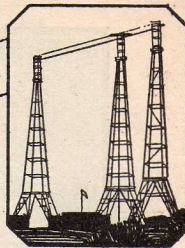
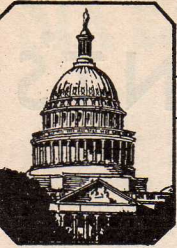


# NATIONAL

# RADIO

# NEWS



**FROM N.R.I. TRAINING HEADQUARTERS**

Vol. 2—No. 10

WASHINGTON, D. C.

MAY, 1930





J. E. SMITH

# The PRESIDENT'S PAGE

## Service Profits

There's a flood of gold pouring into the pockets of Radio service men! There hasn't been anything quite like it before. Figures show that in the next twelve months Mr. American Set-Owner will pay in the neighborhood of \$240,000,000 to service men to keep his radio receivers in tip-top shape.

Consider two hundred forty million dollars! That's sixteen times as much money as was paid to Spain for the rich Mississippi Valley States known as the Louisiana purchase! That's thirty-three times as much money as was paid Russia for that rich northern empire—Alaska! Yet American Radio fans will pay that much out in one year for service and repair work!

Who are pocketing the servicing profits? N. R. I. men are getting a good big slice of them. Hundreds of letters from N. R. I. men in every section of the country bring us good news every month of big service profits.

And here is a great big blunt fact that should interest every N. R. I. man. In practically every case the men who are making the most money are the men whose records at the Institute show regular, persistent study. There's a mighty close connection between regular study habits and money-making ability. So it's perfectly clear now that N. R. I. men who keep plugging on their lessons the next six or eight months are the men who are going to know how to get a big share of America's service profits! We all know what it takes now—let's work together. Keep your lesson papers coming in!

## Right Ahead

More than 100 airplanes have been equipped with Radio apparatus and permits have been granted to 44 airports

for Radio transmitters during the last year reports the Department of Commerce. This is merely another indication of the increasingly important connection between Radio and aviation. In another 10 years this specialized field of Radio in aviation should use more Radio trained men than are now engaged in Radio broadcasting itself!

## Radio Facsimile Transmission

Recently engineers in the General Electric Radio Laboratories at Schenectady read a full page reproduction of a San Francisco paper within three hours after it came off the press on the Pacific coast! That was the first time in history that a full-size newspaper page was sent by Radio waves through space across the United States. What a remarkable event that was! Words can't begin to picture its real meaning and the influence it will have upon the future. It will surely be only a short time until the vast commercial possibilities of Radio facsimile transmission will be exploited. Can you realize what a tremendous field it will open for the Radio trained man? Look ahead a few years. The important news events and pictures will be flashed to newspapers throughout the country. Copies of contracts and other important commercial transactions will be made and flashed through the air by Radio from bank to bank and business house to business house. Scores of other practical uses for this new development suggest themselves. Imagine the immense amount of Radio equipment and the large number of Radio-trained men needed to handle all this work. This sort of thing shows conclusively that we are just now scratching the surface of Radio's vast possibilities. The future of the trained man is rosy indeed!

# SIX BIG POINTS The Service Man Must Have

By Hal Johns

What makes a good service man? Or, rather, what makes a service man good? Lately, I've been sizing up several of them, picking out their good points and shortcomings and analyzing them. Other set owners with whom I have talked agree with me that the successful Radio service man has the good points I'll mention in this article.

First there is the requirement of expert knowledge. No man has a right to come into my home to repair my set unless he knows Radio. A man who does not know Radio and yet who holds himself out as a Radio repair man is a fraud and will soon be found out. He has no business tinkering with expensive Radio sets. By expert knowledge I mean the practical knowledge of Radio combined with a thorough understanding of Radio theory—in short, the service man must know the "whys and wherefores" of every operation he performs. There's just about as much reason in turning my Radio set over to a would-be service man with no training or background in Radio as there would be in asking the dishwasher to overhaul the family car.

The next point I consider is the service man's attitude. I expect him to be businesslike. While his visit may be cordial and friendly, he doesn't come as a guest but as a skilled technician and I expect him to conduct himself as such. A straightforward businesslike attitude impresses those whom he serves. It wins confidence and makes the owner feel that his property is in the hands of one who knows his business and is accustomed to dealing with such in a businesslike manner. While Radio is as fascinating as play it is a business proposition when the service man enters a home to repair or service a set, and the successful man so regards it.

Then, there is the matter of dependability. This quality can be easily acquired yet few have it. By dependability I mean that practical, common sense way of doing things that inspires confidence in the customer and lets him understand that he can count on you. When you tell him that you will be up to fix his set in 30 minutes he wants to depend on you to be there. If anything irks a Radio fan it is to sit around an entire evening waiting for the service man who promises to be on the job "in just a few minutes." If you are busy and can't come right away he will appreciate knowing it. If you must take the set



to your home or shop to repair it don't promise to have it back "by tomorrow" unless you are pretty certain you can do it. Promises should be carried out. Loose talk and poor performance have spoiled the success of many a service man because the public soon learned that he couldn't be depended upon.

Another point I watch in the service man is his sense of fair play or business ethics. There are "racketeers" who make a practice of substituting a set of new tubes for the perfectly good ones in the set and then use the ones taken out for another job at a profit. Thanks to the new type of Radio service man that trick is fast disappearing. The set owner gets on to that sort of thing sooner or later and he naturally calls in a new man the next time he needs service. If a set needs tubes or new parts, sell them, but don't unload a lot of extras just to make a profit. Fair play pays bigger profits in the long run.

A service man should charge what his work is worth. Give the customer a square deal. Playing square, however, does not mean under-estimating the value of your time or charging less than the job is actually worth. It is just as unbusinesslike to charge less than the work is worth than it is to overcharge.

Then, there is the matter of courtesy. It's a little point, you might say. It shows up in the profits though at the end of the year! The baggage man or the janitor may get by with his uncouth, rough way of doing things, but the Radio service man going into the best of homes stands on an entirely different plane. Courtesy doesn't cost anything. A person should never be in too big a hurry or feel too important to be courteous in his approach and in his dealings with the set owner. You've found, no doubt, that people respond quickly and like to deal with a man who is courteous, friendly and tolerant.

