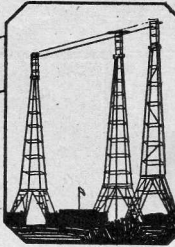


NATIONAL

RADIO

NEWS



FROM N.R.I. TRAINING HEADQUARTERS

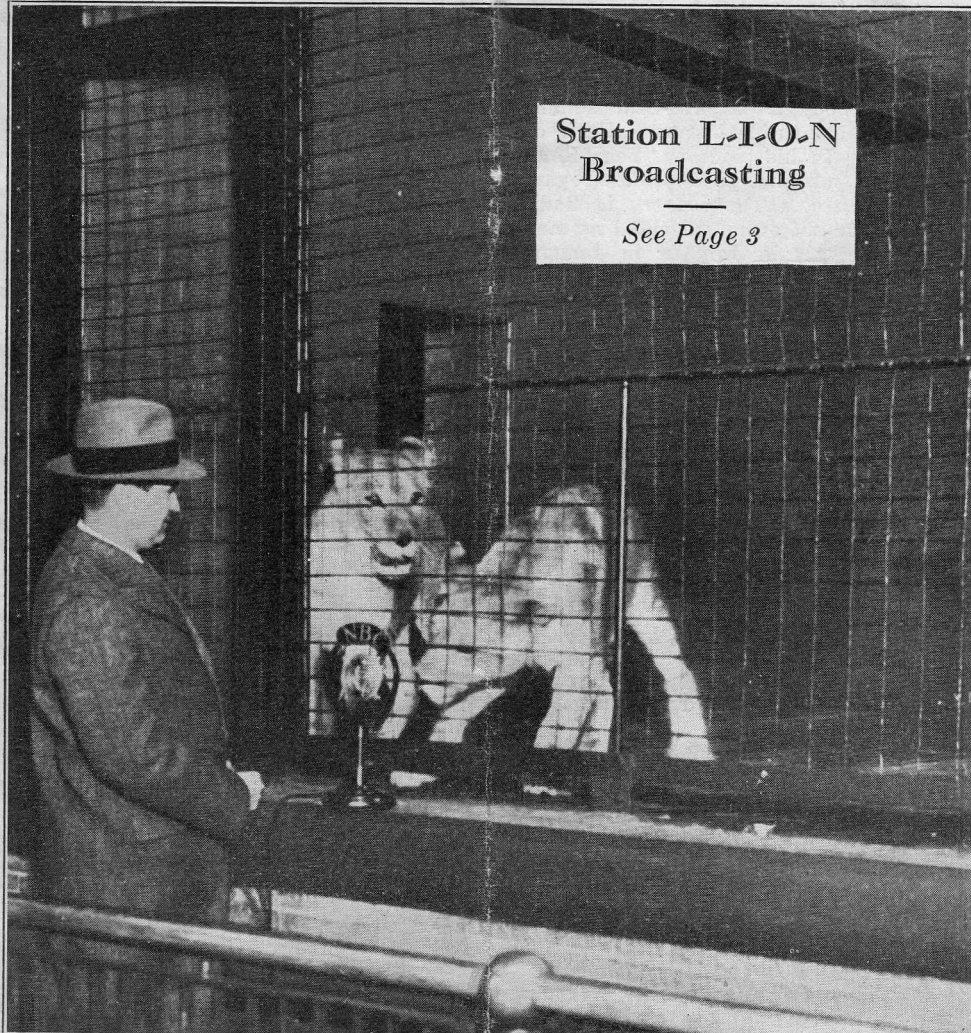
VOL. 2—NO. 11

WASHINGTON, D. C.

JUNE, 1938

**Station L-I-O-N
Broadcasting**

See Page 3





J. E. SMITH

The PRESIDENT'S PAGE

OLD MAN "SUMMER SLUMP" is on his death bed. Nine years ago he was hale and hearty; last year his strength began to fail. Today he is on his last legs—not expected to live through the month. Modern receiver construction improved summer reception, dealing him a severe body blow. All-Star summer programs are the last straw. He is out for good. In his place is "Year Round Business" offering good profits regardless of season. The country is Radiominded and set owners demand as much from receivers in July as in January. Radio-Tricians who go after the work will find a busy summer ahead.

* * * * *

WHEN the newspapers carried the news that Babe Ruth had signed with the Yankees for \$80,000 a year, many fans felt he was lucky to get so much for playing baseball a few hours each day.

They see Ruth on the diamond but they don't see him away from the ball grounds—or after the season is over. They don't know that he trains from early morning until night, day in and day out, in season and out. Stiff workouts in the gymnasium, long jogs on dusty roads, endless training. Pleasures the ordinary fellow enjoys are not for Ruth. No late hours, no tobacco, few sweets.

Ruth worked hard for his \$80,000 contract. Last Fall and Winter while the "Bill Joneses" of the semi-pros were loafing, the Babe was sweating in a gymnasium. In the Spring while the "Joneses" were waiting for the Bush Leagues to open, Ruth was out on the diamond, plugging away at batting practice. Year-round training kept Ruth's body in perfect shape. When the 1930 season opened he was ready for baseball's biggest job. A Winter's loafing for "Bill Jones" means surplus fat—he

was lucky to get a \$30 a week job on a team out in the "sticks."

Ruth's constant training is the secret of his success; Bill Jones' after-season lay-off explains why he is a Bush Leaguer. The same holds true in Radio. The men who stick to their lessons during the warm months when others are loafing, are the men who will be the "Babe Ruths" in this industry. The "Bill Joneses" who lay their lessons aside to gather dust are condemning themselves to the Bush Leagues of Low-Pay jobs.

I am glad that N. R. I. men stay in the big league class. The sincere, enthusiastic manner in which you tackle your lessons, regardless of season, clearly shows why N. R. I. Graduates succeed in Radio. As "Big Leaguers," nothing interferes from the time an N. R. I. man enrolls until he is through the course and in a good Radio job.

* * * * *

THIS Summer many Radio-Tricians are turning their eyes toward four big Radio fields which offer unusual opportunities for extra earnings.

More **Public Address** installations are in demand than ever before. Parks, Summer camps, auditoriums, hotels and apartments are good prospects for these jobs. Campers, picnickers and motorists need **portable receivers** for vacation use. This is a live field offering good opportunities. The advent of **automobile radio** is keeping trained men busy installing receivers in cars. Every automobile owner planning a long motor trip is a good prospect. Owners of Summer camps or cottages spend thousands of dollars every year for **additional receivers and accessories**. The majority of these places are not wired creating a real demand for battery sets.

Here are four fields crammed with money-making opportunities. Every N. R. I. man should land his share, or more, of this extra volume of Summer work.

PROGRAM INTEREST BUILDS DEMAND FOR NEW SETS

On the cover of this issue an announcer is shown picking up a novel program from the Bronx Zoo, New York City. This merely shows to what extremes broadcasting companies go in digging up an endless variety of interesting and entertaining as well as educational programs for their 50,000,000 listeners.

