to "stray," due to these butt-ends.

The third audio transformer which we show is the All-American, ratio three to one.

Mr. Grimes is very definite in his statement that these first two audio frequency transformers should not have a ratio higher than three and one-half to one and the third transformer should not be higher than three to one, and better quality would result if they are a lower ratio than that. We used the All-American transformer for this third step and found that it worked very satisfactorily.

The lay-out of this set as developed by Ted Vollten at Delanco, and shown in the accompanying photographs, proved to be about as economical in space and about as efficient in uniformly short leads as anything that we could devise. Mr. Grimes was very much attracted by it and has pronounced it the best lay-out that he has seen for this circuit.

If you will look at the photographs you will see that the audio frequency transformers and the rheostats are mounted on the upper side of what might be called the "baseboard," although it really is not a baseboard. This board is attached at right angles to the panel and just a little below the middle.

We drove holes for the tube sockets and shoved them through from the bottom and also mounted the radio frequency transformers on the bottom of the board, as well as putting the jacks underneath.

Before going into the matter of wiring up this circuit and operating it, let me say that Mr. Grimes will be very glad indeed to receive any questions you care to ask after you honestly try to make the set work and hook it up exactly as shown here.

Please understand that this job of answering questions from readers of this magazine is getting to be a tremendous one, and it is only fair to request that you do not send Mr. Grimes any questions until you have done your utmost to make the set work from the instructions given here.

If you still run into difficulties, write to Mr. Grimes, in care of this magazine, and he will carry, from month to month, a department devoted to answering these questions.

We are showing here the panel and are giving the size and the exact location of the holes for mounting the different pieces of apparatus, the diameter of the holes and where to drill them. We cannot do any more than this. This is practically

(Continued on Page 8)
The upper photograph shows the new Grimes circuit looking straight from the rear. The baseboard is shown edge-on with the mounting of the audio frequency transformers and the rheostats on the upper side, including binding posts for the battery connections, and underneath are the radio frequency transformers and jacks.

(Continued From Page 6)

doing all of your work for you. The only thing you have to do is to take your panel and lay it off with a ruler or scale, the same as we have done, and drill your holes.

We are showing the exact positions of the tube sockets and the exact positions for mounting the audio frequency transformers and binding posts. The other side of the baseboard shows the mounting for the radio frequency transformers that are placed in between the tube sockets and also some of the fixed condensers.

In the June issue of Radio in the Home we gave this Grimes circuit and we told in that issue the fundamental principals of “reflexing” radio circuits—that is, using the same tube to do two purposes. The first is to bring in radio signals at radio frequency and then to detect or rectify these radio signals and then put them through the same tubes over again in the form of audio or audible frequencies which are audible to the ears.

In this article on the Grimes circuit we are not going to waste any time in telling you about the principal of duplexing tubes, but we are going to spend our time telling you how to build this circuit and make it work.

The reflexing of tubes in a radio circuit really consists of three parts. The first is the “radio frequency” side of the circuit, the next the detector part of the circuit and the last is the “audio frequency” side of the circuit. We can class this

To the left we show a view of the Grimes circuit looking up from underneath the baseboard and showing the way the tube sockets are mounted with the radio frequency transformers on the underneath side of the baseboard and also showing the portion that is cut out to make room for the variable condenser.

Grimes circuit in these three parts, radio frequency, the detector and the audio frequency.

If any of these three parts of the circuit are failing to work you naturally will not have any results from this circuit. In the first place, when you are beginning to make up this circuit, wire up just the radio frequency and the detector parts. If those fail to work you cannot expect to get any results by adding audio frequency. The only thing that audio frequency does to a circuit is to amplify the signals after they have been detected, and that is to make the signal louder to the ear. Radio frequency amplification does not make the signal any louder to your ear; it only amplifies the weak incoming radio signals and impresses them on the detector tube in a stronger form than if the radio frequency amplification were not used. That is to say that if you had a radio signal coming in that was too weak to actuate your detector tube, the radio frequency amplification would amplify this signal to such an intensity as to make the detector tube function.

So when you wire this circuit, first wire your radio frequency tubes and then your detector tube and then try your circuit and see if it is working properly. If you do not receive any signals on the circuit, it will be useless for you to add your audio frequency until you have located your trouble with the radio frequency side of the circuit.

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The tyrant of publomania clenched his pipe between fierce molars and said to me: "Write a story about yourself. Call it: 'The Studio Director—That's Me.'" Said I in a tone of startled protest: "Man alive, I can't write about myself!"

But the publicity fiend scratched off that wretched title on a pad, tore the leaf off and handed it to me with: "Whatever gave you the idea that you could write at all? Gimme that story!"

Well, there ain't no story to it; it's just work, hard, pleasing, gratifying work—which reminds me of Stanley Brauninger. Stanley is the swimming instructor of the Cincinnati Central Y. M. C. A. The other evening after a bit of handball, a swim and a shower at the Y., several of us, including Stan, were lounging on the cots in the resting room. Something was said about the tireless and endless activity of Stanley. "Well, sir," he said, "it's a funny thing: if you'd put me to work with a pick and shovel I couldn't last more than two hours, but then when it comes to swimmin', and playin' ball, I never do get tired!"

And that's the way with anything in the world that we like, I fancy. Doing the things we don't enjoy is just work. Doing the things we do enjoy is just play. Sometimes—often, in fact, people say to me: "WHEN do you sleep?" That question always surprises me—sometimes it almost offends me. For when one is happy in his work, sleep is an intruder to be forgiven only because it leaves with one a fresher thirst for life.

Without any doubt, the thing in radio entertainment which stimulated most the studio director—and still stimulates him—was the newness of the work, and the creative initiative required. There were long, serious plans to be worked out over a series of programs, and there were novel stunts to be pulled off that would be of value for the one time only.

In this former class of entertainments was a series of operas which we did at WLW in the fall of 1922, when the station was still in class A and we could use records. I worked out, with Red Seal Victor records a series of twelve operas, telling the story of the opera in one or two minute paragraphs between numbers. These were given on Wednesday and Saturday afternoons.

Of the spectacular stunts, one of the best that we have as yet pulled off was a prize contest conducted by a drug company, in which we gave away five pound boxes of candy as first prizes and a tooth brush for all second prizes on the telegrams received. We had two special wires into the studio and they brought us, within less than two hours, some 800 telegrams from all over the continent.

Another spectacular stunt was pulled off in the late Cincinnati Fall Festival. (By the way, I want to say right here, that it has been through WLW's multiplicity of friendships that we have been able to put over so many original features
our friends are genuinely helpful both with suggestions and assistance. Oh, yes—the Fall Festival. The big parade on the evening preceding the formal opening of the festival contained a radio float that was a breath taker.

It was a motor fire engine of the newest and most elaborate type, surmounted by a huge radio set, twelve feet long and six feet high. Inside of this was a regular set with power amplifier operated by two men. At our studio we had a brass band and a dance orchestra playing alternately for two straight hours, picking up the music by radio instead of the regular band.

Needless to say, this float made something of a sensation. At the same time, our concert having been picked up all over the country, Cincinnati, the Fall Festival and ourselves obtained some rather extraordinary advertising from the event.

A serious feature of radio programs which gives promise of ever increasing popularity and which originated at WLW is the Sunday school service. This service, from 9.30 to 10.15 every Sunday morning, is conducted by the world's largest company of religious publications, the Methodist Book Concern. Members of this institution have been working so earnestly and attentively on these special programs, that they have become universally enjoyed.

As every one knows, aside from these things, we have the Church of the Covenant services, the Symphony Orchestra concerts, the summer operas at the Zoo, and the regular evening programs four times a week, beside the daily business reports. The evening programs are worked up three weeks in advance, which gives us time to get them to distant papers and publications.

The one feature of radio programs, however, that has given me most work and most pleasure is the radio drama.

Early in the winter of 1922 I saw that the radio play would have to come to some sort of adapted form, especially prepared for the radio. I made all sorts of experiments, among which I put on a series of six plays of the modern classics from as many countries, surrounding these plays with music from their native land.

The very first one almost met its Water-
It was a tiny one-act thing which I had translated from the Spanish of Benavente. I had arranged to have it surrounded with Granados music, violin and piano, as well as some Sarasate numbers.

In it there were two principal roles and one minor role. Of these two principals, the girl was a dramatic critic and the man a clever young actor, but they could see nothing in my Benavente. The play was a fearfully subtle thing, to be understood only by those who had much suffered--and my two friends might have been right in supposing that I was wrong in giving it to the radio public.

At the last rehearsal, just before we were ready to go on the air, they almost revolted at the prospect of participating in such a dumb thing. It was one of those half hours in which the studio director is not happy. But on it went and I gave one big sigh when it was over. Fortunately, the public, for the most part, got the play better than my intellectual friends.

Another unforgettable experience in which I had to combat the opinion of every one who heard anything about my preparation was the following:

When the musical copyright controversy was at its height, Mr. Crosley decided to go into the publishing of popular music. At his suggestion, I selected a number composed by two young Cincinnatians, Aichele and Schmidt, entitled "Somebody Else," and straightway it was sent to the printers. The next problem was to plug the song. By this time my idea of radio plays had fully developed, or had greatly developed, so that I knew what I could do with such an instrument. I decided to write a farce around that song, "Somebody Else."

It so happened that the Pathe people were sending to us every week their collection of jokes, and I decided to work some of them into that farce around "Somebody Else." The plot was to be of a jealous wife, her husband, also jealous, the family doctor, and the doctor they get by mistake. That made it easy for everybody to suspect somebody else.

Now, on the same program, we had the 

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LESSON III

By HENRY M. NEELY

WHENEVER a radio kindergarten class meets, one of the little pupils is almost certain to ask the teacher, "If I get longer wave lengths on my receiving set can I hear a greater distance with it?" Or, "Just what is meant by 'wave length' in radio?"

There seems to me to be more confusion about the question of wave length than almost any other question that confronts the kindergarten class in this new science. Yet it seems to me that nothing is more easy to understand, provided it is explained in simple enough language. And so I am going to try to do that at this, our third, class meeting.

Before we start to talk about radio at all, let us talk about something that every child has known about almost since he has been old enough to talk. That is your pulse.

Every pupil has had the doctor come at some time or other and put his warm, strong fingers on the little wrist and feel the pulse beat in the blood vein of the wrist while he looked at the second hand on his watch and counted the number of pulse beats.

You all know that the heart is a pump. Every so often it contracts and sends a surge of blood out through the system of veins in your body and each one of these surges causes a wave or pulse through the veins to pass under the inquiring fingers of the doctor. It is these surges or pulsations that the doctor counts.

If you can get a mental picture of such a blood vein you can easily see that these surges cause waves to pass along the blood vein much as waves pass along the surface of the ocean. There is a wave for every beat of the heart and between the waves there is a low valley where there is no pulsation of blood at all.

The doctor counts these waves because the number which pass under his finger every minute shows whether the heart is functioning normally or not. And yet he considers the result of his count not by any set rule, but by a great many combinations of circumstances.

For instance, just before a baby is born, its pulse beats may be as fast as from one hundred to one hundred and forty per minute. During the first year of our life our pulse averages from one hundred and fifteen to one hundred and thirty a minute. During the second year the pulse will beat from one hundred to one hundred and fifteen times a minute.

From then on the pulse beats slow down so that in the seventh year the normal number is from eighty-five to ninety per minute; in the fourteenth year the normal number is from eighty to eighty-five per minute. The normal pulse beat for the adult is from seventy to eighty and in old age it has slowed down to from sixty to seventy.

The pulse beat is faster after a meal, and ordinarily is faster in the morning and becomes slower as the day goes on. It is also more rapid when we are standing than when we are sitting and it is slowest when we are asleep—in fact, pulses as low as forty per minute are not at all uncommon when a healthy person is asleep.

All of these figures might be
called the "frequency" of the pulse beats. If we knew exactly how many feet or how many inches the blood travels per minute we could easily figure how far apart in feet or inches these pulse beats or waves were, because all we would have to do would be to divide the number of feet per minute by the number of pulses per minute and the result would be the distance from the top of one pulse wave to the top of the next one.

Now the pulse is, to a certain extent, the symbol of almost every form of energy that we know. There are pulsations or vibrations or wave movements in everything—even in the things we think of as the most solid in the world.

Let us take, for instance, the pulsations that occur in the air. If you had a machine so constructed that it could send out little puffs of air as often as you wanted it to, it would be interesting to see what the results of an experiment would be.

If we let this machine send out puffs slower than about fifteen times a second, directed toward our ears, the result would be nothing but a sensation of puffs. But after the number of puffs have passed fifteen or twenty, or let us say twenty-five, our ears would begin to be conscious of a very low humming sound. As the machine ran faster and faster this sound would gradually cease to be a low humming sound and would grow higher and higher in pitch and if the machine ran fast enough the pitch would become a shriek.

You are all familiar with what is known as the "staff" in music—that is, the five lines on which the little dots with their stems are used to represent tunes so that you can play them on your piano or violin, or sing them.

Let us take the five lines that are known as the "treble clef," which is the one which is used by sopranos, or by the violin, or by the right hand in playing the piano.

Now if our wind machine could be sped up so fast that it would send out nearly two hundred separate puffs every second, we would be conscious of the note which would be represented as a dot on the second line below this staff.

