

# **NATIONAL RADIO NEWS**

Feb.-March, 1934

Volume 5  
Number 12



**TWENTIETH ANNI-  
VERSARY YEAR**

**OF THE NATIONAL  
RADIO INSTITUTE**

DEPOSITS



# Which Is Your FUTURE?

By J. E. SMITH, President

and *the man you will be if you don't follow out your success program.*

Picture yourself wearing good clothes, having a nice home, a car, money to spend . . . . N. R. I. men are doing it. You can do it.

Then, picture yourself as a pitiful old man, roughly and inadequately clad, who must rake and scrape to get a few pennies to provide the barest necessities of life. Disgusted—unhappy—nothing to look forward to—eventually a dependent upon charity. WHICH IS YOUR PICTURE?

**THIS**

**T**HE dividing line between success and failure is just a "hair line" in most cases. The result of one single decision may determine on which side of the dividing line you'll wind up.

**OR**

But, just making a decision is not enough to place you on the success side. Unless the decision is carried out it is useless.

You made a worthy decision when you decided to study Radio—to assure your future. But remember, it's easy to slip back across the line. Back your decision by continual determination to SUCCEED.

Keep before you mental pictures of two men—*the man you want to be*  
Page Two

The road to success is uphill—but that's as it should be. *If it were easy to succeed the ambitious fellow would have no advantage.* It's worth working—it's worth climbing to know that the future holds out security, happiness and prosperity to you.

**THIS?**



# The Serviceman and Collections

By W. W. SAUNDERS, N. R. I. Credit Manager

THE first, and most important, part of collecting the money folks owe you, is convincing *yourself* that you *should* collect—that you have every *right* to collect—and that it is your *duty* to collect. Snap out of that “weak-kneed” frame of mind that makes you put off asking for your money, and that makes you almost apologize to a man when you ask him for the money he owes you.

When you use your time, materials and knowledge doing a job for a customer, the money he agrees to pay you is *yours*. If he delays paying it to you, he is simply using *your money*—without interest and without your consent. He is using money that you need to carry on your business.

Always keep in mind that you can be the best Radio-Trician in the country, and get all the business you can possibly handle—*BUT*, if you fail to *collect* for the work you do, you are simply wasting your time. Your chances of becoming truly successful are mighty slim, if your profits are eaten up by uncollected accounts.

Of course, it's not the easiest thing in the world to collect money—but if you work it right you *can* collect from every customer who has the money. And naturally, you shouldn't do work, except for “cash on the table,” for people who are apparently in bad circumstances—unless you do it purely as an act of charity or friendship.

And remember this, too—where business matters are concerned, friendship and charity can *ruin* a man just starting into business, unless he is mighty careful. This may sound cold-blooded—but until you get your start you can not *afford* to lose money without hurting your business and your chances for success—you *must* be firm, business-like and unemotional when you are asked to grant credit to people who *can't* pay—and when collecting from people who *won't* pay.

Look around a bit, and you'll find that most of the folks who owe you money are living just as well as you are, or better! You'll find that in a month they spend more on luxuries—movies, cigarettes, etc.—than the amount of your bill.

You'll also find that these people do not continue to do business with you. They will have their work done by some other fellow and most likely pay him cash.

In addition to all this, when you don't even make a serious effort to collect money that is



due you, people get the idea that you are an “easy mark” and a “sap.”

So, Mr. Radio-Trician, get it well fixed in your mind that there is no reason in the world why you should *not* collect money that people agree to pay you—and there is every reason why you should collect it!

HOW can you collect?

The most important rule is to keep courteously and everlastingly at the job. When a fellow owes you money, remind him of that fact—frequently and regularly. Don't let it slip his mind for even a week that he *does* have some of your money, and that you want it.

Always make your reminders courteous, and for the first month or six weeks they can even be friendly. But after six weeks, if the bill is not paid, your debtor is showing sure signs of being bad pay, and it is time to change your tactics. But remember—you can be firm and insistent and yet be courteous. Never let your temper get the best of you, and never resort to sarcasm, threats or mud-slinging.

After six weeks, find out all you can about the debtor's personal circumstances. If he, or some member of his family, has been seriously ill, or if he is out of work, you may have to make certain concessions to suit the particular case. But always investigate “hard luck stories” before you ease up on collection efforts. You'll find lots of people telling pitiful stories just to stall you off—and even in cases of genuine merit you should not postpone payments for over one month. There's lots of good common sense in that old saying that “charity begins at home.” Consider your *own* obligations—your *own* family first.

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# A Few Words With the N. R. I. Director

E. R. HAAS, Vice President and Director, National Radio Institute

A MESSAGE of particular importance to all Radio men who are looking forward to Television was contained in a letter received from Dr. Lee de Forest. Dr. de Forest, ranking high among the world's pioneer Radio engineers, and a member of the Advisory Board of the National Radio Institute, has just returned from Europe where he has had an opportunity to study European Television developments. I quote from Dr. de Forest's letter:

"I find the British Baird Company making fine progress in Commercial Television. Four nights each week they broadcast one hour of genuine artistic entertainment, using mirror drums in place of lens disk and 'Kerr-cell' valved light from an incandescent lamp in place of our crater lamps.

"Baird is limited by British regulations to 9,000 kc. side band. Imagine getting a good picture out on that! Yet Baird does it—by use of 30-line picture and 12½ pictures per second. Considering the handicap the results are amazing. Vertical scanning is the answer—incomparably superior to horizontal scanning, when less than 120 lines are employed.

"As a result his 'lookers' (as they are styled in England) see a *black and white* picture, 9x4 inch in size.

"I was informed that over 10,000 Television receivers are in use in the Southern part of England.

"In Germany, I found that the 180-line cathode ray system has been perfected to a great degree. The received pictures compare very favorably with 16 mm. motion picture when both are projected on a 10 foot square screen. Every type of film picture was shown me—close-ups—long shots, outdoor views, waterfalls—one group of 50 or more school children singing was just as life-like and convincing as the moving picture itself. It was positively incredible.

"For their 180-line Television the Germans are now using only film pick-up although they  
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are developing direct pick-up cameras for flood-lighted and out-door scenes.

"They are also at work along similar lines to that of Zworykin's 'Iconoscope' the basic idea of which was disclosed as far back as 1907, by Campbell Swinton of England.

"They get unusually long life from their large cathode ray tubes—guaranteeing them for 1,000 hours useful life. But the Germans are not nearly satisfied with their work on Television—claiming that it will require another two years to perfect the system."



E. R. Haas

A recent survey of the Radio stations of the world indicates that for broadcasting purposes there are now 1426 stations. There are actually 585 stations in the United States, although the number runs well over 600 on the various log books—because in some cases the same transmitter is used under separate sets of call letters for different purposes.

Russia now ranks second with 73 stations, three of which are of 100,000 watts power. The Dominion of Canada is third, having 63 stations, Australia has 60, Cuba 57, Mexico 53, the Argentine 35, Uruguay 33, New Zealand 32, and Sweden 31. Germany has 26 stations, France has 29 and Great Britain has 12. However, Great Britain stations are substantially higher in power than the majority of other stations.

It seems that "all-wave" Radios will be in style this season. Eighty-five per cent of the set manufacturers have included at least one all-wave model in their line of receivers for this year. It is reported that London, England, Paris, France, several German and several Russian stations are heard more or less regularly on these new all-wave receivers as well as many other stations depending upon broadcasting conditions.

# Unleashing 500,000 Watts

**C**ONSTRUCTION work on the giant new 500,000-watt transmitter which is to make WLW in Cincinnati, the most powerful broadcasting plant in the world is progressing rapidly and first test broadcasts are expected to be made shortly. As we go to press with this issue it is expected that broadcasts will begin sometime in January.

To date all rotating equipment has been installed at the new plant which is located on the site of the present Crosley transmitter plant at Mason, Ohio, 22 miles north of the studios in Cincinnati.

Other equipment already in place includes the 831-ft. vertical radiator antenna tower, which, incidentally, is already in use in connection with the present WLW 50,000-watt transmitter and which has been responsible for an increased signal strength of from 50 to 100 per cent; the huge 100,000-pound audio transformer, largest ever built; power lines and mammoth sub-station to supply adequate electrical energy; three filament machines; a giant water cooling system capable of providing the 1,000,000 gallons of water daily required to cool the various tubes used in the transmitter; and the actual transmitter itself.

At the present time the highly complicated work of wiring and connecting the transmitter is in progress.

More than 35 men are being employed regularly by the Crosley Corporation in connection with the construction of this colossus of the air, which, when completed, will make WLW broadcasts audible—under favorable conditions—to listeners virtually anywhere in the world. The service zone to be covered by the 500,000-watt station will include a huge circle having a radius of some 2500 miles.

The new 500,000-watt transmitter is to be a fitting climax to more than 15 years of invaluable pioneering activity in the field of Radio broadcasting by Powel Crosley, Jr.,

president and founder of the Crosley Radio Corporation. His work both in the development of radio broadcasting and as a leader in the manufacture and development of Radio receiving sets has made Mr. Crosley an international figure.

Involving a total cost of approximately \$400,000.00, the construction of this modern Goliath of the Air will not only mark a major development in radio engineering, but is proof of the confidence with which officials of the Crosley Radio Corporation view the economic horizon.