Neatness in appearance and in doing the job is another factor. You wouldn't think of going into a drawing room with mud on your shoes and grease on your clothes, and yet, I've seen some "would-be service men" just about that careless. Of course, one can go to the other extreme. The "dude" or the "fop" won't get far either—he's afraid to get right down to work on the set lest he ruffle his foxy bow tie or spoil the crease in his trousers. At least that's the way the set owner might size him up.

If I were a service man I'd check over all these points. I'd analyze myself fairly and squarely—and see just where my weak points were. I'd put a lot of thought on how I could improve my methods of meeting the public and establishing a good reputation. The successful Radio man is successful because he measures up to these qualifications. Now, how do you rank, and what are you going to do to climb higher?

### Here They Are

Expert Knowledge  
Businesslike attitude  
Dependability  
Fair dealing  
Courtesy  
Neatness

# RADIO'S ONWARD MARCH SHOWN

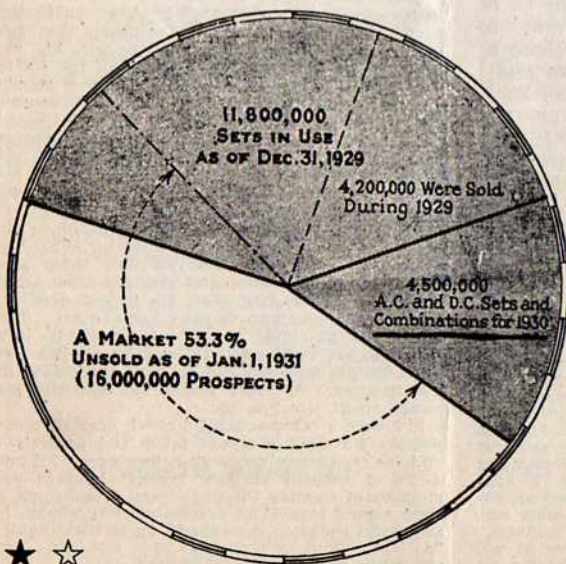
Radio made new high records in 1929. Here are the complete and final figures as gathered by that prominent Radio Trade magazine—Radio Retailing.

1929 Radio Sales, at Retail Prices

Item	Units and Dollars	Item	Dollars
Radio Sets, factory-built (89% include consoles and built-in reproducers) ..	4,200,000 \$525,000,000	Storage (A) Batteries, Chargers and Socket Power Units ..	\$14,350,000
Radio-Phonographs (Combinations) ..	238,000 67,068,000	Other Accessories	9,600,000
Tubes, all types ...	69,000,000 172,500,000	Parts (Direct to Consumer) ...	7,500,000
Reproducers (Exclusive of 3,689,000 sold with sets and combinations)	800,000 16,000,000	Totals	
B-C (Dry) Batteries	..... 30,530,000	Sets, plus Combinations ....	592,068,000
		Parts .....	7,500,000
		Accessories ..	242,980,000
		Total Sales for 1929 .....	\$842,548,000

## 1930 TO BE BIG YEAR

The biggest 1930 months for Radio are still ahead. Radio Retailing estimates that in January, 1930, there were 16,000,000 prospects for Radio sets, and that 4,500,000 new sets will be sold this year. That means good commissions in addition to the service profits on the nearly 12,000,000 old sets now in use. Here's a chart on the Radio situation today! Study it over—see for yourself the big opportunities ahead. ☆ ☆



# National Radio News

Published monthly in the interest of N. R. I. students and graduates, by the NATIONAL RADIO INSTITUTE  
16th and U Streets, N. W.  
Washington, D. C.

J. E. SMITH, Publisher. E. R. HAAS, Editor.

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NATIONAL RADIO INSTITUTE

Washington, D. C.

May, 1930



A FAMOUS man, when asked the secret of his success, once said. "When others slowed up I worked all the harder. We all have about the same amount of brains, so while we were all working we made just about the same progress. But, when some of the boys let down for a week

or two or took the summer off I stuck to my studies and put in a few extra hard licks for good measure." I've thought a lot about that man since. The very thing that has won high positions for him has spelled success for others. It's that extra effort—the "plus" that marks the difference between a commonplace existence and real success.

Or, the well drillers' story shows how this works. Two oil prospectors started wells right next to each other on their claims. One drilled 3840 feet, found no oil, gave up the job a failure. The other drilled 3856—16 feet deeper—and brought in a 10,000 barrel gusher. That extra effort—that extra 16 feet spelled the difference between a down-and-out failure and a big success. That principle is enacted over and over through life. Success lies just around the next corner—tomorrow, next month. But is smiles only upon those who put in that extra effort to reach it.

Now what does this mean to you as an N. R. I. man?

It's this way—the "play boys" have a habit of loafing during the spring and summer months. They have the idea they can slow up with their lessons for a while and then get back on the same footing in the fall with the men who have studied regularly through the summer. Well, it simply can't be done! The man who digs right through his lessons the next four months will be head and shoulders above the "play boys" when the profits are figured up at the end of the year. I want to see N. R. I. men succeed. I want to see you get the biggest opportunities in Radio. Now, if deep down in your heart you want success too, you will prove it by sending in at least a lesson every week during the next four months!

E. R. HAAS,  
Vice President & Director.

## THE COVER

On the cover of this month's National Radio News we show you Graduate Claude Allday at work at his Radio servicing bench. Mr. Allday recently wrote: "While engaged in the study of your course I cleared around \$640 doing spare-time work on Radio receivers. That sum alone has many times paid for the course. I want to say right here that I would not take \$10,000 in cold cash for the training in Radio that I have received from the N. R. I.

"And I'll add—that if any young man wishes to take up the study of Radio and if he wants the best course in the world, he will take a big step on the road to success when he enrolls with the National Radio Institute."

CLAUDE ALLDAY,

Maxwell Field, Montgomery, Ala.