In order to produce a note high enough to get on the first line on the staff—or the note known as E—our machine would have to produce something over three hundred puffs every second. In other words, a frequency of a little over three hundred a second results in the note E, and so the pitch rises as the number of vibrations in the air per second increases. The note on the middle line of this staff, or B, is produced when we get the number of air puffs or waves up almost to five hundred a second, and when we get them up very close to seven hundred per second we have the note which is represented by the dot on the uppermost line of this treble clef—or the note known as F.

These vibrations, it must be remembered, are made in the air just as our pulse beats are made in the blood.

Now it is a very easy matter to figure out the wave lengths of any one of these notes that we have been speaking about.

Scientific experiments have shown us that sound travels through ordinary air at the rate of three hundred and thirty-three meters every second. A meter, you must understand, is a measure of length and is equal to just a little over three feet three and one-third inches in our measurement, so every time we talk of a meter we mean a little over a yard in length.

Now, remembering that there is a very important distinction between radio waves and these air waves which make sound, let us make a comparison. Let us take the ordinary soprano voice.

Let us say that a woman who has not a particularly big range, but the ordinary one, can sing the notes from the first line below the treble clef, the key of C, up to the second line above the treble clef, or the key of C up there. This would mean that her voice can produce frequencies from a little over two hundred pulses or waves a second up to a trifle over one thousand pulses or waves per second.

Knowing that the speed of sound in the air is three hundred and thirty-three meters per second it would be very easy to calculate the wave length of the two notes in this extreme range, and this woman would by nature be confined to the band of wave lengths between these two notes.

In just the same way, the Government, instead of nature, confines the broadcasting stations to a certain band of wave lengths between 220 meters and 524.

Let us now take another picture which will perhaps even more clearly explain this matter of wave length. This is a picture that I used a good many months ago in my former magazine, known as E-Z Radio, and I am going to reprint most of it here because I think it explains about as clearly as I am able to do just what I mean.

"Every one is familiar with the waves of the sea and so we can easily use them to explain the fundamental principles of ether waves by comparing the ether to the ocean.

Let us suppose that we start out on a fishing trip on a hot day. We go out to the banks about ten miles off shore and we find the surface of the ocean as smooth as a pond. It might be represented by Figure 1 in the illustration on Page 12.

After we have fished for a while we will be conscious of the fact that the boat is slowly and easily rising and falling and as we look around we see that there is beginning to be what we call a "swell" on the ocean. As this swell begins, the surface might be represented by Figure 2 in the illustration.

Looking at this second figure we see that it divides into two parts. The dotted line represents the perfectly flat ocean as it was when we started fishing. The curved line shows that one part of the swell rises above the straight line and the other part sinks beneath it. The highest point of the curve from A to B is what we call the crest and the lowest point from B to C is what we call the trough. The distance marked "X" between the straight line, or the normal surface of the ocean, and the highest point is the true height of the wave and in radio we speak of this height as "amplitude." There would be the same amplitude at the trough of the wave between B and C and if the waves (Continued on Page 28)
And Now They're Directing Movies by Radio

Only by radio could this scene be directed without a great loss of time and a vast confusion. The picture shows the camera stand and director's chair from which Emmett Flynn directed the great battle scene for "In the Palace of the King" and the huge horn through which, by means of radio, his orders carried all over the field.

By Constance Palmer Littlefield

THREE days and twelve hours ago I read a squib about one of my colleagues which informed me that the only way editors could get stories out of him was to deprive him of his—well, his—er—pants.

Now, for three days and ten hours I have been torn between conscience and conjecture. The intriguing question: "Just what method will Henry Neely use to get this story from me?" began to torment me two hours after I read the squib.

And then along came the sweetest, most patient, most Neely-like telegram asking me please—"please," mind you—to hustle it along and to wire when sent.

Conscience won.

Those who are not familiar with motion pictures in the making cannot possibly conceive the magnificent scale on which the business is now run out here in Hollywood. Sets are getting larger and more expensive; "props" are procured at enormous expense both from the great cities and the forgotten nooks of the world; costumes which took months of research work to evolve are worn for only a day or an hour, and then are discarded.

Rupert Hughes now has a microphone on his directors' table whenever he has a big scene to handle, and it has entirely done away with the time-honored directors' megaphone.

The call-boy has left his job in the Hollywood moving-picture studios. No matter where the assistant director is, when he wants an actress or an actor to report on the set, he calls by radio, and these loud speakers in the various parts of the dressing rooms boom out the name and the orders as the call-boy used to do.

Along with the immensity of conception must come a large method of management. No matter how magnificent, how wide may be the director's idea of the story, unfortunately he himself remains human, with human limitations.

For instance, in "In the Palace of the King," which Emmett Flynn directed from the novel by F. Marion Crawford, there was an exterior of the palace where, in some shots, the director was almost a mile from the actors at the furthest point of the set.

No directorial megaphone could possibly magnify Mr. Flynn's voice so that it would reach those distant actors and extras.
But the movies make use of everything to further their purpose. Just as they have utilized the material beauty of the world, the genius of men and women and the wonders of nature, so have they made use of science. In this case the radio was the means to the desired end.

The radio outfit itself was small, but an enormous megaphone, twelve feet long, was attached to it. A standard Western Electric loud-speaker was attached to an ordinary desk telephone used as the microphone, which was in turn attached to the big megaphone.

The approximate cost of the entire device was $896, and by it more than 1500 people were directed by Flynn, who talked in ordinary conversational tones, his voice magnified approximately 1000 times.

The set itself was one of the largest ever built for a motion picture. It was 285 feet high and was modeled after the palace of Philip II of Spain, who reigned—according to the history books—in the sixteenth century. The set of which I am speaking was built about a central courtyard almost a quarter of a mile in length.

The use of the radio in directing mob scenes solves one of picturedom's most vexing problems. Hertofore the method has been for the director to have from one to twenty assistants. These assistants have been stationed at intervals in the mob, and the director's orders have either been relayed from one to the other, or each of the twenty assistants has gone forth with his particular version of the director's orders.

It was like the game we played when children, when we all sat in a circle and a whispered sentence was passed from ear to ear. Obviously, the result in motion pictures before the advent of radio was sometimes almost as funny and distorted as it was in those whispered-circle days of ours!

But radio does away with the difficulties of misunderstanding and with the loss of time. It is as if the director were walking about from group to group, personally telling each one the action of the scene.

Not satisfied with achieving marvelous results in one instance, the studios have found another use for radio.

For instance, the Goldwyn lot is the biggest in the industry. It is so big that

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The radio outfit itself was small, but an enormous megaphone, twelve feet long, was attached to it. A standard Western Electric loud-speaker was attached to an ordinary desk telephone used as the microphone, which was in turn attached to the big megaphone.

The approximate cost of the entire device was $896, and by it more than 1500 people were directed by Flynn, who talked in ordinary conversational tones, his voice magnified approximately 1000 times.

The set itself was one of the largest ever built for a motion picture. It was 285 feet high and was modeled after the palace of Philip II of Spain, who reigned—according to the history books—in the sixteenth century. The set of which I am speaking was built about a central courtyard almost a quarter of a mile in length.

The use of the radio in directing mob scenes solves one of picturedom's most vexing problems. Hereofore the method has been for the director to have from one to twenty assistants. These assistants have been stationed at intervals in the mob, and the director's orders have either been relayed from one to the other, or each of the twenty assistants has gone forth with his particular version of the director's orders.

It was like the game we played when children, when we all sat in a circle and a whispered sentence was passed from ear to ear. Obviously, the result in motion pictures before the advent of radio was sometimes almost as funny and distorted as it was in those whispered-circle days of ours!

But radio does away with the difficulties of misunderstanding and with the loss of time. It is as if the director were walking about from group to group, personally telling each one the action of the scene.

Not satisfied with achieving marvelous results in one instance, the studios have found another use for radio.

For instance, the Goldwyn lot is the biggest in the industry. It is so big that

Julianne Johnston — Douglas Fairbanks' "new leading woman for "The Thief of Bagdad"—quite seriously explained to me a plan whereby she would lease to the company a fleet of Palm Beach rolling chairs with their attendant "shades." Thus, for a mere pittance, a mere song, a mere bagatelle, one could get from one's dressing-room to the set, from the set to the wardrobe, to the cafeteria, to the projection room, without dropping down on the lovely green grass midway to sleep off one's fatigue!

Julianne's plan is a splendid one for the actors, but what about the poor assistant directors, who have to walk three blocks
All over the United States during the entire past month and more, scenes such as those shown in these photographs have been taking place.

They have been taking place in much the same way for many years, but this past football season has been entirely different in the fact that the modern miracle of radio has brought a complete description play-by-play of virtually every important football game into the homes of everybody interested.

These pictures are printed here to show the radio fans how much expense and trouble it really is to give them this service of play-by-play broadcasting.

Many people think that all that is necessary to open a telephone at the field and talk over it. This is not the case. If it were, more things of this kind would be broadcast by various stations.

As a matter of fact, these photographs show only a small part of the expensive apparatus used. They show the announcer's booth from which the description is given, and they show in it only the microphone.

But they do not show the elaborate amplifying apparatus installed somewhere in the stand underneath the spectators.

The photographs here were made at Franklin Field, in Philadelphia, Pa., and show the broadcasting of some of the games. The announcer's booth was built on the very top of the press box on the north stand and (continued on Page 44)
THE other day I received a visit from Mr. Norman Kearney, of Philadelphia, who told me that a friend of his on the Pacific Coast had developed a circuit which he called the Multiflex—a one-tube reflex circuit—and claimed wonderful results for it. Naturally we had to hookup this circuit and try it out at Station 3XP. It is just as good as Mr. Kearney said it was, although we have made a change in the circuit from the one which Mr. Kearney gave us.

The circuit which Mr. Kearney had used an antenna and a ground connection. His tuning for his antenna and ground were a variometer and fixed condenser. Not having a variometer available we tried two spiderweb coils and, as luck would have it, we happened to have the wrong size spiderweb coil in the primary circuit to get local reception. As we pulled out the spiderweb coil to change to another coil, we found that the signals still came in, with almost the same volume as when we had the antenna coil in place.

We looked at the circuit and found that the spiderweb coil was acting as a "pick up" coil, or a miniature loop, so right away we switched over from the spiderweb coil and put a loop in place of this coil. We were agreeably surprised to find that the signals were very sharp and very loud on the loop hookup and we had no difficulty in picking up either the 509-meter stations or as low as the 237-meter stations.

This led us to experiment a little bit further and we have developed Mr. Kearney's circuit to the one which we are showing here. This circuit has sufficient volume to bring in stations such as New York and Pittsburgh with wonderful volume on a small eighteen-inch loop.

You remember in one of the other issues of Radio in the Home we showed a circuit that was given us by Mr. C. S. Flather, of Washington, D. C. Mr. Flather's hookup was very similar to the hookup which Mr. Kearney sent us, only Mr. Flather did not use one stage of radio frequency amplification, so we just used the same panel which we used for the Flather's circuit and put on one audio frequency transformer and used another variometer. We changed to the new variometer that is made by the Langbein & Kaufmann Company, of New Haven, Conn.

There have been published in almost every radio magazine in the country certain one-tube reflex circuits. This one does away with the expense of buying a radio frequency transformer. We are using the variometer in this circuit as the tuned plate and at the same time it brings in regeneration.

This circuit employs a crystal for a detector, and it is does away with the extra expense of having a detector tube to operate. We found that the crystal would give us very good clear reception, making...
the circuit very stable in its operation. The crystal detectors which we have tested are very good and we had very little difficulty in getting sensitive spots on them.

First we tried the Erla fixed crystal and this we found to be very good, and we placed this on the rear of the variometer and ran the other wire direct to one post on the audio frequency transformer. This has its objections, due to the fact that if your crystal point ever gets burned out it will mean that you will have to adjust your crystal again and, as it is mounted behind the panel, it is a rather difficult place to get into, if you have your set in a box. To get away from the difficulty of having the crystal in the rear of the front of the panel, this time using the Silvertone crystal and holder. We have tried galena crystals and we found that although they are far superior in volume to the pyrites crystals they have not the standing up qualities the pyrites crystal has. When I say the "standing up" qualities, I mean that, in a reflex circuit, you get a certain B battery potential across your crystal and unless you have quite a pressure on your crystal you are liable to burn out the point.

This is the trouble with the galena crystal in a reflex circuit. The galena works best with a very light contact and the lighter the contact the better the reception you get on galena. The pyrites crystal is entirely different. You can use a very heavy contact on a piece of pyrites and get very good reception from it, although you may not get as loud signals as you do on the galena, but the pyrites is far more stable in use with this reflex circuit or any reflex circuit where it must stand B battery voltage.

When we first made up this circuit we used the same panel as was shown with the Plather circuit, with just the 23-plate variable condenser, but we found this so sharp that it was almost impossible to bring in local stations on just the 23-plate variable condenser, so we had to place above this the small Chelten midget condenser to act as a vernier. Still this circuit on distant stations tunes so sharp that it would be advisable to have a vernier condenser on top of the vernier. That is to say, we should really have a condenser of finer value than even the fine adjustment on the midget.

You really have no idea how sharp this circuit tunes. You have two elements to tune with. The first is the condenser that tunes the loop to its wave length, and the next is the variometer which tunes the plate for the radio frequency signals. That means that you can get very sharp tuning due to the fact that you have two controls.