Do Radio-Tricians realize how important well planned, interesting programs are to the Radio industry? Are you making the most of these possibilities in tying up "program interest" with your Radio sales and service?

A major part of the Radio industry is dependent upon good Radio programs. A receiving set isn't worth much unless there is something good coming over the air. When your customer buys a set he does so on the faith of bringing in good and entertaining matter with it.

In the past 10 years the art of broadcasting and program building has rapidly advanced along with the technical side of the Radio industry. An army of artists, announcers and program directors create the wealth of broadcast material always on tap for the set owner—awaiting to be released at the twist of the dial. The President of the United States speaks, the landing of the Graf Zeppelin is described, sports are broadcast, orchestras jazzticate—the world's best show is on the air every night. The public favor has been captured by all this—in fact, its interest and desire to "listen in" has caused it to expend hundreds of millions of dollars for over 14,000,000 Radio sets and millions more in keeping them serviced and repaired.

If you have not already done so it will pay you to familiarize yourself with some of the favorites of the air—some of the outstanding regular programs. Such knowledge will prove helpful in giving demonstrations and closing sales. Good demonstrators invariably make it a point to know the types of programs on at a certain time of the day and evening and tune in the best for their prospective buyers.

So—make the most out of the programs on the air. Have some idea of what your customer wants to hear and what you can tune in at that particular time, and then, you will be presenting your receiver under the most favorable circumstances.

Bigger and better programs are ahead. Popular interest in Radio is growing by leaps and bounds. Over half of the people of the United States are still without Radios. That explains why around four and one-half million sets will be sold this year! Now is the time to start lining up your sales and service prospects!



Top to bottom—Dorothy Harrington of the "Forty Fathom Trawlers," the "Senator & Major" of La Palina fame, Chic Sale as proprietor of Liberty Bell Gas Station, Dora Boesher from "Around the Samovar" and Ted Husing broadcasting the famous Kentucky Derby. Headliners of the air like these and Will Rogers and "Amos and Andy" create big interest in broadcasting which in turn builds a demand for new Radio receiving equipment.

By-PRODUCTS of RADIO} By RALPH C. EDGAR Editor, Westinghouse Magazine



Radio-Eye Counter

Radio's amazing growth has created a number of new fields—by-products—which require men with specialized Radio training. It's these broad new fields of opportunity that guarantee that the technically trained man will always be in demand! Fortunate is the Radio man—no ruts or blind alley jobs to stare him in the face!—J. E. S.

COLUMBUS sought a new route to India and found a new world. Alchemists failed to find a way to convert base metals into gold but gave birth to chemistry, more precious by far than the world's whole supply of the yellow metal. Astronomy grew out of astrology.

Combustion engineers in the course of experiments, found to their surprise that

coal contains gases and solids of greater value than the fuel product itself, and today the revised family tree of coal has not less than five hundred off-shoots, including perfume and soda water, tobacco seasoning and billiard balls, fertilizer and motor fuel.

Thus the story runs through the entire history of scientific development. Thus, also, the story runs through the various acts of the gripping radio drama.

When Dr. Frank Conrad began tinkering with "wireless," it was with the sole hope that he might find a way to send sound over a distance without wires. He and other engineers worked long and hard, and they reached their goal. But their achievements did not stop with success in radio broadcasting, for every discovery leads to a further discovery. Other scientists investigated. The result is, that while the broadcasting art has been and continues to be the major outcome of investigative effort in the radio field, there has issued, in addition, a great host of valuable "by-products of radio," some of which give promise of one day transcending in importance the mother-invention.

Scores of these by-products have attained mature development and are now in actual use. Others are incubating in research laboratories, awaiting further development, with their eventual practicality not for a moment doubted. Still



Radio Traffic Control System

others exist only as vague ideas in the minds of their sponsors, but it may be that these ideas are the forerunners of some of the greatest inventions of all time.

A thrilling by-product or outgrowth of radio is television. Steady progress is being made.

Closely allied to televi-

sion is another form of sight transmission known as radio-photo. The owner of a radio-photo receiving set receives actual facsimile prints of the subject matter

that is being sent. A style scout in Paris can sketch a Worth creation, hand it to the operator of a radio-photo transmitter and immediately her store in Chicago begins receiving an exact photograph of her drawing. Again, a London banker can write a check for 20,000 pounds, place it in a facsimile transmitter, and a negotiable duplicate reaches the hands of a New York broker in a few minutes.

Facsimile transmission by wire is not new, but the use of radio for this purpose is a recent development. Probably the best machine for performing this feat is the one developed by Dr. Vladimir Zworykin. A picture, drawing or piece of written or printed matter four inches by five inches in size can be placed on a transmitter, be sent through the air any distance within the broadcast range, be picked up and reproduced completely in four minutes' time.

Another well-known development that



Radio in the Movies

owes its rise to radio research is the talking motion picture. It is a fact readily admitted by "talkie" experts that the success of the talking moving picture is due primarily to the perfection of the electrical reproduction of sound which was accomplished in the radio broadcasting transmitter and receiver. Without this perfection neither the desired volume and tone quality nor the delicacy of control necessary for the synchronization of sound and sight would have been possible.

No phase of research has been more fertile in the production of radio by-products than that which has centered about vacuum tubes. In the last decade, thanks to radio, the use of vacuum has invaded practically every field of industry. Through its application, particularly in the form of vacuum tubes, our senses of sight, touch and hearing have been enormously extended.

One of the amazing tubes is the Westinghouse grid-glow tube, the most sensitive power-controlling device the world has ever known. If only the amount of energy expended by a fly crawling one inch up a wall is applied to it, the tube can actuate a relay powerful enough to start almost any electrical operation.

Then there is the photo-electric cell, better known as the "electric eye." This device is sensitive to light and shadow. Any change in the intensity of the light falling on the "eye" causes a

corresponding change in the amount of current passing through the unit. Possible applications of the "electric eye" are limited only by the bounds of



Dr. Frank Conrad's Television Transmitter

the imagination. Were one to list all of the uses to which it might conceivably be put, the total number would reach well into the hundreds. Already the "eye" is used in Pittsburgh and Wilkinsburg, Pa., to control traffic automatically by operating traffic signals when it "sees" approaching

automobiles. It serves as a never-winking watchman ready to operate an automatic fire extinguisher when it detects the faintest wisp of smoke. It takes care of numerous jobs of counting, both of persons and of objects. It is used for sorting materials according to color. It controls factory lights. It furnishes an accurate and continuous record of the intensity of smoke issuing from chimneys. It serves as an automatic sentinel, needing only a person's shadow to set off a burglar alarm.

The "electric ear" is another uncannily human by-product of radio. One of its uses is to turn on an airport's landing lights when it hears the motor-roar or siren-shriek of a night-riding airplane approaching the field.

