

**THE VARIABLE MU TUBES**

(Continued from page 14)

"D" for 67.5 volts Esg. Suppose the signal is such that the automatic volume control forces the grid bias on the controlled tubes to -6. The -24 tube then operates as a detector, while the -51 still operates as an amplifier, although not quite effectively as if the bias were lower. In other words, the -51 will continue to operate as an amplifier without much distortion long after the -24 tube has ceased to operate as an amplifier or as a detector.

This is all accomplished by an entirely new principle in vacuum tube construction. In ordinary tubes the structure is uniform and a constant geometrical amplification constant is obtained. In the new variable mu tube the ele-

ments are so arranged that the voltage on the grid at certain places exercises less control on the flow of plate current than at others providing a variable amplification factor. In other words, this tube changes its character from one of very high mu when the signal is weak to one of very low mu when the signal is strong. By means of this principle the plate current control grid voltage characteristic can be given proper shape to reduce the higher order curvature responsible for distortion and cross-talk. The advantages of the high amplification factor of the -24 tube are retained at normal voltages, while at high biases the low distortion characteristics of a low mu tube are automatically obtained. Therefore this new tube reduces by a large factor, modulation distortion, cross-talk, modulation hum, and associated modulation troubles encountered with the -24 type tube, and permits partially or wholly dispensing with the precautions necessary to overcome these faults.

There are two different variable mu tubes on the market: the '35 and '51. The two differ in the following particulars:

Screen grid voltage...	-51	90 volts	-35	75 volts
Grid bias voltage.....	-51	3 volts	-35	1.5 volts
Plate current.....	-51	5.3 ma.	-35	9 ma.
Plate resistance.....	-51	400,000 ohms	-35	200,000 ohms
Mutual conductance...	-51	950 micromhos	-35	1,100 micromhos

-----TEAR OFF HERE AND MAIL-----

**Will You Spend Two Minutes To Help Your Friends?**

Be a real friend. Share your good habits with others. Give us the chance to point out to them what N. R. I. is doing for you—for ambitious men everywhere; how it is raising incomes by fitting men and young men for good jobs in Radio. List a few names and addresses below, of people interested in Radio, or who are dissatisfied with their present jobs. Your name will not be mentioned when writing to them.

Each man whose name and address you list will receive a free copy of National Radio News. And if the names have not already been received from some other source, you'll receive a \$5.00 commission for each one who enrolls.

Your Name: \_\_\_\_\_

Your Address: \_\_\_\_\_

Your Student Number: \_\_\_\_\_

Mr. \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Occupation \_\_\_\_\_ Age \_\_\_\_\_

Interested in:

Amateur Radio  Service Work

Set Building  \_\_\_\_\_

Mr. \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Occupation \_\_\_\_\_ Age \_\_\_\_\_

Interested in:

Amateur Radio  Service Work

Set Building  \_\_\_\_\_

Mr. \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Occupation \_\_\_\_\_ Age \_\_\_\_\_

Interested in:

Amateur Radio  Service Work

Set Building  \_\_\_\_\_



VOL. 3—NO. 11

WASHINGTON, D. C.

JUNE, 1931

**ONE YEAR'S BUSINESS—\$30,000**



Graduate F. E. DeMerse in front of his store where he did a business of \$30,000 in one year.

**RADIO MERCHANDISING ISSUE**



# Radio and the Plow

MARK TWAIN once commented "Everybody complains about the weather but nobody does anything about it."

True enough, in Mark Twain's time, but since then Radio has stepped into the breach.

While man has yet to devise a successful machine to produce rainfall; avert hail and frost—Radio has materially reduced their ruinous effects.

Crop months are here. The farm Radio has changed overnight from a luxury—a means of entertainment during long winter nights—to a necessity.

During the next several months the farmer will look to his Radio not only as a medium of dollars and cents information on market price reports—but for information on weather conditions. Weather is the most important of the many hazards of the farm; second only to insect invasion.

As the fields begin to show green they become fair prey for a host of insects and diseases, fifty of which are known to affect wheat. Defensive measures broadcast by Radio by the U. S. Department of Agriculture, State Agriculture Departments and Colleges are a great help to the tiller of the soil in combating these blights.

The weather, day by day, becomes of prime importance. While in the case of field crops, little can be done about it, the fruit grower can take steps to protect his orchards by acting on the information broadcast by the Weather Bureau.

Many a good crop has been ruined by a sudden storm during harvesting. Radio weather reports permit planning of harvests to prevent such occasions.

It does seem strange that such a large number of farm homes are still without Radios, when we consider their value to the farmer.

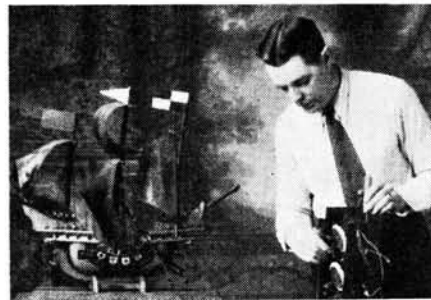
Radio-Tricians—there's a market for you which is gold! The farmer of today needs little selling—he is no back number. He realizes the trend of times—he's modern—he wants conveniences—pleasures. He has been sold numerous products on the appeal of luxury; how easy then it should be to sell him—Radio—a farm implement as important as his plow.