In this circuit it is only advisable for you to use the 201A tubes, as they are wonderful amplifiers and a great deal better than the original UV201. This UV201A tube gives you a signal strength which you cannot get with a dry cell tube. Dry cell tubes are very good when they are used as detectors, but when you use them as audio frequency amplifiers you cannot expect to get such volume from the one and one-half volt tubes as you can with the six volt tubes. This circuit uses in its audio frequency side the well-known Amertran audio frequency transformer having a ratio of five to one.

You will notice that in this circuit we have the telephones in the plate circuit before it goes to the variometer and we use these phones here so as to be sure that we do not have any audio frequency falling back through and over into the radio frequency side of the circuit.

These telephones are shunted by a .0025 Dubilier micadon condenser. The secondary of the audio frequency transformer is shunted by a .001 Dubilier micadon condenser. The primary of that transformer is also shunted with a .001 micadon condenser. These condensers are shunted across the windings of the secondary and primary and phones to be a "by-pass" for what radio frequency currents go through these windings. You know that radio fre-
A GENUINE vision seems at last to be creeping slowly into the merchandising of radio. It has been a long time coming, but evidently it is here at last and I am very glad today, in pointing it out, to do something that a magazine editor is not supposed to do.

Vision Enters in Advertising of Radio

That is, I am taking some advertising from another magazine and reprinting it here. I am doing this not because of the merchandising that these pages are placing before the public, but because of the very fine spirit of generosity and fair play which shows in every line.

The air is full of things you shouldn't miss

If you will read the news, you will see that the thing which is least advertised in them is the stuff which is made and marketed by the advertiser. The National Carbon Company has come to the very broad conclusion that it is now about time for the big people in the radio industry to advertise radio itself—to call the public's attention to the wonderful entertainment and the great educational value of this new hobby and to trust to luck to get their own share of whatever business this general advertising promotes.

This has been done in several other industries. It was done notably by the coffee manufacturers when cereal makers began to carry on campaigns of advertising pointing out the alleged harm done by coffee. At that time the coffee manufacturers themselves got together and began to carry on an extensive counter-campaign denying all of these allegations and pointing out the fact that coffee in moderation does not harm any one.

Many other industries have seen just such large and comprehensive co-operative plans of advertising, but I do not know of any other where such a broad-minded piece of work was undertaken by one manufacturer alone without waiting for others to come into the movement and bear their share of the expense.

It happened to be my privilege to read these advertisements some time before they were published. I saw them in the headquarters of the agency which prepared them and one of the most interesting things which I have come across in the development of an advertising campaign was to see the way "Eveready Batteries" was gradually made smaller and smaller until, in the finished ad, you have to look carefully for these words before you find out what product is made by the advertiser.

At first the words "Eveready Batteries" were at the bottom of the ad in the usual size in which they are generally advertised. Then, as the idea of general radio advertising developed and as the full significance of such a movement began to impress itself upon those in charge, the size of the type in which the product was mentioned was cut smaller and smaller until at the end it was only as big as the general body of the type. I am printing these advertisements here with two hopes in view.

Why not let others enjoy it too?

If not, if you have been altogether or partly bound, morally, or because of your religious beliefs, to the radio industry, then you are not going to want to do the advertising of the "Eveready Batteries". There is no reason why you should want to do the advertising of the "Eveready Batteries". There is no reason why you should want to do the advertising of the "Eveready Batteries". If you have been altogether or partly bound, morally, or because of your religious beliefs, to the radio industry, then you are not going to want to do the advertising of the "Eveready Batteries".

It's the only way to have the ad in the usual size in which they are generally advertised. Then, as the idea of general radio advertising developed and as the full significance of such a movement began to impress itself upon those in charge, the size of the type in which the product was mentioned was cut smaller and smaller until at the end it was only as big as the general body of the type. I am printing these advertisements here with two hopes in view.

First and foremost, I am desirous of calling the attention of other great corporations to them.

There are interested in radio today a score or more of companies almost as large as the National Carbon Company and certainly with a more direct interest in radio. The National Carbon Company touches radio only through the medium of its dry cells.
This is an extremely small part of its business. Other companies, which are also very wealthy concerns, market products which turn over an amount of money every year probably far in excess of the dry cells which are used in radio, and yet National Carbon Company leads the way, points the road by which radio can be sold to the public in the most effective and attractive form.

There are many really beautiful thoughts in these advertisements which are worthy of careful study by those of you who now believe in radio but who have some friends who are not yet as enthusiastic about it as you are.

I like particularly the slogan of the first of these ads—"The Air is Full of Things You Shouldn't Miss."

And then take that sentence a little farther down—"Your theatre is the air—no admission fees—no dressing, and taking the street car down town—no worry about an overcrowded house—no buying tickets in advance."

"Your set may bring you one of those miraculous surprises of all time."

And then take the spirit of the second ad—the thought that you should not enjoy all of this beauty by yourself, but that you which will thrill you with the power and extraordinary possi-

American man and the American woman the envied of all the people in the world. It is this kind of appeal which will sell radio to the best people and which will sell only the best radio to these people.

And in that second ad appears this paragraph, "Any radio set made by a reliable manufacturer is what you need. A million homes already have radio sets of one sort or another. So be sure that you get a good loud-speaker with your set. The human voice with all its exquisite modulations comes over it as clear as a bell."

Now the remarkable part of that is that the National Carbon Company does not sell radio sets, nor does it sell loud-speakers.

Don't miss the miracle of radio

There one million small firms in the United States and Canada. There are people who work in these firms. They work hard and they work well. They work for a living. That's all. They have no time to think, to plan, to dream, to question. Their minds are turned to the things that they do, and to the things that they do. They work from morning to night, and from night to morning, and from morning to night, and from night to morning again. They work so hard that they have no time to think, to plan, to dream, to question. Their minds are turned to the things that they do, and to the things that they do.

And then take that sentence a little farther down—"Your theatre is the air—no admission fees—no dressing, and taking the street car down town—no worry about an overcrowded house—no buying tickets in advance."

"Your set may bring you one of those miraculous surprises of all time."

And then take the spirit of the second ad—the thought that you should not enjoy all of this beauty by yourself, but that you which will thrill you with the power and extraordinary possi-

The Radiant Christmas Gift

It simply advertises radio in general and takes its own chances among a half dozen manufacturers of dry cell batteries to get enough business to make it worth while to do this.

And in the third ad is another of those strong thoughts to appeal to the pride of the American home. "With radio so perfect that it is bringing delights and information and education to a million families, the home without a radio receiving set is handicapped. Its outlook on life is circumscribed. Why should the neighbors enjoy all the happiness and fun?"

There, once again, is the appeal to the pride of the average American, and lower down is the appeal to his love of the beautiful in his own home—"no unsightly wiring—no intricate machinery—a handsome cabinet—and an attractive piece of furniture for the living room."

And last comes the fourth article with its strong appeal (Continued on Page 27)
The Radio Committee of the Mothers' Club

By SIDNEY LEAR

"Why, I don't know," faltered the crimson Mr. Young, "I never thought much about it—there's some darn good dance music, but there's a lot of that other dumb stuff, too; those opera things they had last winter and all that. Why?" "Well, I was just thinking. Somebody at the Mothers' Club meeting today said there was too much jazz everywhere and especially on the radio. And I don't think so; of course, there's a lot, but golly you can't dance to Largo and The Rosary! I'd like to tell her a thing or two, because I like good music as much as anybody."

"Why don't you write a paper about it and read it to 'em?" suggested Billy. "That's a pretty dress, is it a new one?"

"I've worn it a million times," answered Mrs. Billy, still thoughtful. Then she glanced up and met his gaze. There was something in his eyes which told her that the conversation was about to get pleasantly personal, and for a while she forgot all about jazz and radio and the Mothers' Club.

Next morning, however, after Billy had left for the office, his words came back to her. And then she got her idea. Whether Mrs. Burns-Johnson's gloomy view was true or not, it was certain that a great many young people who had never had much music in their lives before were hearing a great deal now. And, no doubt, being young, they preferred the jazzy music to
the other kind and turned away from the stations that were broadcasting classical selections to the one that was playing the latest popular songs. You couldn't blame them for that, since they had had no instruction and no guidance in their music. Yet, if this was to be their musical education what would their taste amount to when they grew up? And as they were the backbone of the nation, the coming generation, where would American music be in a very short time? Mrs. Billy Young was enough of a musician to appreciate the danger of such a situation and get serious over the prospect. At the same time she was so much of a dancer and fun lover that she could sympathize with the youngsters who wanted their dance music and their new songs sung by popular vaudeville stars all the time.

"And yet think how much I would have missed," she mused, as she sat down at the piano and let her fingers find their way into familiar chords, "if I had heard and played nothing but ragtime, all the time I was growing up! And what I did miss not hearing this radio. If I could have heard good orchestras, good musicians playing really good music as often then as I can now, why I'd have thought I was in heaven. And there must be a lot of youngsters that feel just that way; families that can't afford a Victrola or ever go hear any music can have it right in their own homes now, because heaven knows it doesn't cost much to make a set. I wonder—"

And right there the idea sprang up and startled her so that she struck the wrong key in a frightful discord.

During the next week little Mrs. Billy Young was in a dreadfully state of nerves. She was going to make a speech at the Mothers' Club, and she was so scared that she had to be told every evening how perfectly composed she looked as she read off what she had written, and how it didn't make any difference whether she stuttered or not because everybody would fall in love with her as soon as she stood up and showed herself and nobody would hear what she said anyhow—that is, everybody would be so interested in what she said that they wouldn't care how she said it, and of which Mrs. Billy believed or not, according to the condition of her nerves at the moment.

But she made her speech. That is she made the first part of it, and after that she got so interested in her subject that she forgot all about her prepared paper and just told her story in her own natural way.

"It struck me all of a sudden," she said, "how much I had missed when I was studying music, because we weren't very well off and I couldn't afford to go to orchestra concerts or to hear famous musicians and all that sort of thing except as a rare and wonderful treat. And, oh, it meant so much, I loved it so, and it helped me so! Well now, you know, you can get that kind of thing by just putting on your earphones and tuning in. Why, I've heard some beautiful concerts and some of the best singers, very good opera companies and singing teachers and people like that that are very prominent locally and really awfully good. And there must be lots of children who would get as much thrill out of that as I would—and do—and their taste and talent ought to be developed.

Some of them will never be able to take lessons, but it struck me that they could learn an awful lot by radio, if there could be somebody who would put a few lessons or explanations or something like that in with the jazz so that it would catch the jazzy ones when they weren't looking—and they wouldn't have to catch the others. They'd be listening anyhow just because it was music. I should think we could suggest that, ourselves, because we ought to have some weight, there are some pretty representative women among us—with a flattering glance at Mrs. Burns-Johnson—"and anyhow they expect suggestions at the broadcasting stations, you know. Now, I don't know, of course," concluded Mrs. Billy, getting suddenly shy and self-conscious, "Whether that's just a wild dream or not, but I was impressed with what Mrs. Burns-Johnson said last week, and I love radio and I love music and I should think there ought to be a way to combine musical education with their fun and not give them too much jazz—although I do love jazz, too!"

She smiled an apologetic smile and sat down amid loud applause. It had been just as Billy predicted. She was so attractive because everybody approved of what she had said and began to discuss it so whole heartedly that the president had to rap for order.

"I believe your plan is, Mrs. Young," she began, "that the Mothers' Club shall suggest, or request, that the broadcasting stations— that right? I must confess I don't know much about radio myself— institute some way of giving musical education with which to offset the effect of this 'jazz,' which you say they give so much of!"

"Yes, but not that there's too much, just to balance it a little bit and..."

"Well, will you put that in the form of a motion, Mrs. Young? And then we can discuss ways of going about it."

Mrs. Young found a motion, which was promptly seconded and carried. Mrs. Burns-Johnson wore an expression of astonishment upon her tight-lipped face. I had never occurred to her that something might be
done to counteract jazz; she was of the everything or nothing type, who "crab" enthusiastically about conditions which do not suit them, but do nothing definite to better them.

A chairman was appointed of a committee to look into this matter and report upon what could be done. Then the question of the name of the committee was brought up. Mrs. Burna-Johnson was for "Radio Improvement Committee," but its chairman, none other than the still firm radio fan, Mrs. Billy Young, frowned that down. Radio was beyond that stage, she said, and it seemed rather impertinent to talk about "improving" anything that was so perfectly wonderful.

"Why couldn't it be called just the Radio Committee?" she suggested, because that sort of covers the whole thing, and it sort of has the idea of improvement without actually saying it—don't you think so, Mrs. Burna-Johnson?" she appealed, with her most irresistible smile. Mrs. B.-J. didn't, but found to her astonishment that she was smiling and nodding in response.

And so it was decided, but the president wisely announced that she would wait until the next meeting to hear Mrs. Young's plan. As Mrs. Young had absolutely nothing definite in the way of a plan, she winked a silent vote of thanks to the president, who was the mother of her best friend, and stopped blushing at last.

She and Billy talked it out on several evenings as they sat in their pleasing liv-}

ing room. "Honestly, Billy, I think you must take off your shoes and walk around the office in your socks!" she would say, as her exploring fist would peer out at her from a woolen heel that should have been solid. "Well, now, what am I going to do with that darn committee? I never was head of a committee like this before. I don't know how to reform the young! All I can do is get ets for a tea or put up decorations for a dance—you're young, how would you want to be reformed as to your musical taste?"

"I don't think radio needs reforming," he would say, lazily watching her draw the thread through and wiggle the needle back again. "Why don't you let the kids alone, they're happy with their lowbrow jazz."

