

# RADIO



AUGUST  
1930

★  
Until you hear and see  
**CLARION**  
you can not realize what  
a sensational radio devel-  
opment it is . . . .

★  
SEE PAGE 9



★  
*Clarion*

★  
THE GREATEST RADIO VALUE AT ANY PRICE

# » » NEW

## THE JEWELL PATTERN 209 TUBE CHECKER

REG. U. S. PAT. OFF.



The Jewell Pattern 209 Tube Checker is ideal for radio dealers who require an accurate and effective tube checker at a moderate price. It operates on 50-60 cycle, 115 volt alternating current, and requires no batteries. Can be furnished for 25 cycles at same price.

Six tube sockets provide filament voltage of 1.5, 2.5, 3.3, 5 and 7.5 to 4 prong sockets, and 2.5 to 5 prong sockets. Checks screen grid tubes and tubes with heater terminals on top.

Transformers are of ample size to carry the heavy filament current without excessive heating.

A vitrified porcelain resistor is supplied in the circuit large enough to prevent damage in most cases of short circuited tubes, but of sufficiently low value to avoid affecting the readings.



30 YEARS MAKING GOOD INSTRUMENTS  
**JEWELL**

IN THE Pattern 209 Tube Checker Jewell has again produced a service unit which provides a value not equalled by any other equipment on the market today.

For example, the Pattern 209 provides true voltage for testing every tube; 3 volt tubes are not tested with 2.5 volts on the filament or vice versa, and 7.5 volt tubes are not tested on 5 volts, but with full filament voltage applied. The shunt push button actually changes the range of the instrument and does not simply place a high resistance in series with the circuit to cut down the reading and make all tubes appear similar on the high range.

The grid test button shifts the grid biasing potential from one definite value to another; *this is the most effective and accurate method of making grid tests. Be sure it is provided in tube checkers you buy.*

A full size instrument with a 50-division scale  $2\frac{5}{16}$  inches long is used. A chart giving expected readings is molded in the surface of the tester.

The Pattern 209 will be found more accurate and more satisfactory for tube testing than any equipment available at a comparable price. List price \$30.00. Dealers' net price \$22.50. Mail the coupon.

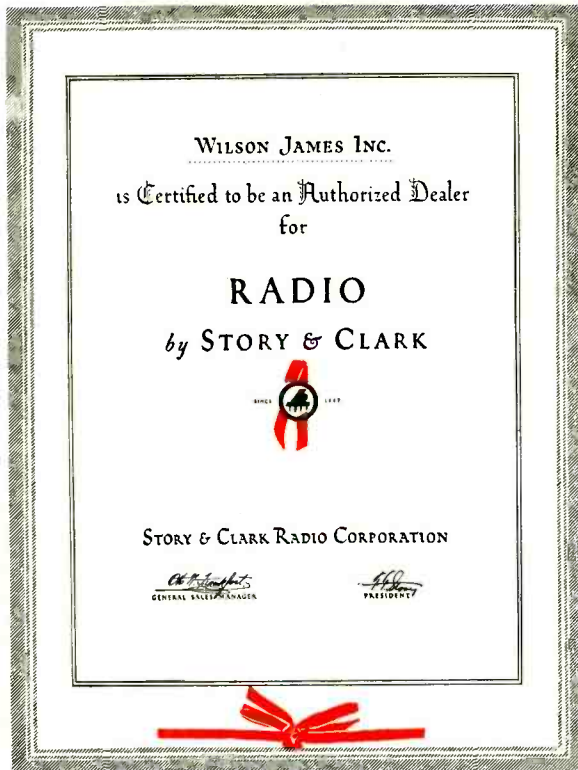
**JEWELL ELECTRICAL INSTRUMENT CO.**  
1642-I Walnut Street  
CHICAGO, ILL.

Jewell Electrical Instrument Company  
1642-I Walnut St., Chicago, Illinois

Mail your 16-page Service Instrument Bulletin describing Jewell Pattern 209 Tube Checkers and other time saving service instruments.

Name.....

Address.....



The highest  
note . . . .  
in radio  
achievement

**C**ERTIFICATES like the one above, authorizing dealers to sell Radio by Story & Clark, will bear mute testimony through many years to come to the beginning of a business relationship that will grow, be more profitable, more highly prized.

Radio by Story & Clark deserves its leadership by virtue of splendid design, fine cabinet work and engineering excellence born of 73 years experience in building musical instruments of enduring reputation.

Every step, from the purchase of raw materials to ultimate satisfaction in the home of the consumer, has been determined with the dealer's profits and problems in mind. For that reason the policies, advertising and merchandising methods as well as the product itself are of importance to you.

Your inquiry will receive prompt and courteous attention.

Production Models listed at \$208.00, \$248.00 and \$317.00. Others to \$1000.00.

*All prices quoted are without tubes*

# RADIO

## by STORY & CLARK



Manufactured under STORY & CLARK owned Patents  
and Patents Pending  
Licensed under R. C. A. and Affiliated Companies,  
Charter Member R. M. A.

Built Complete in the Story & Clark Factories  
THE STORY & CLARK RADIO CORPORATION  
173 N. Michigan Avenue, Chicago

# RADIO

Established 1917

Reg. U. S. Pat. Office

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### A Suggestion to the Reader:

After reading this August number of RADIO give it to some one else in the trade who might be interested in it. Even if he is your competitor, remember that the safest competitor is an educated one. RADIO is teaching better sales and service methods. But if you want to keep this number yourself, send the name of the man whom you think it would help and the publishers will send him a free sample copy.

## PROFITS RATHER THAN SALES

THE radio industry approaches the Fall season with renewed confidence and hope, confident that the worst is over and hopeful that the remaining months of the year will be profitable. These sanguine expectations are based upon solid facts that point to an early revival of activity in a majority of the fundamental industries that pay wages to prospective buyers of radio equipment.

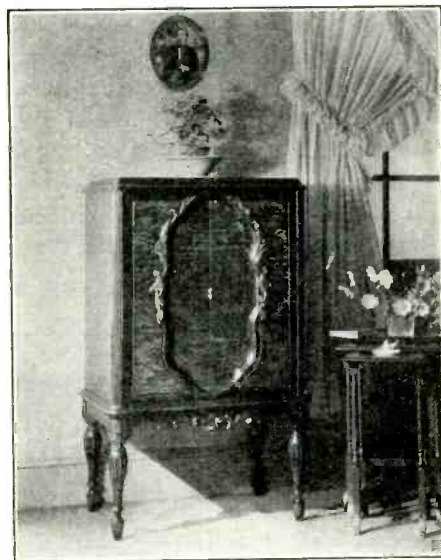
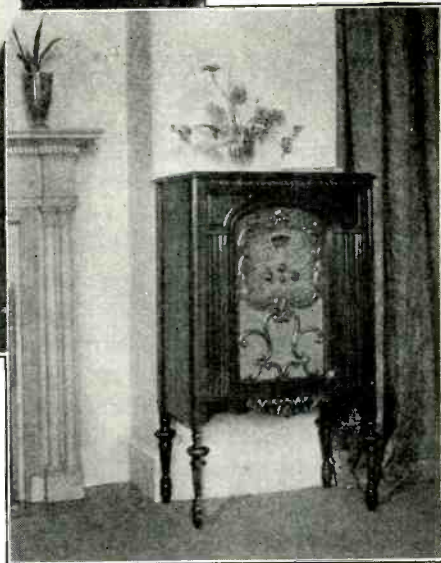
Sweeping changes have been made in the world of general business during the past nine months. Men, rudely awakened from idle dreams of easy money, have gone back to productive work. Excepting in agricultural production, supply has been readjusted to meet normal demand. The prices of basic commodities are down to a level that enables their profitable fabrication into finished products. Venturesome capital, at low interest rates, is ready to undertake new developments rather than to be diverted to gambling with stocks.

In the radio industry, especially, excessive inventories have been reduced to lower levels than ever before at this time of year. Shelves and warehouses are bare, awaiting the arrival of new and improved models that have a definite appeal to buyers who want radio music and entertainment in their homes.

No one expects to set a new record in volume of sales, realizing that abnormally high sales volume frequently results in abnormally low profits. But any intelligently conducted retail radio store whose management is concerned with business efficiency in operation can expect to earn a good profit upon the invested capital and energy. Sales resistance will be encountered, of course, but with the return of better times it will be less than it has been during the recent period when the industry, for the first time, has been learning how to overcome it.



*Grebe 160 ... AH1 Chassis, walnut low-boy, maple panel. List, \$160 without tubes; slightly higher on Pacific Coast.*



*Grebe 18950 ... AH1 Chassis, walnut low-boy, maple panels, sliding doors. List, \$189.50 without tubes; slightly higher on Pacific Coast.*

## “Fits right in our budget”

THEY turn aside to whisper together: husband and wife are in conference. They have heard the new Grebe—have watched you demonstrate it—have followed your explanation of its features. Now, as they choose a moment of privacy to check up, signs point to a sale. “Fits right in our budget,” they agree—which means that they can get the set they want and still stay within their means.

Here is a couple in moderate circumstances—able to afford many of the better things in life, but trained by experience to make their dollars go the limit in buying power.

To this couple, the new

# Grebe radio

SUPER-SYNCHROPHASE

Grebe AH1 means that they can afford the type of radio enjoyed by those who know no barrier to luxury. For this moderate-priced receiver is comparable only with the refined and improved SK4. Offering a standard of reception far beyond its price field, the AH1 opens broader markets to Grebe dealers. And the SK4 is continued with added developments, as a prestige set for those who never could be satisfied with anything short of Grebe performance.

Both the AH1 and the SK4 feature \*Colortone, exclusive Grebe development which (1) imparts greater realism to radio reception and, (2) enables the listener to regulate the broadcast to his individual preference by emphasizing the high or low frequencies.

Profit opportunities are amplified for Grebe dealers by a sales expansion program featured by a newspaper advertising campaign and store merchandising service tie-up.

A. H. GREBE & COMPANY, Inc., Richmond Hill, New York  
Western Branch, 443 So. San Pedro Street, Los Angeles, California

\*Registered U. S. Patent Office

Tell them you saw it in RADIO

# IF THIS DEALER

*was amazed what will  
his CUSTOMERS be...?*



"**WE** HAVE survived many a barrage of radio claims", said a well-known dealer, "but we're frankly amazed with the performance of the new Fadas."

Of course, we at the factory, were sure we had something extra special this year. Engineering huddles yielded up new and practical features galore; cabinet conferences developed the best looking furniture into which a chassis was ever tucked. And the completed radio delivered the famous faithful Fada tone with a new-found assurance that neither static nor station interference, neither unskillful tuning nor fanatical distance-getting could mar its superb beauty.

Behind the features listed on this page is the explanation of the amazement felt by the hero of our headline. They team up into a performance that dealers and customers alike call a remarkable advance over radio behavior to date. We assert that the new Fadas are the self-sellingest receivers of the day, permitting a demonstration before which sales-resistance crumbles as a lump of sugar in a cup of coffee.

How ready are you, Sir Dealer, for the radio-activity that comes with the Fall? Rest assured we're going to tell your prospects about these talented receivers in no uncertain terms. They'll want to see them before they buy. Why not write or wire us, at once, for the whole profitable story?

F. A. D. ANDREA, INC., LONG ISLAND CITY, N. Y.

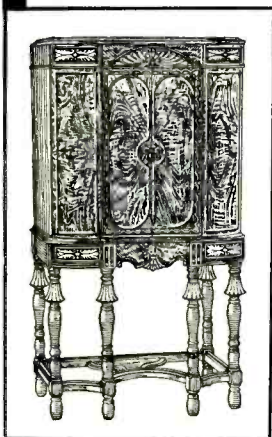


★ The New Fada 42—Open Face Lowboy, \$159 without tubes

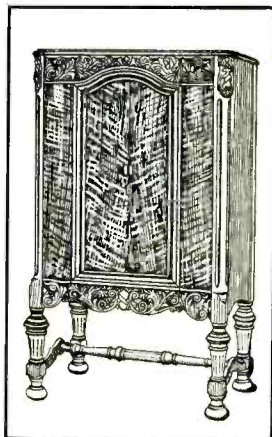
## ONLY THE NEW FADAS HAVE ALL THESE FEATURES

- ★ FLASHOGRAPH
- ★ BEAUTIFUL CABINETS
- ★ AUTOMATIC VOLUME CONTROL
- ★ ONE DIAL... One-Knob Tuning
- ★ NOISE FILTER
- ★ PHONOGRAPH CONNECTION
- ★ LOCAL DISTANCE SWITCH
- ★ FADA DYNAMIC SPEAKER
- ★ HUMLESS OPERATION
- ★ TWO-ELEMENT DETECTOR
- ★ PRE-SELECTOR TUNING
- ★ COMPLETE SHIELDING
- ★ TUBES—9, including 3 Screen Grid
- ★ REMOTE CONTROL SHAFT
- ★ FINER TONE

*Same Prices West of the Rockies, Slightly Higher in  
Canada and for Export*



★ The New Fada 46—Highboy, \$228 without tubes



★ The New Fada 44—Sliding Door Lowboy, \$188 without tubes

### OTHER NEW FADA MODELS

★ The New Fada 41—Highboy, \$218 without tubes

★ The New Fada 47—Radio-Phonograph Combination, \$328 without tubes

**FADA**  
Radio

1920 · SINCE BROADCASTING BEGAN · 1930

# SPEED RADIO TUBES

RCA LICENSED

## NEW! "armored bridge"

exclusively featured in

## SPEED TUBES



PAT. APPLIED FOR

Armored bridge advantages are manifold. Improved spacing of tube elements insures greater uniformity and strict maintenance of operating characteristics. Shock-proof, ultra-rigid mounting eliminates damage in transit and from rough usage. Perfect balance is assured by the elimination of the top-heavy bead construction, which contributed greatly to misplacement of elements.

NEW ADDITIONS TO AN ALREADY  
COMPLETE **SPEED** LINE

Types S-84 and S-82B for Sparton Receivers and the  
new 2 volt types 230—231—232 for portables,  
automobile and aeroplane receivers.

*Write for complete information.*

# SPEED

CABLE RADIO TUBE CORPORATION

84-90 North 9th Street

Brooklyn, N. Y.

Tell them you saw it in RADIO

# how to manage a radio store

September "RADIO" Will Contain—

The First of a Series of 12 Lessons About  
**MANAGING A RADIO STORE**

By WILLIAM E. KOCH

Business Counselor and Specialist in Modern Methods of Management

**T**HIS course outlines the basic principles whereby a retail radio merchant can make a greater profit on his present sales volume. It concentrates on the problem of increasing profits rather than of increasing sales.

The author gives the results of his broad experiences in practical retailing and in teaching others how to apply his proven methods.

## Lessons In The Course:



Please show this announcement to others and ask them to subscribe to "RADIO" . . . NOW. \$2.00 brings the next 12 issues.

1. PROFIT PROMOTION
2. PROFIT-MAKING PROGRAM
3. PARTS OF PROFIT-MAKING PLAN
4. USING SALES QUOTAS
5. CONTROL OF MERCHANDISE STOCKS
6. ANALYSIS OF SELLING PRICE
7. CONTROL OF EXPENSE
8. DETERMINING WHICH LINES ARE PROFITABLE
9. RATE OF TURN-OVER
10. PROFIT FROM INVENTORIES
11. PROFIT FROM BOOKKEEPING
12. USE OF FIGURE-FACTS





*Clarion* DISTRIBUTORS

# Clarion

## PROVES ITSELF

*By every test of tone and appearance*

*Until you hear and see Clarion for yourself, you cannot realize what a sensational new development it is—particularly in clarity and fidelity of tone. That's why we want you to inspect Clarion and submit it to your own tests. We want you to compare it with any other radio made—not merely with any radio in the same price class, but with any other at any price. It will be obvious at once that Clarion is the equal of the most expensive receivers—in tone, in selectivity, in sensitivity, in cabinetwork. It will be just as obvious that Clarion cannot be approached in any of these respects by any radio selling for less than twice its price!*

These are daring comparisons to invite. We invite them because we know the outcome. We know the unprejudiced eye will single out Clarion in any roomful of radio cabinets. We know the sensitive ear will pick Clarion for tone in every "blindfold test."

Clarion has already proved itself in such tests—not once or twice, but time and time again. We want you to make these comparisons in order to convince yourself that Clarion Radio offers more value in appearance, workmanship and performance than any other receiver on the market.

If any radio receiver will sell itself, Clarion is that radio. Write us for particulars or communicate with the Clarion distributor in your territory.

### TRANSFORMER CORPORATION OF AMERICA

Keeler and Ogden Avenues, Chicago

*Licensed under R. C. A. and Associated Company Patents, Member R. M. A.*

# Clarion

**THE GREATEST RADIO VALUE AT ANY PRICE**

- STATE RADIO DISTRIBUTING CO.  
245 Spring St., Atlanta, Ga.
- UNION TIRE & SUPPLY CO.  
Burlington, Iowa
- BIHL BROTHERS  
Buffalo, N. Y.
- WAKEM & WHIPPLE  
Chicago, Illinois
- RAY & WALKER HDWE. CO.  
Chattanooga, Tenn.
- PATTERSON PARTS CO.  
Cincinnati, Ohio
- M. & M. CO.  
500 Prospect Ave., Cleveland, Ohio
- HARRY MOLL  
Denver, Colo.
- H. C. SCHULTZ  
Detroit, Mich.
- BOETTICHER & KELLOGG  
Evansville, Ind.
- DAKOTA ELECTRIC SUPPLY CO.  
Fargo, North Dakota
- MCINTYRE & BURRALL  
Green Bay and Milwaukee, Wis.
- CAROLINA LUGGAGE CO.  
134 East Washington St.  
Greensboro, N. C.
- STERN & COMPANY  
Hartford, Conn.
- DUDA-MYERS CO.  
Hastings, Nebr.
- TOWNLEY METAL & HDWE. CO.  
200 Walnut St., Kansas City, Mo.
- HERBERT HORN  
Los Angeles, Calif.
- STRATTON & TERSTEGG  
Louisville, Ky.
- WILLIAMS HDWE. CO.  
Minneapolis, Minn.
- E. M. WILSON & SON  
Newark, N. J.
- BLACKMAN DISTRIBUTING CO., INC.  
New York City, N. Y.
- NATIONAL ACCESSORIES, INC.  
Omaha, Nebr.
- R. F. & W. R. FITCH  
Oskaloosa, Ia.
- ISAAC WALKER HDWE. CO.  
Peoria, Ill.
- ROBERTS AUTO & RADIO SUPPLY  
Philadelphia, Pa.
- U. S. RADIO CO. OF PA.  
Pittsburgh, Pa.
- STANDARD SUPPLY CO.  
Portsmouth, Ohio
- SHARAR-HOHMAN CO.  
Rochester, N. Y.
- W. E. & W. H. JACKSON  
San Francisco, Calif.
- ROCKEFELLER ACCESSORY HOUSE  
Sunbury, Pa.
- KELVINATOR-SYRACUSE, Inc.  
Syracuse, N. Y.
- MCLENDON HDWE. CO.  
Waco, Texas
- REPASS AUTOMOBILE CO.  
Waterloo, Iowa
- FRONT COMPANY  
Wheeling, W. Va.

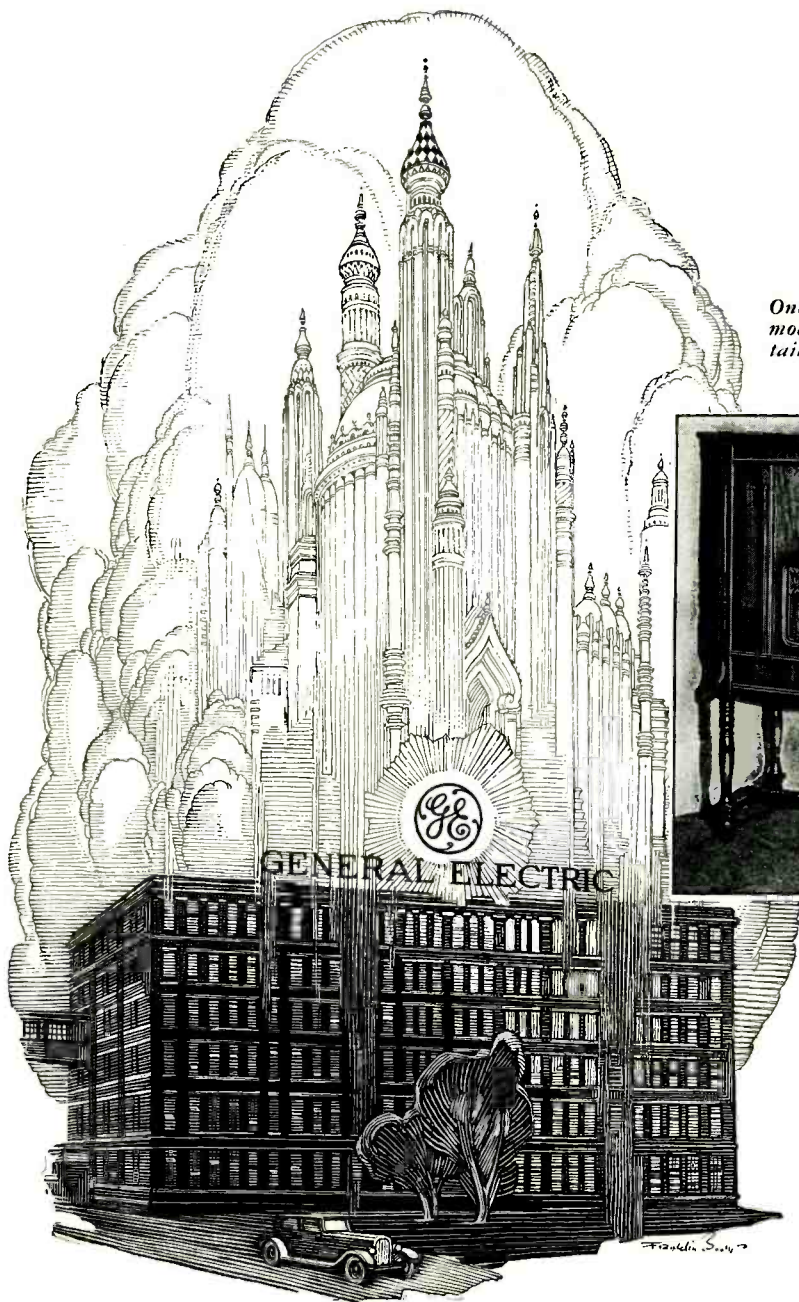
TRANSFORMER CORPORATION  
OF AMERICA  
Keeler and Ogden Avenues, Chicago  
Please send me full details about Clarion  
dealer proposition.

Firm Name \_\_\_\_\_

Address \_\_\_\_\_

2313

# Out of the "House of GENERAL ELECTRIC



## *You've Heard About General Electric Sales Policies*

giving dealers fullest benefit of tremendous General Electric prestige . . . protection against price decline . . . the advantages of the G-E service plan, of the sound finance method.

*One of three beautiful models—LOWBOY, to retail at \$142.50\* (less tubes)*



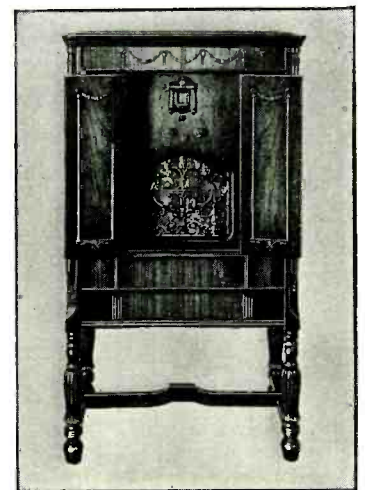
## *You've Learned, Too, About The G-E Merchandising Plan*

. . . immense in scope . . . putting every dealer in closest contact with General Electric, utilizing money making ideas based on the experience of successful dealers.

### THE HIGHBOY CABINET

*A truly handsome piece. Dignified and distinctive. Equipped with tone control. To retail at \$179.50\* (less tubes).*

*\*Prices slightly higher on the Pacific Coast and in Arizona, Idaho, Nevada and Utah.*



MERCHANDISE DEPARTMENT • GENERAL ELECTRIC COMPANY • BRIDGEPORT, CONNECTICUT

# *Magic"*

## **FULL RANGE RADIO**

*Ready for the public the first  
week in* **SEPTEMBER**



Spectacular openings of the "House of Magic" take place simultaneously from Coast to Coast the first week in September, revealing to the public—General Electric Radio!

Radio's most impressive advertising campaign begins that week... colorful spreads in national magazines... a sensational nation-wide radio broadcast... striking newspaper displays... a burst of trade-building dealer helps.

Forward-looking dealers everywhere are clearing the way for the rush of profitable business sure to follow.

**NOW** is the time for **YOU** to act!

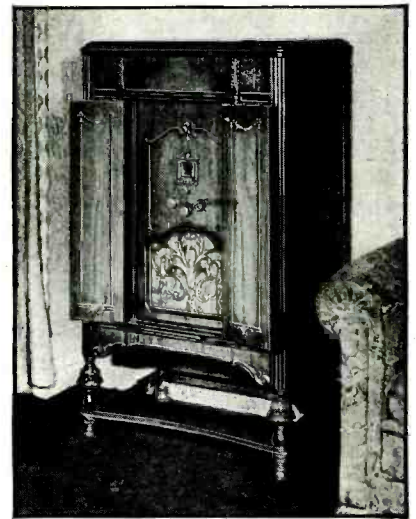
Today General Electric is completing its carefully selected list of dealers who will harvest the profits... dealers equipped to do outstanding work. Are *you* to be one of these?

See the G-E Radio Distributor in your district **TODAY**... or write Section xxx, Merchandise Department, General Electric Company, Bridgeport, Connecticut.

THE RADIO THAT BEARS THIS MONOGRAM IS THE ONE YOU'LL WANT TO SELL.

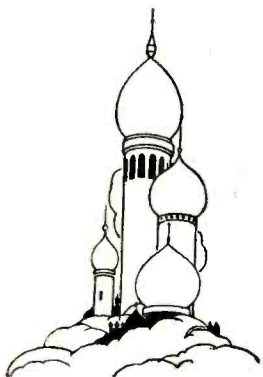
*Because* it gets full General Electric merchandising and scientific support.

It profits by the tremendous consumer acceptance for the General Electric name built up by billions of advertisements... two billion of them this year alone... by millions of *G-E Products* now in American homes and millions more in industries.



**THE RADIO-PHONOGRAPH COMBINATION**

*A cabinet of rare beauty. Its graceful lines are emphasized by the rich grain of the specially selected walnut.*

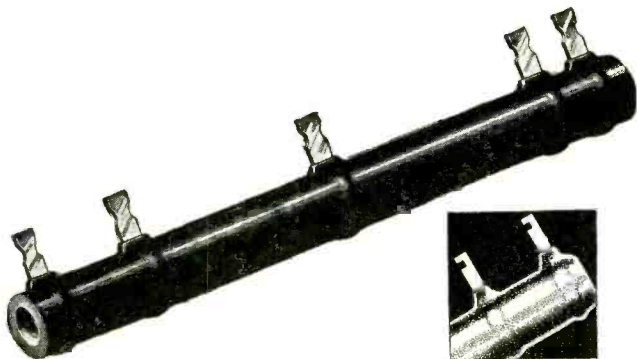


**GENERAL**  **ELECTRIC**  
**FULL RANGE RADIO**

MERCHANDISE DEPARTMENT • GENERAL ELECTRIC COMPANY • BRIDGEPORT, CONNECTICUT


Tell them you saw it in **RADIO**


# VITROHM RESISTORS



## Refractory, Wire and Enamel

**M**OST engineers in the Electrical Industry know how we manufacture our resistors\*, and buy them.

Yet more is purchased than refractory, wire, and enamel when VITROHM  RESISTORS are specified. Added to the physical components and processes — each the finest possible — is the intangible leaven of experience gained during the past 39 years through the zeal of men

determined to make the best. This is protection when you SPECIFY VITROHM  RESISTORS.



There is no one terminal which can be used for all needs



Ward Leonard has had much experience in terminal practice

\*Vitreohm Resistors are made by winding resistance wire of low temperature coefficient of resistivity upon a refractory tube. The resistance wire and terminal connections are then entirely surrounded by and completely protected with a fused-on coating of vitreous enamel.



And, when knowing the application, can often suggest the most



Suitable type. The screw-type terminal above and the



Plain tab-type shown here meet two entirely different conditions.



This terminal often saves time and money. It solders to the terminal screws.

## WARD LEONARD ELECTRIC CO.

Mount Vernon, New York  
*resistor specialists for more than 39 years*

"FRAZAR"  
International  
Merchants  
since  
1834

THE  
PACIFIC  
BASIN  
RADIO  
MARKET  
IS SERVED BY

# FRAZAR & CO., Ltd.

Offices and Correspondents in  
Principal Cities in the Orient,  
Oceania and the Americas.

FRAZAR is an age-old name in export-import circles the world over. FRAZAR represents some of the best known manufacturers in radio—giving these manufacturers a service which otherwise could not be economically and profitably obtained. FRAZAR customers buy on FRAZAR recommendation . . . because they know it is right, and that the FRAZAR guarantee is dependable. Perhaps they can solve your intricate radio problems.



*Your Inquiries and Orders Solicited for*  
Radio and Electrical  
Equipment and Materials

FRAZAR & CO., LTD.  
7 Front Street  
SAN FRANCISCO, CALIF.

Cable Address—  
"FRAZAR" SAN FRANCISCO

# » » » GIVE CUSTOMERS THE TONE-QUALITY THEY WANT... WITH EVEREADY RAYTHEON » » TUBES

**C**HECK-UP on your customer's radios . . . many of them are sure to be struggling along with year-old tubes. Worn out or faulty tubes will cramp the style of the finest radio set you've ever sold. Just let these customers hear the difference a set of new Eveready Raytheons will make! Show them the reason, too, in the patented Eveready Raython 4-Pillar construction. That's the way to sell radio-tubes in quantity . . . by demonstrations, with Eveready Raytheons.