We appreciate the good things Claude Allday says about N. R. I. training. His own experience proves that he has made the most of his opportunities, and the News wishes him continued and unlimited success in Radio.—Editor.

International Resistance Company, manufacturers of Durham Metallized Resistors, have prepared a "resistor replacement guide" giving the values and types of resistors used in practically all of the radio sets produced during 1927-'28-'29, indicating in their guide the values of resistance unit, power rating and type of unit to be used in replacement work. Copies of this guide may be obtained upon application to the Service Department, International Resistance Company, Philadelphia, Pa.

It is when a man stops studying that he ceases to grow.

"The path to success is wide open. The competition is negligible. There is no jostling. In fact, to travel in it is lonely."  
—Edward Bok.

## NOTICE

Have you moved lately? Be sure to keep us posted on your new address. We want you to have each copy of the News on time. Back numbers are seldom available.

—Editor.

## Chief Engineer Gantt

### Cashes in on Public Address Field!



Mr. John Gantt

Public address amplification is one of the newest branches of Radio that's pouring dollars into the pockets of the trained Radio man! N. R. I. Graduate Gantt, as

well as a number of other N. R. I. men have proved this to be true. It's surprising to see how few men are qualified to handle these jobs and how much of this public address work there is to be done! Take Mr. Gantt's case, for example. He had made a fine reputation for himself as Chief Operator of Station WOL. Then along came the National Radio Corporation. They had some government contracts for public address systems and needed a good engineer to design and supervise the work. Gantt was the man they wanted. They knew he knew his Radio. And so he was made Chief Engineer at a good salary and commission on all the systems sold!

Designing and doing the engineering work on the public address equipment for 17 Government Veterans Hospitals was not a small job by any means. Each unit cost close to \$2000 alone! Gantt was now able to appreciate more than ever what his Radio training meant to him. Scores of other N. R. I. men are cashing in on this new Radio field too. Student H. W. Solomon, Medford, Ontario, Canada, recently installed an amplification system in the local skating rink, and Student Copenhaver of Mt. Orab, Ohio, installed and operated the public address apparatus on the S. S. Cincinnati used by President Hoover to address huge crowds along the Ohio River. Student E. Lewis is in charge of the public address equipment recently installed in the Ambassador Hotel at a cost of \$65,000. Public address amplification is literally sweeping the country like wildfire, and the "up and at 'em" Radio men are cleaning up big. Hotels, apartment houses, schools, auditoriums, pavillions, railway waiting rooms and clubs are all prospects for Radio or sound amplification equipment and will have it as soon as there are men qualified to do the work!

Dear Mr. Smith:

I guess you like to hear from OLD TIMERS in the radio game. I feel that I am a real old timer. I graduated from your Institute just about twelve years ago.

My radio career has been successful. I am in charge of the control and operating room activities of WOL here in Washington.

We are putting programs on the air which meet with the favor of our listeners. I feel that my knowledge of Radio as derived from your training is in a large measure responsible for this popularity.

I didn't find occasion to ask for employment service from you until after I had been a graduate eleven years. Then when I did ask for it—I got it. Your employment department assisted me to the position I now hold—thanks to them.

If anyone wants to know whether N. R. I. sticks with its graduates—ask me. It was still working for me after eleven years—and eleven years is a long time.

Your old graduate,

JOHN FRANCIS GANTT.

This picture shows one of the public address units engineered by John Gantt for the National Radio Corporation of Washington. It was built under his supervision from the ground up—even the steel framework being made according to specifications. It is evident that the man who knows Radio thoroughly and who can design and construct Radio apparatus of this nature—will find Radio as John Gantt has found it to offer unlimited opportunities. And remember—this work was done, you might say, in Mr. Gantt's spare time for most of his time is taken up in the control room of Station WOL. Read his letter at top of this page.



Radio Station WOL,  
Annapolis Hotel Bldg.,  
Washington, D. C.

## N. R. I. SERVICE MANUAL

ON

### Brunswick, Models 14, 21 and 31 and Bremer Tully, Models 81 and 82

The receivers are identically the same R. F. chassis and essentially the same socket power unit. In the Brunswick, Model 31, socket power unit the pick-up jack has been replaced with a radio-record switch, cable and input transformer. The input transformer is necessary in order that the low impedance pick-up as used on this model may be matched with the relatively high input impedance existing in the primary of the first audio frequency transformer.

The receiver consists of the following three units:

A. The radio or R. F. chassis.

1. A tuned antenna coupler equipped with an auxiliary antenna compensating condenser to permit the maximum efficiency of the receiver for any length antenna.

2. A three-stage tuned neutralized and shielded radio frequency amplifier and tuned detector stage. Heater type tubes are used as R. F. amplifiers and detector. All component parts are mounted on a pressed steel automobile type chassis of sufficiently thick gauge to insure the continual alignment of the tandem condensers and other parts even though the chassis is subject to unusual strains and jars during shipment.

B. The socket power unit.

1. First stage of cascade transformer coupled audio frequency amplification using a heater type tube.

2. A second or power stage with transformer coupled audio frequency amplification employing two UX-245 tubes in a push-pull amplifier circuit which permits a great power output without tube distortion.

3. A voltage supply unit which, with its associated UX-280 double wave rectifier tube, transformer, choke coil, condenser bank, etc., supplies all voltages necessary for the operation of the receiver.

C. The dynamic speaker.

A powerful ten-inch full dynamic speaker, the field current of which is supplied by the socket power unit. A two-inch voice coil is used to drive the speaker cone which in combination with the ten-inch cone produces a reproducer of remarkable responsiveness, power and fidelity of tone. The cone is so con-

structed and impregnated as to be free from all paper noises and is impervious to climatic conditions. The floating voice coil is centered in position at the factory and should not require additional attention.

NOTE: Do not attempt the operation of any model receiver unless the field coil terminals are connected. If it is desired to operate the receiver for test without the speaker a 600-ohm resistor capable of withstanding a continuous current of 100 milliamperes should be connected in place of the speaker field coil leads.

To facilitate the assembly and service on these models the R. F. chassis and the socket power unit are bolted to a single laminated mounting board which in turn may be inserted in or removed from the cabinet as a unit, by removing or inserting the retaining bolts found at the rear of the mounting board.

