

Radio in the Home

Conducted by **HENRY M. NEELY**

DAVID GRIMES JOINS OUR STAFF



**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 VARIOCOUPLER**

••

STATION WLW

••

*Twenty
Cents*

RADIO IS THE NEW SANTA CLAUS

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

ONE OF THE
GERACO
 PRODUCTS



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

14" Model for the Home **\$30**
 (Light or dark-finish horn)

21" Model for Concerts **\$35**
 (Dark-finish horn only)..

GENERAL RADIO CORPORATION

Makers and Distributors of High-Grade Radio Apparatus

CHICAGO

PHILADELPHIA

S. W. Cor. 10th and Cherry Sts.

PITTSBURGH

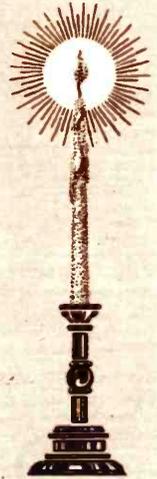
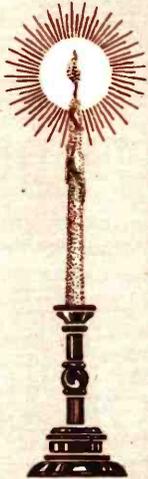
Music Master

RADIO REPRODUCER

RADIO IN THE HOME

VOLUME II

NUMBER VII



CONTENTS FOR DECEMBER, 1923

Radio in the Home of H. Rosendal-Dam, Astoria, Long Island - - - - -	Front Cover	Editorially Speaking - - - - -	20
David Grimes Joins Our Staff - - - - -	4	The Radio Committee of the Mothers' Club - - - - -	22
The New Grimes Inverse Duplex Circuit - - - - -	5	Another Great Broadcaster Will Soon Open - - - - -	25
The Studio Director—That's Me - - - - -	9	How to Wire Taps on a Variocoupler - - - - -	26
The Radio Kindergarten - - - - -	12	The Interscholastic Radio Association of America Makes Its Debut - - - - -	33
Now They're Directing Movies by Radio - - - - -	14	"Abner Armstrong Sez" - - - - -	34
Football From Field to You - - - - -	16	Some Things I Think About Radio - - - - -	36
The Multiflex Circuit - - - - -	17	Channing Pollock : Radio Enthusiast - - - - -	43

IN THE JANUARY ISSUE

- ☞ The new Grimes two-control circuit. Variometer.
- ☞ The Radio Kindergarten
- ☞ The Goodreau One-Tube Circuit With Split
- ☞ The Women's Clubs Hold Meetings by Radio

PUBLISHED MONTHLY BY THE
HENRY M. NEELY PUBLISHING COMPANY
 608 Chestnut St., Philadelphia, Pa.

Bell Telephone—Lombard 9481 Experimental Station (KXP), Delanco, N. J.
 Henry M. Neely.....President and Editor David Grimes.....Contributing Editor
 C. W. Kraft.....Secretary and Treasurer Norman Neely.....Art Editor
 Franklin H. Supplee, General Representative Theodore F. Volton.....Technical Assistant

Radio in the Home is sold at 20c per copy at all newsstands, radio shops and bookstores. Subscription in the United States and Canada, \$2.00 per year.

Printed on the rotogravure process of the Public Ledger, Philadelphia, Pa.
 Copyright, 1923, by the Henry M. Neely Publishing Company
 Entered as second-class matter May 29th, 1922, at the Postoffice, Philadelphia, Pennsylvania, under the act of March 3, 1879



Here is the "Radio in the Home" family out at Station 3XP, Delanco, New Jersey. From left to right they are Henry M. Neely, editor; Theo-

dore F. Vollen, technical assistant, and David Grimes who joins the staff to write about his inverse-duplex system.

David Grimes Joins the Staff Of Radio in the Home



ONE 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 neutrodyne 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 Cor-

poration 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.

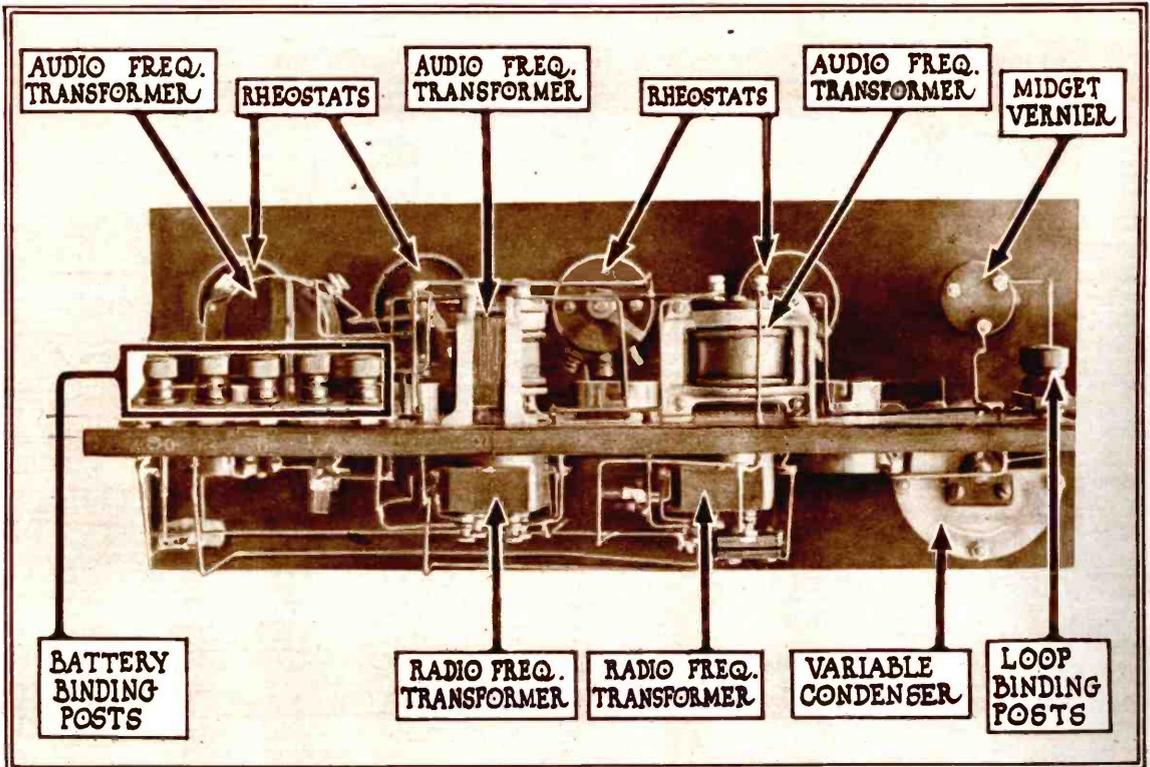
On the next page of this issue we are showing the new version of the first Grimes circuit as published in the June issue of this magazine.

Next month we will show a new Grimes system, using two controls instead of the one shown here. These two 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.



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.

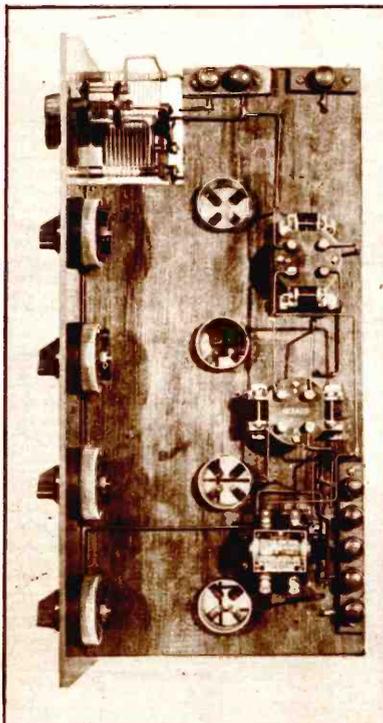
We first tried one of the best of standard makes of transformer with the windings wound horizontally and with metal "butt-ends" and we found considerable interference in the tendency of the magnetic field to "stray," due to these butt-ends.

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



To the left, looking straight down upon the baseboard, showing the tube sockets and audio frequency transformers

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.

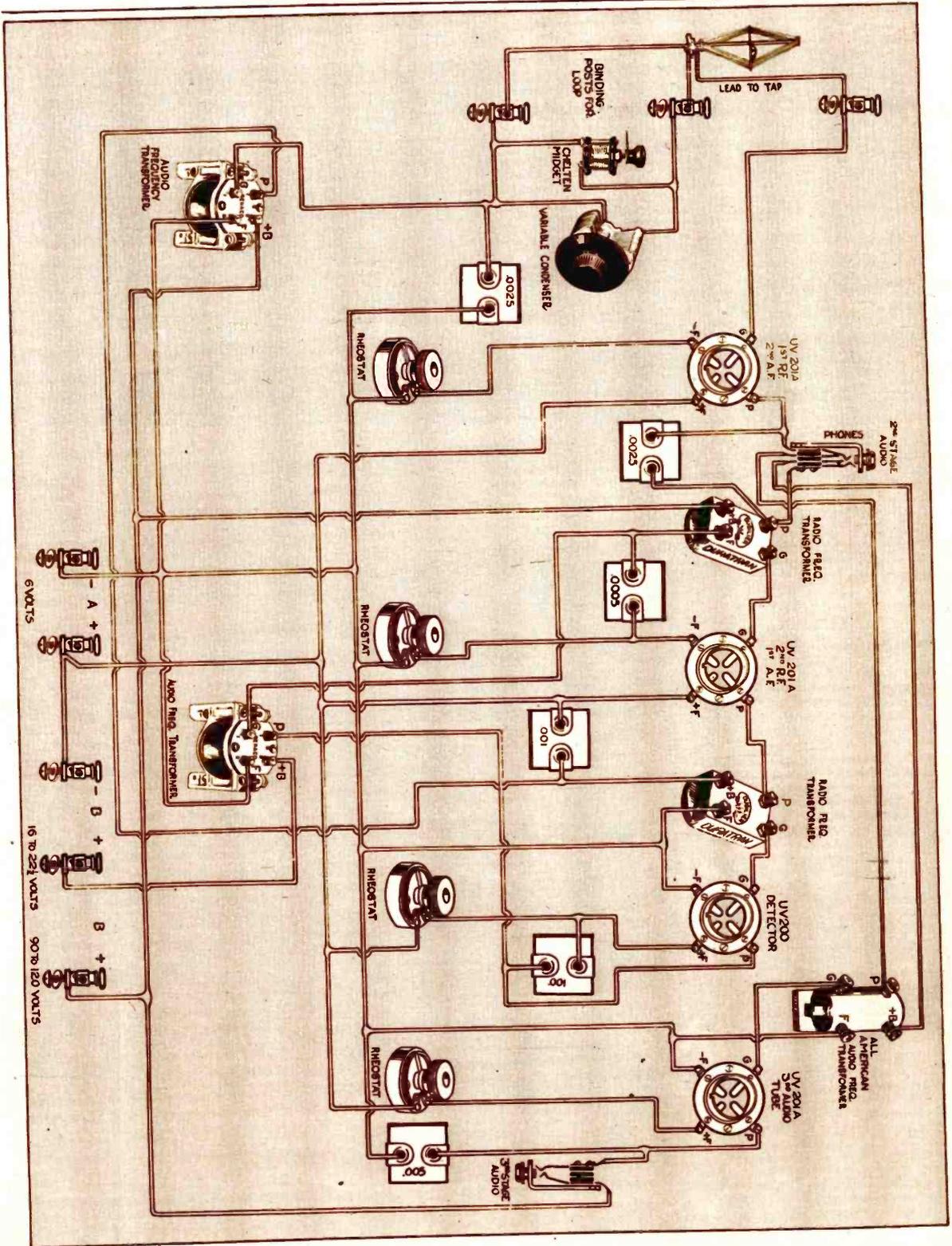
Before going into the matter of wiring up this circuit and operating it, let me say that Mr. Grimes will be very glad indeed to receive any questions you care to ask after you honestly try to make the set work and hook it up exactly as shown here.

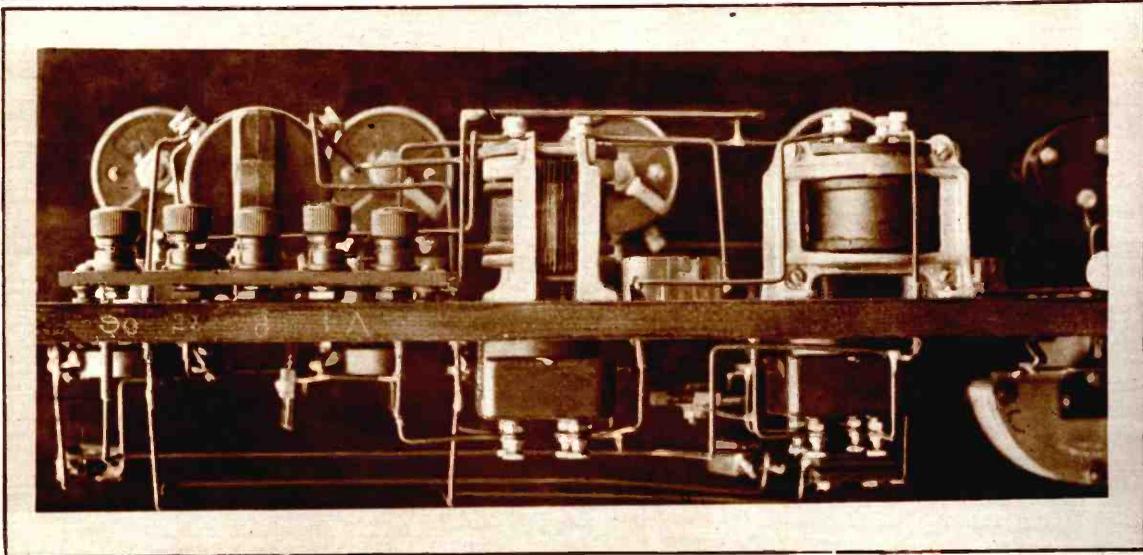
Please understand that this job of answering questions from readers of this magazine is getting to be a tremendous one, and it is only fair to request that you do not send Mr. Grimes any questions until you have done your utmost to make the set work from the instructions given here.

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)

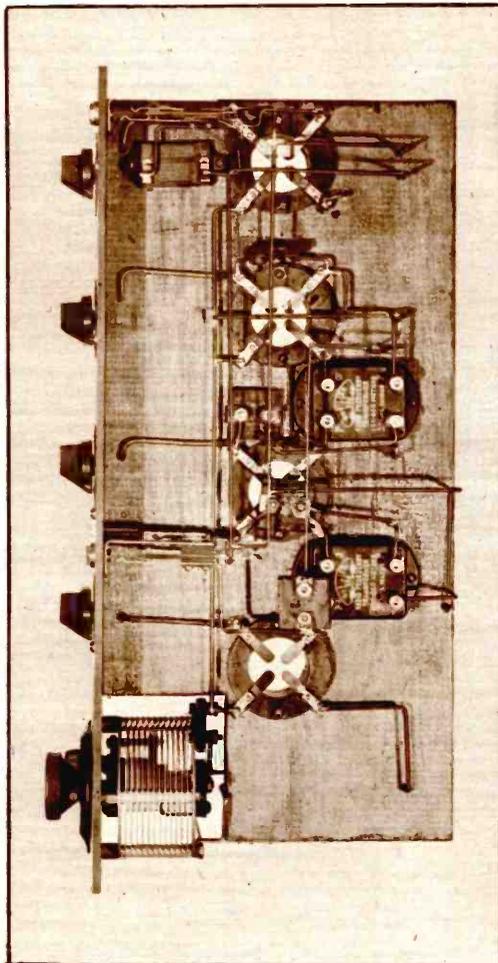
doing all of your work for you. The only thing you have to do is to take your panel and lay it off with a ruler or scale, the same as we have done, and drill your holes.

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 these 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 signals louder to the ear. Radio frequency amplification does not make the signals 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.

(Continued on Page 22)



The Studio Director—That's Me!

By FRED SMITH

Studio Director of WLW,
Cresley Mfg. Co., Cincinnati, Ohio

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 Brauning. 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' hall, 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



Above is the Elmer Aichele Novelty Dance Orchestra, a feature of WLW

—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 com-

pany 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.