*J. E. Smith*

## Builds Speaker in Ship Model

With an eye to the artistic and the hand of a master craftsman, graduate Joseph L. Webb, of Lowell, Mass., has put over a new one. Knowing that ship models are popular as ornaments for Radio sets, Webb has built a loud speaker into one of them. The speaker is in the middle sail of the ship.

In a recent letter to Mr. Smith, Webb said: "I thought I knew all about Radio

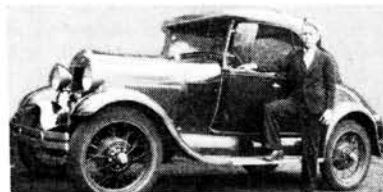


when I enrolled with your school, but when I started to get into the lessons I realized that I didn't know very much about it at all.

"From the time I started studying with you until I graduated, I made about \$2000. I would not have made one-quarter of this amount if I had not taken your course."

I am enclosing a picture of my car that I have bought on the Spare-Time money made in radio.

My motto is—"Join the N. R. I. and learn the radio game in the right way and you can have the better things in life."—Lawrence Ritter, Orland, Ind.



Old Phil Philosopher says, "Honking your horn doesn't help as much as steering wisely."

## A Graduate Talks About His Radio Business



N. W. SMITH  
of Smith & Willson  
Jamestown, N. Y.

The firm of Smith and Willson was organized in April, 1930. Our repair shop was built in Mr. Willson's home about ten blocks from the center of the city. No noise—small overhead expense.

We spend about \$20 a month for advertising in the evening paper. Our number is listed in bold type in the classified section of the telephone directory. \$18 a year. Our time is chiefly devoted to repair service, but we also sell Clarion and Silver-Marshall sets. Our policy is to do real good work, charge a reasonable amount and make friends. The friends we make now will be our best asset later.

Every set we service has a little sticker (printed on yellow gummed paper) pasted on the back. It reminds

Serviced by \_\_\_\_\_ 193...

**SMITH & WILLSON**

"Radio Specialists"

172 Falconer St., Jamestown, N. Y.

**IN CASE OF TROUBLE: DIAL 36-541**

Test Data: \_\_\_\_\_

This sticker in original form is on yellow gummed paper, size 3/4 by 1 1/4 inches.

the customer where to call for service and has a small space for service test data which might prove valuable on a later service call.

A few days following each service job a postcard is mailed the customer. We mail it rather than hand it to him at the time the job is done because it attracts more attention—gives us an additional contact with him and shows that he is not forgotten once the service man leaves the customer's home. It shows

(Page 14, please)

## National Radio News

Published monthly in the interest of its students and graduates, by the  
NATIONAL RADIO INSTITUTE

16th and U Streets N. W.  
Washington, D. C.

J. E. SMITH, Pres. E. R. HAAS, V. Pres. & Director.

Vol. 3—No. 11

June, 1931

### The Merchandiser

By E. R. HAAS

The general definition of merchandising is "dealing in the objects of commerce."

Radio merchandising, therefore, is the buying and selling of Radio material, equipment, or service.

To the Radio man, who has business ability as well, the Radio merchandising field offers a wonderful outlet for his combined talents.

Watch the growth of a Radio-Trician with these qualifications, in the business standing of his community. He starts out with practically nothing. He does not merely pick up service work where he can get. His business ability steps in—it shows ways and means to obtain more business than the average Radio man. Soon he is in a well equipped shop of his own. His business ability has made him live within his income and reinvest profits in his shop.

The shop grows to a store. Franchises are secured for popular Radio equipment. Expert work and good judgment have built good will and increased sales.

Intelligent purchasing has added to the profits. In an incredibly short time, we see our Radio-Trician an employer of servicemen and salesmen—figuring in the commercial life of his community.



E. R. HAAS  
Vice President and Director



### A Thought for the Month

One ship sails east and one sails west,  
By the self same wind that blows;  
It's the set of the sail and not the gale,  
That determines the way it goes.

Like the winds of the sea are the ways of fate,  
As we journey along through life;  
It's the set of the soul that determines the goal,  
And not the stress nor the strife.

—Selected.

### Help the Customer

A customer comes into your store and asks for something you do not carry or which is out of stock. What do you do?

Do you say, "I haven't got it" and let the customer walk out—or do you try to help him—render him a service?

You can make a friend out of that person. Make him feel his needs are a real responsibility to you. Maybe you can't sell him anything—can't make a profit now—but you may later—if you make him remember your courtesy.

Here are four substitutes for "I haven't got it"—all of which can mean dollars in your bank account. Show him something similar. Offer to order it from the factory or jobber. Ask him if you may deliver it tomorrow—then buy one retail locally and take it to the customer. If he can't wait for the order to go through direct him to a store where he can get it.

"Blowing your own horn" is a good idea from an advertising viewpoint, provided the sound does not become a nuisance to others.—Milt Parsons.

## F. L. Sprayberry gives INSTRUCTIONS for OPERATING THE TESTER

In last month's issue of National Radio News, Mr. Sprayberry gave details for building this tester. He now concludes his series by giving full instructions for operating. The "News" for July will carry the regular Service data sheets on these pages.

The tube is removed from the receiver and the test plug inserted in the socket in place of the tube. The tube is then inserted in the proper socket. The receiver is now turned on and you are ready to make measurements. Set switch  $S_3$  to the proper position depending on whether the tube is a 4 or 5 prong. If the tube is of the A.C. type, press the four-volt push button and filament voltage will be indicated on the four-volt range of the A.C. voltmeter.