Some conception of the tremendous electrical energy which the new Crosley transmitter will be capable of unleashing is to be gained when

we consider that its power will be ten times greater than that of the present 50,000-watt WLW transmitter.

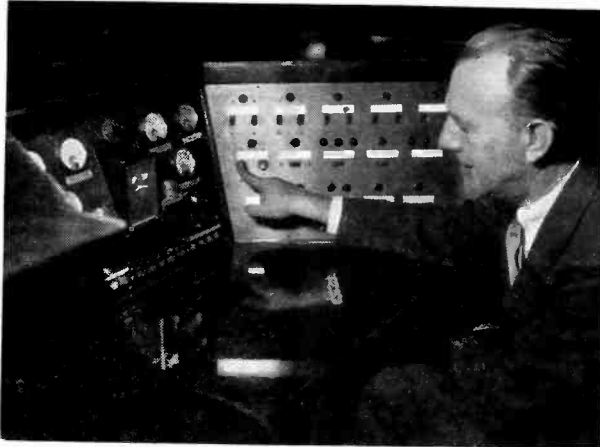
As the result of thus extending the radius of WLW's signal, it is pointed out that the new Crosley equipment will provide for an area coverage of about 25 times that of the present transmitter and antenna equipment. Translated in terms of miles, WLW's reliable service area will be expanded to include a gigantic circle whose diameter is

more than five thousand miles. However, this station will have thousands of listeners beyond even these distant limits, because with a good receiving set and in a good receiving location, WLW's signals should be received almost anywhere in the world.

As viewed both by Mr. Crosley and by members of the Radio Commission, the new transmitter, permit for which has been issued for experimental purposes, will serve as a practical laboratory for the scientific development of actual broadcasting in the heretofore unexplored field of extreme power. The full 500,000 watt power will be utilized experimentally for broadcasting between the hours of 1.00 to 6.00 A. M., E. S. T.

WLW's present cleared channel of 700 K.C. is admirably suited for the use of high power.

(Next page, please)



Powel Crosley, Jr., President and founder of the Crosley Radio Corporation, which owns and operates WLW. Mr. Crosley is seated at the control console of the "Goliath of the Air."

## UNLEASHING 500,000 WATTS—Continued from preceding page

At this frequency fading is neither as severe nor as close to the station as at higher frequencies. In addition, atmospheric disturbances are reasonably low. Due to the tenfold increase of its present power, WLW—with its new transmitter—is expected to “over-ride” all static, and atmospheric noises and other interference, and to provide listeners with a quality of reception heretofore unattainable because of the present inadequacy of the signal strength even of those stations now allowed 50,000-watt power.

It has long been Mr. Crosley’s contention that the only satisfactory method for eliminating static noises in radio reception was to provide a broadcasting signal strength sufficiently powerful to “over-ride” these interferences. As the result of that conviction this pioneer in Radio has for ten years championed the cause of increased power. The soundness of this theory has been substantial in the steady trend towards increased power during the past several years.

The Crosley pioneering activities in the use of increasingly greater power has covered the entire range from the original 20-watt transmitter, located in Mr. Crosley’s home, in 1922, through increases of 50-watts, 500-watts, the pioneer remotely controlled 500-watt transmitter located at Harrison, the first 50,000

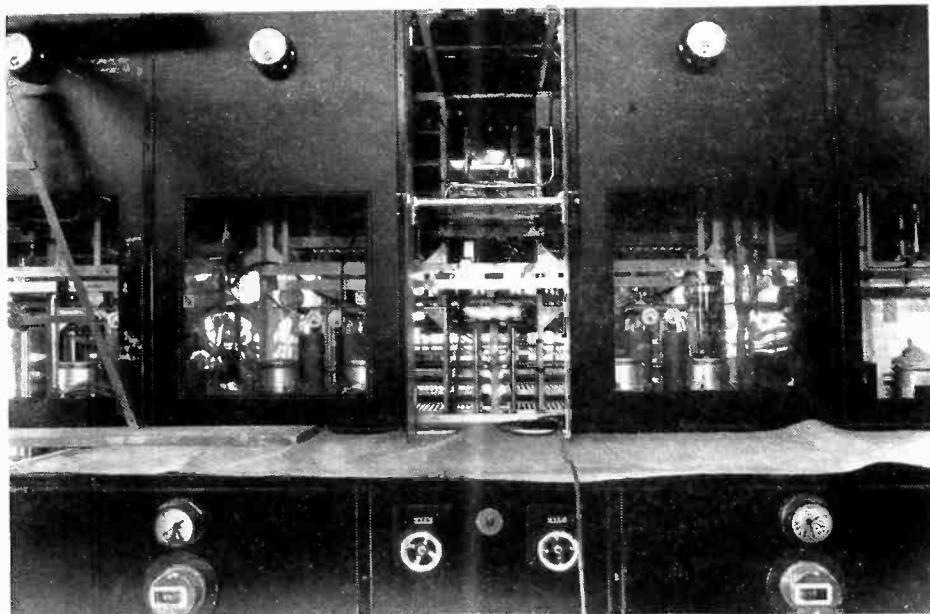
watt broadcasting transmitter in the world, the present WLW located at Mason, Ohio, and now the logical step for this pioneer organization is the new 500,000-watt equipment.

“The early belief that an increase in power causes interference with other broadcasting stations has been definitely disproved over a period of years and the many power increases of WLW,” Mr. Crosley said, adding the assurance that “listeners may expect a definite all-round improvement in service without any sacrifice in any way.”

As a manufacturer of Radio receiving equipment, Mr. Crosley has always felt an obligation to provide satisfactory programs to people living in areas remote from local broadcasting stations and has always believed that there should be two types of broadcasting stations; first, those covering a local area; second, one or more powerful enough to deliver satisfactory signal strength to places remote from local broadcasting stations and dependent entirely on these high powered clear channels, static over-riding stations.

This new development of the Crosley Corporation is a fine example of the forward march of Radio. Radio does not stand still. It is an Industry of continual development which is truly an inspiration to the young men who want to get into an opportunity field.

The first photograph of part of the Radio frequency units of the new Crosley 500,000-watt transmitter.



# RADIO-TRICIAN SERVICE SHEET

REQ. U. S. PAT. OFF. STUDENTS & GRADUATES

COMPILED SOLELY FOR 

## Sparton Model 82 Country Home Superheterodyne (Battery Operated)

### Schematic Diagram, Voltage Analysis and Continuity Chart

#### VOLTAGE ANALYSIS AND CONTINUITY CHART

Condition of "A" Battery—Good

Position of Volume Control—Full with Antenna Disconnected

Condition of "B" Batteries—Good

Position of Band Selector Switch—Broadcast

Condition of "C" Battery—Good

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preced. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
1A6	1st Det.-Osc.	135	1.3	67.5	—3.	—	12.5	0	750,000	0
32	I-F Stage	135	1.7	67.5	—3.	500,000	12.5	0	500,000	0
32	2nd Det.	135	.6	50.	—3.	500,000	350,000	500,000	500,000	0
30	1st Audio	135	3.0	—	—7.5	85,000	80	—	500,000	0
19	Power Stage	135	4.0	—	—3.	300	75	—	220	0

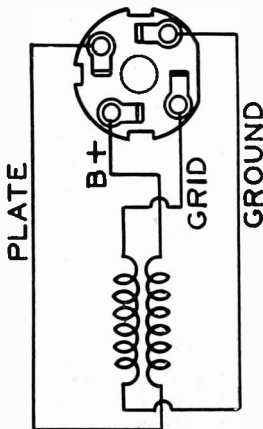
NOTES: Allow 15% + or — on all resistance measurements (all battery leads connected together).

All filament voltages: 2.0 volts.

"A" battery drain .6 ampere.

"B" battery drain 25 to 35 milliamperes.

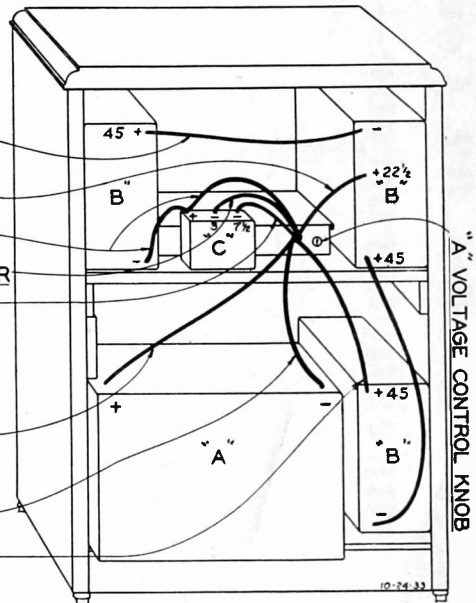
HOOK UP OF TERMINALS ON OSCILLATOR COIL  
A-10330