But she thought best when she was at the piano playing softly at nothing and everything, while Billy looked as if he were reading while he really let himself be lulled to drowsiness by her playing. One evening he had just begun to relax the grip of his teeth upon his pipe and his book had already slid softly to the floor when she suddenly finished with a loud "blue" minor jumped up from the piano stool. Billy, brushing tobacco off his clothes, licking his pipe off the floor and soothing his ruffled nerves, heard her telephoning excitedly to all the members of her committee inviting them to come for tea the next day and talk over her plan. There was a prouche light in his eye when she returned, but she saw it first and bore him off to the kitchen for his just-before-bed-time lunch before he had a chance to say a word.

The committee approved highly of the chairman's plan next day and the club as a whole applauded it at the next meeting. Mrs. Billy Young was chosen unanimously as the member to go to the broadcasting station in the town and talk to the director about conducting a musical competition.

For her idea was this. She remembered the magic charm which the word "prize" has for a child. Recalled the interest and excitement centering about a contest in her own school for the best mark in literature for the year. She had detested rhetoric and English, yet she had struggled along with the rest of them with that goal in sight. Now, if the Mothers' Club should offer a prize for the best composition on musical

radio...
Radio fans will soon hear another broadcaster on the air when this new station, being built by the General Electric Company at Oakland, California, will open. The plans now are to have this station on the air about January 1st.

This station will be virtually a twin to the General Electric station, WGY, at Schenectady, and a third station, which will be almost a duplicate as far as apparatus and power are concerned, is under course of construction at Denver, Colorado. With both the Oakland and Denver stations having the same power and sending radius as WGY, the General Electric Company will thus have a chain of stations which will cover the entire country. This will mean that there is not a point in the United States where a good receiving set will not bring in one or more of these stations, and the chain will give an added impetus to DX fans, because those in the east will have another west coast station to log and those on the west coast can continue logging Schenectady and also go after Denver.

The station at WGY has been operating ever since February, 1922, and has made a reputation which is second to none in this country.
How to Wire Taps on a Variocoupler

No doubt you have seen a kitten playing with a ball of yarn. In a short time it is wrapped up in it and the yarn has become tangled in between its legs and around its head. I have seen some variocouplers that have the taps wired that way. They criss-cross each other and duck under and out again. This can be avoided if you stop to consider the best way to run your leads.

The manufactured radio set is not thrown together as in a day. The engineering staffs of these companies have spent months in finding out the best way to run the leads on the sets that they are building. So why should you be in a hurry to finish your set? If you don't hear the concerts tonight you will hear them tomorrow night. They go on just the same.

Take your panel and lay it on a piece of paper and with a pencil trace around the outside edges, thus giving you the size of the panel on the paper. Then mark off on the paper where you want the different pieces of apparatus mounted. Take your variocoupler and place it on the paper so that the shaft faces you.

It is generally preferred to have the taps above the coupler, as it makes it easier to wire. Most all couplers have two sets of taps, one consisting of single turns of wire and the other of ten turns of wire. These are called units and tens and I will refer to them in this article that way. The units are on one side and the tens are on the other.

With the shaft of the coupler towards you and the taps up, mark off on the paper on each side of the coupler the position of the switch arms. You may either use taps drilled in the panel or, if you wish a real job, you may use the back mounted switches. There are several well-made back mounted switches on the market. Two of the best that I have used are the Carter and the Marco. When the diagram is laid out the best way, you may drill your panel.

The first thing to wire is the coupler. You will find that the manufacturers of good articles are not afraid to go to the extra expense of tinning the taps. However, a great number of them do not scrape and tin the taps.

If you secure one of this kind, take a sharp knife and carefully remove all of the insulation from the taps and apply to each tap a small touch of soldering flux, such as rosin, or, if you are very careful, a very small amount of soldering paste.

Then with a hot soldering iron tin each tap. To do this, apply a small quantity of paste to the tap and take the tinned soldering iron and hold it against the tap until it is tinned almost the same as the iron is.

Then tin the end of the wire the same way, reheat the iron, place the tinned end of the wire up against the tinned spot on the tap and hold the hot iron against them until the solder on the wire and tap flows together. If you use the paste be sure that you wipe the tap carefully after tinning. A
Above are the switch contacts and switch arms from a front view of the panel.

A good thing to do is to wash off the tap with a little Carbona or benzine. This cuts the paste and leaves the tinning clean.

Very frequently when you take the iron out of the fire you will notice that it is covered with a dark coating. This is called oxide, and it should be removed before trying to do any soldering with it.

A good way to remove this oxide is to wipe the iron off with a cloth, leaving it nice and bright, or if necessary, take it off with a file.

Now to make a nice looking job on the wires running to the taps. Do not use a wire that is so stiff that you cannot pull it tight.

Better still, use a wire about No. 20 and solder it to the tap, making it about eight inches long. Solder on each tap one of these wires.

Then stretch this wire to one of the switch contacts so that it will be in a direct line to the contact and not be crossed by any other wire. Now take a piece of varnished cambric tubing, commonly called "spaghetti," and place it up close to the tap on the coupler, and then stretch it to the contact that you want the wire soldered to.

Cut it off the right length. Slip the tubing over the eight-inch piece of wire and wrap the wire around the contact post, pulling it tight. Do all the other contacts the same way. Then place a small quantity of soldering flux on each contact and solder them.

Be sure that the solder flows well around each joint. Then carefully clean the joints with either Carbona or benzine.

Do not use the cheap "spaghetti" that comes in so many different colors. It is nothing but the covering that goes on the stems of artificial flowers on women's hats.

You can tell the difference between the good and the cheap "spaghetti." The cheaper grade is very flexible and has no body to it.

It is composed of gelatin base, coated on a very thin, piece of cloth tubing. The coloring used in it is mostly a metallic dye and was not designed for an insulator.

It will do very nicely in its place, on women's hats, but when you place it in a circuit that carries electrical current, such as radio energy, it is all wasted.

The good grade of "spaghetti" is sort of stiff and has a body to it. It is composed of tubing made of cambric and given a coating of high-grade insulating varnish. The specification of this varnish is that it will stand a thousand volts per thousandth of an inch thick.

That is, if you have a film of varnish that is only one-thousandth of an inch thick, it will stand a pressure of one thousand volts without breaking down.

The varnish on the good "spaghetti" runs anywhere from ten to fifteen thousandths of an inch thick. It will stand between ten and fifteen thousand volts. We may safely say that it will stand five thousand volts.

This is, of course, a great deal higher voltage than that which comes in over your radio set. But the energy that does come in is such a nature that it will leak through surfaces that would be an insulator to other electricity.

For instance, if you were to mount on a dry piece of board two binding posts and fasten your antenna on one and the ground on the other, you would probably not be able to measure any leakage across the board; but let the day be cloudy and you could measure very easily the leakage.

The same thing applies to the cheap "spaghetti," as the metallic dye is a conductor of electricity and the radio energy will leak across the tubing.

When this radio energy leaks from one piece of cheap "spaghetti" to the other, it means that the incoming radio signals are not going through the coil the way they should, but are jumping across from one lead to the other and the fundamental principals of the coupler are lost.

After you have soldered all of the connections of the variocoupler to the various switch taps on the panel, a good suggestion would be to take a test phone and see if they are perfect. Go over the connections from the variocoupler where you have soldered the lead and see if that connection between the lead where you have soldered it on to the variocoupler and to the switch contact is electrically perfect.

That is, see that there is a connection between these two leads. Often a soldered joint may appear to the eye to be perfect, but as an electrical contact it is not as efficient as it should be. It has what we call "high resistance" in it and a great deal of your incoming radio energy is lost.

If you get a circuit with your circuit tester between the wire of the variocoupler and the switch contacts on all of the switch points, then a good method of testing the completed circuit of the primary of the variocoupler would be to attach one side of your tester to one switch arm and the other side of the tester to the outside tap of the variocoupler. Then rotate your switch arm from one tap to the other and see if you get clicks in the tester. You should not get any, as there should be a completed circuit through the whole primary of the variocoupler.

If you get a click while you are rotating this arm it shows that there is an opening in the windings of your variocoupler, or there is bad connection in some of your soldered loints.

This must be remedied before you can go ahead and finish wiring the other part of the circuit.

There are several manufacturers in the radio game who have put on the market a complete back mounted panel switch for wiring the taps from the primary of the variometer.

Some of these switches are made by...
If, however, the radio frequency and detector circuit are working properly, then it is safe to assume that the Grimes can add audio frequency and bring the signals in louder. Before we go into the wiring of this circuit suppose we take a few moments to run over the general layout of the panel and baseboard that I have shown here.

You will notice that in the new Grimes circuit the potentiometer has been taken out and is not used. This is the whole change in the Grimes circuit. Mr. Grimes has spent several days here at our laboratory and has given us the new circuit. It is not used.

The New Grimes Inverse-Duplex

(Continued From Page 8)

A top view of the top-out of the baseboard, showing positions of the tubesockets, audio-transformers and binding posts.

A bottom view of the same panel showing the position of the radio-frequency transformers and the way the tube sockets are shoved up from underneath the baseboard.

three of these are very good tube sockets and have been used in the first radio-frequency tube and the second audio-frequency tube. Now the next tube socket to the one on the top of the baseboard is the second radio frequency tube and the first radio frequency tube. In between these two tube sockets we have the Dubilier Duratron radio frequency transformer. Between the second tube socket and the third tube socket we have another radio frequency transformer and this is also the Dubilier Duratron.

When you will notice in the photographs that we have across certain parts of this circuit small fixed condensers. These fixed condensers are made also by the Dubilier Company and are known as Micacondas.

When you mount these small fixed condensers do not endeavor to solder leads on them unless you are an expert in the use of a soldering iron. The construction of these small fixed condensers is such, that they have alternately a sheet of mica and a sheet of tinfoil. Tinfoil melts at a very low temperature, and if you are not careful with your soldering iron you are liable to melt this tinfoil and ruin the condenser. To eliminate this, if you will look at the photograph you will find that I have made connections to these small fixed condensers with machine screws and nuts. This makes a good permanent connection and does not give any possible chance of ruining the connection of the fixed condensers.

Then in the corner opposite the one which we have cut out on the baseboard you will find a fixed variable condenser. This fixed variable condenser has the value of .006 and is made by the Dubilier Condenser Company. This condenser is the bypass condenser for the last stage of the radio frequency stage of amplification.

Now let us get back to the wiring of this circuit. The first thing to wire in will be the filament from the first tube. We will connect the filament binding posts. Run all of the leads from the filament binding posts to the tube sockets together. Then run a wire from all of the movable arms of the rheostat and the binding posts to the plus filament binding post of the filament battery. The filament battery binding posts are the same as the plus minus binding post of the tube socket. Then from the other connection on the rheostats run the wire to the plus filament on the next tube and this is done for each tube after this has been wired and tested, then connect the plate lead...
from the tubes and grid leads from the tubes to their connections on the radio frequency transformers. You will find that after you have mounted these radio frequency transformers in the position that we have shown in the panel that the grid and plate leads will be very short. They run directly down to the connection on the tube socket. In fact, these leads should not be over one inch long.

Connect the plate lead of the first tube directly to the plate post of the first radio frequency transformer and then the grid post of the first radio frequency transformer is run directly to the grid post of the second tube. The plate post of the second tube runs directly to the plate post of the second radio frequency transformer, and the grid post of the second radio frequency transformer is directly to the grid post of the detector or the tube socket.

These leads want to be very short, so do not try to put these radio leads in any other place than exactly where we have specified, because the way they are now the leads can be made very short.

You will find on looking at the plate leads that quite a number of the leads run through the baseboard. When you run a lead through the baseboard you must be sure that you drill a hole in this baseboard just large enough to accommodate the wire covered by a short piece of good spaghetti or varnished cambric tubing. Do not use the best grade of spaghetti, so as to prevent any leaks.

The leads to the filament and the detector are beginning to look to you as a very short circuit, but now you have wired up audio frequency transformers, and you are beginning to see the importance of the filament to the circuit.

In the audio frequency transformers on the top side of the baseboard exactly the way we have shown them and then run the leads from the radio frequency transformers to the minus B battery and the minus filament battery of the radio frequency transformer to their respective audio frequency connections, as we have shown in the picture found in this hook-up.

By looking at the photographs it will help you considerably in running the leads to your circuit.

Be sure and do not let any leads cross over, because they run parallel to each other more than you can possibly help.

Most every one who has wired up a detector circuit, and the majority of people have also wired up audio frequency amplification to make the signals come through the detector tubes. Of course, when you first built the detector and audio frequency amplifier circuit you had your leads in the same way as any one else, but now that you have mastered this new art and know just about where to look to remedy them you are beginning to look forward to a little more intricate circuit, such as the addition of radio frequency.

After you have played with two or three stages of radio frequency amplification you find that the fundamentals of the radio frequency part of the circuit are entirely different from those of the audio frequency.

The trouble that you had with the audio frequency and that you have located will be somewhat different to locate in the radio frequency side of the circuit.

In the first place, at radio frequency you will have a transformer which must be as short as possible. That is, all the leads from the grid post of the transformers to the grid post of the socket and the plate post of the transformers to the plate post of the socket want to be just as short as you can possibly make them; and do not let them run across or at right angles near any other wires.