If the tube is of the D.C. type, set the switch  $S_3$  to the proper position and set switch  $S_2$  to the 10-volt range. Then press the push button of the filament D.C. switch and filament voltage will be indicated on the D.C. voltmeter.

Next we measure the plate voltage. Set switch  $S_2$  to the 500-volt scale and press the plate voltage push button. The plate voltage will be indicated on the D.C. voltmeter. Drop back to lower scales by resetting  $S_2$  either on the 100 or 50-volt scale in order that the voltage value may be correctly interpreted.

Then we measure the grid voltage, setting switch  $S_3$  to the proper position and  $S_2$  to the proper voltage range. The grid voltage push button is then pressed and grid voltage is indicated on the D.C. voltmeter.

Current measurements are always made after voltage measurements in order to protect the meter against burn-out. It is not likely that voltage measurements will burn out the voltmeters,

but if the tube has an internal short circuit, the high current drain may cause the milliammeter to burn out. If the tube does have an internal short circuit, little or no voltage will be indicated on the voltmeter and for that reason do not make a current measurement until you are sure that the tube is not short circuited internally.

First, make plate current measurement on the 150 milliamper scale of the milliammeter. Then, if the current indicated is not more than 15 milliamperes, reset  $S_4$  for the 15 milliamper position which will give you a more accurate indication of the current value.

With switch  $S_4$  set to No. 3 position, the milliammeter is cut out of the circuit and, therefore, cannot be damaged by an overload of current.

Cathode voltage can be measured on this tester either positive or negative, by setting switch  $S_3$  to the B position and pressing the cathode push button. If the meter tends to read backwards, reverse the position of switch  $S_1$  which will cause the meter to read in the proper direction. This also applies to D.C. filament and any other measurement where the voltmeter tends to read backwards.

The test plug is shown with six prongs. However, it is understood that the sixth connection or the control grid connection is made to the top of the test plug handle as indicated in Fig. 2.

(Page 14, please)



F. L. SPRAYBERRY

# DOES YOUR WINDOW SELL MERCHANDISE FOR YOU

Your store or shop window reflects the personality and character of your business. Customers, prospects and the "passer-by" judge your organization by the part which can be seen from the street. The window dresses up your establishment. With half a chance it will sell for you. A fine advertisement which costs little, if properly handled, but exactly the opposite if hit or miss methods are used.

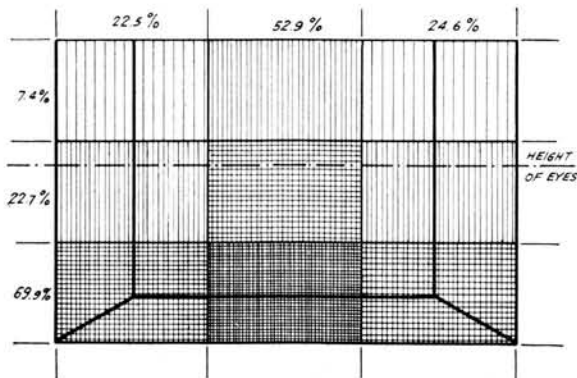
Note the care exercised in the window displays of the big Department Stores of your town. Frequently changed, they show timely and seasonal merchandise. They get and hold attention; they sell merchandise.

Graduate H. A. Mueller, recently returned from a trip to Europe, sends us some valuable information concerning window display, compiled by the University of Koeln, Germany.

The height and width of the window have each been considered as 100% on the chart below.

The sub-divisions show the most important portions from the "attention" point of view. The "attention degree" is indicated by lines. Consequently—the more lines—the more valuable the space. A careful analysis of the chart will show the relative importance of the various window sections.

Below are some helpful pointers on the subject of window displays. Exercise care with your window and it will pay you many times for your efforts.



There's a tendency to just "Let the window worry along." Don't do it. Make that window look like something. It will pay dividends.

Change your display often; build it around a centralized idea; keep it interesting; keep it clean.

Plan displays in advance, don't "think it up" as you put it in.

Have a definite schedule of articles to be displayed, based on timeliness, and profits paid by each.

Don't clutter the display. The eye can only grasp three or four objects at a time. A window becomes a jumble if there are more than a few articles or well defined groups of articles in it.

Do not expose to sunlight merchandise which will be harmed by it.

Do not use price tags and display cards which show former use and age. Have the lettering plain and easy to read.

Do not let shiny objects dazzle the eye and do not use colors which clash.

Don't be satisfied with limited accomplishments. Window space is valuable. Your displays can and must sell merchandise or service.

Daily we hear of N. R. I. Radio-Tricians opening up places of business. This article is written for those men and for the many who will, later on, follow their example.

# PLAYING THE GAME

"... for when the one great scorer comes, to write against our name, he questions not what we've lost or won; but how we've played the game."

Fred Taylor was one of the most promising youngsters who ever came up from the minors. He had his chance in the American League when most pitchers of his age were still playing sandlot baseball. He broke into big company early. Critics picked him as a "big find."

For two years he upheld every promise which had been made for him. Well trained—pitching his team to victory after victory—and when the club clinched second place in the league the newspapers praised his work as a big factor in the team's rise from the second division.