Televox, the world-famous mechanical man who executes orders given over the telephone, owes his robot existence to the discovery by radio investigators of certain facts about sound sensitivity. This electrical servant will take his place as one of our most useful radio by-products.

"High frequency" is a term that is day by day growing in importance. By the "broadcasting" of high frequency power it is possible to fry an egg on a cake of ice. High frequency induction furnaces are used for the melting of metals used in special alloys. There is also indication that in time high frequency currents will be used for therapeutic purposes. High frequency knowledge grew out of radio studies.

Perhaps the greatest by-product of radio has yet to be invented. There are electrical engineers who predict confidently that the world will have this invention at its command before many years have passed. This invention is "power by radio." When it comes, wires will no longer be needed as power channels.

To light your home and run your vacuum sweeper, you will "tune in" a power company just as now you tune in a broadcasting station for music. Airplanes will speed through the sky receiving their power by radio from generators on the earth and ships and trains, likewise, will pick up their power from the air!



Radio Facsimile Transmitter

National Radio News

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NATIONAL RADIO INSTITUTE

Washington, D. C. June, 1930



E. R. HAAS

BREITBART, Germany's professional strong man, could drive iron spikes through two-inch planks with his bare fist. Yet for all his strength a mere scratch of the skin caused his death. Carelessness or supreme belief in his physical superiority made Breitbart feel immune to ordinary ills. Possibly many engagements kept him too busy to care for himself. He considered that scratch unimportant, neglected it, and his life was the price.

Many seemingly unimportant things are vital. Had Breitbart realized the consequences of delaying medical attention he would have been alive today. This story reminds me of the fellows who neglect little things and as a result lose out. The case of two N. R. I. students out in a little Kansas town last Summer is an example of this. Both of these fellows had completed the same number of lessons. One man felt it useless to devote hours to study during the hot weather—didn't feel he could get Radio business anyway in the Summer. So his spare time was spent trying to keep cool—resting, swimming, fishing.

The other fellow knew business was there if he went after it. He made up his mind to grasp the opportunities missed by Radio men who laid down on the job. While these fellows loafed, he plugged along after Radio work. He found plenty of it. Set owners wanted their receivers kept in good shape. Others needed accessories, which he sold at a profit. On top of this he secured orders to build receivers for three of his friends. To make a long story short, he earned several hundred dollars profit from June to September simply because he went after business instead of waiting for it to come to him. Today, he owns a paying Radio business, built up during the season generally thought poor for Radio.

His fellow-student, on the other hand, neglected his opportunities, just as Breitbart neglected his scratch. Breitbart lost his life; the student, four important months and the business built up by the other fellow who studied and worked.

E. R. HAAS,
Vice President & Director.

Gets African Ticket



NEWS received this month from Keetmanshoop, South West Africa, shows again that N. R. I. men are making good all over the world. Student E. G. Thompson, telegraph operator for the South African Railways and Harbor Commission just passed the stiff examination held by the West African Postmaster General. Of the forty-two candidates, Mr. Thompson was the only one to obtain the first-class license. The only other successful

candidate received a second-class ticket. Mr. Thompson's high grades spell promotion with his present employer as he was promised a more responsible position subject to passing the Postmaster General's Proficiency Examination.

Congratulations, student Thompson. You, together with dozens of other N.R.I. men, are carrying the good work of N. R. I. into the far corners of the world. We are proud of what you have accomplished and wish you continued success in Radio.

Electrad, Incorporated, 173-75 Varick Street, New York City, have prepared interesting literature on the Electrad "Lof-tin-White Amplifier."

N. R. I. men are invited to write them for this pamphlet.

BOSCO ON "AIR"

"Station KVEP, Portland, Oregon, announcing our next feature—the N. R. I. Hawaiian Trio, under the direction of John Dal Bosco."

Student Bosco and his N. R. I. Hawaiians are a popular feature in West coast programs. Tune in some night about 8:00 P. M. and hear these artists.

Besides making a record as a student, Mr. Bosco is making good over the "Mike." The News wishes him continued success both with his course and with his trio of Radio entertainers.

Don't miss the July issue of the NEWS. If you have changed your address let us know at once so that you can be sure to get your copy.

N. R. I. SERVICE MANUAL

ON

Bosch Radio Receivers—Models 48 and 49

This receiver is of the tuned Radio-frequency type using the transformer method of coupling the Radio-frequency tubes. It uses three—24, one—27 and two—45 type tubes. A schematic wiring diagram is shown in Figure 1. Figure 2 is a diagram showing an actual wiring of the power pack. These diagrams will enable the Radio-Trician to satisfactorily test the various circuits and determine whether or not they are in good condition.

Oscillation

A receiver which oscillates may "howl" or "squeal" steadily, or may make this noise only when tuned in on a broadcasting station. The whistle is loudest as the dial is turned slightly in either direction from the station. A strong hiss, occurring when the station is tuned in, denotes that the receiver is very near the point of oscillation. This increases the sensitivity somewhat, and will do no harm unless too pronounced. Actual oscillation, however, ruins the performance of the set. The following suggestions will be of assistance in eliminating oscillation from any receiver so affected. It must be remembered, however, that the oscillation may be due to any simultaneous combination of the causes.

1. Receiver Ungrounded: Some receivers, due to a certain combination of tubes or other factors, may operate perfectly when properly connected to a good antenna and ground is removed or when the ground connection is poorly made. The remedy consists in providing the set with a short, direct ground lead firmly connected to a water or steam pipe.

2. Defective or non-uniform tube is a common cause of oscillation. The quickest and most certain method of determining whether this condition exists is to substitute other tubes in the radio-frequency and detector stages.

3. Lack of shielding: The shielding is applied to the receiver principally to prevent oscillation and it is therefore quite obvious that all shielding must be in place and properly secured to obtain correct operation of the receiver. Make sure that the variometer shield, coil shields, tube shield, condenser gang shield, and the three small shields under the condenser gang are in place. Each shield must be firmly fastened by its

screws or clips, and good contact obtained between the shields and chassis frame.

4. Variometer Grounded: The variometer is grounded only through a special ground wire running to the ground terminal of the condenser "C8," and insulation is provided between the variometer bracket and the condenser gang so that there is no path to ground from the variometer direct to the condenser gang. Oscillation is liable to result if these two units become grounded together through a poorly insulated bracket. Check this condition by disconnecting the variometer ground lead and checking between the condenser gang and variometer bracket with the continuity test. No reading indicates a properly insulated bracket.

5. Poor Condenser Gang Ground: The condenser gang is grounded to the chassis through the bracket support at one end, and the single stud at the other. Make sure that these two joints are clean and tight. The rotor of the second radio-frequency stage is grounded through a pig-tail to the ground lug of coil L2 (second radio-frequency stage). Make sure that this wire is intact. Make sure also that the other two condenser rotors are grounded to the condenser frame through pig-tails.

