

# NATIONAL RADIO NEWS

December, 1933

January, 1934

Vol. 5, No. 11



TWENTIETH ANNI-  
VERSARY YEAR

OF THE NATIONAL  
RADIO INSTITUTE



# A Real Key to Happiness



**I**N a little mountain village, not so many miles from Washington, there is a hospital. The inmates, cut off from the outside world must depend upon Radio for their entertainment. It is one of the few real pleasures they can have. It keeps their minds off of the terrible malady from which they are suffering. It brings music; the news of the outside world. What would their lives be without Radio? This is only one case; there are hundreds of institutions, just like this hospital where Radio affords the only real HAPPINESS.

Then there are aged persons, who cannot leave their rooms; helpless cripples doomed to tedious years in beds or wheel chairs. The gloomy silence of their days is relieved by Radio. Mariners at sea are kept in touch with the happenings of the day and at the same time are protected while on hazardous journeys by Radio.

During the trying years of depressed conditions, when many families could not afford even the little inexpensive pleasures—their Radios filled in the gap. Hundreds of thousands of dollars worth of entertaining programs were placed at their disposal; music, drama, comedy, news of the world; a wealth of HAPPINESS at the flick of a finger.

The Radio-Trician deals in HAPPINESS. To him Radio brings a two-fold HAPPINESS. It brings the joy of knowing that he lends pleasure to the lives of others; and the HAPPINESS OF PERSONAL SUCCESS. As long as there is such a thing as Radio he will continue to lighten the burdens of others who look to their Radios as a means of relaxation. And equally as long will he continue to add to his personal success; gain financially.

The years ahead hold much for the Radio man. With business definitely on the upswing; with increased public confidence and consequently more spending; with more men going back to work daily, Radio business will go forward with leaps and bounds. The Radio man will have the satisfaction of seeing his earnings increase, but in all probability his greatest pleasure will be derived from the knowledge that he has in a great measure added to the HAPPINESS of his fellow men — by being in a position to supply Radio entertainment, the real key to HAPPINESS.

It is never so apparent as during the Christmas and New Year's season, just how much HAPPINESS really counts in this life. To add cheer is to lighten a burden and reflects as much real satisfaction on the donor as upon the recipient.

J. E. SMITH



# Breaking Into The Radio Service Game

By J. B. STRAUGHN, Radio Servicing Consultant



TO some fellows, breaking into the Service game is like jumping into a pool of cold water. They stand around fretting and fuming—just a bit hesitant to experience the quick change in temperature. In service work, a fellow might hesitate before starting—because he doesn't know just what he is up against. It is easy for him to have visions of himself standing in front of a Radio, helpless, while a disgusted customer or two look on. This feeling is quite natural—but the fellow with the proper training—and a certain amount of foresight before starting into the Service game can prevent the necessity of having this experience.

To be sure, the fellow who dives into the Service game head-first—unprepared—without experience, and without a complete knowledge of what he is up against, is going to feel quite a shock.

Going into the Radio Service business is, in certain respects, exactly like going into any other business. The first thing to do is to analyze the entire situation, before any work is attempted.

Now, let us suppose, for illustration, that Jack Walters wants to make his dream of owning his own Radio business a reality. Walters has finished 25 lessons of his Course with the National Radio Institute. He is a level headed sort of a chap and decides to think everything out to his satisfaction before he takes any steps. He realizes that he is going to sell his services to the public and he immediately takes stock of what he has to offer. An analysis of his qualifications reveals to him that first of all he has a good sound fundamental training in Radio theory, but he feels that that is not enough. So he makes the following list of what he thinks is necessary in order to market his services:

1. Practical experience.
2. A place to work.
3. Tools.
4. Equipment.
5. A means of letting people know about him.
6. A stock of parts and tubes.
7. Transportation.
8. A phone.

Running over his list he decides that items 2, 7 and 8 offer no problem. He has a good

basement in which a work bench can be erected, he has an old car and he has a telephone.

Since practical experience is the first item on his list, he sets out to acquire this in the following manner. He goes to a dealer who is doing a fine business in Radio Sales and Service. He puts the matter up to him squarely, stating that he wants to get experience in Radio service work and in exchange he is willing to work out at night around the store. The dealer accepts the proposition and in a short time Jack is delivering and installing Midgets and helping the regular repair men. He listens carefully and watches everything that goes on. He finds that the Radio servicemen like to answer questions and parade their practical knowledge, as long as you don't put a question to them that they can't answer. Jack stays in this place long enough to learn that the average service job is simple—that with his knowledge and the proper testing equipment he could do any of the jobs in his own home—even before he started looking for experience, provided he had time enough. He had learned a good lesson, so he considered the time was well used—particularly because it gave him a certain amount of self-confidence.

He was glad he tried this method, in preference to the one he originally had—that of trying to get a temporary, full-time job with a dealer, as a serviceman. (That idea had been discarded, because he felt that the practical experience he was after was really necessary in order to hold down that job.)

Next on his list is tools. This too was a simple matter. A trip to the local 10c store equipped him with an assortment of screwdrivers, pliers, and socket wrenches. To this he adds a small hammer, an electric soldering iron, a roll of rosin core solder, tape, a jack knife, and a roll of rubber covered wire. Thus the tool problem is solved.

Then comes the item of Equipment. From his friends at the store he has learned that the best equipment is that which is most flexible and uses the highest grade meter. Cheap milliammeters, ohmmeters, and A. C. volt-

(Page 15, please)

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



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

We have watched Radio grow from the crystal receiver through the various stages of the battery operated tube set. We saw many developments in the old tubes, saw the advent and refinements of the A.C. sets.

Cabinet improvements—more new tubes—phonograph combinations—midgets—automobile Radio—remote control—Television. Of course, Television has been slow in the development and the depression retarded its marketing—but there is little doubt that it will be next in line

So far the Radio Industry has always kept something new before the public, and Television will hold the stage for a long time—but what after that?

We know something new will be pushed forward but it is interesting to speculate on what it will be.



To succeed you must be able to do something better than someone else. Whenever a job is being done wrong or not done at all, there is a chance for the man who "knows how" to get a job and as long as there are untrained tinkers there will be jobs improperly done. The fellow who does botch jobs is going to get by once or twice, but he will soon be found out. The man who does this kind of work is an economic drawback. Not only does he charge more than his services are worth—because they are not worth anything—but he has a tendency to sour the minds of his improperly handled customers to the point that the customer doubts the ability even of a good man.

The N. R. I. Alumni Association is fighting tooth and nail against haphazard, hit-or-miss Radio service work—the kind which costs customers confidence. The Local Chapters of the Alumni Association are doing particularly fine work in their efforts to fight down this type of competition.



The revision of working hours in many trades and professions due to the N. R. A. Codes will give hundreds of thousands of men more leisure moments. Some fellows are going

to make good use of that time—others are not going to be any better off than if they were working on the old long hour schedule.

It doesn't make a bit of difference whether you are a student or a graduate—you have something to study. If you are a student, you have your regular lessons, your experimental work—and if you are a graduate, the type of fellow who wants to keep up with times, you'll find plenty of Radio and allied subjects on which you can study up. **WHAT YOU STUDY** is not of such importance—the main point is **THAT YOU STUDY SOMETHING**. Don't waste those N. R. A. hours.



A few days ago, while busy in my office, my secretary entered with six diplomas, for my signature—diplomas for N. R. I. men graduating that day.

As I placed my signature on these diplomas, I could not help feeling the importance of the occasion. Here were six men, who had seen the advisability of getting into Radio, the fastest moving industry of the age. They had studied hard and now they were qualified—full-fledged graduates of N. R. I.

Six men—two auto mechanics, a boy just out of high school, an electrician, a bookkeeper and a Radio man who needed more training. They were stepping out on their own now—ready to hit the line—to go on to their successes.

How much better off are these six men than they were a scant twelve months ago; how much brighter for them is 1934 than last year? How many young men are there who could have done the same—could now be ready to step out into a well-paying profession but because they failed to act must start 1934 handicapped with a lack of training?

A worthwhile New Year's resolution for you is, "I'll never stop studying until I achieve success."

# RADIO-TRICIAN

REQ. U. S. PAT. OFF.

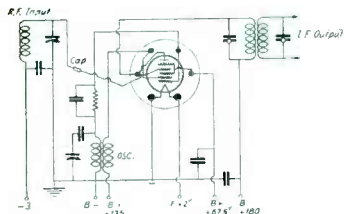
## TUBE DATA

COMPILED SOLELY FOR STUDENTS & GRADUATES



### 19— D.C. PENTAGRID CONVERTER

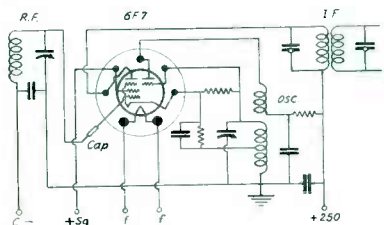
The 1A6 is the counterpart of the 2A7 and 6A7 tubes for battery operation. It functions just as the latter two mentioned. Its circuit and characteristics follow:



	<b>1A6</b>
$E_f$ .....	2v
$I_f$ .....	.06a
$E_p$ .....	180v
$I_p$ .....	1.3 ma.
$E_{sg}$ .....	.3v min.
$E_{sg}$ .....	.67.5v
$I_{sg}$ .....	2.4 ma.
$R_p$ .....	500,000 ohms

### 20— TRIODE-PENTODE

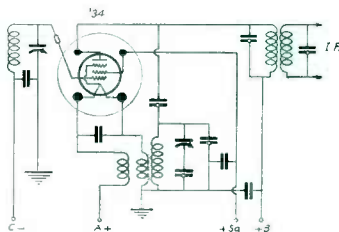
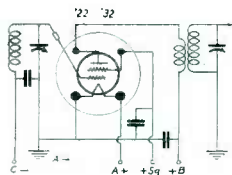
This tube was originally designed to be used as a 1st det-osc. in superheterodyne receivers. It consists of two separate units linked only by a common cathode. The circuit shows it used as a 1st det-osc. It has a 6.3v, 0.3 amp. heater.