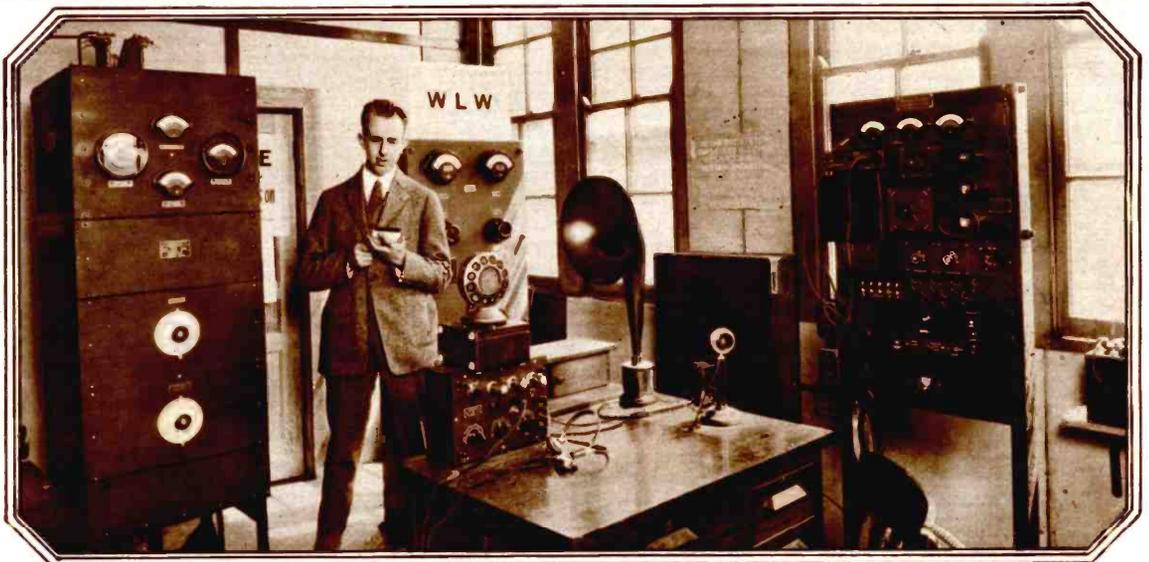
The very first one almost met its Water-



Above is Kathryn Reece, one of WLW's popular singers

To the left is the Conservatory Mixed Quartette and to the right is the Instrumental Ensemble from the Cincinnati Conservatory of Music—all popular features of WLW





Powell Crosley, Jr., in the operating room of the station at WLW, Cincinnati, Ohio

loo. 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. So, 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

(Continued on Page 22)



Above is Fred Smith, studio director of WLW and originator of their radio plays

To the left is shown a group of children giving a play for kiddies

To the right is the regular dramatic company of WLW under the direction of Helen Schuster Martin





Station 3XP, Delanco, N. J., the test station of RADIO IN THE HOME.

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

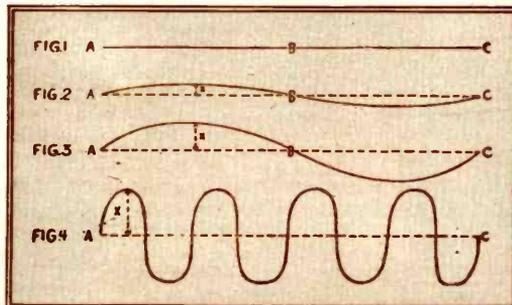
every minute shows whether the heart is functioning normally or not. And yet he considers the result of his count not by any set rule, but by a great many combinations of circumstances.

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 sitting than when we are standing 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



These illustrations, as explained in the accompanying article, give an idea of some of the aspects of the motion of ether waves

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.

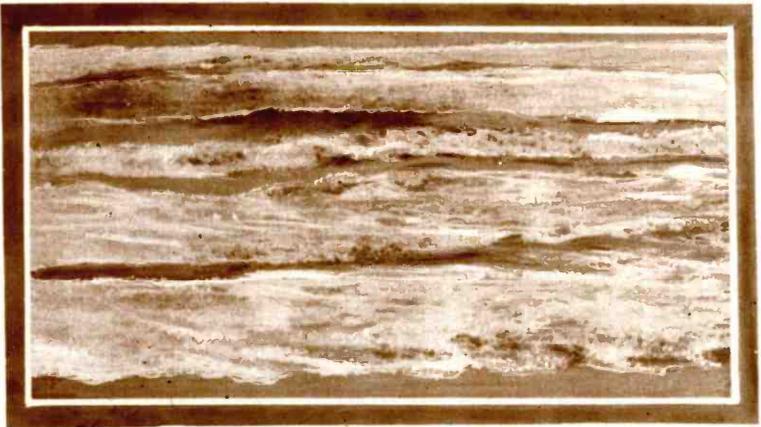
As the machine ran faster and faster this sound would gradually cease to be a low humming sound and would grow higher and higher in pitch and if the machine ran fast enough the pitch would become a shriek.

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 E, 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 in explaining the fundamental principles of other waves by comparing the ether to the ocean.

Let us suppose that we start out on a fishing trip on a beautiful calm 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 the straight line in Figure 1 in the illustration on Page 12.

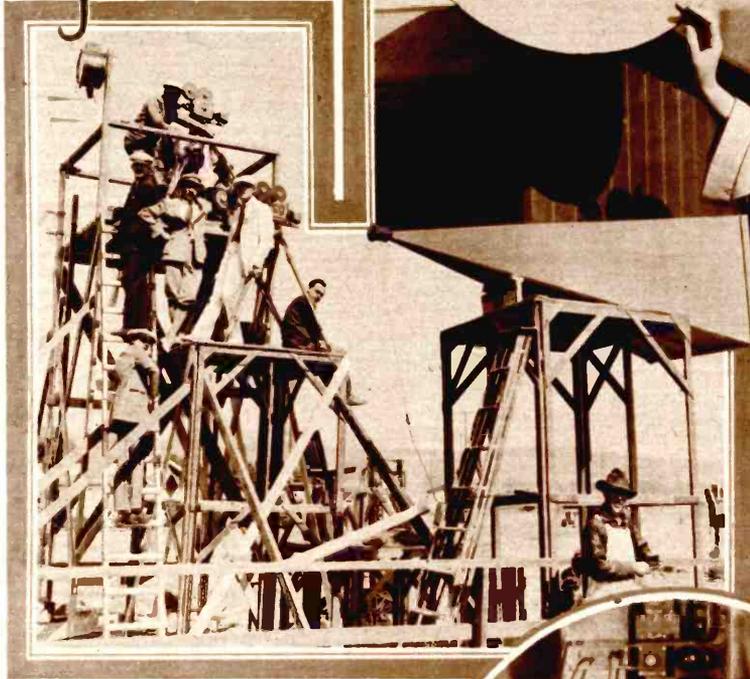
After we have fished for a while we will be conscious of the fact that the boat is slowly and easily rising and falling and as we look around us we see that there is beginning to be what we call a "swell" on the ocean. As this swell begins, the surface might be represented by Figure 2 in the illustration.

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 32)

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



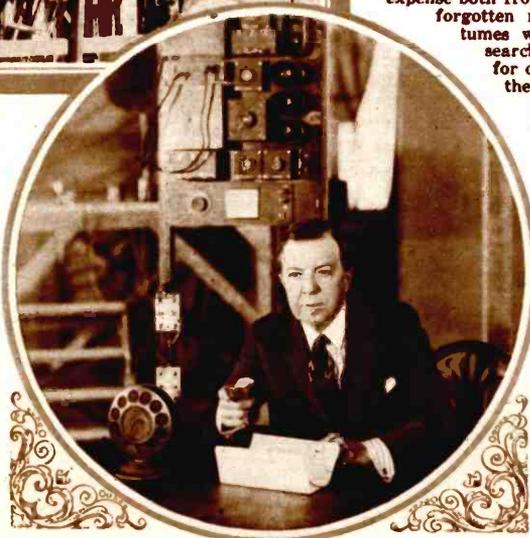
The call-boy has left his job in the Hollywood moving-picture studios. No matter where the assistant director is, when he wants an actress or an actor to report on the set, he calls by radio, and these loud speakers in the various parts of the dressing rooms boom out the name and the orders as the call-boy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

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.

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.



Expert 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.

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 \$950, 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. Heretofore 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

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.

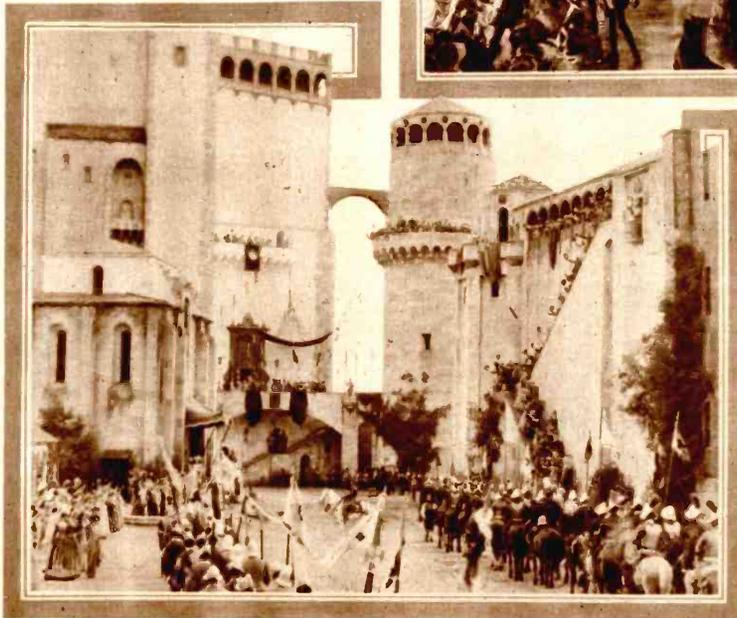
For instance, the Goldwyn lot is the biggest in the industry. It is so big that

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!

Julanne's plan is a splendid one for the actors, but what about the poor assistant directors, who have to walk three blocks



Emmett Flynn directed this great ballroom scene by radio in a time which was only a fraction of what would have been required had he had the usual number of assistants stationed in various parts to relay his orders



When Madrid cheered as Don John led the Spanish army home after a campaign against the Moors, they needed no direction, but in this huge reproduction for the movie story of "In the Palace of the King" all of these mobs in the various parts of the vast courtyard were directed by means of radio

at least from the set to the row of dressing-rooms (which in itself is two blocks long) whenever they want to call an actor to the set. After arriving there absolutely exhausted the poor souls have to go howling names down its green-and-white length!

But this is all solved now. The assistant director merely goes to his little radio and gives his calls in a perfectly ordinary tone of voice and the calls are boomed out by loud-speakers about the dressing-rooms.

And, finally, during the noon lunch hour, they tune in on KHJ (the Los Angeles Times) and KFI (the Examiner) and all the workers of the studio gather on the lawn around the big horn to enjoy the splendid concerts given by both broadcasting stations.

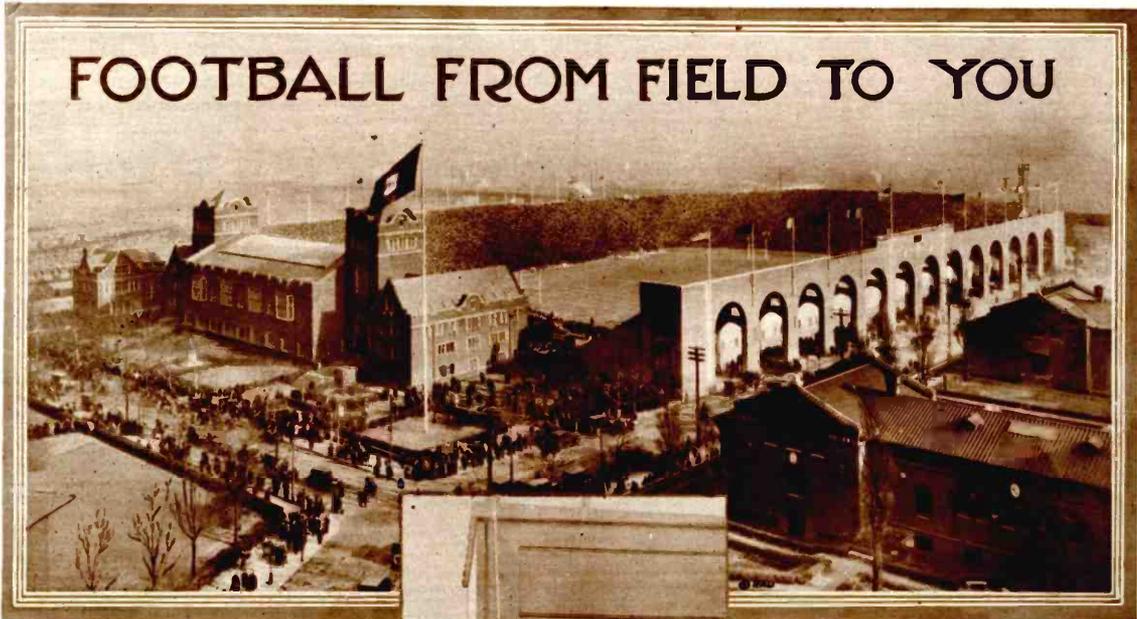
These noon time concerts are increasing the number of radio fans in the moving picture colony very rapidly. The uncertainties of the demand upon the time of a moving picture actor or actress makes radio an ideal adjunct to the home, because, with two such fine stations broadcasting, it is always possible in the few moments of relaxation to tune in something which will soothe the weary, jaded nerves.

Most of the best known stars have quite elaborate outfits in their homes and I am going to tell you from month to month in this magazine something about these installations and what their owners think of them.

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

Julanne 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

FOOTBALL FROM FIELD TO YOU



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 is 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

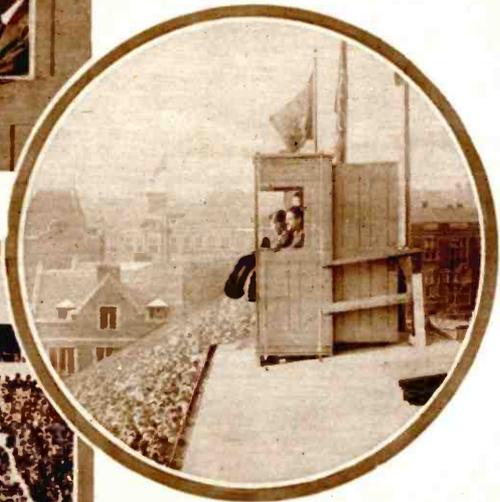


Above—An airplane view of Franklin Field during a big game

Circle—The announcer's booth on top of the press stand at Franklin Field

Left—A close-up of the announcers. The man leaning forward is John R. George ("PN announcing") and the one to the rear is Henry M. Weisig ("HEN announcing"). Editor of this magazine and Director of station WIP

Bottom Left—The announcer's booth is quite far up above the crowd of football enthusiasts



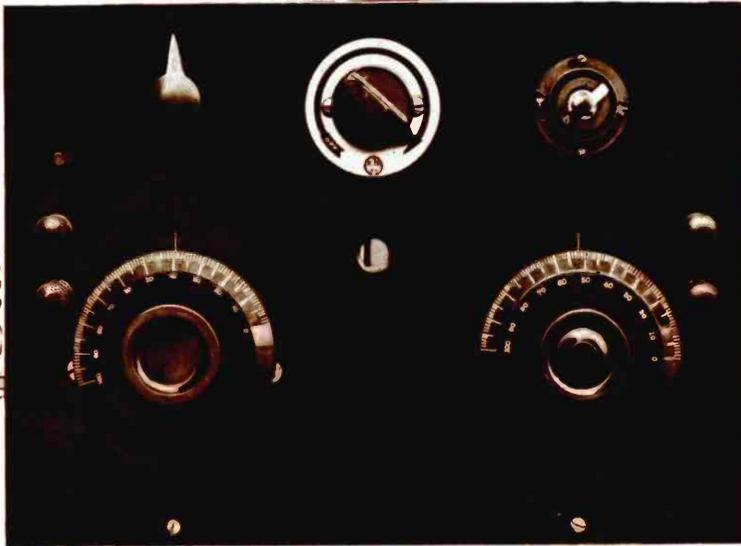
which the description is given, and they show in it only the microphone.

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

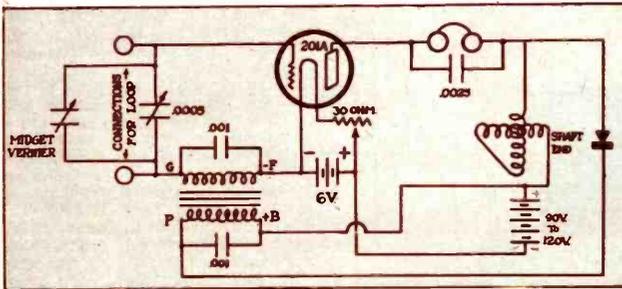
volume to bring in stations such as New York and Pittsburgh with wonderful volume on a small eighteen-inch loop.

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 & Kaufman Company, of New Haven, Conn.

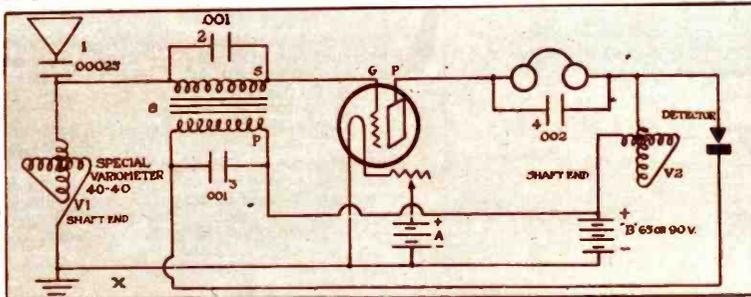
There have been published in almost every radio magazine in the country certain one-tube reflex circuits. This one does away with the expense of buying a radio frequency transformer. We are using the variometer in this circuit as the tuned plate and at the same time it brings in regeneration.