His third year in the big league started—then came the slip. Taylor "let up" on his training. Of course, he went through the motions—the management insisted on that—but his heart wasn't in the work. His losses increased—his wins were less. Not only was he a traitor to himself, but to his team. He ruined their chances for a pennant—and the resultant share in the world-series profits. His actions and general



By  
MILT  
PARSONS

attitude were as our English brothers put it, "Not cricket," or as we'd say—not playing the game.

How many of us are Fred Taylors? Maybe we don't even realize it. But—stop and think—look things in the face. Are we playing square with ourselves—with those dependent upon us? Are we preparing to get the best out of life—are we Playing the Game?

I've often said I have little sympathy for the fellow who can't succeed in this age of opportunity. We can't always expect success to come at the first trial. Perhaps we didn't try hard enough—or our success may have been retarded temporarily by some mistakes we've made. Bear in mind that most worthwhile things are made by first making mistakes. We learn much by our errors.

The game fellow who puts up a fight against odds and loses, has the crowd pulling for him—but the fellow who won't fight back is—well, the less said about him, the better. He just leaves a bad taste.

Play the game. Play it for yourself—for those who depend on you—for those who trust in you to succeed. Don't be a Fred Taylor—don't slack on your training. Hit the ball and Play the Game.

## To Students and Graduates in Ohio and Kentucky

N. R. I. men living in towns in Ohio and Kentucky, having a population of 5,000 or over, and who wish to establish themselves locally in a radio sales and service business of their own, without

investing much money, may write to Student Walter C. Willard 718 Columbia St., Newport, Ky., who has a proposal to make. Write Student Willard direct. We are simply passing the word along to you.



## TELLING THE WORLD

By E. L. DEGENER  
Director of Publicity

A great philosopher once made a statement to the effect that if a man built a better mouse trap than his neighbor, even though he lived in a forest, all the world would beat a path to his door.

That may be good philosophy, but it's poor business.

The modern mouse trap builder, or Radio Serviceman or Salesman, doesn't wait for the world to find its way to his door. In the first place he does not hide his door off in the forest. He tells the world about himself—where to locate him—what his business is.

Maybe he starts building his products—or preparing his services in obscure surroundings, but when he is ready to market them—he goes to the highways. He “cries his wares.”

He moves his business to a place where customers can find him—then he uses every means at his command to help the world know him.

It pays to advertise yourself. If it didn't—large well managed organizations would not spend hundreds of thousands of dollars annually for publicity purposes. Fifteen thousand dollars spent for a one page ad in a periodical is not unusual.

How to tell your customers—your world—is your problem. A method of presentation which will appeal to one class of people may be a failure with another class. It is a problem which requires careful testing to find the most effective means. Find out which plan pays best—then “bear down” on that particular method.

One naturally thinks of newspapers when considering local advertising. And logically so. But there are other ways which may work out as well—sometimes better.

Sales letters to a list of prospects or customers have been used effectively by N. R. I. men to solicit service work and sales. This plan is generally referred to as the “Direct Mail Method” and is widely used to obtain sales prospects—to prepare the way for salesmen to call, and it has been remarkably successful in the sale of service contracts.

While less effective—the “Circular Method” of advertising is also less expensive. Simple printed circulars or cards—offering Radio service are dropped in the mail boxes of prospects.

Don't make the mistake of trying to write “clever ads.” Too much clever advertising matter finds its way to the trash basket. Be content to present your story in a brief, clear manner—just a definite statement of facts which tells your prospects about your business.

Below is a “Direct Mail” Sales letter which has brought a lot of work for the N. R. I. Graduate who originated it. Just one way of Telling the World.

Is your Radio working like it was the day you bought it? It should be.

Even the best Radio set will deteriorate. It should be inspected by an expert and corrected before the condition becomes serious.

I'll look over your set—regularly, or when called—keep it in tip-top condition. The cost of this service is very small—it more than pays for itself in satisfaction alone.

My technical experience and knowledge of Radio are unreservedly at your call.

Simply mail the postcard which I am enclosing (no obligation whatever). I'll gladly call and discuss the matter with you—any day or hour to suit your convenience. May I hear from you?

## The Chief Shows HOW VARIABLE MU TUBES IMPROVE RADIO RECEPTION

In order to provide maximum sensitivity for the handling of weak signals while at the same time safeguarding against overloading, modulation distortion and troublesome cross-talk on loud signals, a new screen-grid tube known as the -51 and -35, has been placed on the market by several tube manufacturers.

The technical name of this new tube is Variable-Mu-Tetrode. It is a development of Stuart Ballantine and his associates of the Boonton Research Corporation of Boonton, New Jersey. It is designed as a Radio frequency and intermediate frequency amplifier. It is not ordinarily interchangeable with other tubes because it must be used in circuits built for its characteristics. It is intended for use in broadcast receivers which control volume by varying the control grid voltage. This tube has the general appearance of the screen grid tube; its design is such as to permit easy control of a large range of signal voltages without the use of local distance switches or



J. A. DOWIE, Chief Instructor

antenna potentiometers. This feature makes the tube adaptable to automatic volume control design.

Modulation distortion as you probably know is caused by non-linear amplification characteristics of the R.F. amplifier tubes. This occurs in ordinary receivers when receiving from nearby stations, the result being an increase in modulation of the signal, accompanied by increase distortion of the output. This distortion becomes worse as the input to the tube increases, and is particularly evident in the -24 tube owing to its sharp plate current cut-off. Cross-talk comes about from the same tube characteristics responsible for modulation distortion, the R.F. amplifiers acting as detectors or modulators, instead of amplifiers only. In most instances, this is caused by the first tube, causing inter-modulation in the R.F. tubes between a desired signal and a strong interfering signal of different frequency and results in the two signals being heard simultaneously when tuning to the desired signal, both signals apparently tuning at the same point. The elimination of this type of interference has necessitated the use of double and triple pre-selector circuits between the antenna and the first tube of the receiver.