	<b>6F7</b>	
	<b>Triode Unit</b>	<b>Pentode Unit</b>
$E_p$ .....	100v	250v
$E_{sg}$ .....	100v	100v
$E_{sg}$ .....		-10v
$I_p$ .....	2.4 ma.	2.8 ma.
$I_{sg}$ .....		0.6 ma.

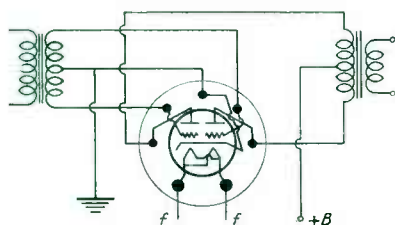
### 21— D.C. R.F. TETRODES AND PENTODE

A circuit is shown using the 22 and 32 tubes as R.F. amplifiers and another shows use of the 34 R.F. pentode as a composite oscillator detector for use in superheterodynes. This is only one of the many applications for this very useful tube.



	<b>22</b>	<b>32</b>	<b>34</b>
$E_f$ .....	.3.3v	2v	2v
$I_f$ .....	.0.132a	.06a	.06a
$E_p$ .....	.135v	180v	180v
$E_{sg}$ .....	.67.5v	67.5v	67.5v
$I_p$ .....	.3.7 ma.	1.7 ma.	2.8 ma.
$I_{sg}$ .....	.1.3 ma.	0.4 ma.	1. ma.
$E_g$ .....	-.1.5v	-3.v	-3.v
$R_p$ .....	325,000 ohms.	1.2 meg.	1 meg.
$G_m$ .....	.500 m-mhos	650 m-mhos	620 m-mhos
$\mu$ .....	160	780	620

The 53 tube contains two grids and two plates in addition to a heater and cathode. It draws practically no plate current in either section at zero bias which is the usual Class B design. It furnishes both of the necessary halves of the balanced circuit.

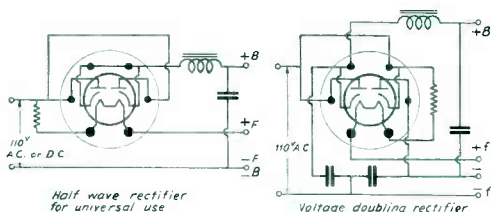


	<b>53</b>
$E_f$ .....	2.5v
$I_f$ .....	2a
$E_p$ .....	300v
$E_g$ .....	0v
$R_L$ .....	10,000 plate-to-plate ohms.
UPO*	10 watts

\*Undistorted power output.

## DOUBLE PURPOSE RECTIFIER

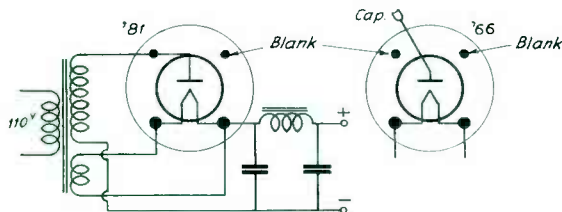
The 25Z5 tube may be used as a half-wave rectifier tube or as a full-wave voltage doubling rectifier. Circuits are given showing both uses. Note that in the latter use the condensers are charged in parallel with alternate half cycles of the input current and are discharged in series hence the voltage doubling effect.



	<b>25Z5</b>
$E_f$ .....	25v
$I_f$ .....	0.3a
$E_p$ .....	125v (r.m.s.)
$I_p$ .....	100 ma.

## HALF WAVE RECTIFIER

Although the 81 tube is usually used in a half of a full wave circuit, the entire system requiring 2 tubes, its use as a half-wave rectifier is shown. The 66 tube has exactly the same use for much higher voltages and currents.



	<b>'81</b>	<b>'66</b>
$E_f$ .....	7.5v	2.5v
$I_f$ .....	1.25a	5a
$E_p$ .....	700v (r.m.s.)	3,500v (r.m.s.)
$I_p$ .....	85 ma.	600 ma.

# RADIO-TRICIAN SERVICE SHEET

REG. U. S. PAT. OFF.

COMPILED SOLELY FOR STUDENTS & GRADUATES



## Intermediate Frequencies Used In Commercial Receivers

**ALL-AMERICAN MOHAWK**—175 Kc.—Models S7—S8—S10—S50—S63—SA65—DC65—B80—S80—SA90—SA91—SA110—SA130. 485 Kc.—Models SW8—SW80—U55.

**ALLIED RADIO**—175 Kc.—Models Knight 118 AVC Super 1930, Knight 6 tube, Knight 7 tube. 177.5 Kc.—Models Knight E9830, Knight E9831, Knight 12 tube Class B.

**ATWATER KENT**—130 Kc.—Models 72 Chassis H1—H2—80—80F—83—83F—82D—82—82F—82Q—84D—84—84F—84Q—85—85F—85Q—86—86F—87—87D—89—89F—89P—90—90F—92—92F—94—94F—96—96F—99—99F—99P—188—188F—228—228F—228D—228Q—260—260F—469—469F—469D—558D—469Q—558Q—567—567F—558—612—627—812. 262.5 Kc.—Models 216—155—636—756—75613. 472.5 Kc.—Model 480. 1000 Kc.—Model 93.

**AUDIOLA RADIO**—175 Kc.—Model 1931 Super. 177.5 Kc.—Models 7 Tube Super Pent, 8 Tube Super Pent, 9 Tube Super Pent, 9T45, 10 Tube Super, 23S12.

**BALKEIT RADIO COMPANY**—175 Kc.—Models L7—55—85.

**BELMONT RADIO**—175 Kc.—Models—All others. 456 Kc.—Model 525.

**BROWNING DRAKE**—175 Kc.—Models 40—80.

**BRUNSWICK RADIO**—175 Kc.—Models 11—12—16—33AC—17—24—25. 180 Kc.—Models 3NC8—5NC8—3NW8.

**BULOVA WATCH**—175 Kc.—Models M701—G781—C751.

**CANADIAN WESTINGHOUSE**—171 Kc.—Models 89—90—99—99A—110—120. 178 Kc.—Models Columnaires 8 and 10—101—801—802.

**COLONIAL RADIO**—175 Kc.—Models 44—47—48—50—51—52—56—62—69—71—73—76—T345—C399—T397—C495—C595—C695—C995. 1000 Kc.—Model 55.

**COLUMBIA PHONOGRAPH**—175 Kc.—Models 32—34—C80A—C80B—C800—C90—12013.

**CROSLEY RADIO**—175 Kc.—Models 120—122—123—124—124-1—125—126—126-1—127—127-1—128—131. 181.5 Kc.—Models 96—129—129-1—132-1—133—134—134-1—135—137—141—146—146-1—150—157—158—160. 456 Kc.—Models 136-1—148—155—156—163—154.

**DELCO APPLIANCE**—175 Kc.—Models RB1—RC1.

**DEWALD RADIO**—175 Kc.—Models AC746-7M—BAH.

**ECHOPHONE RADIO**—115 Kc.—Models 62—72—92. 175 Kc.—Models S5—5—11—10—15—20—16—17—18—12—38—35—36—50—55—60—65—70—75—80—90—S5 Special.

**EMERSON RADIO**—175 Kc.—Models JS—KS—CS—MAC—7—BAC—10. 172.5 Kc.—Model H5. 445 Kc.—Model AW55.

**FRLA**—175 Kc.—Models 81—82(245)—81P—82P—30—61—62—63.

**FADA**—175 Kc.—Models 45—45Z(KU)—48—49 (KW)—51(KO)—53—57(KOC)—55(RG)—66(KY)—73—85(RE)—74—76—83—88—89(RA)—78—79 (RC)—101(RK). 470 Kc.—Model RN.

**FEDERATED PURCHASER**—175 Kc.—Models 31—40.

**FREED RADIO & TELEVISION**—175 Kc.—Models 51DC—58AC—72—74—MB-7.

**JESSE FRENCH & SONS**—175 Kc.—Model U-1.

**GENERAL MOTORS**—175 Kc.—Models 216—217—219—250 (S-1A, S-1B)—251 (S-2A, S-2B)—252 to 258 inclusive—211—220. 535 Kc.—Model 281.

**A. H. GREBE**—175 Kc.—Models HS3—HS4—HS5—HS6—HS7—HS8—HS12.

**GRIGSBY GRUNOW**—175 Kc.—Models 20—21—22—23—50—52—60—61—62—160—163—15—15B—25—25B—35—35-1—353—55—120—150—200—210—220—290—300—310A—310B—320—330—340—360—390. 456 Kc.—Models 370—400. 1000 Kc.—Model 10.