These tubes come in all types, and fit the sockets of every standard A.C. and battery-operated radio in present use. They are a product of National Carbon Company, Inc., makers of the famous Eveready Layerbilt "B" Batteries. With all the resources of this great organization behind them . . . a world of experience in building the finest quality products, and a reputation for doing it, national advertising, and radio broadcasting.

You can buy Eveready Raytheons on a special introductory sales plan, applying to purchases of 25, 45, and 200 tubes respectively. With the K-11, 50-tube assortment, you get the beautiful, metal tube-vending cabinet shown on this page, in addition, and free of charge. There are a host of other sales-helps you'll appreciate. For details, ask your jobber, or write our nearest branch for names of jobbers near you.



Front view of the tube-vending cabinet given free with purchase of 45 tubes in the K-11 assortment

## SERVICE-MEN!

Write for this material

Information and sales-helps designed especially for service-men's use will gladly be sent free. Among them is a blue-print giving important engineering data on Eveready Raytheon Tubes. Hundreds of service-men are using these to advantage. Write our nearest branch.



**NATIONAL CARBON CO., Inc.**

General Offices: New York, N. Y.

Branches: CHICAGO KANSAS CITY  
NEW YORK SAN FRANCISCO

Unit of  and Carbon Corporation

*Eveready Raytheon 4-Pillar tubes cost no more than any other established brands. Because of their superior quality, therefore, Eveready Raytheons offer outstanding value to you and to your customers at no extra cost.*



There . . . . !

The

# BLUE BOOK

Closed Another Sale!

### FROM THOSE WHO KNOW

#### Best Thing in the Radio Business

"I think the Radio Dealer's Blue Book is one of the best things that has come into the literature of the radio business."  
**THOMAS MERCER, Vice President,**  
 Bankers Commercial Security Company.

#### Worth Twelve Times Its Cost

"The Blue Book paid for itself on the first deal. In my opinion it is worth \$7.50 a month instead of the \$7.50 a year that you ask."

**CARL JONES,**  
 Radio Dealer, Chicago.

#### A Sure Cure

"A sure cure for relieving yourself of a great many of the sorrows that come to most radio dealers is to adopt the Radio Dealer's Blue Book."

**RADIO & MUSIC TRADES ASSOCIATION**  
 (Seattle)

#### What the Radio Business Has Needed

"The Blue Book is just what the radio business has long needed. I am instructing our salesmen to do their best to have every one of our dealers get and use the Blue Book."

**STRAVELL-PATTERSON,**  
 Radio Jobber.

**T**HE Blue Book has stood the acid test of over a year's use in dealers' hands, first appearing in March, 1929, and quarterly since.

Four thousand, four hundred seventy-one dealers in all parts of the country are using the Blue Book today, 248 jobbers have recommended it to their dealers. Fourteen radio trade Associations have adopted it.

Questionnaires are sent to 8,000 dealers, Blue Book subscribers, leading merchants, etc. Averages are struck from these answers, which are then checked by prominent dealers, jobbers, Association secretaries, and lastly by a committee of leading finance companies. Blue Book quotations are accurate—dependable.

In addition to trade-in prices (292 models of 76 makes) the Blue Book contains—Complete detailed descriptions of all new merchandise with list prices, and—Schematic diagrams of new models.

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"But she sure was hard to sell until the Blue Book convinced her that our trade-in price was fair"

**M**R. AND MRS. RADIO BUYER know that the Automobile Blue Book sets a fair value on their car. Therefore, they accept the Blue Book quotations as fair, honest, and authentic, when applied to radio.

The Blue Book takes trade-in allowances out of the bounds of competitive wrangling. It is unbiased—Convinces—Makes Sales—Converts shoppers into buyers.

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Write, wire, or send the coupon. We'll rush a Blue Book.

Correspondence invited from Radio Trade Associations and Jobbers. A few metropolitan territories open to responsible sales representatives.

**TRADE-IN VALUES**

Model	Table	List Price	Trade-in Value
1928			
1929			
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Testing Instruments

"SUPREME BY COMPARISON"

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LET "Supreme" be your watchword in choice of service instruments and you assure even more than service instruments of the highest grade, designed for greater accuracy . . . speed . . . simplicity . . . and durability—

You inherit an ever-ready, highly developed, skilled Service Engineering Department . . . specializing in the solution of unusual service problems, producing comprehensive, yet simplified manuals for prompt and easy mastery of the almost limitless facilities of "Supreme" products—

PLUS a distributor organization composed of the leading radio jobbers in each locality. The last page of this 4-page insert gives the lineup of "Supreme" distributors who are helping their dealers and them-

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PLUS district field representatives in each territorial center—co-operating with distributors and dealers. Constantly developing new uses for Supreme Instruments—new service angles for our owners—new data of inestimable value in your work—

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That is why leaders in the radio servicing field unanimously choose "Supreme." Profit by their experience—set the pace for your community with Supreme Testing Instruments. You, too, will find them truly "Supreme by Comparison."

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Measures Resistances Accurately, Quickly. Minimum Size and Weight. Maximum Speed and Efficiency. Dial of meter directly calibrated in ohms and meter amply protected from damage against short circuits. Single cell of an ordinary flashlight battery, which provides the small amount of current required for meter movement. Capacity 0 to 10,000 ohms.



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ONLY ONE METER  
TO READ

PUTS  
ALL  
OTHERS  
IN THE  
"OLD MODEL"  
CLASS.

A  
SET  
ANALYZER  
THAT



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Set Analyzer  
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Size 4¼ x 9¼ x 11¼,  
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Net Price, f. o. b. Green-  
wood, Miss.

**\$78.50**

SMALLER

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MORE EFFICIENT

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**A one meter instrument, more complete and with greater range and elasticity than any other Set Analyzer, regardless of the number of meters employed!**

No matter when you expect to invest in a Set Analyzer, ask your jobber to show you this wonder-instrument, true in every detail of design and construction to "Supreme" standards. Its marvelous range and elasticity, its multiplicity of functions are almost incredible. A revelation in completeness, thoroughness, simplicity, handiness and good looks.

And yet the "Supreme" compares in price with ordinary set testers—only \$78.50 Net to Dealers. Here are just a few of the features of "Supreme" points.

*79 Distinct readings and ranges available—as compared with a maximum of 20 in nearest approaching competitive instruments.*

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*All Pentode, screen grid and overhead heater type analyses and tests made WITHOUT ADAPTERS OR EXTRA LEADS.*

*Measures screen grid current and Pentode current.*

*Tests helium non-filament rectifier tubes.*

*Measures resistances and capacities.*

*Measures reactance of choke coils from 2 to 100 henrys.*

*May be used as output meter on any type of radio, meter adaptable for output impedances ranging from 1000 to 35,000 ohms.*

*Provides high and low resistance continuity tests.*

**READS GRID TO PLATE VOLTAGES.**

*Meter measures alternating voltages at 1000 ohms per volt.*

**ONLY SET TESTER OR ANALYZER PROVIDING READINGS OF ALTERNATING CURRENT IN MILLIAMPERES.**

*Supreme analyzer plug eliminates the need for extra leads and adapters.*

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**PARTICULARLY ADAPTED FOR TESTING AUTO RECEIVERS**

**Unequaled by any portable "Set Analyzer" or "Set Tester," regardless of number of meters, or cost. Manifestly, "Supreme by Comparison."**

## METER RANGES

A.C. Voltage 0/3 - 0/9 - 0/30 - 0/90  
0/300 - 0/900

D.C. Voltage 0/3 - 0/9 - 0/30 - 0/90  
0/300 - 0/900

A.C. Milliamperes 0/3 - 0/9 - 0/30  
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All scales read with utmost ease—no complication—no guesswork.

Twice the efficiency of any other set analyzer with greater speed and simplicity.

*"Only One Meter to Read"*

## METER FEATURES

Meter is of copper oxide rectifier type, heretofore confined to the more expensive laboratory equipment. Meter provides accurate readings of A.C. and D.C. voltages and A.C. and D.C. current in Milliamperes—*Only one meter to read*—resulting in unapproached speed, simplicity, range and elasticity.

Special Processed Punched Aluminum Silicate jewels used instead of the ordinary Sapphire Jewels. Will stand approximately 20 million operations before sign of wear.

Copper oxide unit will stand 3000% overload before breaking down and in event of breakdown is self-healing, therefore impervious to permanent damage through overload.

Meter stops are within armature whereas most stops are on the meter scale, and stop the needle arm. Ingenious design prevents wrapping of needle and eliminates sticking on stops.

Fully enclosed armature prevents dirt or dust entering air gap of magnet.

Removable meter glass provides easy replacement. Location of zero adjuster under glass covers reduces breakage hazard and eliminates constant re-setting.

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### SUPREME DIAGNOMETER MODEL 400-B

THE ONLY COMPLETE PORTABLE RADIO  
TESTING LABORATORY

*conceivable*  
Makes every ~~test~~ on any Radio Set-

**E**VERY forward step in the design of portable set testing equipment only serves to more emphatically affirm the unapproached leadership of the SUPREME DIAGNOMETER MODEL 400-B in the field of radio test work. None other so foresighted in design, so complete, so infallible in sourcing trouble and yet so easily mastered by any service man or dealer. Supplementing its countless circuit combinations with analyses of PENTODE, SCREEN GRID TUBES AND CIRCUITS, it is recognized by technicians, manufacturers and service organizations of every type as the most economical investment in testing equipment because:

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3. Makes every radio man an expert . . . operation reduced to utmost simplicity.
4. Pays for itself within a few months in faster work, increased output, extra profits.
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6. Adaptable with equal ease to portable and laboratory work.
7. Unsurpassed for work on auto receivers.
8. Gives the maximum testing equipment in minimum space at lowest cost per service unit—service units in Supreme Diagonometer if purchased separately would cost many times its moderate price.

Keep pace with demonstrated progress . . . leadership . . . in equipment . . . give your Service Lab the advantages of Diagonometer speed, accuracy, skill and ability to produce extra profits and greater prestige.



Size  $7\frac{1}{2}$  x  $12\frac{3}{16}$  x  $18\frac{7}{16}$ .  
Dealer's Net Price, F.O.B. Greenwood, Miss.

**\$139.50**

Also available in smaller case for the radio man who does not care to carry spare parts, tubes, etc., in the same unit.

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Supreme Instruments Corp.,  
375 Supreme Bldg.,  
Greenwood, Miss.

- Model 400-B Supreme Diagonometer
- Model 90 Supreme Set Analyzer
- Model 50 Supreme Tube Tester
- Model 19 Supreme Tube Checker
- Model 17 Supreme Tube Checker
- Model 10 Supreme Ohmmeter

(Check instrument in which you are interested)

My Jobber is .....

Address .....

Signed .....

Firm Name .....

Street Address .....

City .....

State .....

P A R I S O N »

Tell them you saw it in RADIO

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Order your **DIAGNOMETER, SET ANALYZER**, or other needed Supreme Testing Instruments from any of these alert, helpful jobbers who know that it pays to standardize on Supreme Testing Instruments—“Supreme by Comparison!”

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## IOWA

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Klostermeier Bros. Hdw. Co., Atchinson  
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Tri-State Philco Co., Huntington  
The A. E. Supply Co., Parkersburg  
Hamburg Bros., Wheeling  
Ott-Heiskell Co., Wheeling

## WISCONSIN

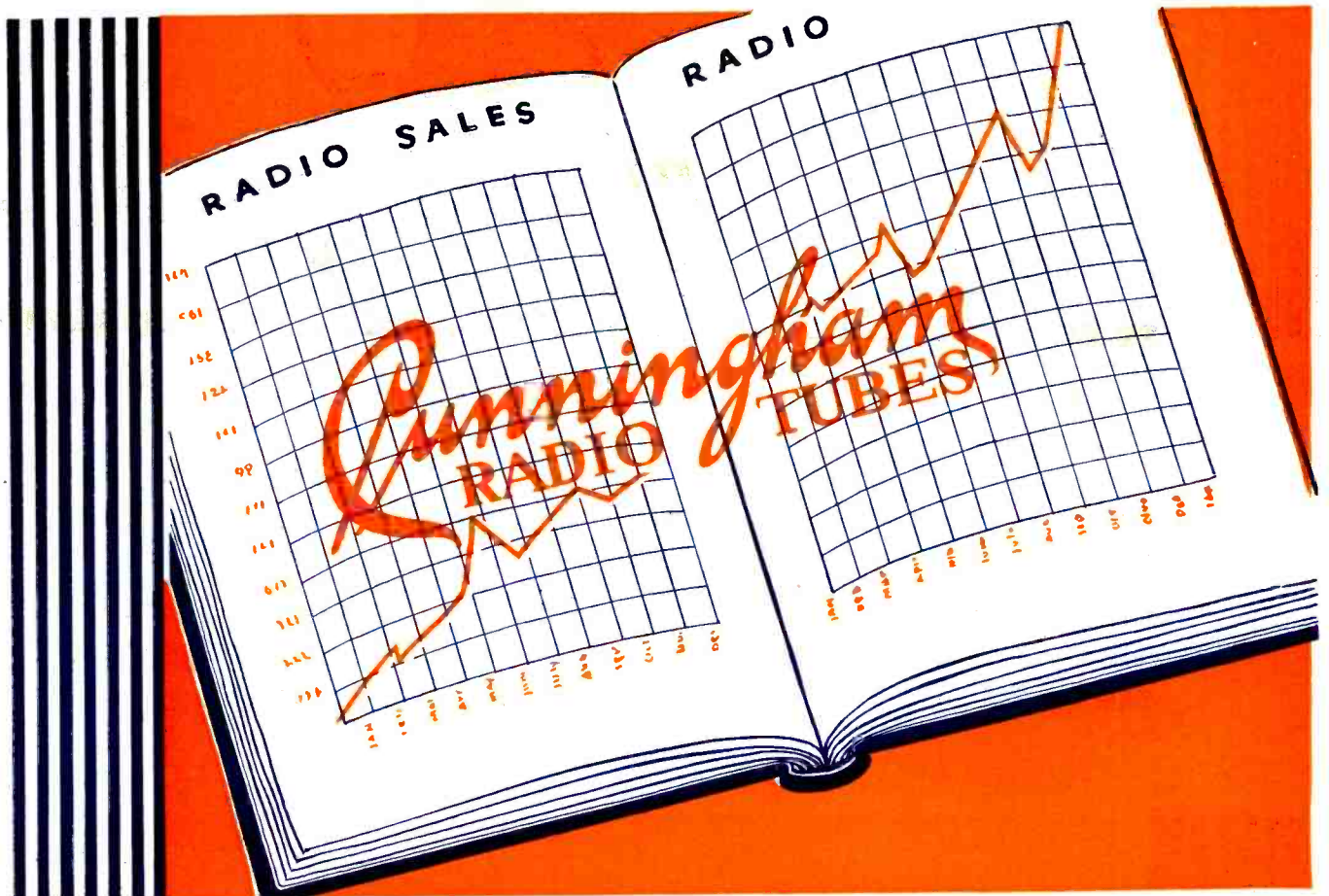
Schlafer Hdw. Co., Appleton  
McIntyre-Burrall Co., Greenbay  
Morley-Murphy Co., Greenbay  
Sorenson Lamp Co., Luck  
Central Elec. Sales Corp., Milwaukee  
Lappin Electric Co., Milwaukee  
Pioneer Sales Co., Milwaukee  
Radio Specialty Co., Milwaukee  
Radio Parts Company, Milwaukee  
J. J. Koepsell Co., Sheboygan  
Wisconsin Auto Supply Co., Wausau

And All Houses of the

GENERAL  ELECTRIC  
SUPPLY CORPORATION

# Keeping the Sales Curve pointed *upward*

**It's an "open book" if you will just use a little more thought, time, and effort in selling old customers. It's easier to resell the 40% who have owned radios for two years or more than the 60% who are merely "exposed" to radio . . . . .**





● **“....yes, madam, our advice would be to allow one of our service men to call, inspect your radio, test your tubes, and offer to help bring back your first radio enthusiasm when your radio was new. The call obligates you in no way...”**

• *Cunningham* • RADIO TUBES • *Cunningham* •



**Live dealers are finding new ways and methods of keeping contact and building confidence with old customers. Many dealers are surprised to find startling results from just one phone call..... it often leads to an order for a new radio.**

*Cunningham* • RADIO TUBES • *Cunningham* •

# The whole family will smile and thank you

**for helping to bring their radio up to its  
original performance...**

Radio should be the "big moment" in every family circle — especially with the world events coming over the air today.

It is up to every dealer to see that the radio he sells is kept up to date.

Have your service man telephone or call on your customers who purchased a radio a year or more ago. They may be in the market for a new receiver — if not, they will thank you for bringing their old set up to date with new tubes and other accessories.

Like the family car, radios need attention once in a while.

**E. T. CUNNINGHAM, INC.**

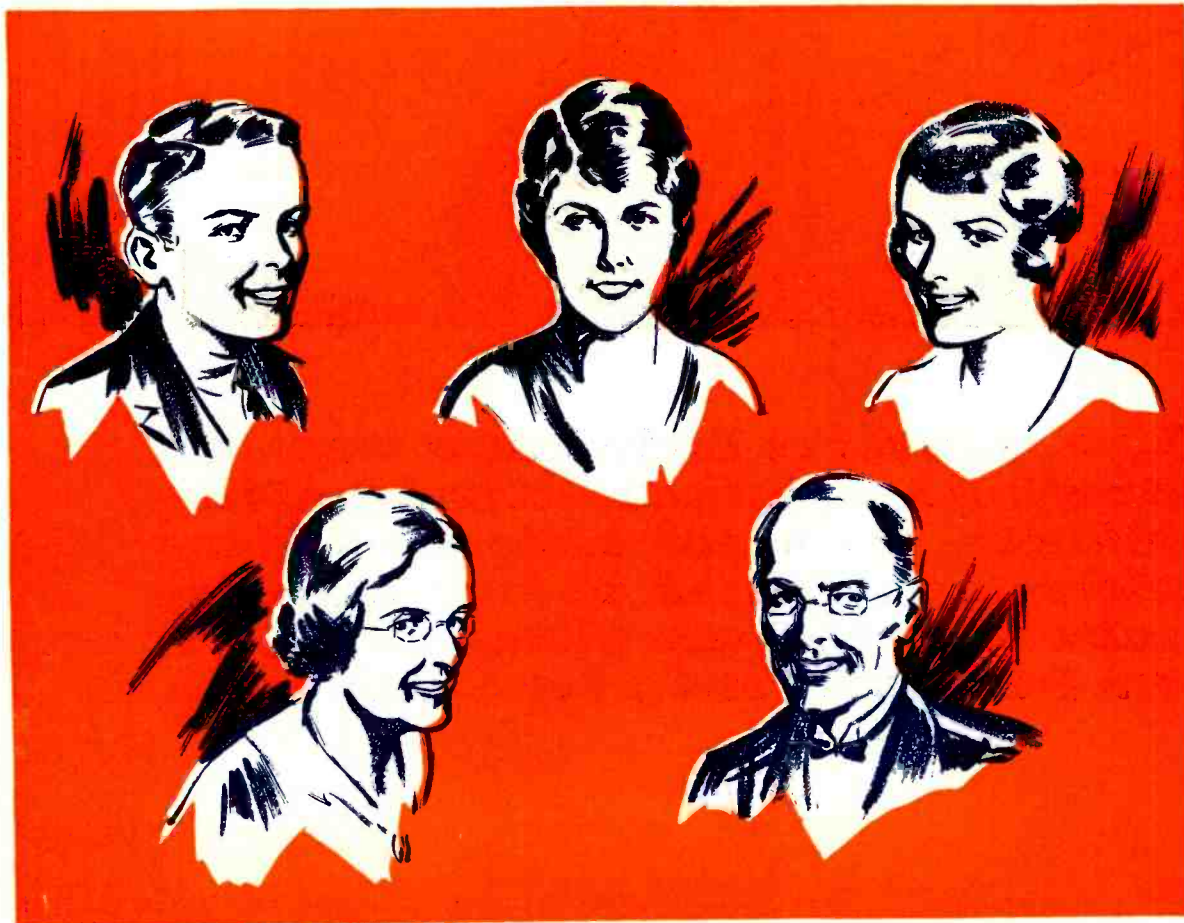
NEW YORK

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# RADIO

the national trade magazine

VOL. XII

AUGUST, 1930

No. 8



## How to Be a Radio Hawkshaw

By VOLNEY G. MATHISON

THINGS were going along their lumpy but usual way in the store of the Gray Radio Company. The telephone was ringing on an average of once every fifteen minutes with a demand for service or something by some one of the store's three thousand customers.

Then of a sudden into the busy calm of the office burst, like a human tornado, a little jumping shaggy man with long reddish mustaches and glaring bristly-browed eyes.

"She's skipped out!" he fairly shouted, as he plunged in beside the manager's desk. "She's run off with my dimings pin an' your Hotwater Kettle radio in her trunk. Quick! You got to catch her!"

"Who—what's her name?" demanded Gray, rising and shoving the distracted rag-bag of a man into a chair.

"Don't you know me—I'm Bozik—the Bozik of West Redbank — I got thirty-eight tenement flats. It's my dimings pin I'm worrying for. She had my keys. Used to—to clean up my place.

She took my dimings pin and six blankets. Your radio—she said a dozen times she was going to let you kiss her foot for the money because you sent a collector at her door every week—that dimings pin, I got it for the rent from the Schroder bunch—fifty dollars if a nickels, it was worth—"

"Any idea when she left, and how—train, automobile, airplane or submarine?" cut in Gray.

"Seattle, she told everybody," panted Bozik. "She went to the depot this afternoon when I was to the bank—took her trunks and the dimings pin. She's gone—I was to the station—"

"All right," said Gray, rising and reaching for his hat. "Come on!"

He hustled the chattering Bozik out to an automobile, jumped in and shot swiftly through the traffic down to the Pacific station. Straight to the baggage department went Gray, displaying an elaborate gold badge marked "Deputy Sheriff." He got the chief baggage-clerk aside and soon had the trunk-check record spread out on a desk.

"Here it is," said the clerk, after a moment. "Katie Smith, Train No. 310—that train goes to Los Angeles, not Seattle."

"O.K." said Gray and he rushed back into his auto. Ten minutes later he was at the city hall of Redbank.

"How do you know the woman has either the radio or the diamond pin in her trunk?" demanded a peaked-faced assistant to the district attorney. "It's Saturday afternoon anyway—you can't get a warrant till Monday, and I'm not sure you can get it then."

"But we know the woman's on the train and you could pick her up at Los Angeles tomorrow afternoon," protested Gray. "Once she gets off the train in a city of a million people how will we ever find her?"

"Can't help it—what did you sell her a radio for?" snapped the representative of the law. "You accepted a contract from her, didn't you?"

And that was all the satisfaction Gray could get from the police. It was about as much as he had expected. He

had had too much experience with them before. He promptly telegraphed a private detective agency in Los Angeles and had an operative meet the train to spot Katie Smith, of whom he gave a detailed description, with the aid of Bozik.

Then he filled his gas-tank and struck out on a four-hundred mile drive to Los Angeles. He arrived the next evening, went to the detective agency where he found that the operative assigned to the job had trailed Katie Smith to an address in South Los Angeles—trunks and all.

"Tried to get the police to hold her and her baggage," said the detective. "Got the horse-laugh—they demanded to see a warrant from Redbank."

"I thought so," said Gray. And thirty minutes later he was at the door of a disreputable-looking place in South Los Angeles. From inside came the music of the radio going full blast.

"Skip out with property you don't own, will you!" snapped Gray, shoving first his foot and then his body through the door which was opened by Katie Smith herself, a strapping rawboned female with a face like a broken brick fence. "You're lucky not to get a pair of handcuffs on your wrists and be taken for a ride back to Redbank."

Keeping up a fast running fire of angry talk, Gray quickly unhooked the aerial and ground of the radio, pulled out the light-socket plug, bundled set and speaker under his arm and marched out with his property, leaving the female absconder standing breathlessly in the door staring after him with jaw agape.

AND that, friend dealer, is one way of getting back your property from a deadbeat that won't pay for it—go after it yourself and take it. No matter how conservative a dealer may be, he is likely occasionally to face the necessity of recovering an unpaid-for radio. He may know where the set is and he may not. Herein is the story of what the Gray Company did in both cases.

In the first place, the Gray Company learned the lesson thoroughly that the radio dealer can save himself many a job of tracing a skip if he will be extremely rigid in his collection system. The moment an account falls behind, the dealer or his collector should find out exactly *why* it is behind.

Statements of a delinquent customer are not always reliable. He may not care to state that he is out of employment and is thinking of hitting the pike with his family and your radio to some more prosperous town in a far state. You should communicate with the concern with whom the delinquent states he is employed. If the delinquent customer is out of employment, that is a danger

sign; if he was discharged for unsatisfactory work, that is a triple danger sign.

A reliable and honest man of course may be out of work; in that case the foreman or manager of the place where he was last employed can usually give information that will enable the dealer to judge whether or not to take steps toward recovering his property.

If the delinquent purchaser is in some sort of shoestring business of his own, it is advisable to find out who his other creditors are and see what they think of his situation. If the purchaser has no place of employment and no business of his own, if he just seems to be staying some place with no ostensible means of support, the faster the dealer gets his set back the better.

It is an interesting and important fact that persons in certain types of occupations and businesses are vastly more risky than are those in others. The worst accounts in the world, as any financial-reporting company will affirm, are those of one-horse building contractors. These fellows are continually in hot water, are everlastingly on the move, and almost always leave a flood of bad bills in their wake.

Do not deal with a bootlegger except on a cash basis; the successful ones have plenty of money to pay cash, and the pikers will invariably skip out with your property if you let them get hold of it. The same applies to operators of gambling places or of any type of shady or illegitimate enterprise.

Small restaurant keepers are usually bad risks. The Gray Company, I remember, had about fourteen restaurant accounts; out of these, twelve sets had to be repossessed, and the other two were extremely slow pay. Restaurant keepers will also give the dealer every possible amount of expense and trouble in getting his property back.

We sent a fighting collector to bring in one restaurant-keeper's set, a woman she was by the way, though not a lady; the collector returned with the set, but also with a scratched and bleeding face, a head cracked with a mustard bottle



"The collector returned with the set."

and half a dozen knife slashes across his fingers and wrists. And after all that the woman got a judgment against the company for four hundred dollars, because the repossession was not made with the usual legal red tape. The account was three months delinquent and only twenty-five dollars had been paid on the radio.

Among occupations, the most risky is that of the salesman. The salesman has a hundred dollars in his pocket today and not a dime tomorrow. He is more gullible and more easily sold a dozen times beyond his means—on the installment plan—than any other bird that breathes. Restaurant help and cooks are also usually bad risks. Unskilled laborers should never be granted credit unless they have lived in one place for years, and have a record of reliable service with their employers, or can produce at least two first-class references where they made previous purchases on time-payments. Persons employed in canneries or packing plants that operate only a few months in the year are extremely bad risks. And an applicant who admits that he moves frequently from one town to another in his own car should not be considered for credit, unless especially good references are produced.

Sickness often overwhelms a purchaser and it is liable to be the painful obligation of the dealer to make a repossession promptly. If the illness is of a serious kind and bids fair to be prolonged, and the victim has little or no money, the dealer can make up his mind that his radio will never be paid for, however sympathetic he may feel about the matter.

When a delinquent purchaser pours forth a long story of what he is going to do next month and winds up with a promise to pay on a certain date, and then stalls to a still more future date, the dealer had better make a thorough investigation at once and act quickly to get his property back. Dozens of times I have listened to such stories, and the outcome very often was that the collector finally found that the delinquent customer had skipped out with the radio.

WHEN the dealer has decided to recover his set, the first thing to do is to send the store truck out with orders to bring the machine in. If the customer is not at home, or, as very often happens, pretends not to be at home, the truck should be sent back repeatedly until the set is obtained or a definite refusal to surrender it is made by the purchaser.

In the event of such refusal, the next step of the Gray Company was to run a "bluff" replevin. A man whom the troublesome customer had never seen before would be sent out with our high-powered gold deputy-sheriff badge and a



dummy court-order. The dummy court-orders were printed up by the Gray Company from a genuine form, were typed out in a pseudo legal style, and were signed by the owner himself, and then the company's corporation seal was affixed—all for the sake of impressiveness.

With the badge and this dummy order, the special man went forth to get the company's property away from the rambunctious delinquent; and although the whole thing was sheer bluff, the ruse usually succeeded. In fact, it always did except in the case of hard-boiled, time-scarred birds who had been through too many real replevin suits to be fooled.

The dummy order and badge system saved the Gray Company hundreds of dollars in lawyers' fees. Also it got speedy results. It is necessary to state however, that the impersonation of an officer is unlawful, the penalty being anything from a fifty dollar fine down—depending on who your attorney happens to be. In running this bluff, too, it is advisable to get a high-grade, fifteen-dollar gold badge; don't try it with a six-bit tin star or you're liable to be kicked down the front steps. Any metal sign company will make up the proper article to order.

If this ruse fails, the only thing left to do is to get a genuine replevin. This is such a lot of red tape that the dealer can't manage it for himself but must employ an attorney. There are all kinds of lawyers with shingles stuck out and I should like to stress on the radio dealer, especially the smaller dealer with little money to spend for legal services, that the retaining of a shoddy unknown hack of a lawyer is just about the worst break the dealer could possibly make. The Gray Company had one lawyer who lost every case given to him, who could never bring anything to a head, and whose ignorance and lack of ability in his own profession caused the owner of the concern a direct cash loss of nearly ten thousand dollars.

**B**UT suppose that Mr. Bunkum Skip, the delinquent customer who has stalled the trusting dealer for three months with more tales than there are in the Arabian Nights, has finally skiddooed and taken the dealer's radio along with him. Behind him he has left a thousand unpaid bills and no trace of his destination. What then?

The greenest dealer will take his troubles to the police. For all the good he will get out of that he might as well write out his woes on a postcard and drop the postcard into the incinerator. The police, when faced with a complaint about their inefficiency, will tell you with hearty goodwill that they are not in the collection business and that if you made a contract with a crook, why that

shows you must be something of a jack-ass even though your ears don't flop over; and you can do your own wailing about it.