#### Adjustment For Minimizing Hum

In order that the receiver may be adjusted for quiet operation on any A. C. line, two hum minimizing potentiometers have been placed on the socket power unit chassis connected across the UY-227 filament winding and the UX-245 filament winding respectively. The UY-227 hum minimizing potentiometer is located between the UY-227 socket and the first UX-245 socket. The adjustment of this control should be made after the UX-245 hum minimizing potentiometer has been adjusted. If the UY-227 hum minimizing potentiometer appears irresponsible, a new tube should be inserted in the first audio and detector sockets.

An excessive hum which usually appears on a strong local or nearby station and which cannot be balanced out with the hum minimizing potentiometers may be due to one or more of the R. F. stages oscillating, in which case the receiver should be neutralized before the hum minimizing potentiometers are adjusted.

#### Adjustment of Neutralizing Condensers

The receivers are neutralized at the factory for average UY-227 or CY-327 tubes and the neutralizing screws are then sealed with collodion to prevent the loss of adjustment during shipment. If other than R. C. A. or Cunningham tubes

are to be used it may be necessary to re-neutralize the R. F. amplifier to compensate for a difference in the inter-electrode capacity of the tube.

Before neutralizing it is advisable to try a different set of tubes in the R. F. amplifier to be sure that an abnormal tube is not causing the receiver to oscillate.

An oscillating R. F. stage or stages is evidenced by:

1. Abnormal hum on local or nearby stations which cannot be eliminated with hum minimizing potentiometers.

2. Distorted reception of any or all stations usually on the lower wavelengths.

3. A whistle or squeal preceding the station being tuned in.

NOTE: Do not mistake a station heterodyning whistle for this indication. Oscillation squeal will occur on more than one station.

4. Motorboating on all portions of the broadcasting band.

To neutralize the R. F. amplifier proceed as follows:

1. Adjust a modulated oscillator for operation at 1400 kilocycles and couple it to the long antenna post of the receiver with a five-foot wire, one end of which should be wrapped two or three times about the oscillator coil.

2. Tune the oscillator signal in on the radio to maximum volume using both the tandem condenser control and the antenna compensator control.

3. Allow the receiver and oscillator to operate for about a minute in order that the tubes may become thoroughly warmed up and stable. Then replace the first R. F. tube with a good tube of average characteristics (one that will not cause a set that has previously been neutralized to oscillate) with one of the heater prongs cut off. It is very important that the tube from which the heater prong has been removed

be of the same make and type as it is desired to use in the R. F. amplifier—do not neutralize with one make of tube and then use a different make for an amplifier. To do so may cause the receiver to oscillate stronger than it did in the beginning.

4. Adjust the first R. F. neutralizing condenser for minimum signal. The neutralizing condensers will be found located between the coil and tube sockets of the stage they neutralize. Because of the great amplification secured, a node or dead spot will not be found.

5. Remove the dummy tube and insert in its place a good tube. Place the dummy tube in the second R. F. socket and after allowing one minute for the first R. F. tube to become thoroughly heated, neutralize the second stage as explained.

In the event any trouble is experienced

in neutralizing this receiver, a thorough check should be made of the receiver voltages and the by-pass condensers. An open by-pass condenser may allow sufficient radio frequency energy to feed back from one stage to another to make neutralizing impossible. If voltages are tested and found O.K. and the by-pass condensers are all good a different dummy tube should be used.

### The Voltage Regulator Tube

The receivers are shipped with a special voltage regulator tube as standard equipment and should it at any time be found necessary to replace this tube it is essential that those intended for use in the standard models be replaced with a Duresite type 98 or 105 and the 25 to 40 cycle models be replaced with a Duresite 110 voltage regulator tube. If the heater voltage on any of the tubes is

greater than 2.6 then the voltage regular tube type 98 should be used. It has been found that the short life of the 227 type tubes is often due to the fact that the A. C. line voltage is unusually high. In this case the 98 type regulator should be used.

### External Pick-up Operation

In the event it is desired to use receivers not having a radio-phonograph combination to amplify and reproduce phonographic music, any good pick-up may be connected to an ordinary telephone plug and inserted in the radio jack located in the rear of the socket power unit. Phonograph volume may then be controlled by the volume control usually furnished with such equipment. It is important to remember, if this magnetic pick-up is used, that the radio cannot be operated until the plug is removed.

### Service Data

**Hum.**—Abnormal hum which cannot be eliminated by an adjustment of the hum minimizing potentiometers, as previously explained, may be due to one or more of the following causes:

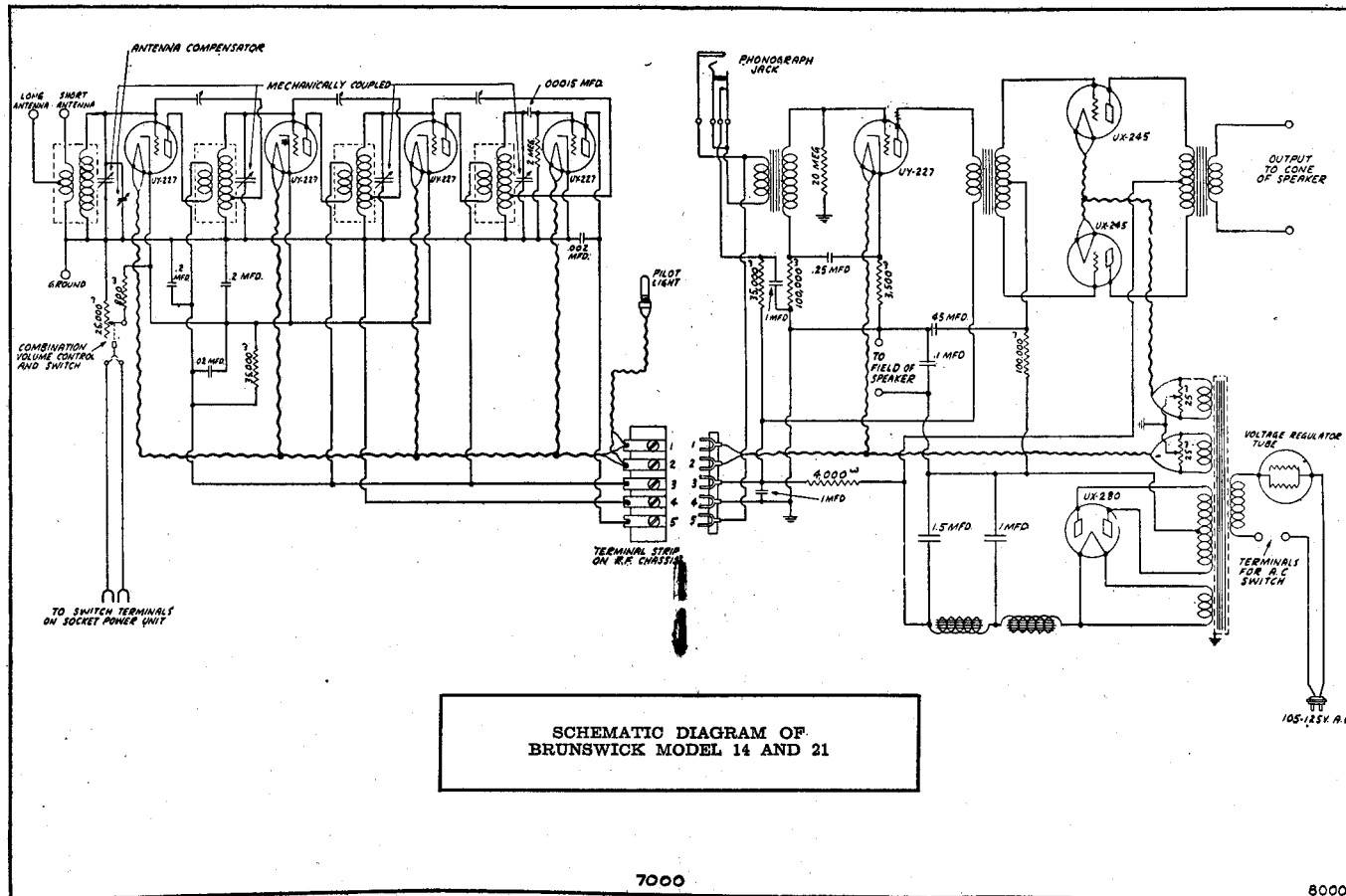
1. One or more R. F. stages oscillating.
2. Low emission tube, particularly UX-245 or UX-280.
3. Open filter or by-pass condenser.
4. Open grid lead in R. F. or audio amplifier.
5. Center arms of hum minimizing potentiometers not grounded or poorly grounded.

**Howl.**—1. Microphonic detector or first audio amplifier tube.

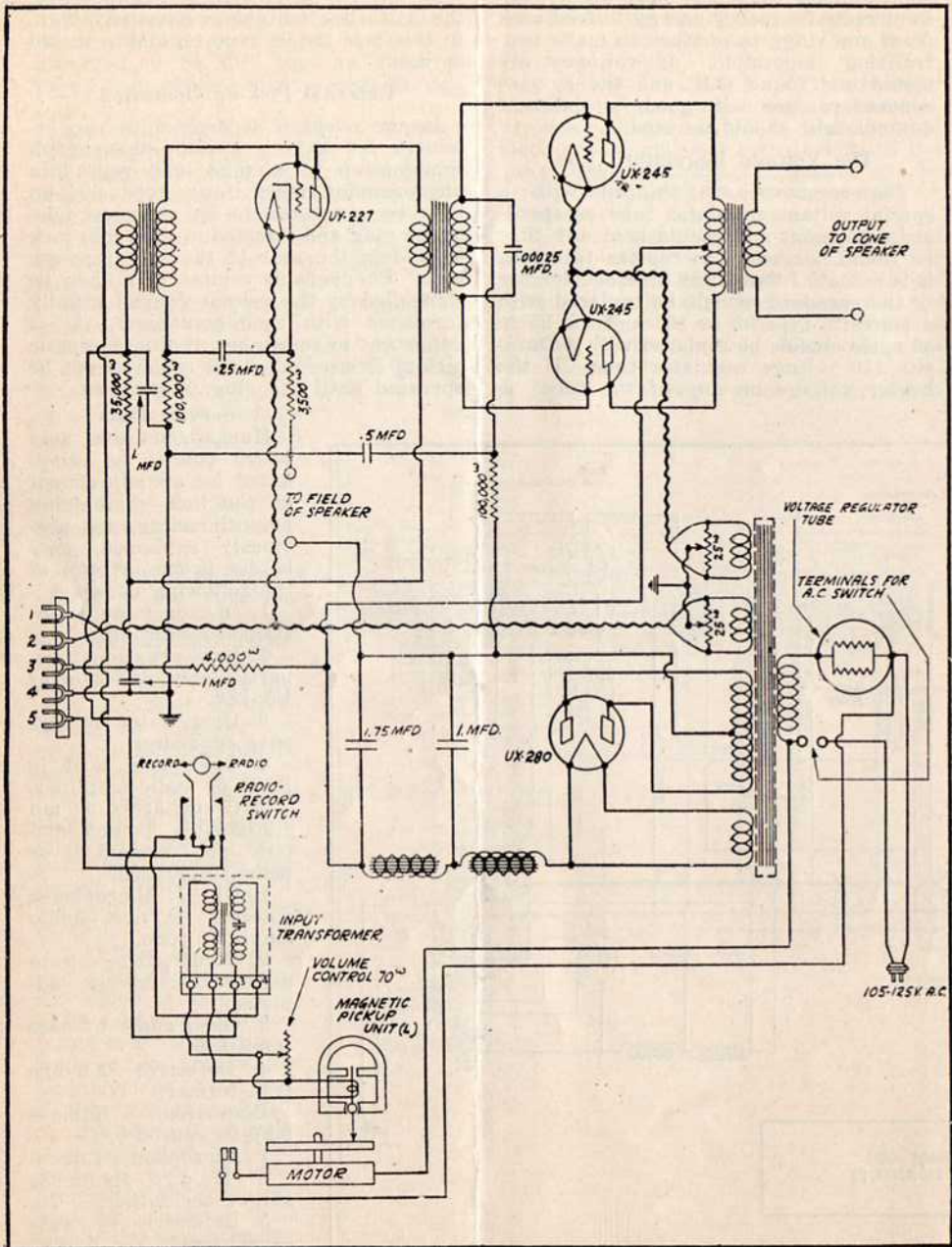
2. Neutralizing condenser incorrectly adjusted.
3. Open audio by-pass condenser.
4. Defective audio transformer.