**GULBRANSEN**—175 Kc.—Models 13—23—20—10—92—93—53—322. 262 Kc.—Models 352—362.

**HAMMARLUND**—465 Kc.—Models Comet Dec. '31, Comet July '32, Comet Pro, Comet All-Wave.

**CHARLES HOODWIN CO.**—175 Kc.—Models 6 tube Midget, 6 tube Auto Set. 456 Kc.—Model All-Wave Chassis.

**H. H. HORN**—175 Kc.—Models 59—69—90—70—71—101B—102—101—110.

**HOWARD RADIO**—140 Kc.—Model EX. 175 Kc.—Models 35—40(H)—45—60(AVH)—20—25—30—22(O)—420—M—400—Chassis K—35A. 456 Kc.—Model 5-3. 680 Kc.—Model A (SW Converter).

**INTERNATIONAL RADIO**—175 Kc.—Models JS—KS—CS. 445 Kc.—Model AW-55.

**JACKSON BELL**—175 Kc.—Models 25—27—28—29. 465 Kc.—Model 205. 840 Kc.—Model 33.

**KELLER-FULLER MFG. CO.**—175 Kc.—Models Radiette 70—80—90—120—50S.

**COLIN B. KENNEDY**—110 Kc.—Model 67 (Export). 135 Kc.—Model 52 (Export). 175

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

Kc.—Models 52—56—62—62A—62B—882-62D—563A—63—64—164B—882-64C—66—66A—266B—366B—72. 1000 Kc.—Models 53SW—54SW. 1525 Kc.—Model 54.

**KOLSTER RADIO**—175 Kc.—Models K-55—60—62—63—65—66—70—72—73—75—76—80—82—83—85—86—90—92—93—95—96—100—102—103—105—106—110—112—113—114—115—120—122—123—125—130—132—133—135—140—142—143.

**LANG RADIO**—175 Kc.—Models SA7—SD7—SA8—SD8—MA8—MD8—MA7—MD7—SA9.

**C. R. LEUTZ**—47 Kc.—Model C-10, Special Short Wave Receiver, 450 Kc.

**LINCOLN RADIO CORP.**—480 Kc.—Models Deluxe SW-33—DC-SW10.

**MID-WEST RADIO**—175 Kc.—Model Miraco Pentode 11-Tube Super.

**MONTGOMERY WARD**—175 Kc.—Models 62-11—62-12—62-14—62-27—62-19—62-20—62-20X (62-25)—1111 (62-1611)—811 (62-1711)—62-29 (11-12)—17—62-1—62-2—62-7—62-8—62-9. 262 Kc.—Models 62-22—62-30 (62-21)—13—15—16X—16—17—18—18X—1238 (62-1838)—1355 (62-1955)—62-38—62-40—62-50—Auto Radio.

**NATIONAL COMPANY**—500 Kc.—Model AGS.

**NORCO MANUFACTURING CO.**—250 Kc.—Model 4 Super.

**OZARKA**—175 Kc.—Models 93—93A—93B—94-AV.C.

**PACKARD**—465 Kc.—Models 4 Tube Super 5.

**PATTERSON RADIO**—262 Kc.—Models 70AW—107AW—207AW—210—AW.

**PHILCO**—175 Kc.—Models 7—8—12—15—51—51A—37—48—90—90A—111—111A—211—211A—112—112A—212—212A (Broadcast IF)—116—116A. 260 Kc.—Models 35—71—14—91—70—70A—270—270A—89—19—90—90A (with 2 47's)—91 (121-221)—22-L—23X—47DC (121-221) (Broadcast IF). 450 Kc.—Models 43—53—80. 460 Kc.—Models 5—81. 1000 Kc.—Models 4—470—470A (SW-IF)—490 (SW-IF).

**PILOT RADIO**—115 Kc.—Models 39—41—10—11. 175 Kc.—Models S148—149—S164—C162—C165—C163—C154. 456 Kc.—Models B2—D3. 482 Kc.—Model 81. 550 Kc.—Model SW Converter.

**PLAZA MUSIC**—175 Kc.—Models 711 Super, 6 Tube Long Wave, 7 Tube Super. 456 Kc.—Model 456.

**RADIO CHASSIS**—175 Kc.—Models LSA37—AC36—QAC36—LSA36.

**RCA VICTOR**—175 Kc.—Models R4—R6—R7—R9—R7A—R8—R12—R10—R11—RE18—RE19—RE20—R21 (Broadcast IF)—RAE26—R28—M30—P31—M34—R37—R38—RE40—R43—R50—R55—RAE59—R71—R72—R71B—R73—R74—R75—R76—R77—R78—RAE79—80—RE81—82—RAE84—R90. 180 Kc.—Models R51—60—62—64—66—67. 1000 Kc.—Model SW Adaptor. 1075 Kc.—Models R023 (SW-IF)—SWA-2

**REMLER CO., LTD.**—115 Kc.—Model Best "115KC". 180 Kc.—Models 10—19—15—21—15-3—17. 250 Kc.—Models 10-3—21-3. 450 Kc.—Model 26.

**RADIOTROPE**—262 Kc.—Models 70R—71R—72R—73R.

**SCOTT LABS**—470 Kc.—Model All-Wave Super.

**SEARS-ROEBUCK**—175 Kc.—Models 1320—1322—1324—1430—1462—1480—1482—1484—1580—1582—1584—1570—1572—1754—1590—1592—1630—1640—1390—1400—1402—1404—1406. 1000 Kc.—Model 1600.

**SENTINEL RADIO**—175 Kc.—Models 108—109—108A—110—114—261—513—550—614—106B. 265 Kc.—Models 560—561.

**SILVER MARSHALL**—175 Kc.—Models 36A—41—Bearcat Midget—683—714—716—724—724B—726—728—773—A—B—C—D—E—F—G—J—R—V. 465 Kc.—Model 727. 650 Kc.—Model 739. 1000 Kc.—Model 738.

**SIMPLEX RADIO**—175 Kc.—Models K—J—L—N—P—Q—T—Automobile.

**SONORA**—262 Kc.—Models 70—71—72—73—84—85—86—87.

**SPARKS-WITHINGTON**—172.5 Kc.—Models 10—12—14—15—16—16-AW—18—25—26—26-AW—27—27-A—28—30—30-A—34—35—45—56.

**STEINITE RADIO**—175 Kc.—Models 203—600—605—630—635—642—643—700—705—706—725—642-B.

**STEWART WARNER**—177.5 Kc.—Models 102A-B & E—R102A-B & E—R104A-B & E (Broadcast IF)—1090 to 1099. 1525 Kc.—Model 105 (SW-IF).

**STROMBERG-CARLSON**—175 Kc.—Models 19—20—22—22A—24—25—26—27—29—37—38—39—40—41—48—49—50—51.

**TRANSFORMER CORP. OF AMERICA**—100 Kc.—Model 125. 175 Kc.—Models AC80—81—83—84—85—86—90—90A—91—94—95—96—100—101—110—111—120—130—131—160—170—220—230—260—270—280—290—300—320—340—420. 490 Kc.—Model 240. 600 Kc.—Model 200. 1000 Kc.—Model 200. 1500 Kc.—Model 200.

**TRAVLER RADIO**—175 Kc.—Models S8—S9—S10.

**UNITED AMERICAN BOSCH**—175 Kc.—Models 10—20J—20K—20L—31—32—36—37—40—41—91—92—100 Auto—108—236—237—242—243—250—251—312—313. 456 Kc.—Model 305A. 517.5 Kc.—Models 260—261.

**UNITED MOTORS SERVICE**—262 Kc.—Model 2035.

**U. S. RADIO & TELEVISION**—262 Kc.—Models 7—8—10—10C—9—19—12—120—69—99—1006—1007. 455 Kc.—Models 5A—7D—21—25—3040—3056. 1000 Kc.—Model 112A.

**WARE**—175 Kc.—Models SB-45—SBA—SBB—S1—SBF.

**WELLS-GARDNER**—175 Kc.—Models 50—022—092—92—93—502—572. 262 Kc.—Models 052—062—072.

**WHOLESALE RADIO SERVICE**—170 Kc.—Models 10—20—L-1—80M—80MA. 262 Kc.—Models L20—Auto Radio.

**WILCOX-GAY**—175 Kc.—Models 2S5—2T5—2VA7—3D5.

**ZENITH RADIO**—125 Kc.—Models 210-5—211-5—270-5. 175 Kc.—Models 91—92—AH—CH—RH—BH—LH—WH—MH—090—90—91—92—103—210—220—230—240—245 (Broadcast IF)—410—411—420—430—440—500—501—503—514—515—600—604—606—610—616—618. 456 Kc.—Model 701. 1000 Kc.—Models 250—260—272 (SW-IF).



# QUERIES AND ANSWERS

.....

???



*Question: What causes amplitude distortion on a grid leak detector when receiving signals from a broadcasting transmitter that is 100% modulated? Please explain in detail.*

**Answer:** The grid leak condenser type of detector is essentially a small signal type of detector and operates on what we call a square law characteristic. The operation of this type of detector depends on rectified grid current and this current contains a direct current component, a modulation frequency component, which is the desired output and an additional component having twice the modulation frequency representing a distortion frequency introduced by the square law action of the detector. The percentage of this distortion component is equal to one-fourth of the modulation percentage. At 100% modulation this distortion reaches a maximum of 25%.

Since the distortion is proportional to the modulation percentage or the modulation factor, it is reduced by reducing the percentage of modulation.

For the reasons give above, grid leak condenser type detectors are not highly suitable for the reception of completely modulated waves.