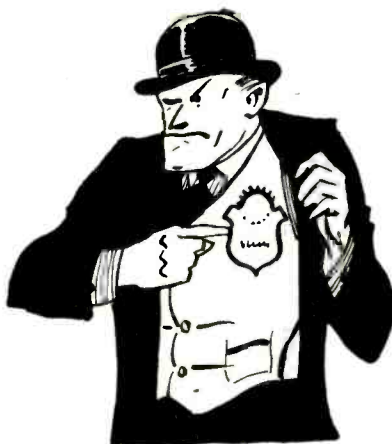
A better course for the smaller dealer is to turn the case over to a private detective agency. There are a number of these concerns that pretend to make a speciality of tracing skips. They can do only a fraction of what they claim they can do. They are composed sometimes of ex-flatfoots who are too lazy or too crooked even to be on the regular force. These agencies vary greatly; some are entirely worthless, others approach a semblance of efficiency and do recover a good many missing pieces of property.

If the dealer has a large volume of business, it is advisable for him to train one of his collectors to trace skips. But if the dealer is operating a one or two-man concern he will either have to turn this work over to an agency or tackle the job himself.

The first thing to do is to try to find out how the skip took his departure. If he left by train, his baggage checks will reveal his destination—if that destination is a big city and he can't be headed off before his arrival, the radio may be permanently lost. If he left in his own wobbly lizzie loaded to the guards with bedding, washtubs, kids and cats, and your hundred and fifty dollar radio, you may never see it again.

Fortunately for the radio dealer, the greater number of radio skips do not move out of the city in which they have purchased their set. Sometimes they go to some small suburb fifteen or twenty miles away from where they were last seen, or again they may move only a couple of blocks.

Every person who can be talked with in the vicinity of the place where the skip lived should be queried fully and painstakingly for all possible knowledge of the missing person. Old ladies with a proclivity for sitting at windows are the best sources of information, but anybody may be able to shed light on the destination of the skip—the corner groceryman, the man in the third house to



*"Don't try it with a six-bit tin star."*

the right, or the son of the lady in the second house to the left. It pays to make inquiries the extent of four or five houses in each direction, if the skip lived in a residence. If he lived in an apartment, the case is about a hundred times tougher. But the landlord may be able to tell something of importance.

For instance, if the skip hired a commercial moving van, it is only necessary to find out what concern the van belonged to; if you know the date the move was made, the van company can give you the wanted person's new address. If you can't find out what van company did the moving, you can query them all unless the city is a big one and there are too many companies to make it feasible.

If the missing purchaser's credit statement in your files indicates that he was paying on an automobile, you should, if possible, find out what company is in possession of the auto contract, and through that company you can eventually get the new address of the delinquent customer. Or if he owns an automobile outright and you can find out the license number of the machine, you can get the location of the owner when he renews his license plates. The Gray Company made it a practice to query every credit applicant about make, ownership and license number of his car, if he had one. The license numbers were secretly checked up and indicated on the customer's record in the files.

Another point that was followed up was that of checking the customer's insurance; purchasers presenting weak credit statements were asked if they carried any kind of insurance; if so, the name and address of the agent to whom they made the payments was obtained.

The name of a relative of different address from that of the purchaser should always be secured when preparing a customer's credit statement. New addresses of missing customers can often be obtained from such relatives especially if the information is obtained adroitly—not by sending a collector but by sending a "plant"—say a bogus expressman with an important package that he must deliver to the wanted party.

Another simple expedient is to hire privately a Western Union messenger boy to pretend to take a telegram to the wanted person, going to the known address of the relative, and have him insist that he must deliver the message to the missing party. This little system will work wonders—provided you have the address of the relative to start with.

The prize stunt of all, and one that I have never heard of any other concern making use of, is to make an agreement on the quiet with some employee of the gas and electric company in your city who has access to the customer records.

By paying from three to five dollars for each new address furnished, you will be able to flabbergast more than one skip by waiting for him on his new doorstep almost before he arrives.

In order to work this, it is necessary to operate strictly with some individual employee, as the gas and electric companies will not stand for having their people spending time tracing skips through the concern's records—not if they know it.

If all other methods fail, it is often worth while to make an effort to trace the skip through his occupation. For instance, if his credit statement shows that he is a bricklayer, a plasterer, or a carpenter, a mimeographed letter with stamped and addressed return envelope enclosed may be mailed to the employment departments of every contracting concern within a hundred miles. If the man is an auto mechanic, a similar procedure may be followed with garages and automobile companies.

The Gray Company found this a successful means of getting hold of skips. I remember that a tile-setter was located through broadcasting for information among tiling companies, a truck-driver through trucking companies, a steel-worker through fabricated building contractors, and a bootlegger by consulting police records. Railroad and steamship workers can be readily located through such inquiries.

An unskilled laborer who owns a thumping heap of 1919 vintage and moves from town to town at frequent intervals cannot ordinarily be traced at all—a dealer who allows a good radio to get into the hands of such a risky person deserves to lose it.

At times, however, even the most careful dealer may be misled by a clever deadbeat who misrepresents skillfully in making his application for credit, or who gives one good reference when he could have given a dozen bad ones. A radio in such hands is also very likely to be lost; but there still remains two possible ways of recovering property from a skip who has completely hidden his trail.

In the first place, if the fellow is an out and out crook, he cannot stay away

from other crooks. With due exceptions, it is an extremely true saying that birds of a feather flock together. It is almost solely on account of this fact that the police ever get hold of a criminal, rather than through any startling brilliance or cleverness of their force. When they want a man they know just about where to look for him.

If the missing person is a young man, he can often be run down in pool-rooms, public dance halls, at local prize-fights, bootleg dives, and other places of interestingly questionable character. If you live in a large city, you should obtain permission from the police to consult their rogues' gallery. If you find the photograph of your man you can then see what information the police have concerning your departed customer. Don't be surprised if the faces of several of your customers jump out at you from the police's picture-books. Such things will happen.

The radio dealer of a large city probably may not know just where the places of rendezvous of the underworld and the semi-underworld are. But he can find out by making judicious inquiries, either from a friendly police officer or a taxi-driver, or best of all from a bootlegger or a female underworld character who is willing to talk. If the dealer does not want to attempt this sort of work himself, he may be able to obtain the services of some one who will, or to train one of his collectors to attend to it.

In a period of a year, I recovered radios worth a total of six hundred dollars at wholesale through contact with underworld characters, and besides was forewarned in the cases of three credit applications that would have otherwise been accepted as they checked O.K. in almost every respect.

When all other methods fail, a stunt that is frequently effective is to offer a reward of about twenty-five dollars for information leading to the repossession of the missing property. This reward offer should not be spread broadcast but should be made confidentially to any persons, old or young, that the dealer or his collector suspects may have some knowledge of the whereabouts of the delinquent customer.

In making such an offer, if you are dealing with shady characters or outright crooks, it will be important to impress on your hearer that you positively are not trying to set a police trap for anybody; that you merely are anxious to get your own property back and are not interested in the missing person's affairs in any other way and do not intend to try to get any revenge on him by having him arrested.

Honor among thieves is a myth; in their clashes with the law they cooperate for the sake of self-preservation. As long

as they are sure that the police will not have a finger in the matter at hand, they will for twenty-five dollars cheerfully doublecross their grandmothers any day in the week.

At one time, a large drove of "bad" negroes emigrated into Redbank from Los Angeles, whence they had been ordered out by the police. Unfortunately, a salesman of the Gray Company, who specialized on colored accounts, placed a radio on demonstration in a house occupied by some of these criminals. He learned his mistake and was back three hours after the delivery of the set to pull it out, but it and the "prospects" had already vanished.

The usual methods of tracing were obviously useless in this case and no time was wasted with them. By some querying around, I soon got hold of another crook, a young dandy of a black boy who was rumored to have suffered the loss of a "moll" or girl at the hands of the thief who had decamped with our radio.

I put this young fellow through a searching cross-examination, doing it entirely under an outwardly good-natured razzing of him about his loss, figuring that this would heighten his ill-will toward his successful rival. But he seemed very positive that he did not know where his ex-flame and the other crook had gone.

So finally I offered him twenty-five dollars in cash if he would get busy and find out where my radio was. He at once showed me the whites of his eyes, looked me over, and told me he would come to my office the next evening. He did so, and informed me that we would have to cross the bay to San Francisco.

He got into my car, piloted me over to San Francisco, down into the heart of the toughest section of the old Barbary Coast, then directed me to a most disreputable looking Filipino hotel, and gave me a room number. "In that room is th' rajo," he asserted. Meanwhile he slunk low in the car as some colored gentlemen passed, and finally pulled down all the curtains in the coupe and kept himself perfectly hid.

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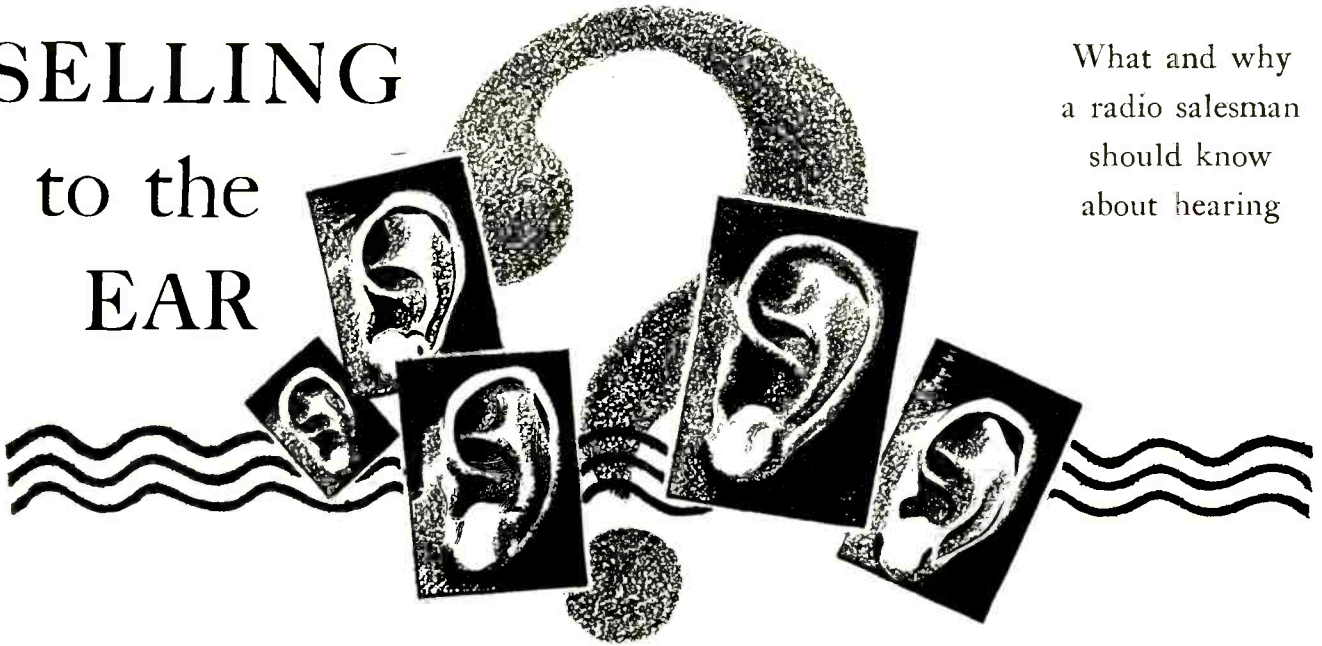
"Honor among thieves is a myth—they



will cheerfully doublecross their grandmothers."

# SELLING to the EAR

What and why  
a radio salesman  
should know  
about hearing



By HECKERT L. PARKER

A MAN who is partially deaf finds but little more difficulty in becoming a successful radio salesman than does a salesman who is unable to recognize differences in tone quality. The one does not hear well; the other does not hear intelligently. Yet in order to praise or to condemn, to emphasize or to gloss over the reproduction of the music by a radio, the salesman must not only be able to hear well but also to hear understandingly.

While many radio prospects know little about tone quality, a few *convincing* remarks from the salesman will often help them decide to buy when they are unable to judge for themselves. The tone of a set may not show to good advantage during a store demonstration, yet when a salesman tells how and why his set has good tone in a home, a person with a trained musical ear will be convinced and buy in the belief that it will meet his requirements in his home.

Without going too deeply into the technical details of radio, every radio salesman should know the fundamental facts about sound and hearing. While he should not waste time in discussing them idly, he should be able to explain why the set that he is selling meets the factory's claims for tone quality. Furthermore, he should understand why all sounds do not have the same effect on all people, so that he can deal intelligently with those whose hearing is defective. Let the retail salesman adopt the spirit implied by Sir Oliver Lodge when he said, "You are not to suppose to understand things because you call them by name." Thereby he can sell more sets to more people.

THE BASIS of sound is the vibration of a material object. Sound starts from an object that vibrates. Each object of definite size and weight always vibrates back and forth at the same number of times per second. This number is known as the object's natural period of vibration, "period" meaning the time between any particular part of a vibration and its repetition.

The complete time between which a vibrating object, starting from rest, going a maximum distance in one direction, stopping, returning in the opposite direction, passing through its original position of rest, continuing to a maximum distance, stopping and returning to its original position of rest, is known as a cycle. Picture a pendulum on a clock. Its cycle is a complete to and fro swing.

Time is a factor in considering all motion; hence the second is taken as the unit to measure the frequency with which these complete cycles recur. The word "frequency" in all radio topics means the number of cycles per second.

The frequencies between about 16 and 10,000 cycles per second are called "audio" frequencies, because the human ear can hear sounds from sources or materials which set the air in vibration at rates between these limits. As the frequency becomes higher or lower the ear can not detect it as sound.

Air is elastic. It can be compressed and will expand upon release of the pressure. Air can be set in motion, made to vibrate, and its rate of vibration, or frequency, will be the same as the frequency of the material which set it in motion. These air waves are in the form of alternate condensations and rarefac-

tions, like "puffs." Sound is possible only when the air is set into vibration in a succession of waves, or minute changes in air pressure.

These waves of air pressure vibrate the ear drum, which is a stretched membrane, or a diaphragm, in the outer ear. Vibrations of the drum are transmitted through a set of curiously shaped bones in the middle ear, the last one of which touches a second diaphragm at the entrance to the inner ear. The inner ear is a spiral cavity in the skull bone, filled with a liquid which contacts with a flexible, cone-shaped spiral membrane along which are distributed the nerves of hearing. Vibrations of the second diaphragm set the liquid in motion. This in turn affects the spiral membrane. Lower frequencies (low rate per second) affect the lower or larger end of the spiral; and higher frequencies (high rate per second) affect the membrane toward its apex; the pattern carried to the brain by the nerves of hearing will depend upon the combination of vibrations, or frequencies, disturbing the spiral membrane.

In common with all substances in nature, the response of the human ear to sounds of different frequency rates is limited. Averages taken by examination of hundreds of individuals, by many investigators, show the lower limit of response to be around 16 cycles, and the upper limit around 15,000 cycles per second.

THE MUSICIAN'S term for frequency of vibration is "pitch." Middle C means 256 cycles per second to the acoustical engineer; but to the musician it

means a tone which lies at the middle of the piano keyboard, frequently used as a reference tone with which to compare tones of other "pitch." Any vibration of the air at rates between the above limits will be perceived and recognized as sound, provided there is enough pressure back of the force which set the air in motion. If there is too much pressure, sounds are felt, actually causing pain with excessive pressure. Musicians refer to this air pressure as "loudness" and measure it by names only, such as "forte" for loud and "piano" for soft; very loud by "fortissimo" and very soft by "pianissimo." One person's perception of "forte" may be "fortissimo" to another person, etc.

Sounds at low frequencies require more air pressure than sounds at high frequency to produce the same sensation of loudness. For instance, the air pressure required to produce a tone of frequency of 64 cycles may be 1000 times greater than the air pressure required to produce a 512-cycle tone. Likewise, in electrical reproduction of these tones, 1000 times more power is required to produce the 64-cycle tone than is required to reproduce the 512-cycle tone at equal volume. The importance of "power" tubes in the last audio stage of a receiver is appreciated when this fact is realized. These tubes can handle the electrical energy required for low tones.

The entire mechanism of hearing is extremely delicate, composed of many parts, and is quite complex. Slight differences in shape and structure of any of these parts can cause different people to "hear" the same sounds differently. These differences may be inherited at birth, or because these parts are so delicate, slight impairment by accident or by disease may occur any time during life. The mechanism of hearing in some people may be as perfect as nature intended it should be. Trained muscles are necessary in an athlete, dancer or singer. Because of training and practice, minute changes of pressure or frequency are heard by some ears which would be impossible with ears and hearing not so acutely adjusted and trained.

Tones are sounds of sufficient definiteness that their characteristics are appreciated by the ear and are therefore useful for musical purposes. Measured on an oscillograph, and photographed, a simple tone may be nearly as mechanically simple as the 256-cycle fundamental curve in Fig. 1.

However, in musical tones, there is set up with the "fundamental" a whole series of tones (or harmonics) which the musician terms "overtones" or "partials."

A musical tone is more or less complex because of these overtones, but the "wave form" of a given note of music

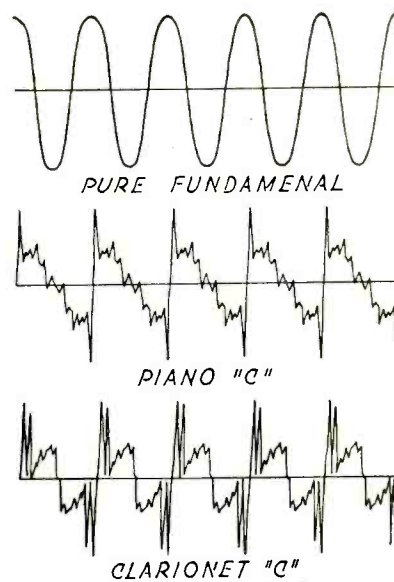


Fig. 1. Fundamental and Overtones

or frequency (pitch) maintains a similarity easily recognized as being of a certain fundamental frequency regardless of the substance or material from which the tone originated. Note the similarity of the amplitude points of the three curves in Fig. 1. Note the differences in the little zigzag lines of the curve of Middle C originating on a clarinet, and the same note originating on a piano. These little extra zigzag lines indicate the number, position and loudness of the "overtones" (harmonics) or "partials" present in the tone of that frequency when sounded by these different instruments. The height (or amplitude) of these lines above and below the horizontal line indicates the

loudness of each overtone. The number of these overtones, their relative loudness (amplitude) with respect to the amplitude of the fundamental, the length of time they are sustained or "damped" out as compared to the fundamental and each other, are the factors which determine the "quality" of a tone, and likewise the reason why the human ear can distinguish between different instruments.

The word "timbre" is used by some musicians to describe quality. Some of these overtones are strong, others are weak; but the sum total of the fundamental and its overtones must be received in their original form, and no other tones added, to be able to say that the fidelity is perfect. When all of the overtones are present in the natural relation to the fundamental, the tone is said to be at its best quality as described by the musician with the words "brilliance" or "definition." The frequency of the first overtone is double the frequency of the fundamental tone or frequency. The frequency of the second overtone is double the frequency of the first overtone, etc., etc.

The muted trumpet, clarinet, trombone and violin are familiar tones. The mute damps out certain of the overtones of the instrumental notes, changing the character of the tone, and these changes are shown up instantly on a picture of the wave form.

Noise is a sound of too short duration, or too complex in structure, to be analyzed or identified by the ear. Because of lack of training, or lack of suitable standards of comparison, or possibly on account of fatigue or relaxation of attention, the ear may classify tones as noise. When the wave form of a tone is partially recognized, but slurred because of some alteration of the relationship between the fundamental and its overtones, the result is called "distortion."

A picture of oscillograph curves of the same note sung by different persons will also show a variation in the presence of overtones because of the differences in the vocal organs, and is the reason why the human ear can recognize people by their voices, or why the "quality" of voices differs. A man's voice is pitched at about 128 cycles, and a woman's voice at about 256 cycles. While both voices have several overtones, a man's voice has more overtones than a woman's. This can account for the fact that a woman's voice is more difficult for the ear to interpret, because the spiral membrane of the ear is not affected in as many places by a woman's voice. The organ, piano and harp have the greatest span of frequencies, ranging from 16 to 4000 cycles. The notes which are used most in music are in the octaves below and above Middle C, or from 128 to 512



Fundamental Frequencies of Musical Instruments

cycles. The fourth overtone of 512 cycles has a frequency of 8192 cycles. A highly trained ear might detect the absence of the fourth overtone of a 512 frequency note, but the average person would have difficulty in detecting the absence of overtones at frequencies above about 5500 cycles. The first, second and third overtones are, however, quite important for a tone to retain its characteristic.

**T**O COMPARE the difference in tone between two different sounds requires that the comparison be made quickly, because the intricate "quality" pattern of a sound registered in the brain fades out rapidly in many of its details. If the difference is wide, the brain can retain the comparison longer. The most highly trained musician could not listen to a concert A on a piano, go into another room one minute later and accurately tune his violin to the same pitch as the note sounded on the piano. He might get close, but only an accident would have it in exact pitch relation with the piano. This trick would be almost impossible with the untrained ear. For this reason, few radio prospects, or radio salesmen for that matter, can listen to a receiver, walk one city block, listen to another receiver and make an accurate comparison between the tone quality, unless there is a very wide difference between the two instruments.

Most people are sensitive about any physical imperfection they may have;

and those who are slightly deaf may not admit it to the radio salesman. Where the imperfection of hearing is only that of partial deafness, the person may be perfectly capable of distinguishing the most minute differences of quality, but the over-all pressure, or loudness, may have to be increased for them to hear distinctly and enjoy the radio reproduction. The acoustics of particular rooms, a particular location of the receiver or of the deaf person in the room, various degrees of loudness or volume, play peculiar tricks for people who are only partially deaf.

Some people so afflicted have been agreeably surprised at their ability to hear radio which was not considered possible until a particular set of conditions were found which suited their condition of hearing. Incidentally, it is common practice to equip receivers with head-phone attachments so that a partially deaf person can listen and control the volume independently through a set of head phones on his ears, without disturbing the other members of the household who would be annoyed by the excessive volume required to enable the deaf person to hear through the loud speaker. Furthermore, more delicate shadings of tone quality are perceptible through radio transmission when the volume demanded through a receiving set is not greater than the volume, or loudness, of the origin of the music or speech in the broadcast studio.

When one considers the complex nature of the mechanism of hearing, and the ability or inability to register all of these complex vibrations of one tone so as to distinguish between voices and instruments, is it any wonder that all people hear the same sound differently?

Many different radio manufacturers claim that their receiver has "the finest tone quality." Is it any wonder that this claim is accepted by thousands of people with one grade of hearing, while as many more thousands ridicule the statement because their ears tell them a different story?

It is remarkable to observe the great improvement made in the fidelity of radio reproduction of sound. This development has taken place at both the broadcast transmission and the receiving ends; and neither can claim that they alone are responsible for such improvement. One might gather from advertising statements of some radio receiver manufacturers that the quality of tone they claim is due in some particular manner to their particular receiver. Radio devices, starting at the microphone in the broadcast studio and ending with the loud speaker in the receiver, are only instruments for the *reproduction* of sound and do not have anything to do with the quality of sound except to bring about changes and distortions of the original. Radio can not improve upon the original. The copy is best when it is as near like the original as possible, regardless of any faults in the original.

## The Customer—Not Right But Mostly Honest

**N**O, THE customer's not always right. But the circumstance that figures in your profit showing is not what he is but what he thinks.

He may be as wrong as Judas Iscariot, but if you allow the matter to be settled against him while he thinks in his heart that he's right you've done yourself quite as much damage as if he had been right.

Which sounds elementary. But how many business houses do you know who act upon that postulate in dealing with complaints? What percentage of them seem to realize that selling the complaint is only a shade less important than selling the prospect?

We have had a few complaints, you may imagine. We blunder often in our handling of them. But this, at least, we have learned from long experience—that out-and-out dishonest claims are so negligible that the average merchant can disregard them wholly in framing his adjustment policy. We have also learned that complaints are nearly nil in which

the customer is altogether wrong. When he sets up a howl the house is almost certainly to blame in some respect. One hundred per cent service plus one hundred per cent tact would just about eliminate complaints. Which is, of course, one way of saying that they will never be eliminated. But since they won't and since the customer is almost always partly right and generally thinks he's altogether so, it would seem the part of wisdom for every business institution to transform them from the liability to the asset column if it can, as factors in its quotient of good will.

Quite the surest and quickest means of averting acrimony in the discussion of a claim is to put all the facts on the table at the outset. Neither you nor I—run-of-mine human beings—can hold our rage long in the face of a manifest purpose to settle according to truth. We would probably foam at the mouth at any show of prejudice, opportunism or expediency. But our sense of fairness is instantly intrigued when the facts are

trotted out. We will fight hard for our dues as we see them in the light of said facts—but we aren't small enough to ask for more and are ready to shake hands and laugh the whole thing off the minute that much is conceded.

And if, on top of the facts, we are asked to say how we would view them if we were complainers instead of complainants, we are likely to fall over backwards in our effort not to ask too much.

Combated, we will have our pound of flesh. Conciliated, we will compromise. In the long run our vendors of goods or services will spend less on our claims by dealing four-square from the start and betting on our honesty of purpose than by covering up and bargaining to shave a penny here and there from their adjustments.

The customer is not always right but he is nearly always honest in his claim. When he isn't you can generally shame him into being so by acting as if you thought he was.—Commercial Credit Company.

**RADIO DEALER TURNS  
COLUMNIST IN  
HIS ADS**

It's one thing to insert an advertisement in a newspaper; it's something else again to get that advertisement read by the maximum number of readers. Such at least is the belief of S. T. Webb, proprietor of The House of Better Radio, 1740 North Highland Avenue, Hollywood, California.

To the end that more people read his advertisements, Mr. Webb has turned into a newspaper columnist, though he pays the newspaper for that privilege. In short, he is using his paid advertising space for a column called "Radio Squeaks" that appears once a week.

The column is written chattily and while it usually pertains to radio, Webb is astute enough to know that part of his column must be devoted to paragraphs that only indirectly sell merchandise. Perhaps not one out of four paragraphs exploit a specific product handled by Webb.

Humorous illustrations are used to break up the copy and tease the casual reader into staying with the column from top to bottom. Captions are placed over each paragraph.

While The House of Better Radio is less than a block from busy Hollywood Boulevard, there is little pedestrian shopping traffic past the store door. Most of the sales are made through outside contacting by salesmen.

To encourage more people to visit the store, Webb is offering one dollar for every joke that is personally brought in to him that is suitable for running in "Radio Squeaks."

One of the favorite methods used by Webb to introduce a direct piece of advertising into the column is to start out with a suitable joke that lends itself to illustration for the sales message to follow. For example under the caption, "Strange . . . !" the column says:

"They were talking about modern music and dancing.

"I don't like dancing to jazz," said the girl. 'It's nothing but hugging set to music.'

"Well," asked the man, 'what is there about that to which you object?'

"The music," she said."

And then Webb swings into his message:

"... but, I simply must disagree with that young lady. The music that is received over the new Radiola 33 is perfect in tone . . ." etc., for fifty words, then another joke and brief mention of the product again.

"I have found the column idea mighty sound," declared Mr. Webb. "For one thing it standardizes your advertisement

# What Some Dealers More

as a whole so that it is easily picked out of a page of ads and news, yet is not standardized to the point where it is uninteresting. I hope to develop it to the point where readers will look upon it as a regular feature of the paper, to be classed with syndicate features and comic strips."

## Radio Squeaks

By S. T. WEBB

**THIS IS THE SECOND SQUEEK!**

**HOWDY, FOLKS!**

**Here I Am**

asin . . . the "Radio Squeaks Columnist" . . . back to tell you that "Squeaks" are becoming less in Hollywood since last Tuesday when I "broke" loose with my first Radio Squeak . . . and I want you all to know how much I appreciate your comments last week . . . good or bad. I want you all to tell me what you think of "Radio Squeaks" whether they're yours or mine . . . and tell me your radio problems, too . . . mail me questions. I'll answer them here . . . Yes, sir, we can have a good old fashioned time . . . and if you are good at jokes worth a dollar . . . but you have to read farther to learn about that.

**A "Gripping" Situation**

... a Scotchman called us up the other day . . . wanted us to come right out and fix his radio . . . we did . . . arrive shortly thereafter . . . checked and found it absolutely O. K. . . told him . . . but, he insisted that it wasn't right . . . said that he liked the music but the "light bulb" in the set didn't give off enough light for him to read his paper . . . imagine that . . . his set was not to give him entertainment alone, but it was meant to cut down on the light bill, also . . . Yes, sir, Scotchmen are always getting into "strange" situations . . . that we send out a "Bulb" . . . you bet, our service is complete in every detail.

**Distance Season Will Soon Be Here . . . . .**

and, if your tubes are getting old, you'll be mighty sorry some time when the old set doesn't bring in the distance you want. We carry a complete stock of tubes . . . including known makes like RCA's, General, Ham, and others . . . the set will act like new if you have us install a complete new set of tubes . . . Call us today!

**Distance Season Will Soon Be Here . . . . .**

and, if your tubes are getting old, you'll be mighty sorry some time when the old set doesn't bring in the distance you want. We carry a complete stock of tubes . . . including known makes like RCA's, General, Ham, and others . . . the set will act like new if you have us install a complete new set of tubes . . . Call us today!

**Don't Forget**

With every set you purchase here, we will inspect it FREE each month for one year.