These wires are carrying high frequency alternating electricity, and if these wires happen to be near any other wires that are hooked to other parts of the apparatus in the circuit they are likely to have the same effect as a condenser; that is to say, that the high frequency currents will cross right over from one wire into the other without having to any permanent connection to them. This will cause no end of troubles, and it will start your set to oscillating and howling, which is very disagreeable and very hard to control. The only way you can be sure that you have radio frequency amplification at its best is to allow only very short leads to be run of the radio frequency circuit, and be sure that you keep these wires away from other wires that is in the hook-up.

Look at the photograph that accompanies this article and you will see that we have run the grid and plate leads of the transformers to the tube sockets just as short as it is possible to make them and keeping them as far away from other wires as we can possibly make them. The other wires that connect the other parts of the apparatus to the circuit are also run as short as can possibly make them, and at the same time keeping them away from other parts of the circuit.

In putting on the small fixed condenser across the filament to the plus B and minus filament return of the radio frequency transformers be sure to place the fixed condenser near the filament post on the tube socket as you possibly can get them. This will mean that you must run a very short piece of wire under the filament post and under the screw out of one of the condensers and solder it just as close as you can to the filament lead of the tube, then run the other side of the condenser to the terminals where it shows in the diagram.

The primary leads of the first audio transformer should be reversed. Then try your set. If this does not fix it, put the leads back the way they were and change the secondary leads. While you are doing this have the detector tube in the socket.
The skyscraper "B" Battery is here!

New—this upright Eveready "B" Battery for cabinet or table
where space is limited

Here is a new "B" Battery that stands on practically the same size base as the smallest Eveready "B" Battery, but towers above it in height and capacity.

It is twice as high, and will last you more than twice as long.

And you pay only 50 cents more for the added capacity.

For portable sets, where smallest size and light weight are essential, the familiar favorite Eveready No. 763 is supreme at $1.75. But where weight is not so important as space, buy the more than doubled service of the new upright No. 764 at $2.25.

Fifteen vigorous cells give 22½ volts. Two Fahnestock Spring Clip terminals.

For compact capacity, buy the new Eveready No. 764.

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NOW is the season when Magnavox owners confidently tune their receiving-sets for the reception of organ recitals, opera and other important musical events—assured that a Magnavox Reproducer will actually re-create these difficult programs.

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Power Amplifiers

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<tr>
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MagnaVOX Products are for sale at good dealers everywhere. Write for free 32-page catalogue.

THE MAGNAVOX CO.

Oakland, Cal.

The circuit is O. K. You will receive a click in your ear phones and this designates that you have completed a circuit through your transformers. Then try the other windings of the transformers and see if you get a click there. If you do not get a click it shows that the transformer is open circuit, and you should be taken back to the store from which it was purchased.

Another thing is, that sometimes there is a complete circuit between a primary and a secondary winding of these transformers. This should not be. However, the manufacturers cannot be expected to supervise all the work that goes out of their factories and at times they happen to employ careless men who do not take pains with their work and naturally there is a short between the primary and the secondary leads of the transformer. To test this place one of the leads of your circuit tester, as we call the battery and ear phones, across the primary lead of the transformer. Then place the other lead of the circuit tester on the secondary and if you hear a click here you may be assured that there is a short between the primary and the secondary windings and this also designates that it is a defective transformer. If you do not hear a click here the circuit is O. K., as there should not be any connections between the primary and the secondary windings. Try this also on your audio transformers and then go over and try the contacts on your jacks and see that they make good connections. Try the variable condenser, that is, put one lead on the fixed plate and one lead on the movable plate of the variable condenser and then rotate it, and if you hear a click anywhere while rotating the condenser, that shows that the plates are shorted and this must be remedied before you can expect to get any results from your circuit. After you have gone over this circuit you will find that everything is O. K. that is for connections and there are no shorts or open circuits in any of your transformers go over your wires and trace them where one wire is held on one spot over to where it is soldered on the other and see if there is a circuit to this.

When you have located this defective condenser remove it and insert another. Then put the other condensers back and try again, and it may be that one or the other of the other condensers that you have removed before also leaks, so you will probably have to do the same thing over again and do it until you are sure that all of them are standing up and are not breaking down against the B battery voltage.

After these have been tested and you find that on certain settings of your variable condenser you still have a howl there are ways of eliminating this.

There are other things that enter into this circuit that have to be looked after. Sometimes you may have poor tubes, so try switching your tubes and then try two tubes in one socket and then in another, and another thing may be that your B battery is run down or your A battery may not be up to its full capacity. Watch all of these and see if they are O. K.

Another thing may be that your loop may leak so see that your loop is well insulated and does not have any tendency to leakage that would cause disturbances in your set.

Taken from every turn starting from the inside, covering about five-eighths of the winding.
HIGH SCHOOL STUDENTS

Join the

Interscholastic Radio Association of America

Form a Local Chapter in Your School

ESSENTIAL POINTS OF AFFILIATION

1. Authentic information on radio products and their manufacture.
2. A buying service for parts or sets.
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First by County, then by States

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WRITE FOR PLANS

Give name, address, school, class and age.

INTERSCHOLASTIC RADIO ASSOCIATION OF AMERICA

606 Chestnut St., Phila., Pa.
ROOM 502

The Radio Committee of the Mothers' Club

(Continued from Page 14)

would be awarded, although the reason for its being given was a bit hazy.

And while all the details were being decided upon, Mrs. Billy Young had the most delightful time meeting the Voice with Initials which had become so familiar to her in announcements over the radio. He was most cordial to her suggestion—broadcasting directors are remarkably glad to have ideas for improvement or greater interest or better entertainment submitted to them—and introduced her to the whole working staff. She had the thrill of listening in from the producing side of the station and of seeing all the mysteries of the station itself with its awesome warnings of "silence" hung about the sound-proof walls. Incidentally the director and his working staff had the pleasure of meeting little Mrs. Billy, which was no small pleasure.

They found a rising young musician who would give the talks very gladly, illustrating and making them entertaining by playing several of the outstanding works of each composer he discussed. It was finally decided that he should take a different one with each lecture, advising his "pupils" to know as much as possible of this composer's work and studying his style of composition, points of similarity in different works, and so on. Any girl or boy under twenty-one might compete for the prize, and decision would be made from papers written once a month and sent to the Mothers' Club in care of the broadcasting station. These to be judged by the members of the club assisted and guided by the musician himself.

There has been one month's worth of prizes sent in so far, the plan having been put into action just six weeks ago. And it cost the club several days of hard labor to sort out the best ones, give them an average, and file them for future reference.

But their work was often lightened by amusement, for some of the youngest writers, or those whose English needed a little more Americanizing, were exceptionally funny. And then, too, there is the glow of success to make up for concentrated work, for the more papers they get, the more certain they feel of having done the right thing in accepting Mrs. Billy Young's plan.

As for her she is on the top of the world. Her beloved radio is above criticism now, and there's no chance of anybody's taking Billy's jazz and vaudeville music away from him—or from her. Her membership in the Mothers' Club really means something to her, too, and she no longer feels like somebody's daughter, who has strayed in by mistake when she goes to a meeting. To the delight of the other members she still looks like that, but she feels that she has acquired a certain dignity in becoming chairman of so important a committee. It is an important committee, too, for there have been a number of new members just lately. They didn't know there was such a club so near them, they said, until they heard it mentioned so often over the radio and looked it up in the telephone book. And they thought it was doing such a splendid work for the children; why, their own had developed the greatest interest in really good music since the lectures started.

But every once in a while little Mrs. Billy Young has a little bit of a cold shiver when she wonders what she will wear on the evening the grand presentation is made—probably to some child a hundred miles away—and remembers that as chairman of the Committee she will have to follow the president on the program and make a speech of congratulation herself. And here will be the voice that is heard around the world!
Officers and members of committees of the Interscholastic Radio Association, after formal adoption of by-laws, made an inspection of the great Curtis Publishing Company building in Philadelphia. This photograph shows them at the entrance to this building.

Interscholastic Radio Association of America Makes It's Debut

"To bring into mutually helpful and stimulative contact and association all male students of high schools, preparatory schools and schools of equal grade throughout the United States who may be interested in any manner in the science of radio."

Read it again. Now pass the magazine to Jim, your son, or Fred, that high school chum of yours, if you happen to be a reader of that age, or, if you are of the female persuasion, hand the magazine to your daughter, or, if you can get him away from his newspaper long enough, to your husband.

Have them read out loud the opening paragraph of this article—the paragraph printed in quotation marks. The quotation marks aren't mine; that is, I mean I didn't write that paragraph.

But I want you readers to get every word of it thoroughly and deeply implanted in your minds, memories, hearts and daily lives. For that paragraph, folks, is the statement of aims and ambitions of one of the most important radio movements that has been started in this country in some time.

I'm in deadly earnest. It doesn't matter who I am or where I come from. I'm writing this article because Mr. Neely came to me one day and said: Charles Henry, I've got something you'll be interested in. You're a newspaper man and this is news. Big news. We meet Friday

(Continued on Page 41)
Abner Armstrong Sez:

Riverton, N. J., Nov. 17, 1923.

dear Mr. Neely—

Abner Armstrong came over from Jobetown to see me at noon the other day and I asked him How does he get so much time away from his Farm and Ab sez that before he had a Radio he had to watch his men all the time as they would stand on him. But now he's put a Radio in his barn with a horn on it, and all he does is fack a Ducom plug in the Electric Light Socket Tune in to some snappy Jazz an' the men finish their work so early they fill in the rest of the day helping his wife with the Housework an' he sez that countin' me there's just 82,229 people in the U. S. and outskirts that don't think Radio is the best thing that's happened to them and he went to Volstead tow away the Pretzel's Playmate. "How can you tell the exact number?" I asked.

"They was counted in New York," Ab sez, "at the Dempsey-Firpo Fight."

"The poor unfortunates," I sez, "underwent untold agonies, paid big gobs of real money to see something they couldn't see, an' to hear what I heard like it was in the next room, an' I saved enough money for a winter overcoat and got 8 hours sleep as usual."

"Where was you?" Ab sez.

"Listenin' on a friends Radio," I sez, blushing a deep Stutz Red.

"It's been a good thing for the Government," I sez, "for 2 or 3 hands full of old Ford cars will make a pretty good little Radio Set an' with the total population c on s umin' several, doz. Fords, per person, per annum, an' carelessly tossin' them in our main T h o roughfares I sez o u r Highway Dept's would soon have had to turn their Problem over to the Government."

"But," I sez, "a coupla Boys can gather up enough Fords in a half Hour or so to make enough sets for themselves and neighbors."

"Well," Ab sez, "them sets is O. K. but in the average Home they're like a lawn mower in winter, out of Place; the same as eatin' corn beef an' cabbage off a King Louis the 7th Mahogany Table an'," Ab sez, "look at the way they've advertised their banannas."

"Well," I sez, "I'm fed up on banannas. My wife sez to me that she didn't see a yellow dress all summer. 'Sure,' I sez, 'and you won't till this bananna epidemic is quelled,' an' it's got so bad in Jersey that the Trolley men wouldn't work on the cars cause they was yellow, so the Co. put them in the barns to be painted blue but no painters would work on them so now there only used nights an' Foggy days. I haven't ate one for over a year an' that same feelin' has spread so that the price has fluctuated from 60 cents a doz. to 20 cents."

"I wish they'd sing one about coal," Ab sez, "an' as far as I can see bananas are as plentyfull as German marks, an' the people ain't mad at 'em."

"Before Radio introduced Ear Vesta," Ab sez, "Telephone Girls had the only ears that was visible. Woman's ears was becomin' mildewed and I guess they was boys in High School and even in College that had never seen a female ear."

"Well from what I've noticed," I sez, "That's about all they could miss."

"Speakin' about them," Ab sez, "I hear that since that Beauty Pageant at Atlantic City, Ventnor's population exceeds that of Cleveland."

"I'm not surprised at that," sez I, "for a lot of the hard boiled eggs in Palmire went to the Pageant and when they returned they was Omelets and one of them told me that when Ventnor's 57 Varieties passed, the men's hats flew off like clay pigeons and the Buttons popping off their shoes sounded like the fireworks at Old Home Week. Many a girl reached down to chase a green head fly off her lair and picked up a shoe button."

"Look at the music that Radio's givin' the Public every nite," sez Ab.

**RADIO PROGRAM**

7.20 WASH, Washington (306)
Three O'clock in the Morning—Solo By Dalite Saving Thyme
Keeps on A-Rainin'—Chorus By Wetherfor Castors
7.35 BIFF, Jersey City (105)
All Muddled Up—Trom Bone Solo By Louis Angel Bimbo
10 for ear lot No. 2
phones for all
Sour Krout Band
them wives of
7.51 D.D.D, Detroit (706)
Running Wild—Henry Fords
cas-ta-ah—Solo
by Mule, Luden-Menthol
8.30 CHAT, Big Bay, N. Y. (1896)
Address on William Jennings Byron and Other Grape Nuts
by Pastum Serial Co.
You Said a Mouthfull
by Wrigley Chorus
Rocked in the Cradle of the Deep—Quartett
by Four Hoarse Men
9.15 BOO, Phil. (9032)
Cut yourself a Piece of Cake—Palsetta
(Composed by Fry-Hoffer)
Miss Feefy de Face Constant-Lee
How Dry I Am
Max Senata Bathing Beauties
(Continued on Page 46)
The Studio Director
—That's Me!

Dance orchestra, conducted by Elmer Alchele, one of the composers of our song, so it was easy enough to work out my idea with him. And the idea was this: There were to be three scenes. During each intermission the orchestra was to play the complete chorus. But the original stunt was that whenever any one in the play said "somebody else," the orchestra was to play in very fast tempo the first four measures of the chorus, to which the words went "Somebody else is stealing my sweetheart's kisses."