*Question: I have an 0-10 milliammeter and wish to decrease its range to 0-500 microamperes, please tell me just how to do it.*

**Answer:** I doubt very much if your wishes can be accomplished. If there is a shunt across the meter it may be removed. This will reduce the meter to its fundamental range, which may be determined by placing the meter in series with another calibrated milliammeter and passing sufficient current through the circuit to give full scale deflection on the meter you are changing.

If there is no meter shunt or removal of the shunt does not reduce the range sufficiently, there is nothing you can do to further decrease it.

Never attempt to make any changes in the meter coils or you will ruin your instrument.



*Question: In my set tester I have a grid test button that changes the plate current of the tube when pressed. As most sets use different operating voltages I generally put a new tube in the tester and make a comparative test. How can I get an accurate test without trying a new tube?*

**Answer:** You can get an accurate measurement of the Gm (mutual conductance) of the tube under test by dividing the change in plate current by the change in grid voltage. The result being the Gm in mhos. As tube charts give the Gm in micromhos it will be necessary to multiply the answer by 1,000 to get the answer into micromhos. This is easily done by moving the decimal point three places to the right.

For example suppose your C battery in your tester has a potential of 3 volts and that you are checking a '24 type tube. The plate current is normally 4ma. on changing the grid voltage the plate current rises to 7ma.—the change being 3ma.  $3\text{ma.} \div 3\text{ volts} = 1\text{ mho}$  or 1,000 micromhos. A tube chart shows that the mutual conductance at the voltages used in the set should be 1,050 micromhos and we know our tube is almost perfect.



*Question: In a recent article on superheterodyne receivers, I have noted the term "conversion transconductance" and "conversion gain" and I would like to have an explanation of just what they mean.*

**Answer:** In a superheterodyne, mixing of the signal and oscillator frequencies forming a beat frequency is accomplished by the first detector and local oscillator. This first detector may combine R.F. amplification and the oscillator within one tube, it may combine the oscillator within this tube, or it may be independent of both. When all three functions are accomplished by one tube, this tube is called a penti-grid converter. Regardless of the system used, under definite

(Page 11, please)

# The Automobile Radio

## Installation and Elimination of Noise

By BERNARD GOTTLIEB\*

**T**HE installation of the Auto Radio is indeed a simple problem if done systematically.

The first step should be the selection of a satisfactory position for the mounting of the set and speaker. Precaution must be taken to keep the set as far from the spark coil as possible as that is the greatest source of interference.

Next, the suppressors must be mounted on the spark plugs, and the condenser on the generator. It is sometimes necessary to bypass the dome light and tail light with a condenser of from one-half to one micro farad to reduce the noise picked up by the storage battery cables.

The antenna should be one that can easily be installed and give maximum pick-up with a minimum amount of interference. The underslung type antenna will be found to be the most satisfactory being simple to install and very sensitive to the broadcast signal. Due to the fact that this type antenna is so close to the ground, the electrical energy is secured from the ground waves, thus insuring a low motor noise level.

The proper method for mounting this type antenna is on the underside of the car opposite the exhaust pipe. Mount one end on the rear axle between the differential housing and wheel, extend forward along the drive shaft and mount the front end on the cross member supporting the running boards. The center should be attached to a body bolt or cleat to prevent sagging and flapping. The wire lead connecting the set to the antenna must be shielded and grounded in as many places as possible.

In cases where a roof antenna is installed, it is advisable to use a counterpoise antenna

under the car. This method will produce a very efficient signal. In tests made with this type of antenna system, results were one and one-half times more efficient than any other type of antenna. It will be noticed that it is not necessary to use suppressors or condensers in conjunction with this system as it is free from all motor noise.

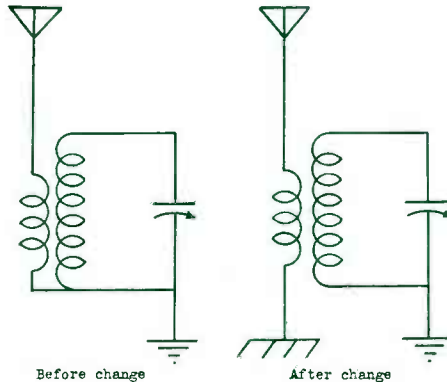
The counterpoise antenna is mounted the same as the underslung but the antenna lead is brought up to the grounded primary side of the antenna coil. To prepare the set for the counterpoise antenna, remove chassis from cabinet, disconnect the primary side of the antenna coil from the ground. Solder wire to a terminal post or direct to the counterpoise antenna. A set hooked up in this manner will give the best performance of which it is capable.

In cases where a counterpoise antenna is not used, it is more difficult to eliminate motor noise. The first step to be taken is the shielding of all high tension cables and the antenna leads. Shielding must be grounded in as many places as possible. The most desirable shielding is the loose braided sleeves allowing space between the wire and the shield. It is important never to use a tight shielding on the antenna lead as a loss in volume and sensitivity will result.

\*Bernard Gottlieb, Engineer, Bell Radio Sales Co., New York.

\* \* \* \*

Prices and further information on the antennas and parts may be secured by writing to "The Bell Radio Sales Company, 936 Westchester Avenue, New York, N. Y."



## QUERIES and ANSWERS

(Continued from page 9)

conditions, the intermediate frequency output voltage at the secondary of the plate transformer divided by the signal input voltage, will be the "conversion gain" of the system.

Mutual conductance in any amplifier tube is the measure of how much the plate current changes for a change in grid voltage. Obviously in this case the input and output frequencies are alike. An oscillator, mixer, detector circuit may be treated as an amplifier and the grid voltage-plate current relation is referred to as conversion-trans-conductance. Conversion-trans-conductance, is a measure of the A.C. plate current flowing at intermediate frequency, divided by the input A.C. grid voltage at the signal frequency and is affected by many factors.



*Question: Quite often I find it necessary to replace the voltage divider in the power pack of a receiver or public address amplifier but I have trouble*

*in getting original replacement parts or locating wiring diagrams which show the resistance values of each section in the voltage divider. I have attempted to use the values of measured voltage and currents but the resulting voltages after replacement of the resistors vary considerably from the correct values. What procedure should be followed in making the repair quickly and correctly?*

**Answer:** Voltage dividers can be obtained from all Radio parts dealers which are provided with adjustable taps. It is convenient to select a 15,000 ohm, 75 watt, voltage divider for universal replacement. Five adjustable taps will usually serve all cases.

Remove the burned out divider. Substitute the new divider and slide the taps until proper voltages are recorded on a voltmeter. The taps can then be fastened permanently and the job is complete without having to know what values of specific resistance exists in each section.

Just a few little tips to make N. R. I.'s service to you better and faster. When you write a letter be sure your full name, address and student number are written legibly. Seal envelopes carefully. Affix sufficient postage. Notify N. R. I. immediately of any change of address. Do not send cash in the mail unless it is registered. Checks or money orders are a good, safe method of sending money.

AMERICAN RADIO HARDWARE COMPANY ANNOUNCES a kit of testing prods, plugs, jacks and interchangeable testing parts. This kit, solderless and interchangeable, is composed of a complete line of necessary parts for standard testing outfits. Each kit is made in two colors—red parts for positive identification—black parts for negative identification. The price of the kit is \$2. Purchases must be made direct from the American Radio Hardware Company, 135 Grand Street, New York City. They will also supply, free of charge, their catalog No. 30, upon request.



## NEW G. E. RECEIVERS

Three new type Radio receivers, for both broadcast and short wave transmitters bands (as low as 16 meters), are outstanding among the 14 new models announced by the General Electric Company. These all-wave sets are equipped with an aircraft type four-in-one tuning dial and by merely turning a button, which brings into use a completely different set of coils, reception can readily be shifted from one band to another.



N. R. I. Graduates are taking advantage of the offer of free membership in the "Radio Manufacturers' Service", offered in the last issue of National Radio News. Reports show that the applications are pouring in to Philco in every mail.

This is a worthwhile movement and any graduates who have not already done so should send in their application to the nearest

Philco distributor or to the Philco factory direct.

The Philco department handling this service is up to its ears in work so don't feel they have overlooked your application if their reply is a little late.

Much valuable technical material is supplied members free, by Philco. They now have available for distribution a collection of data sheets and parts lists, bound in catalog form, which may be obtained at the factory or from distributors for 35¢ a copy. The price is merely to cover cost of assembling and binding, as the same material, unbound, is supplied free, to members.



A partial view of the Instruction Department at N. R. I. It is here that students receive service on technical matters pertaining to Radio. Chief Instructor Dowie and Supervisor of Education Kaufman may be seen in the right and left foreground, respectively.

**W**HAT makes the wheels turn so smoothly at N. R. I.? How does N. R. I. handle so many inquiries on technical and business subjects, keep its text books and practical units up-to-date, at all times?

These questions are put to us hundreds of times by students and graduates out in the field, many of whom have never had the opportunity to personally visit the school. With the aid of the staff photographer, we will attempt to answer these questions for you.

Of course, there are many minor departments at N. R. I., but from the students' and graduates' viewpoint, there are three major divisions: Instruction, Service, and Mailing.

In the upper left hand corner of this page we show a photograph of the Instruction Department. Here students' lessons are graded, and requests for information on technical Radio subjects are answered. This Department is responsible for obtaining and developing new Radio material, writing and re-writing

## A Trip Through N. R. I. W

*Photos by National Radio*



A section of the Student Service Department with Student Service Director Armstrong in the foreground. This Department is responsible for maintaining student records and rendering service on all matters of a non-technical nature. In this Department the student's progress is most carefully watched.

text books, developing practical units for experimental work, etc. The Department is composed of Radio experts, Radio draftsmen, Radio writers, library and file clerks. The Department is under the joint supervision of Mr. J. A. Dowie and Mr. Joseph Kaufman.