**Distortion.**—Radio—may be caused by:

1. Microphonic tube.
2. Radio-frequency stages oscillating.
3. Defective by-pass condensers.
4. Defective audio-transformer in SPU.
5. Shorted grid condenser.



SCHEMATIC DIAGRAM OF  
BRUNSWICK MODEL 14 AND 21



SCHEMATIC CIRCUIT OF POWER UNIT USED ON BRUNSWICK MODEL 31

### In the Old Days—



### The N. R. I. Service Man—



He is the recognized Radio authority in his community. His expert knowledge and courteous ways open the best homes to him. He is confident, alert, awake to new changes in Radio. He is always in the forefront. He is loyal, prosperous and is contributing his share to the onward march of the Radio profession. Over 100 Radio stations and hundreds of papers spread the name of the N. R. I. and the fame of Radio-Tricians of which he is one. There's a reason why the N. R. I. man is proud of the work he is doing, the organization and the resources that are back of him and the larger opportunities that lie ahead of him.

# RADIO REPAIRING AND SERVICING

By J. A. DOWIE, I. R. E., Chief Instructor

**T**HERE are many links in the chain of Radio satisfaction.

First, a special designed receiver is conceived by a Radio Engineer and perfected by laboratory research.

Second, the receiver is manufactured in quantities in a factory especially adapted to its production.

Third, it is distributed through manufacturers, jobbers, and dealers, sales organizations to a customer whose radio requirements are filled.

Fourth, the receiver is installed and maintained by a Radio-Trician.

Upon the skilled Radio-Trician lies the burden of correcting all the errors which may have been made in the above manifold process.

He must be able to repair any damage to the set due to transportation or correct any misuse to which the receiver is subjected at the hands of its owner.

The technically trained Radio-Trician's contribution to Radio satisfaction is therefore highly important.

To accomplish his work successfully, he must be equipped with the correct tools and testing apparatus; he must be thoroughly trained to analyze receiving set difficulties quickly and accurately and he must have a personal attitude which makes himself evident that he knows his business.

Usually Radio-Tricians are in business for themselves or associated with retail Radio organizations. The buyer of a Radio set naturally turns to the Radio store from which he bought the set when difficulties arise, therefore if you are not in business for yourself it is wise to enter into a business agreement with stores which handle Radios and do not have a regular service station, to take care of their service problems.

## The First Service—Installation

The first service which must be performed with every Radio set sale is installation. Installations may be a part of the original sales. In that case, the Radio-Trician is paid by the Radio store either at a salary or at a specific fee



J. A. DOWIE

for installations or for doing his part of the work.

In other words, installation is sold separately, or the customer is led to shift for himself. This latter policy is frequently adopted by stores which carry Radios as a side line. If a commission arrangement is entered into with an independent professional service man or Radio-Trician it is in the interests of both the Radio store and the customer to sell his services. No one is better qualified than a skilled Radio-Trician to erect antennas, place lead-ins and do other necessary work. Nine times out of ten, when a professional

job is not done, it is due only to the fact that there is no Radio-Trician on the store's staff and no one to whom the store wishes to recommend. The erection of antennas and installation of Radio sets is not especially difficult for a practical man, but there are many differences between the amateur and the professional job.

## The Professional Installing Jobs

One thing characterizes the professional installation—it is permanent. The anchoring wire is not just hung at a convenient place; it is permanently fastened there. If it goes to a chimney, it is not looped around the chimney as the layman would do it; it is fastened on with expansion bolts. If a mast must be erected, it is not made of a warped broomstick bandaged to a convenient chimney—it is a professional job, standing on its base, guyed in all directions to counteract any strain which would otherwise tend to warp it. The aerial wire is itself taut and firm. It does not sag and swing as does the average amateur installed aerial. The lead-in is either the aerial wire itself continued or soldered in a permanent manner. If the lead-in passes over a cornice, it is not dropped over ultimately to wear out and ground as it swings in the wind. It is fastened with an insulator and held permanently in place. It is also fastened down the side of the building by an insulator so it cannot sway. The lightning

(Continued on page 14)



February 8, 1930.

Dear Mr. Smith:

The day I requested a copy of "Rich Rewards in Radio" was the real turning point in my whole experience.

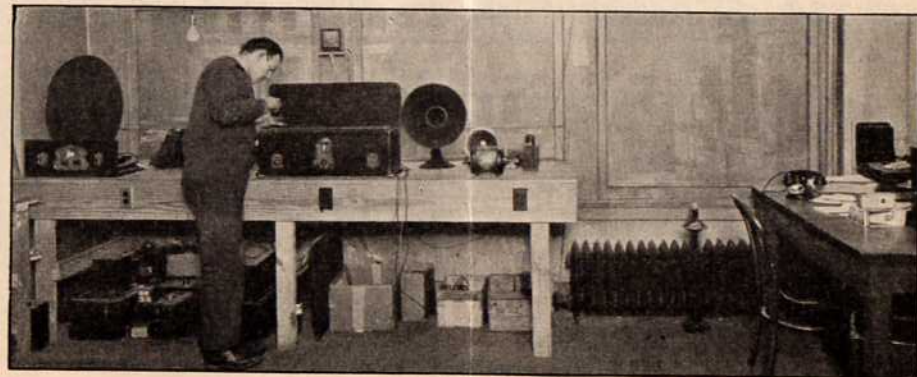
First, because I find in Radio my life's work. Second, from my experience to date, through N. R. I. training, I have gained a business education from meeting people in my service work and part-time sales.