This circuit employs a crystal for a detector, and this 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 Multiflex Tuner

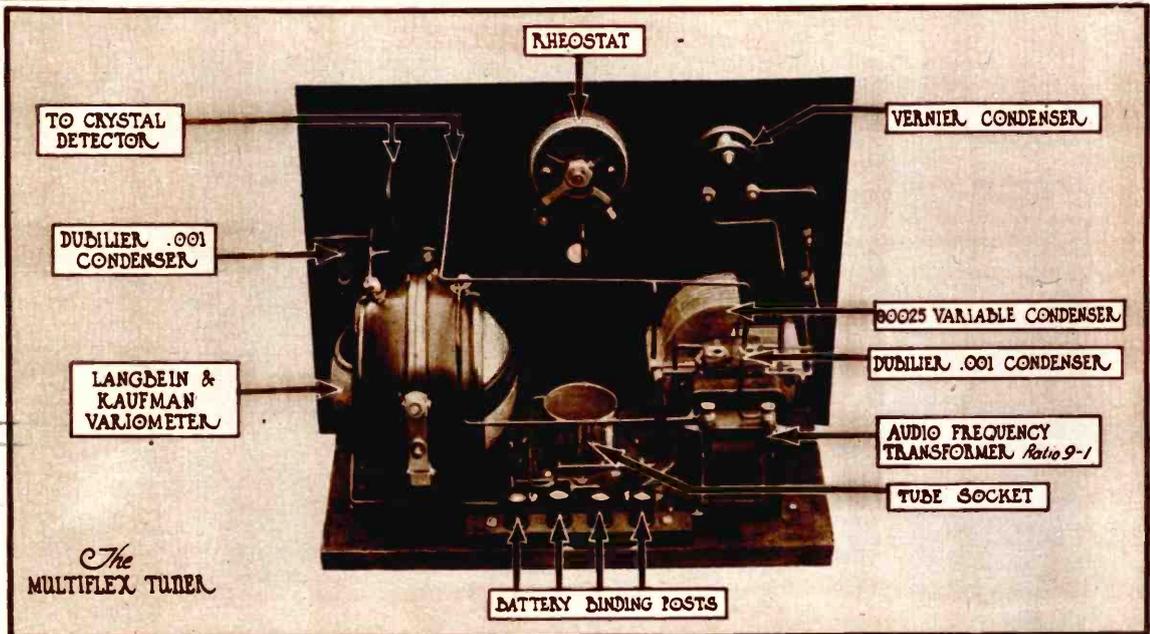


Schematic diagram of Multiflex circuit as developed at Station 3XP, Delanc, New Jersey



The original Multiflex circuit as submitted by Mr. Kearney. This was designed for the UV199 or the WD12 tubes. For other tubes, Mr. Kearney recommends a 200 to 400 ohm potentiometer in the place marked "X."

The aerial variometer must be specially wound with 40 turns on rotor and 40 on stator. All condensers are Dubilier Mica d.o.n.s. No. 8—preferably a 9 to 1 ratio audio frequency transformer. Smaller ratio will work, but not so well.



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 we mounted the crystal on 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 Flather 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

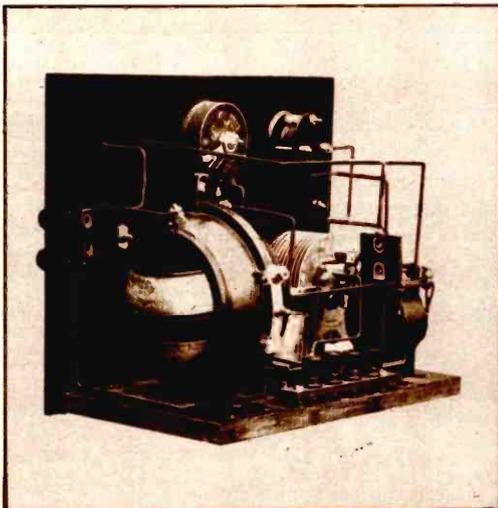
small Chelton midget condenser to act as a vernier. Really this circuit on distant stations tunes so sharp that it would be advisable to have a vernier condenser on top of the vernier. That is to say, we should really have a condenser of finer value than even the fine adjustment on the midget.

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-



Above is a three-quarter view of the Multiflex circuit as hooked up at Station 3XP, showing the Langbein and Kaufman variometer

EDITORIALLY

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 merchandise 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

There are over one million families home in the United States where it is possible to work into the air and bring right into the homes of the family, the best entertainment and educational features of the world—specifically yours!

The air is full of fun things. The invisible waves come and stream without interrupting one with the other. A radio-receiving set brings these home to you wherever, and as long as, you wish.

There you sit faced up to an eloquent speech on "American Liberty." It is beautiful, but pathetic. By a slight shift of the dial, which turns you on to another wave length, you can listen to music in another language; a Spanish song from Cuba, or perhaps an announcement in French from Montreal. Another slight turn of the dial and your home is filled with harmony from a quartet concert, or you are listening to a sermon by a famous preacher.

Your children in the air—on admission free—are drawing and taking the street car down town—no money, almost an unexcused lesson—no keeping tablets in address.

You sit and bring you one of those marvelous captions which so thrill you with the power and extraordinary possibilities of radio.

In East Harlem, Alaska, recently a family listened to a concert from Mexico LIVE in its home. There have been times when WEAP at New York has been heard plainly 1,400 miles away at Albany, Oregon. There are some of the unusual gifts that radio may hold for you. And the air is full of these wonderful things you shouldn't miss.

Remember following someone of world interest—General Clegg on a distant air if you sit in a big—handball and football games play by play—latest market quotations—news on forthcoming features on an infinite variety of subjects—the music of the theater—a sparkling orchestra, or a superb organ recital.

There are only some of the million messages of which the air is full, and which you may enjoy only if you have a radio receiving set, which reaches into the ether and brings you your heart's desire.

A good radio set puts you in touch with the great and of humanity; your home and family you brought into contact with the heart of the world. That a good radio set of reliable construction, and bring the wonders outside into your home.

The battery is the vital part of any radio receiving set. Eveready Batteries—especially modeler-Batteries—serve better, last longer, and give better results.

NATIONAL CARBON COMPANY, INC.
1000 WEST 10TH AVENUE, DENVER, COLO.



"THE AIR IS FULL OF THINGS YOU SHOULDN'T MISS!"

If you will read these ads, 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?

Of course, if you have headphones on your Radio receiving set you can hear perfectly, but the family can't get much fun out of listening your child repeating to you lines to a four corner, a ball, that's dangerous, a table square, or a wonderful shape. You may tell them how good it was afterwards, or you may let your wife or one of the children take one of the phones and have part of it. But most times half of my enjoyment is wasted!

That's why you can't afford to be without a Loud Speaker for your set. Get three of them in the joy of the good things that come to you freely and at the air.

With a Loud Speaker you can fill the home with harmony. When you tune in on that famous jazz orchestra, everyone can dance. With your family or friends about you can all enjoy grand opera, or a lecture, or even President Harding speak. The loud speaker makes possible the pleasant course of the music, and you can tune it down, just by turning a dial, so that it is a delight to every ear.

You don't have to sit and listen. With a Loud Speaker turned on you may have music at your dinner table; your wife goes on with her sewing; the children may listen while they play; it is an added pleasure to the home you've already loved.

A Loud Speaker makes your radio set a wonderful boon to the whole family. It makes your home an added delight to your friends. The Loud Speaker has increased many fold the joy of working into the air, and introducing into your home any one of a thousand harmonies.

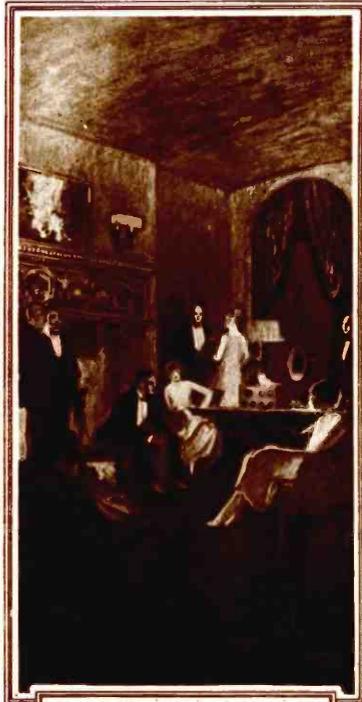
It's good to share your thoughts with others—especially with your own folks—that's why a Loud Speaker makes you a better father.

Just think of all the joy that is passing invisibly about your head and over all the streets and night in town, but yet you can make all of these joy-balls and continents full if you have a radio set, only the entertainment will be better and better if you've a Loud Speaker so that others may share your joy.

Any radio set made by a reliable manufacturer is what you need. A million homes already have radio sets of one sort or another. As for you you get a good Loud Speaker with your set. The famous radio with all its exquisite modifications comes over it as clear as a bell.

The battery is the vital part of any radio receiving set. Eveready Batteries—especially modeler-Batteries—serve better, last longer, and give better results.

NATIONAL CARBON COMPANY, INC.
1000 WEST 10TH AVENUE, DENVER, COLO.



"THE AIR IS FULL OF THINGS YOU SHOULDN'T MISS!"

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.

SPEAKING

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 blights of radio."

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

Over one million homes in the United States are already equipped with radio receiving sets. There are several hundred broadcasting stations filling the air with this modern miracle!

The result is that the great body of American people are daily becoming better informed than any other people on earth. They eat, when just by listening a dial on the console and beautiful melodies in the living room, they can hear the best music the world has to offer; become on a wide variety of subjects by suitable bands of thought; high class entertainment from the theatre and concert halls; speakers by thousands the world of finance; up to the minute reports on the world's markets—the latest news in the field of sport.

The strides made toward the highest ambitions of the radio engineers within the past few years have been marvellous. Platters and discs have worked side by side to make radio receiving a universal boon, satisfying the intellect and enlarging the horizons of all who are willing to enjoy it.

The radio receiving is wonderful! Practical perfection is here. The set is fitted with dozens of valves which, if you have a radio set, you are privileged to enjoy and bring into your home for the recreation of your family and friends. And it is all perfectly free!

With radio so perfect that it is bringing delight 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?

The radio is here—Radio has reached a state of perfection that is marvellous. And the first step is to make sure that no listener can be so unfortunate as to be unable to enjoy it.

No unaided wiring—an intricate machinery—no hand-cranked valves—no attractive glass—no impurities for the living room.

There are different kinds of radio sets, all made to suit you on the market. Buy one of those that is made by a reliable manufacturer: that is, get a radio receiving set and join the great and ever-growing invisible audience that is enjoying the greatest miracle of modern science.

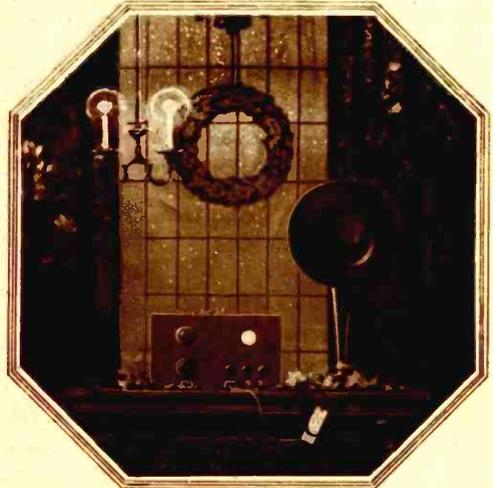
The great thing of the world now offers the simplest. Radio is one of them.

The battery is the vital part of any radio receiving set. Eveready Batteries—especially made for Radio—more better, last longer, and give better results.

NATIONAL CARBON COMPANY, INC.
1000 HUNTER BUILDING, N. Y. C.



"YOU CAN ENJOY THE MIRACLE OF RADIO BY YOURSELF."



The Radiant Christmas Gift

The radiant Christmas happiness that should be the portion of yourself and your family and friends can be brought through the modern miracle of Radio.

You can enjoy this Christmas a perpetual benefit by the gift of a radio set.

A radio set is not one but a multitude of blessings. It makes you and your friends partakers of the goodness that are passing through the air in radiant waves with the speed of light.

With the home a radio set will every day justify a Christmas spent every day in the coming year. Present one as a Christmas gift to a friend and

it is a hundred times as many a number of the greatest pleasures in the world. It may hundreds of miles by every direction over ships and planes across land rivers and over the islands of the sea, the absolute assurance of joy for the recipient where he is.

From a hundred places of worship on Christmas they will flock back by radio that even a wandering stranger of Peace on Earth, Good Will to Men.

By the medium of a Loud Speaker that beautiful music of the Christmas season—"Hark, the Herald Angels Sing"—will permeate the atmosphere within the sanctity of your own home.

That's where all of about your Christmas gift.

The Radio set makes your problem. There is a set to suit your purse and your tastes. There is a set to suit the conditions of the place you get.

There are radio sets, all ready to install, set on the market. Let any one of these made by a reliable manufacturer and you can't go wrong. It will be a Happy Christmas and a New Year!

The battery is the vital part of any radio receiving set. Eveready Batteries—especially made for Radio—more better, last longer, and give better results.

NATIONAL CARBON COMPANY, INC.
1000 HUNTER BUILDING, N. Y. C.

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 delight 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)

should have such a set with a loud-speaker that your family and your friends may come in and enjoy it also.

Here is the breath of the spirit of social life in America. Here is an appeal to that instinct which has helped us to build the most beautiful homes in the world. Here is that pride in our own surroundings and our own friends and family that has made the



"Mrs. Billie Young, who looked just like her name, went home in a thoughtful mood."

The Radio Committee of the Mothers' Club

By SIDNEY LEAR

"IT IS my firm belief," said Mrs. Burns-Johnson, in conclusion, "that for the above-mentioned reasons, jazz is largely responsible for the reckless, rash and undisciplined behavior of our young people."

She sat down as emphatically as she had read her speech, and gazed about her, stern disapproval of "our young people" in her winking eyes and tight-lipped mouth. The audience applauded dutifully, many in earnest, some because they were dutiful.

Mrs. Burns-Johnson had been reading a paper on the manners of modern young people before the Mothers' Club, of which she was a precise and exacting member. She held the wave of jazz, which she declared has swept the country like a cyclone, responsible for the wildness of young girls and boys. It excited them, roused their emotions, she said, made them restless and anxious for excitement. Having got into this state they were reckless, heedless of law and order, contemptuous of discipline and courtesy and obedience, intent only upon their own pleasures. It wouldn't be so bad, she admitted, if they weren't constantly coming in contact with this "barbaric noise." But they heard it whistled along the street, they went to theatrical performances that specialized in it, they danced to it, they brought home Victrola records of it, and as for radio—well, Mrs. Burns-Johnson literally held up her hands in despair. Why, every time you listened

to a concert, hoping to hear something really worth while, there was nothing but this uncouth wailing of horns, crashing of cymbals and drums, no music, no rhythm, just horrible, ugly sounds! She was scarcely able to express herself on the subject.

Mrs. Billy Young, who looked just like her name, went home in thoughtful mood. She had joined the Mothers' Club because she was the mother of a child of one busy, inquisitive, obstreperous year, and she thought maybe she would get some helpful ideas about bringing him up. Hence, the talk on modern young people had merely amused her since she was so recently a modern young person herself. But she was also a music lover, and a radio fan. She played well, loved really good music, but at the same time would rather dance to good peppy music than almost anything she could think of without more than a minute's notice. And there were some subjects upon which she did not agree with Mrs. Burns-Johnson at all. She remarked this at the dinner table that evening.

"Billybumps," she said absent to her husband, right in the presence of the one maid, which embarrassed him frightfully, "do you thing there's too much jazz on the radio?"

"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 specially 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 having 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 dreadful 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

anyhow she said it beautifully. All 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 con-

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 like 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 herself that everybody approved of what she had said and began to discuss it so wholeheartedly 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—is 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 better 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 floundered through a complicated motion, which was promptly seconded and carried. Mrs. Burns-Johnson wore an expression of astonishment upon her tight-lipped face. It had never occurred to her that something might be



"But she could think best when she was at the piano, playing softly."

certs 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.

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. Burns-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,

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 eats 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

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 in the modern home. It makes presidents, premiers, ambassadors and the world's greatest thinkers and artists members of the family circles all over the country. The picture shows radio in the home of Louis Woertz, 3445 Trimble Ave., Cincinnati, Ohio.

and it sort of has the idea of improvement without actually saying it—don't you think so, Mrs. Burns-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.