The Service Department, pictured at the lower left is of inestimable value to students and graduates. Under the personal supervision of Mr. Stuart Armstrong, Director of Service, this Department functions to maintain the

The important Addressograph Department. The cabinets contain a metal stencil for each student and graduate, for addressing bulk mailings.



proper records of a student's progress. The Department is composed of men and women who are experts on business subjects. Many an N. R. I. student and graduate owes a big portion of his success to the expert business advice given him by this Department.

The expert technical instruction, business advice and information, and other help rendered by this Instruction and Service Departments would be of little value if we were not in a position to place it in your hands promptly. Our Course would be of little value if your lessons, graded answers, practical work, etc., were not mailed on schedule. That is why we stress the importance of this Mailing Division.

This is probably the largest division at N. R. I., insofar as space occupied and personnel are concerned. It is in the charge of Mr. Albert Doig, an expert on postal regulations and matters pertaining to the prompt and efficient handling of mail. His corps of



The Printing and Multigraphing Department, with its equipment and skilled personnel, renders a valuable service. Here model answer sheets, special notices, office forms, etc., are prepared. This Department helps us speed up our service to you.

## With The Staff Photographer

*Radio News Photographer*

assistants includes multigraph, mimeograph and graphotype (machines which cut metal stencils—shown in left hand corner of picture at bottom of page) operators; mail, file and stock clerks.

The entire N. R. I. organization is dedicated to one purpose, **SERVICE TO YOU**. Only when you are receiving the best, most rapid, most courteous service possible, do your friends at N. R. I. feel they have done a thorough job.



The Addressograph Department helps National Radio News reach you promptly. With stencils the News can be mailed as fast as it comes off the press.



A section of the Mailing Department. Much credit for our prompt and efficient service is due this Department. They see that you get the proper lesson at the proper time and that your graded lessons are returned to you promptly. You seldom hear from anyone in this Department—but they are silent partners in your success.

# THE ELECTRONIC PIANO

The First Significant Advance in Piano Construction in More Than 100 Years.

By J. A. DOWIE, Chief Instructor

THE piano of today unlike the organ has but one quality of tone, which must be used for every composition without variation. In this respect the pianist and composer are limited in expressing their musical ideas, just as a painter would be limited with but one or two colors of paint with which to express his artistic ideas on canvas.

The main purpose of Mr. Benjamin F. Miessner in developing the new electronic piano has been not merely to extend the traditional piano tone, but rather to provide a wide range of tone qualities or sound colors, better suited to the interpretation of certain moods, composers and periods. The musical beauty of large organs, as you know, lies chiefly in their large range of tone colors available at the touch of a stop. In the same way how much more beautiful and expressive could a pianist's performance be made if he too could select his tone timbre to fit the musical mood of the moment. This, as you know, in a large measure is the beauty of orchestral music.

The electronic piano demonstration at the National Electrical Exposition in New York City aroused considerable interest. The instrument is a regular six-foot grand piano; its keyboard, action, dampers and strings being of the usual type. The soundboard, however, was removed, so that practically no sound comes directly from the piano. Electrical apparatus transforms the mechanical vibration of the piano strings into a corresponding electrical vibration, that is, alternating currents. These can be mixed together in varying proportions by turning control knobs near the keyboard, so that the pianist may blend his primary tone colors to produce the exact type of tone he desires.

More technically, the string vibrations are translated into electrical vibrations by means of electrostatic pick-up apparatus operating much like a condenser microphone. These pick-ups are insulated conducting strips mounted close under the piano strings. Several such strips are used at different positions along the string, but each maintaining some constant fractional string length position for all strings, such for example as one-sixteenth or one-fifth or one-third.

Each of these pick-up strips feeds into its own pre-amplifier tube. The strings are also



insulated and maintained at several hundred volts potential above the pick-up strips, so that string vibrations are translated into corresponding voltages. These amplified voltages are fed into a mixing system controllable either by fixed, pre-selected tone quality stops, or by knobs. Further, an amplifier frequency-tipping control and circuit is provided to aid further in tone quality control.

There are four amplifier stages altogether feeding two auditorium speakers. A 500-ohm line with a foot-pedal controlled attenuator joins the pre-amplifier in the piano with the power amplifier. Another volume control operated by a knob may be used to set the maximum output power obtainable with the foot pedal. The wind instrument tones are obtained by translation-delay apparatus for each string. These keep all charges off the string until after the hammer has struck and left the strings. Then it closes a circuit which starts charging the string and an associated condenser through a resistance, gradually building up the polarizing voltage, and consequently the vibration translation efficiency in a few tenths of a second. In this way the percussion transients are removed, and the reproduced tone built up gradually instead of starting with these noises and immediately falling logarithmically in amplitude. The tone to the ear is thereby transformed from a typical percussion or plucked string tone to that of a wind instrument or organ.

Further information on the electronic piano may be obtained by writing Mr. Miessner at his laboratory in Millburn, N. J.

## BREAKING INTO THE RADIO SERVICE GAME—From page 3

meters will do, but the D. C. meter should have a sensitivity of a least 1000 ohms per volt. Jack decides on one of the new All-Purpose Testers containing a single meter which is used as an ohmmeter, output meter,, A.C., D.C., milliammeter and A.C., D.C., volt meter. The Tester contains an oscillator capable of generating all frequencies used in ordinary service work.

Again drawing on the experience he gained at the store, he orders from a mail order house a kit of resistors. Paper by-pass condensers, and electrolytic condensers. He steers clear of transformers and expensive special apparatus knowing that he would only tie his money up and that he can easily order special parts from any supply house and get delivery in a short time, or that he can purchase them locally from the manufacturers' distributor.

Tubes present a different problem, the exact types of tubes to be carried varying with the location. However, Walters was in a typical A.C. District and he decided upon 5—26 type tubes, 5—27's, 5—24's, 3—35's, 1—57, 1—58, 1—55, 4—45's, 2—47's, 5—80's, 2—71A's and 1—56.

Walters is now ready to go out and get some business. There are many ways of doing this and he considers those which have been tried and tested. First, there's the classified section of the phone book. A small block ad, costing about \$8 per month, will bring in business, if it is not surrounded by ads four or five times as large. However, in Jack's town competition in the telephone book was rather stiff and he did not take an ad in the book. Penny post-cards represent the next best bet especially if a select list is available—which should not have to be the case. One method he did try was to obtain names of set owners by cruising around in his car and noting the addresses of houses which had antennas. From the addresses, the names of the owners could be looked up in the directory. Names picked at random from the phone book were circularized, as most phone owners also have a Radio. A test mailing of 500 cards showed the value of the names in the phone book vary considerably with the section of the city in which the person lived. Blotters and hand-bills work out fine, but Jack found by sad experience that it is not safe to trust someone else to distribute them for him, as sewers often present too great a lure as a depository for such literature by unscrupulous persons just paid to toss out this material.

In the magazines to which he subscribed Walters found quite a number of advertising

and business getting hints which he of course changed around to suit his own particular needs. He also found that his printer was glad to offer suggestions. He soon found out that it is not wise to put all of his advertising appropriation into one idea—but to test each one keeping track of the returns so that unprofitable schemes can be discarded. Jack stayed away from newspaper advertising from the start, as common sense told him it only pays when you are selling as well as servicing, and such advertising to show results must be consistent. (In small communities, newspaper advertising for service work is sometimes quite profitable, especially if the paper does not come out daily.)

Here are a few rules which Jack Walters formulated for his behavior while on the job:

When in a customers house try to talk his language. If he talks baseball, do likewise. If he discusses Shakespere and you know nothing about him, eat up what he is telling you. Do your best to make the customer your friend and to have him think you are a fine fellow. Making people like you is nine-tenths of the battle in building a successful business. There are plenty of men who can repair Radios but who are kept in the shop because they always antagonize the customer. The fellow who is pleasant, as well as a good serviceman, is the one who invariably succeeds. A serviceman must be a diplomat at all times.

Whenever possible the Radio set should be repaired in the customer's home. However, if the trouble is not readily apparent, take the set to the shop. It is mighty hard to think out a difficult problem in the customer's home with everybody looking on.

Don't guess at what is wrong and make statements until you *know*. Nothing is more embarrassing than to be constantly retracting statements as you go from one test to another. Take a tip from the doctors who don't say anything until the examination is completed.

If, after the examination is over you have not located the trouble, inform the customer that the set must be taken to the shop where your entire equipment is available. If he insists on an estimate, the best way to get the set to the shop is to tell him that you will phone him when you know exactly what the job will cost and before actually doing anything to the set. Then, if he is not satisfied, you will bring the set back at no additional cost for the shop examination.

# THIS and THAT in RADIO

At a convention of International Chiefs of Police, there was demonstrated a new type Radio built for use on motorcycles. This Convention was held in Chicago. Radio continues its forward march in fighting the criminal.



An entirely new use for Radio telephone equipment was found on the big construction job of the San Francisco Bay Bridge. Twenty-two Radio telephones were installed to link offices on both sides of the Bay with boats, piers, caissons and other points of the construction. Standard short wave receivers and transmitters operating at a wave length of from four to six meters were employed.