The production of cross-modulation can be understood by studying Fig. 1. The curves “C” and “D” indicate the relation between grid voltage and plate current taken on the -51 tube under the same screen and plate voltage conditions

Characteristics of the New Variable MU Tube

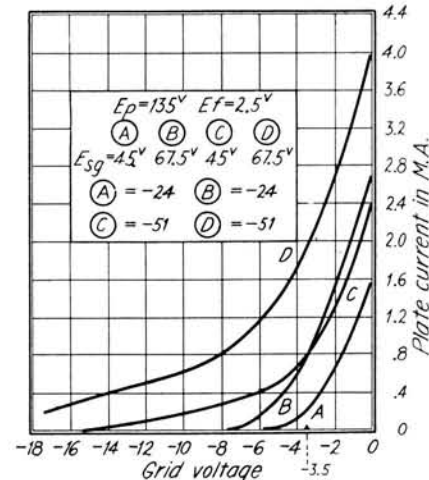


Fig. 1—Plate current variations plotted against changing grid voltage values.

(Page 14, please)

# How Much Technical Knowledge Should A Radio Salesman Have?



T. E. ROSE  
Vocational Director

Here's an old saying among sales-people: "To sell anything, be sold on it yourself." You must feel your merchandise is your customers' best buy. More sales are lost through the salesman's lack of confidence in his goods than through any other single factor.

If a Radio salesman doesn't have a thorough technical knowledge of Radio, how will he know that the product he sells is superior to others in the same class? He may say it is, but unless he knows it is, he cannot be "sold" on it himself. His sales-talk will lack "punch." Mere repetition of: "This receiver is the best" or, "The best receiver for the money" is just so much "talk"—unless the salesman can explain, to himself and the prospect, why it is the best.

Take the case of Hurley, for instance. When he began selling Radios he didn't know a condenser from a rolling pin. He depended solely on his ability as a salesman.

He interviewed a prospect—an Englishman who has just arrived in this country. He used his customary sales-talk—full of "best," "finest," "greatest value to be had." Finally, after one of his stock phrases, the Englishman asked—"Why?"

Hurley answered: "Because it's made by the ——— Company. Anything made by ——— is the best."

"That doesn't mean a thing to me," came the prompt reply. "I never heard of them. They're not known in England and I'm new in this country."

Hurley was "stumped." What

other argument could he use to convince his prospect of the quality of the receiver? Go into details, point out superior construction of the set? Yes, but he didn't know anything about them!

To make matters worse, the Englishman asked: "How many stages of amplification does it have?"

Hurley was in a bad fix. "Why—why," he mumbled; then he dived for the service book, thumbed the pages hurriedly, seeking the section devoted to constructional details.

"Never mind," the Englishman broke in impatiently. "See me some other time."

When it was learned a competitor had "sold" the Englishman, Hurley was "called on the carpet." He was told if he wanted to hold down his job, he would have to learn something of what he was selling. Shortly afterward, as Vocational Director, I met a most determined N. R. I. student—Hurley.

A salesman not only has to know Radio, he also has to explain it in terms understandable to the prospect. Try sometime to explain Ohm's law or the atomic theory to somebody who never heard of either!

There is a vacuum cleaner company of world-wide reputation which trains new salesmen on full pay for six weeks before sending them into the field. More than 90% of the prospects the sales-

(Page 15, please)

# SUCCESS!! — — — — SUCCESS!!

## Judges award prizes for best Letters in "RESULTS CONTEST"

The "News" has just received the final word from the Contest Judges. The big Results Contest has come to a close. Every member of the N. R. I. Faculty and Staff joins the "News" in congratulating the winners.

### World Wide

One important point was brought out by the Success letters which were received. Success of N. R. I. men is not confined to any one section—state or country. Letters were received from N. R. I. men the world over. Prize winners are in United States, Canada, Poland, Egypt, Australia, China, Siam and British West Indies. It's not the locality which makes success—it's the man and his training.

### Inspiration

Read these winning success letters. They contain ideas of value—but above all they will prove an inspiration. If any man can read all these stories of success—accomplishments of just every-day average fellows—and not get a thrill from it, he's a better man than your editor.

Who among us, when told in the words of a former bank clerk, of his rise from \$100 a month to the ownership of a fine home, a business, car, and bank ac-

count, can help feeling the tingle of success possibilities.

### Winning Letters to be Published

The list of winners appears in this issue of the "News." Each future issue will carry prize winning letters until all have been published. The letters of Bernard Sellers, winner of First Grand Prize, and Edwin Francis, which took Second Grand Prize, are in this number.

### Why We Did It

A number of Students and Graduates have written in asking "What is the idea behind the Results Contest?" The answer is simply this—we want to know what our boys are doing—how they are succeeding. We want to pass the good news along to others.