MODEL 82

- BLACK CONNECTING JUMPER
- BLUE
- BROWN
- GREEN- BLACK TRACER
- GREEN

- RED
- BLACK
- YELLOW

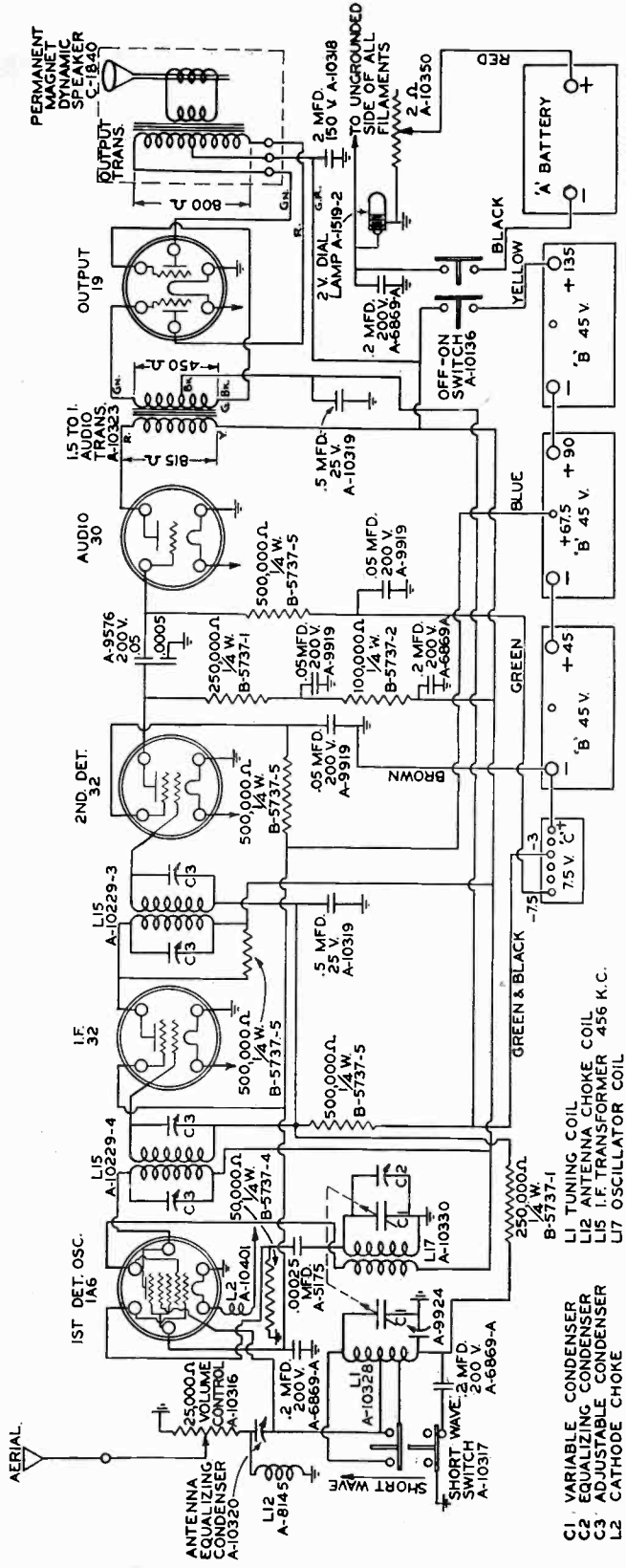


SPARTON MODEL 82 WIRING DIAGRAM

Readers who file Service Data in separate binders remove page carefully; trim on dotted line for same size as Data published heretofore.

# Sparton Model 82 Country Home Receiver

## Superheterodyne—Battery Operated



**Are you getting the most out of your country market?**  
**Farmers and others in rural communities**  
**are fine Radio prospects.**



# QUERIES AND ANSWERS

???



*Question: What advantage has the 1A6 tube over the 32 or 34 as an osc-det. in a battery operated super-heterodyne?*

**Answer:** When a tube such as the 32 or 34 is used for a double function it cannot perform both functions well. When it oscillates its detecting ability is reduced and when the circuit is arranged so that it is most suitable for detection it will not necessarily oscillate; if it does, its detecting efficiency will be greatly reduced. The circuit characteristics necessary for one operation will naturally not be suitable for the other. In the 1A6 tube the functions are isolated through separate element structures electron coupled to one another. In this way each function can be designed for most favorable conditions.



*Question: How can I tell if A.C. or D.C. is being supplied to the 110-volt power line?*

**Answer:** The type of current and the value of the voltage delivered to a power line is usually marked on the name plate of the power meter which measures the power delivered to the premises.

It has been observed in some instances that no mention is made about D.C. or A.C. However, there will be a notation always giving the frequency in cycles where A.C. is used. Where you see no reference to "cycles" on the name plate, you can be sure that D.C. is supplied.

In case that you cannot have access to the place where the power meter is located, then you can construct a simple tester by using an ordinary electric lamp and a condenser. An electric lamp will work just as well on direct current as it will with alternating current. However, if a condenser is included in the circuit, the lamp will only light when direct current is applied.

Connect one terminal of a condenser to one wire of the power line. The condenser

should be 1 mfd. or more. Then take a 10-watt, 110-volt lamp and connect one terminal of it to the remaining terminal on the condenser. Connect the remaining terminal on the lamp to the power line. The lamp will light to approximately three-quarters of its normal brilliancy if the frequency of the power line is 60 cycles. On the other hand, the filament of the lamp will show a dull cherry red color if the frequency of the line is 25 cycles.

If you do not have a 10-watt lamp available, then use a 25-watt lamp in connection with a 2 mfd. condenser.

On the other hand, if the lamp does not light while the condenser is included in the circuit, but the lamp does light when the condenser is removed, then you will know that you have direct current supplied to the power line.

If you use a D.C. voltmeter, connecting the 150 volt range to the socket it will tell you whether you are getting A.C. or D.C. It will read only if D.C. is supplied and will not read for A.C.



*Question: I have an old tuned Radio frequency receiver and wish to install a tuning meter. How shall I go about it?*

**Answer:** As the receiver is not equipped with an automatic volume control, the tuning meter would not indicate resonance if placed in the plate circuits of the R.F. tubes. The only tube in a set not equipped with AVC whose plate current changes with an incoming signal is the detector. Therefore the meter must be placed in either the plate or cathode circuit of the detector, where it can record any change in plate current. An 0-5 milliammeter should be used.

The plate current reading will increase or decrease at resonance depending on the type

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# Biological Effects of Radio Waves

By H. K. BRADFORD, N. R. I. Communications Consultant



LET us reflect for a moment on the actual nature of Radio waves especially those of very short lengths corresponding to very high frequencies. From our original studies of electromagnetic induction, we have learned that magnetic energy can be converted into electrical energy directly. For example, when any wire or conductor is in a magnetic field which is varying, a voltage will be produced in the conductor in accordance with the magnetic variation. The same is true of high frequency magnetic waves—that is, they will induce alternating voltages in any conductor through which they pass which will have a value depending on the strength of the magnetic wave and a frequency equal to the frequency of the magnetic wave.

Suppose we carry the experiment further and insert a conducting ring or cylinder in a coil of wire carrying the heavy current at a very high frequency. The magnetic field cutting this ring or cylinder, will induce a current flow into it and if the current flow becomes great enough, heat will be developed in the ring or cylinder. Electrical energy is placed directly into the conductor by induction and it cannot escape except in the form of heat.

To diverge for a moment this principle is used in electrical bombardiers used in the manufacture of vacuum tubes. The "getter cup" as it is called placed at the base of the electrodes in a vacuum tube is a metallic member and is filled with a chemical which when heated will start a chemical action with the remaining gas in the tube after evacuation and eliminate most of it. This getter cup is heated to a red heat by electromagnetic induction from a coil.

If we make further investigations of this subject we will find that the same is true of the electrostatic field, between the two plates of the high frequency condenser used in the system. If we place a conductor between the condenser plates, we will find that it also will heat up due to induction of energy from the electrostatic field.

When first investigating these ultra-high frequencies between 60 and 100 megacycles it was found that certain types of moulded material used for dielectric were not at all suitable because of the tremendous energy developed in the electrostatic field between the

condenser plates of such circuits. Such material would be disrupted very quickly as it would overheat and buckle and decompose.

Now it has been found that every living organism contains a certain amount of conductive material thus when living organisms are subjected to strong and rapidly reversing electro-static fields, they are decomposed.

Experimental apparatus has been set up using a frequency of 60 megacycles and a resonant tuned circuit with condenser plates about 3 inches square and  $\frac{3}{4}$  inch apart. The condenser was designed so that a glass container could be introduced between the plates and flies, mosquitoes and other insects were introduced into the glass container. After being subjected to the heavy electro-static field for a short time they died. This can be done with a power ranging between 10 and 50 watts.

Further experiments using this idea were performed in the elimination of weavils from wheat. The weavils themselves can be eliminated through the use of poison gas or mechanical blowers but this does not take care of their eggs and larvae which remain inside of the wheat grain.

In the experiment a grain chute was constructed so that the grain could be passed through in fairly large quantities at a rapid rate. In order to kill all living organisms in the grain when it is exposed to the high frequency field for such a short time, it is necessary to use a large amount of power. Nearly 14 kilowatts at 60 megacycles was used in one particular experiment with grain passing through the chute at about 60 bushels an hour.

It was found that nearly all the weavils and their larvae died instantly. The eggs were eliminated in six seconds. Under this process, the wheat being relatively non-conductive passed through uninjured.