An employment increase during the month of August, 1933, of more than 43% at the plant of the Crosley Radio Corporation—which owns and operates Radio Station WLW—was announced by Mr. Powell Crosley, Jr., President of the Crosley Radio Corporation. It is stated that during the past few weeks orders have been pyramiding so rapidly at the Crosley Factory that they are approximately 30,000 sets behind on production. The Crosley organization considers that the general betterment of business conditions and a more optimistic public are responsible for the up-trend in this phase of the business. They feel that the N. R. A. movement is doing a good job for Radio.



The Cuban Revolution and the subsequent political uncertainty leaves the Cuban Radio situation more or less a large question mark. There is a lot of American Capital in Cuban Radio stations and some doubt is expressed as to what the future holds for these stations on the war-torn island. Due to the great possibility of the various political factions commanding the Cuban stations, American Capital, which is so necessary to the efficient operation of these stations is not forthcoming for their maintenance or expansion. We can only hope for the best, but knowing the Cuban people as we do we have confidence in their ability to settle their differences at an early date and get back to the normal activities. Our New Year's wish to them is peace, happiness and prosperity.

# Success Stories

*Have you some idea which helped you in your business—some plan of advertising—some method of getting business that you'd like to tell in the News? Send it in—it may be worth \$1.00 to you.*

## Success Story No. 7

DEAR MR. SMITH:

Not long ago I received my diploma from N. R. I. and want to tell you of the success I have had since I began your Course.

After completing about fifteen lessons, I began servicing and selling Radios from my home. I had all the work I could do in my spare time. It was not long before I was forced to open a shop as my work became entirely too much to do in my home. Now I sell Radios and have all the service work I can do.

At the present time a fellow N. R. I. student, Mr. Snively Myers, is working for me as assistant serviceman. My success has been due to your training and it would be a good investment for anyone—the N. R. I. Course.

When I first began doing Radio service work, I made on the average of \$5 a day. That was before I completed my Course. Now that I have finished my training, and am a graduate, I am realizing from \$15 to \$20 a day.

Very truly yours,

WILLIAM H. DEARDORFF,  
108 E. King St., Chambersburg, Pa.

Every department of the National Radio Institute will operate during the coming year, with the fundamental purpose of making students and graduates successful. We wish you a most prosperous 1934.





# RADIO-TRICIAN SERVICE SHEET

REG. U.S. PAT. OFF. COMPILLED SOLELY FOR STUDENTS & GRADUATES



## Silvertone Models 1700-7062

**GENERAL NOTES:** The A.V.C. action can be rendered inoperative, when peaking the I.F. transformers, by shorting Resistors R3 and R4. A preferable method is to use an oscillator with variable output power. The output should be made no greater than is necessary to obtain a satisfactory signal or output meter reading.

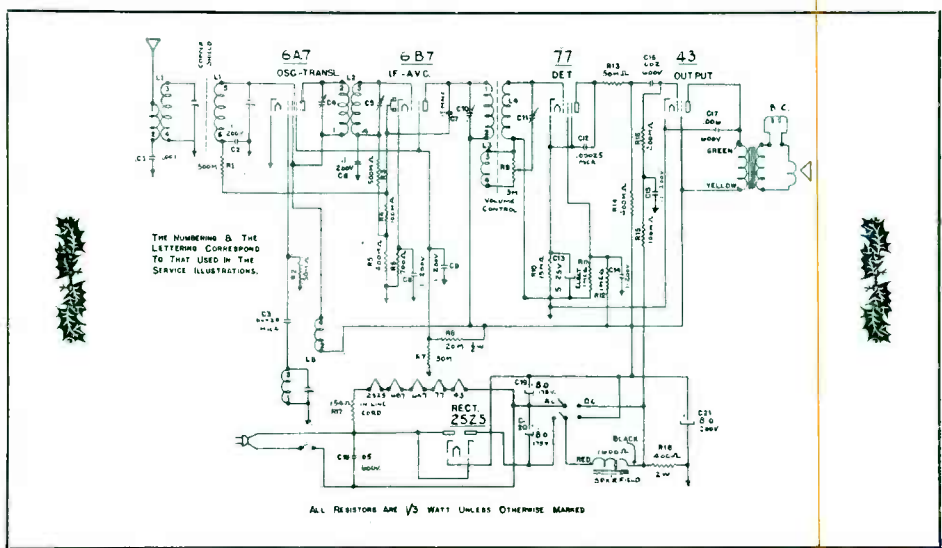
The four tuning condenser adjustments for the I.F. transformers are accessible from the front of the chassis and are illustrated in Fig. 1. The I.F. frequency is 175 Kc.

The loudspeaker can be removed for replacement by taking off the 6B7 tube shield and removing the three speaker mounting screws. Be certain that the speaker leads color code, indicated in the schematic, is followed. Improper connection will cause excessive hum due to the hum bucking coil's increasing hum instead of cancelling it out.

Speaker rattle may be due to the cone's being off center. Loosen the center adjusting screw, insert four 1/8 inch wide strips of heavy writing paper between the pole piece and the inside of the voice coil, retighten the adjusting screw, and remove the paper spacing strips.

Increased pickup can be had by splicing the antenna lead to an additional length of wire or to a regular antenna if available.

All metal parts of the chassis (including the AC-DC Switch) are at high potential to ground. DO NOT touch chassis while the line cord is plugged into an outlet.



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

TUBE VOLTAGE AND CURRENT CHART  
MODELS 1700 - 7062

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE MA	SCREEN MA
6B7 IF-AVC	110	55	-7*	.4	.2
77 Detector	50	22	-1.5	.1	.04
43 Output	100	120	-10*	26	5
6A7 Osc-Transl	Ep=105v EG#4=*	EG#1=-5v Ip=2ma	EG#2=105v Ig#2=1.3ma	EG#3 and 5=55v Ig-#3&5=1.2ma	
25Z5 Rectifier	Plate Current	- 40 M.A.per plate			

Speaker Field Voltage = 70 v

Eg=Grid Voltage

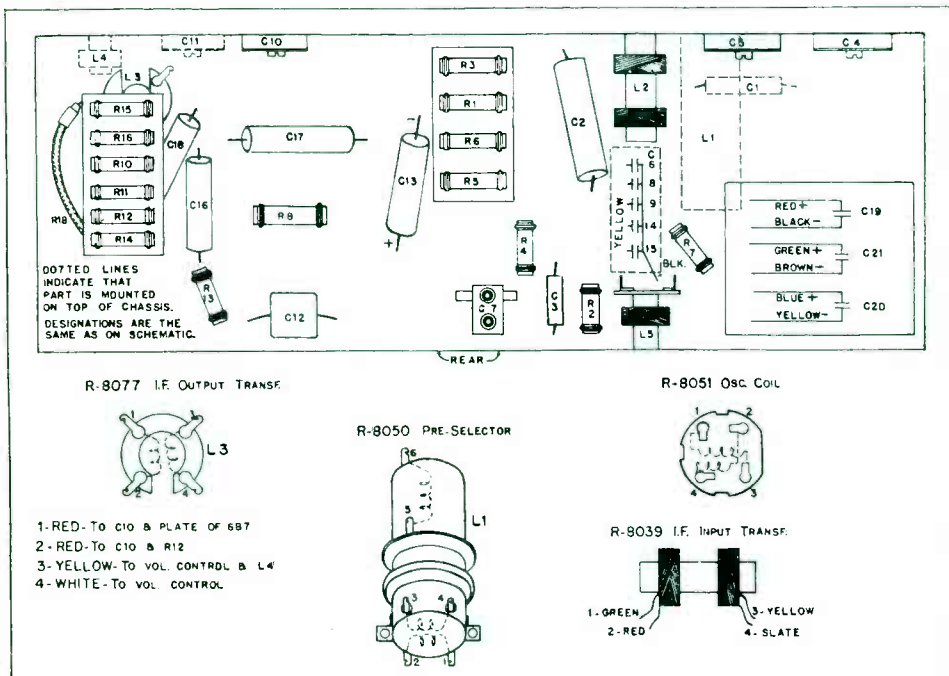
Ip=Plate Current

Ep=Plate Voltage

Ig=Grid Current

\* Indicates high series resistor

Tube heaters are in series so that if one burns out, none will light. These measurements were made with a 500 volt, 1000 ohms per volt meter. Power supply 118 volts A.C. Measurements made with set detuned, and speaker field hot. Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation.



# N. R. I. ALUMNI News

## Heavy Voting Marks Nominations

### President Griffith Not A Candidate For Reelection

In the heaviest balloting in the history of the Alumni Association nominees have been selected for the final run off. K. W. Griffith, President of the Association for 1933, desiring to give some other member a chance at the presidency is not a candidate for reelection.

Various sections are lining up in support of native sons. The northeast is backing Harry Barschdorf, of Mass. Around New York City they are pulling for Victor Osgood, of New Jersey. In the eastern lakes region and Canada the boys are betting on Ted Telaak, Chairman of the Buffalo Local.

Down south the choices seem to be F. A. Parkins, Georgia, and G. W. Page, Tennessee. Polling a big western vote is Fred Nichols.

The midwest is backing several fine fellows: Hoyt Moore, Indiana; R. B. Smith, Michigan; L. J. Vanek and Norman Hood, Ohio, and T. A. DeSchantz, Chairman of the Pittsburgh Local.

Around Washington, D. C., the support goes to John Gantt, P. J. Murray, and Earl Merryman.