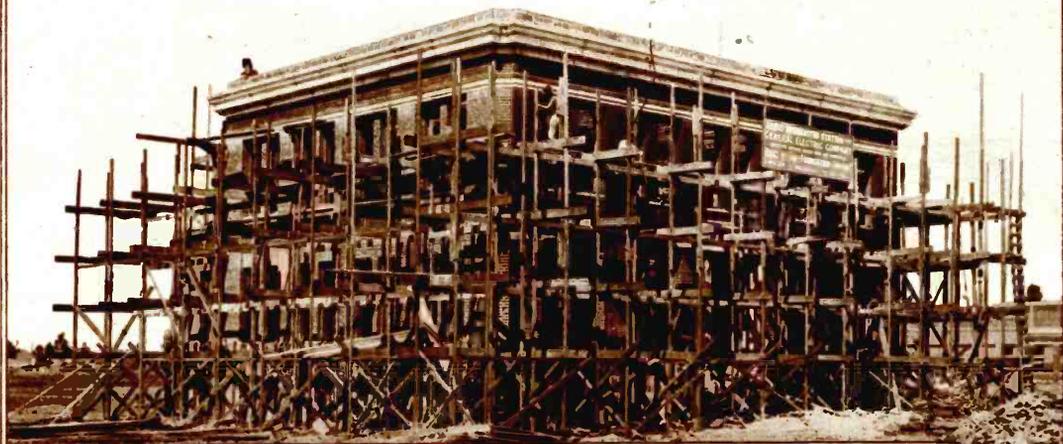
And so it was decided, but the president wisely announced that she would wait until the next meeting to hear Mrs. Young's plan. As Mrs. Young had absolutely nothing definite in the way of a plan, she winked a silent vote of thanks to the president, who was the mother of her best friend, and stopped blushing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

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

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 and jumped up from the piano stool. Billy, brushing tobacco off his clothes, picking 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 grouchy light in his eye when she returned, but she saw it first and bore him

composers, or a musical composer, or something or other like that, after a series of lessons on the subject given via radio by a well-known music teacher or musician, it surely would change the tendency of all musically inclined children toward the more educational music. And the others you couldn't change anyhow, so why worry about them? The idea still was not crystal clear. Mrs. Young expected to leave much of the working out of it to the director of the broadcasting station, but she had the germ of the great idea, and also the enthusiastic interest of the Mothers' Club. There was no doubt that a prize

(Continued on Page 25)



Another
Great
Broadcaster
Will Soon
Open

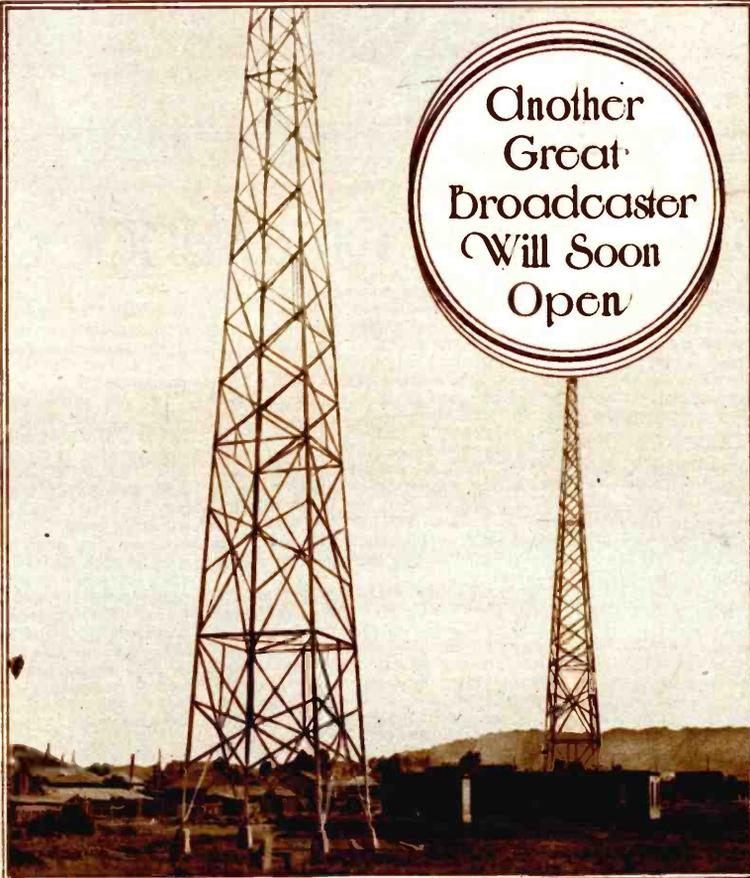
Radio fans will soon hear another broadcaster on the air when this new station, being built by the General Electric Company at Oakland, California, will open. The plans now are to have this station on the air about January 1st.

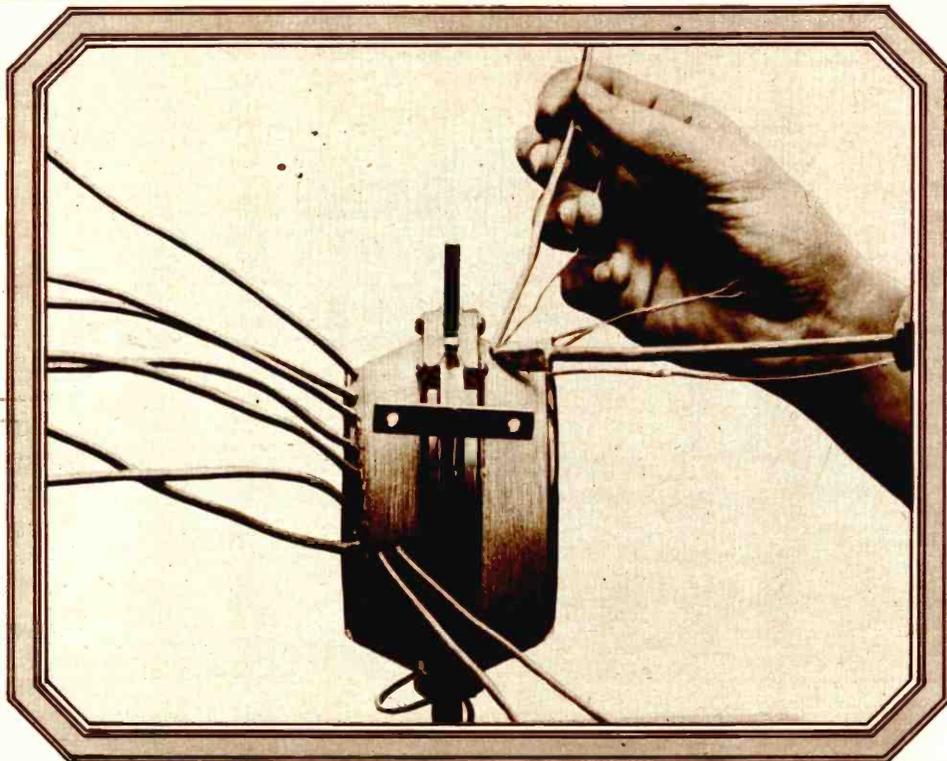
This station will be virtually a twin to the General Electric station, WGY, at Schenectady, and a third station, which will be almost a duplicate as far as apparatus and power are concerned, is under course of construction at Denver, Colorado.

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 the 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.





The above shows how we solder the terminals for the switch connections to the loops on the primary of the variocoupler

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 just 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.

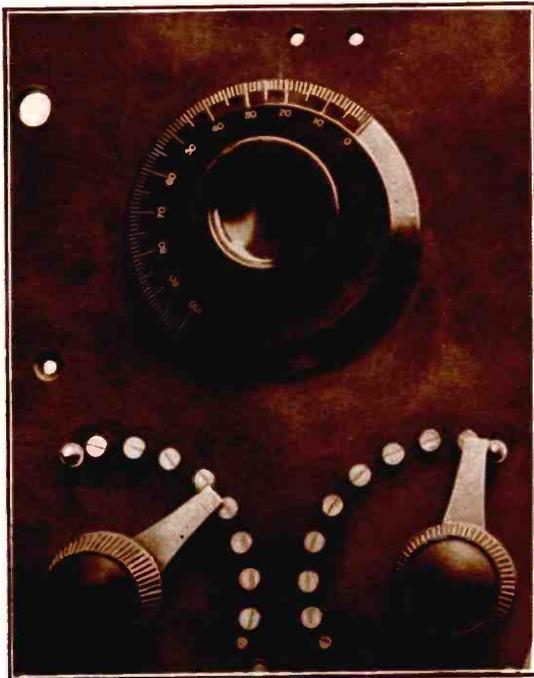
Then tin the end of the wire the same way, reheat the iron, place the tinned end of the wire up

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

This shows the method that is to be used in tinning the soldering iron

After the parts are mounted you are ready for wiring.



Above are the switch contacts and switch arms from a front view of the panel

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 specifications 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 of 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 fastened 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

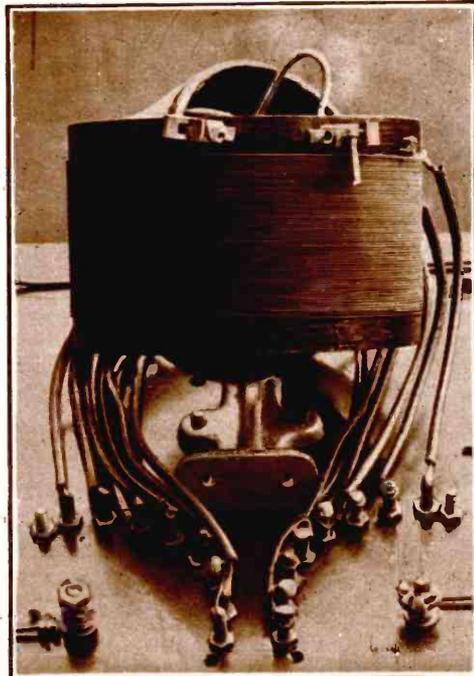
taps on the panel, a good suggestion would be to take a test phone and see if they are perfect. Go over the connections from the variocoupler where you have soldered the lead and see if that connection between the lead where you have soldered it on to the variocoupler and to the switch contact is electrically 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 joints. This must be remedied before you can go ahead and finish wiring up 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

(Continued on Page 37)



Showing the rear view of the panel with the leads from the variocoupler wired and soldered to the switch contacts

If, however, the radio frequency and detector circuit are working properly, then it is safe to say that you 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 lay-out of 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

The New Grimes Inverse-Duplex

(Continued From Page 8)

bottom we have the double circuit jack, and this jack is made by the Pacent people. This jack can be either a Carter jack or a Pacent jack or any other standard jack, though I personally prefer the Carter.

Now turn to the photographs that show the view looking down on the baseboard of the set; we find that we have four tube sockets and then be-

hind these audio frequency transformers. This is the transformer that amplifies the first stage of audio frequency. Then alongside of the third tube socket we have the last tube socket, which is the third stage of audio frequency amplification, and behind this we have mounted the All-American audio frequency transformer, having a ratio of three to one.

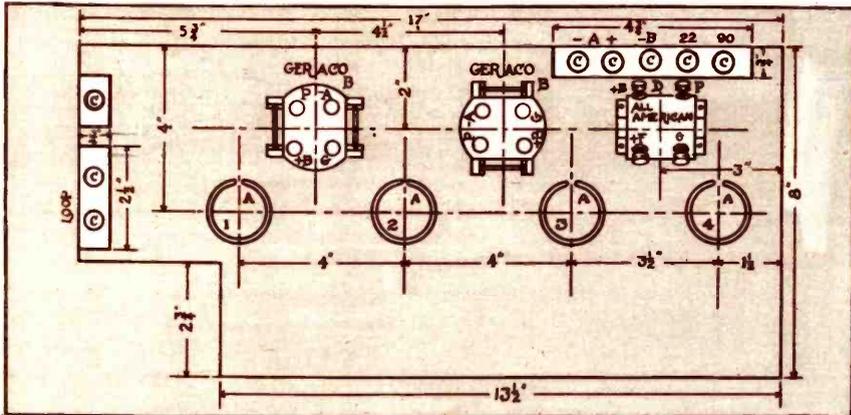
three of these are very good tube sockets and have minimum losses.

The first tube socket, that is the one next to the side of the baseboard that has the corner cut out, is the first radio-frequency tube and the second audio-frequency tube. Now the next tube socket to this one is the second radio frequency tube and the first audio 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 also is the Dubilier Duratron.

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

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, 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. So 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 run any possible chance of ruining the connections of the fixed condensers.

Then in the corner opposite the one which we have cut out on the baseboard you will find another fixed condenser. This fixed condenser has the value of .005 and is made by the Du-



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

seems that the old circuit was very good on the UV201 tubes, but about the time Mr. Grimes came out with his circuit, the UV201 tubes were taken off the market and as the new UV201A tubes were better amplifiers than the old UV201 tubes, the circuit would howl and be very unstable. So Mr. Grimes had to get busy and devise a circuit that would work with the A tubes. He hit upon the idea of tapping the loop. The potentiometer resistance was not enough to control the overloading of the tubes.

So by tapping the loop and running the wire to the grid connection of the first tube socket he was able to control the incoming radio energy very nicely. That explains the third connection of the loop.

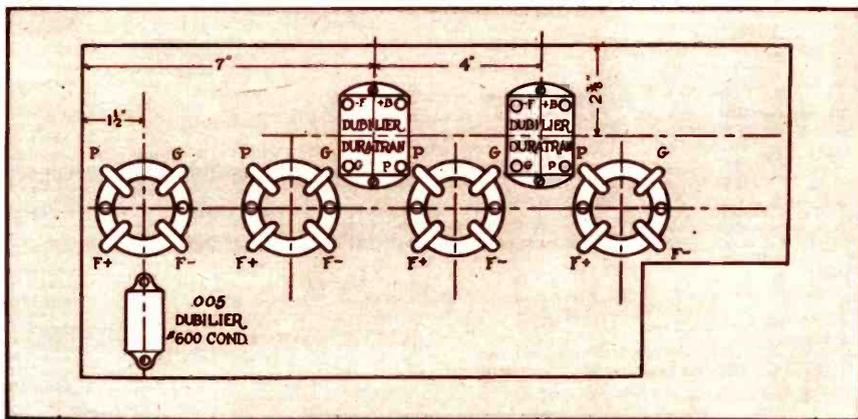
In tapping this loop start with the inside turn and take a tap off every turn up to the thirteenth turn. That is, if you use a loop having twenty turns, if you use a larger or smaller loop, tap five-eighths of the total number of turns on the loop.

In connecting the loop to the circuit I found that the inside connection of the loop should go to the movable plates of the variable condensers. When you are using your set and you find that the signals are mushy and not clear, move the switch taps back and forth until they are clear.

This tapping the loop has the same effect as the potentiometer had in the original Grimes circuit.

Let us look at the accompanying photographs. Looking at the front view of the panel you will see at the top we have a Chelton midge condenser. The next four knobs to the right of this midge condenser are the new Pacent rheostats that control the filaments of the tubes. In the lower left-hand corner we have the variable condenser, and this is a 22-plate condenser, which may be of standard make.

In the center of the panel near the



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.

hind these tube sockets we have three audio frequency transformers. Now looking down on the top of this set we have in the left-hand corner in the center three binding posts. These three binding posts are for the loop connections, and then we have a tube socket which is the first radio frequency tube that carries the input of the radio frequency from the loop and also carries the second stage of audio frequency amplification.

Next to this we have the second tube and this is the second stage of radio frequency amplification and the first stage of audio frequency amplification. Behind these two sockets we show the second audio frequency transformer.

Next to the second tube socket we have another tube socket and this is the detector tube, and mounted behind this we have another audio fre-

quency transformer. Behind these audio frequency transformers we have mounted on a strip of hard rubber five Eby binding posts. These binding posts are connections for the filament battery and the B batteries and they are as follows, reading from left to right: first is the minus A battery and next is the plus A and the next is the minus B and the fourth is the plus 22 B battery and the last is the plus 90 volt B battery.

Looking at the photograph which shows the underneath side of the baseboard we find that we have the bottom side of the tube sockets and the radio-frequency transformers with the bypass fixed condensers mounted.

The tube sockets which we have used here are the Paragon. These tube sockets may either be the Eria, the General Radio Company of Cambridge, Mass., or the Na-Aid. All

bilier Condenser Company. This condenser is the bypass condenser for the last audio frequency stage of amplification.

Now let us get back to the wiring of this circuit. The first thing to wire in will be the filaments from the tube sockets to the rheostats and the filament binding posts. Run all of the minus filament leads on the tube sockets together. Then run a wire from all of the movable arms of the rheostats together and from there to the plus binding post of the filament battery. The filament battery binding post should be connected to the minus filament on the minus filament post of the tube socket. Then from the other connection on the rheostats run the wire to the plus filament on the tubes. Try one rheostat 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 runs directly to the grid post of the detector or third tube socket.

These leads want to be very short, so do not try to put these radio frequency transformers 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 photographs 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 large enough to accommodate the wire covered by a short piece of spaghetti or varnished cambric tubing. Use only the best grade of spaghetti, so as to prevent any leakage of the wires going through the boards to any other part of the circuit.

Then mount the audio frequency transformers on the top side of the baseboard exactly where we have shown them and then run the leads from the radio frequency transformers—that is, the plus 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 diagram on this hook-up. By looking at the photograph it will help you considerably in running the leads to your circuit.

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

Most every one 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 tube louder. Of course, when you first built the detector and audio frequency amplifier circuit you had your troubles the same as any one else, but now that you have mastered these troubles 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.

If, however, you have had no experience, or very little experience, with radio frequency circuits these few following suggestions may be of great help to you. In the first place, in radio frequency all the leads from the transformer to the tube socket 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 or 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 have any permanent connection to them. This will cause no end of trouble, 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 in the radio frequency circuit, and be sure that you keep them far away from every other lead 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 we are keeping them as far away from other wires as we can possibly do. The other wires that connect the other parts of the apparatus to the circuit are also run as short as we can possibly make them, and at the same time keeping them away from other parts of the circuit which carry different potentials of electricity.