The high frequency current is produced by power oscillators similar to those used in regular transmitting circuits. Instead of regular tuning condensers, the plates comprising the condenser are used as the electrodes between which the material to be treated is passed.

## QUERIES and ANSWERS

(Continued from page 9)

of detector used. With a grid leak and condenser type of detector the plate current will decrease, while with a power detector the plate current will increase. With the latter type the meter should have a size of 0-1 ma. as the normal plate current should usually be about .1 ma. These instructions are general and you should measure the tube's plate current as this will enable you to tell without any guess work just what size meter to employ.



*Question: A few months ago I changed an old 6-volt battery operated receiver to use 2-volt tubes by merely using a 2-volt A battery and the 2-volt tubes. On testing the tubes recently I find that they test very weak. What caused this?*

**Answer:** The fact that the tubes quickly became weak was probably due to incorrect grid and plate voltages applied to the tubes. The voltages applied to the filament of the 2-volt tubes should however never be more than 2 volts, and this actually determined by measurement.

The plate voltage and grid bias should be so adjusted that the plate current is never more than 3.1 milliamperes for the 30 tube, 12.3 milliamperes for the 31 tube, 14.5 milliamperes for the 33, and 2.8 milliamperes for the 34 tube. The exact plate, screen and grid voltages can be determined by consulting any standard tube characteristic chart

## ULTRA-VIOLET LAMP

There has just been called to the attention of National Radio News a new product sponsored by the National Union Radio Corporation, 400 Madison Avenue, New York City, manufacturers of National Union Radio Tubes.

This product is known as the "Lederer Ultra-Violet Lamp."

To N. R. I. men who would like to handle this equipment, a regular dealer's discount is offered by the National Union people. Get in touch with their distributors who are located in all large cities—or if you cannot locate a distributor near you, write to the National Union Radio Corporation direct, at 400 Madison Avenue, New York City, and they will be glad to tell you the address of their nearest distributor, where you can obtain full information on the proposition.

## Alumni Association News

*Additional Alumni Association News will be found on pages 15, 19, 20 and 21 of this issue.*

### BUFFALO LOCAL

As the end of our first year of operation as a Local Chapter of the N. R. I. Alumni Association is drawing near, it was voted at our last regular meeting to accept nominations for officers of the Local for the coming year.

As Local Chairman of the organization, Mr. T. J. Telaak was unanimously nominated. No one was nominated to run against Mr. Telaak, he will therefore be elected as Local Chairman for the year of 1934. For the office of Financial Secretary, Mr. John E. Kreitner will run against Mr. John T. Pollard.

A new office was created—the officer is to be known as Corresponding Secretary. It was felt that the former duties of the Financial Secretary were too much for one man to handle. Consequently nominations were made for Mr. Norman Smith and Mr. Fred C. Cutler. One of these two will be the Corresponding Secretary for the Buffalo Local for the year of 1934.

For the two posts of Financial Committee-men, Mr. Frank Burns will run against Mr. Louis Weber and Mr. Adams Zalnowski will run against Mr. Norman Schmelz. As all of these men have been ardent workers in the Local Chapter of Buffalo a spirited race is anticipated.

At the November meeting of the Buffalo Chapter, Mr. L. M. Temple, of the Raytheon Manufacturing Corporation, addressed the members. Mr. Temple traveled all the way from Newton, Mass., to Buffalo, N. Y., for this occasion. We thank him.

At the next regular meeting of the Buffalo Local a "New Membership Committee" is to be organized and a concentrated drive for new Local members will be made immediately thereafter.

\* \* \* \*

The Buffalo Local Chapter and National Headquarters of the Alumni Association are anxious to get in touch with Mr. Honoratio Bernadino. If this comes to his attention it is requested that he immediately communicate with Mr. Murray at National Headquarters in Washington or with Mr. Telaak at the headquarters of the Buffalo Chapter.

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# Calling a



Announcer receives a message from the dispatcher.

**M**RS. WILSON was sewing. The afternoon sunshine poured in the living room window of her second-floor apartment. The calm silence of a late fall afternoon covered the little suburb. At this hour the streets were practically deserted. A slight murmur, a distant rumbling was the only evidence of the seething activity that was Brooklyn nearby.

Suddenly, out of the silence, a screech of brakes, sounds of a scuffle, a muffled cry for help. One glance from the window was sufficient; Mrs. Wilson dashed to the phone: "Police headquarters, operator, and make it quick. . . . Hello, Police Department, Mrs. Norman Wilson, Markham Apartments, speaking. A mail truck is being held up in front of this building. . . . Two men, I think—one touring car—no I can't see the license number—thanks. Goodbye."

Almost before she could return to the window there was the wail of a siren. Two thugs were holding the mail driver, one of them hesitated in the act of bringing a wrench down upon his head. He listened; both dashed

for the black touring . . . shot into gear and up the street. A police patrol car roared by in hot pursuit. Both men were captured. Another victory for the Radio patrol.

Mrs. Wilson's message had been relayed at once to the police dispatcher; it was broadcast and picked up by a squad car just six blocks from the scene of the crime. Approximately 3,200 arrests are made annually by New York's Radio cruisers. \$1,100,000 worth of stolen property is being recovered annually by the use of these Radio cars.

The Radio organization of the New York Police Department is a model of efficiency. Three transmitters are used: WPEG, located in lower Manhattan; WPEF, located in the Bronx, and WPEE, located in Brooklyn.

The 400 patrol cars of the New York Radio Police system are each equipped with a special seven-tube superheterodyne outfit manufactured by the American Bosch Company. The receivers, mounted under the instrument board and controlled by a dial on the steering column, are each equipped with automatic volume control.

The standard car batteries and generators are used to supply the 2.2 amperes drawn by the filament and have been generally satisfactory. Plate power at 135 volts is drawn from heavy-duty dry B batteries. As these batteries require renewal every five weeks, they are to be replaced soon by eliminators capable of delivering 25 milliamperes at 135 volts with a 6 volt, 1 ampere input.

Special magnetic cone speakers are mounted either under the instrument board or in the ceiling, depending upon the type of car.

The antenna in a Radio patrol car of the New York Police system consists

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The 1,000-watt transmitter; Station WPEG.



A typical Ra

# Cars . . .

of twelve feet of copper screening in the car roof, except in the roadster model, which has about forty feet of No. 16 rubber covered wire sewed in the top.

The Department has equipped five repair cars, which are on twenty-four-hour service. Each of these cars carry eight spare receivers and a full stock of tools and accessories. They also carry dynatron oscillators set for 2,450 kilocycles, so that receivers can be adjusted without the necessity of awaiting signals from the police transmitting station. It is seldom if ever necessary to take one of the Police Radio cars into the shop for Radio service, as the mobile repair shops are fully equipped to make repairs wherever and whenever Radio receiver trouble is reported.

Station WPEG is a W. E. No. 305A and a W. E. No. 9A speech input. The transmitting equipment consists of a 100-watt transmitter with a 1,000-watt power amplifier operated at 500 watts output.

The transmitter unit has a crystal oscillator, two stages of R. F. amplification and a two-tube balanced modulating amplifier, the grid voltage of which is varied by the audio-frequency voltage supplied by the speech input equipment. The power amplifier has a single push-pull stage, harmonic suppression circuits, antenna coupling and tuning circuits, and a monitoring circuit. The speech input equipment is a standard A. C. operated single channel broadcast outfit with three moving coil microphones.

The equipment in the auxiliary stations in Brooklyn and in the Bronx consists, in each case, of a No. 9 type Radio transmitter and a No. 10A speech input equipment. The transmitter has a quartz crystal controlled oscillator, a frequency doubler, a modulating amplifier, an audio fre-

Sending an alarm over Station WPEG.



quency amplifier, and a power amplifier. The speech input equipment includes a No. 57A amplifier and a No. 6061A telephone set. The amplifier contains its own rectifier.

On the average, the New York Radio patrol cars reach the scene of their assignment about forty-five seconds after the transmission of their instructions. An average of one arrest is made for every twelve assignments.

With the increasing popularity of Radio police patrol in battling crime, more and more cities and states will continue to Radiofy their police departments. This, consequently, creates jobs for Radio men, as skilled personnel is required all down the line, from the manufacturer of the sets and transmitters down to the operation of the transmitters and servicing of the receivers.

rol car.



The 400-watt auxiliary station WPEG.

# Graphite Anode Transmitting Tubes

By VICTOR O. ALLEN, Assistant Chief Engineer,  
Electronics Division, Hygrade Sylvania Corporation.



Victor  
O.  
Allen

**G**RAPHITE or specially processed carbon has come to take the place of the usual nickel or molybdenum for the plate or anode of large and small air-cooled transmitting tubes. The black mass, precisely machined for thin walls, ridges, mounting holes and other features, is held in place by means of nuts and bolts in a rugged manner. At a glance, we have here an improved mechanical job. But there are certain electrical gains which are not so obvious, and it is with these gains that we are mainly concerned in the present introduction of the graphite anode transmitting and power tubes.

The anode of an air-cooled tube, handling a considerable output, becomes quite heated. Transmitting tube anodes usually operate at cherry red heat. Metal plates have a tendency to buckle under the terrific heat, and consequently must be braced by a bridge-like trussing. If the anode does warp, tube characteristics are materially altered. The added metal adds to the problems of degassing the tube during bombardment and exhaust, and also tends to release gas during the service life of the tube. The intense operating heat, conveyed to nearby grid, gives rise to primary and secondary grid emission seriously interfering with tube operation. Little wonder, therefore, that tube engineers have long sought some means of increasing the heat radiation of the anode, so as to have it run cooler.