Here's the lineup:

For President: T. J. Telaak, Buffalo, N. Y., vs. V. L. Osgood, West Orange, N. J.

Vice-President: L. A. Vanek, Cincinnati, Ohio, vs. Harry Barschdorf, Adams, Mass.

Vice-President: T. A. DeSchantz, Pittsburgh, Pa., vs. Hoyt Moore, Indianapolis, Ind.

Vice-President: Fred A. Nichols, Denver, Colo., vs. Norman Hood, Akron, Ohio.

Vice-President: F. A. Parkins, Oglethorpe, Ga., vs. G. W. Page, Nashville, Tenn.

Executive Secretary: R. B. Smith, Sault Ste. Marie, Mich., vs. P. J. Murray, Washington, D. C.

Secretary: John Gantt, Washington, D. C., vs. Earl Merryman, Washington, D. C.

The final ballots are enclosed with this issue of the News for all Alumni members. Fill yours in, and mail it at once. It's a good scrap and may the best men win.

## Two New Chapters Formed

### Mueller Heads Chicago Local; Schachtner Elected Chairman At Detroit

Two new Local Chapters have been added to the growing family of Locals of the N. R. I. Alumni Association. They are located in Chicago and Detroit.

Out in the windy city they were fortunate in the selection of Heinz A. Mueller, as Chairman of the Local Chapter. Mr. Mueller is an old time Radio man with loads of experience. He has traveled extensively and had an opportunity to study Radio conditions in this country and abroad. Many of the old time readers of National Radio News will remember the very interesting report Mueller made, through the columns of National Radio News, on his return to this country from Europe, several years ago, where he made a thorough study of European Radio conditions.



H. A. Mueller

In addition to Mr. Mueller as Chairman of the Chicago Local, the following officers were elected at the first meeting, and who are now serving their Local Chapter to a degree which merits a lot of credit:

John Siovic was elected Secretary; George W. Korbel is holding the office of Chapter Librarian; while Samuel Juricek and Earl Bennett are capably handling the posts of Financial Committeemen.

At present the members of the Chicago Local Chapter are as follows: M. M. Weist, P. J. Cosey, Earl R. Bennett, M. F. Sullone, John E. Siovic, Max Crosby, Samuel Juricek, E. J. Skrzyziarz, P. J. Richardson, Charles Proper, Leo Lewandowski, Arthur Marcus, C. G. St. Clair, Joseph Novacek, Ben Lampe, Cecil B. Morehead, James Balsamello, Herman Horstmann, William Sanberg, Edward Sorg,

(Page 20, please)

## BUFFALO REPORTING

Word has just been received at the Buffalo Chapter headquarters that their Local Chairman T. J. Telaak, who is also an Associate Editor of National Radio News, is well out in the lead for nomination for President of the National Radio Institute Alumni Association. The members of the Buffalo Chapter feel that this is indeed an honor and present indications point to a record vote in the coming election in favor of the Local Chairman. He is sure to have the support of the entire Buffalo Chapter.

The last meeting of the N. R. I. Alumni Association Buffalo Local was particularly instructive. They were fortunate in having Mr. Francis F. Engel, Commercial Engineering Section of the Radiotron Corporation as technical speaker. Mr. Engel went into a detailed description of the fundamental principles which brought about recent tube changes and also illustrated with movie slides the circuit characteristics of the newer type tubes. This was a very interesting lecture and the attendance at this meeting ran well over 100.

It has been the policy of the Buffalo Chapter to invite as their guests the members of the Institute of Radio Servicemen and the Radio Service Engineers of Western New York, both organizations being composed of the Radio servicemen in this area.

The meeting was interesting and instructive—as indicated by the fact that it was 2.30 o'clock the following morning before it finally terminated. Of course some of this time was devoted to the light lunch and refreshments which were served. After the technical meeting plans were formulated for the Buffalo Radio Servicemen's N. R. A. co-operative platform.

The next meeting will bring as their guest technical speaker, Mr. R. M. Temple of the Raytheon Corporation. Mr. Temple is well known in the Radio tube development field and his talk should be one of the best of the season. This talk will also be augmented by moving picture slides illustrating the various points of interest.



Following the Radio parley with the Mexican Government, the Radio Commission of this country is preparing to abandon three of the five intermediate wave bands which have heretofore been assigned to Television.

Affective January 1, 1934, this agreement provides for the abandonment of the 1600-1700, 2100-2200 and 2200-2300 kilocycle bands.



Alumni member J. L. Huard owns and operates Amateur Station 3E21G at Lyster Station, Que., Canada.

Page Twenty \*

## Two New Chapters Formed

(Continued from page 19)

Frank Weisenburger, Heinz A. Mueller, Richard Cordero and John Duffala.

Alumni Association members are requested by Mr. Mueller to get in touch with him at 217-A Washington Blvd., Oak Park, Illinois, or, if more convenient, Mr. John Siovic, 9204 Saginaw Ave., Chicago, Illinois, for full details regarding membership in the Local Chapter.



In Detroit the new Local Chapter is headed by Frank X. Schachtner, who was elected Chairman. He is ably assisted by M. George Hassar as Secretary, William A. Fisher and Robert Enders as Financial Committeemen and William W. Webster as Librarian.

At the first meeting 26 men became members of the Local, as follows: M. George Hassar, J. C. Jackson, William W. Webster, C. L. White, Milton R. Fetterly, Robert Enders, William C. Langh, Archie W. Whisler, A. R. Kreuzer, Eustace A. Bowen, Frank M. Gordon, Alexander Thomson, G. E. Redenaugh, William A. Fisher, William Urbanski, William Simcek, Frank Schachtner, Henry Kreda, F. C. Oliver, Alexander Fournier, William R. Sewell, Joe Johnston, Kenneth G. Swain, Chas. H. Colquitt, Richard Wearne and Charles H. Mills.



F. X. Schachtner

Since then another meeting has been held and seven new members accepted: Wilfred H. Ziegler, Stanley J. Smolarek, Robert I. Nelson, D. Van Allen, Joseph M. Shubeck, Charles F. Krause and W. Denomy.

Mr. Schachtner will be glad to talk to any Alumni Association members who desire membership in the Local and heartily recommend that they get in touch with him at 4833 St. Claire Ave., Detroit, Michigan.



The following officers have been elected at a meeting of the Cleveland, Ohio, Local Chapter of the N. R. I. Alumni Association: Charles R. Jesse, Chairman; J. C. Hannum, Secretary; E. E. Williams, Financial Committeeman; R. G. Johnson, Financial Committeeman. A special membership committee has been appointed with the following members: Steve Horvath, Glen H. Wright, John W. Routledge and Charles R. Jesse.

## CLEVELAND MAKING DRIVE FOR LOCAL MEMBERS

Sets Quota at 75 by Mid-January

By CHAS. JESSE, *Chairman*

The Membership Committee which has been appointed at the Cleveland local is working hard to raise our membership to the quota we have set, seventy-five members by January 19, 1934. At this time, we intend to open our own Radio supply store.

Plans are already up for discussion at our meetings to work in the "spot system" mentioned in the last issue of National Radio News—using the entire membership of the Cleveland Local as a unit for this system. Operating the Cleveland Local as a unit under the plan offered by the Philco Radio and Television Company (also mentioned in the last issue of National Radio News), is under discussion.



The Radio business here in Cleveland is going at top speed—we're glad to say—for those who have done nothing but good work. The public in this city is fed up on cheap, haphazard Radio service work. They want something better and we're going to give it to them.

At our last meeting we had the pleasure of adding the names of Mr. William Toth and Mr. R. J. Ehrbar, both of Cleveland, to the membership of the Cleveland Local Chapter of the N. R. I. Alumni Association.

I want to take this opportunity to request—urgently request—all N. R. I. graduates in Cleveland and vicinity to get in touch with me as soon as possible. Call Clearwater 3675 and I will come to see you in person. We want you in this Cleveland Chapter of the N. R. I. Alumni Association. You owe it to yourself to belong—you owe it to your fellow students and graduates—and you owe it to Radio.

## PITTSBURGH LOCAL REPORTS PROGRESS

Members Looking Forward To Fine  
Season in Radio.

By T. A. DESCHANTZ, *Chairman*

The members of the Pittsburgh Local have been putting forth a great deal of effort, here of late, to bringing in new members for the Local organization. We realize that the bigger we get—the more members we have, the stronger we will be; consequently the better we will be able to carry out the function of our Local Chapter here in Pittsburgh and the greater credit we will reflect on the National Association of the N. R. I. Alumni.

Since our last meeting we have admitted one new Local Member, Mr. Bob Sperring, of this city, and have quite a number of others who have made application for admission and who will in all probability be accepted for Local membership in the near future.

With business conditions much better than they were, with the spending of money by people going back to work, the Radio business is bound to boom. It is picking up already, and we are looking forward to a fine fall and winter Radio business in the Pittsburgh territory.

We know that the organization we have in Pittsburgh will be well received by the Radio set owners of this city, because our Code of Ethics which was adopted several months ago is bound to be popular with the customers. We are placing our service work on a strictly ethical basis, doing good work, charging proper prices, and cooperating with our customers and with our fellow members of the organization to a great degree.

The future of the trained Radio man—the *properly trained Radio man*—is assured. The day is past when anything will go and be accepted as Radio service. The Radio service-buying customer has been educated to get value for his money. That is one thing the depression did for Radio if it accomplished nothing else. Our members are good Radio men and they are ready to reap the harvest.