### The \$50 Grand Prize Winning Letter

Dear Mr. Smith:  
Three years ago I was a bank clerk in a small town bank at a salary of one hundred dollars a month. Promotions are very slow in a small bank and I was anxious to earn more money. I have a wife and baby daughter and one of our ambitions was to have a fine home of our own.  
One day my attention was arrested by the advertisement of the National Radio Institute. After some deliberation I enrolled for the course and it proved to be the luckiest thing I had ever done.  
As soon as I had completed a number of lessons I began to do service work very successfully. Soon I took the agency for two well known makes of radios and during these three years I have built up a very profitable radio business. My gross income for the past three years totals \$7,645.00 compared to \$3,150.00 gross income for the three years preceeding my enrollment with the National Radio Institute.  
Now we are enjoying our new home, a new car and many other things that my increased income has made possible. To N. R. I. I give all the credit.—  
Bernard L. Sellers, Monmouth, Oregon.



THE HOME N. R. I. BUILT

This contest gave us a fine chance to get better acquainted. We want every N. R. I. man to keep in touch with the Institute—to tell of his work—his accomplishments.

Don't stop—just because the Results Contest is over. If you buy a new car—tell us. If you land a new job—we want to know it. Let us have a picture of the new house you're building—or the girl you just married who is going to (Next page, please)

### THE "RESULTS CONTEST"

live in the house. How did you handle the special Radio job for your home town banker—after the other service men in town fell down on the job? We're curious fellows up here at N. R. I.—and we're interested, fellows. We want to know what you're doing—we want to hear of your Success.

#### This Letter Won \$25

Dear Mr. Smith:

Since I first enrolled as an N. R. I. student I have had the following results:

When I commenced I was physically unfit for other labor due to an accident to my leg. Now the other laboring men I know are out of employment, while I have a store known as The Almont Radio Shop and am making a living for myself,

my wife, and two children. I know what N. R. I. did for me. I knew nothing of Radio when I enrolled, and now, while other men seek employment of any kind, I have plenty of work and a store on Main Street. I am gradually winning the confidence of the people here, as a sure enough Radio-Trician.

I have a battery service and am authorized as dealer for R.C.A., Crosley, United, and Westinghouse Radios. What a change in a few short months from a crippled laborer whom no one cared to hire, to a man in business and earning a good living for a family.

N. R. I. did it for me. Two years ago I thought I was down and out, but now I know I am just beginning. Watch my smoke from now on!—Edwin W. Francis, Box 206, Almont, Mich.



### THE CONTEST WINNERS AT A GLANCE

- First Grand Prize—\$50.....Bernard L. Sellers, Monmouth, Oregon
- Second Grand Prize—\$25.....Edwin W. Francis, Almont, Mich.
- Third Grand Prize—\$15.....Frank McClellan, Troy, N. Y.
- Special Prize—\$10.....Peter D. Musnicki, Luck, Wolhynien, Poland

- |   |  |
|---|--|
| Leo Saunders, Wewoka, Okla.... \$15                   | O. H. Hansen, Stoughton, Mass.... \$3              |
| Herbert Jones, Chicago, Ill..... 16                   | Clyde S. Nelson, Indiana, Pa..... 3                |
| S. L. Mahaffay, S. Lake City, Utah 10                 | Ralph H. Walker, Columbus, Ohio... 3               |
| Chin Wong Fatt, Bangkok, Siam.. 10                    | M. J. Reef, Alton, Iowa..... 3                     |
| Alphy L. Blais, Thetford Mines, P. Q., Canada..... 10 | Jno. J. Werbinski, Detroit, Mich... 3              |
| John J. Reider, St. Paul, Minn... 5                   | Wm. T. Ragland, Chicago, Ill..... 3                |
| N. G. Mavrommatis, Port Said, Egypt ..... 11          | Chas. H. Behrens, L. I. City, N. Y... 2            |
| K. W. Griffith, Little Rock, Ark... 5                 | Kermit A. Strohm, Pickerington, O. 2               |
| D. Walter Burrell, Temple, Pa.... 5                   | E. A. Warren, Chicago, Ill..... 2                  |
| James H. Richmond, Mt. Vernon, Wash. .... 5           | Han Peng Juan, Hongkong, China. 2                  |
| Paul West, Franklin, N. C..... 3                      | Irvin S. Duncan, Duluth, Minn.... 2                |
| Herbert E. Jenkins, Waldeck, Sask., Canada ..... 3    | John I. Haskin, Merrill, Oreg..... 2               |
| James R. Sowell, Pulaski, Tenn... 3                   | Douglas F. LaPorte, Prescott, Ont., Canada ..... 2 |
| Henry Simmons, Perth, Western Australia ..... 3       | F. Oliver Hill, Grand Cayman, B. W. I..... 2       |
| Sidney Mechlovics, Brooklyn, N. Y. 3                  | Michael Figlar, Delawanna, N. J... 2               |
|   | Willis H. Johnson, Quaker City, O. 2               |
|   | Ralph Mellon, Pottstown, Pa..... 2                 |
|   | Herbert A. Umnus, Manitowoc, Wis. 2                |



### YOUNKER'S YEAR

The last year netted me about \$2,000 clear profit in spare time. I am now devoting my full time to Radio, partly on my own Radio business and partly in connection with the Radio work of Tyler Ryan Furniture Company of this city. Installation and service of General Motors Radios for which this furniture store has the franchise is a big part of my work.—Francis A. Younker, Mason City, Iowa.