6. Poor Coil Grounds: The secondary winding of each coil is grounded through one of the coil fastening lugs. This connection must be clean and tight.

7. Other Grounds: Check all other ground connections such as by-pass condenser grounds, volume control ground, and connection at "Ground" terminal post.

8. Defective Center Tap Resistor: Oscillation may result if center tap resistor "R10" is open or not grounded. Use the continuity test to check this unit.

9. Open By-Pass Condensers: One or more open by-pass condensers in the receiver may cause oscillation. This condition is best checked by using the "Condenser Test." An open condenser is, however, a somewhat rare occurrence.

10. Grid Resistors: If the resistance value of the grid resistors R4, R5 is too low, oscillation may result. Check these units for proper resistance by means of the Ohm-meter.

11. "B" voltage too high: Check the

"B" voltage in the radio-frequency and detector stages. If too high, refer to the "Trouble Chart."

12. Screen Voltage Too High: Too high a screen voltage caused by wrong connections or a defective resistor R11 may be the cause of oscillation. Check screen voltages and if too high refer to trouble chart.

Alignment Condensers

The alignment condensers are indicated at C4, C5, and C6 on the schematic wiring diagram. The function of these condensers is to act as vernier condensers across the main tuning condensers C1, C2 and C3 and thus bring the tuned circuits into exact resonance. The capacity of the alignment condensers may be varied by means of a bakelite wrench inserted from the rear of the

TABLE OF CORRECT SOCKET VOLTAGES FOR AVERAGE RECEIVER

Type of Tube	Position of Tube	A Volts		B Volts		Screen Volts		C Volts		Plate M. A. Normal		Plate M. A. Grid Test	
		60 Cycle	25 Cycle	60 Cycle	25 Cycle	60 Cycle	25 Cycle	60 Cycle	25 Cycle	60 Cycle	25 Cycle	60 Cycle	25 Cycle
BY-224	1st R. F.	2.4	2.4	175	150	70.	70.	2.5	1.5	3.5	3.5	6.0	6.0
BY-224	2nd R. F.	2.4	2.4	175	150	70.	70.	2.5	1.5	3.5	3.5	6.0	6.0
BY-224	3rd R. F.	2.4	2.4	175	150	70.	70.	2.5	1.5	3.5	3.5	6.0	6.0
BY-227	Detector	2.4	2.4	290	250	---	---	27	27	2.0	2.0	---	---
BX-245	Audio	2.4	2.4	250	200	---	---	45	42	30	30	50.0	50.0
BX-245	Audio	2.4	2.4	250	200	---	---	45	42	30	30	50.0	50.0
BX-280	Rectifier	4.8	4.8	---	---	---	---	---	---	55	55	---	---

Line Voltage 115. Set on 115 Volt tap.
 Plate voltages measured from Plate to Cathode.
 Grid voltages measured from Grid to Cathode.
 Screen Grid voltages measured from Screen Grid Cathode.
 Volume control in full on position for all voltages. Note: Voltage readings are dependent on the type of meter used and may vary considerably from the above values.
 Readings may also be taken at the chassis-power pack connector strip and are approximately as given below:

	60 Cycle	25 Cycle
Detector plate voltage read between connectors.....	7 and 1-300 Volts	250 Volts
R. F. plate voltage read between connectors.....	5 and 1-180 Volts	150 Volts
Screen grid voltage read between connectors.....	4 and 1- 70 Volts	70 Volts
BY-224 and BY-227 filament voltage read between connectors.....	3 and 2- 2.55 Volts	2.55 Volts

ceiver and through the holes provided in tube shields. The method of adjusting these condensers is given in the following paragraphs.

Alignment Adjustment: The adjustment of the alignment condensers should not be attempted until it has been definitely determined that the trouble does not lie elsewhere in the receiver. The selectivity and sensitivity of the receiver depend on the exact setting of these condensers, assuming, of course, that the rest of the set is in perfect order. The actual adjustment of the condensers must be made with the receiver in operation, that is, while it is actually receiving energy from a modulated oscillator or a broadcast station. The principle of the adjustment consists merely of turning the adjustment nut of the alignment condensers until the signal is strongest.