In putting on the small fixed condensers across the filament to the plus B and minus filament return of the radio frequency transformers be sure to place the fixed condenser as near to the filament post on the tube socket as you can possibly get them. This will mean that you can run a very short piece of wire under the binding post and under the screw and nut of one of the condensers and solder it just as close as you can to the filament lead of the tube socket, 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 BIGGEST LITTLE THING in radio

Here is the Dubilier Micadon, Type 601, full size. It is the standard fixed condenser of radio—adopted by foremost manufacturers of radio sets and accessories and by discriminating amateurs because it is permanent in capacity. Made in many styles and capacities for any circuit.

Price 35 cents up

Your dealer will tell you more

Micadons are specified by the principal manufacturers, among whom are:—

- | | |
|---------------------------------|------------------------------|
| Adams-Merran Co. | Murd Laboratory, Inc. |
| F. A. D. Andre, Inc. | National Airplane Co. |
| Blum Engineering Co. | O. & T. Electric Corp. |
| Retrol Co. | Geosidic Corp. |
| Central Radio Laboratory | Frankfort Radio Serv. Co. |
| Clare Electronics Co. | Q. R. S. Music Roll Co. |
| Crasley Mfg. Co. | Radio Distributing Co. |
| Cutting and Washington | See-True Radio Co. |
| Radio Corp. | Sheral Elec. Co. |
| The Farad Radio Tel. & Tel. Co. | Hooper Radio Corp. |
| Durham & Co. | Telephone Maintenance Co. |
| Earle Radio Co. | J. S. Timmons |
| Freed-Kleinmann Radio Corp. | Ware Radio Corp. |
| Garud Corporation | Western Call & Elec. Co. |
| Independent Wireless Tel. Co. | Westborough Elec. & Mfg. Co. |
| Nichols Radio Corp. | Whiteland Mfg. Co. |
| Midwest Radio Co. | Wireless Improvement Co. |
| B. Mitchell & Co. | Chicago Radio Laboratories |

Dubilier Condenser and Radio Corporation
48-50 West Fourth Street New York

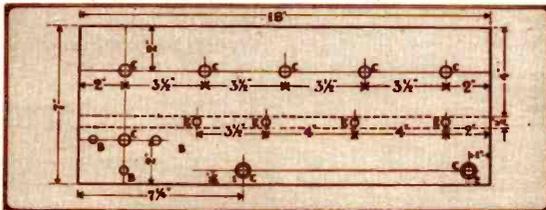
(Radio frequency transformer)



(Socket and Plug)



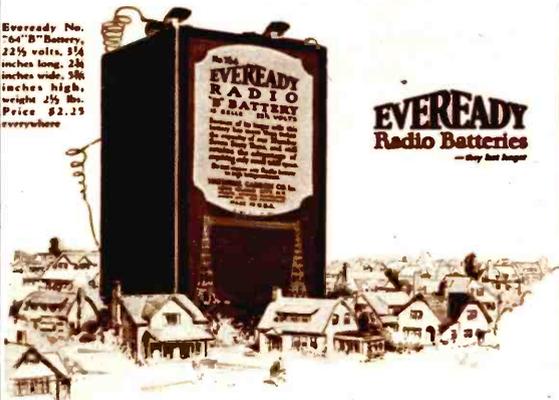
(Variable film condenser)



The panel lay-out of the new Grimes "inverse-duplex." In drilling these holes, remember that "A" means a No. 37 drill, "B" a No. 18 drill and "C" a 5/16-inch drill. No. 1 is a double-circuit jack and No. 11 a single-circuit jack.

DUBILIER DEVICES

Eveready No. "64" B Battery, 22½ volts, 3¼ inches long, 2½ inches wide, 5½ inches high, weight 2½ lbs. Price \$2.25 everywhere



EVEREADY
Radio Batteries
—they last longer

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 Fannestock Spring Clip terminals.

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

Manufactured and guaranteed by
NATIONAL CARBON COMPANY, Inc.
New York, N. Y.

but the filament not lighted. You should not have any howl with the detector tube filament turned off.

Let us say that the reversing of these leads has stopped the howl. Then we turn on the filament of the detector tube and the howl starts again. This means that we have to try reversing the leads of the other transformer, switch the primary leads of the other transformer and try it. This may not help matters any; then put the leads back and change the secondary leads.

You will have to use a separate B battery for the detector tube; when you are using three steps of audio frequency amplification there is often a great deal of capacity in the leads of the B battery, and this causes a howl when you use the third step. But a separate B battery on the detector will stop this.

In the June issue we showed the Grimes circuit compact in a small cabinet and with the loop wound on the inside of the lid of this cabinet. This, however, is a very difficult job to do that is, to wind the loop on the inside of the lid; and I know that I spent a great deal of time and cursed quite a few times after I banged my fingers in trying to get the small tacks in position to hold the wires. However, it is not necessary to use such a small loop as this. You can get very good results, in fact wonderful results, on a loop about eighteen to twenty inches square. It is not advisable to use a loop any larger than this on account of the enormous amount of energy gathered by this circuit. On a larger loop the only thing that it does on local stations, and, say, stations within 100 miles or so, will have a tendency to overload your circuit. We use a loop eighteen to twenty inches square in our laboratory, having twenty turns of wire on it, spaced one-quarter of an inch apart, for this, and it gives very good results, and we have wonderful reception from stations on a loud speaker that are within 100 to 200 miles away.

You can very easily distinguish when you are overloading your tubes, as the signals, will have a very mushy tone and will not be clear cut, as the reception should be.

In the last stage of this circuit, that is the third step of audio frequency, it is advisable if you have it to use the 216A tubes or the UV202, which is a five-watt power tube. This increases your amplification a great deal and practically adds a power amplifier, and yet you get very strong signals with the use of this tube. However, if you do not have these tubes the 201A tube will work very nicely in this third step of audio frequency amplification.

After you have drilled your panel and mounted your apparatus and wired it according to our instructions there are cases, of course, where you will have trouble. Everybody does not do the same kind of work as every one else and if you happen to be a little careless or happen to get hold of some apparatus that wasn't exactly up to standard, which I know happens to be the case a great many times, you will run into trouble.

Here are a few suggestions on how to get rid of that trouble. If you have hooked your circuit up and do not get any results at all from it you may be assured that there is defective apparatus such as open leads on the transformers. Very carefully test the circuit through the transformer and a good way to do this is to take an ordinary dry cell and put it in series with a pair of telephone receivers; that is, place one lead of the telephone receivers on to one terminal of the dry cell and on the other terminal of the dry cell fasten a wire and fasten it to one of the terminals on the transformers which you wish to test. Then with the other lead of the telephone re-

To a few high-grade Radio Manufacturers

¶ We would like to meet two or three manufacturers of high-grade receiving apparatus and to place before them our ideas on successful Radio Advertising.

¶ This organization talks your "language" and the "language" of hundreds of thousands of "radio-bugs" who buy and operate receiving apparatus.

¶ We "know" the radio-man, whether he tunes-in from the home of WEAf or that of KJH. We know radio—radio apparatus and radio technicalities when necessary. We know radio first hand.

¶ We invite correspondence and appointments from interested manufacturers. Inquiries entail no obligation.

BERTRAM MAY
ADVERTISING
1520 Chestnut St. Philadelphia.

RADIO IN THE HOME

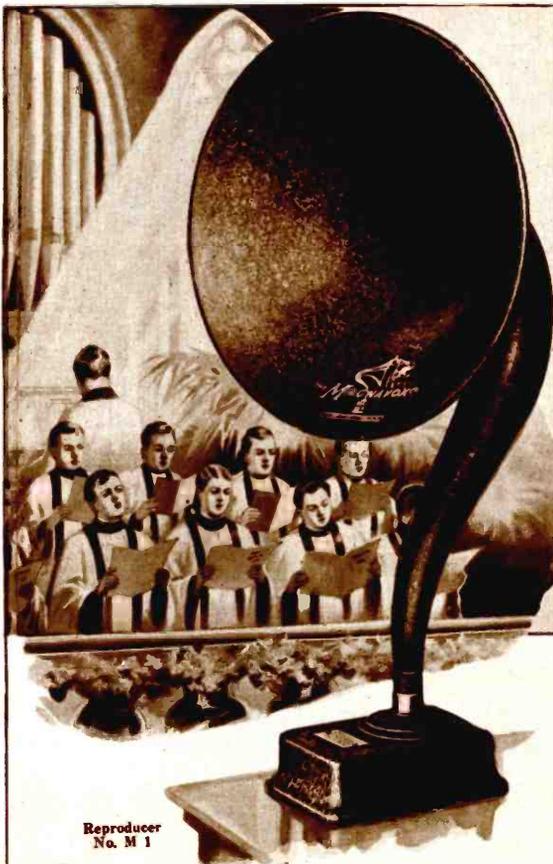
is devoted entirely to better class radio—the only kind that is fit to go into the American home.

RADIO IN THE HOME

is not in the market for general radio advertising. We make our own tests of apparatus and our own investigations of the financial and commercial reliability of firms, and we solicit advertising only from those manufacturers whose products we ourselves are willing to guarantee in the light of these researches.

This is to assure our readers that they can depend on the things they see advertised in our columns.

It is a Reader Service



Reproducer
No. M 1

Magnavox brings you the Voice of All Christmaside

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. You, too, will be assured of this supreme satisfaction if your set is Magnavox equipped.

Magnavox Reproducers
M1 with 12" horn . . . \$48.00
M3 with 14" horn . . . 32.00
M1 for dry battery sets . 22.00

Combination Sets
A1-B Reproducer and 1-stage
Amplifier . . . \$59.00
A2-B, same with 2-stage 65.00

Power Amplifiers
A1-One-stage . . . \$27.50
AC-2-C-Two-stage . . . 55.00
AC-3-Three-stage . . . 75.00

Magnavox Products are for sale at good dealers every-where. Write for new 32-page Magnavox Radio Catalogue.
THE MAGNAVOX CO.
Oakland, Cal.
New York Office: 270 SEVENTH AVE.
Fortias Electric Limited: Toronto,
Montreal, Winnipeg,
CANADIAN DISTRIBUTORS

MAGNAVOX Radio. Reproducers and Amplifiers

ceivers touch the other binding post on the transformer. If the circuit is O. K. you will receive a click in your ear phones and this designates that you have a completed 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 circuited and 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 personally 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 frequency 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 and found 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 soldered on one spot over to where it is soldered on the other and see if there is a circuit to this. I remember an instance at one time where I had soldered a wire on to a binding post and apparently when

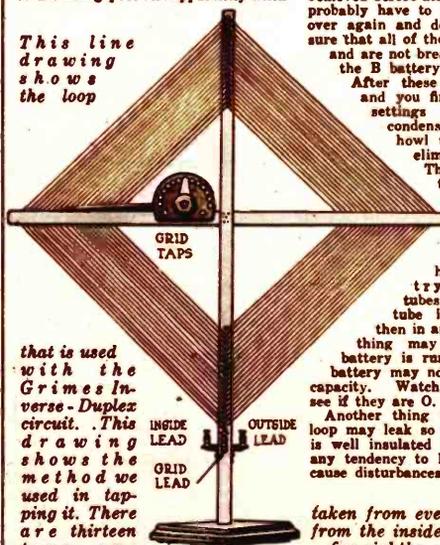
looking at it it was a completed joint just as nice as any joint you would want to see. I finished my circuit and in testing it I found that I had nothing but a hum, so I started to trace out my connections and they apparently were all O. K. After a great deal of worry and trouble and switching different pieces of apparatus around and trying this and trying that I decided that I would go over all my connections with the circuit tester and when I came to this one I had no click at all, so I naturally knew right away that it was not making a good contact, so having a hot soldering iron handy I resoldered this connection and the circuit was O. K.

This just shows that no matter how well the soldered joint looks there is always a possibility of it not making good contact, especially when you are using rosin-core solder or rosin as a flux. Sometimes this rosin does get around the binding post which you want to solder to and forms a perfect insulator. The only way to eliminate this is to have a good hot iron and melt all of the rosin out and let the solder take the place of the rosin.

Let us say that all of these connections are O. K. and we have tried this circuit and find that you get an awful howl and whistle and it is impossible to clear it up by changing the switch tap on the loop. Now, there are ways of overcoming this. This usually designates that you have a poorly constructed fixed condenser and this can be tested by eliminating one at a time and see if this cuts out this noise.

When you have removed one condenser at a time and as you take off another one you find out that the howling and the noise stops, then you may be assured that the last fixed condenser which you have taken off is the one that is leaking. These condensers have to withstand the full B battery voltage and it is absolutely necessary that they be thoroughly insulated so as to have no leakage across them. However, some of these will leak and it may be due to soldering, as I mentioned before in this article, or it may be due to careless handling. When you have located this defective condenser remove it and insert another. Then put the other condensers back and try it again, and it may be that one 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.

This line drawing shows the loop



that is used with the Grimes Invers-Duplex circuit. This drawing shows the method we used in tapping it. There are thirteen taps, one

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 one tube 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.
3. Qualify for positions in the radio field, in research, manufacture, construction, broadcasting and publishing.
4. To promote amateur effort in experimentation and research.
5. To direct radio publicity and truthful advertising.
6. To direct and assist radio industry in general.

Five Interested Radio Class Men Can Form a Chapter

10 COMPETITIVE CONTESTS PLANNED

Logging, Set Construction, Code and Vocational Work
which includes Singing, Playing, Oratory,
Debate, Essay and Art

Elimination Contests for National Honors

First by County, then by States

National Convention in the Planning

The American School Student Made
Radio—Now Make It Still Better

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 16)

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 aerial 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 hear 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 papers 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 wave. 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 of the grand presentation is made—probably to some child a hundred miles away—and remembers that as chairman of the Radio Committee she will have to follow the president on the program and make a speech of congratulation herself. And hers will be the voice that is heard around the world!



The best is none too
good for a Christ-
mas Gift

LANGBEIN & KAUFMAN
VARIOMETERS and
VARIOCOUPLERS
ARE THE BEST

Highly polished PURE
HARD RUBBER
forms, double silk covered
wire, highly nicked brass
hardware — all skillfully
assembled

L. & K. wire-wound in-
struments are to be had in
seven different windings,
an instrument for every
use.

Standard Variometer . . \$7
Standard Variocoupler . \$7

NEW!!!

A UNIVERSAL
VARIOMETER

A split variometer appli-
cable in 101 ways. An
instrument for the ex-
perimenter as well as the
set builder.

Send for Literature

LANGBEIN & KAUFMAN
654 Grand Avenue
NEW HAVEN : CONN.





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

WHEN a hard-boiled radio editor of a great metropolitan daily newspaper becomes really enthusiastic about the launching of a new movement, it's a safe bet that that movement will be worth watching.

The article that follows was written by just such a hard-boiled radio editor. He wasn't enthusiastic when I first spoke to him about it. But he is now. That's the best sign of all—that he has been won over from skepticism to enthusiasm by the movement itself.

But I'll let him tell his own story.

E. M. N.

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 42)

Abner Armstrong Sez:

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

Editor of Radio in the Home.
dear Mr. Neely—

Abner Armstrong came over from Jobstown to see me at noon the other day an 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 stall on him. But now he's put a Radio in his barn with a horn on it, and all he does is tuck a Ducon plug in the Electric Light Socket Tubes 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 Household 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 this country since Volstead took 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."

"Those 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, blushin' 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 consumin' several doz. Fords, per person, per annum, and carelessly tossin' them in our main thoroughfares I sez our Highway Dept's would soon have had to turn their Problem over to the Government."



"Rocked in the cradle of the deep" by the Four Hoarsemen.

"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 the banana."

"Well," I sez, "I'm fed up on bananas. My wife sez to me that she didn't see a yellow dress all summer. 'Sure,' I sez, 'and you won't till this banana 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

King Solomon would have had to pay an awful



Before radio introduced ear vests they was boys in college that had never seen a female ear.

can see bananas are as plentyfull as German marks, an' the people ain't mad at 'em."

"Before Radio introduced Ear Vests," 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."