*Student McCullum says solicit monthly inspection service for Radio Receivers. It is a real money-maker, particularly good in summer.*

### LOOK OUT FORDS!

I needed some No. 38 enameled wire for a special radio frequency choke coil that was to be placed where space was at a premium. It's rather hard to get wire this small on the open market so I explored the inner workings of the T model Ford spark coils and discovered a gold mine of this type of wire besides a perfectly good condenser. In another spark coil I dissected from a bigger car, I realized thousands of feet of this same size wire only silk covered. So if any of the fellows need wire of this type they had better start collecting old spark coils.—Claude J. Krupka, Saginaw, Mich.

### LECLAIRE SERVICE MANAGER

For the past eighteen months I have been holding down a full time Radio job. My salary has been increased over one hundred per cent and at present I have entire charge of the Service Department and shop of Charles Corey, Electrical Contractor, at Penn Yan. Without your course I never could have started this job, much less make a success at it. I have never been stuck on any Radio job.—Harold L. LeClaire, Penn Yan, New York.

### CUMINS REPORTS SUCCESS

I was working at my trade as an auto mechanic when I enrolled. After 12 lessons, with the aid of the Service Sheets and Manuals you sent me, I have taken up full time in radio. Sold one set the first day I worked after leaving the grease and dirt of the garage. Since then I have made enough sales alone to make real money. Have made better than \$20 per day at times. I am now connected with the L. N. Messenger Radio Store of this city.—A. B. Cumins, Vallejo, Calif.

The Mailbag is the "Get together" medium—the "Meeting Place" for N. R. I. students and graduates. Send us your ideas—your experiences. Letters for the Mailbag should not be enclosed with any other material. Send them in a separate envelope—addressed to the "Mailbag Editor."

### THANKS, DAVE

I am sending you the name of a young man whom I have been talking to with regard to your course. I am sure he will enroll.

My last year has been very good. I have averaged about \$50 a week in Radio work and that is surely better than what I was making while in the automobile business.—David D. Yorke, Willimantic, Conn.

### DIPLOMA BRINGS BUSINESS

Business has been exceptionally good and has taken up quite a bit of my time—so much in fact—that I have forgotten about writing. My sales and service amounted to a little over \$1500 for one month. A ninety-day guarantee of expert servicing is a wonderful advertising stunt to sell sets. People demand this kind of service and the best proof that I give them is my Diploma—displayed in my show window along with my Radios. It attracts more attention than the sets.—J. H. Shew, Princeton, Wisconsin.

### MORE OF WARNER'S IDEAS

Here are a few hints on service of popular makes of radio sets that might help other Radio-Tricians.

1. If Majestic sets have a peculiar noise in the R.F. section, solder all connections on the R.F. by-pass condensers, coils and ground connections.
2. If the same type set sounds mushy, and the trouble is traced to the dynamic speaker field, take the speaker apart and the trouble may be a short between the coil and metal cover.
3. In Radiola 44 be sure connections to chassis on shield cans are clean or set may oscillate.
4. In Silver-Marshall (certain models) the springs that place the tension on the tube socket prongs may break and short the contact to the chassis.
5. If Sparton sets are dead look for the resistance on the terminal strip to be open. If it is take it out and rewind it.
6. In Stewart - Warners look for plate circuit resistance to be open before blaming the trouble on the filter block.—Walter I. Warner, Cambridge, Md.

I am working for one of the leading Radio stores here. I am getting experience on Atwater Kent, Majestic, Philco, Edison and General Electric, and many other types of battery and electric sets.—Lewis W. Fenton, Penn Yan, New York.

### INDEX

Article	Page
Radio and the Plow.....	2
Ship Model Speaker.....	3
Ritter Buys a Car.....	3
A Grad. Talks Business.....	3
The Merchandiser.....	4
A Thought for the Month.....	4
Help the Customer.....	4
Operating the Tester.....	5
Does Your Window Sell?.....	6
Playing the Game.....	7
Ohio & Kentucky Students.....	7
Telling the World.....	8
The Variable MU Tubes.....	9
How Much Technical Knowledge Should a Salesman Have?.....	10
RESULTS CONTEST.....	11-12
The Mailbag.....	13
Tone Satisfaction.....	15
The Office Pup.....	15
Special—Help Your Friends.....	16

## A GRADUATE TALKS ABOUT HIS RADIO BUSINESS

(Continued from page 3)

him also we have confidence in ourselves and gives him confidence in us.

Taking into consideration that the average set owner knows little about Radio I have attempted to educate my customers—to eliminate complaints which might be made against my service and which are not my fault. I have prepared a short article (covering about two pages typewritten) which I am placing in the hands of every customer. It tells the why and wherefore of static, selectivity, station interference, fading, aerials and ground, tubes, etc.

This plan serves to show my customers

Clarion & Silver-Marshall  
Sales and Service  
TELEPHONE 36-541

193

### Service Warranty

Repairs and Replacements made by the undersigned on your

Radio, are hereby warranted against defective material and workmanship for a period of ninety days from the above date.

Tubes \_\_\_\_\_  
Parts \_\_\_\_\_  
Service \_\_\_\_\_

**SMITH & WILLSON**  
"Radio Specialists"  
172 Falconer St.  
JAMESTOWN, N. Y.

Keep This Card

By \_\_\_\_\_

Printed on standard Government Postcards—this warranty is mailed a few days after each service call.

the limitations of Radio sets. It is written in non-technical language and should be understandable to anyone.