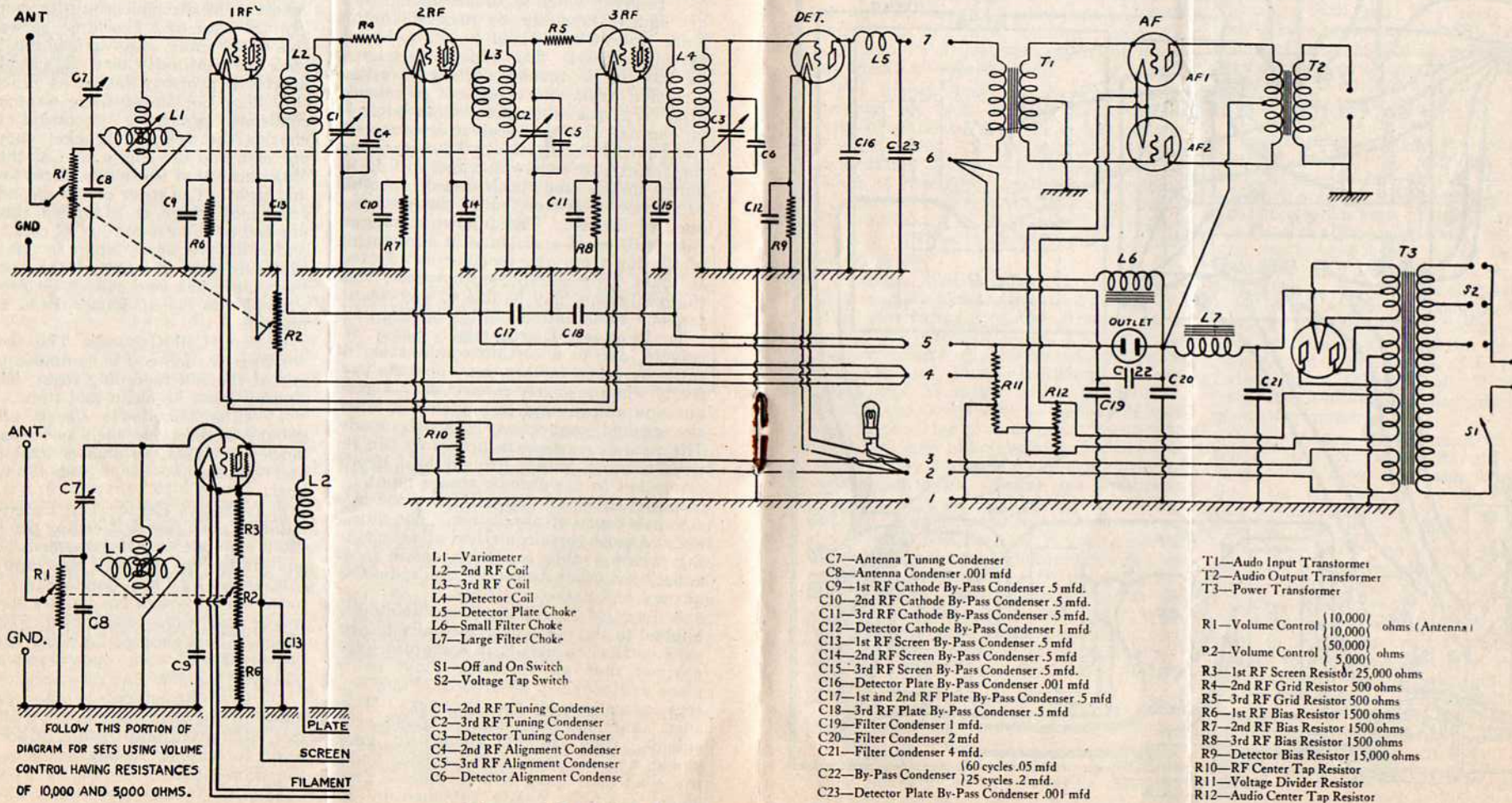


Fig. 1—Schematic wiring diagram of Bosch Model 48 Receiver.

There are, however, some precautions to be noted, the observance of which will enable an exact adjustment to be quickly made.

1. The receiver signal comes preferably from a modulated oscillator, battery or AC operated.

2. If no oscillator is available, use the signal from a semi-distant broadcast station.

3. Set the oscillator or select the broadcast station so that the signal may be received at some point between 30 and 40 on the dial, or as near to the section as possible (below 30 rather than above 40).

4. Use both the "Station Selector" and

"Clarifier" control to tune in the loudest possible signal.

5. Use the "Volume Control" to reduce the signal so it is just barely audible.

6. Adjust the three alignment condensers (in any order) for maximum volume using a bakelite wrench inserted through the tube shields.

7. Again adjust the "Selector" and "Clarifier" for maximum volume.

8. Again check the adjustment of alignment condensers for exact setting.

Condenser Test

As mentioned elsewhere in the manual there is a simple test which can be used

(Continued on page 15)

An Open Letter To The Alumni Association

I have often remarked to the staff of N. R. I. what a fine bunch of fellows attended the convention in Washington last fall. Every man—whether old, young, or middle-aged—had that expectant look in his eye which meant he was contented. They were satisfied because they were all successful Radio men. It was not hard to fathom the real cause of happiness—the N. R. I.

Fellows, we have gained our knowledge from N. R. I. as well as the pleasure of knowing such men as J. E. Smith, E. R. Haas, Phil Murray, J. A. Dowie—I could go right on down the line naming each individual, but after naming them all, they would still sum up to one great organization—the N. R. I.

For fifteen years N. R. I. has been turning out men—turning out, but not forgetting because N. R. I. has always thought of us. That's why the Alumni Association is striving to keep the old bunch of graduates together. We're having splendid success and the cooperation of hundreds of N. R. I. men. Here is a letter I received with an application just the other day:

"I would like to offer my congratulations and thanks to those public spirited men who formulated the Alumni. It is one of the grandest things I know of, to keep members of such an institution as the National Radio Institute in close touch and harmony with one another. During the Great War battalions of men fought shoulder to shoulder. Those who were left are today holding reunions to get together and renew old acquaintances and experiences. Today we graduates of old N. R. I. are out fighting the battles of life. Indiscriminately, we are scattered over the face of North America and throughout foreign countries but we can fight those battles in mass formation through such an association as the Alumni. Therefore, I say again, congratulations and thanks to those men who made for the rest of us such a possibility. I am, cordially yours, George F. Doan."

What a letter! Such fellows as Doan belonging to any organization are bound to make it a success. There are more than 6,000 graduates—men who have gone through the same routine of study, the same as you and I. We want every

one of that number back again. We want to know each and every one of them, and we want them to know us. I have already received 500 applications for membership out of that 6,000. And to each one of them has been mailed a membership card and a letter of welcome. Right here I want to tell you what the Alumni Association has done so far and what its ambitions are for the future.

With Association dues received from applications we opened and equipped a small office in the U. S. Savings Bank Building, 14th and U Streets. Letter-heads, envelopes, membership cards and copies of the constitution were printed to send to prospective members of the Association. The balance of the funds have been deposited in the U. S. Savings Bank.

Now, as to the future. We have hopes of a publication devoted entirely to the Alumni Association, carrying news of N. R. I. graduates. This is going to be a big job and will take plenty of cooperation. Help has been promised along this line from the Editor of the N. R. I. News, who has proved a real friend to the Association. We are going to work with Mr. Murray, N. R. I. Employment Manager, to assist him to place graduates in good paying jobs. In the future we may even open up an Information Service for members to provide data from the U. S. Patent Office, Official Radio Publications from the Bureau of Standards, Department of Commerce, etc.

Now, fellows, the Alumni of a great school like N. R. I. should have a Creed. We have one—and a good one, too. It is taken from the Constitution of the Association. I want every man to read it over several times so that he will know it and be able to tell other graduates about our aims. Let every one of these words sink in: "To cultivate the friendly relations among the Alumni of the National Radio Institute, to foster the spirit of unity and loyalty to our Alma Mater, to encourage the Institute in its dissemination of Radio knowledge, and to promote the welfare of the members by inter-change of helpful information."