**See You Next Week!**

**House of Better Radio**  
S. T. WEBB

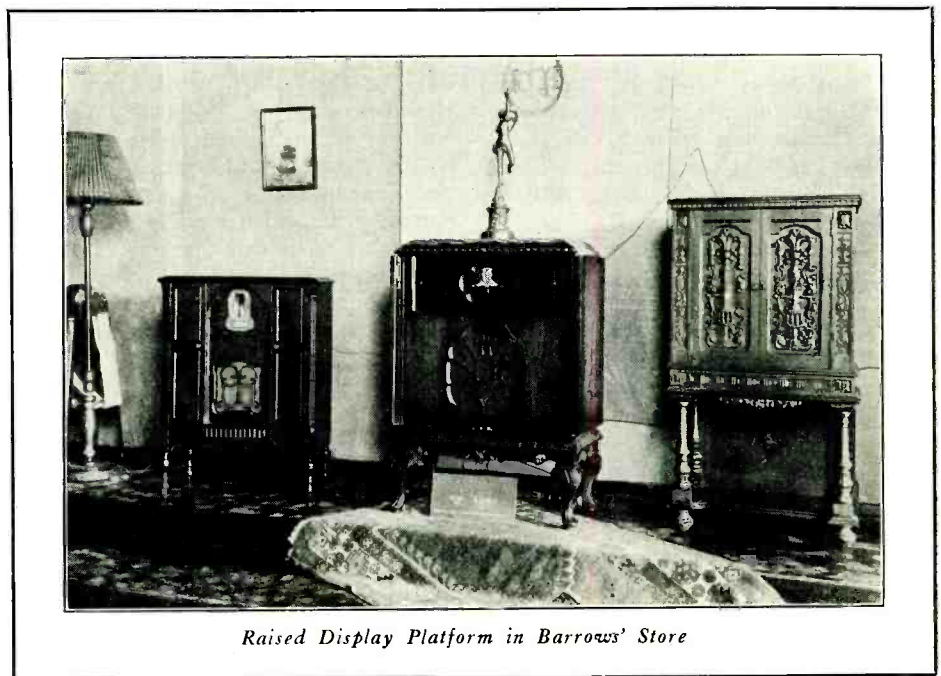
1740 N. Highland                      GRanite 4608  
Store No. 2—9040 Melrose Ave.  
Open Evenings Till 9 o'clock

## FURNISHES MODEL HOMES

By FRED E. KUNKEL

FURNISHING model homes with a radio for the living room and one for the bedroom is a good stunt which pays good dividends. It not only brings in new business but in addition it furnishes a lot of free newspaper publicity. Then, also, thousands of people visit these model homes and this acts as a splendid advertisement in itself.

"We furnished a model home recently in Wynwood Park, a suburb, and we installed a very fine radio in the living room," says E. L. Geasey of House and Herrmann, furniture merchants, in Washington, D. C. "This room created a great deal of interest and comment. We kept the radio playing all the time in this room and this has brought in a lot of inquiries concerning radios. There is an attendant at this house at all hours and the radio is going all the time, either



Raised Display Platform in Barrows' Store

# Are Doing To Get Business

the radio or the phonograph combination. We find that by putting that radio in there we got a lot of inquiries concerning radio as well as furniture and rugs.

"Sixteen hundred people visited the house on the opening day. In every room they found a framed price list of everything we had put into each room. We decorated each room with good looking drapes and hook rugs which were very reasonably priced, and in selecting our furniture, radio, and rugs we picked out the best and the finest rather than merchandise with a price appeal, to tie in with the thought of 'better homes' as reflected in the model home. Yet the items were all moderate in price at the same time that they were plus ultra in style.

"We are so well pleased with results in furnishing model homes that we are going to repeat it.

"Not only did this get us helpful publicity, but it also brought many people into the store, from which sales subsequently followed. In fact, we think that furnishing model homes is very helpful, particularly in selling radios. People see them, hear them, and want to know more about them. We find a lot of people coming into the store who have been very enthusiastic about it, and so far we have received some nice orders

as a result on merchandise which was actually displayed in the home as well as on other merchandise."

## SELLS HIMSELF TO THE PUBLIC

By HAROLD J. ASHE

**I**DEAS CONCERNING merchandising methods that crystallized while on the road for Stewart-Warner have been the basis of the success of Leon Barrows, owner of The Barrows Company, radio dealer, 5545 Sunset Boulevard, Hollywood, Calif. All forms of promotional effort have contributed to the success of the firm: direct-mail, newspaper advertising, stunts, etc., all centering around the personality of Leon Barrows. Barrows is a firm believer in selling himself to the public.

The Barrows' business has doubled and tripled in volume the past year over the first year or two. Last year's volume totaled \$76,000.

Figuratively speaking, Mr. Barrows believes that he must look far ahead to keep abreast of the times. He has been delving deeply into less developed phases of radio, notably public address systems, audiophones and talking pictures. Being located where talking pictures are made, he is better able to visualize the

rapid changes that can be expected in radio in the next few years, and is preparing himself for those changes. He is reading technical magazines on the subject, every available book, and all manufacturers' descriptive literature.

"Talking pictures, radio and public address systems are all allied," declared Mr. Barrows. "Radio is not only for home reception but for many other uses as well, and it is only a matter of time until experiments and discoveries recently made will be commercially practical. Audiophones open up an entirely new world to the deaf. Public address systems may soon be the rule, rather than the exception in churches, legitimate theatres, public halls and other places where large numbers of people meet. Talking pictures involve radio. Television will come into common usage some day. All this means that revolutionary steps will need to be taken before long by radio dealers, if they expect to keep abreast of the times and serve their communities."

In conjunction with his radio store, Mr. Barrows has a Speedometer sales and service plant, which specializes in selling and servicing speedometers. This phase of his business is tied in closely with radio sales.

In the speedometer department, reached by a drive-in, is a sign suggesting a visit to the radio department.

There are about 1,500 names on the radio direct-mail list. At present these are not being circularized, but Mr. Barrows declared that direct-mail had been most profitable to him, and he is planning to employ one person to handle this detail in the future.

At the time a radio is bought for cash, or when the last payment is made, a bill of sale is mailed to the customer, together with a "thank you" printed form, which thanks the customer for the patronage, expresses the hope that the radio is giving satisfaction and requests future business.

Various forms of advertising cost Barrows 5 per cent of the gross volume. In addition to paid newspaper space he gets an unusually large amount of free newspaper publicity, largely because of the use of good hokum photos, such as tying up a radio with an airplane and a movie star, an unbeatable combination.

Barrows uses both straight newspaper advertising copy, and also syndicated advertisements that include humorous sketches of characters in various poses and in different situations. While the latter costs more, Barrows believes that it is profitable due to its increased reader interest.

Radio broadcasting is used to a large extent. This is one form of advertising where both the radio and speedometer departments are plugged together. Every message sent out on the ether suggests



Leon Barrows' Staff and Store

that the customer "visit the radio department, while having the speedometer serviced."

One of his best single pieces of advertising, he has found, has been the mailing of a desk calendar to all customers at Christmas time. This calendar carries only the name and address of the firm together with the slogan: "Where your business is appreciated."

On occasion he has bally-hoed his wares by employing a truck with a broadcasting system to drive up and down Hollywood Boulevard. On the truck are labeled signs that tell the world that this is "another carload of radios for the Barrows Company." Newspaper publicity supports this by reproducing a photo of the radios being unloaded in front of the store.

There are two salesmen employed by Barrows, much of the business coming into the store, where Barrows handles it himself, thanks to his constantly selling his personality through every advertising medium.

Barrows refuses to do any business over the telephone, insisting that all such customers come into the store. As a result he has lost only one set through absconding, and that while he was out of town.

Radio salesmen are paid a 5 per cent commission. At the time a sale is made, the salesman also calls upon the resident on either side of the customer, explaining that the neighbor has just bought a radio. Also the serviceman follows the same procedure when making a service call.

All customers are given the Atwater Kent radio "Booster Book," which has been productive of many sales. This book, which allows \$5 to a customer for every reported prospect that becomes a sale, is now being adapted by Barrows



Sue Carroll and Leon Barrows in a Publicity Picture

to all makes carried. He is planning to use his own book hereafter.

Used radios are not a problem to Barrows. He buys them in at a reasonable trade-in figure and sells them at a reasonable price after re-conditioning them. He guarantees a used set to work as good as a new one, but of course not as a new set itself, due to radical changes in radio models. Though he has not tried to make the used radio department pay, it showed a net profit, after a careful audit, of \$300 last year.

"I'll dig deep in my pocket to satisfy a complaining customer," stated Barrows, in explaining the reasons for his

success. "It has been said many times before, but it holds equally true today that a satisfied customer is any firm's best advertisement. It has been the underlying cause of our success. Because of our fair treatment, customers recommend us to others whom we otherwise would not have contacted.

"Time and again I have had a chance to buy cheap parts and always refused, even though on occasion I have felt that they were from the same dies as nationally advertised parts. I felt I couldn't risk it."

Barrows is careful in granting credit and watches collections carefully. He lost only \$54 last year from bad bills. Terms are usually 20 per cent down and six or eight months, sometimes ten or twelve.

Three printed collection notices are used. The first, marked a "reminder notice" is couched in diplomatic terms, and goes out before a payment is due. This reminds the customer that he has a payment to meet and he prepares for it.

The second notice emphasizes in red ink that "Your contract payments are overdue," and "a Good credit reputation is as good as Cash."

The final notice is strongly worded. In red ink it states: "To preserve your credit reputation pay \$..... (at once)" and "Your Credit reputation is Danger."

All three forms carry the notation: "If payment already remitted, kindly disregard this notice."

Mr. Barrows gives as much thought to the service department as to new sales. For a long time he found the

(Continued on Page 32)

THE BARROWS CO.—SERVICE DEPARTMENT		MEMO. INVOICE	
Name.....	Town.....	Hr. ....	Date.....
Street Direction.....	Phone.....	Your Radio was Serviced as requested—Test Shows	
Make of Set.....	Call Rec'd. Hr.....Date.....By.....	A-Bat. ....	
Customer's Reason	Call Completed, Hr.....Date.....	B-Bat. ....	
for Call .....	Time on Job.....House or Shop.....	C-Bat. ....	
Test Shows	Materials Used.....Service Chgr.	Charger .....	
A-Bat..... C-Bat.....		Eliminator .....	
B-Bat.....		Speaker .....	
Tubes .....		Aerial .....	
		Ground .....	
Charger .....		Tubes .....	
Eliminator .....	Claims of any nature concerning this call must be made within 48 hours or adjustment will not be allowed.	Materials Used	
Speaker .....		.....	
Aerial .....		.....	
Ground .....		.....	
	Remarks: See other side	Service Chg. ....	
Cash Rec'd.....	Charge to My Account.....	Total Charge .....	
Invoice No.....	The Work is Satisfactory.....	Subject to Correction by office	
Radiotrician.....	Customer's Signature.....	Claim of any nature concerning this call must be made within 48 hrs. or adjustment will not be allowed.	
		THE BARROWS CO.	
		5545 Sunset Blvd.	
		Phone GR-2525	
		Signed .....	
		Radiotrician	
		Remarks: See other side	



# Side-Stepping Trade-In Business\*

By DAVID M. TRILLING

IT IS to the dealer's advantage not to accept trade-in business if it is possible to avoid it. Some dealers have an erroneous impression that if they cannot get the whole profit, they will take what profit they can, reckoning half a loaf better than none.

When the prospect asks, "How much will you allow me on my old radio?" the salesman's reply, in order tactfully to provide a background for an attempt by the appraiser to break down the prospect's trade-in idea, should pursue the following lines: "Mr. Prospect, obsolete or second-hand radios have no resale value to a dealer, as there is no market for them. However, our manager may be able to arrange an allowance on your used set. Before introducing you to the manager I can assist you better if you will give me some idea of just what make and model you have and what set you are interested in buying."

The prospect, let us assume, owns a battery set and evidences an interest in a Zenith model 62. The salesman proceeds to do a selling job on this set and, after working up the prospect's desire, inquires: "Would you mind telling me whether it is your intention to buy for cash or on the club plan?" The prospect may ask: "What difference does it make?"

"Only this," replies the salesman, "I can perhaps assist you in obtaining a better allowance on your used set on a cash sale; again, you save the finance and carrying charges, or a total of \$....."

If, however, the answer is "club plan," the salesman should proceed to sell the customer on increasing the amount of the down payment, explaining further that he may be able to assist the prospect in obtaining a greater allowance on the set if the down payment is larger. He should also point out that the monthly payments will be smaller, in consequence of a large down payment, and easier for the customer to meet.

\* Extract from "Radio Talks," by Trilling and Montague, Sunbury, Pennsylvania. Price, 15 cents.

The prospect is then introduced to the manager, the salesman explaining the details of the prospective purchase to him in the presence of the customer, so that the entire situation is clear to all the parties.

The manager can now cooperate with the sales person by saying, "You know, Mr. Prospect, your radio set is of very little or no value to us. The most we can offer you is probably a great deal less than it is really worth to you; and it would hardly be wise for you to part with it for the \$5 or \$10 (or 'small sum') which we could allow you. I strongly recommend that you keep this radio set for the following reasons:

"Perhaps you have a boy in the family who is continually annoying you by changing the program when you are all set to enjoy one that pleases you. It would be much nicer to give the boy the old set and hook it up for him in your attic or basement so that he can have his own radio entertainment without annoying the rest of the family.

"Or, you may have a less fortunate relative or friend who cannot afford a radio set. You may not have thought of it, but you'd probably like to present your old set to him as a gift. It would certainly have a value to him considerably greater than \$10.

"Or perhaps you, like most people, are charitable; and there may be some particular institution in which you are interested. It would probably be much more appreciated, if instead of giving them money, you will present them with your old set. If it happens to be a hospital, the patients, too, may have the pleasure of radio entertainment." (If the prospect is willing to dispose of his set in this way the dealer may volunteer his services in hooking it up. To do so may result in the sale of a few batteries or tubes.)

"On the other hand, Mr. Prospect, the old set may still be valuable to you,



yourself. You and your family can utilize it while on your vacation. Surely there are days, while one is on a vacation, when the weather is not favorable. The radio may come in handy on such occasions or during idle moments.

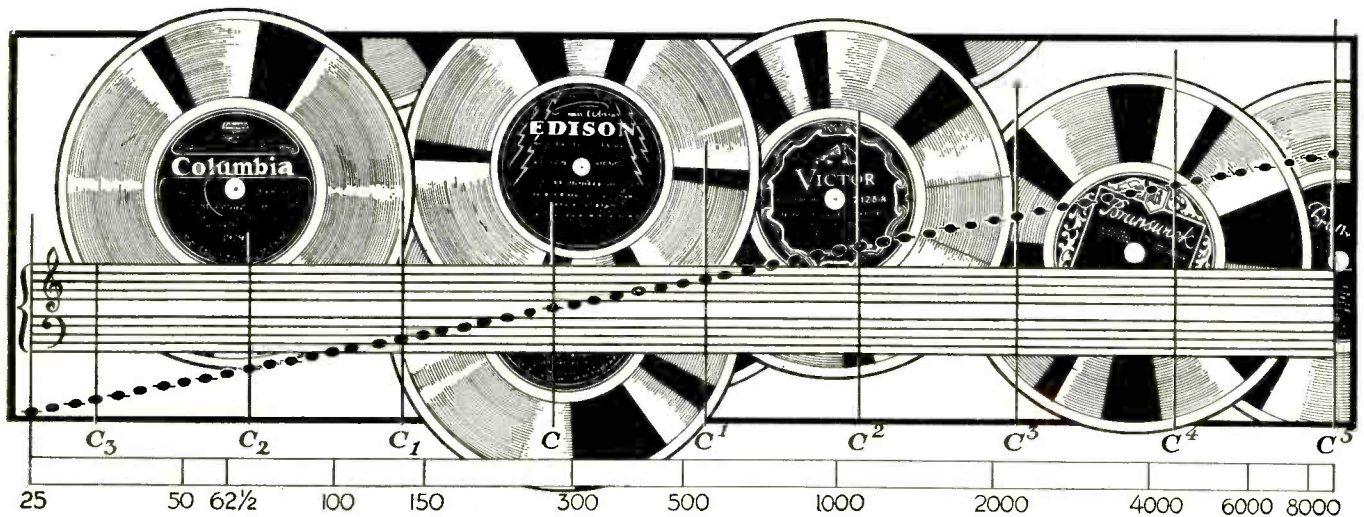
"Therefore, you can readily see that considering what you can get from your old outfit, it would be better for you to keep it and to use it for either emergency or charitable purposes.

"Mr. Prospect, considering the length of time you have had this battery set and its original cost, it has surely paid for itself. You can afford now to buy a new radio set and to forget all about the old one; you have had your value out of it. When you have had the full value out of a suit of clothes or any other commodity, you don't look to recover part of its value, and in due course of time you either give it to some one or throw it away."

It can readily be understood that the purpose of these suggestions is to rid the prospect of the idea of trying to sell the set to you. You are instilling in the prospect the idea of actually selling it elsewhere at a better price than a dealer can afford to allow or of giving it away. It would be an exceptional individual who was able to buy a set two or three years ago and who could not be appealed to by the power of the above suggestions.

If dealers realized that to make up the loss involved in any sacrifice of part of their profits they must increase their sales by large margins, they would be reluctant to make excessive trade-in allowances or to give unwarranted cash discounts. The following is an idea of

(Continued on Page 32)



# Selling Radio by Recorded Music

THE study of phonograph records in order to find some which would serve the purposes of the radio dealer who wished to use them in demonstrating his wares, has brought up some interesting points. In the first place, the question arises: "What constitutes a good demonstrating record?" Although the vote cannot be unanimous, the consensus of opinion seems to be that it should have low enough bass reproduction so that the untrained ear can recognize its presence. It must have high notes, that is, fundamental tones, that show off the receiver's ability to reproduce everything that can be played on any musical instrument. It must have brilliant notes, the perfect reproduction of which show nothing about frequency range, but prove that no foreign audio effects make the reproduction "fuzzy." And it must have soft, full tones which, as every musician knows, usually require a much farther range into the highs than even the piccolo, due to the fact that what makes them soft is the preponderance of harmonics or tone partials.

For example, if the note C is played on the violin, the fundamental frequency is 512 cycles per second. The first harmonic is of a frequency of twice that, or 1024. The second is 2048, the third is 4096 (the highest fundamental possible on the piccolo), the fourth is 8092 and so on, beyond the possibilities of the average receiver, or practically any other receiver. Suppose the highest note on the violin is played; about 3000 cycles per second. It would be pretty bare without some degree of reproduction of its first harmonic at least. It usually is just that.

But the presence of harmonics is very difficult for the untrained ear to perceive, although it is very easy for the demonstrator to say, "Hear the fullness of those tones? That's due to the fact that this receiver will play the harmonics

of them, which are exceedingly high." It is therefore doubly important to point to high fundamentals, of piccolo, bells or organ, and explain that they are hard to reproduce. And whether it be bass, high or intermediate tones, it is essential that they be momentarily isolated so that the prospect can fix his mind upon them and actually recognize what is being pointed out to him. When he grasps it the battle is half won.

THEN comes the question: "How should the record be used for demonstration?" This, of course, depends almost entirely upon the demonstrator and his prospect. In the great majority of cases it seems unwise to make any reference to the frequency of tones, for this is of interest only to the physicist. Organists and symphony orchestra conductors will look rather blank when the frequency of a tone is mentioned. It would naturally be good sales psychology to size up the prospect before picking the record, which, of course, demands that a variety be kept on hand. Third, unless the prospect shows signs of being bored, which indicates that the wrong record was chosen, *never* break up a performance in the middle. Never do too much talking. Tell the prospective customer for what to look before dropping the needle. Then call his attention to the feature spoken of by some slight gesture of the hand or head.

IN SEARCH for the ideal demonstrating record, the staff of RADIO has found many that serve the purpose very nicely except for the one weakness—isolation of certain tones or series of tones, so that the untrained ear can pick them out. In most good records either the bass or the extremely high instruments are strong enough, but are always accompanied by enough other instruments to make it difficult to concentrate on them.

In the record produced by this magazine, each instrumental stop on the pipe organ was played over a few bars unaccompanied by any other instrument. A short announcement tells the prospect just what to listen for and what it means if the receiver can reproduce the notes correctly. Bass is in it, quite a bit deeper than it is possible to produce from the bass viol, tuba or bassoon. The organ used employs 16-foot pipes in its bass section which are capable of rattling the windows, so tremendous are the vibrations emitting therefrom. And special care was taken by the recorders so that this bass could be cut into the record grooves without jumping the track. There are radio receivers on the market that will not allow it to pass, while others play it beautifully.

The high notes, made by the organ piccolo stop, go right up to the top for the fundamentals. A soprano and a baritone singer each do their bit. It is a peculiar fact, yet characteristic of the inaccuracies of the human ear, that nearly everybody who listens to this record thinks the soprano touches the top of the limits of audibility when she gets up to her highest note. They hold their breath; yet the uppermost limit of the average good soprano voice, so-called "High C," is 1024 cycles per second; right at the most efficient spot in every radio receiver's fidelity curve. At that, only the flute, piccolo, oboe, and violin can do better.

In spite of the isolation of tones and the attempt to bring out certain effects by themselves, the record is tuneful, and has enough human interest to keep it from becoming monotonous. A musical background is played during all announcements, and strains from popular pieces are used for the demonstrations, rather than scales or runs. If intelligently used, this record ought to fulfill its purpose very nicely.

# Building a *Successful Business* Notwithstanding a *Physical Handicap*

By J. EDWARD TUFFT

"RADIO DOC" has not walked a step for fifteen years; he directs all his business operations from a wheel chair, yet he has built up at Pasadena, California, the largest radio service business in that city. During most of the year he has seven service cars on the go, oftentimes nearly all day and night. His real name is Dr. D. I. Wadsworth, and for twenty-six years he practiced dentistry in Washington and Oregon. Fifteen years ago, however, he was attacked with arthritis, and from that time until now he has been confined to a wheel chair.

He moved to southern California, and when radio came into vogue he became interested and directed the construction of a receiving set which attracted attention over a wide area, as it was the very first set in southern California to support a loudspeaker. To amuse himself he began writing letters for radio announcers to read. "Uncle John" and "Uncle Remus" were then in their ascendancy, and it was "Uncle Remus" who gave Dr. Wadsworth the nickname of "Radio Doc," a nickname which stuck and a name which stood him in good stead when he established his own place of business well out of the business center of the city.

The business building is divided into a display room and a work room. "Radio Doc" has his wheel chair in the work room, where he does not have to meet everyone who comes into the display room, and yet where he is always accessible. His residence is at the rear on the same lot. His bedroom is equipped with a fine radio set which rests upon a heavy, swinging wall bracket above his bed. Since he cannot turn the knobs with his fingers he operates the dials with a cane.

In the store is a microphone with a large power amplifier and the switch and control wires are run through an underground pipe conduit which terminates in his bedroom. The wires connect with a loudspeaker which he can turn on and off at will. He can hear distinctly even the slightest whisper in any part of his work room or store.

In the same conduit there run the four pairs of wires that supply his signal bell system, his master phone and switches which connect with his two store phones. This system enables him to go to his bedroom at any time and yet be in direct communication with his store, his men, and with every operation being performed in the store.

Three of his men are licensed oper-



*Transacting All Business From a Wheel Chair*

ators and he is familiar with the code so secret conversations can be employed at any time without the public knowing what it is all about.

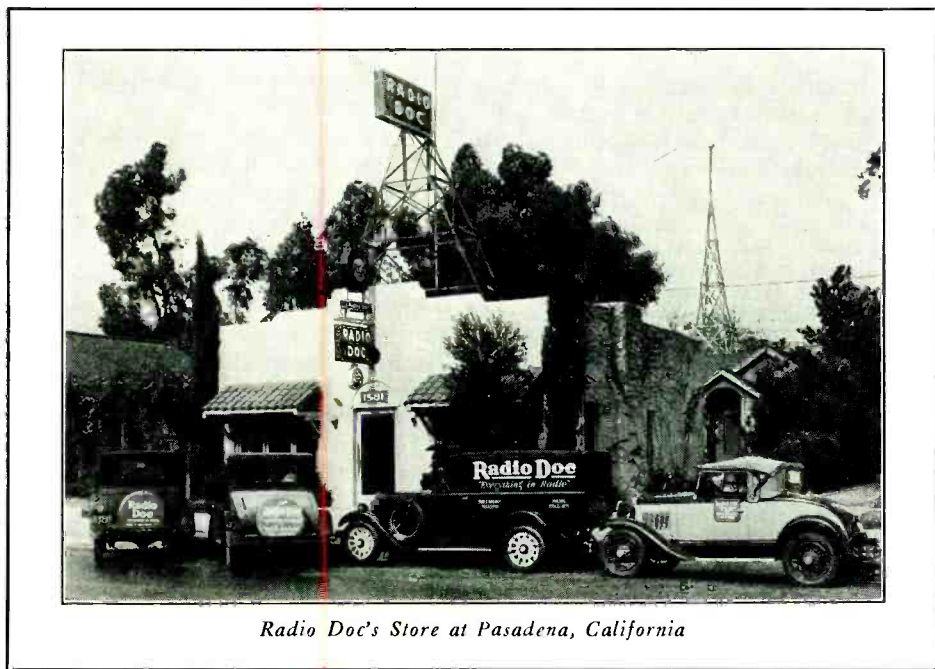
"Since I cannot go to the homes myself," says "Radio Doc," "I must be well represented in my employees. So no man who cannot qualify as an expert can work for me. I offer no temptations in the way of commissions, but pay straight salaries, top salaries for my community. I feel that if I were to employ men on a commission basis, volume of work rather than quality in work might become an actuating motive. I would have no way of inspecting work myself in order to correct errors, hence my business strength must lie in hiring the best men and paying them according to a system that will not tempt them in any way to neglect service."

## The Golden Rule

FROM the beginning of his business career he has had but one rule of business, and that is the Golden Rule. "Do not do a thing in making a sale or in repairing a set that you would not want the other fellow to do to you if your positions were reversed," he tells his men.

"When you are repairing a battery set do not sell batteries to a customer until he actually needs them. If a group of batteries have two more months of service in them do not under any circumstances cause that man to lose those two months.

"When you are servicing a set you must also be careful to explain every step you take and tell the owner why you are doing it. The radio workman who feels too professional to explain everything he is doing is making a bad mistake. Nothing arouses suspicion more quickly than secrecy or semi-secrecy. We must not let the impression get out that we are doing anything to a set that



*Radio Doc's Store at Pasadena, California*

should not be done at the time it is being done.

"More than this, you must also tell the owner of the set all about any possible trouble that may be pending in his set; you must warn him against difficulties that may arise in the near future. If trouble arises soon after you have worked on a set naturally the owner will feel that you have neglected something or have done your work poorly. You can head off a lot of grief by being honestly frank."

There is one very fine form of advertising by which "Radio Doc" is widely known, but concerning which he says little, and that is his never-failing friendship for people in need of friendship. Every institution of charity in "Radio Doc's" territory, where the need is felt, is literally filled with battery sets that he has placed there. These sets are given outright, the only consideration being that the tubes and batteries be bought at his store. Free entertainment is coming into many a life because "Radio Doc" is interested in humanity. Knowing the loneliness of life himself, he wishes to brighten the lives of others. While the average man in his physical condition would be looking for sympathy he is extending sympathy. Whenever word comes to him that a blind person needs a radio set that word is sufficient—the blind man gets the set. Letters that would move the heart of a stone man come to "Radio Doc's" chair every day.

This practice is not done for advertising purposes, and yet in the very nature

of things it is the best possible kind of advertising. Disposing of battery sets is not a problem with "Radio Doc"; he has a place for every set worth placing in a home or in an institution. There are but few battery sets in his store-room.

#### No Salesmen on the Street

HE HAS no salesmen on the street. All sales are made through satisfied service customers. High pressure is forbidden, and no set is sold to a person who "Radio Doc" thinks is not in a financial position to make the purchase. He has talked himself out of many a possible sale in order that the Golden Rule might not be violated. Some idea of the standing of his firm can be gained from the fact that he carries eight of the fastest selling nationally known radio sets.

Several special installations of an advanced character have recently been made in Pasadena under his direction. His firm did all the pioneer work in equipping the Pasadena police department with a transmitter and with receiving sets on the police cars. Recently, too, he installed the public address system at the Pasadena municipal golf links. He has made a great many installations of power amplifiers, dynamic speakers, etc., in several leading theaters in his community, as well as in many drive-in markets and dance pavilions.

"In all my business experience," says "Radio Doc," "my problem has not been to get more business, but to keep up

with the business that comes, and it has come with a very nominal amount of advertising. We use the daily newspaper sparingly, our advertisement appears in the telephone directory, we use the theater curtains and the store is surmounted with two large neon signs. The Golden Rule has done the work for us."

In response to a direct question as to other elements fundamental in his phenomenal success "Radio Doc" emphasized the value of concentration. He is continually on the job and on account of his physical condition has few distractions. Only a week prior to this interview he had heard and seen his first talkie-movie, as he had not been in a theater for eight years. "This fact," says "Radio Doc," "means that the energy which the average man expends in amusements, I am able to give wholly and solely to the work of developing my business. There is no lost motion and no lost time."

The story of "Radio Doc" should be an encouragement to every radio dealer. Apparently there is plenty of business for the man who will handle it correctly. Seated in a wheel chair in the back room of his store, connected with the outside world merely by a telephone which is anchored to the arm of his chair, "Radio Doc" is showing the world a true lesson in business optimism. He is teaching able-bodied men with hard muscles and strong legs how a Golden Rule principle, backed by concentration and industry, can build a successful business.

#### SELLS HIMSELF TO THE PUBLIC

(Continued from Page 28)

service department was not showing the profit it should.

Now he has a plan in effect where free service is not carried by the service department. It is an unfair burden and is rightly charged to new sales.

Service cards are carefully kept on every service call and all work performed in the department. At the end of each day these cards are recapped onto a blank report showing where time and material has gone, according to free work and paid service.

"Now we know how much it costs to demonstrate sets, move them and service them," explained Barrows. "I doubt if one dealer out of ten knows those costs, and if he doesn't he isn't in a position to stop up profit leaks.

"We know just what each department is doing, both in gross volume and profit, and if it isn't running what we think it should we know soon enough to investigate before the loss becomes too great."

In addition to this data, a graph is pinned on the wall of the office, which

traces the volume of the speedometer department and that of the radio department in blue and red ink, respectively, since the inception of the firm.