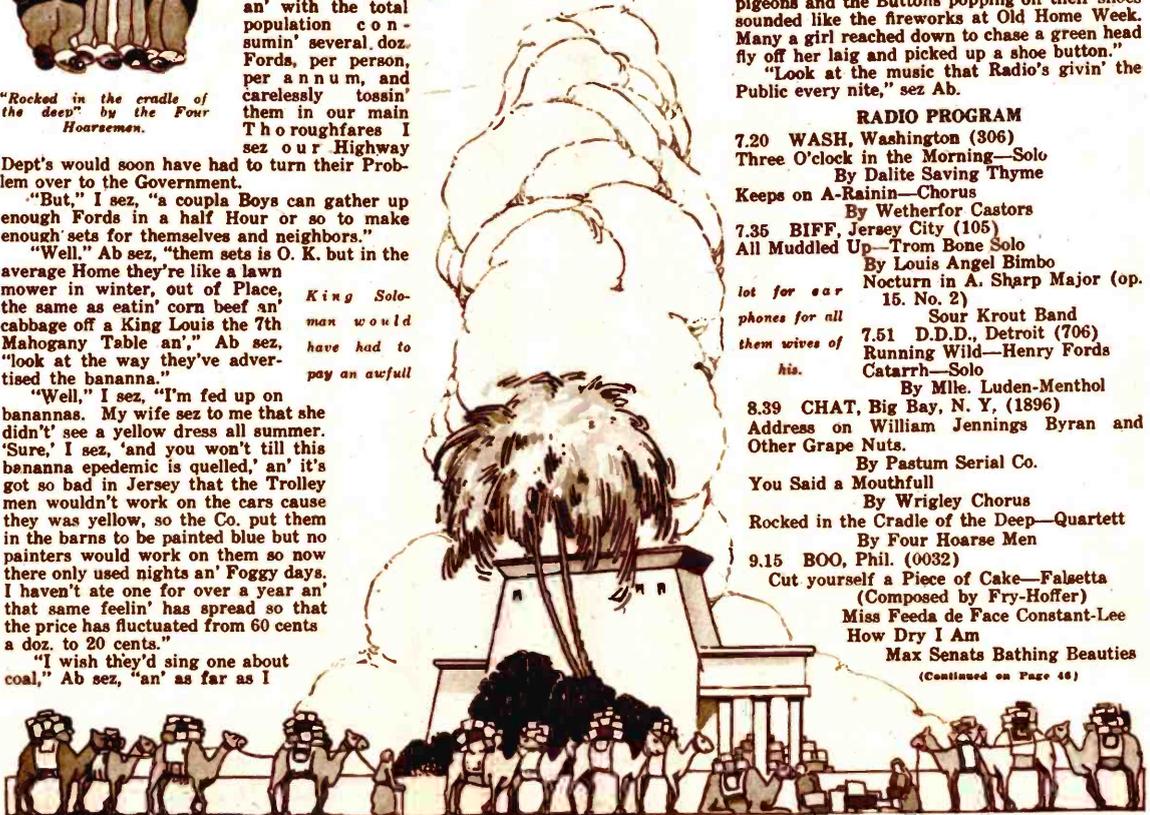
"I'm not surprised at that," sez I, "for a lot of the hard boiled eggs in Palmire went to the Pageant and when they returned they was Omelets and one of them told me that when Ventnors 57 Varieties passed, the men's hats flew off like clay pigeons and the Buttons popping off their shoes sounded like the fireworks at Old Home Week. Many a girl reached down to chase a green head fly off her laig 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
Nocturn in A. Sharp Major (op. 15. No. 2)
lot for ear phones for all them wives of his.
Sour Krout Band
7.51 D.D.D., Detroit (706)
Running Wild—Henry Fords
Catarrh—Solo
By Mile. Luden-Menthol
- 8.39 CHAT, Big Bay, N. Y. (1896)
Address on William Jennings Byran and Other Grape Nuts.
By Pastum Serial Co.
You Said a Mouthfull
By Wrigley Chorus
Rocked in the Cradle of the Deep—Quartet
By Four Hoarse Men
- 9.15 BOO, Phil. (0032)
Cut yourself a Piece of Cake—Falsetta
(Composed by Fry-Hoffer)
Miss Feeda de Face Constant-Lee
How Dry I Am
Max Senats Bathing Beauties

(Continued on Page 46)



**The Studio Director
—That's Me!**

(Continued From Page 11)

dance orchestra, conducted by Elmer Aichele, 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 sweetie'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 to 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. Never ever any one would say something like this: "You are in love with 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 one! What a dumb-bell 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. Crowley walked in with a wide grin on his face as he said: "Say, I never heard a song get 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, the 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 trite to say that radio has done more for the home than any form of amusement. Safe by 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, and themselves enjoying the beauty of music and elevated entertainment in their own home. All that we have done 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."



**Long Distance
ON THE
New Crystal**

FOR satisfactory radio reception, when a hook-up including a crystal is used, you want a crystal that is highly sensitive over its entire surface. The day is past when radio fans are content to hunt for spots. You want clear, instant live contact. You want clear, loud reception with a crystal that will deliver to the ear phones 10% of the energy your aerial picks up. You also need a properly designed cat-whisker—one that will put as much or as little pressure on the crystal as you require.

Efficiency in a crystal is often more a question of contact than of spot.

**MULTI-POINT
HIGH POWER
CRYSTALS**

are so perfect that they may be used to TEST your set

If your reception is not satisfactory with Multi-Point—hook elsewhere for something to be improved—series, ground, coil or phono.

Price sixty cents each or two for one dollar

By mail or at leading dealers

To purchasers of our crystals we will supply a scientific cat-whisker arm and post, complete—unmounted for TWENTY CENTS EXTRA

Write your name and address on a card and wrap a dollar bill around it. Mail to us and we will send you two specially tested crystals.

If you include twenty cents in coin or stamps you will receive the scientific cat-whisker which you can mount in a few minutes.

If after three days' trial you want your money back—return the goods and a check for the full amount will go to you at once.

Circular on Request

We are a long distance ahead of the progression with our crystal. We are also just as far ahead with our new

UNGER CRYSTAL SET

described elsewhere in this magazine. This is equipped with Multi-Point H. P. Crystal and sells for

**\$7.50 by Mail,
Postage Prepaid**

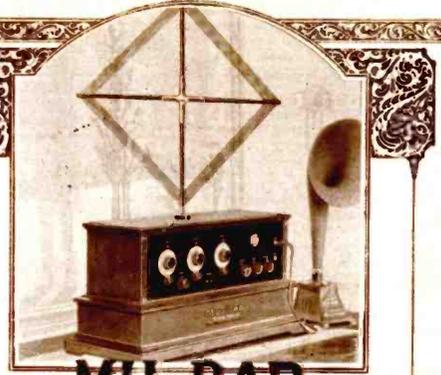
A year's subscription for **RADIO IN THE HOME** is included in this price—which you can present to a friend if you are already a subscriber.

Sold by Leading Dealers

ADDRESS

**MULTI-POINT H. P. CO.
Box 4062
WEST PHILA., PA.**

**Especially Good
For Reflex
Ask Neely**



**MU-RAD
RECEIVERS**

NEW MU-RAD RECEIVER MA-17

MU-RAD, in the vanguard of the radio art, once again blazing a new trail of progress. Years of scientific achievement anticipated in this *super set*, the Mu-Rad MA-17. A new sensitivity, greater distance, fuller volume, with the absolute simplicity and substantial construction of the famous Mu-Rad MA-13. Most recently discovered principles are embodied and developments of the future thoughtfully considered in the designing of the Mu-Rad MA-17.

Three stages of radio and two of audio frequency amplification and detector. One tuning dial and two selecting dials, each independent of the other. Plug-in type *r. f.* transformers to care for changes of tube type or wave lengths. Panel-mounted volt-meter for quick reading of A and B batteries. Solid mahogany, Adam Brown hand-rubbed finish cabinet with loop fitted into top and compartment in base for "B" batteries. Guaranteed for 1000 miles reception using only a 2-foot loop.

WRITE FOR BOOKLET AND THE NAME OF THE NEAREST DEALER

MU-RAD LABORATORIES, Inc.
810 Fifth Ave., Asbury Park, New Jersey



I AM not a "radio expert," nor am I an authority on the intensely interesting theory of wireless transmission. I have never even had a "new hook-up credited to me, and to this date the Radio Corporation of America has not yet deemed it necessary to call for my services as technical consultant.

I am just an ordinary, meek, commonplace sort of individual—just one—in the ranks of an army of countless millions of species "listener-in."

My experience with radio covers a riotous period of a bit over two years. Like countless others, your "fellow-bug" coaxed a cat-whisker over a bit of "don't you dare touch me" galena. After that came the single tube set; then a three-tube affair with its maze of apparatus and at least two dozen controls. Every one said, "it must be a great outfit—look how many dials on the panel." I myself thought it a highly "professional" looking affair. Then came a "flock" of various type receivers—each acclaimed "the last word in radio."

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.

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 lack 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 "scrapping" practically new apparatus should be looked into and remedied, if possible.

It is not reasonable to expect the trusting public to re-invest in new radio equipment, season after season, any more than it is reasonable to expect a man running a car this season to buy a new car next season. The public needs reassuring—it needs to be assured that radio equipment purchased today will function as well tomorrow and for some time to come.

Recommendation number one to radio manufacturers, in my opinion, is to convince the public that present-day radio has reached a state of perfection which justifies an investment in high-type apparatus. Of course, it would be ridiculous to guarantee that no improvements in radio were imminent, but it does seem as though some assurance could be given the public, that equipment bought now will function efficiently for a reasonable length of time to come.

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.

My idea 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-

ant, untrue and unethical advertising being placed by many unscrupulous manufacturers. Claims have been made for apparatus, which have been as impossible of fulfillment as communication with Mars. While these claims have been apparently ridiculous to a radio expert, the inexperienced and trusting public have been unmercifully hoodwinked and "bamboozled."

Many a potential radio fan has been lost to radio forever, because of circus advertising and false claims and statements.

Then, too, many have entered the radio manufacturing business with the idea that it is a new "get-rich-quick" proposition—a short cut to sure and sudden wealth. I have talked with manufacturers of radio receivers who could not answer the simplest question regarding their own products. One even went so far as to admit frankly that he knew nothing whatever about radio—didn't have a set in his own home—didn't want one, and yet was a manufacturer of radio receivers! One was a butcher; one a carpenter, and still another a sub-contractor before the grand and glorious crate of radio enabled them to become known as manufacturers of radio apparatus.

Yet, these same men, as heads of their respective firms, lay out and formulate their advertising plans. They evidently reason that if the "X" receiver, a single tube affair, can "cover" a distance of 500 miles, then certainly, their own product, a three tube affair, should of a certainty "do" 1500 and maybe an additional 500 miles thrown in for "good luck."

Recommendation number two, is to confine all claims to the realm of reasonable certainty, rather than that of probability and possibility. In other words there are few sets made, even using the identical hook-up, assembled with perfectly matched parts, that

(Continued on Page 48)



The Christmas Gift She Will Most Enjoy

Beauty, convenience, reliability—these you have in the Durham de Luxe Tea Wagon. The Du-Rad receiver has an established record for distance without any separate wiring. Yet, with all accessories, it is entirely concealed in this exquisite piece of furniture. Thoroughly practical as an entertainer—for tea, for radio, or both—this is the set for homes of distinction.

DURHAM & CO., INC.
1936 Market St., Phila.

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

And, as I have said, all of this advertising, designed to sell the better class radio sets, is being done and paid for by a concern which will not market any more batteries through a good set than it will through a cheap one. It is genuine educational copy based upon the broadest kind of vision, and the fact that these set pages were printed in beautiful color in the Saturday Evening Post—the most expensive as well as the most effective form of advertising possible—shows the sincerity of the motive behind the thought.

I can only say that if some other manufacturers, who have more to sell to the radio public than the National Carbon Company has, could see a vision of this kind, there would be less of the universal skepticism toward radio and a disposition on the part of the public to regard it more seriously and with a proper sense of the real marvels which it possesses.

ALMOST every month it is our privilege to announce the opening of another fine broadcasting station and it seems to me that these announcements are the best answers in the world to the constant questions of the skeptics. "Will radio broadcasting continue?"

I think it is generally admitted that there is more to doubt as to the continuance of the smaller stations operated by department stores, newspapers, and so forth. But if you will notice the modern tendency you will find that it is to open broadcasting stations by the great firms which are actually in the business of selling radio materials to the public. These are the concerns who can be depended upon to continue broadcasting because if broadcasting stops their business stops with it.

This is a tendency which personally I am very glad to see because of its 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 industry.

There is, of course, no concealing the fact that most of the largest companies in the radio business today have at least a certain family connection even though this connection may not be so close as to lay them open to the favorite charge of being trusts. Public sentiment in this country against trusts is so strong that these concerns must conduct their business in such a way as to conceal whatever relationship may exist and this concealment will, it seems to me, always compel them to keep the fiction of being rivals and this fiction will produce the necessary striving for superiority in broadcasting to keep the game alive and to make it continuously worth while to own a good radio receiving set.

Over in England there is a genuine monopoly in broadcasting and the results are just what one would expect where a monopoly of this kind exists. There, all of the broadcasting stations are owned by a company which was organized for the purpose of broadcasting and the shares of this company are held by the people who are manufacturing radio sets. In other words, it is a pool of radio interests, and as it is not necessary for them to do anything more than merely furnish enough broadcasting to keep the market for sets moving, there is none of the real rivalry which we have in America today.

The result is almost disastrous. I am in touch with several radio manufacturers in England and they constantly write me of the increasing discouragement of their business. It seems to be impossible to get the

Editorially Speaking

(Continued From Page 21)

broadcasting company to furnish the kind of programs desired by the people and there is constant wrangling between the company and the Postoffice Department, under whose auspices all broadcasting is done.

It is also necessary, under that arrangement, for a tax to be put on every radio set of every kind and this tax must be put on at the source—that is to say the tax is added to the price which you pay for the set—then half of the tax will go to the postoffice and the other half to the broadcasting company.

Naturally, the company wants to make money if it can, and aside from the sale of sets. The consequence is that the broadcasting stations are run at a minimum of expense in order to show a profit for those who are running them.

There are certain features of broadcasting which will always make it worth considerable money to department stores, newspapers, hotels, and so forth. This value, however, will unquestionably reach a certain definite amount and every bit of cost over and above that amount will mean that the permanence of such broadcasting is not assured.

The problem faced by those of us who are today trying to run such broadcasting stations is the problem of giving first-class entertainment within such a reasonable amount that the stores or the newspapers will consider it worth while to appropriate that budget year after year and feel that they are getting their value out of it. And yet, oddly enough, the "big interests" who have the most to gain from radio seem to be definitely and almost bitterly antagonistic to our work. They are perfectly free to admit that they don't want us to succeed in this; they want to see all such independent broadcasting stations fail so that they themselves can come into the cities where the most money is and run a toll or advertising service for the purpose of making a definite profit out of it.

Now, I have no quarrel whatever with those who wish to make a profit out of broadcasting stations. I believe it can be done if it is done with extreme care and intelligence.

But, as the broadcasting becomes more and more centralized in such stations there will be an inevitable tendency on their part to go just a little farther than they are doing now and the first thing we know the advertising aspect of this broadcasting will be so obvious that the public will begin to lose interest in it and that will mean the death of radio.

And so, at the present time, the situation is not in three classes. 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, operating station 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. Then there are those of us who are directors of the common garden variety of stations such as are run by department stores, hotels, newspapers. We are facing a harder problem than the others because we know that the possible good will won for the firm by broadcasting stations is definitely limited and that the total cost of conducting such a station must be well within the limit of the value that it will give. From day to day it becomes

more and more difficult to get the kind of talent we want without pay. We are trying to

reduce the cost of our operation by having "remote control stations" in such places as cafes, churches and opera houses these stations to be placed with people who feel that it is worth their while to bear whatever expense the remote control stations cost. With a sufficient number of these remote control stations, all of them being self-supporting and maintained because of their publicity value, the total cost of broadcasting per year would be considerably reduced and the firms would 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 rights to have the expenses reduced in this way. The claim is made that this is almost the same as taking pay for broadcasting and that we are not allowed to charge under our license.

My answer to that is it is not taking pay for broadcasting at all. If we were not enabled to run these remote control stations at the expense of some one else we would not go under any expense for those periods, but would arrange to fill in that time with things which would cost us nothing but which the public would not like so well. It therefore becomes a question of whether the public is going to be permitted to enjoy such things continually without interference from those who might very obviously be open to charges of wanting to get actual money for such broadcasting themselves.

I am merely outlining some of these problems so that the readers of this magazine will get a first-hand view of the questions that broadcasting directors are facing. It seems to me that it would be a pity if it were necessary to bring up charges of monopoly at this early stage of broadcasting and I really do not think that the attitude I have spoken of will be carried far enough to meet such charges necessary before Congress.

How to Wire Taps on a Variocoupler

(Continued From Page 31)

very reliable companies and they save the radio amateur a good deal of trouble and bother in drilling the panel for the switch contacts. When you drill the panel it is very difficult to get the switch taps in exactly the same radius and so they are equal distances from each other.

To get away from this and also to get away from a whole lot of worry and trouble in drilling your panel, it is a splendid idea to buy one of these ready manufactured "back-mounted tap switches." These are very easily mounted, as all that is necessary is to drill one hole, which is the hole for mounting the shaft. Then you can very easily run the wires from the primary of the variocoupler to the switch contacts that are already mounted on the back of this panel mounted switch.

This makes a very good-looking job and we have used it several times in publishing in the magazine circuits shown that we have built at station 3XP. If you remember the Reimarts circuit shown in the September issue of Radio in the Home we used the back-mounted switches. If I were you I would use these switches in preference to drilling your own panel, and you will find that you eliminate a whole lot of trouble for yourself and you have a very good-looking job when it is through. When you buy your radio material, be sure that you buy only the best, otherwise you will not have the results that you should.