I am going to close with a blunt statement. I never thought a correspondence school was worth the postage stamps used till I visited N. R. I. back in March, 1929. I knew differently immediately thereafter. Now I am proud of my N. R. I. diploma. The National Radio Institute started me on the right track to what will eventually be the best Radio shop in this county.

The doctor's little daughter had strayed into his surgery, and was watching, wild-eyed, as he tested the heart and lungs of a patient. Suddenly she spoke: "Getting any new stations, daddy?"

## THE VARIABLE MU TUBES

(Continued from page 9)

as the two curves "A" and "B" for the -24 tube. You will notice that for grid bias voltages less than about -3.5 volts all the curves are practically alike as far as the amplification constants are concerned, for the corresponding curves are parallel and the slopes are the same.

However, for grid bias voltages above -3.5, the characteristics of these two tubes change. The curves for the -24 drop to zero rapidly while those of the -51 flatten out, and approach zero much slower and gradual; this indicating the amplification factor has changed to a lower value. To operate a tube as an amplifier the tube has to work on some point upon the straight portion of either of these curves. From these curves it can be seen that there will not be nearly as much cross-modulation on the -51 tube as the grid bias increases. For example—consider the two curves "B" and

(Page 16, please)

## OPERATING THE TESTER

(Continued from page 5)

Switches  $S_6$  and  $S_7$  are provided for testing tubes. Operating potentials are obtained from the receiver under test through the plug with cable attached. By pressing either  $S_6$  or  $S_7$  depending upon the type of tube to be tested, a change in plate current will be indicated on the milliammeter. The greater this change, in most cases, the better the tube.

Rectifier tubes are tested in the socket with the switch marked  $S_8$  connected to it. In the usual position, the contact is permanently made to the P terminal. However, when the push button is pressed, contact is made to the G terminal allowing a current measurement on the second plate of an '80 rectifier. In the case of a '81, it is not necessary to press the button of  $S_8$ .

To measure the high voltage applied to the plates of the rectifier, connect two leads to the two binding posts marked 800 volts A.C. and test across the two plates of the rectifier tube. A.C. voltage will then be indicated on the 4-volt scale of the A.C. voltmeter. However, due to the series 8,000 ohm resistance, the 4-volt scale becomes an 800-volt scale. This scale can be evenly divided off to take care of all voltages between 0 and 800 bearing in mind that the 4-volt position on the scale represents 800 volts with the 8,000 ohm resistance connected in series.

With the instructions just given, and with a little practice you will soon learn to operate this tester proficiently and without any trouble. Remember, if any special problems arise in connection with applying this tester to any piece of Radio apparatus, just write us as we will be more than glad to explain to you just how any measurement is to be made.

# tone SATISFACTION

The other day I was working out some experiments in my home laboratory that had to do with the fidelity of a particular receiver. Just for purposes of comparison I hooked up an old set of mine—one of the old table models with a speaker that looks like an ear trumpet. I remember when I first bought the set, I considered the reception I got with it pretty nearly perfect. But when I heard it again, after becoming accustomed to a 1931 receiver, believe me, it sounded like tin pan alley.

The point of the story is that during the past three years or so my ears had become accustomed to a different kind of music reproduction, and at the same time my appreciation of sound reproduction had increased to such an extent that it really pained me to listen to the old set.

This led me to believe that possibly within the next three years there may be just as great improvement in Radio reproduction, although it hardly seems possible now. But our ears may keep on becoming better educated and it will require better and better reproduction to satisfy them.

## RADIO SALESMAN'S TECHNICAL KNOWLEDGE

(Continued from page 10)

men interview later are women having not even a speaking acquaintance with things mechanical. Yet only three weeks of the salesman's training period is given over to the art of salesmanship! The other three weeks are spent in instructing the salesmen in electric motors, mechanics, rug-weaving, etc. In short, the salesmen receive a limited but comprehensive technical education in every art and science even remotely connected with vacuum cleaners and their use. And their sales record is ample proof of the value of technical training for salesmen.

Speaking of sales records, it seems appropriate here to mention one made for a particular manufacturer, in 1930, by N. R. I. trained men. The receivers range in price from \$69.50 to \$200 and upward. Keeping in mind that most of

The fact that manufacturers are adding tone control devices to their receivers seems to be an indication that they are aware of this. They are doing their best to build into their sets the same kind of satisfaction one would get if he were sitting in his favorite seat in the concert hall, in the theatre, or wherever the program might originate, for to some people the lower tones are more satisfying, while others prefer their music brilliant, that is, they like music in which the higher frequencies predominate.

For the same reason, Radio-Tricians are giving considerable thought to correct receiver placement. A receiver stuck up against a bare wall may sound entirely different when properly placed in the room.

The important lesson this editorial is designed to teach, is this—people are willing to pay for tone satisfaction and the Radio-Trician can get his share of the set owners' expenditures—by installing tone controls, by correcting loud-speaker troubles, even by redesigning audio systems if required, or by the simple expedient of properly placing the receiver or speaker.

these students and graduates worked only in their spare time, this record (see list), is one that both N. R. I. and the men themselves are justly proud of.

How much technical knowledge should a salesman have?—The answer is simple—"All he can possibly get."

## The Office Pup says—

There are 23,200,000 pleasure car owners in the United States, a lot of whom are going vacationing this summer.

Most of them would like to take Amos 'n' Andy along. Sell 'em automobile Radios.

June is the "Month of Brides"—folks starting housekeeping. Marriage license notices will give you a good lead on live prospects for Radio sets.