Fraternally yours,

E. A. MERRYMAN, Secretary,
N. R. I. Alumni Association.

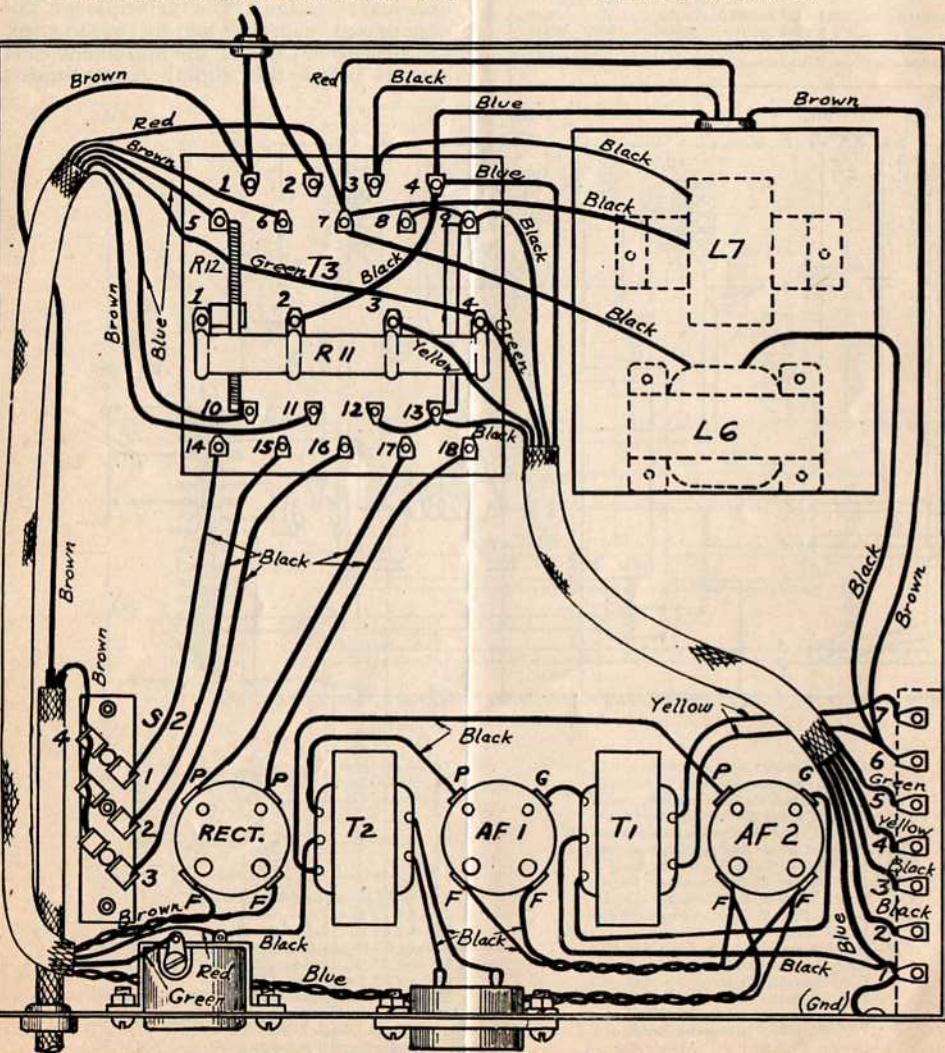


Fig. 2—Wiring diagram of Power Pack.

How To Install An

By STUART C. MAHANAY

The installation of Radio receivers in automobiles is opening up a tremendous field for trained Radio men. Mr. Mahanay, Editor of Radio News, gives some valuable pointers to Radio men who are after this business. Read this money-making article, fellows—then get busy and go after this work.—Editor.

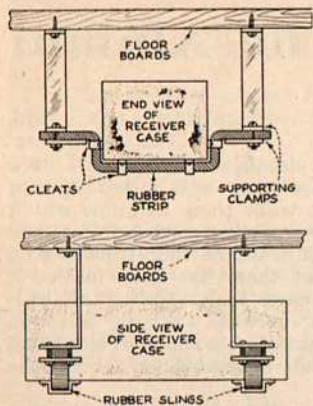


Fig. 1—Shock absorbers for mounting the set under the floor boards.

THE selection and construction of receivers for automobiles present only a part of the job to be accomplished. Once the receiver is built the constructor must give thought to its location in the car. It is true, too, that where the set has not as yet been built, the amount of space available for it will exert a deciding influence on the type finally chosen.

It is with this in mind that the following article has been prepared. The information presented has been carefully compiled and is offered as an aid to those enthusiastic pioneering souls who are now finding an outlet for their energies in this newest of ventures in radio.

Assuming that the receiver has been built, the first item for consideration, in the car itself, is how and where the tuning controls are to be located. Naturally it is out of the question to consider that the tuning dial, volume control and "on-off" switch will be mounted directly on the receiver chassis. The bulkiness and the lack of a suitable place to locate a receiver, so as to be reasonably convenient for tuning, precludes this possibility in most cases. Therefore, we will assume that the tuning controls will have to be placed in one location, naturally the most accessible and convenient one, while the set itself is located elsewhere in the car.

Belt drive of the condenser shaft is a possibility, but the simplest method of

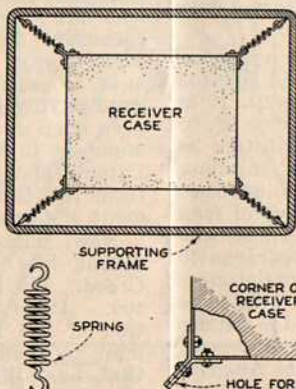


Fig. 2—Another method of shock-proofing the set.

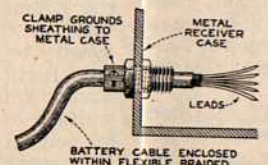


Fig. 3—Use a clamp to ground the cable shield to the set's case.

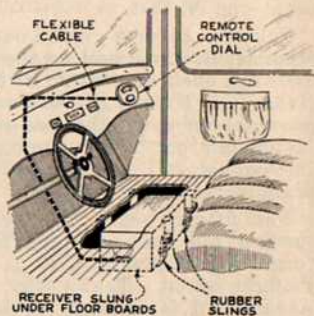


Fig. 4—This shows the location of the remote control, set and flexible shaft.

control is a flexible shaft such as those used in dental drilling machinery and speedometers. In other words—a modified remote tuning control. Volume control of the receiver, together with the means for switching it "on" and "off" require only that the actual units necessary for these operations namely the volume control variable resistance and battery switch, be connected with the circuit of the receiver by means of extra long shielded leads.

Usually it is found most convenient to locate the tuning controls directly on the dash or at the driver's left, on the side wall of the car. (See Figs. 7 and 8.) From either of these locations the flexible shaft and leads go directly to the set.

The actual placing of the receiver depends largely

Auto-Radio Receiver

upon the size and type of car in which it is to be installed, for instance, in a coupe or roadster, the logical place for the set and batteries would be in the compartment occupied by the rumble seat (Fig. 7). In a sedan or touring car having an unusually long hood, ample space for locating the receiver will be found directly forward of the dash, under the hood. In others, space may be found under the floor-boards (Fig. 4) or even under the seat. Still another place for the set is on the running board, where it may be placed in a metal box, strong enough to serve as a step if necessary.

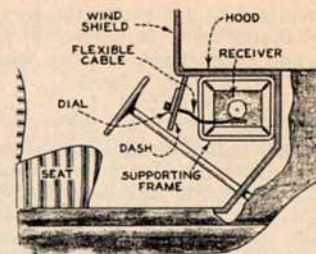


Fig. 8—Mounting the set under the dash provides a short tuning control cable to the dash board.

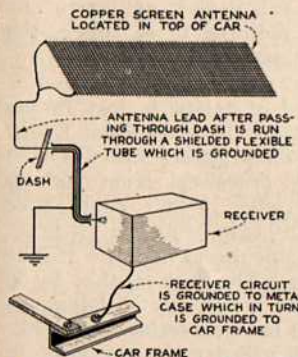


Fig. 5—Details of the antenna-ground system for an auto-radio installation.