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 neither 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

ENGINEERS - DRY BATTERIES - MANUFACTURERS
FLASHLIGHT - RADIO IGNITION - TELEPHONE
GENERAL SALES OFFICE: HARBOR TRUST BLDG. CHICAGO
LABORATORIES AND WORKS: BACON, WISCONSIN

BRANCHES
NEW YORK CHICAGO ST. LOUIS
PHOENIX PITTSBURGH BIRMINGHAM
IN CANADA
PLANTS: NIAGARA FALLS AND WINNIPEG
TRADE MARKS REGISTERED



-it must
be good-
Neely says
so

The
**Death Valley
CRYSTAL, 30¢**

SINCE Henry M. Neely's article recommending Death Valley Crystal appeared in the July issue of "Radio in the Home" we have been flooded with inquiries as to where these crystals may be purchased. If your dealer has not yet stocked Death Valley, send 30c (cash or money order) and we will gladly fill your order.

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.

30c Everywhere

Ask your dealer for PERMATEME fixed crystals. Hold on the regular Death Valley money-back guarantee. **\$1.00**

PACIFIC RADIO SPEC. CO.
Dept III 17 So. ORIANNA 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 incorporated 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 12)

continue to roll in exactly this way and the amplitude continues to be the same we would have what, in radio, 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 is the kind of wave sent out by the spark stations that you sometimes hear in your radio receiver.

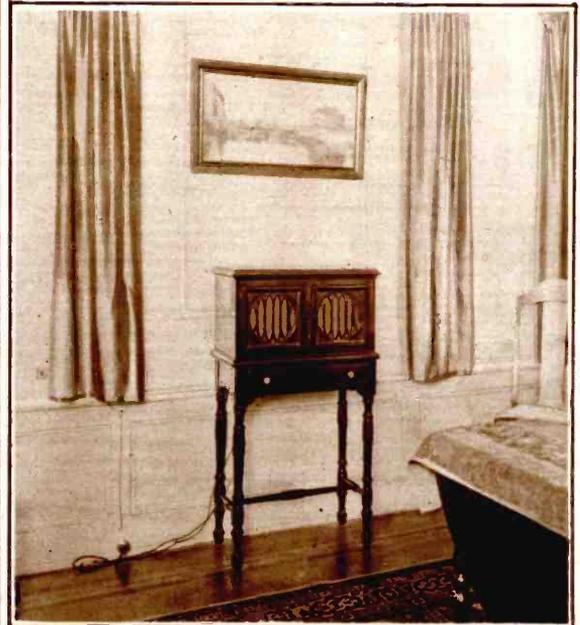
Turning again to our fishing boat, we will assume that the "swell" on the ocean continues to rise as in Figure 3 and there we see that the amplitude marked X is considerably greater than in Figure 2, though the length of the wave from A to C remains the same.

Now we will notice that this change in amplitude makes one very evident

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 notice 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



Simplicity combined with quality reproduction marks the radio installation at the home of Pierre Boucheron, 28 Argyle Road, Brooklyn, New York. The set is a console model with two compartments enclosed by two grille doors; the left-hand compartment contains the three control knobs, while the right-hand one holds the loud speaker unit and horn. As will be noted, the aerial and ground are plugged in on an ordinary wall socket. Mr. Boucheron is an official of the Radio Corporation of America.

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. We will see that the bubbles on the surface are not carried with them, their motion along the

that four separate wave crests pass us in a second, we know that the wave impulse or energy is traveling 4 times 20 feet or 80 feet per second.

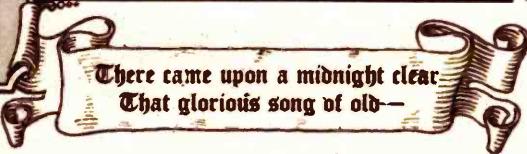
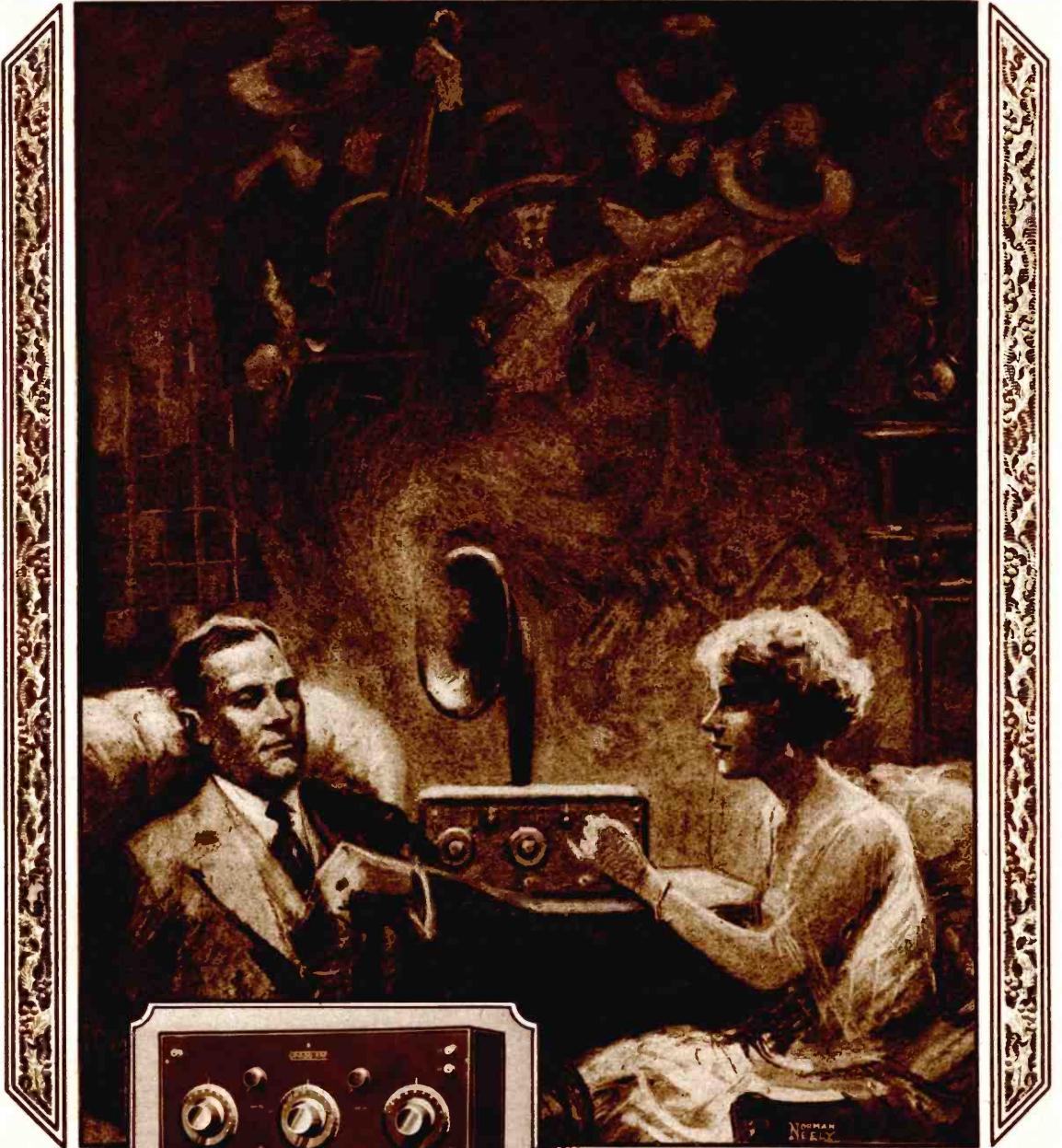
Twenty feet is the wave length and four is the frequency with which the waves pass us and so, reducing this to what the mathematicians call a formula, we see that frequency times wave length equals velocity.

Knowing any two of these figures we can easily find the third and, in radio, this is fairly easy because the velocity of radio waves is always three hundred million meters per second and a meter is 39.37 inches.

Suppose we want to know the frequency of a wave sent out by an amateur on 200 meters. We would divide 300,000,000 (velocity) by 200 (wave length) and get 1,500,000 (frequency).

Figure 4 in the illustration gives some idea of what the waves in the

(Continued on Page 40)



There came upon a midnight clear
That glorious song of old—

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 38)

other might look like under these conditions 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 is in 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 undulating 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 creates a ripple in the ether wave. A big station like the one in Annapolis, Md., which communicates daily with Rome, Italy, sends out veritable mountains of energy.

It is also well at this point to understand distinctly that wave length has nothing whatever to do with the distance a station can be heard. Distance 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 length, 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.

You wake up on a beautiful summer morning and see a glorious day of sunshine and you 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-thirty-thousandth to one-sixty-thousandth of an inch, and that is pure sunlight—the combination of all of the wave lengths within that range. The frequency of these vibrations runs up to trillions of times a second, but you do not stop to count them; you merely know that your eyes receive the glowing sunshine.

That is because the nerves of your

eye have tuned themselves to respond to these vibrations.

You turn your eyes away from the heavens and look across the country and you see green fields and the color of the lush brown earth freshly up-turned by the plow, or a flash of red or blue or yellow from some bird dashing in and out among the trees or any one of the myriad colors of the flowers.

You do not have to turn any knobs or test any currents or twist any variometers to get the full effect of all this beauty. And yet, as your eye passes from one color to another, nature herself takes care of all this tuning for you and you select the different wave lengths without being conscious of it.

Some day, perhaps, you will be able to work your radio receiver just as quickly and as surely. But the two processes are fundamentally the same; color, whether the white light of the sun or the different shades that you see, is entirely a matter of wave frequency.

You will see in the advertisements of radio receiving sets such qualifying statements as "wave length range 150 to 450 meters." You may wonder why it is necessary to have limits of this kind placed upon a set.

Remember that, in this vibrating universe in which we live, there are waves so long that they will reach a score of miles from one crest to the other, and there are waves so short that the only way that we can measure them is to put them against the shortest wave we can actually measure and calculate how often these waves interfere with each other. It is not too much to say that we know of waves so small that we could have a billion of them on the head of a pin.

It is beyond possibility for any one piece of mechanism to respond to such a limitless range. The eye responds to waves between one-thirty-thousandth and one-sixty-thousandth of an inch from crest to crest, and these waves, producing what we call light, give the marvelous gift of sight.

There are waves still smaller than these visible ones. We know that they exist because we can make pictures with them upon an ordinary photographic plate even though the eye cannot see them. They are what we term the ultra-violet rays.

As we get to the longest waves that can be seen, producing the sensation which we know as the color red, we begin to be conscious of them through another of our senses, and this is the sense of touch. The vibrations cause what we know as heat.

Thus the human body has a separate receiving set for tuning in these waves of different lengths.

The sensation which we call sound is as I have said, entirely a matter of wave length, but there is this important distinction between sound and light; sound waves are produced by vibrations in the air, and will not go through a vacuum, whereas light waves are produced in the ether and will not only go through a vacuum, but through a number of very solid substances, such as glass and quartz.

Just as the different wave frequencies in the range which we call light give us the sensation of different colors, so the different wave frequencies in the air within the range of sound give us the sensation which we know as pitch.

The high, shrill note of the piccolo or the chirp of a bird is caused by air waves with the shortest wave length. It is possible, by mechanical means, to cause vibrations in the air which can be detected scientifically, but which the human ear cannot hear. Many naturalists believe that some birds and many insects communicate with each other by means of these short waves to which we cannot tune our own receiving instruments.

The great bass notes of a church organ are produced on long pipes and some organs have pipes as much as

(Continued on Page 45)

Your Kellogg Radio Christmas

Here is a way to get a wonderful receiver 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 reliable 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 selectivity, 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 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 Christmas receiving set, and make every member of the household happy.



KELLOGG SWITCHBOARD & SUPPLY COMPANY

CHICAGO, ILLINOIS

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.

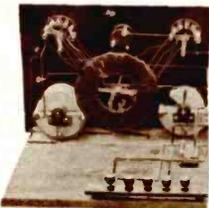
*Positions secured
for our graduates*

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 Pfanzstiel 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."

Pfanzstiel 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 5XD. It will be separate and entirely distinct from the present radio house and its equipment, which will then be used solely for broadcasting service under its present call letters of KOB.

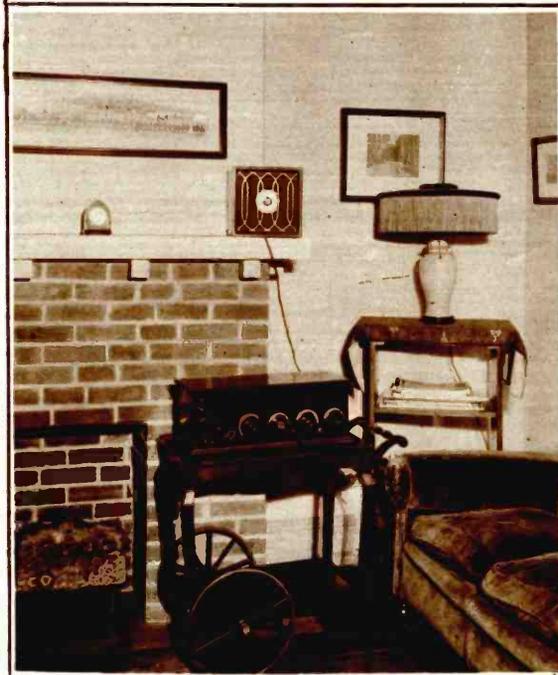
Plans for the new radio house call for a frame building 15x24 feet with concrete floor. An operating room will occupy the east end of the

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,



Radio in the home of John L. McMichael, Jr., 909 S. 55th St., Philadelphia

Photo courtesy J. S. Timmons

building, while a club room for the college Radio Club will be at the west end. The center will contain a work shop and closets for the storage of miscellaneous equipment and batteries.

A site 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 60-foot frame towers, spaced 125 feet apart. A counterpoise system of twenty wires is planned. These wires will radiate from the roof of the building in all directions to steel post supports at their outer ends.

The transmitter planned is of the reversed-feed-back type, using two 50-watt Kenotron vacuum tubes for oscillators. The plate current will

and are at present being utilized for experimental purposes. One of these is a 1000-watt set of the synchronous gap type, while the other is a standard navy 500-watt quenched gap transmitter, complete with motor-generator power supply.

The station is equipped with several receivers, including a Westinghouse type RC, a Grebe type CR 8, a three-circuit regenerative honeycomb coil universal wave-length set with detector and two-stage amplifier, a Reinartz tuner and detector, and a two-circuit honeycomb coil set with six-tube detector-amplifier. The latter set is very selective and sensitive, being adapted to all wavelengths, and having three stages of radio frequency amplification, a detector and two stages of audio frequency amplification. A Western Electric Company's loud speaker, with push and

(Continued on Page 45)

514-Page RADIO Handbook Only \$1

Just off the press. The greatest book on Radio ever written. 514 pages. Compiled by Harry F. Dart, B.S.E.E., formerly with the Western Electric Co., and U. S. Army Instructor of Radio. Technically edited by F. H. Doane. Filled with sound, practical, tested information for every radio fan, from beginner to hard-boiled owl. Send \$1 to-day, and get this 514-page 1 C. S. Radio Handbook before you spend another cent on parts. Money back if not satisfied.

Mail the Coupon To-day

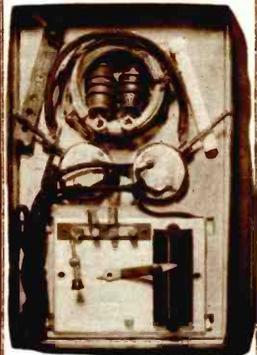
INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 8599 Scranton, Penna.

I enclose One Dollar. Please send me promptly the 514-page 1 C. S. Radio Handbook. It is understood that if I am not entirely satisfied I may return the book within five days and you will refund my money.

Name _____

Address _____

GIVE YOURSELF



THIS CHRISTMAS GIFT

The little marvel of crystal sets—the Metro Jr.—complete with phones, set, aerial wire and insulators, hookup 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 \$2.00 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 set—or anything else you want in radio.

ADDRESS

Circulation Manager

"RADIO IN THE HOME"
608 Chestnut Street
Philadelphia, Pa.

evening. Come around and look us over."

And when I dropped in at Mr. Neely's office I began to "look 'em over," for I have every confidence in the judgment of the editor of *Radio in the Home* when it comes to news and radio.

What I saw was a crowd of boys who, from their language and conversation, I judged to be high school students very much interested in radio. There were also present a number of men who, with one or two exceptions, seemed to know the least about radio of anyone present.

"Will you say a few words?" queried the editor of this magazine, expectantly, just before the group was called to order.

"I will not," I replied. "I came here to get news, and up to the present minute I can't say I am particularly impressed."

"You will be before the meeting's over," was his confident reply. "But the news of this meeting will be a vision, and if you do not catch the vision you will lose the news."

And the meeting began. And I began to see visions. To be facetious for a moment, they were of neither pre-Volstead nor spiritualistic manifestations. They were vital, they were real, they were living visions, visions of radio wrongs that need correction, of means and methods whereby these wrongs may be righted, of plans for the organization of the high school youth of this country into a band pledged to work for the betterment of each other, the science of radio and the improvement of their individual communities generally.

No, folks, I am not trying to write a sermon. I'm trying to write something, though, that could mightily well be used as the subject for one. And that something is an outline of the birth of a movement which if it please Providence, will some day make itself

Interscholastic Association of America Makes Its Debut

(Continued From Page 33)

felt in every State in the Union and every country of the world.