#### SIDE-STEPPING TRADE-INS

(Continued from Page 29)

the percentage of increase in volume necessary to make up for certain percentages of concessions, assuming a 40 per cent trade discount:

If a cut of 5 per cent is made, 14.3 per cent increase in business is required.

If a cut of 10 per cent is made, 33 per cent increase in business is required.

If a cut of 15 per cent is made, 60 per cent increase in business is required.

If a cut of 20 per cent is made, 100 per cent increase in business is required.

From the above it can be seen that volume built up by cut prices or long trade-in concessions is undesirable. The more sales you make the more hazards are involved, both as to delinquent accounts and the cost of service requirements to satisfy customers. Realizing the extra volume necessary to make up for price cuts and concessions, a dealer should determine how far he can go before he overburdens himself because of

lack of further working capital. Furthermore the dealer should make up his mind once for all that "quality" of sales rather than "quantity" is the only secret of success in his business.

#### Tips for the Radio Salesman

You are paid to sell radios; not to win arguments.

If a prospect realizes that he is being sold, the sale is all but lost.

No superlatives are needed by those whom you have already sold. Other people resent them.

The sales canvass had just reached the ticklish point of a trade-in allowance for the old radio. After a few feints, the dealer found that the prospect was somewhat hard-boiled, so he remarked, "By the way, Mr. Jones, that oldest boy of yours was telling me about that old battery set and speaker which he picked up for \$5.00. He's a great kid, all right. I certainly hand it to you for knowing how to bring up sons." In recounting the story, Mr. Jones said, "Clever devil, that salesman. How did he know that I was nuts on my two boys. Anyhow, I traded on his terms."

# Radiotorial Comment

By the Editor

FROM out of the West, where originated the midget set and many other new things in radio, comes a catchy slang word for a small, compact radio which is designed to give fairly good reproduction of

## *Advent of the "Jalopee"*

local programs. This word is pronounced as though it were spelled "jalopee." The name, like a mule, has little pride of ancestry or hope of posterity. Yet it seems to apply, just as the set that it designates seems to fill the demand for a cheaper if not a better instrument. Thousands have already been sold in California and millions will be sold throughout the nation, especially as the larger manufacturers sense the demand.

The poor man buys it because he can afford it. The rich man buys it as a second set in the home. Hotels and hospitals use them instead of a centralized radio installation. It has been hailed as the beginning of a new era in the merchandising of radio.

It at least means the opening of a new market which the higher-priced sets cannot enter. It means a radio in every home and an increased demand for vacuum tubes. It means more over-the-counter sales and less home demonstrations. It means more rapid turnover of stock. And, with sufficient volume, it means profit for the dealer.

SOME of those who attended this year's two radio trade shows, the one at Atlantic City and the other at San Francisco, were almost unanimous in saying that the Eastern show was a flop and the Western

## *What's Wrong With This Picture?*

show a wow. While there were at least five times the number of dealers in attendance at Atlantic City as at San Francisco, they seemed to attend the Eastern show for pleasure and the Western show for business. The marvelous attractions at Atlantic City provided too many distractions from business.

The compact arrangements at San Francisco enabled a dealer to compare and decide what lines he wanted to sell. Furthermore, notwithstanding the disparity in numerical registration at the two shows, the actual attendance at convention sessions was greater at San Francisco than at Atlantic City.

Both shows were marred by the absence of quite a number of leading manufacturers from the exhibit picture. Their new models were not ready. This raises the question as to whether it would not be better to hold the trade shows later in the season when models and prices are more definitely known by more manufacturers. Perhaps the exhibit picture would then be more complete; but perhaps not.

Some manufacturers and jobbers question the wisdom of these comparative exhibits, preferring to invite selected dealers to individual showings at various centers throughout the country. But in such cases the dealer loses the advantage of judging for himself as to the comparative merits of various makes. Furthermore, he misses the larger contacts that are possible in the unconventionality of a big convention.

Another problem that is aggravated by the June show is the lack of salable merchandise during the summer months. What with the clean-up of old models and lack of delivery on the new models, the strictly radio dealer has little to sell. This year, where obtainable, the new midget sets have been a godsend in tiding over the slack period. But most dealers have had to depend upon some non-radio device to fill in the valley in the sales curve.

While no definite answer has here been given to these several minor questions which help to make up the big question as to what is the matter with the present plan of holding the trade shows in June, there is every expectation that the RMA leaders will succeed in finding a satisfactory answer. The trade show and accompanying convention still fills a need that no other agency has yet supplied in the radio industry.

# A Leaf from the Diary of Keyhole George

**J**OBBER'S meeting a regular old-fashioned revival this week. Testimony by Al Wett, who abandoned dealer business at instigation of Byam Wright, the local Gold-Sheriff jobber. "By's" theory is that all dealers come under one of three classifications—ex-set builders, ex-salesmen, or ex-bookkeepers. Claims Al is a sample of number one—the soldering-iron juggler, with the flux-paste still under his nails. It looked as though it was. Great service man—business aptitude nil. "By" says each of three classes suffers from too much specialization. Combine the three and you have the perfect radio dealer. Provided he has plenty of jack. Loud applause indicated that the boys agreed about the latter qualification.

Byam made a few brief remarks for about an hour and twenty minutes, on stabilization of the industry, lots of hooley but plenty of sense too. Here's a sample: "Fellas," he says, "the manufacturers have done their part. They've cut down production, put out good merchandise at reasonable prices and adopted fair discounts. Now it's up to us jobbers to do our whack." "Who do we whack?" "Droop" King wanted to know, but he couldn't fool "By," who came back quick as a flash with "Whack some of your dealers, old top, and whack 'em hard, and I'll tell you how to do it. First of all you have to catalog them, then weed out the weak sisters and pigeon-hole them."

Some of the boys didn't get the drift, so "By" elucidated: "The trouble with us," he said, "is that we ain't careful enough in handing out franchises. Any peanut dealer who asks for the line can have it. Usually we don't take the trouble to find out who and what they are—till it's too late. Result—after three or four months stuck for a few hundred dollars, with a bunch of orphaned sets and a dealer out of business. And every time that happens it's a black mark for us and for the line." Shuffling of feet and slight coughs indicated the boys were waking up. "By" drooled on. "The trick," he said, "is to take every questionable dealer apart and see what makes him tick. Specially dealers that have just gone

into business. Get him in a corner, and figure, nigger, figure!"

"Take Al Wett, here. Al was a darn good service man till he saved up a thousand bucks or so. Figured he'd make a lot more dough selling sets. So he rents a store, paying ninety days in advance, sticks up a canvas sign, and phones me. Well I've known Al for a good many years, so I toddles over to see what he's up to. Everything looked pretty nice—nothing missing except the merchandise. 'Al,' I says, 'what do you want me to do?' 'Let me have three or four receivers,' he said, 'and a franchise I can frame.' 'Wait a minute,' said I, 'who's going to handle your paper?' Well, he'd fixed that up all right. It looked beautifully simple—nearly a thousand in the bank, sell two or three sets a week to start, and collect the money from the finance company to buy more with. That's what they all think.

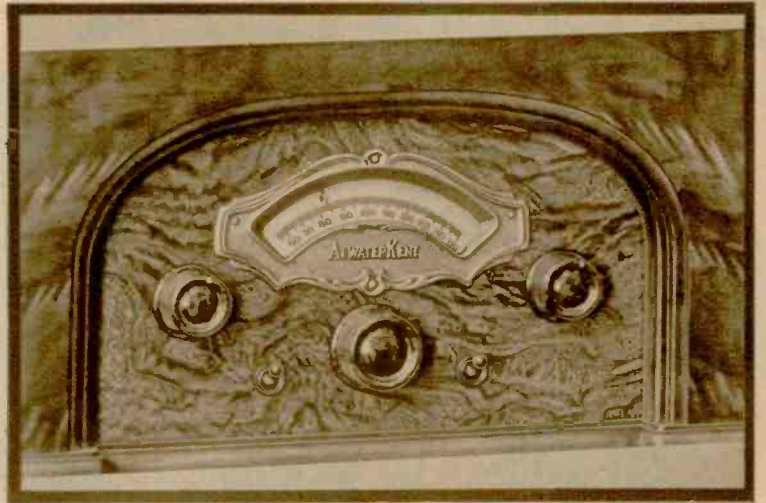
"Anyway I took Al into his little office, grabbed a scratch pad and showed him where he really stood. We figured his cost, overhead, finance charges, down-payment, the percentage he would collect from the finance people, trade-in allowance and resale profit. If I remember rightly, the surplus cash available from one deal totalled around seven bucks, out of which to pay for installation, wages and other items. Was Al surprised? I'll tell the cockeyed world. He didn't have to tell me the only way he could get by would be by letting the jobber hold the sack. Too many doing that already. And so, Al didn't get his merchandise.

"Instead I got Al a job, and there's a for rent sign in his store window right now. What's more, Al's tickled to death. So am I, for no jobber can finance dealers free of charge, though many try to do it just because they haven't the gumption to sit down with a man and figure before they start in." Loud huzzas and cries of commendation arose as "By" took a pull at the chairman's glass of water and sat down.

# ATWATER KENT

## "GOLDEN VOICE" MODELS FOR 1930-1931

Quick Vision Dial—eight tubes, including three screen grids, two '27's, two '45's and one '80—a line of lowboys and highboys and a radio-phonograph combination—new four point tone control—dual volume control and a new improved circuit for equalizing amplification are some of the new features found in the Atwater Kent line which was announced August 1st.



ATWATER KENT  
CONTROL  
PANEL

Reading left to right: Volume Control Knob, Local - Distance Switch, Tuning Knob, On-Off Switch, and Tone Control Knob.



MODEL 76

Highboy with Sliding Doors: height, 45½ in.; width, 26 in.; depth, 16¼ in. Doors slide easily and are muffled with felt for silence.

\$152.00

MODEL 70  
LOWBOY

Height, 38¾ in.; width, 24¾ in.; depth, 15⅛ in. Finished in American Walnut with matched butt walnut front panels.

\$125.00



MODEL 74  
Table Model. Height, 30¼ in.; width 24½ in.; depth 16½ in. Finished on all sides.

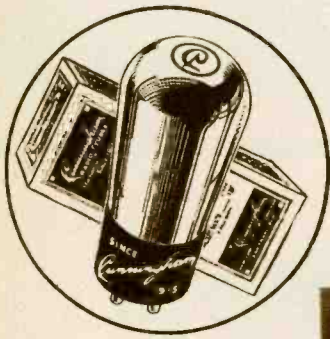
\$131.00

MODEL 75  
Radio - Phonograph Combination. Height, 40 in.; width, 24 in.; depth, 17 in. Piano-hinged top with automatic stop support. Ample and accessible record compartment.

\$205.00

# The MEN BEHIND *Cunningham* RADIO TUBES

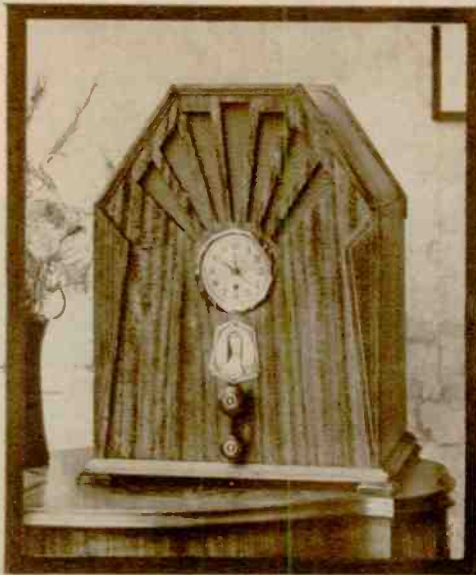
MR. G. K.  
THROCKMORTON  
Executive Vice-President  
and General Manager of  
E. T. Cunningham, Inc.



MR. M. F. BURNS  
Vice-President and  
General Sales Manager  
of E. T. Cunningham, Inc.



# NEWEST OFFERINGS from the SET MANUFACTURERS



ERLA Model 72  
Mantle Type  
MIDGET with  
3-'24 tubes and  
electro-dynamic  
speaker.  
List price, with  
clock, \$77.50.  
Without electric  
clock, \$69.50.

STERLING  
"LITTLE  
SYMPHONY"  
Another MIDGET  
receiver with  
3-'24 tubes but  
using Loftin  
White amplifier.  
5 tubes in all.  
List price, \$69.00  
less tubes.



ROLA BOUDOIR MODEL 80  
Sold only in Western states. Can be  
had in various color combinations.  
\$99.00 With Tubes

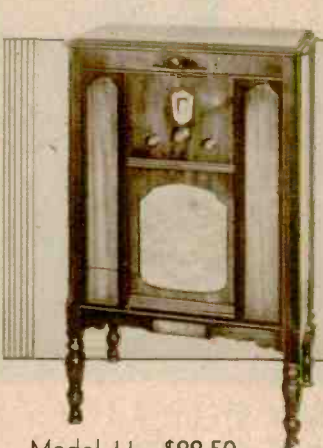


ROLA 92  
Sold in Western  
states only.  
Electro-dynamic  
speaker.  
Price, \$125.00  
With Tubes

ROLA 82  
Sold in Western  
states only.  
A consolette of  
small size for  
apartment use.  
\$99.00 with tubes  
and electro-  
dynamic speaker.



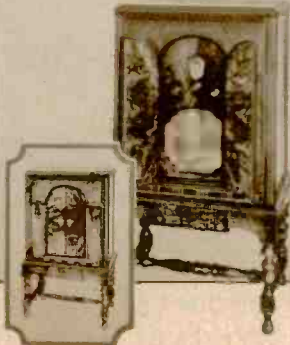
## THE NEW "LYRIC" MODELS



Model 11—\$99.50



Model 19—\$119.00



Model 29—\$139.00



Combination Model 39—\$199.50



# TUBE EXECUTIVES



E. A. TRACEY  
Vice-President  
National Union



H. A. HUTCHINS, JR.  
Sales Manager  
National Union



DR. RALPH E. MYERS  
Vice-President  
in charge of Engineering  
National Union



H. R. PETERS  
Executive  
Vice-President  
National Union

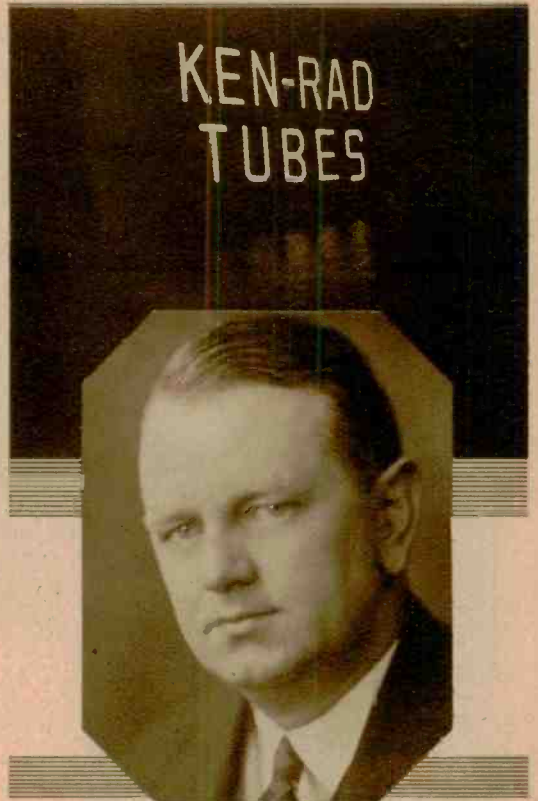


J. J. STEINHARTER  
President of Cable Radio Tube  
Corporation, Manufacturers of  
"Speed Tubes"



F. W. MARSH  
President of Champion Radio  
Works of Dan-Vers, Mass.

KEN-RAD Floating Electric  
Display "Three Miles Out"  
from Atlantic City



R. (Dick) E. SMILEY  
Gen. Sales Manager of Ken-Rad



HARRY STEINLE  
Sales Manager of Triad

# and Tube Manufacturing



## HYGRADE



WALTER E. POOR  
Vice-Pres. and Chief  
Engineer of Hygrade



F. A. POOR  
Treas. & Gen. Mgr.  
of Hygrade



Hygrade Plant  
at Salem, Mass.



(Left)  
Factory Testing  
of Hygrade  
Tubes



(Right)  
EDWARD J.  
POOR  
President and  
Sales Manager  
of Hygrade

## TRIAD



WILLIAM CEPEC  
Secretary of the  
Triad Mfg. Co.



GEORGE COBY  
President of Triad



ELY ENGATOFF  
Treasurer of Triad

# BRUNSWICK RADIO AND PANATROPE

With the new Record Changing Device the Brunswick 42 Radio and Panatrope will play twelve records automatically. The audio amplifier uses one stage of resistance coupled amplification and two '45 tubes in parallel in the second audio stage. The central control panel for the radio receiver incorporates the new Brunswick horizontal station indicator.



Brunswick 42 Automatic  
Radio Panatrope



Group of Brunswick Distributors and Executives gathered at the Brunswick Recreation Building at Dubuque, Iowa



The new RCA-VICTOR permanent exhibit on the Boardwalk at Atlantic City. In the foreground an RCA Victor recording party is making talking motion pictures of a group of RCA distributors.



KEN-RAD makes it easy for radio show visitors to "do the town."



Gigantic Edison Truck used for transportation of EDISON RADIOS.

# COLUMBIA FOR 1930-1931



COLUMBIA C-20

Early English Lowboy 8 tube screen grid receiver with TELE-FOCAL power detection.

List Price, \$145.00

COLUMBIA C-21

Early Carolean Highboy 8 tube screen grid receiver with TELE-FOCAL power detection.

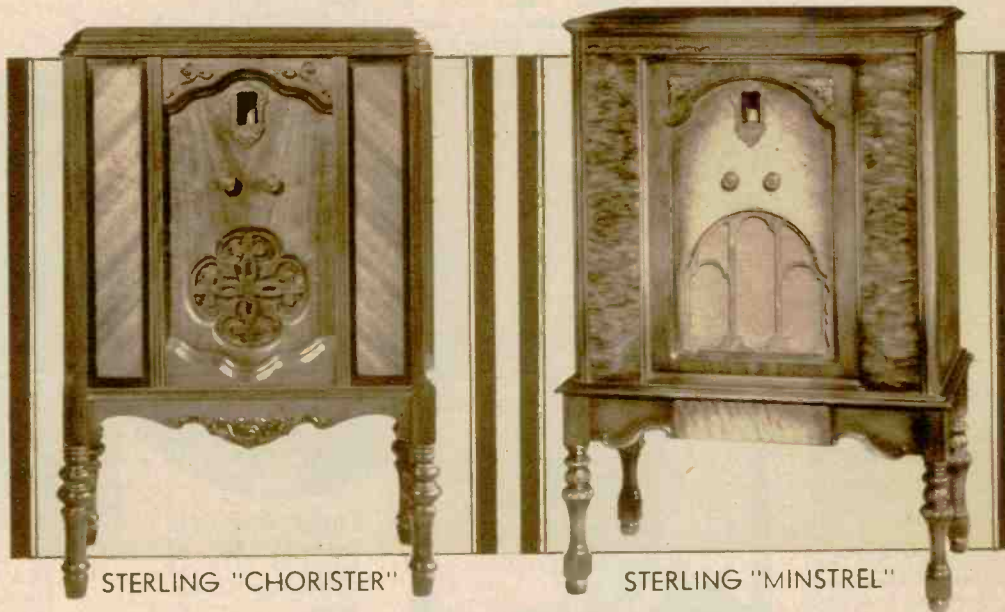
List Price, \$185.00

COLUMBIA C-21

A view of the Highboy with doors closed.

## THE NEW STERLING

Four Screen Grid Tubes are used in the new STERLING models. The "CHORISTER" is an 8 tube receiver, listing at \$107.50 The "MINSTREL" is a 7 tube receiver, listing at \$123.50. The "Minstrel" incorporates the Loftin-White amplifier system. The "Chorister" has a new variable tone control system.



STERLING "CHORISTER"

STERLING "MINSTREL"

## TWO OF THE NEW GREBE MODELS



GREBE "Occasional Furniture" Model

New Grebe Models retailing at \$225.00 and \$265.00 (east of the Rockies) incorporate the much-wanted "occasional furniture" mode. The chassis is a companion to the GREBE SK line and includes the GREBE colortone device. Three '24 tubes are used with linear power detection.

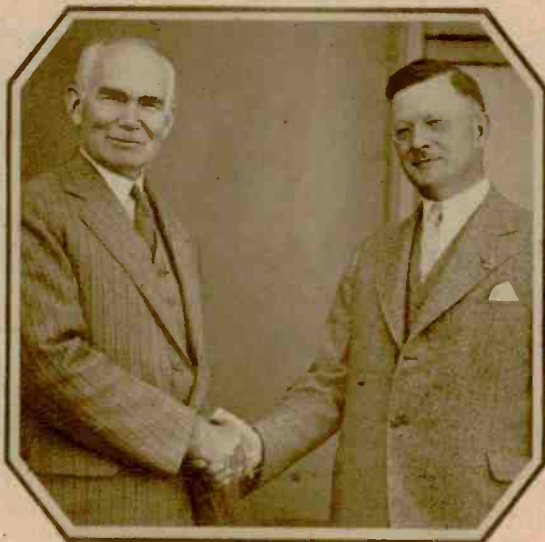


The NEW GREBE has the "SK" Chassis

# RADIO PERSONALITIES



**CAPT. WILLIAM SPARKS** of the Sparton Radio organization announces valuable scholarships and European tours, with expenses paid, to students between the ages of 12 and 19. This is Captain Sparks' contribution to education.



**DR. LEE DeFOREST**, "Father of Radio," congratulates one of the "Babies of Radio," General Motors Radio Corp. Mr. Henry E. Gardiner, Zone Manager for General Motors, and Dr. DeForest are pictured above. Photo by staff photographer of "RADIO."



**ALFRED HAND**, Advertising Manager of Thomas A. Edison, Inc., signing the first Merchandise Credit Check to be issued under the newly announced Edison Co-operative Advertising Plan.



(Left) **MAURICE RAPHAEL** of A. H. Grebe and Co. is the first actual national road salesman of complete radio receivers. His pioneer sales work dates back to 1909.



"**DICK**" **COTTON**, Sales Manager of Samson Electric Company of Canton, Mass.



**E. E. SCHUMAKER** President of the RCA Victor Company, Inc., and H. C. Grubbs, Vice-President, direct a talking movie at Atlantic City.



(Right) **A. B. AYRES**, General Manager of Sprague Specialties Co., Quincy, Mass.



**GENERAL MOTORS RADIO EXECUTIVES**  
Left to right: Chas. T. Lawson, Sales Manager; R. H. White, Director of Advertising; John Hager, Eastern Regional Manager; John E. Grimm, Jr., Vice-President in Charge of Sales.



**MORTIMER FRANKEL**, President of Audiola Radio Co. of Chicago, which company he founded in 1921.



**R. C. SPRAGUE**, President of Sprague Specialties Co., tells his mechanic that Sprague Condensers, unlike automobile tires, are puncture-proof.

# The Importance of Tube Sales in the Radio Business\*

By RICHARD E. SMILEY



Richard E. Smiley, Sales Manager the Ken-Rad Corporation

SINCE the a-c set was introduced two years ago not only have the sales of all radio accessories except tubes dwindled to practically nothing, but also the prices of complete sets have been going down. Four years ago a set and its accessories cost ten times as much as the tubes necessary for its operation. Today a set may cost only four times as much as its tubes. In other words, the tube business has become 300 per cent more important than it used to be. It is an industry within an industry.

Last year \$187,000,000 worth of tubes were sold. It is generally admitted that one-third of this went for initial equipment, the other two-thirds for replacement. We are always sure of the replacement business, just as we are of replacing the lights that burn out in our home.

I have found on studying the situation that over one-third as many dollars are spent for radio tubes as are spent for radio sets. This means then, if we can take the figures that have been given to us as being reasonably accurate, that the tube business of today is as large as the set business of 1927. One-third of your business should be done in tubes, is it not, therefore, essential that we work upon this tube business, not as a necessary evil, not as something that has to be handled just as a matter of course,

but as one of the most important divisions of our business? Is it not essential, therefore, that we make definitely sure that this department of our business is making us a profit and that we are giving to it the attention which a major part of our business such as this deserves and requires?

What are some of the aspects of the tube business which constitute in themselves one of the greatest changes that have come to this industry? First of all, let us look at the angle of stability. It is true that there are some changes in the construction of the tube from time to time, but do these changes affect the operations of the set? Usually not to any consequence. Therefore, first of all, we have in the tube business the great factor of stability which has been so absent in the set field. It means this to you as business men, that you are not stocking merchandise which thirty days hence may be obsolete, that depends upon the figure on the cabinet, that depends upon the appeal of price, because the price of tubes is quite standardized as against the price of sets. In the face of what may be considered one of the most demoralized parts of our business, I go on record at this time as stating that the tube business is the most standardized, stable and dependable part of our entire industry.

With the approach of what may be called the point of maximum absorption, it is evident the set business must find new markets if it is to continue its growth in volume. Compare this, if you will, with the tube industry which each year is growing larger and at present gives excellent promise of growing to a volume beyond anticipation. From 1927 to 1929 it almost tripled in volume while the set business showed an increase of about 75 per cent. Indications for 1930 promise a comparatively satisfactory increase while the most optimistic figures I have seen for the set market do well if they hold their own with last year.

There is no need for pessimism in the set field. That market holds possibilities for the future that are as good or better than the past. My remarks are intended to convey a picture of this great and growing opportunity in the tube market.

## Crosley Automatic Volume Control

"The most outstanding improvement in the new radio receivers is automatic volume control," according to R. H. Langley, director of engineering, the Crosley Radio Corporation, and director of the R. M. A.

"It has been defined as that mechanism by means of which a radio receiver automatically adapts itself to the strength of the received signal so that the output from the reproducing device remains substantially uniform. Its principal advantages are:

1. A great reduction in fading on distant stations by making the sensitivity of the receiver increase or decrease automatically as the signal becomes weak or strong.

2. Permits tuning through local stations without having them blast out at full power.

3. Makes it possible to change from local to distant reception without additional adjustment of hand-operated volume control.

"The automatic volume feature of the new Crosley radios operates to increase or decrease the negative voltage which is applied to the grids of the screen grid amplifier tubes. The actual value of this voltage depends on the strength of the carrier of the received signal. The relation between the strength of the carrier and the modulation is controlled at the sending station and is technically known as the percentage of modulation and varies, particularly in music, over wide ranges depending upon whether the music is soft or loud. This relation is not interfered with by the automatic volume control, and musical accentuation is as true in the reproduction of the receivers as would be the case without this feature.

"The manual operation of a receiver employing automatic volume control is the same as any other receiver except that for practically all stations received the manual volume or level control, as it is frequently called, on the front of the radio, is set for the loudness of signal desired and need not be readjusted when changing from one station to another. A local-distance switch is necessary, otherwise very powerful local stations will force the grid voltage so far negative that serious distortion with resultant poor quality occurs.

"As has always been the case with improvements in radio receivers, the user as he becomes more familiar with the operation will be increasingly aware of the benefits of automatic volume control. The receiver automatically compensates for practically all of the vicissitudes of fading signals; only when a signal fades completely out, so that there is really no signal left at all, does the receiver fail to accommodate itself."

\*Excerpt from talk before Western Music and Radio Trades Association.







# Passing on the Credit Application

Conservative, liberal, and very liberal, policies—  
Questions to be answered—  
Sub-standard risks—Protective measures.

By JOHN T. BARTLETT

**D**IFFERING policies, as well as differing judgment, explain why credit applications rejected by one store may be accepted by another. Some stores are conservative in considering an application. Other stores are liberal. Some stores are very liberal.

The attitude of most stores doing a credit business at this time is liberal. They are inclined to give applicants the benefit of small doubts. Experience shows they can do this—in part, because many stores have excellent collection departments.

Some stores are conservative in extending credit, because their collection experience has been unsatisfactory. How liberal a store can be in extending credit depends, in one aspect, very closely upon collection skill.

Margin of profit, with the bad debt loss which is feasible, affects liberality of credit policy. So does competition. Many stores are forced to be liberal in granting credit because their principal competitors are.

## Questions to be Answered

**T**HE interview with the applicant, and the information which thereafter has been developed, including credit bureau reports, usually enables the credit man to quickly size up the risk. Every so often there is a case where doubt continues to exist, and a second interview with the applicant, or additional investigation, or both, will be necessary.

The credit man wants to know if the applicant will be able to pay the obligations he wishes to incur with the store. The income condition has most to do with the answer to this question. It is not enough to know that a customer is able to pay, if he wishes to. Will he pay? Is he the sort of man who will feel the moral obligation? The applicant's record counts for much here, as indeed it does for all the questions. His reputation enters, also.

When will the customer pay? This is a vital point also, and the customer should be accepted or otherwise with full knowledge of it. The man's credit record, how he has performed with other stores, is a good indicant. However, his income and obligation circumstances affect, too. An applicant may rate 100

per cent on moral risk, yet hold out practical certainty of delayed payments.

Finally, the credit man wants to know if, failing to pay, the applicant *can be made to pay*. The answer to this is found in the resources of the applicant, in his employment, property owned. As exemption laws vary a great deal from date to date, the answer here is not known until resources are put beside the exemptions.

It is seldom that a credit man will take on credit business with the expectation of collection by legal process, but it is highly important to know that, if necessary, collection can be brought about in this way.

Certain facts of themselves go far to qualify an applicant for credit in ordinary amounts. One is an excellent credit record. The man who has promptly and faithfully met his obligations to others over a considerable period does not change his habit over night. Home ownership goes a long way to qualify. Credit losses with all customers owning homes, taken as a group, are very much lower than with customers not owning homes. Long employment with one concern is a very favorable factor. The credit man sizes up all the facts before him and answers the key questions.

## The Sub-Standard Types

**E**VERY concern doing credit business in a large way develops for itself a list of types which it has learned to be very careful in passing on. It thus happens that there is wide prejudice among credit grantors against painters, truck drivers, waitresses, salesmen on commission, Mexicans. Even certain professional men—doctors, in particular—do not stand well with many stores. Men and women engaged in questionable pursuits are sub-standard.