To take up the excessive vibration which will be visited upon the receiver chassis while the car is in motion, both to prevent breakage of the tubes and to minimize microphonic noises produced by vibration, several systems may be employed. One is to support the receiver chassis in a frame by suspending it at the four corners of each end by means of springs. This method is illustrated in Fig. 2. Another is to make a sling of several layers of rubber strips and support the receiver chassis from hangers as shown in Fig. 1. Discarded inner tubes are excellent for this purpose.

Turning the condenser shaft by means of the flexible

cable presents another problem, which cannot always be solved by directly connecting the end of the cable to the condenser shaft through a coupling medium such as a universal joint. Fine tuning, or in other words, the direct turning of the condenser shaft without "back-lash," which is just as necessary whether the set be in a car or in the home, is very difficult while the car is in motion. Some means of gearing down the revolution of the tuning control knob for vernier action must be utilized. Straight and worm gears have been found reliable and satisfactory for this job. Moreover, their use permits locating the set so that there are a minimum of twists and turns in the flexible cable itself. Details of the gear drive are shown in Fig. 9.

To a certain degree the amount of signal coming from the loud-speaker is dependent on and in proportion to the efficiency of the antenna. In automobiles, where size injects a limiting factor, the pick-up is

boosted by the use of several stages of high-gain radio-frequency amplification, but of course there is a limit beyond which they cannot be used effectively. Several ways of providing an acceptable collector are possible. First, one may use a copper screen fastened to, but insulated from the roof, inside the car (Fig. 5). Second, five or ten turns of wire may be strung around the inside of the car at the top, where they will be out of the way. If this latter system (Fig. 6) is used the collector may be connected to the receiver as a straight antenna or as a tuned horizontal loop. When used as a loop some experimentation will be

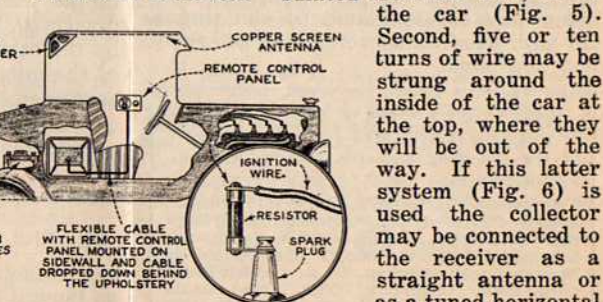


Fig. 6—How to mount the coil antenna in the roof.

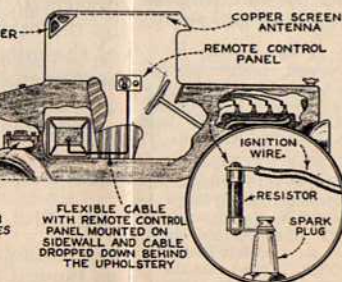


Fig. 7—Showing the installation details for the set, batteries and tuning control. For eliminating spark-plug interference note the use of the resistors.

required to determine the correct number of turns to be employed so that the antenna stage tunes in step with the other radio-frequency stages.

The main source of noise in a receiver installed in a car is from the spark plugs, induction coil and associated ignition wiring. To prevent pick-up from the wiring it has been found necessary not only to shield the receiver itself, but also to run the receiver battery wires and all other leads connected to the set through flexible metallic braid, grounding the latter to the car's frame. (Fig. 3.)

Eliminating the noise caused by the discharge of the spark plugs presents a

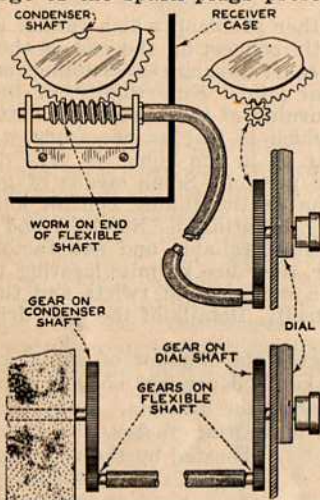


Fig. 9—Some methods for gearing the tuning control to the condenser shaft are shown here.

more complicated problem. Shielded spark plugs may be substituted for the usual ones, or choking resistors of about 50,000 ohms may be inserted in series with the spark-plug leads. (Fig. 7.)

Noises produced by the action of the brushes against the generator's commutator may be eliminated by shunting a .25 mfd. fixed condenser across the relay box to ground.

Editor's Note.—The growing importance of this field is evidenced by the prominence of the following concerns making Automobile Receivers:

Automobile Radio Corporation, 4615 Prospect Avenue, Cleveland, Ohio; American Bosch Magneto Corporation, Springfield, Massachusetts; Continental Wireless Supply Corporation, 60 Newark Street, Hoboken, N. J.; Crosley Radio Corporation, Cincinnati, Ohio; Deico Radio Corporation, 1420 Wisconsin Blvd., Dayton, Ohio; National, Inc., 61 Sherman Street, Malden, Massachusetts; Silver Marshall, Inc., 6405 W. 65th Street, Chicago, Ill.

They Have Said—

The victory of success is half won when one gains the habit of work.—Sarah A. Bolton.

He who would do some great thing in this short life must apply himself to work with such a concentration of his forces as, to idle spectators, who live only to amuse themselves, looks like insanity.—Parkman.

Nothing is easier than fault-finding; no talent, no self-denial, no brains, no character are required to set up in the grumbling business.—Robert West.

A great deal of talent is lost in the world for want of a little courage. Every day sends to their graves obscure men whom timidity prevented from making a first effort; who, if they could have been induced to begin, would in all probability have gone great lengths in the career of fame. The fact is, that to do anything in the world worth doing, we must not stand back shivering and thinking of the cold and danger, but jump in and scramble through as well as we can.—Sydney Smith.

Bad will be the day for every man when he becomes absolutely contented with the life that he is living, with the thoughts that he is thinking, with the deeds that he is doing, when there is not forever beating at the doors of his soul some great desire to do something larger.—Phillips Brooks.

Reading is to the mind what exercise is to the body. As by the one, health is preserved, strengthened and invigorated; by the other, virtue (which is the health of the mind) is kept alive, cherished and confirmed.—Addison.

Success or failure in business is caused more by mental attitude even than by mental capacities.—Walter Dill Scott.

When you get into a tight place and everything goes against you, till it seems as though you could not hold on a minute longer, never give up, then, for that is just the place and time that the tide will turn.—Harriet Beecher Stowe.



N. R. I. AT R. M. A. SHOW

N. R. I. will be represented at the 1930 Radio Manufacturers Association Show at Atlantic City, June 2-6, by Mr. Joseph Kaufman, Chief of the Consulting Department.

Mr. Kaufman will make a thorough study of Radio problems for the coming season as well as of the new equipment offered by Radio manufacturers. A forthcoming issue of the News will carry a complete account of his findings at the R. M. A. Show. Watch for this article—it will contain important data for every Radio man.