This movement began at the meeting I attended that Friday evening on the fifth floor of an office building not more than a stone's throw from the cradle of the birth of a movement which has been for centuries the hope of the world—Independence Hall, Philadelphia. There is nothing undignified in this allusion. That movement was dedicated to "life, liberty and the pursuit of happiness."

So is this. The science of radio today is doing as much to assure to the human race life, liberty and the pursuit of happiness as perhaps any other branch of modern science. And it is to the continued improvement and development of that science the members of this new organization are dedicated.

The meeting was opened by one of the older men present and the aims and expectations of the proposed organization stated in outline. There were calls for expressions of opinion. The response was instantaneous, not only from the boys themselves, but from the older men present, who proved to be representatives of several Eastern colleges and technical schools. And it didn't take very long for an observer to discover, from these spontaneous talks, that "those present" had many things in common and were only too glad of a chance "to get it off their chests."

If the opinions there expressed may be taken as the views of the average high school boy of a scientific or technical turn of mind (and almost all American boys and many American

girls are), then there exists in this country today a real need for the very organization which was coaxed before that meeting adjourned.

The boys were mad. They were disgusted. Radio apparatus today isn't standardized; much of it is worthless and undependable; there are unscrupulous dealers handling radio merchandise; false information, unreliable data and exaggerated statements concerning radio are being put out by untrained writers; radio broadcasting isn't on a stable, permanent basis; there isn't any organization through which the youths of the country, who are the real "radio experimenters," can get together and exchange ideas and to get concerted action on matters vitally affecting the public and radio generally.

These are some of the points discussed with much heat and no little energy. The boys put it in their own words and they don't mince matters. As a matter of fact, from the number of boys present who had suffered by "being stung" with improperly or poorly made radio apparatus, it would have fared badly with certain radio dealers had they been present at the meeting.

It was very evident this matter of improving and standardizing radio merchandise is one in which the boys are deeply interested. But they were eager, almost pathetically eager, to get the chance to meet each other and "talk things over." The spirit of comradeship sprang into evidence as soon as the meeting was over and the young radio enthusiasts got a chance to "rub elbows." Many expressions

that the organization is "just the thing" could be heard.

For this movement is to be of, by and for the boys themselves and for the improvement of radio generally. Older heads will act as counselors and advisers, but the boys will "run the organization."

At this initial meeting, I learned, fifteen high schools and a number of colleges and technical schools were represented. Since then other schools have learned of the movement and have expressed interest. Officers have been elected and a set of by-laws outlined.

In fact, nothing could more plainly and clearly state the aims of this enthusiastic organization than these extracts from the statement of policies of the association.

"To foster and develop the spirit of experimentation and research among its members; to afford its members common forum for the interchange of ideas and thoughts and the expression of opinions; to gather and place at the disposal of its members exact and reliable data and information on all matters within the scope of the association; to qualify and aid such of its members as may desire to do so to take their places in the radio industry, whether it be in research, manufacture, construction, merchandising, broadcasting or publishing.

"To promote amateur effort and development; to create proper publicity on radio subjects; to use the combined power and influence of its members to stabilize the manufacture and merchandising of radio apparatus; to develop and stabilize broadcasting and to raise the entire field of radio and the radio industry to higher ethical standards and to a higher level of achievement."

A little study of these points will clearly indicate the benefits that this organization can bring to the indi-

(Continued on Page 43)

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 acquiring 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 finely executed Gothic design, backed by a screen of bronzed gold.

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" folder, or write us.

J. S. TIMMONS, 339 E. Tulpehocken 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 rostrum. During his talks to radio fans, Mr. Pollock speaks on the drama 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 have 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."

Interscholastic Assn. Makes Its Debut

(Continued From Page 42)

vidual boy and to 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 organization to train boys and girls for just this kind of work.

Membership in the organization is open to "any honest, persevering high school student, or student of equal grade of similar school anywhere in the United States," declares the rules adopted by the members. It has also been suggested that auxiliaries may be organized 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 organization. I want that there shall stand to you, as the 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 schoolboys interested in radio organized on Friday, November 2, 1923, under the name of the Interscholastic Radio Association of America with national headquarters at 606 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 Organization, Information, Publicity, Broadcasting, Legislation and Contests. A National Advisory Board was also organized consisting of prominent educators, electrical and radio experts, big business men and other men of prominence.

"An official membership emblem was adopted as shown in this magazine.

"A schedule of contests 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 trophies 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

When You Think of REFLEX You Think of ERLA

The famous Erla one, two and three tube reflex circuits designed by us are the most successful radio circuits in use today.

Easy to build, simple to operate, amazingly efficient in use. But their efficiency is doubled if you use with them the apparatus especially designed for them. Naturally.

Erla Synchronizing Radio Frequency Transformers
Types—Reflex 1 and Reflex 2
List Price, \$5.00

Erla Synchronizing Audio Transformers
Ratios 3 1/2 to 1 and 6 to 1
List Price, \$5.00

Erla Radio Frequency Transformers
Cascode Type

Whether employed for one, two or three stages of amplification, their efficiency is notably greater than that of less highly developed types.

For the most efficient use of these transformers, consult our Bulletin No. 12, showing graphic test hook-ups using one to five stages of amplification.

Types A B, 1, 2 and 3, \$4.00

Erla Telescoping Baffle

Erla baffles add 100% to the appearance of any receiving set, neatly screening the unsightly openings required for tube ventilation, yet enabling complete view of the tube filaments. The rim is patented, built up of special telescoping type that fits any 1/2" to 3/4" panel. Made in 1" and 1 1/2" diameter. Price 20c.

Erla Solderless Connections

Every connection in radio apparatus assembly, including the difficult variocoupler, is made by means of their respective panel contact points, is now successfully accomplished without the dangerous use of soldering irons. Erla connections eliminate such difficulties forever for our types, as follows: No. 1 Variocoupler, \$2; No. 2, Bus Bar, \$2; No. 3, Jack, 4c; No. 4, Condenser, 3c.

Erla Variable Grid Leaks

The Erla grid leak is of the well-known pencil-mark type that has proved itself ideal for stabilizing vacuum tubes, being easy to adjust and highly efficient. Terminals are heavily nicked and spaced to fit the Erla grid condenser. Price 20c.

Erla Grid Condenser

These grid condensers are of standard type, with a record of uniformly satisfactory service in the hands of thousands of users. The holes of the condenser are spaced to fit the Erla grid leak. Price 10c.

Erla Fixed Crystal Rectifier

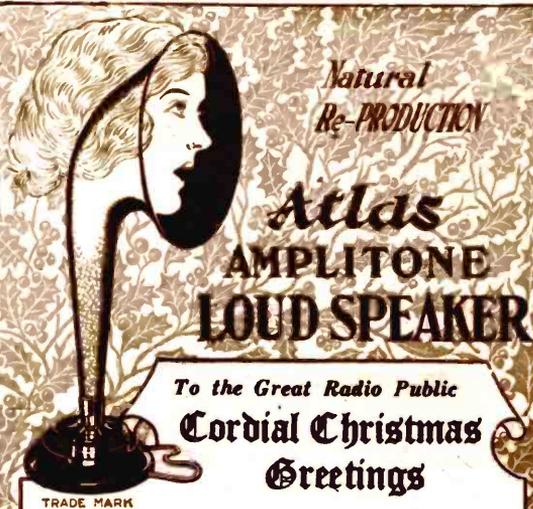
Unequaled efficiency, together with absolute stability in reflex work, is assured through the Erla fixed crystal rectifier, antequating costly vacuum tube detector purposes. No adjustment is required, even after a heavy jolt or jar. Once installed no further attention is required. Price \$1.00.

Warranty—All Erla products are guaranteed unconditionally, defects in material or workmanship, and full warranty money returned, satisfaction, when proper, is obtainable.

At All First-Class Dealers

ELECTRICAL RESEARCH LABORATORIES

2515 Michigan Ave., Chicago



Natural
Re-PRODUCTION

**Atlas
AMPLITONE
LOUD SPEAKER**

To the Great Radio Public
**Cordial Christmas
Greetings**

TRADE MARK

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 ganyantoo tag.

Write for Booklet "M"

Contains a great deal of helpful information

Sole Canadian Distributors

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

*Letters
from Users
Requested*

The remarkable re-productions of *Atlas Loud Speakers* make every owner enthusiastic. "Musical experts" write a man in St. Paul "have pronounced it the clearest reproduction they have ever heard." What results have you accomplished with your *Atlas Loud Speaker*. Write us about them—TODAY.

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 male 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 14)

from it an unobstructed view was obtained. The glass enclosure 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 field 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 are broadcast through station WIP, Gimbel Brothers, Philadelphia.

**A Kink for Using
Rosin in Soldering**

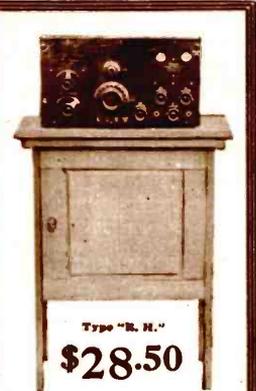
EVERY time we mention soldering in this magazine we always tell you to guard against using either acid or soldering paste in making your connections. The use of acid or soldering paste is very harmful, as acid conducts electricity and eventually causes leakage and also causes the wires to turn green 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 rosin 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 pieces of clear rosin about the size of a walnut and dissolve this in about one ounce of Carbonyl cleaning fluid. It takes about four or five hours for the Carbonyl 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

encloses 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.
312 North Front Street
Camden, N. J.



Multiple Electric Products Co. Inc.

ORANGE, FLORIDA

The Right Binding Posts May Save Your Bulbs



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

Here's Some Advice

From an Authority

"Any other standard parts will do, but let me say that I feel that you ought always to use Eby binding posts for your battery binding posts."

These binding posts have rubber caps and this 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. From "A Two-step Amplifier Unit," by Henry M. Neely in the November issue of "Radio in the Home."

Eby binding posts are made in many styles and many sizes—to suit all uses and all tastes.

Your dealer carries them. If not, write direct to

EBY MANUFACTURING CO.
40 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 Kolster decimeter, 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 field.

At the recent convention of the New Mexico Boys' and Girls' Club members held at State College, a mesa 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 40)

thirty-two or even sixty-four feet long, but this is not usual, because very few persons can hear the notes produced by a sixty-four-foot pipe. Yet it is a mathematical certainty that if we make a pipe 128 feet long and use the same mechanical process for creating wave motion in the air in it, we are producing an effect which would be included in the word "sound" if our receiving instruments—the ears—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 or wave lengths outside of 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

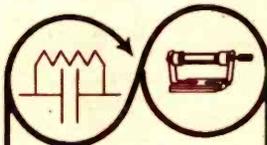
Will Give Your Mileage—Instantly—Correctly

The Biggest Dollar Buy in Radio

The Scalometer—Official Radio Map—Complete Broadcasting Directory
Official Measuring Device of Intercollegiate Radio Association of America
AT YOUR DEALER OR DIRECT

EMBLEM MANUFACTURING CORPORATION

Middle City Building, Philadelphia, Pa.



DURHAM Variables

Grid Leaks with a Guarantee



Little Owner Durham of Nation WCAU

You've noticed how signals vary with shifting conditions. Well, DURHAM Variables will help meet these changes. One-finger control provides the accuracy needed for full success. Two sizes—for soft and hard tubes.

Price, 75c each

No. 101—9.1 to 5 megohms

No. 201A—2 to 10 megohms

Durham Base, 30c Extra

Satisfaction Guaranteed

DURHAM & CO.
1030 Market St., Philadelphia

DEALERS

Here's a product that you can recommend. For the thousands of us in radio engineering circles. And Little Owner Durhams is a stand performer 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 33d Street
Brooklyn, N. Y.

Some Things I Think About the Radio Business

(Continued From Page 34)

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, forcing them to the limit with high voltages on the plates—are eager and frequent buyers of Eveready "B" Batteries. Others renew less often—content 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 weak," 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. The greater the bias, the smaller the "B" Battery current.
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 can 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. Furness, Manager Radio Division, National Carbon Company, Inc., 122 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. 766. The popular 22½-volt Eveready Battery in a new handsome, durable, waterproof metal case. At all dealers, \$3.00.



Eveready Radio Battery No. 771. The Eveready "Three." The ideal "C" Battery. Voltage, 4½—three terminals permitting the use of 1½, 3, or 4½ volts. The correct use of this battery greatly prolongs the life of the "B" Battery. At all dealers, 70 cents.



Eveready "B" Battery No. 767. Contains 30 large size cells, as used in the popular No. 766. Voltage, 45. Made especially for sets using detector and one or more stages of amplification. The most economical "B" Battery where 45 volts are required. At all dealers, \$5.50.

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

EVEREADY

Radio Batteries

—they last longer

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

Radio manufacturers have given the public credit for being more mechanically informed than it actually is. There are many prospective purchasers of radio equipment who have no mechanical aptitude whatsoever. This class of people is so large in number that it cannot be ignored in the future.

I believe that a great percentage of those owning and operating radio sets today are men with more or less mechanical training and knowledge. Many others, who would otherwise purchase sets, are overawed, and discouraged on looking at the seemingly complicated array of coils, condensers, transformers, etc., on display at radio shops.

Then again, the assembled sets (most of them) are enough to throw a scare into even the average seasoned "ham." Have you ever noticed how complicated 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 about one hundred miles away? Along about 11 o'clock you just about make the grade—only to hear "—on WEAF signing off!" Then you discover that you had neglected to finger one of the fifty-seven varieties of dials and controls.

Recommendation number three is, therefore, to feature a self-contained set, as compact and uncomplicated as is possible, and to back up this product with publicity that will reassure the prospective purchaser that no trained skill is necessary for the successful operation of the set. The 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 us have limited patience 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 of a dealer by a fan, the contact ceases with the transaction. Many sets in homes today are only partially satisfactory and partially efficient purely because of the ignorance of the operator. He has taken his set home, more or less carefully followed his hookup instructions—turned on the juice and trusted to blundering luck. Insecure connections, improper placement of set, in-expert tuning, all playing a prominent 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.

Recommendation number four follows naturally as a result of these observations. When a dealer makes a sale his work should actually begin. With every sales agency, a manufacturer should establish a service department which should supervise the original installation of his product, and subsequently follow up the performance of each and every set sold. In this way only can he be sure his apparatus is getting its chance to live.

Buyers of sets should be invited, or even solicited, to bring their problems, their successes or their failures, to the attention of the dealer selling them their equipment. A great number of malcontents can thus be saved from the limbo of radio knockers.

It warmed 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 objected strenuously to the unsightliness of radio installations in the home. Ugly, leaking batteries, tangles of wiring, lead-ins, loops, "wave-traps," battery testers and a score of 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 scattered set that interferes 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 plans sets for use in the average apartment or home cannot afford to lose sight of this all-important aspect of his selling problem.

Stability, utility, simplicity, compactability, service and beauty are mileposts along the road to success of the radio of the future. I cannot help feeling the necessity for observing these common-sense signs in directing the merchandising and advertising of radio equipment for the future.

To 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 with the locomotive, the telephone, the automobile and the airplane not so many 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:—

(Continued From Page 34)

You've Got to See Your Mamma's Every Night

Chorus by Sultan's Wives

"King Solomon would have had to pay an awful lot for Ear phones for all the wives of His!" I sez

"Well! Ab sez "that would have been a simpler matter than taking them all to the movies an cheaper, for 40 per cent. must of been adults and even figurin' the rest half fare that's a lot of money, and they was no subways so I guess they used Camels. I don't know what Camels cost then but the're 20 for 15 cents now and if one of them should of suggested a coco-cola fix the show there's a total loss of 50 bucks right there. I got no sympathy for him anyway!" I sez "Some Girls get dumbbells to put red on their faces and some put red on their faces to get dumbbells and he must've been a pair of dumbbells 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!"

Yours for Tunin' In"

C. D. TEEPLE.



Bristol Single Control Radio Receiver

USING GRIMES INVERSE-DUPLEX CIRCUIT

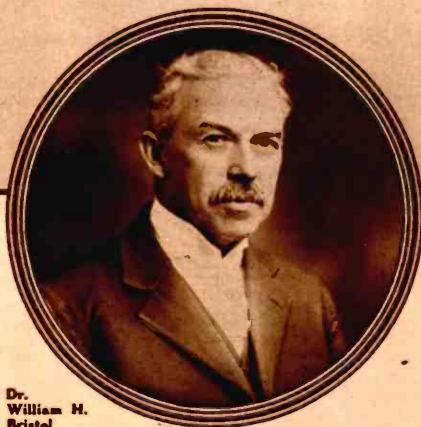
The Bristol Single-Control Receiver with Power Amplifier. Grimes Inverse-Duplex Circuit. The smaller picture shows how all connections are made in the rear, out of sight.



The Factory of the Bristol Company at Waterbury, Conn.



The Bristol Loud Speaker



Dr. William H. Bristol

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

Widener Building—Philadelphia, Pa.
114 Liberty Street—New York, N. Y.
Old South Building—Boston, Mass.
Monodoch Building—Chicago, Ill.

Boek Building—Detroit, Mich.
Boottman's Bank Building—St. Louis, Mo.
Frick Annex Building—Pittsburgh, Pa.
Rialto Building—San Francisco, Calif.