I was of the opinion that this sort of thing would make a hit. But alas! I had no sympathizers. The evening for the fateful program came. I said the players of plays and the players of jazz instruments: "Nobody in the world believes in this stunt but myself. For the love of Mike, go to it as though you were with me."

It was a late program, and "Somebody Else" did not begin until nearly eleven. Early in the program I announced over the air that it was coming. Finally it did. We started and every one did his bit to my direction as faithfully as a stop watch. Whenever any one would say something like this: "You are in somebody else" that faithful orchestra would pound out the first four measures in about two seconds.

Then the finale, and I ran down stairs to ask the telephone boy if any reports were coming in—not a soul. What a dumbbell I had been! The program came to an end shortly after, with not a single telephone call.

But the next day, the letters! I was sitting in my office reading some of them, when Mr. Credley walked in with a wide grin on his face as he said: "Say, I never heard a song like such a plugging in my life." His opinion seemed to be universal judging from the letters that rolled in. And "Somebody Else" made a hit. Which demonstrates the moral—which we'll leave to you and Aesop.

In visualizing the radio audience. I think of all the different types of human beings listening in: Summer crowds in parks, winter crowds in halls, lone men in rooming houses, lumber jacks in far away camps, bank presidents in easy chairs, invalids in hospitals, old men that listen with wonder and boys that listen with enthusiasm; but most of all, those happy members of a happy family, seated in the home, modest or magnificent, listening together and bound together by their mutual interest in radio. It is now time to say that radio has done more for the home than any other form of amusement. Safe mother's side, it will keep the energetic boy who must be actively satisfying his curiosity in some manner; brothers and sisters, fathers and mothers, find themselves enjoying the beauty of music and elevated entertainment in their own home. All that we have for them is nothing in comparison to that which we should like to do. Lord, when I think of the work that one may do in radio—when I think of how little I, as an individual, may do in the development of this marvelous revelation of the heretofore unknown medium of communication, I crumple up—and go to work again in order to forget my own insignificance. Then why talk about it? Not a bit of use in the world. Every moment I spend in this effort to try to talk about myself is a lost moment in my work. All I hope is that some day a mind reader will come up to me and ask: "Say, who's that guy that's thinking about radio programs for next year, and five years from now, and twenty years from now?"

Ah, ha! and then I shall answer: "The Studio Director—That's Me."
Some Things I Think About the Radio Business

By HARRY M. DITTMAN, of the Bertram Advertising Agency

Dealers and manufacturers are at this writing blaming the public for the fakery of radio interest and the falling off of the expected "big" business. In reality they have none other than themselves to thank for the loss of sales and momentum.

The last year has witnessed so many changes—so many "good things" of last season—discredited by the makers themselves that the general public has come to look on radio as an overly expensive luxury. I do not mean to suggest that radio progress be halted, or hindered, in any way—but I do mean that this continuous necessity for "scraping" practically new apparatus should be looked into and remedied, if possible.

I remember well the purchase of my eighth and last receiver. It was then that Mrs. Dittman advised me that on and after that date, "the last word in radio" would be spoken by none other than herself. I honestly feel that after having purchased eight "standard" receivers, I am entitled to voice my thoughts on behalf of thousands of fellow sufferers.

From time to time, a number of prospective purchasers of high-grade radio apparatus speak to me regarding receivers. While they all invariably admit that they would thoroughly enjoy owning a good set—they nevertheless hold off the purchase because of the fear that radio is yet in an unstable stage. They are under the impression that equipment bought at this time will be relegated to the ever-growing "scrap-heap" within a month or two.

The better grade of dealers will certainly prefer and welcome the products of the manufacturer whose goods assure the greatest probability of stability. Permanently satisfactory connections are, of course, the aim of every manufacturer, whether in radio or any other business.

What I have in mind is admirably exemplified by the policies of the Victor Talking Machine Co. and the Packard Motor Car Co. Both the Victrola and the Packard car have always been regarded as high quality products. No model or innovation ever introduced by either company has ever been discredited by its maker. Public confidence in anything marketed by these firms has been immediate. Their dealers have remained the same for years. The whole atmosphere of everything associated with these products bespeaks quality and stability.

Despite the fact that both companies have been pioneers, in their respective fields, in the making of improvements, there are still Packards on the street—and Victrolas in the home—that are a credit to their makers as well as their owners, though five, six, yes and even ten years old.

Why it is to assure the public that the "air-ability" of their receivers will equal the "road-ability" of a Packard, two or three years from the day of purchase. Naturally, a high-grade piece of apparatus is the only one that can substantiate publicity of this nature.

Next, let us consider the flamboy-
Editorially Speaking

(Continued From Page 11)

Radio IN THE HOME

37

Concerning BURGESS BATTERIES

The unique position of esteem and confidence occupied by Burgess Radio Batteries is a natural development of the conservative policy which has characterized the manufacture, advertising and sale of Burgess products.

It will be of interest to the thinking battery buyer to know that a Burgess product is never advertised nor sold until its merit has been proven, not only by our own rigid tests, but also those of the foremost radio engineers, manufacturers and experimenters in the country.

Through friendly criticism and suggestions, together with extensive research and engineering by the C. F. Burgess Laboratories the efficiency of Burgess Batteries has increased to a degree which we believe is not equalled elsewhere.

"ASK ANY RADIO ENGINEER"

BURGESS BATTERY COMPANY

EASTERN - DRY BATTERIES - MANUFACTURER

FLASHTUBE - RADIO IGNITION TELEPHONE FLASHTUBE MANUFACTURERS

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LABORATORIES AND BURGESS BATTERY WASHINGTON, D. C.

BRANCD:

i

in CANADA

PLATE BURGESS FIELD AND WILKINSON


talks about the Christmas spirit. This alone is sufficient to turn the thousands of potential buyers to the radio set as a Christmas gift.

And, as we have said, all of this advertising, in one form or another, is being done at the expense of manufacturers, dealers, and radio enthusiasts. So that there is no question about the desire of all concerned to see the radio public enlarged and made public to give it more serious and with a proper sense of the possibilities which it possesses.

A L M O S T every month it is our privilege to announce the opening of another broadcasting company or radio cooperative. There are the concerns which we believe will be the radio stations by the largest of the smaller stations operated by department stores, newspapers, and so forth. But in the most of the cases, the public to which you will find that it is to open broadcasting stations by the more powerful companies of the skeptics. "Will radio broadcasting continue?"

I think it is generally admitted that there is more or less doubt as to the continuance of the operations of the broadcasting stations by the public. These stations are the concerns which are being operated to continue broadcasting because if a station is to be successful it must be able to sell the business with the public.

This is a tendency which personally I am very glad to see because of the assurance that such stations will give us the very best possible broadcasting that they can furnish. They will have to do so in order to continue at the head of the intelligent broadcasting companies.

There is, of course, no concealing the fact that most of the largest companies in the country today have at least a certain family connection, even though the remaining companies may not be so close as to lay them open to the favorite charge of being trusts. This is due to the fact that there is a genuine monopoly in broadcasting and the result is that there is a considerable business in such a way as to conceal whatever relationship may exist and this concealment will, it seems to me, only compel them to make the fiction of being independent which this fiction will produce the necessary striving for superiority in broadcasting to keep the business alive and to make it continuously worth while to own a good radio receiving set.

As the broadcast stations become more and more centralized in such stations there will be an inevitable struggle on their part to go further than they are doing now and the first thing we know the advertising aspect of the business will be so obvious that the public will be put to the test of whether it will pay for such a program and that will mean the death of radio.

And so, at the present time, the situation is now in those wise.

First there are such companies as General Electric, Radio Corporation of America, Westinghouse, Willard Storage Battery, Crosley and others who are in the business to sell radio goods and who know how much they will gain by running good broadcasting stations.

Then there is the American Telephone & Telegraph Company, and Mutual Broadcasting System, WEAF in New York, with its affiliated land wire station in Washington and one in New England which is definitely trying to solve the problem of broadcasting for pay.

There are those of us who are directors of the smaller stations who can only say that broadcasting stations are definitely limited and that the total cost of converting one station must be well within the limit of the value of that good. From day to day it becomes more and more difficult to get the kind of talent we want without pay. We are trying to operate our station by having "remote control stations" in such places as Chicago, New York and so forth, and these stations to be placed with people who feel that it is worth their while to take whatever is left over from our "remote control stations" cost. With a sufficient number of these "remote control stations" all of them being self-supporting and maintained because of the publicity value, the value of these remote broadcasting per year would be considerable and that expense can be perfectly satisfied to continue this excellent entertainment year after year.

On top of this, however, comes the very definite threat that was made to my representative in New York, that, if this continues, there will be an investigation of our advertising, and sale of Burgess products.

We will be interested to the thinking battery buyer to know that a Burgess product is never advertised nor sold until its merit has been proven, not only by our own rigid tests, but also those of the foremost radio engineers, manufacturers and experimenters in the country.

Through friendly criticism and suggestions, together with extensive research and engineering by the C. F. Burgess Laboratories the efficiency of Burgess Batteries has increased to a degree which we believe is not equalled elsewhere.

"ASK ANY RADIO ENGINEER"
DEATH VALLEY FEATURES
1. Entire surface is sensitive.
2. Natural mineral—not synthetic.
3. Cannot be damaged by handling.
4. Loudness and clearness cannot be equalled.
5. Will stand high plate voltage.
6. Recommended by radio experts for reflex circuits.
7. Unless you use a "Death Valley" Crystal you have not developed the maximum efficiency of your set.
8. Sold only in sealed packages.

30¢ Everywhere

Ask your dealer for PERMATIC Brand crystals. Sold only on the regular Death Valley money-back guarantee...

$1.00

PACIFIC RADIO SPEC. CO.
Dept 111 17 So. ORIARNA St. Phila.

RADIO CLUBS

Have You a Membership Emblem For Your Club?

If not, our art department will gladly create an original design for you. If you already use an emblem we can probably give you better service, or better quality at the same price, or both.

No obligation on your part if we create a design or quote you prices.

We Have Been Making

SCHOOL, COLLEGE & FRATERNITY EMBLEMS: PINS: RINGS

for organizations throughout the United States for a long term of years.

Our Service Is Unusual; Our Quality Is Unexcelled; Our Prices Are Reasonable

Advise us as to the approximate quantity, quality and any features you desire to have emblazoned in the design. Our service department will do the rest without obligating you in any way.

EMBLEM MANUFACTURING CORPORATION
Middle City Building Philadelphia

Radio Kindergarten

(Continued From Page 48)

continue to roll in exactly this way and the amplitude continues to be the same we would have if, in radio, it is called "continuous" waves and these are the kind always meant by the familiar abbreviation C.W.

If, however, the amplitude of the waves died down rapidly until the ocean was again perfectly smooth we would call that a "damped" wave, and that kind of wave sent out by the spark stations that you sometimes hear in your radio receiver.

Turning again to our fishing boat, we will assume that the "swell" on the ocean continues to rise as in Figure 3 and there we see that the amplitude marked X is considerably greater than in Figure 2, though the length of the wave from A to C remains the same.

Now we will notice that this change in amplitude makes one very evident difference. When the ocean was like Figure 2 it was perfectly easy and comfortable to sit in the boat, but now that the surface is like Figure 3 we find that we are being thrown around rather violently.

This tells us two things about waves. One is that they are capable of exerting power or force or, as we say in radio they have energy, and the greater the amplitude, the greater the energy. Let us say in passing right here that the reverse is also true. The greater the energy or power of the transmitting station, the greater will be the amplitude sent out, the louder will be the signals which we hear and the farther they will carry.

There is another thing that we will notice and that is that the crests and troughs proceed steadily in one direction. As we will see that the bubbles on the surface are not carried with them, their motion along the surface is evidently not a movement of the water itself, but is a movement of some kind of force or disturbance.

We speak of the length of the wave and this is the measurement from crest to crest or from trough to trough or between any two similar points on two succeeding waves. Thus: in the first three figures the wave length would be from A to C, A being the middle point of the rising wave and C being the middle point of the next rising.

Suppose now that we want to know some definite figures about these waves. Let us assume that we want to know how fast they are traveling. We note that our boat just reaches from one crest to another and we know that the boat is twenty feet long. This means that the "wave length" is twenty feet. If now we take out our watches and discover...
Millions will hear it this year by the modern marvel of radio. Thousands will turn and twist their dials in a vain effort to bring it from some particularly fine station.

But not the Garod owner—he knows.

He turns his dials—and smiles, for there comes upon the midnight "clear," that glorious song of old.

The Garod Corporation

120 Pacific Street
Newark, New Jersey
Radio Kindergarten

(Continued from Page 39)

other might look like under these con-
ditions and we can easily see that, if
the motion of all the waves in the
illustration was at the same speed or
velocity, four waves in Figure 4 would
pass us in the same time that it
would require for one wave in the
other figures. In Figure 4, X is
again the amplitude indicating a
greater amount of energy than the
other waves, but do not get the
impression from this that short wave
lengths always have more energy
than long ones. Figure 4 might have
been made up of a series of uninter-
secting lines whose amplitude was even
less than that shown in Figure 2 and
indeed this would be the correct curve
for the average amateur set. It
might even be said that an amateur
sending on a spark coil merely cre-
ates a ripple in the ether wave. A
big station like the one in Annopolis,
Md., which communicates daily with
Rome, Italy, sends out veritable
mountains of energy.