Last, but not least, I have been handsomely rewarded in a lucrative way, in spare time only. Today, I have a service contract with one of the largest Electrical Appliance Stores in Western Pennsylvania, of which the Bellevue store is one of a dozen. My income for service alone is six hundred dollars per month. Without N. R. I. training this could not be possible and I do not hesitate to place the credit where it belongs, with N. R. I.

Best wishes to the N. R. I. staff.

HENRY C. HAYES,  
901 Quail Ave., Bellevue, Pa.

In the picture below Mr. Hayes is seen repairing one of the more difficult jobs in his own well-arranged service room. Notice the roomy work bench wired for tests, etc. This is a fine example of the well-kept service stations of N. R. I. men all over the United States. Your success is well deserved, Mr. Hayes, and the Editor wishes you and other N. R. I. men still more of it.—J. E. S.



## Service Tips

Do not forget that the best soldering job is done by heating the joint to a high enough temperature to melt the solder, not by applying the soldering iron directly to the solder.

Hum or line noises can often be reduced by reversing the 110-volt A. C. plug or connecting the plug of the set to another outlet plug.

A heater type tube will sometimes cause a buzz similar to that of a bee.

A microphonic tube can sometimes be rendered non-microphonic by wrapping several turns of friction tape around the top of the bulb.

Electrolytic condensers will pass a small amount of current when testing them in series with a voltmeter and battery.

A temporary aerial may be had by connecting under the screw head which you will find on the ordinary A. C. outlet plate.

The wattage dissipated in a resistance can be obtained by squaring the current in amperes and multiplying by the resistance in ohms. Thus:  $.04 \times .04 \times 50,000 = 80$  watts.

To determine the current rating of a resistor from its wattage rating divide the power rating in watts by the resistance in ohms and extract the square root. The result is the current rating in amperes of the resistor.

## NEW ADDITIONS TO N.R.I. STAFF



JOSEPH KAUFMAN

The two men whose pictures are shown here have recently joined the N. R. I. staff. Both are well known to the Radio Industry. Mr. Kaufman is a graduate of Massachusetts Institute of Technology. He later taught at that same institution. Then he organized the Lansbein-Kaufman Radio Company which manufactured Radio parts and equipment for the Industry.

Mr. Miller is a graduate of Johns Hopkins University and has had experience with Western Electric and with the retail Radio trade. We are glad to announce to our students and graduates the association of Messrs. Kaufman and Miller with us. They will bring their years of experience and understanding of Radio's problems and possibilities to our course and in that way their experience and knowledge will be shared by N. R. I. men.

J. E. SMITH.



J. E. MILLER

ground lead becoming disconnected from set or volume control being left at the off position. This will save many unnecessary service calls.

### Answering Repair Calls

Repair calls are of an entirely different nature from installations. It takes something of a spirit of a doctor and a diplomat to handle a call. The customer is in trouble; the receiving set does not work properly. He bought the receiving set with the expectation that it would work properly at all times. Often he is easily irritated. If the Radio-Trician, who answers his call, is clumsy, hesitant or manifests a desire to lecture, he will annoy the customer, but, if he goes about his work quietly, systematically and effectively, he will restore good-will and regain confidence.

To accomplish a quick and thorough repair requires that the Radio-Trician be properly equipped with a universal set tester (one that can be used for checking battery sets and all types of A. C. receivers). Most frequently repair calls are the result of depreciation of the parts of the set in use, either tubes, or resistances, etc. Therefore, the Radio-Trician must be fully equipped to check the parts to test and replace the parts of the receiving set which depreciate, hence if the type of receiver used is known to him, he is able to carry with him a full set of tubes, resistances, etc., should they need replacement. If he receives the service call by telephone, he obtains the necessary information before starting. The habit of going back for tools and supplies is not established in the Radio business.

### Extensive Repairs Should Be Made in the Shop

If the trouble located is of a minor nature, and most Radio troubles are, the repairs may be performed in the customer's home, but any major repairs involving soldering, rewiring or disassembling of instruments should be performed in the Radio shop. Customers often object to having their Radio set taken from their homes, but this is the only logical way to repair and secure an efficient job. It is worthwhile to explain that you have special testing equipment, tools and machinery at the shop with which you can make the repairs quickly and cheaply, with such an explanation the customer will understand the wisdom of permitting you to take the set to your service station.

## RADIO REPAIRING AND SERVICING

(Continued from page 12)

arrester is firmly fastened with its grounded portion either lead to the earth itself through a pipe forced at least 2 feet in the ground or fastened to a girder on the building or to a grounded plumbing system. The lead-in is a commercial job. The interior wiring is concealed or practically invisible. It is fastened down with molding tacks spaced sufficiently close together that no ambitious housewife wielding a broom will derange the installation.

The expert Radio-Trician actually matches the color of the wire to the wood work or decorations. The enunciator wire used for this purpose can be secured in all colors.

The ground wire is fastened with a ground clamp and then soldered.

### Instruction in Tuning

The Radio-Trician's work is not completed until he has placed the set in operation, demonstrated it to every available member of the family and logged the dial settings for at least two or three broadcasting stations. The installer's instructions are usually the only information which the new purchaser of a Radio receiver receives.

The purchaser should be shown how to turn the set on and off and how to use the various controls on the mantle on the receiver for best results.

If the installer's job is well done, the temptation to "monkey" with the receiver is greatly minimized and this will cut down unnecessary service calls.

Before you leave an installation job explain to the customer several pointers concerning the set, such as the probability of the 110-volt plug being pulled out from the A. C. socket or making a poor contact with same, the antenna or



"I have made about \$200.00 in Service work in last two months. The Service Sheets you have sent me and also those appearing in the National Radio News have been a great help." Mr. L. A. Rutz, 14289 Cloverlawn Ave., Detroit, Mich.

"I 'cashed in' on plenty of side jobs and now I have a part time shop. My best week was \$101." Mr. H. E. Trautmann, 2406 Arlington Ave., Pittsburgh, Pa.