In our physics books we learn that a pure black body is the ideal heat radiator. Theo-

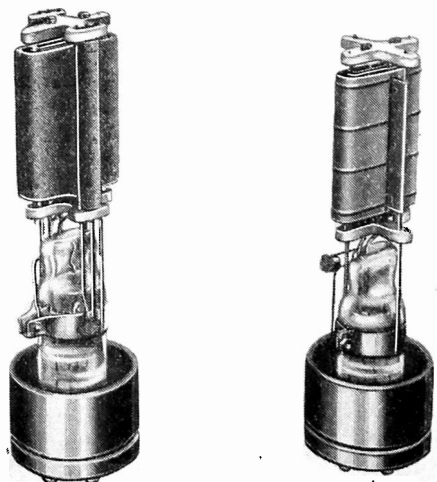
Page Fourteen

retically, therefore, tube engineers have sought to employ carbon for anodes. But in practice serious obstacles have been encountered. For one thing, if the anode is made up in sections instead of one piece, high contact resistance is encountered between sections. The usual commercial carbon contains impurities, such as a binder. Also, it contains amorphous carbon, or a loose surface layer. Mounted in a tube, the carbon anode under bombardment distills off its binder and other impurities, as well as the amorphous carbon. These particles deposit on the inside of the glass bulb, actually increasing the heat within the tube and therefore defeating the very purpose of the black anode. Depositing on glass press, spacers and other insulating elements, the carbon dust causes troublesome leakage at high voltage. All in all, carbon anodes heretofore have not proven practical.

Our research staff turned to the problem of the carbon anode. We felt that in the practical solution of this problem lay an en-

(Page 22, please)

Hygrade-Sylvania type 211 tube mounts, showing the old or carbon-coated metal anode on the right, and the new Graphite anode on the left.



# ALUMNI ASSOCIATION NEWS

(Continued from page 11)

## PITTSBURGH LOCAL

While the Local Chapter of the N. R. I. Alumni Association at Pittsburgh, Pa., has nothing startling to report in this issue of National Radio News, we want it to be known that we are getting along fine—and building gradually. Several out-of-town Alumni Association members have applied for membership in the Local. Their applications will be acted upon shortly.

Following the lead of some of the other Local Chapters, the matter of affiliating our Local with other service organizations in our city was placed before the membership. It was unanimously rejected at this time—due to certain conditions here in Pittsburgh—and for the present we have decided to remain strictly an N. R. I. organization.

All members of the Pittsburgh Local have been instructed to refer items of interest encountered in their daily work to the Mail Bag of National Radio News, as we are interested in that section of our paper and want to build it up and keep it going.

## CHICAGO LOCAL

The Chicago Chapter has started out the year 1934 with a four-point program to which it expects to adhere very closely. The four points are as follows:

First—To increase our membership to include as many as possible of the seventy-five N. R. I. Alumni Association members who are in this vicinity. (We now have thirty-two of them as active Local members).

Second—To organize a supply division and to centralized buying, thus getting better wholesale prices.

Third—To have lectures pertaining to Radio Engineering by members and representatives of various Radio companies.

Fourth—To discuss everyday Radio problems that come up in the daily work of the Radio man, thereby adding greatly to the knowledge of our members.

Mr. Bennett suggested an idea to the Local which has been followed out. Various members of the Local are assigned subjects on which, after a little preparation, they give lectures at our regular meetings. Mr. Bennett, being the originator of the idea, volunteered to give the first lecture, which dealt with "Superheterodyne Circuits." It is doubt-

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UNDERWOOD & UNDERWOOD PHOTO

C. M. Jansky, Jr.

Readers of National Radio News will be pleased to hear of the election of Professor C. M. Jansky, Jr., as PRESIDENT of the INSTITUTE OF RADIO ENGINEERS for the year 1934.

Mr. Jansky is a member of the Advisory Board of the National Radio Institute and as such has contributed greatly to the N. R. I. course of training.

From 1920 to 1929 he had charge of instruction in Radio Engineering at the University of Minnesota and was also in charge of that university's broadcasting and experimental Radio station. Mr. Jansky is now a Consultant Radio Engineer with offices in Washington, D. C. He is a member of the Board of Directors of the American Radio Relay League. His father was Professor C. M. Jansky, the noted University of Wisconsin physicist.

In the next issue of National Radio News we will bring you an article on the subject of Piezo Crystals in speakers, phono pick-ups and microphones. This article was written by student L. W. Anderson, of the Brush Laboratories Company, of Cleveland, Ohio.

# THIS and THAT in RADIO

## Wrapped In Cellophane

Radio finds a new use for cellophane. By making a huge hood or envelope of this material and suspending it over and around a singer the voice is muted and bad microphonic effects of very high notes eliminated. This plan has been highly successful in cases of coloratura sopranos.

## Radio Typewriter

A new Radio development has come to the attention of National Radio News. It is a Radio typewriter. We have not had an opportunity to see this new machine, but we understand that it makes use of the wave lengths in the vicinity of 5 meters and has already transmitted successfully over a distance of several miles. The Radio typewriter can transmit just as rapidly as an experienced typist can run the machine.

Since the Radio typewriter, or "The Radio-type" as it is called, transmits on a very narrow channel and causes practically no interference, if sufficient practical use can be found for this machine, the possibilities may be very great.

## Autocrat Radio

The Autocrat Radio Company, of 3855 North Hamilton Avenue, Chicago, Ill., is offering a complete line of midget Radios for 1934. Their catalog will be supplied upon request and special discounts are offered N. R. I. men. Address them direct, Autocrat Radio Company, 3855 North Hamilton Avenue, Chicago, Ill., for full particulars.

## This Month's Cover

On the cover of this issue of National Radio News is a striking view of the United States Capitol at Washington. Here legislation is enacted which has a great bearing on the Radio Industry.

The Capitol is situated on Capitol Hill, in fifty-nine acres of beautifully landscaped parks. It faces east and rises to a height of 287 feet. The Capitol dome is crowned by a bronze statue of Freedom. The cornerstone of the original Capitol was laid by President Washington, September 18, 1793. On August 24, 1814, during the war with Great Britain the original Capitol was burned.

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# Success Stories

*National Radio News is pleased to publish two Success Stories in this issue, both of which we hope will be of help to our readers—enabling them to make some money through the use of the ideas in these letters. Have you an idea? If so, send it along to National Radio News. It may be worth a dollar to you.*

## Success Story No. 8

I have been advertising in the papers and passing out handbills from house to house. It did some little good, but I was not satisfied. For a long time I could not get sufficient attention to my place of business to do the amount of business I desired.

So I built an amplifier and put a loud speaker outside of my Radio shop. The music coming over this system attracts attention to my place of business and it brings them in to get their tubes tested, etc. Inside of two months this idea has been the cause of my selling about 250 tubes. My business is going along fine.

MIKE RISTVEY,  
The Sharon Radio Shop,  
Sharon, Pa.

## Success Story No. 9

The town where I am living is very small and there are only a few sets. So I decided I would have to expand my business if I wanted to make a worthwhile living in Radio. I went up to the next town and located a young man about sixteen or seventeen years old who was looking for some work. I offered him 25 per cent. commission on all Radio service work he obtained for me. As the young man knew the town pretty well, he got quite a bit of business for me. He has a good reputation and a lot of friends and in a number of cases he took me from house to house, introduced me to his friends and acquaintances. He and I have both enjoyed the arrangement, as it has been beneficial financially to both of us.

EDWARD LEE WILLARD,  
Sebastian, Texas.



# RADIO-TRICIAN SERVICE SHEET

REG. U.S. PAT. OFF.



COMPILED SOLELY FOR

STUDENTS & GRADUATES

## General Electric Models L-50 and L-51—R. C. A. Victor R-22

### SERVICE DATA

#### ELECTRICAL SPECIFICATIONS

Voltage Rating ..... 100-125 A. C. or D. C.  
 Frequency Rating (A. C.) ..... 25-133 Cycles  
 Power Consumption: A. C. 60 Cycles, 115 Volts—60 Watts  
 D. C. 115 Volts—40 Watts  
 Number and Types of Radiotrons ..... 1 RCA-78,  
 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-2525—Total, 5  
 Undistorted Output (A. C.) ..... 1.5 Watts  
 Undistorted Output (D. C.) ..... 0.5 Watts  
 Frequency Range ..... 540-1710 K. C. and 2400-2500 K. C.

This receiver is a five tube Super-Heterodyne designed to operate on A. C. or D. C. over a wide voltage and frequency range. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-2525 which is used in a voltage doubling circuit. This results in considerable more output when the receiver is used on A. C. than that obtained from D. C. operation.