It is also well at this point to un-
derstand distinctly that wave length
has nothing whatever to do with the
distance a station can be heard. Dis-
cance depends on amplitude, which, in
turn, depends on energy.

The pupils in this kindergarten may
feel that I am over-emphasizing the
importance of studying the subject of
vibrations and the matter of wave
lengths, but we are living in a universe
whose very existence depends upon
vibrations, and all of the joys and all
of the sorrows of the world might al-
most be said to narrow themselves
down to a question of the wave length
of these vibrations.

We wake up on a beautiful sum-
mer morning and see a glorious day
of sunshine and we are happy.
Why? Scientifically it is because of
the vibrations of the particular wave
lengths which are having their effect
upon you.

With no clouds to interfere there are
vibrations with wave lengths of from
one-thousandth to, one-sixty-


Your Kellogg Radio Christmas

Here is a way to get a wonderful re-
ceiver of Kellogg parts that most radio
fans will tell you, are the most reliable,
durable and efficient on the market.
In several million families this year,
each of us will be racking our brains
to think of some Xmas present to
please each member of the family.

Forget all this trouble and work,
and plan a radio Christmas. Ask the
boy or dad to make up a list of reli-
bable parts for a simple set; then each
one buy one part for someone in
the family, and you will have a receiving
set that will bring Christmas carols,
and the world to your fireside, if you
have efficient Kellogg parts carefully
put together.

Such assembling is an easy matter
with Kellogg radio equipment. There
are thousands of circuits, some very
efficient, both as to distance and selec-
tivity, that require only a condenser,
coupler (or variometer), tube socket,
fixed condenser, grid leak, tube, dials,
and a few other inexpensive parts.
You don't need to buy an expensive
chassis cabinet to have a good radio set.

If your dealer does not handle Kellogg
send us his address. We will send you
our helpful and valuable
radio hand book. Start
today on your Christ-
mas receiving set, and make every
member of the household happy.

KELLOGG SWITCHBOARD
& SUPPLY COMPANY
CHICAGO, ILLINOIS

(Continued on Page 45)
See the world and be paid for it!

The Philadelphia School of Wireless Telegraphy has graduated hundreds of men who are seeing the world as Radio operators and these men are earning good salaries aboard some of the largest ships.

Our courses are thorough and practical — and are taught you in the shortest time possible.

Positions secured for our graduates

DAY AND EVENING COURSES

"Send today for Illustrated Booklet"

Philadelphia School of Wireless Telegraphy
1533 Pine Street
Philadelphia

The Reinartz Coil

The famous Reinartz circuit will not function properly unless the coil is correctly made and perfectly insulated.

The Pfannstiel Reinartz Coil has been the standard ever since this circuit was developed.

It is the coil which was shown and specified in the article on the Reinartz circuit published in the September issue of "Radio in the Home."

Pfannstiel Radio Service Co.
Highland Park
Illinois

New Mexico College Is Active In Radio

THROUGH the efforts of Dean Goddard, the New Mexico College of Agriculture and Mechanic Arts is the recipient of the gift of a new radio station. The donors have requested that their names be withheld.

This gift will include the equipment for constructing a 100-watt vacuum tube transmitter and the building to house it. The station will be utilized for experimental purposes and amateur relay work under the Government license of 6XD. It will be separate and entirely distinct from the present radio house and its equipment, which will then be used solely for broadcasting services under its present call letters of KOB.

Plans for the new radio house call for a frame building 18x24 feet with concrete floor. An operating room will occupy the east end of the building, while a club room for the college Radio Club will be at the west end. The center will contain a work shop and closet for the storage of miscellaneous equipment and better.

A site has been selected east of the Engineering Department's Forge Shop and south of the Commercial Building. This site gives plenty of open space about the building, where a new aerial of the T cage type can easily be erected. It is planned to support the new aerial from two 6-foot frame towers, spaced 125 feet apart. A counterpoise system of twelve wires is planned. These will radiate from the roof of the building in all directions to steel post supporting the outer ends. The transmitter planned is of the reversed-feedback type, using two 50-watt Radiotron vacuum tubes for oscillators. The plate current will be supplied by a Kenotron rectifier and filter system. The materials for this have already been purchased, and the set will be constructed by members of the Radio Club from designs by Dean Goddard.

When completed, this new station will give the college radio experimental facilities, which, combined with its present extensive equipment, will be unsurpassed by any college in the West, if, indeed, by any in the United States.

Station KOB is equipped with two combination telephone - telegraph transmitters, one of 500 watts output, and the other of 50 watts. Both these transmitters are of the vacuum tube type, and either may be connected instantly to the 140-foot fan aerial over the Engineering Building. Two other telegraph transmitters of the spark type are also available.

514-Page RADIO Handbook Only $1


Mail the Coupon To-day

GIVE YOURSELF

THIS CHRISTMAS GIFT

The little marvel of crystal sets—the Metro Jr.— complete with phones, RF aerial and insulated hook up wire, ground pipe clamp, lead-in insulator. Not a thing to add to it. Just hook up and listen in.

GET US TEN SUBSCRIPTIONS

to "Radio in the Home" at $1.00 a year and we will send you the set complete in an attractive box, and will include a year's subscription for yourself.

Boys! Get in on This!

Register with us and earn this marvel by your own work in radio.

ADDRESS

Circulation Manager

"RADIO IN THE HOME"

606 Chestnut Street

Radio in the home of John L. McMicheal, Jr., 908 S. 55th St., Philadelphia

Photo courtesy J. S. Timmons

(Continued on Page 48)
RADIO IN THE HOME

Interscholastical Association of America Makes Its Debut

(Continued From Page 59)

A BEAUTIFUL PIECE OF FURNITURE— AS WELL AS A WONDERFUL LOUD SPEAKER

Volume without forcing tubes

Remember, in purchasing a loud speaker, that today radio is often in the best-dressed room of the home.

The loud speaker, of course, becomes part of the room furnishings.

In selecting a Timmons Talker you are securing a loud speaker that has no equal for volume and clarity, and at the same time a Timmons Talker is a piece of beautiful furniture. The cabinet has a rich hand-rubbed mahogany finish. The grill is of fabric standard Gray Elgin, backed by a screen of bronzoid gauze.

There are two types of Timmons Talkers—Adjustable (Type A) $35, and Non-Adjustable (Type B) $25. Extra battery is not required with either. Your dealer has both. He also will give you a "Volume Without Noise" fob, at no cost.

J. S. TIMMONS, 339 E. Tulipbockam St., Germantown, Phila.

Timmons Talker
Channing Pollock: Radio Enthusiast

Channing Pollock, dramatist and lecturer, and author of the successful play "The Fool," is an enthusiast when it comes to using the radio. At his home in New York he has installed as fine a radio set as is made, and when on tour he enjoys talking from broadcasting stations that he may reach a larger audience than is possible from the lecture room. During his talks to radio fans, Mr. Pollock speaks on the dramas and the theatre as an institution.

In this picture Mr. Pollock is seen speaking from the Outlet Company's broadcasting station at Providence, R. I. He is telling thousands of listeners—in that his experience in the theatre has not convinced him that people do not want fine things in the theatre, but that all of the people who want fine things have stopped going to the theatre.

The author said that theatres were patronized by people who did not appreciate real plays of merit, but demanded trashy action. He expressed belief, however, that the better class of people were now being won back to the theatre and that great strides would be made in the near future. No dull play is a good play and no good play is a dull play," Mr. Pollock averred. He predicted that "you will live to see the day when first-class dramas are a part of school curriculums and the drama is put in the place where it belongs with the university, the Church and other forces of good."

Interscholastical Assn. Makes Its Debut

(Continued From Page 45)

individual boy and the radio industry generally. Prominent manufacturers of radio apparatus declare it is almost impossible to obtain men and women trained in the more scientific and technical aspects of the radio industry. It is one of the aims of this organisation to train boys and girls for just this kind of work.

Membership in the organisation is open to "any honest, persevering high school student, or student of equal grade of similar school anywhere in the United States," declare the rules adopted by the members. It has also been suggested that auxiliaries may be organised to include girls and women and older men.

One of the aspects of the movement that most strongly appeals to me personally is that the parents of these boys and girls are to be appealed to most strongly to interest themselves in the movement. Anything that lets in "Dad" and "Mother" is pretty well apt to be "the real thing," to quote my young friends again.

"Well, what do you think of it?" queried Mr. Neely when the meeting was adjourned.

"I think it's one of the best things that ever happened to radio," I replied instantly. "And I'm going to say so publicly. And I have. And now there's just one thing more I want you boy and girl, men and women readers to take away with you and to keep in your minds and memories and to help make a thing of help and service and dignity in the communities in which you live, and that is the one thing on which I have not yet touched—the name of the organisation. I want that there shall stand to you, as a guarantee of the best there is in radio and integrity of character and highness of purpose, this name:

"The Interscholastic Radio Association of America!"

The following is a report in tabloid form by the national executive secretary:

A national association of high school and preparatory school boys interested in radio organised on Friday, November 2, 1923, under the name of the Interscholastic Radio Association of America with national headquarters at 608 Chestnut street, Philadelphia, Pa.

A constitution and by-laws were formally adopted.

National officers were elected to serve until the next annual convention. These committees were appointed under the provisions of the by-laws: National Executive Committee, a National Committee on Organisation, Information, Publicity, Broadcasting, Legislation and Contests. A National Advisory Board was also organised consisting of prominent educators, electrical and radio experts, big business men and other men of prominence.

The following was adopted as shown in this magazine:

"An official membership emblem was adopted for individuals in each chapter with school, county, State and national eliminations. Contests to cover logging, code, set construction, musical (vocal and instrumental), writing, speaking and drawing. Appropriate prizes of individual and chapter winners and a national tour of radio factories and broadcasting stations for national winners. Contest Committee instructed to arrange for broadcasting by county, State and national winners."

"Radio in the Home appointed the official organ of the association, with a special department for publication of news, letters from members, chapter reports, discussions, contest announcements and the like."

"Annual session of the National Council fixed by by-laws for August..."
FOR CHRISTMAS give the radio enthusiast his fondest expectation—a perfect re-PRODUCER, the Atlas Loud Speaker. Natural re-PRODUCTION, identical with the original in the broadcasting studio, is completely achieved. The patented "double diaphragm" responds uniformly to the full range of sound intensities. Adjustable to each individual set and receiving conditions. The Atlas Loud Speaker is a gift not only to an individual, but to an entire home, an unmistakable sign of your regard and thoughtfulness.

Hear the Atlas Loud Speaker at your dealer's. Its amazing naturalness will convince you.

LIST PRICE $25
Complete With Connecting Cord

WARNING: Be sure you get the new model with our red grained pea bag.

Write for Booklet "M"

Contains a great deal of helpful information

For Canadian Distributors

MARCONI WIRELESS TELEGRAPH COMPANY
OF CANADA, LIMITED, MONTREAL, CANADA

of each year. Annual sessions of State councils first two weeks in July. State and national elimination contests will be co-ordinated with these conventions.

"Membership in the association is open to make students in attendance at any secondary school in the United States. A local chapter may be organized by application for a charter to the National Executive Committee by five or more students. Existing radio clubs may join the association as a body.

"Application blanks will be furnished upon request. Address National Executive Committee, Inter-scholastic Radio Association of America, 608 Chestnut street, Philadelphia, Pa.

"This section of Radio in the Home belongs to the members of the association. It is a common meeting place, a forum for the expression of your opinions, a place for the publication of chapter news. We are one big family of radio enthusiasts, working with the common purpose and the common ideal of bettering radio in every way. Let us keep contact. These are your pages. Use them. Send your communications on matters of general interest to the executive secretary at national headquarters."

Football From Field to You

(Continued From Page 16)

from it an unobstructed view was obtained. The glass inclosure is put there not for the comfort of the operator, but to prevent the noises of cheering and shouting and singing from drowning his voice as he gives the play-by-play description.

There is another microphone out on the west stand shown in one of the photographs which is there especially to pick up the cheers and other field noises and the operator has a switch in his booth by which he can switch from his own microphone to the other microphone so as to give the radio audience all of the thrill of hearing the college yells and the college songs and the band playing and the other noises so intimately connected with the great game of football.

The games from Franklin Field this year were broadcast through station WIP, Gimbel Brothers, Philadelphia.

A Kink for Using Rosin in Soldering

EVERY time we mention soldering paste in this magazine we always tell you to guard against using either acid or soldering paste in making your connections. The use of acid or soldering paste is very harmful, as acid conduct electricity and eventually causes leakage and also causes the wires to turn green and corrode.

Now, I have a new wrinkle that I have tried out and that is very successful in using rosin as a flux in soldering. Most every one who has tried to solder with rosins knows that it is very difficult and that you have to have a good clean joint and a good hot iron to make the solder flow when you use rosin as a flux.

This new wrinkle was given to me by a Doctor Spidel, of the Department of Commerce, who sent me a small bottle of soldering fluid that he had made himself. This new flux is a wonderful help in soldering with rosin. The whole secret is to apply with a small brush a small quantity of this fluid and hold an iron (that has been previously tinned) over the joint and the solder will flow very readily around the two wires on the connection. To make this soldering flux yourself, use a piece of clear rosin about the size of a walnut and dissolve it about one ounce of Carbona cleaning fluid. It takes about four or five hours for the Carbona to dissolve all of the rosin. When this is dissolved it has a clear amber color and is thin like water.