"I have now two service men and four salesmen employed. After paying for all of the merchandise, material, equipment and wages for October, I find that my profits for the month are over the \$1,000 mark. I am in Radio to stay as I believe it is the largest field today and in the future for EXPERIMENTS, INVENTIONS and PROFITS." W. F. McCool, 2315 N. Monroe, Spokane, Wash.

"I've done almost all of the experiments. I've spent many hours changing and recharging the circuits possible with it, and find it, not work, but a pleasure and getting more interesting all the while, especially the short wave hook-ups." Wilbur H. Fought, Mechanicsburg, Pa.

"When I enrolled I had a little doubt that the Radio game could be learned by the home-study method, but it has been proven to me, so that my little doubt has vanished into thin air. My profits for four months spare time service work amount to over \$300."

"I have not sent you any lessons for some months because I am so busy fixing sets that I don't have time to study about them. I have done considerable work for dealers in addition to work that I have done for myself which takes up nearly all my spare time. However, I have decided to refer my work to Mr. C. B. Kinter who is also a student of your school, until I have completed my studies." Mr. Ivan Gressler, 741 Michigan Ave., Glassport, Pa.

"I have installed musical equipment in an ice skating rink in a neighboring town and from this job alone I cleared enough money to pay for my course twice over. I have also sold Radio sets valued at \$2133." Mr. H. W. Solomon, Meaford, Ont., Canada.

"I have made enough money in my spare time to pay for the course over and again." Mr. Tura L. Gibson, 253 North River Avenue, Weston, W. Virginia.

Dear Mr. Smith: "I have started selling Radios—sold two this month, which net me \$55.00. This is besides my local repair work. I have lots of prospects for the spring—for selling new Radios. I repaired a Super-Heterodyne last week.

The owner said it gives better results than when it was new. He had it to three different places and they said it couldn't be fixed. I charged him twenty-five dollars, including about six dollars for parts. He is my best advertiser now. I can tell you of many other things, but I will have to close and finish my next lesson." Floyd Hutchison, Bridgman, Mich.

"I bought four battery sets and sold them at a nice profit; converted two to electrics from work sheet you sent me. The ad I put in the local paper sure kept me busy." Leo J. Saunders, 1114 S. Wewoka Ave., Wewoka, Okla.

"I have simply been swamped with service work here in the last few weeks. Made \$6.75 last night after supper in about 45 minutes. There are still a great many battery sets around here as most of the country people have no electric lights. As soon as some new lines are built there should be a good demand for electric sets and you can just bet that I am going to get my share of the business." James Re. Sowell, Box 104, Lynnville, Tenn.

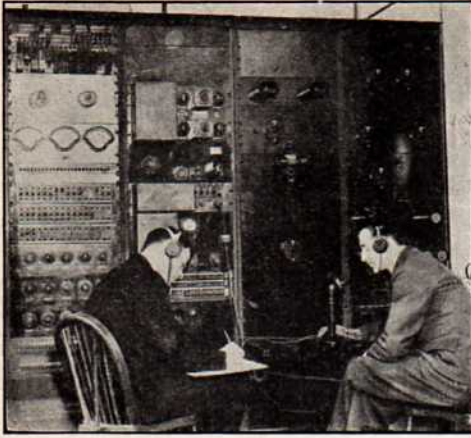
"In the last four months I have made \$269.27 from Radio sales and repair work in my spare time and I have not gone at it very strong at that. If it was not for your radio course I would have been one of the unemployed boys this winter with the other eight or ten million." Mr. John E. Tannich, Albany, Oregon.

"Since starting your training, I have built many sets and power units for customers and repaired many sets of different makes. The results have been so satisfactory that my business is fast growing a part time proposition. At the present time I work with a local manufacturer in a good position. Without your help, I would never have been able to land it. My daily work requires a thorough knowledge of Radio, but that is very easy for a National Radio Institute man." Thomas Astone, 73 Williams Ave., Jersey City, N. J.

"Well, the cards you sent me got me started. I went down to the corner Hardware store and stuck one in the show case. Well, that one card has brought me 7 repair jobs on which I made a total of \$20. None of them were hard. I also have orders for 3 A & B eliminators which I will build this week. I will get a total profit of \$39.00 on the three outfits." Frank Annunzio, Walnut Beach, Milford, Conn.

"Your training has certainly helped me to make more money than heretofore. Some time ago I asked you to write to the A. A. Doerr Merc. Co. and tell them about me. Well, I got a job from them on the strength of your letter." Mr. H. M. Johnson, Box No. 371, Larned, Kansas.





This photo shows the switchboard through which passes wireless telephone calls between Great Britain and ships at sea and the United States. The operators shown here are handling short-wave communications from ships at sea. The recent telephone messages sent by passengers on the *Majestic* and *Leviathan* in mid-ocean have proved the practicability of this new Radio feature. This development is increasing the demand for Radio operators, as the traveling public has been quick to take advantage of ship-to-shore Radio service.

## ALUMNI ASSOCIATION NEWS

Earl Merryman, Secretary of the N. R. I. Alumni Association intended to write a story about the doings of the Alumni Association for this issue. However, he has been working so hard on getting the infinite number of details and plans of the Alumni Association worked out that he was unable to complete his story by the time this number goes to press.

He will have it ready for the next issue—the June Number—and we know all graduates, especially those who have sent in applications for membership in the Association, will be anxious to read what he has to say.

Earl, as the genial Secretary is called, has opened the executive offices of the Alumni Association in the U. S. Savings Bank Building, just a few blocks from the Administration Building of the National Radio Institute so that he can be in close contact with the school activities at all times.

With all of the details involved by his Secretarial duties and his regular job as remote control operator for the National Broadcasting Company, he certainly has his hands full.

And, we may as well say right here that the N. R. I. Alumni really picked a good man for the job of Secretary. Earl is a hard worker and he is for the N. R. I. man one hundred per cent. Look for his story in the next issue of the News and any of you graduates who haven't sent in your applications yet would do well to join up at once so you won't miss out on anything. —Editor.