#### LINE-UP CAPACITOR ADJUSTMENTS

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175

K. C., 1400 K. C., 1710 K. C. and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C. coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1710 K. C. This is done with the Range Switch at the broadcast position (counter-clockwise). A similar manner is used as that of the I. F. except that the oscillator is set at 1710 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 8 (minimum dial position). The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) After making the 1710 K. C. adjustment, set the dial at 18 and the oscillator at 1400. Then adjust the first detector and R. F. line-up capacitors only. This adjustment is made so that the R. F. and 1st detector will be aligned over the broadcast band but the receiver will still tune to 1710 K. C. due to the oscillator line-up capacitor not being readjusted.

(e) Then set the Range Switch at its clockwise position. The oscillator should now be set at 2440 K. C. and the signal tuned in. Two points on the dial will be noted where the signal is heard, one of which may be louder than the other. Set the dial at either point. Note—the 2440 K. C. signal will still be heard at two points since these R. F. stages act as fixed tuned circuits. Adjust the two high frequency trimmers, located on the lower side of the gang capacitor until maximum output is obtained.

#### RADIOTRON SOCKET VOLTAGES

115 Volts D. C. or 60 Cycle A. C.

Divide all A. C. Values (Except Heater) by 1.3 for 25 Cycles

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78 R. F.	2.6	1.5	90	50	157	88.5	5.5	3.0	6.0
HCA-6A7 Oscillator 1st Detector	2.6	1.5	90	50	157	88.5	1.7	1.0	6.0
RCA-77 2nd Detector	Plate and Bias Supply 160 Volts						—	—	6.0
RCA-43 Power	21.0	12.0	135	80	125	72.0	35.0	20.0	25.0
RCA-2525 Rectifier	115 R. M. S.						89.0	35.0	25.0

Voltage Across Loudspeaker Field (115 Volts, 60 Cycles—185  
 115 Volts, 25 Cycles—140  
 115 Volts, D. C.—105)

### REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
<b>RECEIVER ASSEMBLIES</b>					
2747	Contact cap—Package of 5	\$0.50	3712	Capacitor—400 mmfd.	\$0.40
2963	Resistor—8,000 ohms—Carbon type—1 watt—Package of 5	1.10	3713	Capacitor—0.05 mfd.	.32
3033	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00	3725	Capacitor—130 mmfd.	.50
3555	Capacitor—1 mfd.—or oscillator coil shield—Package of 5	.36	6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
3569	Knob—Station selector and volume control knob—Package of 5	.65	6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
5572	Socket—7 contact Radiotron socket	.40	6250	Resistor—4,000 ohms—Carbon type—½ watt—Package of 5	1.00
3584	Ring—Antenna coil shield retaining ring—Package of 5	1.00	6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00	6464	Transformer—Intermediate frequency transformer	1.88
3602	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00	6506	Reactor—Filter reactor	1.06
3623	Shield—Antenna, R. F. or oscillator coil shield	.30	6507	Condenser—Three gang variable condenser assembly	3.24
3632	Resistor—500 ohms—Carbon type—1 watt—Package of 5	.25	6511	Resistor—180 ohms—Permalloy type	.60
3640	Capacitor—0.05 mfd.	.35	6510	Volume control—Complete with mounting nut	1.56
3641	Capacitor—0.1 mfd.	.22	6519	Capacitor—3.0 mfd.	1.00
3683	Shield—Radiotron shield body	.20	6520	Capacitor—Comprising one 8.0 mfd. one 10 mfd. and 4.0 mfd.	1.58
3684	Shield—Radiotron shield cap	.94	6521	Coil—Antenna coil	.88
3686	Switch—Toggle type—A-C-D-C operation	.54	7485	Coil—R. F. coil assembly	.94
3685	Coil—Choke coil—Second detector plate	.28		Coil—Oscillator coil assembly	.60
3697	Scotchcon—Station selector Scotchcon—Package of 2	.28		Socket—6 contact Radiotron socket	.40
3698	Scotchcon—Volume control Scotchcon—Package of 2	.28			
3700	Resistor—450,000 ohms—Carbon type—½ watt—Package of 5	1.00	<b>REPRODUCER ASSEMBLIES</b>		
3701	Capacitor—0.01 mfd.	.30	6509	Transformer—Output transformer	1.34
3702	Capacitor—0.25 mfd.	.42	7606	Coil assembly—Comprising field coil, magnet and cone	2.06
3710	Capacitor—60 mmfd.	.36	8927	Cone—Reproducer cone complete with voice coil—Package of 5	5.00
3711	Capacitor—80 mmfd.	.40			

Readers who file Service Data in separate binders remove page carefully; trim on dotted line for same size as Data published heretofore.

# General Electric Models L-50 and L-51 RCA Victor R-22

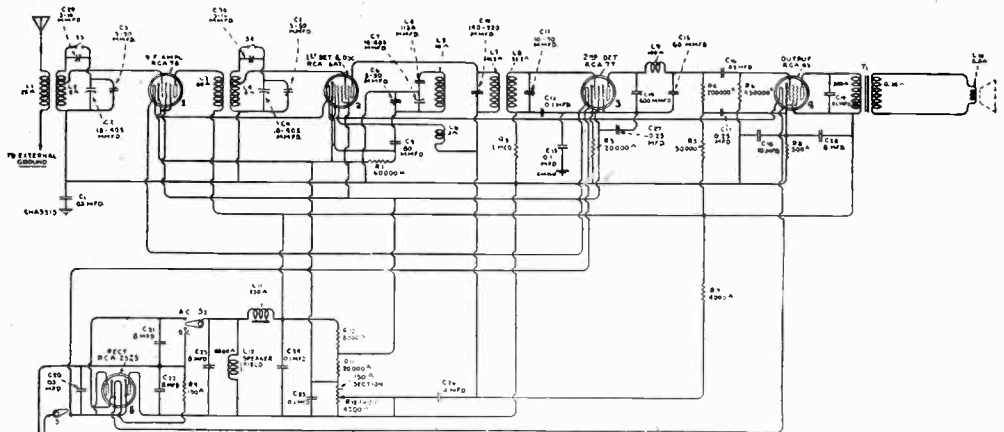


Figure A—Schematic Circuit

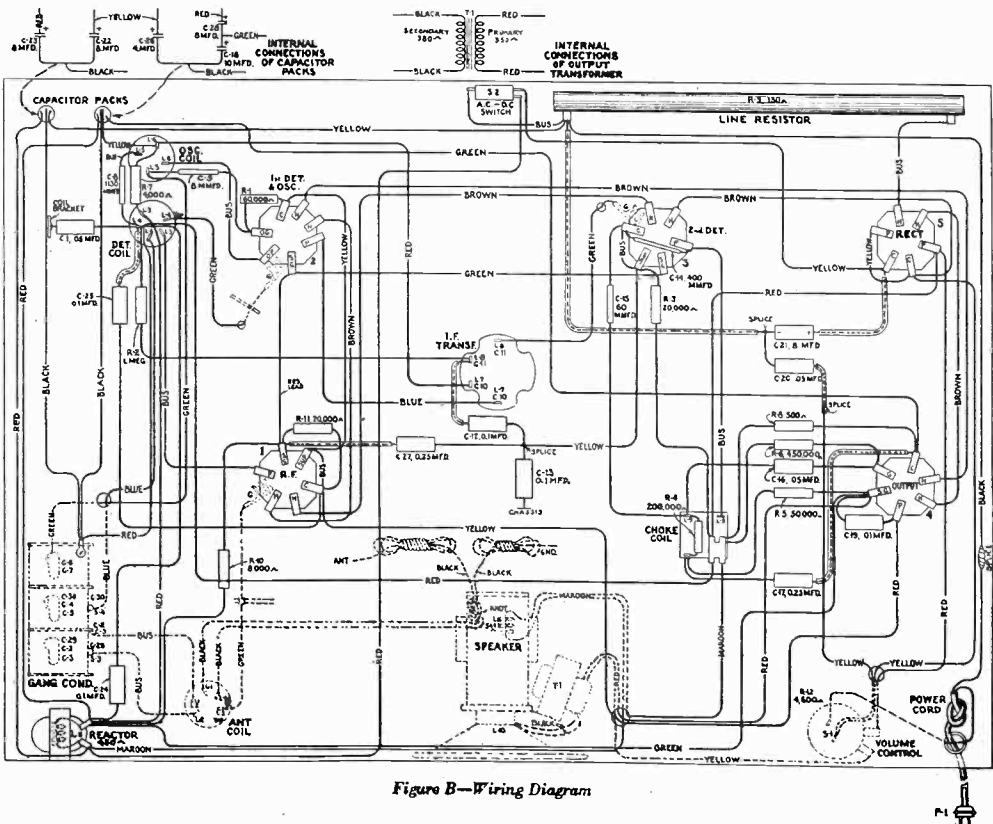
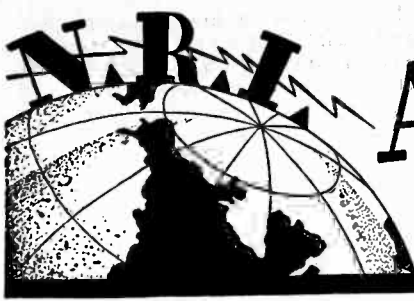


Figure B—Wiring Diagram



# N. R. I. ALUMNI *News*



T. J. Telaak

## Telaak Elected

### Buffalo Local Chairman Bests Osgood In Close Race

The 1934 officers are elected. The new President of the Alumni Association is Ted Telaak, the popular and hardworking Chairman of the Buffalo,

N. Y., Local Chapter. He beat out V. L. Osgood, a mighty fine fellow from West Orange, N. J., in the tightest race we've ever seen in the Association's history.