N. R. I. SERVICE MANUAL

(Continued from page 10)

to determine the efficiency of condensers. The apparatus consists merely of an attachment cord, 110-volt 25-watt lamp and socket, and two test leads. Connect as follows:

1. One conductor of attachment cord to lamp socket.
2. One conductor of attachment cord to one test lead.
3. Other test lead to other terminal of lamp socket.

Plug the attachment cord into a 110-volt outlet and insert the bulb into the lamp socket.

a. When the two test leads are touched together the lamp will burn at full brilliancy.

b. When the two leads are touched to the terminals of a large condenser (such as 2 Microfarads) the bulb will glow, its brilliance dependent on the size of the condenser.

c. On a small condenser (.002 microfarads) the lamp will not glow at all.

d. The bulb will burn at full brilliancy if the condenser is shorted.

This test applies 110 volts to the condenser and will detect condensers which might break down in use but would not be detected by an ordinary continuity test using a 4½-volt "C" battery.

Bushels of Letters

Show N. R. I. Men Cashing In. Here Are a Few.

"I made \$150.00 selling and repairing receivers since I mailed the last lesson. I promised to cut out some of my servicing and get more lessons, but I saw a chance to make some money and just couldn't pass it up. I have made the cost of my course several times over. I did so much Radio work in spare time I could not find time to get my lessons in fast enough." Carl D. Marum, 611 Spruce Ave., Kansas City, Mo.

"I am praising the course every day for all it has done for me. I threw my money-back agreement in the fire the second week after I started." S. E. Bost, 112 48th St., Wylam, Alabama.

"I have worked at Servicing for about seven months and during that time I earned about \$2,200.00." John Wippick, 121 Fern St., Darby, Penna.

"I wouldn't take ten times the cost of the whole course for what I have already learned about Radio. It is worth the cost just to be associated with such a bunch of good fellows. I turn down work every day because I feel like it is more important to keep up with the lessons." Jack W. Allen, 1004 Hale St. (P. O. Box 221), W. Durham, N. C.

"Last week I made \$48.00 in about 15 hours out of the week. I charge from \$1.50 to \$2.50 per hour. I have lined up two dealers who give me all of their repair and service work. If it were not for you, I would still be digging ditches. When I enrolled it was my starting step to a better job." Herbert J. Sainsbury, 4144 10th Ave., N. E., Seattle, Washington.

"You will be interested to know that I have accepted a job as Service Man for Montgomery Ward & Co. Have taken care of a number of calls this week and have them all running O. K." Fred J. Dubuque, 19 Church Street, Oswego, N. Y.

"I gave out 15 cards and as a result have 9 repair jobs. I can tackle any Radio job that comes my way. I have every right to be confident because I am getting the best Radio training possible." William Orr, 343 S. Main Ave., Scranton, Penna.

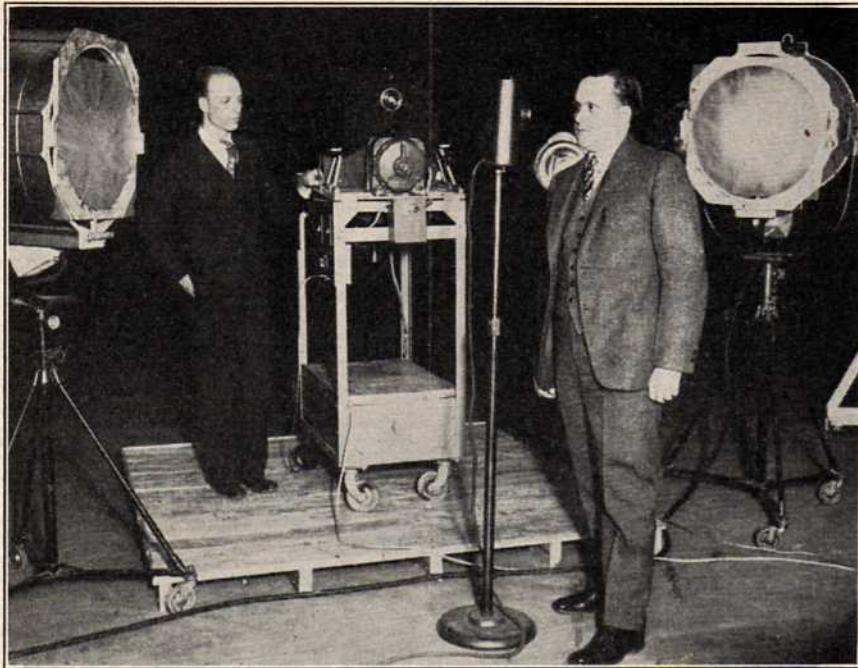
"I have been doing Radio Servicing and I have done fine. I am just working on my 20th lesson now and have already earned \$143.80. I have been enrolled with you only two and one-half months." Ernest M. Zimmerman, 980 No. Water Street, Decatur, Illinois.

"It seems that Aladdin rubbed his magic lamp for me. Your Course has opened up a new world of mysteries. I feel as proud when I send in a lesson as if I were banking money." S. H. Johnson, 406 O'Connor Ave., Charleston, W. Va.

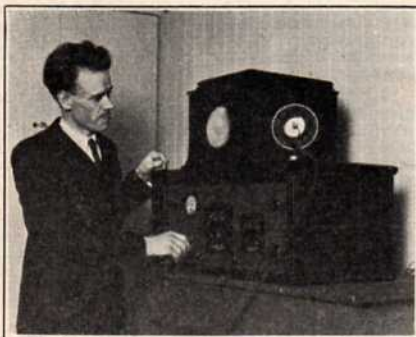
"I think the N. R. I. course can't be beat. All the students that I've talked to who have made a success in Radio seem to be N. R. I. trained. An N. R. I. man is always popular with set owners." Blaney B. Blay, 601 Columbia Ave., Elgin, Illinois.

"I just do Radio work in my spare time now, but I'll tackle any screen grid receiver right now and guarantee results. I have earned the price of my course over many times." R. A. Reel, Bouton, Iowa.

IT'S HERE — FIRST SIGHT-SOUND THEATER OF THE AIR!



Television has been right around the corner for a long time. It looks like it is here at last from the above picture taken in the first Radio-Television theatre in Lincoln Park, Jersey City, New Jersey. Wendell McMahon (right), pioneer of Television announcers, and Don Short (left), Television camera man, are standing beside the complicated mechanism which is a combination of Radio Broadcasting apparatus with ultra-modern motion picture camera. Illumination for the Television camera eye is supplied by a 65,000 kilowatt power supply. The image of the speaker is Radioed from the black box behind the television eye instead of imprinting itself upon a negative.



Philo T. Farnsworth, young San Francisco inventor and experimenter, shown with his improved Teletvisor, constructed in the Crocker laboratories. The white circle is the image screen for reception, the microphone being used for talking sequences.



Miss Ann Clancy has the distinction of being the world's first Radio Television girl by "looking in" on the first Television broadcast in history. She is not only hearing the voice of Wendell McMahon, but also seeing his Teletvised features as he speaks.