This does not mean that, because a man or woman belongs to a certain class or race, he or she is necessarily a poor credit risk. There are exceptions to all these group ratings. In the situation, the course of wisdom is to be much more careful than usual in dealing with them.

Rated as to income, applicants whose income comes from investments, grade, as a whole, better than those whose income comes from business or profession.

These, in turn, rate better than applicants gaining their living from a regular occupation. At the foot of the list are applicants whose living comes from seasonal employment and day labor.

Accounts with business concerns can be checked through a credit bureau or bank. A problem often arises with new corporations. It may not be enough that some of the officers, as individuals, have large resources. If the condition of the concern itself does not warrant the credit wanted, seek to have the account guaranteed by officers whose personal credit is good.

## The Scientific Use of Terms

**I**N PASSING on credit applications, the seasoned credit grantor has regard at all times for his averages in type situations. If the results with rooming house owners, for example, have been very poor, he will exercise much more than usual caution in making terms for them. If employees of a certain railroad have graded very high for results, that fact should influence decisions on future applications of these railroad men. This regard for averages becomes of high importance in skillful handling of radio store credits.

Installment credits become a science when there is professional adjustment of terms to individual risks, or groups of risks. Thus, if facts made apparent by the interview and investigation rate an applicant down, there are available a selection of courses, one of which or a combination usually will qualify the credit. For example: (1) a reduced sale, or deliberate sale of slow-sellers; (2) altered down payment, payment period, payment intervals, or other terms; (3) sufficient security; (4) account marked for special collection attention.

When a radio store has been established for some time, a high percentage of sales are in the form of add-ons, or re-opened accounts. The general experience goes to show that past excellent performance is nearly always adequate assurance the new purchase, if within buying power, will be handled well. This should not prevent, however, precautions to assure that no new developments seriously affecting the risk have occurred.

# INSTALLMENT SELLING\*

Favored by a banker as an economical means for improving distribution of an over-production.

By E. V. KRICK

Vice-President and Cashier, American Trust Company, San Francisco, California

LESS than a decade ago the fact was currently recognized that production was organized on a better basis than distribution. Over a period of many years production had evolved in a manner whereby its essentials, the full use of credit, labor and machinery, contributed to make mass production most effective. Production credit was well established on a sound acceptable basis.

With distribution in a less organized condition and a demand existing for an outlet of production, it became apparent that the question was an economic one, and that sooner or later a movement would set in, directed toward meeting the demand.

One important retarding influence in such a movement was the fact that at that time there existed little or no provision for consumer or distribution credit. Conditions were opportune for the development of installment selling to enter the situation in a major capacity. It did so to the extent, according to Professor E. R. A. Seligman<sup>1</sup> of Columbia University, of last year accounting for one-sixth of an aggregate of \$36,000,000,000 of retail trade in the United States.

This movement is an economic one, you are interested in its present status. This status rests upon three principal factors—sales, collections, financing.

Sales naturally depend upon purchasing power, and the latter to a great degree is contingent upon employment. It should be borne in mind that the variation in volume of goods sold at retail or consumed in a business cycle between the high point of prosperity and the low point of depression is not tremendous. Robert Porter<sup>2</sup> states that in the business cycle 1920-1923 this fluctuation was between 95 and 105, or a spread of 10 per cent.

The question in the minds of installment sellers is whether this 10 per cent spread will in a depression be distributed to installment sales in the same propor-

tion as the total of installment sales bears to cash and book account sales. Some express the opinion that installment sales will bear the heavier proportion, but in checking with various authorities about the country the majority expressed themselves that when the depression is over installment sales will have declined only in line with the general falling off of trade. This may be partially accounted for by the fact that many cash and account houses, to keep up sales, are resorting to the development of installment business. One of the large furniture stores on the Pacific Coast a few months ago adopted the installment program, with the result that in spite of the general business depression May, 1930, was the largest May in its history.

If the spread in volume of trade between prosperity and depression is 10 per cent, employment fluctuations may vary much in the same proportion.

President William Green<sup>3</sup>, American Federation of Labor, has stated that in his organization unemployment during the 27 months preceding April 1930 fluctuated from a low of 9 to a high of 22 per cent, a spread of 13 per cent. A comparison of employment and payroll totals<sup>4</sup> in manufacturing industries, March 1930 and March 1929, indicates that employment, March 1930, was 8.9 per cent lower than March 1929, and salaries 12.6 per cent lower.

A reduction in employment and salaries obviously curtails purchases. Many installment houses make the claim that unemployment runs first against the poorer type of workmen, and that the larger purchases are made by the better type where "tenure on their jobs is strongest."<sup>5</sup>

Some ideas on this point may be gleaned from the history of the automobile industry. Automobiles comprise about 52 per cent of the entire installment business.<sup>6</sup> "Annual credit exten-

sion on motor cars \$2,300,000,000—four times as much as on household furniture, next largest item." This article goes on to state: "Department of Commerce figures for the first two months of 1930 give some idea of what is happening. They cover operations of 423 automobile financing concerns \* \* \*. The figures reveal that fewer new cars were financed during January and February 1930 than in 1929, that there was a corresponding increase in the same period of used cars financed, thus:

	New Cars Financed	Used Cars Financed
January and February, 1929 .....	180,995	160,577
January and February, 1930 .....	169,670	173,854

The total of all cars financed (including unclassified) was 356,321 for the corresponding period, 1929, and 354,410 for 1930—volume in dollars, \$162,163,022 in 1929, and \$154,678,794 in 1930."

The percentage furnished by the National Association of Finance Companies<sup>7</sup> may throw additional light on the subject:

	Per Cent Sold on Installments		
	New	Used	All
1919 .....	64.9	44.5	57.4
1920 .....	61.6	47.6	56.1
1921 .....	63.9	50.7	58.4
1922 .....	63.7	51.6	58.8
1923 .....	65.0	54.8	60.9
1924 .....	70.4	57.4	64.2
1925 .....	68.2	62.8	65.5
1926 .....	64.5	65.2	64.8
1927 .....	58.0	63.6	61.0
1928 .....	58.1	60.8	59.5
1929 .....	60.9	64.7	62.9

It is impossible, because of lack of information, to determine whether installment sales of other lines follow the motor industry, but if so, it would appear that installment sales are not reduced disproportionate to unemployment, wages, or aggregate purchases. The representatives of many of the larger finance companies are of this opinion.

The effect of unemployment and drop in wages is not felt alone in purchases, but also on collections. Perhaps the real condition of the installment movement may be reflected more in this factor than the others. Here again statistics on recent experience do not seem available.

(7) Automotive Industries, April 19, 1930, page 621.

\*Paper given before Western Music and Radio Trades Association Convention.

(1) Barrons, March 17, 1930, "Signs and Portents of a Great Revolution," page 5.

(2) Robert Porter, "Taming the Business Cycle," Business, March 1928, page 5.

(3) Financial Chronicle, April 5, 1930, page 2,304.

(4) Monthly Labor Review, May, 1930, page 181.

(5) Business Week, December 4, 1929, page 35.

(6) Business Week, May 7, page 16.

Quoting from a survey by the Department of Commerce<sup>8</sup> of 24,000 stores and five billion dollars in business, showed that in 1927 the ratio of bad debts to total credit sales was 1.2 per cent for installment sales and 0.6 per cent for charge accounts. This same report showed installments outstanding were collected at the rate of 13.5 per cent per month, settling in seven months instead of the customary ten months. Charge accounts paid in at rate of 44.1 per cent a month.

Preliminary figures from the National Retail Credit Survey<sup>9</sup> reported by the Department of Commerce show that automobile dealers lost 0.9 per cent of their charge accounts as bad debts but lost only 0.4 per cent of their installment sales. Another striking experience furnished in this report was that all dealers (merchandise as well as auto) handling their own installment sales lost 0.6 per cent of their total deferred business, but those using finance companies lost only 0.3 per cent.

From this it would appear that experience shows losses on installment sales are not unduly heavy. Just what is happening now is difficult to ascertain. Within the past month there have been expressions of opinion from bankers in several of the large eastern centers and some from western points. All admit

(8) Business Week, June 25, 1930, page 11.

(9) Business Week, December 4, 1929, page 35.

that the situation is being watched very closely, that while in many instances collections are slower and repossessions are increasing somewhat, the sentiment seemed to be that the installment business was holding its own as compared with book accounts. On the other hand, some of the finance companies report repossession on the increase, but collections keep up in good shape.

The older firms handling installment paper have now had a decade of experience and realize that upon the proper extension of credit and proper financing rests the success of installment selling. One reason given by a large finance company on the Pacific Coast for the satisfactory condition of its paper was that for several years it has been educating the dealers from whom it takes paper to exercise care in extending credit. A representative of this company recently expressed himself in this manner: "The dealers have had their losses; they realize now that it is unwise to push a sale unless there is every expectancy of payment. Requirements are becoming more uniform and exacting; terms are more restrictive, with the result that our business is on a very satisfactory basis."

The present status of financing installment sales seems to be settling down to quite uniform practice throughout the country.

Undoubtedly many stores, to increase sales, will desire to utilize installment selling. When considering this, the fa-

tal mistake should not be made of doing so without a watchful eye on working capital. If sales are run up faster than collections are made, capital is tied up; previous provision should be made before entering on an enterprise of this kind.

Consumer credit is of a different character than producer credit, and from the very first it became obvious that it could not follow the lines of the latter. You will probably all recall the early days before finance companies came into existence, the difficulties experienced in negotiating installment paper. There was an apparent need for a type of financial institution that could extend long term credit. The result was that the finance company soon made its appearance and is now playing its part in making consumer credit possible. In discussing this phase of the subject recently with a group of bankers from various sections of the country, it was found that in almost every instance the finance companies are handling the installment paper instead of the banks, and the banks extend temporary credit as need arises, but seldom direct to the dealer.

It appears from a review of this subject that the consensus of opinion is that installment selling is not under a severe test at this time, that it will not be affected unduly by the present depression or is not disproportionate to general trade, and that its financing is being done on an improved basis that is generally accepted as satisfactory.

## *Mack's Observations* on How Not to Do It

**D**URING a recent trip through Ohio I called upon a radio dealer who advertised free radio service, anywhere, any distance, for \$1. He drives a covered truck with the initials M. M. M. painted on the side panels, which in no manner referred to either himself personally or his line of business, thus passing up his best advertisement as he drives around town. He said business was so poor that he could not afford to have his truck painted with his name on it.

Another dealer advertised to test your tubes in your own home free of charge. From all local reports, it is said that the tester is practically sure of finding at least one bad tube for each call.

The fact that competition is keen in Ohio, is evident from the following, all of which happened in one week, in one of the large cities. One radio dealer advertised in a local paper to give a \$50 allowance on your old set. The very next day in the same paper appeared the advertisement of a second dealer giving an allowance of \$75 on a trade-in. Three days later we saw the third dealer come

out and raise the ante to an even \$100. Having talked to some prospective radio buyers in this town, we are assured that these selling methods are doing more to undermine the confidence of all prospective buyers, in both the dealer and his merchandise, than any other trade condition the dealer has to contend with at the present time.

Today we find radio service men advertising in the daily papers in all large cities, using a blind advertisement, giving no name, only a phone number. You simply call the number and wait to see who or what comes to your door. What has he to hide if he is honest and a proficient mechanic? Such advertising does not inspire the prospect with confidence. After all, he should know that a satisfied customer is his best advertisement and will help to get return calls for him. Surely one cannot expect people to place confidence in a man who is soliciting business from behind a blank wall.

A dealer complained to me that his jobber was not giving him enough advertising literature to help him increase

his sales. On his counters were folders and leaflets that fully covered the sets in the store, yet there was no name on any of the printed matter. He would not buy a rubber stamp to put his name on them, although there are five other dealers in his town who are selling the same line of radio sets.

Another dealer has his literature stamped, but it is strewn all over the counters. One day a customer came in to ask the price of a radio receiver, picked up a folder from the counter, and immediately put up a howl at the difference in the price just quoted to him by the dealer and the price on the folder. He had picked up a 1929 relic.

Radio dealers in general are anxious that the manufacturer bring out his new models not oftener than once a year, as is practically done today in the auto field. Here is a case in point. A jobber at the Atlantic City radio show was asked if he had placed any orders at the show. He said "No, I am going to wait to see the latest models that will be shown at the New York radio show this fall."

# NEWS of the Radio Industry

## Tube Prices Reduced

Reductions averaging 24% in the list prices of four of the most popular types of RCA Radiotron vacuum tubes were announced July 17 by T. W. Frech, president of the RCA Radiotron Co., Inc. In making this announcement, Mr. Frech indicated that these new low prices are to be regarded as "the beginning of the fulfillment of a promise." The new prices, which become effective immediately, are as follows:

Type of Tube	Old List Price	New List Price	Saving
224	\$4.00	\$3.30	\$.70
227	2.50	2.20	.30
245	3.50	2.00	1.50
280	3.00	1.90	1.10

"Economies introduced since the formation of the RCA Radiotron Co. seven months ago make these new prices possible," said Mr. Frech. "Our company was organized by the Radio Corporation of America to effect the unification of vacuum tube development, manufacture and sales, and we accept the responsibility of leadership which rests upon the founders of the radio industry in America. We shall always strive to produce a good value in a radio tube, thus contributing to the enjoyment of radio everywhere."

It is to be assumed, without further announcement, that similar reductions will be made by other tube manufacturers.

## Grigsby-Grunow Sues RCA

Following announcement of its withdrawal from the Radio Manufacturers' Association, Grigsby-Grunow Co. of Chicago brought suit against the Radio Corporation of America for triple the damages caused by allegedly illegal collection of royalties and by the "tube clause."

## Superheterodyne Licenses

The Radio Corporation of America has made an addendum to existing licenses granted to set manufacturers, allowing them to market factory-built superheterodyne receivers. The results of experiments with this circuit are placed at the disposal of the various factory engineers.

## Philco—C. I. T. Plan

Philco has arranged for the Commercial Investment Trust of Philadelphia, with branches in 130 cities, to handle radio time payments for Philco dealers. The finance company investigates the credit of the purchaser and collects overdue accounts.

## Sangamo Remote Control

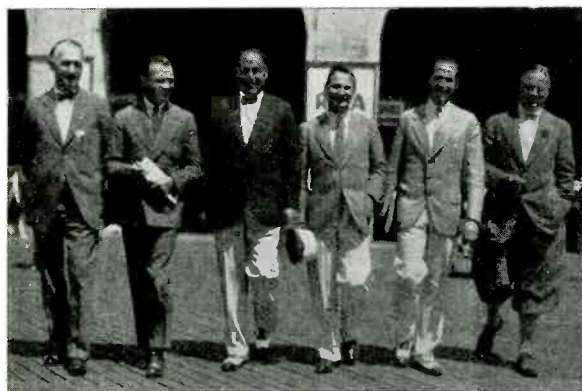
Sangamo Electric Company is developing a new type of special high torque motor for use with remote control systems, says Mr. H. L. Kunz, sales manager of the radio division of Sangamo.

## Increase in Radio Advertising

Radio and allied advertising in national magazines, national farm magazines and for radio broadcasting for the first six months of 1930 totalled \$3,611,938, as compared with expenditures of \$3,584,307 during the same period in 1929, according to the Business Survey Department of Dorrance, Sullivan & Co., New York advertising agents.

The accumulative total for the first six months of radio and allied advertising in the national magazines was \$1,095,113, as against \$1,423,455. The accumulative for national farm magazines was \$111,438, as against \$131,800 for the first six months of 1929. For radio broadcasting the total was \$2,405,385, as compared with \$2,029,052 for the first five months of 1929, a gain of 18.5 per cent.

Radio advertising in June, 1930, totalled \$531,193, compared with \$499,199 in June, 1929. In national magazines eighty advertisers spent \$334,926, a gain of \$100,034 over the June, 1929, total of \$234,892. The average June, 1930, expenditure was \$4,180 and the June, 1929, expenditure \$2,589. National farm radio advertising in June, 1930, was \$8,250, while in June, 1929, it was \$9,150. Radio broadcast advertising was \$190,017, compared to \$254,100 during the same period in 1929.



This group of men, who are directing the sales of the new Westinghouse Radio, are, left to right: J. A. Duncan, assistant to the merchandising manager; C. H. Collins, merchandising manager; M. C. Rypinski, manager; L. W. Staunton, assistant to the manager; R. B. Austrian, assistant to the merchandising manager, and Charles Peitsch of Lennox and Mitchell, the advertising agency handling the Westinghouse radio account.

## Radisco Starts Training School for Dealers

RCA dealers of northern New Jersey and Staten Island will welcome the announcement by the Radio Distributing Corporation, Newark, of the establishment of a free course of intensive training in sales and service, open to all Radisco RCA dealers and their employees. The school will be conducted in cooperation with RCA Institutes, Inc. A complete course of study, covering sixteen hours of instruction, has been worked out to cover every phase of demonstrating, selling, servicing, etc., besides lectures on the actual manufacture of RCA Radiolas. Each course will occupy a period of one month, with two-hour sessions (8:00 to 10:00 p. m.) twice weekly, every Tuesday and Thursday. There will be four complete courses in all, a new group of fifty students being organized for each succeeding month. The first course will begin August 5 and end August 29; the second course will be from September 2 to September 29; the third from October 2 to October 28; the fourth and final course will be from October 30 to November 25. It is proposed to award prizes to those doing the best work of the course. At the completion of each course diplomas will be presented to those who graduate.

## Colonial Furniture Preferred

The results of a survey made by the American Walnut Manufacturers Association to determine preference trends in furniture woods and styles show that more than half of the housewives preferred walnut. More than 28% voted in favor of Colonial furniture, 18% in favor of William and Mary, 15% in favor of Queen Anne and 13% in favor of Georgian. Only 1½% were attracted to the modern style.

## Pacnet Acquires Right to Tone Compensator

Rights to a new tone compensator system have been acquired by Pacnet Electric Company which will license manufacturers to use the device. It is claimed to be able to cut down, eliminate or strengthen any a-f when reproduced through an amplifier and speaker system.

# Who Distributes It Now

"The Greatest problem in the efficient and economical movement of radio products from the maker to the user is in the development of better channels of distribution."

## **The Acme Wire Co.**

Frazer & Co., Ltd., San Francisco, are the new distributors for the radio products of The Acme Wire Co., New Haven, Conn., throughout Northern California.

## **Atwater Kent**

The Frank M. Brown Company are newly appointed Atwater Kent distributors of Portland and Bangor, Maine.

## **Baldwin**

Nathaniel Baldwin, Inc., announce new distributors as follows: Halperin Distributing Co., Inc., New York City and Boston; Maass Radio Corporation, Baltimore, Md.; Providence Electric Co., Providence, R. I.; Domestic Utilities Co., Oshkosh, Wis.; R. F. & W. B. Fitch Co., Oskaloosa, Iowa; Rumsey Electric Co., Philadelphia, Pa., and Valley Utilities Co., Wilkes-Barre, Pa.

## **Bosch**

Salt Lake Hardware Co., Salt Lake City, Utah, is distributor for products of the American Bosch Magneto Corp. in the inter-mountain district.

## **CeCo Mfg. Co.**

The CeCo Manufacturing Company has set up its own distributing machinery in six eastern cities. These are New Amsterdam Distributing Company, New York City; Penn State Distributing Company, Philadelphia; South New England Distributing Company, Providence, R. I.; Commonwealth Radio Distributing Company, Boston; Carnegie Distributing Company, Pittsburgh, and Midwest Radio Distributing Company, Chicago.

## **Dubilier**

The appointment of two additional sales representatives is announced by N. S. Tobey, general sales manager of the Dubilier Condenser Corporation, as follows: For southern Ohio and Kentucky, Congleton Engineering Co., Dayton, Ohio, and for California, Lombard Smith Co., Los Angeles, Calif.

## **Edison**

Roy S. Dunn, sales promotion manager of Thomas A. Edison, Inc., has announced the appointment of McIntyre-Burrall Company of Green Bay,

Wisconsin, as Edison radio distributors. Wahn Radio Co., 737 Boylston Street, Boston, will handle Edison radio in Massachusetts, New Hampshire, Vermont and Rhode Island. Whitney Sporting Goods Co., 1640 California Street, Denver, Colo., are the new distributors throughout the Rocky Mountain region.

## **Gulbransen**

M. E. Seegmiller has been appointed a special sales representative of the Gulbransen Company, manufacturers of the "Champion" model radio set. He will assist district sales representatives throughout the country in promoting the sale of Gulbransen radio. New district representatives include Martin J. Polihoff of Philadelphia, Wahn Radio Co., Boston, Brown-Dorrance Company of Pittsburgh, Pa., and the Motor Supply Company, Savannah, Georgia.

## **Oro-Tone Pick-ups**

The Oro-Tone Company, Chicago, has appointed Universal agencies, San Francisco, as Pacific Coast representatives, and Friedman-Snyder Co., New York City, as sales agents for the New England and North Atlantic States.

## **Philco**

Philadelphia Electric Storage Battery Co. has appointed Columbia Wholesalers, Inc., Washington, D. C., as distributors in southern Maryland, upper Virginia and Washington, and the Garrett-Miller Co. of Wilmington, Del., as distributors in Delaware and northern Maryland.

## **Pierce-Airo**

The Merit Distributing Corporation, 30 Irving Place, New York City, have been appointed New York distributors for the Pierce-Airo Receiver manufactured by the Pierce-Airo, Inc., 113 Fourth Ave., New York City.

## **Radiola**

V. W. Collamore, manager of Radiola division of the R. C. A.-Victor Company, Inc., has announced that the new plans of his company call for the continued distributorship of Joseph M. Vamoiski Company of Baltimore, Md.,

the Klaus Radio and Electric Company, Peoria, Ill., the Charleston Electric Supply Company, Charleston, W. Va., the Smith Radio Corporation of Evansville, Ind., the Continental Radio Corporation in Vermont, Connecticut and Central Massachusetts, and the Leo. J. Meyberg Company of San Francisco and Los Angeles.

## **Solar Clock**

Aerial Insulator Co., Green Bay, Wis., announce the following new sales representatives for their Solar clocks: The Ira Greene Co., Brooklyn, N. Y.; Paragon Sales Co., Philadelphia; Fraser Sales Co., Detroit, Mich.; Harry Fox Co., Hollywood, Calif., and D. Spencer Pritchard, Chicago, Ill.

## **Stewart-Warner**

Stewart-Warner Corporation, Diversey Parkway, Chicago, announce that the Stewart-Warner Sales Co. has been organized with Joe Rozzele as manager at Salt Lake City, and the Stewart-Warner Sales Co., Roanoke, Va., with Chas. A. Brown as the manager.

## **Story & Clark Radio Corp.**

New distributors appointed for radio by Story & Clark include J. V. Kane & Co., Philadelphia, Electric Appliance Co., Pittsburgh, and Butts & Ordway Co., Boston. Under the direction of Otto N. Frankfort, general sales manager, Murray E. Main is to cover the Ohio, West Virginia and Kentucky territory. Frank W. Lorenz is to cover Indiana, Illinois and Michigan. Harry Simmons is to travel throughout Wisconsin, Minnesota, North and South Dakota, while Charles G. Walter and James T. Barrett will be the California representatives.

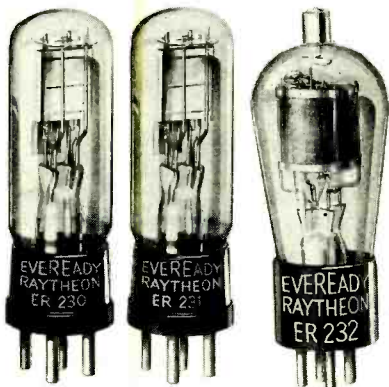
## **Zenith**

F. R. Mihleisen, for years associated with the United Reproducers Corporation as western district sales manager, will travel the northwest states, contacting Zenith distributors and dealers in that territory. Charles J. Pilliod, Jr., also previously connected with the same company for years as west coast manager, will act as Zenith's west coast representative, having San Francisco as his headquarters.

# New Radio Equipment

## Eveready Raytheon 2-Volt Low-Drain Tubes

Three new low-drain Eveready Raytheon tubes have been designed for use in battery-powered receivers in unwired homes. These 2-volt tubes comprise the ER-230, a general purpose tube, the ER-231, an output tube, and the ER-232, a screen-grid tube. All employ the patented 4-pillar type of construction to secure strength, uniformity in operation and absence of microphonic noises. They may be operated from two No. 6 dry cells in series, with a filament rheostat and voltmeter to hold them to their rated filament voltage. They



should be mounted vertically in a standard UX socket.

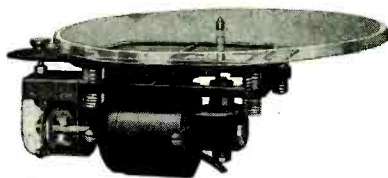
The ER-230 may be used as an r-f or a-f amplifier or as a detector. Its filament current is .06 amperes at 2 volts and its plate current 2 ma at 90 volts with 45 volts negative bias. It has a mutual conductance of 700 micromhos, a plate resistance of 12,500 ohms and an amplification factor of 8.8. It will stand a maximum of 150 volts in the plate.

The ER-231 draws a filament current of .13 amperes at 2 volts and a plate current of 8 ma at 135 volts with 25.5 volts in the grid. It has an undistorted power output of 170 mw, a mutual conductance of 875 micromhos, a plate resistance of 4000 ohms and an amplification factor of 3.5.

The ER-232 may be used as an r-f or intermediate a-f amplifier or as a detector, all with impedance coupling. Its filament drain is .06 amperes at 2 volts. With 135 volts on the plate, 67½ volts on the screen-grid and -3 volts on the control grid it draws 1.5 ma. It has a plate resistance of 800,000 ohms, a mutual conductance of 550 micromhos and an amplification factor of 440.

## New Bodine Turntable

The Bodine Electric Company, Chicago, are marketing a new electric turntable which has an oversized fan to ven-



*Bodine Type R. C-12 Electric Turntable*

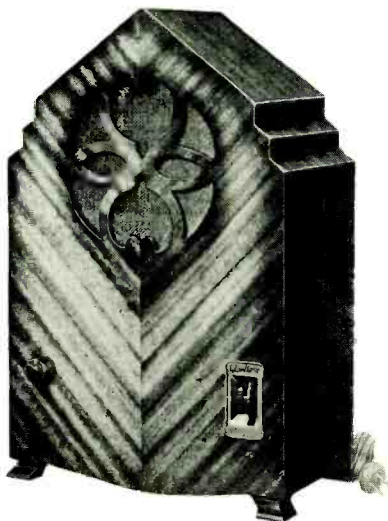
tilate the stator. Other designed improvement is silence in operation and minimum of wear.

## Simplex Radio

Simplex Radio Company, Sandusky, Ohio, manufacturers of public address systems, are making three models of the Simplex screen grid radio whose chassis is also sold separately. The set uses three 24s, one 27, two 45s, and one 80 tube and has four tuned stages with tone control, band pass filters, and power detection. The three cabinet models are equipped with dynamic speakers.

## U. S. Radio & Television Corp. Makes Midget Set

The U. S. Radio and Television Corporation of Marion, Indiana, announces the Gloritone as a convenient set for the porch, breakfast nook, summer cottage or the individual room. It uses two '24

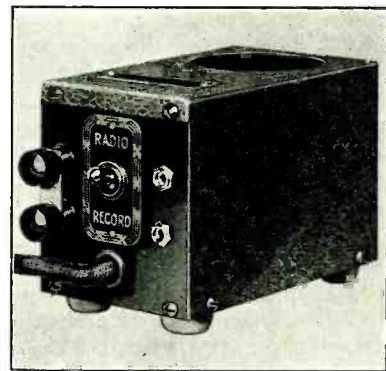


*The Gloritone.*

tubes in the r-f stages, a '27 in the detector, and a '45 in the single audio, with an '80 rectifier. The chassis and electro-dynamic speaker are housed in a walnut cabinet 20 inches high, 15¼ inches wide and 7 inches deep, the total weight being 26 pounds. Complete with tubes it lists at \$59.50.

## Pacent Pick-up Booster

A booster for use with electric phonograph pick-ups, when playing records through receivers with power detector and one audio stage, is announced by Pacent Electric Company. The unit is neat and compact in design, and offers owners of sets with power detector the full volume and excellent quality sometimes lacking when sets of this type are used to amplify phonograph records. The detector tube of the set is placed in the adapter of the booster, and the adapter is placed in the detector socket of the set. A type '27 tube is placed in the socket of the booster and the ground



*Pacent Booster for Phonograph Pick-Up*

connection from the booster made to the ground post of the receiver. Once the connections between booster and receiver are made, no changes need be made when going from radio to recorded entertainment, or vice versa. A convenient switch is provided on the front of the booster to facilitate change from radio to record. Two pin jacks are provided for the input of the phonograph pick-up. It may also be used as a third audio stage when a set has two audio stages.

## Webster Pick-ups and Amplifiers

The Webster Electric Co., Racine, Wisconsin, is marketing a complete line of electric phonograph pick-ups for home, commercial or theatre use. The feature models of this line are the No. 3A, listing at \$14 and the No. 4A, listing at \$21. The line of power amplifiers includes a complete assortment of base model amplifiers and a line of "rack and panel" amplifiers for sound distribution systems. In addition to the present line, there will be shortly an additional line of RB models, comprising power amplifiers on racks for sound distribution systems in small institutions.

### Weston Set and Tube Tester

In their Model 565 the Weston Electrical Instrument Co. offer a complete, self-contained radio set tester which incorporates a checker for a-c, d-c and rectifier tubes, a double range ohmmeter and a modulated rf oscillator.