May I renew my invitation to all N. R. I. Alumni Association members in this territory to join their Local Chapter? It is for their own good—it is for the good of Radio—it is for the good of the N. R. I. Alumni Association. My address is 1216 Coal St., Wilkensburg, Pittsburgh, Pa. Drop in to see me or give me a ring on the phone. I'm sure you'll be interested in our fine organization.

## THE VOICE OF THE BYRD EXPEDITION

Here's the tiny cabin from which Radio Engineer John N. Dyer will operate the Radio control by which weekly broadcasts from the Byrd Expedition in the Antarctic are to be attempted over the Columbia network for the next two years. Below, Dyer is shown seated before his equipment in the control room aboard the S. S. JACOB RUPPERT. At the right is the microphone mixing panel which also embodies controls for the short wave receiver by which Dyer will get his cues directly from New York. Radio operators go to many strange places; see many sights out of the reach of the ordinary man. Photograph courtesy the Columbia Broadcasting System.



# NATIONAL RADIO NEWS



Vo. 5  
No. 11

Dec., 1933  
Jan., 1934

Published bi-monthly in the interest of the students  
and Alumni Association of the  
**NATIONAL RADIO INSTITUTE**  
Washington, D. C.

The Official Organ of the N. R. I. Alumni Association

P. J. Murray, Washington, D. C., Managing Editor  
Thos. A. Deschantz, Pittsburgh, Pa., Associate Editor  
T. J. Telaak, Buffalo, N. Y., Associate Editor  
Chas. Jesse, Cleveland, Ohio, Associate Editor  
H. J. Mueller, Chicago, Ill., Associate Editor  
F. X. Schachtner, Detroit, Mich., Associate Editor

## Index

<i>Article</i>	<i>Page</i>
A Real Key to Happiness.....	2
Breaking Into The Radio Service Game .....	3-15
A Few Words With the N. R. I. Director .....	4
Tube Data .....	5-6
Intermediate Frequencies .....	7-8
Queries and Answers.....	9
The Automobile Radio.....	10
A Trip Through N. R. I.....	12-13
The Electronic Piano.....	14
This and That in Radio.....	16
Success Stories .....	16
Data Sheet Silvertone 1700-7062..	17-18
Alumni News .....	19-20-21
Byrd's Radio .....	22
The Mailbag .....	23
Calcaterra Service .....	24

# The Mailbag



## More Amateurs

The latest list of Ham Stations reported to the Mailbag:

- W3BLG—Robert O. Morris, Harrisburg, Pa.  
W9BFV—Lloyd V. Stenberg, Willmar, Minn.  
VE4MW—Harry Hardham, Winnipeg, Man., Canada.  
W9CCJ—Melvin Osborne, Indianapolis, Ind.  
W8EHA—Herman Freeman, Montana Mines, W. Va.  
W1FZX—Francis McAllen, Natick, Mass.  
W9BUT—J. Kenneth Jones, Iliff, Colo.  
W3ANX—Paul Kenneth Musselman, Shillington, Pa.  
W3CZD—Ray A. Johnston, Norfolk, Va.  
W9GSN—Charles M. Heath, Denver, Colo.  
W4CHN—Fred L. Hood, Atlanta, Ga.  
W1GPL—Ralph Toye, Braintree, Mass.  
VE3MH—H. W. Gasson, Chapleau, Ont., Canada.  
K5AC—John Varney, Corozal, C. Z.  
W9DG1—I. C. Gartner, Byron, Neb.  
W6IQY—Elwin Troutman, Flagstaff, Ariz.



## Took Up Radio As Hobby

For ten years I have been employed in a wholesale grocery house as traffic manager. I took up Radio as a hobby—never expecting to do any service work or make any money.

But after I received my Diploma my friends and neighbors saw it and told their friends to call on me for Radio service work. I have never solicited any Radio work as I don't have much spare time. But I have received 152 service jobs for which I charged \$1.50 for service call, plus \$1.50 per hour labor charge. All replacement parts were charged for at retail price and I showed a profit. My total profit from these jobs was \$652. There is money to be made in Radio.

SAMUEL E. HAAS, Pittsburgh, Pa.

*Mr. Haas is a member of the Pittsburgh Local Chapter of the N. R. I. Alumni Association...* EDITOR.



## Deforest-Crosley

On Deforest-Crosley 9 tube model, weak signals may be due to defective 224 tubes. Interchanging cured one case, but usually I have to substitute a new tube.

J. ART RAYMOND, Rimouski, Que., Canada.

## Fada Super

Awhile back I wrote you about a Fada Super which would cut out. Shutting off the set then turning it back on again it would work O. K. In test all parts showed O. K. I made a change, placing a fixed condenser in the circuit ahead of the 247, (which was resistance coupled), in place of the bypass condenser type. This set is now working fine and owner is well pleased.

H. H. HAYNER,  
St. Louis, Mo.



## Ship Operators, Attention

The National Radio News contains everything a book of its type could have. I would like to ask, through the Mailbag if some News readers will write me so we can correspond and swap ideas and experiences by mail. I would particularly like to get acquainted with Radio men on board ship.

C. JAMES HAMPSON, Central Falls, R. I.



## A Bouquet

I enjoy National Radio News. It's great. The Mailbag is O. K. too. I save every copy of the News as there are many tips that may be useful some day. I have all the Radio work I can handle in my spare time. I do the Radio work for two Radio dealers. I have a good friend, a graduate of N. R. I., who helps me when I am rushed. More power to N. R. I., the Alumni Association and National Radio News.

A. E. McCAULEY, Mason, Wisc.



If an Atwater Kent 40 has excessive hum, or squeals on some stations, try a higher resistance in the detector B supply.

WM. McCOY, Cayuga, Ind.



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

## A FREE SERVICE DESIGNED TO SAVE YOU TIME AND MONEY

The cooperation of the manufacturers whose catalogs, literature and booklets are listed on this page, and the courtesy of the Calcaterra Catalog Service, has made it possible for the N. R. 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 CALCATERRA CATALOG SERVICE. DO NOT MAIL COUPONS TO THE NATIONAL RADIO INSTITUTE, AS THAT WILL DELAY THE FILLING OF YOUR ORDER.

Stocks of the publications listed are kept on hand and they will be sent to you promptly, as long as the supply lasts.

2. **HAMMARLUND 1933 PARTS CATALOG.** 8 pages. Variable and adjustable condensers, sockets, coils, intermediate frequency transformers, chokes, etc., for broadcast and short wave work.

5. **ELECTRAD 1933 CATALOG.** 12 pages. Standard and replacement volume controls, Truovolt adjustable resistors, voltage dividers, vitreous enamelled fixed resistors, public address systems, etc.

9. **INTERNATIONAL RESISTOR CATALOG.** Specifications and prices on International Metallized, Precision wire wound and enamelled wire wound resistors, motor Radio noise suppressors and resistor kits.

16. **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.

18. **CENTRALAB VOLUME CONTROLS, FIXED RESISTORS, MOTOR RADIO NOISE SUPPRESSORS AND POWER RHEOSTATS.** A 1933 catalog containing

descriptions, specifications and prices of the complete line of Centralab standard, special and replacement volume controls, etc.

34. **ELECTRAD SERVICEMEN'S REPLACEMENT VOLUME CONTROL GUIDE.** A 44-page vest-pocket size booklet containing a revised, complete list, in alphabetical order, of over 2,000 different receiver models with the proper type of Electrad Control to use for replacements.

41. **HOW TO BUILD THE ECONOMY "EIGHT."** 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 \$13.75. These receivers can be built and sold in spare time at a profit.

42. **HOW TO BUILD USEFUL SERVICING 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.

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

45. **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.

48. **THE FORDSON LOW-COST SUPERHETERODYNE RECEIVER.** A well illustrated folder which describes a remarkably efficient midget Radio especially designed to fill the need of servicemen who are seeking a well-designed chassis for replacement purposes. The set is sold on a 30-day free trial basis.

52. **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.

56. **SERVICING AND TESTING INSTRUMENTS.** A folder containing complete descriptions of a new line of Supreme low priced analyzers, set testers, tube testers, ohmmeters, capacity testers, oscillators and universal meters.

(Please Use Pencil and Print in Filling in Coupon)  
THE CALCATERRA SERVICE                      NRN-1233  
Thornwood, N. Y.

Please send me, without charge or obligation, the catalogs, booklets, etc., whose numbers I have filled in below.

Booklet Numbers: .....

- My connection in Radio is checked off below.
- Serviceman operating own business
  - Serviceman employed by:
    - Manufacturer
    - Jobber
    - Dealer
    - Servicing organization
  - Dealer
  - Jobber
  - Radio Engineer
  - Experimenter
  - Laboratory Technician
  - Professional or Amateur Set Builder
  - Licensed Amateur
  - Station Operator
  - Manufacturers' Executive
  - Student
  - Public Address Work
  - 
  -

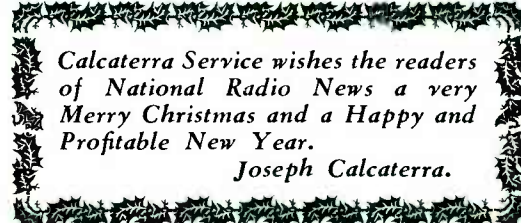
I buy approximately \$ .....00 of Radio material a month.

(Please answer above without exaggeration or not at all.)

Name.....

Address.....

City.....State.....



(Index on Page 22)