Telaak deserves a lot of credit for the fine work he has done for the Association in building the Buffalo Chapter to its present strength and we know he will be equally successful in the office of President of the Association.

In addition to his duties as President of the National Association, Telaak will still retain the helm at the Buffalo Local, having been selected to act as Chairman of that Chapter for the year 1934.

The Association is lucky indeed to have a President of Mr. Telaak's ability. Not only has he demonstrated it in the building of the Buffalo Local Chapter—he has shown it in his own personal business.

Mr. Telaak operates a fine Radio Service Business in Buffalo—has been a Radio manufacturer's representative at large—has traveled extensively in the interests of Radio and therefore understands Radio conditions in the United States, Mexico and Canada. He has also served as Radio Editor on a large Buffalo daily newspaper.

Your editor has known Telaak, personally, for a number of years and in addition to his all-around Radio, business and organization ability, we will say that "Ted" is an all-around good fellow.

## DeSchantz and Vanek New Vice- Presidents . . . Nichols and Parkins Reelected

Two new faces appear in vice-presidency offices of the Alumni Association as the result of the elections. The Pittsburgh Local Chapter has the honor of having their Chairman as one of the Vice-Presidents of the National Association. The man is T. A. DeSchantz.



T. A. DeSchantz

When the Pittsburgh Chapter was formed in January, 1933, Mr. DeSchantz was elected Chairman by his fellow members and he has fought to put that Chapter on the map. We say fought, because business and financial conditions in that city were in terrible shape.

But DeSchantz jumped in and began building. His Local members were with him 100 per cent. and they have weathered the depression and now have a fine, growing organization.

In this election DeSchantz defeated Hoyt Moore, of Indianapolis. Moore has served the Association as Vice-President since it was organized in 1929. He has done a good job and on his retirement from his office he will carry a vote of thanks from every loyal Alumni member. At the N. R. I. Fifteenth Anniversary Convention in Washington, when the silver loving cup was presented to President J. E. Smith by the Alumni, Moore had the distinct

L. J. Vanek



(Page 20, please)

## Nichols-Parkins Reelected

(Continued from page 19)

honor of making the speech of presentation. L. J. Vanek, of Cincinnati, Ohio, won out for a vice-presidency over our old friend Harry Barschdorf, Adams, Mass. Barschdorf is another old timer who has served his Association well, having served as Vice-President since the Alumni Association was formed in 1929.

Vanek graduated from N. R. I. in 1921. He is widely experienced in the Radio service field—in service departments of dealers, distributors and manufacturers. He is widely known in his part of the country and can do much to assist the Alumni Association and its members.

Fred Nichols and Frank Parkins were reelected to serve as Vice-Presidents for another year. Both men became Vice-Presidents at the beginning of 1933.

Nichols hails from Denver, Colo., and has long been associated with Radio work. He has built up a mighty fine Public Address business and some of his ideas have appeared from time to time in National Radio News.

Parkins is a Broadcasting man. He is connected with Radio Station WJTL, which is operated by Oglethorpe University, Oglethorpe, Ga. In addition to his duties as Chief Engineer of the station, Mr. Parkins is also a member of the faculty of Oglethorpe University.

## Murray-Merryman Retain Office

P. J. Murray, Executive Secretary, and Earl Merryman, Secretary, both were reelected for another year, defeating Rex B. Smith and John F. Gantt, respectively. Both Merryman and Murray have held office since 1929.

Mr. Murray was formerly Employment and Graduate Service Manager for the National Radio Institute, having been connected with N. R. I. since 1927. The majority of his time is now devoted to Alumni Association activities.

Mr. Merryman, who was formerly with WRC, the NBC outlet in Washington, is now connected with Station WJSV, Alexandria, Va., which is one of the CBS stations serving the Washington area.

## The Serviceman and Collections

(Continued from page 3)

When you investigate your debtor, and find that he has a job, and that no one in his family is seriously ill, then start tightening up on your collection efforts.

Page Twenty

Phone him—either at his home or where he works—and insist that he definitely promise to pay a certain amount on some day that he sets, within the next two weeks. (If he won't promise to pay, tell him in writing that you will place his account with an attorney within ten days, and *do it.*) Always keep exact copies of correspondence in case it is necessary to turn it over to an attorney.

If he promises to pay and fails to make his word good on the very day, phone him the next day and ask him why he failed to pay. (This can all be done by letter, in case it is not possible to phone—but the phone is usually more effective.)

If he again promises to pay, insist that the payment be made in not more than five days. (If he won't promise, inform him—in writing—that your attorney will handle the matter within ten days.)

Then—if he fails to pay after promising twice to do so, notify him in writing that your attorney will handle the matter within ten days.

Establish connections with a good reputable attorney, and when it is necessary to turn an account over to him, show him exactly what has taken place in the past, and tell him to go ahead and collect. Tell him you want to settle your accounts as reasonably, as quietly, and with as little trouble as possible—but that you are a responsible business man, entitled to your money, and want to take every legal step necessary to protect your interests.

Naturally, you should avoid giving an account to your attorney simply to save yourself work or disagreeable experiences. Give him an account *only* when you are convinced that your debtor is trying to beat you out of your money.

You may make enemies, of course, whenever you force people to pay you. But when a man won't pay of his own free will—after you give him every reasonable opportunity to do so—his friendship and good will are certainly worthless to you. The "knocks" of such a man are really better for your business than his praises.

So I repeat—don't be afraid of collecting money that is due you. Go after it *courteously*, persistently, and firmly, and you should collect 90 per cent. of it.

And when you collect in this manner you'll make more friends than you lose—you'll cause folks to place a higher value on the work you do—and you'll establish the reputation of being a responsible business man, instead of an inconsequential amateur who works for whatever he can happen to get.



Hoyt Moore



K. W. Griffith



Harry Barschdorf

## A VOTE OF THANKS

to our retiring Alumni Association Officers. To K. W. Griffith, our President during the year 1933, and to Hoyt Moore and Harry Barschdorf, who have served the Association in the capacity of Vice-Presidents since 1929, the Alumni Association of the National Radio Institute extends its thanks.

You have done your jobs well. You have lived up to the principles upon which our Association was formed—ever anxious to help, you have been fine examples for other men in the conduct of your duties as Alumni Association officers and in your own Radio work.

The Alumni Association is proud of you and upon your retirement from office in this Association let this be a vote of thanks for services rendered.

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*Due to the increased amount of Alumni Association news in this issue there is more news of Alumni Association activities on pages 11 and 15.*

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### ALUMNI ASSOCIATION NEWS—Continued from page 15

ul if any member of the organization who heard this lecture did not derive a great deal of benefit from it. The idea went across so well that a second lecture was given by one of the members—Mr. Weisenburger. Mr. Weisenburger's topic was "Tubes" and it went across in a big way.

The following new members have been admitted since our last report: Mario Lozano, Wilfred Theil, J. Kachnowski, P. Balsamello and E. D. Pullings.

The Chicago Local has started, among its members, a Radio parts exchange service, through which members will be able to get Radio parts they need in exchange for parts they can spare. It is working out fine. Much credit is due Mr. Cordero, the Librarian of the Chicago Local, for the method in which he is handling the Library of the Chapter. He keeps us well supplied with Radio reading matter.

Mr. Juricek, one of the Financial Committeemen of the Local, was successful in ob-

taining a meeting place which can be used free of charge by the Local. It is in the club-room of the Chase Park Field-House.

It has been definitely decided at National Headquarters of the N. R. I. Alumni Association that the program of opening Local Chapters at various points throughout the country which was started in 1933 will be continued during the year 1934.

The success of the Locals so far has indicated that this is a good work for the Association to carry out and we hope by the time the next issue of National Radio News reaches you we will be able to give some definite information on the cities which will be organized.

We wish to compliment Mr. Heinz A. Muel-ler, Chairman of the Chicago Local, on the fine article on the subject of "How to Make a Modern Small Radio Set," which appears in the December, 1933 and January, 1934 issues of Radio-Craft.

# Graphite Anode Tubes

(Continued from page 14)

tirely new standard of performance for transmitting and power tubes. It soon became obvious that commercial carbon would not do. We had to have a pure carbon or graphite anode mounted in our tube, prior to bombardment and exhaust, in order to avoid troublesome deposits.

It remained for our engineers and specialists in tube chemistry to evolve a unique process of purifying carbon and producing a graphite anode. We now begin with a solid block of carbon, which is machined with a precision of one one-thousandth of an inch to final size and shape. The anode is then chemically treated and reduced to graphite. Mounted in the tube, it is bombarded, heating to a cherry red. The graphite acts as a getter during bombardment and in subsequent service.

There are a number of outstanding advantages gained with the graphite anode, as follows:

1. No impurities are introduced in the tube. Bombardment and exhaust operations are facilitated. Graphite acts as a getter during entire life of tube, which therefore remains "hard."

2. Graphite will not warp. Therefore tube characteristics remain uniform even when tube is overloaded for long periods.

3. Because of greater heat dissipation, graphite anode tubes are capable of handling higher outputs at given ratings. If desired, smaller tubes may be provided for given ratings.