Weston Set and Tube Tester

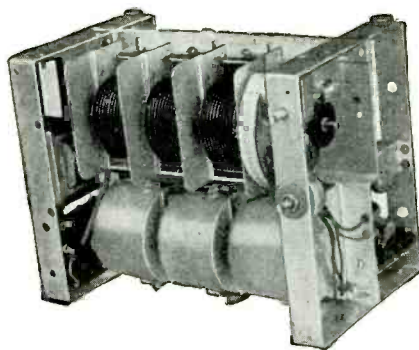
On the panel are three meters: An a-c voltmeter, a d-c voltmeter, and a milliammeter, all arranged for multi-scale reading. The ranges of the a-c meter are controlled by a 9-point bi-polar switch whereby it is possible to measure up to 4, 8, 16, 200, or 1000 volts, 4 amperes, and 100 or 200 milliamperes. By means of a 23-point bi-polar switch, the d-c voltmeter gives readings of 5, 10, 25, 50, 100, 250 or 1000 volts, 0-10,000 or 0-100,000 ohms, and up to 1, 2½, 25 or 100 milliamperes. A toggle switch changes the range of the d-c milliammeter to either 20 or 100 ma. Sockets are provided for UX and UY tubes as well as for an oscillator. Adaptors are used for UV tubes. Ten standard tests may be made through a tester plug inserted in radio set and as many more external tests may be made through the various binding posts, as described in a complete book of instructions which accompanies each instrument.

### Rola Speakers, Sets and Phonograph

Rola Company reports that 1,200 speakers a day are being built in the Cleveland plant and 1,000 per day in the Oakland plant. A Stinson monoplane has been purchased for use of sales executives in covering the national territory. Rola announces three new apartment style radio sets at prices of from \$99.00 to \$125.00 with tubes. All have three screen grid tubes, 4 tuned circuits, tone control, pre-selector tuning and Rola electro-dynamic speakers. Another new item to the Rola line is a phonograph, with electric motor and pick-up, built primarily for the export trade. It uses a new Rola screen grid amplifier with one screen grid tube, one '27 tube and one '45 tube, and one '80 rectifier and is housed in a modernistic small console cabinet. It lists for \$99.00 complete with tubes and is known as the Rola Model 60.

### Premier Auto-Pal

Premier Electric Co., Chicago, announces the Auto-Pal as a self-contained set which can be installed under the cowl or elsewhere in an automobile. The chassis is housed in a metal cabinet 8 in. high, 10 in. wide and 6 in.

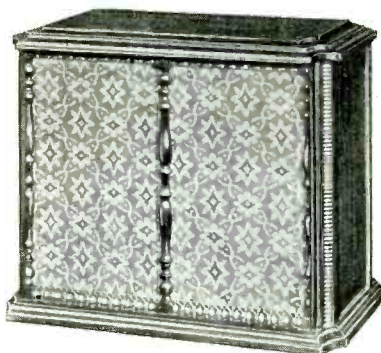


Auto-Pal Chassis, Cover Removed

deep. It uses screen-grid tubes in the two rf and detector stages and a 112-A in the audio stage, having a total B battery drain of only 9 ma. It employs direct tuning of a micrometer drum drive and has a fully illuminated dial. It is furnished complete with tubes, B and C batteries, loudspeaker, antenna, connecting cords, and mounting brackets for \$65.

### Cavac Autovox

This is a new five-tube midget set which the Cavac Corporation of Ann Arbor, Michigan, markets complete with a built-in Cordonic (electro-static)



The Autovox

speaker to sell for \$57.50. The cabinet is 12½ inches high, 15½ inches long and 9 inches deep. Two '24 tubes are used in the rf stages, a '27 in the detector, and a 112-A in the audio stage, with an '80 as a rectifier.

### Steinite Plans New Activities

Oscar Getz, former vice-president and general sales manager, has been named president of the Steinite Radio Co. of Fort Wayne, Ind. He states that production will soon be started in a new line of sets. H. S. Alexander has rejoined the company as advertising manager.

### Auto-Pilot Kit

The Pilot Radio and Tube Corporation of Brooklyn, N. Y., is marketing in kit form an automobile radio receiver which is designed for mounting on the running board or rumble seat. The chassis is housed in a black japanned



Assembled Auto-Pilot Set.

steel case 6⅞ in. high, 22 in. long and 8 in. wide. It is controlled from inside the car by means of a 6-foot flexible cable which encloses two brass chains fastened to pulleys at both ends. The set uses '24 tubes in the three rf and the detector stages, a '27 tube in the resistance-coupled first audio and a '45 tube in the transformer-coupled second audio. A pair of wires strung under the car between the front and rear axles or around the edge of the running boards may be used as an aerial if it is not convenient to tack a piece of copper screening on the inside top. It uses the car battery for filament supply and requires 135 volts of B battery which may be placed where desired. Its price is \$47.50, including the case, control panel, cable, and hardware, as well as detailed instructions for assembly, installation and operation.

### Erla Makes Midget

Electrical Research Laboratories is selling a seven-tube midget receiver equipped with dynamic speaker and electrically operated clock. The same chassis is also available in a console cabinet.

### New D-C Set

Pierce-Airo, Inc., New York City, is making a special all electric radio for operation on direct current. These sets have specially designed selective control tuning; double push-pull amplification; triple screen grid tubes; humless filter circuit; novel non-glare metal drum dial; completely shielded r-f assembly; special bridge circuit compensated antenna; excellent tonal quality; automatic phonograph attachment.

(Continued on Page 54)



## HOW TO BE A RADIO HAWKSHAW

(Continued from Page 22)

I went up into the hotel, closely eyed by a lot of shabby-looking mongrels, found the room that I wanted, but it was locked; evidently nobody was in it. I got out of sight up the corridor and in about an hour and a half I saw two hulking figures come up and enter the room. In a moment I heard the radio playing.

I hurried down to the street, got my truck-driver, returned, and pounded roughly on the door, demanding immediate admittance in the name of the law. I got in just in time to catch the thief in the act of selling my brand new hundred and eighty dollar "rajo" to another fellow, a white man, for forty-five dollars.

They were both bad-looking eggs, so I kept up a rapid fire of menacing talk to the effect that I had a good notion to take the pair of them forthwith to jail and throw the key away—meanwhile, with my helper I ripped off the ground wire that was being used to play the set, yanked out the socket-plug, got hold of the radio and carried it out. In a few moments the occupants of the room came slinking down to the street and vanished at a shuffling lope, while the dandy hidden in my car crouched still lower and looked almost pale as he grasped the handful of five-dollar bills I then paid him. I don't know whether he had his throat cut by the next morning or not.

Some readers may wonder why I didn't call the police to do this work; I shall only remark briefly that they would have bungled the whole job; the crook would probably have gotten away, or if the police had seized the radio at all they would have carted it to the station to hold it as "evidence" for an indefinite length of time.

Once the Gray Company had a very bad customer, who fought with collectors, knocking one downstairs, and who finally skipped with a set. He left no trace behind him, but as his credit statement showed him to be a tile-setter, we communicated with the half dozen ornamental-tile companies of Redbank and soon found one with whom he had applied for employment recently. He had left an address—a cheap apartment house in a bad part of town.

Hurrying to that address, I arrived half a day too late. The skip had just moved elsewhere with the radio. No further trace of him could be found for several weeks, when a new check-up among the tile companies revealed that the fellow had been put to work on the tiling of a large new building. He had given no new residence address to his employer. Being green at that time, I went to the district attorney, swore to

the facts and got a warrant for the arrest of the absconder.

No police officer ever even went near the scene of the man's employment, but by mere chance he was arrested in a drunken fight later, and when brought in to the police station, the warrant for his arrest came to light from some pigeonhole. I went to the station, and obtained the fellow's latest address. This was another large low-class apartment house hardly three blocks from the Gray store.

By the time I got there, the thief had been bailed out by a bonding company. He savagely refused to surrender the radio, which he had there in his possession. I at once telephoned a private detective and put him on watch outside the fellow's door, fearing he would move off again with the machine before I could legally replevin it. I got replevin papers next morning and a deputy sheriff went and seized the machine at the point of a gun and brought it in to the store.

A police inspector showed up an hour later in a fury, demanding that the radio be turned over to the police as evidence. At the hearing, the defendant swore that he had left his address with the Gray Company; and the judge bawled us out to beat the band and dismissed the case with the surly remark that it was only a "contract-squabble" and that the defendant had committed no crime inasmuch as he had not sold the radio or moved it out of the state!

But we had the satisfaction of seeing the fellow walk from the courtroom into the arms of another policeman with a warrant for his arrest sworn to by his wife on a charge of deserting her and his three youngsters. This man made wages of ten dollars a day in a highly specialized trade.

**T**HE more one has to do with criminal law, the more one sees that it is a funny thing and often acts to protect criminals instead of business men. There were nearly always warrants on file in Redbank calling for the arrest of certain "missing" persons employed by the Gray Radio Company, the charge being burglary, which is a felony.

The specific act resulting in the issuing of these warrants were merely that the Gray Company's investigator, having located a missing radio in the hands of some fellow who drove off collectors with a gun, finally hid himself nearby, and when he saw the crook go out, he coolly broke in a window, went inside, dragged the radio onto the sidewalk, and phoned for a store-truck to come and get it.

But the dispossessed thief, as I have said, got a John Doe warrant on a burglary charge because the Gray Company had stolen its own property. If the police could only have laid hands on the particular fellow who did that breaking

in, he might have been up against several years in the penitentiary—the length of time again depending on who his lawyer was.

Time and again burglary warrants have been issued on similar complaints. The inexperienced young radio dealer should distinctly understand, as many do not, that it is highly dangerous for him to break into a locked room and remove his own property. No matter how disreputable the place or the occupants, the act is "burglary."

But there is one funny little joker in this game. If the dealer should go to the door, try it, find it unlocked, walk in and politely remove his radio, no burglary charge or any other charge against him can be made to stick. And if the complainant should assert that the door showed the use of a jimmy or other tool, the dealer need only reply that the door was already open when he arrived on the scene. Unless the complainant can then produce witnesses to testify that they actually saw the accused breaking the door, again the charge cannot be made to stick. But don't imagine that a cheap hack lawyer could think of all this—if you get in a jam, get the best one you can afford.

Once we had an extremely nasty and belligerent couple to deal with, a landlord and his wife, who had seized a brand new radio from a tenant on account of a delinquent rent bill. The radio was not paid for and belonged to us, but the landlord absolutely refused to surrender it. On the appearance of a man with our gold badge and court-order, the landlord slammed the door in his face and locked and barred it. A second attempt resulted similarly.

Getting into a rage, I then went myself after that radio, taking along a sledge-hammer and an axe and a sawed-off shotgun. It was about eight o'clock and quite dark when I arrived at the place. No lights showed in the apartment of the landlord. I went around to the back door, which is always the best door to work on, especially if you are not a full-fledged house-breaker. I tried the back door and was astonished to find it unlocked.

I immediately became wary, fearing this was a trap and that I might be blown to pieces by the fellow hiding somewhere inside. I played my flashlight everywhere as I advanced and soon was certain that the man and his wife had both really gone out. I found the radio hooked up in the parlor. With my truck boy, I disconnected it, unlocked the front door, carried the radio out and took it to the store.

In about an hour, the woman came into the store in a ferocious temper, scattering blasphemy liberally over the place, and announcing that she had witnesses who had seen the removal of the

machine from her premises. But she was unable even to get a warrant from the district attorney because she could not produce a single witness who would be able to testify on oath that he saw the breaking of a door—it having been pitch dark.

There is still on file in some pigeon-hole in a certain police headquarters of a large city, a warrant, probably now buried deep in dust, for one scoundrel known as "Mike Gallagher," who once worked for the Gray Company.

This arrant knave was sent to obtain by persuasion, main force or any other means, at his discretion, a missing radio that had been successfully traced to a definite address, a second-story flat. On Mike's arrival at the place nobody was in the flat, and as Mike was impatient to be up and going, he took the hammer which he used for nailing up aerial poles, smashed a pane in the kitchen window, unlocked the sash, climbed in, reached the radio, and with the aid of a helper carried it down into his truck and pulled out.

The skip, who had been missing for three months, showed up at our store within twenty-four hours, demanding the radio and threatening an arrest on a burglary charge, pointing out that he had influential friends among the police. He did get a John Doe warrant, but when the police inspectors came to the store, we informed them that the guilty truck-driver, the said Mike Gallagher, had not returned with the radio, but had so far as we knew decamped to fresh fields of endeavor and that we were very anxious to find him ourselves.

The puzzled inspectors lurked around, quizzing our boys and even the office girls. Everybody gave an identical description of Mike, describing a big hulking fellow, a gyp jobber, who used to sell us tubes and supplies at inside discounts—so the inspectors went away carrying with them a very well checked-up description of Mike as being a huge Irishman, about six feet three in height, four feet around the chest, redheaded and freckled-faced, inclined to fight at the drop of the hat, and generally an all-around rogue.

"We're going to get him," said the police inspector, wrathfully. "We're damn good and mad!" And, so far as I know, they may have locked up some unfortunate Michael and he may be languishing in prison now for this crime.

As long as the Gray Company did not admit having taken possession of the burglarized radio, fixing the blame on a missing truck-driver who had broken in on his own responsibility, there was nothing in the world the police could do about it. But had the concern admitted all these things, it would have cost at least five hundred dollars to get matters fixed up, and half the company would

have been walking around under heavy bond for several months. All because it had recovered its own property.

I think I had better make it very clear at this point that I am *not* advising any radio dealer to make a practice of house-breaking. It is highly risky and dangerous at any time. But it may be justified in an emergency; and at any rate the dealer should know just what to do to protect himself. He certainly ought to have the right to get his property back, quickly, without excessive expense and delay, when dealing with a mere scurvy decamping thief.

According to law, the repossessing of merchandise must be made by the legal red-tape way—a way that costs the dealer plenty of money, and worse yet, occupies hours and sometimes days of time, giving the crook a thousand chances to move again before the cumbersome law finally allows a deputy sheriff to go and get the property—your property.

I repeat that I think criminal law is often worked by our police and our courts to act in favor of criminals rather than of decent business men. I have had many experiences that intensify that feeling.

Without caring to set myself up as an apple-barrel critic who wants to tell everybody how to run the world, I venture the opinion that it should be made a crime, a felony, to remove any article bought on time payments, worth more than fifty dollars, from the exact location at which it was left by the dealer, except by the dealer's express and written permission.

As the law stands now, the only unpleasant thing that can ever happen to Mr. Bunkum Skip is possibly to have the dealer run him down and take the radio away from him—that's all. And he can go and buy another radio from a second sucker dealer next door to the first one and skip with that.

In conclusion, I should like to say again, as I have repeatedly stressed in these articles, that it is up to the dealer to be extremely careful in granting credit to the public. Don't take any chances on a weak-looking credit statement; investigate every applicant thoroughly, making particular inquiries of his employers, and of his other creditors. Keep collections rigidly up to date; begin immediate re-investigation of every delinquent purchaser.

If you make your own collections, you will know how your accounts stand. If you are a finance company's victim, and they collect their money—and most of yours—make the finance company render you a list of delinquent accounts every fifteen days and go after them yourself, tooth and nail—or you'll certainly be up that famous creek that I have mentioned before.

## NEW RADIO EQUIPMENT

(Continued from Page 52)

### Vocaphone Theater Equipment

Vocaphone Company of America, 31 West 21st St., New York City, offers the Miles air column speaker in 9 and 10-ft. sizes and the Miles electro-chromatic pick-up for installation in theaters. The speaker has an electrodynamic unit whose field coil requires 6-volt supply.

### Dayton Scientific Corp. Makes Short-Wave Receiver

The Dayton Scientific Corporation, with offices and plant at Dayton, Ohio, has been formed with Oscar H. Hulberg as president, H. L. Burns as vice-president and treasurer, and George F. Holland as secretary. One of the first products will be a short wave receiver suitable for the use of the non-technical trade and will be sold through distributors, about half of whom have been appointed.

### Balkeit Radio

National Transformer Manufacturing Company, 205 North Wacker Drive, Chicago, are producing the new model SG8 Balkeit Radio, which is claimed to be unusually selective and sensitive. It uses three '24 tubes in the r-f stages, '27 tubes in the power detector and first audio stages, and '45 tubes in push-pull in the second audio stage. It has an electrodynamic speaker and phonograph pick-up jack in a standard console cabinet. Its list price is \$125 less tubes. This company also makes eight chassis models for private brand sale.

### Ozarka Viking 91

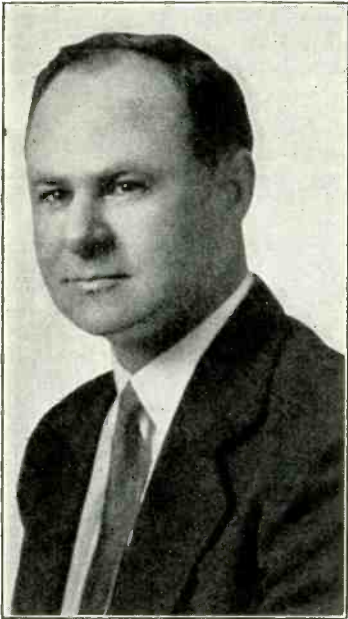
This is a new midget set made by Ozarka, Inc., of Chicago. The table cabinet is 7 inches high, 15 inches long and 9 inches deep. It uses '24 tubes in the two r-f and detector stages, '27 tubes in the first audio and '45 tubes in the second audio. Complete with tubes and electrodynamic speaker its sells for \$69.50. Its current consumption is 75 watts. A carrying case is provided separately for taking it to a demonstration place.

### Two New Type Photoelectric Cells

G-M Laboratories, Inc., Chicago, announce two new types of Visitron photoelectric cells for sound-on-film equipment, television, and industrial control devices. They are designated as Types A and AV, the type A cell being gas filled, and the type AV a vacuum cell. Each type is manufactured in four sizes. They have great sensitivity to all parts of the visible light spectrum, especially red light from incandescent lamp sources, low operating voltage, and great electrical and mechanical sturdiness.

# Personal Mention

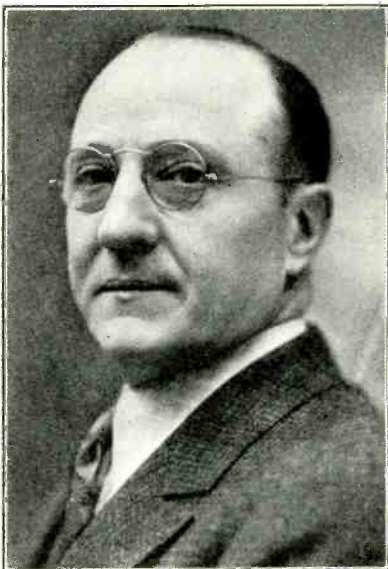
Harry J. Nichols, formerly in charge of the Westinghouse radio engineering department at Chicopee Falls, Mass., has been made chief engineer of General Motors Ra-



Harry J. Nichols

dio Corporation, Dayton, Ohio. In this position he succeeds E. B. Newill, who becomes vice-president in charge of engineering for the Frigidaire division of General Motors.

B. G. Erskine, vice-president of the Radio Manufacturers Association, predicts an early return to normal in the radio industry. This assertion, made over KDKA, Pittsburgh, he



B. G. Erskine

backed up with figures to prove that both tube and set manufacturers are now working toward the peak of production necessary to care for present orders and in preparation for the anticipated fall increase in business. While in Pittsburgh he was guest of honor at the Radio Council of the Pittsburgh

Chamber of Commerce. He also addressed a gathering of Bosch dealers, sponsored by the O-M-C Supply Co. Erskine, who is president of the Sylvania Products Co. spends much of his time working in the interests of the radio industry as a whole. He is now engaged in special research on behalf of the Tube Manufacturers Group of the RMA, of which he is chairman.

S. Jay Goldstein has been made sales promotion manager for Sanford Radio Corporation, Brunswick distributors, New York City.

H. G. Blakeslee, formerly California representative for the Ken-Rad Corporation of Owensboro, Ky., is now western sales manager for the entire Pacific Coast.

J. B. Cummings has become sales representative with Randall-Lore, Inc., distributors for Stromberg-Carlson in Baltimore and Washington, D. C.

E. A. Leger, formerly engaged in research work of radio tubes with the Westinghouse Company, has been appointed chief engineer of the National Union Radio Corporation.

Oliver Ayer has been made sales manager of the Jacobs Television Corporation of Jersey City, N. J. He was formerly connected with the Fada organization.

Wm. H. Cooke of Long Beach, Calif., is now California sales representative for the Sylvania Products Co.

Carl J. Main is the newly appointed Zenith representative in the states of Ohio, West Virginia, Kentucky, Indiana and lower Michigan. He will make his headquarters at Columbus. Leo W. Reed, who formerly covered this field has been transferred to the territory covering Maine, Vermont, Massachusetts, New Hampshire, Connecticut and a portion of northern New York state.

Leslie F. Muter has been appointed vice-president in charge of sales of Utah Radio Products Company. He is a pioneer in the radio industry, actively associated with it as president of the Leslie F. Muter Company since 1921. He is a director in the R. M. A. as well as general chairman of the R. M. A. Credit Committee and is thoroughly acquainted with the requirements of manufacturers for radio parts.

B. E. Trupp has been made Pacific Coast District Manager for National Union Radio Corporation, with warehouse headquarters at San Francisco. Waterhouse-Weinstock-Scovel and the Electric Corporation, both of San Francisco, Oakland and Portland, have been made distributors.

Ross D. Siragusa, president, Transformer Corporation of America, manufacturers of Clarion radio receivers, in a Trans-Pacific telephone call to Montevideo, Uruguay, South America, on July 11, closed the fifteenth export contract introducing the new Clarion Radio to as many foreign countries within the past four months. This negotiation confirming an order for three thousand Clarion Radios, capped a foreign-entry record unusual for a new product.

Henry A. Hutchins, Jr., is now sales manager of National Union Radio Corporation. He was formerly associated with Kolster in a similar capacity.



Henry A. Hutchins, Jr.

## Triad Tubes

During the past year the Triad Manufacturing Co., Inc., of Pawtucket, R. I., makers of Triad radio tubes, under the guidance of the executives whose pictures are



GEORGE COBY  
President



ELY EGNATOFF  
Treasurer



HARRY H. STEIDLE  
Vice-President and  
General Sales Manager



WILLIAM CEPEK  
Secretary

shown herewith, have become an increasingly important factor in the production and distribution of tubes. Not only have they endeavored to produce tubes which will give better service and have longer life, but also have they sold over a million dollars' worth of tubes during their first year of business. Vernon K. Wilson, assistant sales manager, has recently appointed a number of new representatives, including R. J. Noel at Los Angeles, G. N. Noel at San Francisco, and E. R. Fallon at Boston.

## CONVENTION OF WESTERN MUSIC AND RADIO TRADES ASSOCIATION

During the three-day exhibit of new radio models presented at the Pacific Radio Trade Show in San Francisco the Western Music and Radio Trades Association held its seventh annual convention, June 30 to July 2. The convention and show were inaugurated at a meeting of the Electrical Development League when Dr. Lee De Forest recounted his early work with vacuum tubes. President Ernest Ingold presided at all sessions.

The first of the two business meetings featured music, with a keynote address by Lloyd Taylor of the Sparks-Withington Co. Arthur S. Garbutt, of the NBC, in analyzing what music people like, stressed the point that the most popular music is that which calls upon all the faculties for only a short period of time. The address on Installment Selling by E. V. Krick is printed elsewhere in these columns. Norman Pillsbury explained how ten-student classes are being successfully taught to play the piano in the public schools of Oakland, Calif. P. T. Clay briefly reviewed the trends in merchandising musical instruments, advising against free servicing and against home demonstration of radio sets.

The second business session featured radio. It was opened with a recorded demonstration of a typical Standard Symphony Educational Broadcast, whose purpose and result were explained by W. J. Held. Robert D. Eastman presented an interesting talk about the details of "Effective Retailing." Don E. Gilman told of the musical preferences of listeners as revealed by the Starch survey, which shows that orchestral semi-classical and dance music are most in favor. He stated that radio sets are bought because of what they bring into the home, that radio audiences are not opposed to sponsored programs from chain stations and that any criticism of the advertising part of a program is detrimental to the radio business.

R. E. Smiley, manager Ken-Rad Corporation, in analyzing "The Changing Radio Picture" emphasized the growing importance of the sale of tubes, the tremendous possibilities in the sale of midget sets and the lessening importance of radio shows in June. A paper by J. L. Ray, president RCA Victor Co., explained the new RCA lineup, said that a year would elapse before the a-c pentode set would be available, and that it was a matter of years rather than months before radio television would be available for home use.

E. T. Cunningham gave warning that the radio industry is facing another year of over-production unless the most intensive selling methods are employed. He particularly advised the dealer to use his service department as a means to create good-will on any old-set owners, who should be prospects to be followed up in the sale of new sets.

The entertainment included two luncheons and two banquets, as well as automobile and theatre parties for the ladies. Musical entertainment for the first luncheon was provided by the National Carbon Co. and for the first banquet by the Victor Talking Machine Co., with dance music presented by the Brunswick Radio Corporation, menus and flowers being provided by E. T. Cunningham, Inc. Philco also arranged for a preview of "Follow Through." Musical entertainment for the second luncheon was provided by the National Broadcasting Co. and for the second banquet by the Atwater Kent Mfg. Co. and its Pacific Coast distributors, menus and flowers being provided by H. R. Curtiss Co. Music for the dance that followed was furnished through the courtesy of the Radio Corporation of America.

## I. R. E. Convention

The fifth annual convention of the Institute of Radio Engineers will be held at Toronto, Canada, August 18 to 21. Joint technical meetings will be held with the engineering division of the R. M. A. A component parts exhibit will be made in connection with the convention. Subjects to be covered by papers include: International Communications, Constant Frequency Oscillator Circuits, Directive Antennas, Radio Electric Clock System, Determination of Thermionic Emission from Filaments, Radio Direction Finding, Aircraft Radio Transmission and Reception, Developments in Television R. F. Coupling Methods, R. F. Measurements, Calculating R. F. Selectivity with Oscillograph Method of Taking Selectivity Curves.

### Los Angeles Radio Show

Los Angeles is to hold its eighth annual radio show in the Ambassador Auditorium, August 31 to September 6. A preview for the trade only will be held August 31. This show is conducted by the Radio and Music Trades Association of Southern California, of which H. E. Sherman, Jr., is president and A. G. Farquarson is secretary. The show committee is C. H. Mansfield, chairman; R. B. Yale, George H. Nicholson, Naylor Rogers, Walter Fagan, Glenn Dolberg, J. J. Perlmuth, Edward A. Geissler, H. A. Bell and L. E. Fontron. The show is under the management of Waldo H. Tupper.

### Radio Short Course at University of Florida

The extension division of the University of Florida, July 7-11, gave a short course in radio to 182 men, mostly dealers and distributors from Florida, Georgia, and South Carolina. The instruction included "Fundamentals of Electricity, A-C and D-C," lectures and demonstrations on r-f, detector and a-f circuits, power units and speakers, and a lecture on tube engineering, manufacturing and test. In the opinion of L. P. Naylor of the Arcturus Radio Tube Co., who gave the lecture on vacuum tubes, this course pioneered a new idea which will be adopted by many engineers. No charge was made for the course, which was conducted under the direction of Prof. Joseph Weil.

### California Radio Interference Association

The California Radio Interference Association has been organized as an outgrowth of a meeting of public utility and radio trade association representatives at Fresno, July 16-17. Its purpose is to minimize interference to radio reception. George R. Walters, who is in charge of interference investigations for the Radio and Music Trades Association of Southern California, is the chairman, and George H. Curtiss, secretary of the Pacific Radio Trade Association, is secretary. Committees have been appointed on research, publicity, and public relations. A. H. Babcock is chairman of the committee on papers to be presented at a meeting October 28-29. A practical demonstration of radio interference caused by power line equipment was made by H. N. Kalb, of the San Joaquin Light and Power Co. at their testing laboratory during the session. Membership in this new association is open to those who are on the pay roll of a utility, a radio trade association, or a city employee who is engaged in radio interference suppression.

J. W. Kelly of Vancouver, B. C., was elected president. J. H. Fletcher and Don Preston vice-presidents, D. H. Kent secretary and W. C. Clark treasurer. Vancouver was selected as the city for the next meeting.

## NEW RADIO CATALOGS

Hoyt Electrical Instrument Works, Boston, Mass., have issued a handy booklet about Hoyt radio instruments, including portable and panel voltmeters, milliammeters, resistance meters and pocket meters, and another booklet about Burton-Rogers service instruments, including tube checkers, set analyzer, grid-dip oscillator, complete test panel and direct-reading ohmmeter.

Radio Master Corporation, Bay City, Mich., in a recent brochure show some beautiful new models of period cabinets for installation of a radio chassis. Prices range from \$35 to \$450.

Birnbach Radio Co., 145 Hudson St., New York City, are distributing an illustrated price list of their weather-proof lead-in strips, pipe and ground clamps, aerial kits, lightning arrester, cord, cable and wire.

Carter Radio Co., Chicago, furnish a booklet which illustrates and prices new designs of radio outlet plates.

Cable Radio Tube Corporation of Brooklyn, N. Y., have issued a handsome sales portfolio on "Speed" tubes. In addition to giving the characteristics of the twenty-two types of tubes made it shows the pictures of the plant, equipment and personnel, together with an account of the sales aid that is being given to the dealer.

Pacent Electric Co., 91 Seventh Ave., New York City, in "The Latest and Last Word in Quality" describes five types of Pacent power amplifiers for electric reproduction of records with phonovox pickup. Another pamphlet describes the Pacent electric pickup booster stage for providing increased volume through some popular radio models.

The Brunswick Radio Corporation has issued "Home Demonstration," so as to give the dealer ideas as to the best way to handle the problem of home demonstration with practical suggestions for his salesmen to follow. According to Parker H. Erickson, of the advertising department of the Brunswick Radio Corporation, 500 dealers helped in the production of this book through their suggestions.

Gilby Resistance Handbook from Gilby Wire Co., Newark, N. J., presents tables and curves of the resistance characteristics of a large number of nickel-alloy wires. It also gives useful data for the design of electrical heating elements.

De Jus-Amsco Corporation, 418 Broome St., New York City, illustrate and describe heavy duty rheostats and potentiometers in a recent circular. These units are made in 40 and 75-watt sizes in any resistance, to order, up to 2000 ohms. The resistances are wire-wound over asbestos covering on a steel core and are noiseless in operation.