NOW—!

Beauty in RADIO TABLES

also

EFFICIENCY:

Can be extended to suit any set
A place for all batteries
A place for the loud speaker
A place for the headphones

THE CABINET TYPE covers the batteries, but leaves them readily accessible for charging or examination.

Finish in walnut, oak or mahogany

Cabinet work on both types is of the finest, done by experienced workmen of a well-established concern.

Make her radio Christmas really enjoyable

W. H. DOLLAR MANUFACTURING CO.
313 North Front Street
Camden, N. J.

Type "B N."

$28.50

Type "D"

$8.50
The Right Binding Posts May Save Your Bulbs

Only an accidental touch of a loosened positive battery wire to an A battery connection—and your tubes are burned out.

Here's Some Advice

From an Authority

"...any other standards parts will do, but let me say that I feel that you binding posts for your battery binding posts...

These binding posts have rubber caps which is a great advantage, as it is almost impossible for a battery wire connection to come off and touch the metallic part of any other battery binding post to cause a short circuit..."


Eby binding posts are made in many styles and many sizes—to suit all needs and all tastes. Your dealer carries them. If not, write direct to EBY MANUFACTURING CO.

48 So. 7th St., Philadelphia, Pa.

New Mexico College Is Active in Radio

(Continued From Page 41)

pull power amplifier, and a large-sized Magnavox loud speaker, is included in the equipment. A new Kohler dectrometer, such as is used by the Radio Inspection Service of the Department of Commerce for standardization work, has recently been added.

The motor-generators for supplying the high-voltage direct current for the telephone transmitters are located in a special generator room, and remotely controlled from the operator's desk in the Radio House. There is a 500-watt, 1000-volt set for the small transmitter, and a 2000-watt, 2000-volt set for the large transmitter. There is also a 250-watt, 1000-volt set in reserve, as a spare, to be used in case of trouble with the regular machines, and for experimental purposes.

The college is also provided with two complete portable stations licensed under the call letters of 5FY and 5FZ. These stations have five-watt combination telephone-telegraph transmitters and single-circuit regenerative receivers with detectors and two-stage audio-frequency amplifiers. They are used for experimental work and for communication with the college station from points in the town.

At the recent convention of the New Mexico Boys' and Girls' Club members held at State College, a picnic was enlivened with a radio concert received by one of these stations.

The football game in El Paso of the Aggies and the El Paso High School was broadcast, and the coming game with the Texas School of Mines will be broadcast from one of these stations erected on the sidelines.

They have since the war served as the communication link between the annual college R. O. T. C. unit camp in the Organ Mountains and the college. Two years ago at the time of the Hatch flood, one of these stations rushed to the scene of the disaster and supplied a quick means of communication with the lower valley towns, from which assistance and supplies were sent.

The work of the present station at the college has gained for it a national reputation in this branch of engineering. A number of students are now attending this institution because of the exceptional facilities offered along these lines. With the wide spread of interest in and use of radio as a means of communication, it is anticipated that industry will require a large number of electrical engineers especially trained in this branch. Indeed, at the present time the manufacturers of radio equipment cannot supply the demand, and much damage has resulted from the flooding of the market with cheap and worthless apparatus put out by incompetent and get-rich-quick dealers.

Radio Kindergarten

(Continued From Page 49)

thirty-two or even sixty-four feet long, but this is not usual, because very few persons can hear a tone produced by a sixty-four-foot pipe. Yet it is a mathematical certainty that if we make a pipe 125 feet long and use the same mechanical process for creating wave motion in the air, we are producing an effect which would be included in the word "sound" if our receiving instruments were made to respond to that wave length.

But they are not. And so neither is your radio receiving set built to respond to wave frequencies outside the range used by the broadcasting stations.

10,000 Miles in a Single Evening

The Magic Carpet of the Arabian Nights Is Yours

IT WILL CARRY YOU

in your own easy chair to Washington to hear the incomparable Marine Band—to Newark to visit the Man-in-the-Moon—to Los Angeles to listen to the latest jazz with the stars from Hollywood—to Cuba with the whirl of the tango and the click of castanets.

How many miles will you travel to-night? No satisfaction in guessing—no enjoyment in laborious computations.

THE SCALOMETER

Will Give Your Mileage—Instantly—Correctly

The biggest dollar buy in Radio


EMBLEM MANUFACTURING CORPORATION

Middle City Building, Philadelphia, Pa.

DURHAM Variables

Grid Leaks with a Guarantee

Little Gooey with the New "No..." We say...to be mentioned...

Durham Base, 30c Extra

Satisfaction Guaranteed

DURHAM & CO.

1970 S. 12th St., Philadelphia

DEALERS

Here's a product that you can recommend with the assurance of its radio engineering elements. And the clipping Durham is a real perform on the cash register. Write for details.

Write for a copy today

UPON request, our latest radio catalog will be sent gratis to those interested in constructing their own receiving sets.

The outstanding feature of our parts, aside from their excellent electrical characteristics, is the unusual method of mounting and time saving in wiring. All parts are illustrated and described in detail.

EISEMANN MAGNETO CORPORATION

WILLIAM N. SHAW, President

General Office and Factory, 52 33rd Street

Brooklyn, N. Y.
How Lively Is Your "B" Battery?

THIS IS NUMBER THREE OF A SERIES

Each Radio fan has different tastes and desires in Radio receiving. Those that demand maximum volume—and to get it use many tubes, fortified by batteries with high voltages on the plates—are eager and frequent buyers of Eveready "B" Batteries. Others renew less often—with smaller volume, and employing fewer tubes at lower plate voltages. Again, some will long enjoy concerts that others would not consider loud enough. Just what is "too much," and therefore needs fresh "B" Batteries, is purely a matter of personal opinion. These, then, are the things that determine how long you use your "B" Batteries—

1. The number and kind of tubes. The more tubes and the greater their power, the shorter the "B" Battery life.
2. The "B" Battery voltage. The higher it is, the more current flows from the battery.
3. The amount of negative grid bias ("C" Battery voltage) on amplifiers.
4. The life put into the battery in the first place by the manufacturer, and the freshness of the battery when you buy it.
5. The signal strength you wish. The smaller the volume of sound you enjoy, the longer you can use your "B" Batteries.

The life of any "B" Battery you can buy is affected by the above factors.

Eveready "B" Batteries predominate. There is more life in them—they last longer! Blocks of large cells, packed with energy, made especially for radio use, delivered fresh to your dealer, give you the most power for your money—power you can use loudly and swiftly, or softly and slowly, as you wish—Eveready for Everybody.

Note: This is Number 3 of a series of informative advertisements, printed to enable users to know how to get the most out of their receivers and batteries. If you have any battery problem, write to G. C. Parness, Manager Radio Division, National Carbon Company, Inc., 123 Thompson Ave., Long Island City, N. Y. Write for special booklets on "A," "B," and "C" Batteries.

"the life of your radio"

The Metal Case Eveready "B" Battery No. 706. The popular 22 1/2-volt Eveready Battery in a new durable, waterproof metal case. At all dealers. $3.00.

Eveready Battery No. 707. Contains 36 large size cells, as used in the popular No. 706. Voltage 41/2. Made especially for use using detectors and one or more stages of amplification. The most economical "B" Battery where 45 volts are required. At all dealers, $3.50.

Eveready Radio Battery No. 711. The Eveready "Three." The ideal "C" Battery. Voltage, 41/2—three terminals permitting the use of 15, 3, or 4½ volts. The correct use of this battery greatly prolongs the life of the "B" Battery. At all dealers. 70 cents.

Manufactured and guaranteed by
NATIONAL CARBON COMPANY, Inc.
Long Island City, N. Y.

E VERAD Y
Radio Batteries
—they last longer

Some Things I Think About the Radio Business

(Continued From Page 34)

will perform precisely alike. Instead of advertising the performance of the best one of his instruments, it would be better and safer, and far more constructive for a manufacturer to feature the accomplishments of his average instrument.

Radio manufacturers have given the public credit for being more mechanistic than it actually is. There are many prospective purchasers of radio equipment who have never considered or cared whether or not the machine does everything that one man can do. This class of people is so large that he has carelessly ignored it.

I believe that a great percentage of those owning and operating radio sets today are men with more mechanical training and knowledge. Many others, who would otherwise have been discouraged about looking at the seemingly complicated array of coils, condensers, tube-runners, etc., are on display at radio shops.

Then, again, the assembled sets (most of them) are not enough to throw a scare into even the average seasoned "ham." Have you ever noticed how easily three tubes, a simple three tube set, can be? The kind that you sit down to at 8 o'clock and try to tune in a station with an unknown name and have it away! Along about 11 o'clock you just make the grade—only to have it go off WEAF signing "HUNKER THREE.

You discover that you had neglected to finger one of the fifty-seven varieties of dials and controls. Recommendation number three is, therefore, to secure a self-contained set, as compact and uncomplicated as possible, and to back up this product with a guarantee that will relieve the prospective purchaser that no trained skill is necessary for the successful operation of the set. Fewer dials, rheostats, controls and incidental paraphernalia necessary to the operation of the set the better. The simple set is bound to be preferred by the masses. Most of our buyers are the young and still more limited knowledge of radio, and this must surely be taken into serious consideration, when marketing a radio product.

When a set is purchased by a dealer, a fan, the cost ceases with the transaction. Many sets in homes today are only partially satisfactory, and partially efficient purely because of the ignorance of the operator. Many have taken their set home, more or less carefully followed his hookup instructions, turned on the juice and in blundering luck. Insecure connections, improper placement of set, importuning tuning, all playing a grand part in the average radio failure. The dealer, when advised that the set is not working, calmly states that the set worked when it left his place and that he really is not responsible. Salesman number four follows naturally as a result of these observations. A salesman who does not realize the value of his apparatus is getting his chance to live.

Before the salesman should be invited, or even solicited, to bring their problems, their successes or their failures, he must know the position of the dealer selling them their equipment. A great number of complaints can thus be traced from the limbo of radio knockers. It warned my heart when I read an announcement in one of yesterday's newspapers that one dealer in New York City has seen the light and, on his own initiative, opened just such a service department.

Up to the present time most radio receivers have been anything but acceptable to the eye. The average living room is not improved in its appearance by the acquisition of the average radio outfit. Women, particularly, have protested most vociferously to the unsightliness of radio installations in the home. Ugly, leaking batteries, tangles of wiring, lead-ins, loops, "waste-traps," battery testers and all other "accessories" have tended to prejudice women against radio. In a great majority of cases, I must admit this prejudice has been well founded.

Recommendation number five argues for the improved appearance of radio sets—for compactness, neatness, good cabinet work, for beauty and simplicity. The obvious need for cord and interferer with house-cleaning, that clutters up the room and crowds other useful, as well as ornamental, articles into the background must always be a source of contention in the home. The manufacturer who produces for use in the average apartment or home cannot afford to give up this important aspect of his selling problem.

Stability, utility, simplicity, compactness, beauty, and price are milestones along the road to success of the radio of the future. I cannot help feeling the necessity for observing these common-sense signs in designing the merchandising and advertising of the radio sets for the future.

The average person radio is still a marvel—still but little understood, still an unknown quantity. Like all products with a similar status, it has certain very drastic prejudices to overcome. An intelligent handling is necessary to offset much of the unfavorable criticism of radio—as was the case when the locomotive, the telephone, the automobile and the airplane were no more than 10 years ago.

The problem of public incredulity and prejudice is not a new one, though it is comparatively new as applied to radio. Much can be used to profit from the experience of pioneers in such industries as the automobile and the talking machine.

Abner Armstrong sez—

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You've Got to See Your Mammies Every Night

Chorus by Sultan's Wives

"King Solomon would have had to pay an awful lot for Ear phones for all the kids, not for a song"

"Well" Ab sez "Las would have been a simple matter but taking them all to the manager an cheaper, for 40 per cent, must of been adults and even figuring' to get half far that's a lot of money, and they was no subways so I guess they used Camels. I don't know that Camel cost then but the're 20 for 15 cents now and if one of them should of suggested a coco-cola after the show there's a total loss of 50 bucks right..." I got no sympathy for him anyway" I see "Some Girls get dumboel to put red on their faces and some put red on their faces to get dumboel and he must've been a pair of dumboels and a few Indian Clubs thrown in."

"Well" I sez "Is there any wrong about Radio?"

"Yes" Ab sez "there's $2.229 wrong about Radio not countin' Tex Rickard's Yours for $10 in..."

C. D. TEEPLE
Single Control Radio Receiver

USING GRIMES INVERSE-DUPELX CIRCUIT

The Bristol Single-Control Receiver with Power Amplifier. Grimes Inverse-Duplex Circuit. The smaller picture shows how all connections are made in the rear, out of sight.

The Bristol Load Speaker

The Factory of the Bristol Company at Waterbury, Conn.

The Gift Perfect for the Perfect Christmas

The most complete radio receiving set with Bristol Power Amplifier as last stage. The last word in loud speakers—and only one control required.

THE BRISTOL COMPANY bought all of the ten licenses available under the Grimes patents and is concentrating on the GRIMES system.

THE MAN AND THE FACTORY back of this company are proof of the soundness of its products. There is no mushroom growth here, but a fine tradition and a record of years of consistent honor and integrity.

BRANCH OFFICES


Book Building—Detroit, Mich.

Bostons Book Building—St. Louis, Mo.


Rialto Building—San Francisco, Calif.

The Factory of the Bristol Company at Waterbury, Conn.