4. Cooler operating anode minimizes primary and secondary emission from grid.

5. With harder tubes, positive ion bombardment of filament is reduced to minimum, which means that throrium in thoriated filaments is consumed at far slower rate.

6. More rugged mechanical construction.

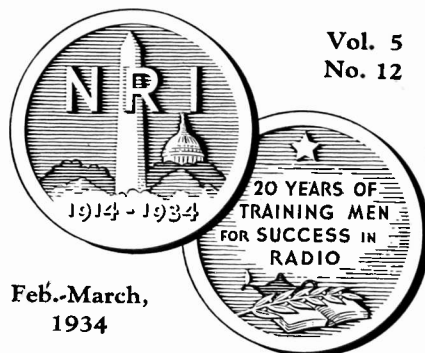
7. Tubes can be processed and aged more critically than is common practice with metallic plate tubes.

Reports from the field confirm our own laboratory findings. So encouraging have been the performances of graphite anodes that our entire line of air-cooled tubes, from small 210 oscillator to large 1 KW. modulators, are now made with graphite anodes. It is even possible that other graphite elements will be introduced in the near future, to gain further advantages.

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# NATIONAL RADIO NEWS

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P. J. Murray, *Managing Editor*

*Associate Editors:*

T. A. DeSchantz, Pittsburgh

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Chas. Jesse, Cleveland

H. A. Mueller, Chicago

F. X. Schachtner, Detroit

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# THE MAILBAG



The following are names and addresses of students and graduates of the National Radio Institute who own and operate amateur Radio stations:

W8JFK—Donald L. Leiphart, Punxsutawney, Pa.

VE3RI—G. E. Holmes, Kirkland Lake, Ont.

VE4ML—Wm. McDonald, Regina, Sask., Canada.

W8KSC—Alvin C. Cappel, Pittsburgh, Pa.

WIUX—Clyde Lee, Medford, Mass.

W8JEC—John Dudiak, Hault, W. Va.

You ham operators—have you told the boys about your call letters? Have they been published in the Mailbag? If not—let's hear from you—especially you Canadians.

I had a call the other night on a Victor RE-45. The owner told me everytime he put a rectifier in the set it burned out. I tested and found a condenser burned out and a defective transformer.

After replacing them the set played well for eleven days—then the rectifier burned out again. I tested the set and found everything O. K., but finally discovered that the trouble was in the filter choke coil, which was shorting intermittently with the chassis.

JOSEPH ROY, Fall River, Mass.

A competitor in my vicinity who is untrained in Radio handles some Radio work, but occasionally a sticker crops up, then my doorbell rings. He was called on a Zenith 52, fading merrily. A new set of tubes was sold the victim, but soon after the serviceman left, so did the music. On a recall the electrolytic condenser was replaced. Still fading. Then the volume control was junked, and the same old story. I was called in on the job and cleaned the rotor contacts and the fading ended. I have found this trouble to be the cause of fading in several sets of this type.

WILMER GIESE, Baltimore, Md.

A Silver-Marshall nine-tube A.C. would cut off and on about every thirty seconds. A serviceman tested it and said everything checked perfect, except the plate voltage when it shut off, but he could not find the trouble. Testing the tubes, I found them O. K.; the set analyzer on each socket showed perfect when running and no plate voltage when it

cut off. It would stay off only ten seconds, then come in again. I placed my finger on the cap of each 24 tube while playing and the volume would cut down about 90 per cent. When the Radio cut out I did the same thing again and received 180 volts from the cap of a 24 tube. I replaced this tube and had no more trouble. An instantaneous short between the plate and control grid cut the plate current from all the tubes. But *use a meter instead of your finger* for testing if you find trouble of this nature.

H. R. CAIN, LaCrosse, Ind.

When adjusting and cleaning a dynamic speaker I use the following method of cleaning the voice coil. I first disconnect the field coil and connect it to an alternating current source. I do this to materialize the permeability of the pole pieces. I then hold a strong permanent magnet in front of the dynamic speaker and blow on the voice coil and pole pieces. Any tiny particles of iron and steel will be attracted to the permanent magnet. They would otherwise have clung to the field magnet due to a certain amount of permeability.

In Radios like Crosley having condensers ganged by metal ribbons and pulleys I often remove the pulley; take off the condenser rotor tension spring; polish it clean and tighten it a bit and wipe the rotor shaft. The result is the customer gets more stations and sharper tuning and clearer reception, when the rotor springs are not clean and the tuning dial is turned, a crackling and squealing is the result.

It is not always necessary to replace volume controls when they are noisy. Take them apart. Clean them. Tighten up the contacts (being careful not to tighten too much, as this causes excessive wear on the elements). However, this procedure only holds good if the elements are not open or burned out.

C. W. TEWS, Milwaukee, Wis.

*Let's have more Mailbag letters. They are a bit slow coming in lately. This is your page—you must supply material to fill it, otherwise we'll have to cut down the space devoted to it. Address letters: The Mailbag Editor, National Radio Institute, Washington, D. C.*

# Build Yourself a Valuable Radio Library with these Helpful FREE MANUFACTURERS' BOOKLETS and CATALOGS

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The cooperation of the manufacturers whose catalogs, literature and booklets are listed on this page, and the courtesy of the Calcatera Catalog Service, has made it possible for the N. E. I. Alumni Association to offer to readers of National Radio News a unique and money-saving service in obtaining Radio manufacturers' literature.

All that is necessary for you to obtain the catalogs or other literature listed on this page is to

write the numbers of the items in which you are interested on the coupon, fill in the information asked for and MAIL IT TO THE CALCATERA CATALOG SERVICE. DO NOT MAIL COUPONS TO THE NATIONAL RADIO INSTITUTE, AS THAT WILL DELAY THE FILLING OF YOUR ORDER.

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8. **ELECTRAD 1934 CATALOG.** 43 pages. Standard and replacement volume controls, Tuning adjustable resistors, voltage dividers, vitreous enamelled fixed resistors, public address systems, etc.

9. **AMPERITE REAL LINE VOLTAGE CONTROL.** Characteristic, uses and chart showing the correct Ampertite recommended by set manufacturers for their sets.

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12. **LYNCH RMA STANDARD RESISTOR COLOR CODE CHART.** Handy postcard size. Simplifies job of identifying resistance values of coded resistors. Gives a list of most commonly used resistor values and colors.

13. **ELECTRAD SERVICEMEN'S REPLACEMENT VOLUME CONTROL GUIDE.** A 64-page van-pocket size booklet containing a revised, complete list, in alphabetical order, of over 3,500 different receiver models with the proper type of Electrad Control to run for replacements.

14. **HOW TO BUILD THE ECONOMY "EUST."** A folder prepared by the Wholesale Radio Service Co. which gives complete data on how to build this efficient eight-tube receiver from a kit costing only \$14.75. These receivers can be built and sold in spare time at a profit.

15. **HOW TO BUILD USEFUL SKIVING AND TESTING INSTRUMENTS WITH SIMPLE STANDARD METERS.** A folder prepared by the Lynch Mfg. Co. giving circuits and explanations showing how to increase the usefulness of simple meters to measure current, voltage or resistance through any desired range.

16. **HOW TO MODERNIZE OLD SET ANALYZER.** A valuable folder prepared by the Supreme Instrument Corp. which describes a new plan for the conversion of obsolete set analyzers and testers into modern instruments.

17. **POTTER CONDENSER BULLETIN FOR 1934.** Complete descriptions, specifications and prices of the Potter line of paper and electrolytic condensers for bypass, filter and replacement use and Potter interference filters and tone controls.

18. **THE I. R. C. SERVICER.** A free monthly house organ published by the International Resistance Co. A sample copy will be sent on request through this service, after which you can subscribe to it, if you like it, by writing direct to the International Resistance Co.

19. **SUPREME SERVICING AND TESTING INSTRUMENTS.** A catalog containing complete descriptions of a new line of Supreme low-price analyzers, set testers, tube testers, ohmmeters, capacity testers, oscillators and universal meters.

20. **HOW TO BUILD A HIGH-QUALITY CONDENSER OR RIBBON MICROPHONE.** This circular describes the Superior Microphone Kit and instruction sheets with which it is possible to build, quickly and easily, a high quality condenser or ribbon microphone. The kit is made by the Bruno Division of the Ampcity Corporation.

21. **THE IBC VOLT-OHM-METER.** A folder describing the characteristics and uses of the International Resistance Company Volt-Ohm-meter, a combination voltmeter and ohmmeter specially designed for the point-to-point method of trouble-shooting. The instrument contains the Automatic Vacuum Relay feature which gives positive protection against burn-outs.

22. **AMERTRAN AUDIO AND POWER TRANSFORMERS AND CHOK COILS FOR USE IN PUBLIC ADDRESS AMPLIFIERS AND RECEIVERS.** A folder containing very complete information on the characteristics of a wide variety of AmerTRAN De Luxe and Silver (popular priced line) audio and power transformers and chokes.

23. **WHOLESALE RADIO SERVICE REPLACEMENT PARTS LIST PRICE CATALOG.** A handy, pocket-size, 22-page book listing replacement units of all kinds, with list prices, which can be used by servicemen to show to customers in quoting prices for parts.

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