## BOOK REVIEW

"Photocells and Their Application," by V. K. Zworykin and E. D. Wilson. 209 pp. 5½ by 7½ in. Published by John Wiley & Son, Inc., New York City. Price \$2.50.

This book admirably fills its purpose in giving an accurate and understandable account of the development, behavior and functioning of the "electrical eye." The authors are associated with Westinghouse Research Laboratories. After tracing the history, general theory and mechanical features of photoelectric cells, they tell how the gas-filled and vacuum types of cells are made and used with radio tubes as amplifiers in the talkies, facsimile and television as well as various other industrial applications. The treatment, while not too technical for the untrained man, will be of great interest and aid to the experimenter.

TOBE

Filterette

AUGUST, 1930

**RADIO ORDINANCE IS PASSED  
BY CITY COUNCIL—LAW IS  
AIMED AT ELECTRICAL  
DEVICES**

**Machines Which Are Said to Cause  
Noises, Banned for 12 Hours Daily**

**SCHUELER FAVORED MORE DRASTIC  
LAW**

**City Council in Regular Session Refuses to  
Grant an Extension of Time**

Hagerstown, Md.—Adoption of the radio anti-interference ordinance, designed to eliminate all or most of the noises now so objectionable in Hagerstown, featured last night's session of the Mayor and City Council. The new law will become effective September 1.

The law prohibits the use of any machine or electrical device which has any tendency to "broadcast" noise detectable by radio receiving sets. The ordinance is patterned after federal laws and is said to be absolutely ironclad in that it makes no exceptions.

Passage of the law has been held up here for months on pleas of local chiropractors, who own and operate diathermy and high frequency equipment in the course of their practice. Such machines must of necessity be screened at some expense to the owners to come within the provisions of the ordinance.

The new ordinance reads that all machines of the type, unless screened, cannot be used during the interim from 12 o'clock noon until 12 o'clock midnight. This provision thus permits the use of unscreened machines during the mornings.

Councilman Schueler wanted the time provision stricken out, thus making the use of machines prohibitive at all times unless screened. He cast a dissenting vote on the passage of the ordinance while the other four voted for its passage.



F. W. THOMAS  
*Pacific Coast Resident Engineer Tobe-  
Deutschmann Corporation*

**PREMIER BROADCAST FROM  
ZOO**

**New Sound Effects From Foundry**

Dear Friend Joe:

You may not know it, but I reside on the northeast corner of Summer and Barret streets, in a brick veneer house, comfortably mortgaged. The mortgage doesn't perturb me much, but a transformer on a pole south of my mortgage on Barret Street causes me acute misery, not to mention unspeakable anguish. The transformer, I am informed and believe, is the property and corporate holding of a benevolent institution doing business under the name and style of the Southern You-tell-me-one Company, of which you are the local Big Gun.

What I am getting at is that last evening, when radio reception all over town was remarkably clear and pellucid, the disturbance which erupted from my all-electric set sounded like the patter of spring rain on a red hot stove. The first selection on the Palm Olive Hour was like unto the Battle of the Marne, with effects. The effects were contributed, presumably, by the Southern Interfer-

ence Company, incorporated under the laws of Delaware. The second number (introduced by Phillips Carlin, with staccato accompaniment) was a weird representation of Feeding Time in the Zoo. We distinctly heard the roar of the famished lions, the strident yelp of the hyenas and the sibilant hissing of the boa constrictors, all furnished presumably by the Static Disability Company, a corporation organized and persisting contrary to the statute in such case made and provided. The third number I think was Fun in the Foundry, with a stunning climax, representing the blowing up of the whole damn works, the falling of debris on tin roofs, the siren shrieks of the fire department and the agonized wails of dying foundrymen—all sound effects by the Sputterin' Inferno Company, a conspiracy organized and operating on a frequency of 500,000 discontented kilowatts. At this point, we wrecked the radio, wrapped our ears in hot towels, and slunk to our couch like quarry slaves scourged to the dungeon.

I think, Joe, your naughty little kilowatts are running around at night, wasting the kilowatt hours in ungodly revelry. They are badly trained; they think every night is Hallowe'en, and go helling around our block, necking and sparking, and making life miserable for staid householders. I know that kilowatts must have their fling, but keep them in at nights and teach them some manners. I am a patient man, but if I ever find one of your kilowatts pedaling around my screen-grid on his little kilocycle, I'm going to grab him and shake the brat until the sparks fly. I never killed a watt, but another night of torture like last and the Stentorian Dynamic Dissonance Company, a corporation disorganized and existing under the laws of Gehenna will be holding kilowatt obsequies.

Seriously, Joe, your street light at the intersection of Summer and Barret streets has been defunct for a couple of evenings. This, coupled with the fact that

(Continued on Page 60)

# Application of Filterettes to Oil Burners Now on The Market

WITH the approach of the fall and winter seasons when oil burners will once more be in use, a discussion of the steps to be taken in the suppression of interference created by certain of the oil burners now on the market will be of benefit to service men. Before discussing specific cases, however, a consideration of the possible sources of interference in any oil burner will be worth while.

Interference from an oil burner may be due to the operation of the blower, the temperature-control system, or the ignition system. The amount of interference from each of these sources will depend upon the construction of the burner and the type of blower, temperature-control, and ignition system used.

The blower motor in most cases creates interference only for a few seconds or for a fraction of a second at the instant of starting. The reason for this is that the motor commonly used for operation of the blower is generally so constructed that the starting brushes lift clear of the commutator as soon as the motor reaches its normal speed. Some motors do not use a brush lifting mechanism, but contain a centrifugal switch which opens the brush circuit as soon as normal running speed has been reached. Motors of this type are likely to cause interference during their entire period of operation.

In order to prevent the feed-back of interference from the motor into the power line from which it may be radiated, an inductive capacitive type filter should be connected directly in series with the

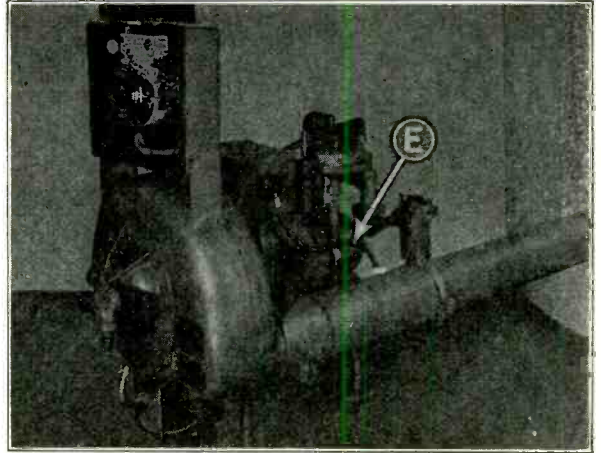


Fig. 2. Model Oil Burner Whose Interference Comes Only from Ignition Leads.

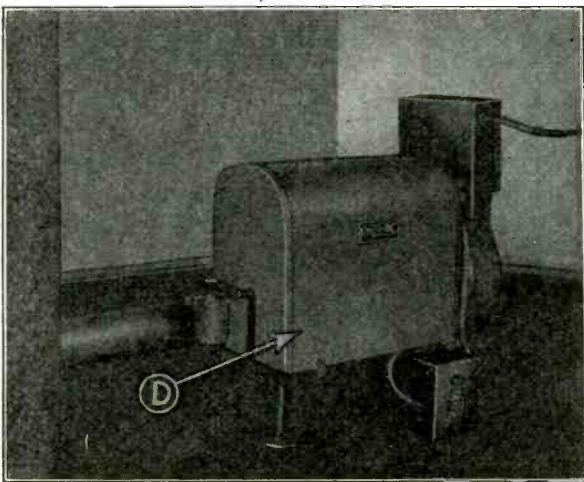


Fig. 1. Burner Whose Ignition Leads Not Within Metal Housing.

input leads to the motor. (For a more comprehensive discussion of interference elimination from fractional horse power motors, see the "Filterette" for October 1929.) If a direct current motor is used, interference will probably be in evidence whenever the motor is running. In this case the same type of filter as is used for the a.c. motor will be required. Care must be taken in the choice of the filter used that its current carrying capacity is sufficient to handle the normal running current of the motor.

The temperature-control system seldom creates interference other than a single click at the time of starting or stopping the burner. Some burners, however, employ a motor-driven temperature control which may cause considerable interference. The motor used for the operation of this control is usually a small series-wound unit of approximately 1/20 horsepower. An inductive capacitive type filter will be required for suppressing the interference from this motor. The connection most commonly used with this type of installation places the filter in series with the main feed line to the burner so that the current to both blower and heat control motor will pass through the filter.

Ignition systems may be broadly classified as gas pilot or electric. Gas pilot ignition creates no interference. Electric ignition may be

further divided into constant spark and intermittent spark, and grounded electrode and ungrounded electrode. As the principles governing the elimination of interference caused by the various types of electric ignition do not differ materially, the procedure outlined below may be followed in the treatment of all oil burner interference cases. Ignition interference presents a twofold radiation problem, since all wiring connected to the ignition system carries interference. The first step to be taken in suppressing this interference is the application of a suitable filter to prevent its conductive impression on the power line and thermostat wiring. An inductive capacitive type filter connected directly in series to the power input leads to the transformer will accomplish this result.

Whatever interference then remains will be due to radiation from the high potential circuit, including the transformer terminals, firing points, and connecting leads. As it is not possible to connect filters in this circuit, shielding must be used to confine the interference currents to the immediate vicinity of the burner. The amount and type of shielding to be used will depend upon the manner in which the ignition system is installed and upon numerous local conditions

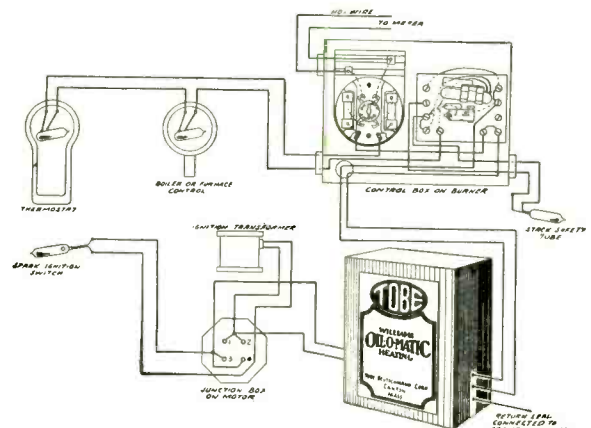


Fig. 3. Wiring System of Williams Oil-O-Matic Burner.

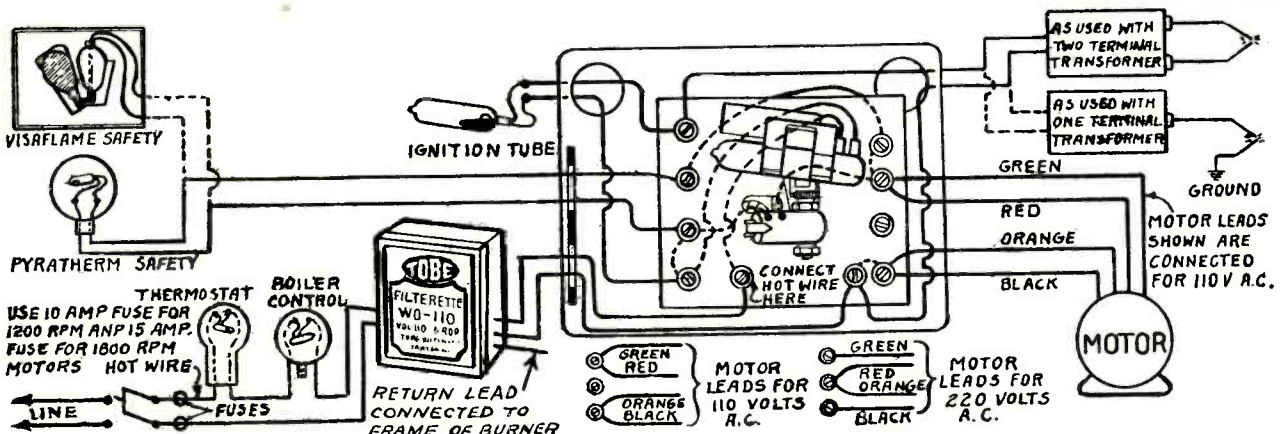


Fig. 4. Wiring System of Typical Oil Burner.

which will vary with every installation. In order to be sure that no possibility of interference radiation exists, the entire high potential side of the ignition system should be completely enclosed in metal. The high tension leads may be carried partly within the fuel tube so that some shielding is obtained.

The ignition leads not contained within the fuel tube or within a metal housing, as is the case with the burner shown in Fig. 1, should be carried in separate flexible metal conduits extending from the transformer terminals to the point at which the high tension lead enters the tube. These conduits should be bonded together and to the burner frame at several points and should be so spaced from the transformer terminals and high tension conductors that there is no possibility of spark discharge from high potential system to shielding. The spacing between conductor and shield is

from the high potential terminals. In some cases it will be found that the furnace wall tends to act as a radiating surface for interference. It is, therefore, advisable to bond the furnace wall to the burner frame.

The question of the use of a ground will depend largely upon local conditions. If a good ground is available close

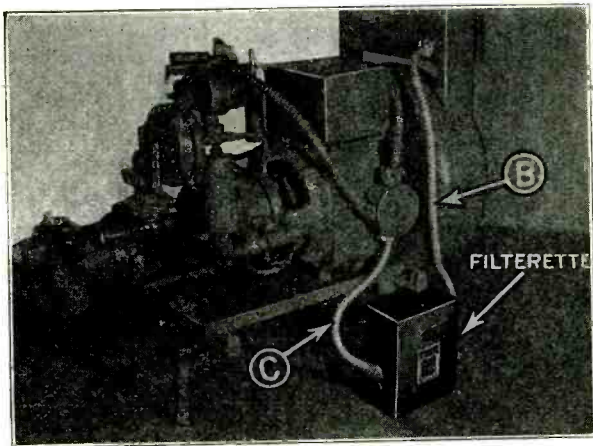


Fig. 5. Changes in BX Wiring for Filter at Power Input to Ignition Transformer.

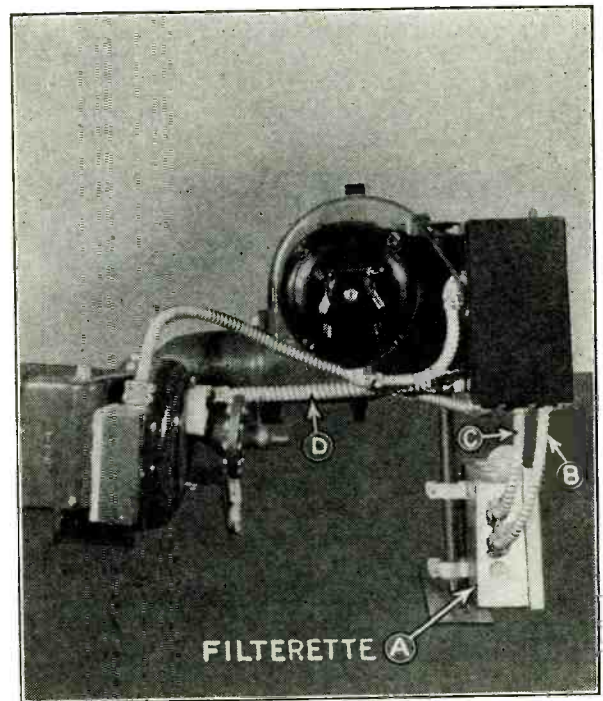


Fig. 7. Burner Which Requires Shielding on Two Ignition Leads.

best accomplished by use of rubber tubing placed over the high tension lead. The minimum size of flexible conduit recommended for shielding is  $\frac{3}{4}$  in.

In some cases it will be found that enough interference may be radiated from the high potential terminals of the ignition transformer to nullify the effect of the shielding and filters applied. When such a case is encountered, a metal housing completely enclosing the high potential terminal and bonded to the transformer case and shielding of the high potential leads will be required. When such a housing is employed, it must be spaced at least  $1\frac{1}{2}$  in.

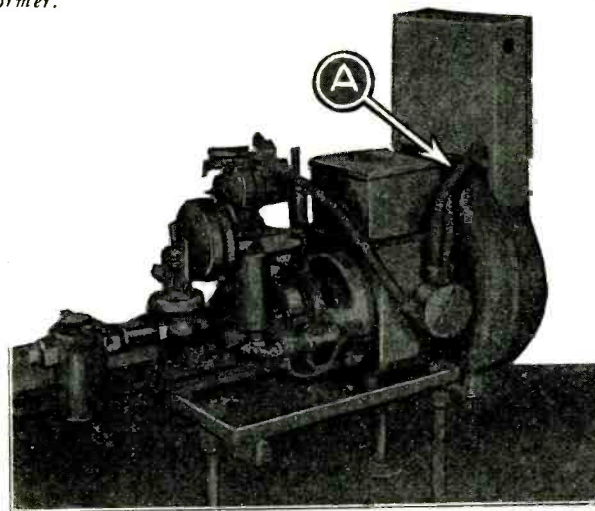


Fig. 6. Changes in BX Wiring for Filter at Power Input to Ignition Transformer.

to the burner it may be advisable to ground the entire installation. If the ground is located at a considerable distance from the burner, grounding may intensify the interference due to possible radiation from the long ground lead used. When this condition exists, it may be necessary to drive a ground beside the burner, if satisfactory interference elimination is to be obtained.

In commercial practice, it has been found that in most cases interference from a-c operated burners is due entirely to the ignition system and that the possibility of interference from blower motor or temperature

control equipment may be ignored. The burner shown in Fig. 2 is an excellent example of a modern oil burner whose ignition system only is responsible for radio interference. In the case of this burner, the interference is fed back into the power supply line and also into the leads from the burner to the room thermostats and is radiated from these lines. The use of an inductive capacitive type filter connected in the wiring circuits as shown in Fig. 3 and Fig. 4, effectively prevents the feedback of interference to power line or thermostat wiring. The high potential lead of the ignition system is shown at E, in Fig. 2. If the burner were left as shown in this figure, it would be necessary to shield the high potential lead and the transformer terminal as previously described. The construction of this burner, however, is such that direct radiation of interference is prevented by the metal housing D, Fig. 1. It is bonded to the burner frame and completely encloses all high tension leads.

Figs. 5 and 6 show the changes to be made in the BX wiring of the burner

The procedure required for eliminating interference from the burners shown will be applicable in practically every case of oil burner interference. There is, however, one outstanding exception, the burner shown in Fig. 8. Since this burner, including the ignition transformer, is located entirely within the furnace, the only shielding required is a metal plate covering the bottom of the furnace and bonded to the furnace wall. In addition to the use of this shielding and inductive capacitive type filter must be connected directly in series with the power input leads to the ignition transformer. The position of the filter in the wiring system of this burner is shown in Fig. 9.

The examples given may be taken as typical of conditions likely to be encountered in commercial oil burner installations, and the most difficult case of oil burner interference may be solved by application of the principles outlined. It must be remembered, however, that oil burner ignition interference is of such character and intensity that all of the precautions outlined may be required if

(Continued from Page 57)  
our radio trouble occurs only at nightfall, leads me to think that the interference emanates either from the defective light or the transformer. I may be wrong, but have your serfs check it. All the expense in connection with fixing the light and cleaning the carbon out of the transformer, you may put on my bill, and I will send you a check for it, drawn on the Merchants National and guaranteed by the Kingston Bank.

Statically yours,

Although the above letter may appear to treat the interference situation lightly, a vein of seriousness nevertheless underlies the apparent levity.

The following list of noises indicates the diversity of opinion which renders difficult the task of the interference investigator who is attempting to locate interference sources and to determine from complainants' descriptions the probable cause of interference from any particular case.

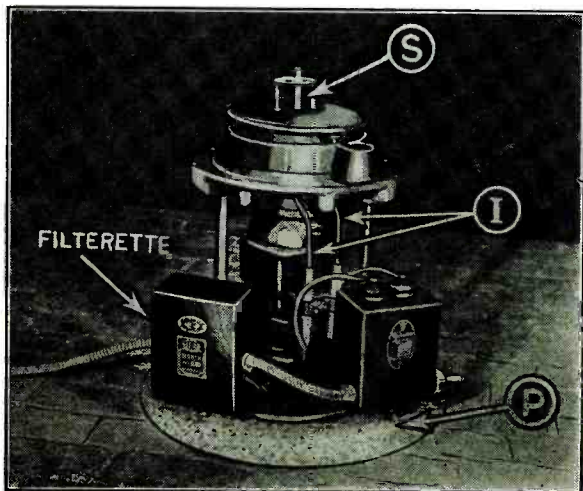


Fig. 8. Burner Designed for Installation Within Furnace.

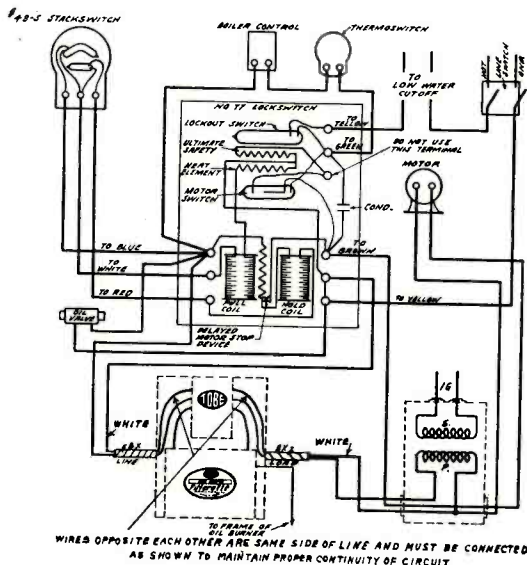


Fig. 9. Wiring System of Burner Shown in Fig. 8.

when a filter is connected at the power input to the ignition transformer.

The burner shown in Fig. 7 is an example of a burner requiring the use of shielding on two high tension ignition leads. With this burner the filter is connected directly in series with the power input leads to the ignition transformer and the high potential ignition leads are carried in a flexible metal conduit shown at D (Fig. 7). With this burner it is frequently necessary to connect the neutral lead of the ignition transformer primary to the frame of the burner. Before making this connection a test should be made to determine whether or not the neutral is grounded. If it is found that the neutral is ungrounded, the connection previously described should be made through a 1 mfd. condenser having a d-c working voltage of not less than 400 volts.

satisfactory suppression of interference is to result. Moreover, particular care must be taken that none of the equipment added to the burner is likely to interfere in any way with its operation and that whatever filter is used bears the approval of the Underwriters' Laboratories. Installation of filters should only be made by experienced electricians. Interference from any oil burner installation may be eliminated by application of suitable filters to blower motors, temperature control motors, or ignition transformers, and by the application of complete shielding to the high potential side of electric ignition systems.

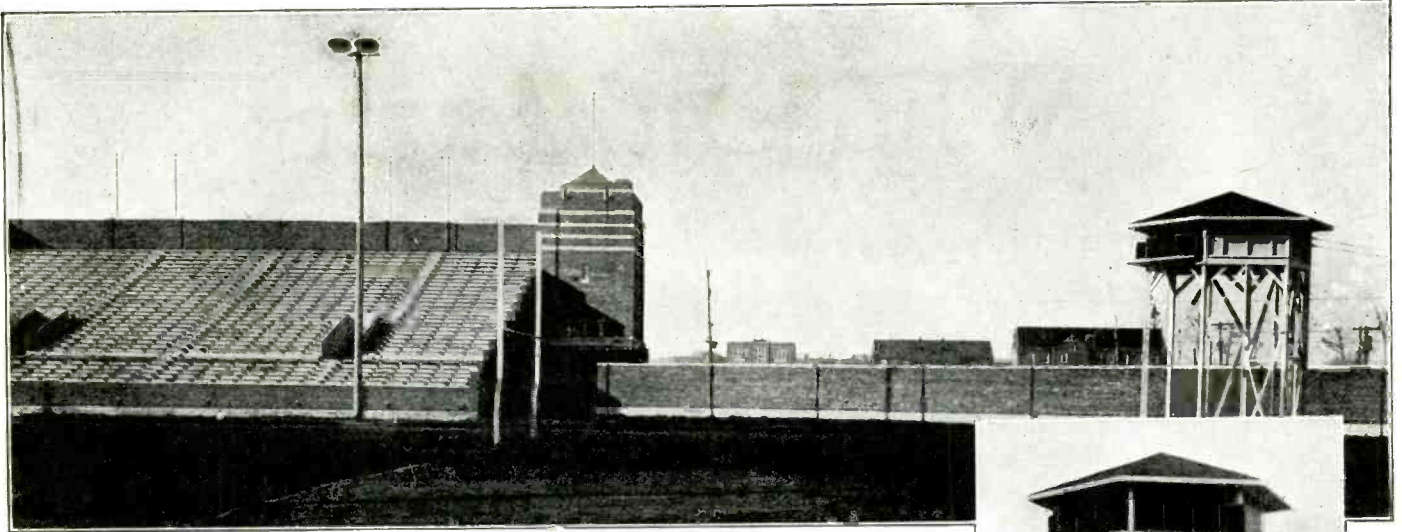
Zit-zit like a sound on watch.  
As if electricity were skipping into space.

Continuous clicking like telegraph instruments.  
Sh-she-sh-sh-sh.

- Like striking a match.
- Circle saw going through a knot.
- Resembles the grinding of a poor needle on a victrola.
- Groaning sound.
- Ripple,
- Regular bombardment
- Sounds like a welding spark.
- Like an outboard motor.
- Squells and squalls.
- Like whistles blowing on New Year's Eve.
- Like a cat purring.
- Spattering.
- Band saw.
- Boiling oil.
- Fluttering like birds on the wing.
- Like a hammer working.
- Click-click.
- Rumbling like a water hoiler.
- Someone sending out code.

- Like hickory nuts exploding in a corn popper.
- Snare drum.
- Bubbling.
- Constant singing.
- Horn sound.
- Bell-like scratching.
- Cracking.
- Rumbling.
- Power line hum.
- Crackling.
- Buzzing.
- Buzz-buzz-buzz, etc.
- Hum.
- Crashes.
- Whistle sound.
- RRRutt-Rutt-Rutt.
- Shooting of machine gun.
- Sharp crackling and hum.
- It's a gargling and blubbering sound.
- Sounds like a 60-cycle buzz.
- Like an old-time coffee-mill.
- Boiler shop in full swing.
- Like a thunder storm.
- Quiver.
- Ticks.
- Like our canary bird.
- Blowing.
- Brrrrr on the order of a blow torch.
- A rat-a-tat-tat-tat.
- Monotonous grinding.
- Dull hum.
- Penny firecrackers.
- As rustling of leaves in autumn.
- A deep river boat whistle.
- Like pouring water on hot stove.
- A rough noise.
- Just like meat frying on a pan without water.





*Wright-DeCoster Loud Speaker Equipment at U. of N. D. Memorial Stadium*

## Another Opportunity to Sell Sound!

UNIVERSITY stadiums offer just ONE of the many profitable markets for Sound Equipment. The large Universities are either making first installations or are replacing obsolete sound equipment for reporting plays—to enable all spectators in all parts of the stadium to follow the game play by play, thus increasing their enjoyment and enthusiasm. Read below what the University of North Dakota says about



*Approximate height—12 feet*

## WRIGHT-DeCOSTER SPEAKERS

Remember, also, that ball parks, fairs, amusement parks, dance halls, bathing beaches and many other places are real prospects for sound equipment.

THE UNIVERSITY OF NORTH DAKOTA  
Grand Forks, North Dakota

Wright-DeCoster, Inc.  
Saint Paul, Minnesota.

October 29, 1929

Gentlemen:

We are pleased to report that the four Model 107 Speaker units installed in your #5 horns are proving very satisfactory in the public address system installed in the University Memorial Stadium.

The installation has been successfully used not only for speeches and entertainment before the game and between halves, but also during the football game for reporting, play by play, the names of players, numbers of downs, yards gained, etc.

Very truly yours,  
DEPARTMENT OF ELECTRICAL ENGINEERING  
By: (Signed) E. A. Garard  
Radio Laboratory

EAG/LL

Sell Wright-DeCoster Sound Equipment and build up a reputation for yourself as selling the best. Sound equipment can only be as good as its speaker.

*Write for Full Information and Address of Nearest Sales Office*

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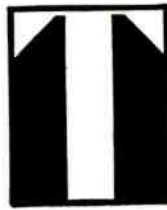


*"The Speaker of the Year"*

# Who Makes It

## Classified Index of Radio Equipment and Its Manufacturers Corrected Monthly

- Key to Letters and Numbers
- A-1 The Abox Co., 215 N. Michigan Ave., Chicago, Ill.
- A-2 Accusti-Cone Laboratories, 1 N. Seventh, Philadelphia, Pa.
- A-3 The A-C Dayton Co., 300 E. First St., Dayton, Ohio.
- A-4 Acme Apparatus Corp., 37 Osborn St., Cambridge, Mass.
- A-5 The Acme Electric & Mfg. Co., 1444 Hamilton Ave., Cleveland, Ohio.
- A-6 Acme Products Co., 22 Elkins St., South Boston, Mass.
- A-7 The Acme Wire Co., New Haven, Conn.
- A-8 The Actron Corp., 123 N. Sangamon St., Chicago, Ill.
- A-9 Adler Mfg. Co., 29th and Chestnut Sts., Louisville, Ky.
- A-10 Adrola Corp., Fort Jefferson, N. Y.
- A-11 Advance Electric Co., 1260 W. 2nd St., Los Angeles, Calif.
- A-12 Aerial Insulator Co., Inc., 429 N. Washington St., Green Bay, Wis.
- A-13 Aero Products, Inc., 4611 E. Ravenswood Ave., Chicago, Ill.
- A-14 Aerovox Wireless Corp., 70 Washington St., Brooklyn, N. Y.
- A-15 Ajax Electric Specialty Co., 1926 Chestnut St., St. Louis, Mo.
- A-16 Akron Porcelain Co., Akron, Ohio.
- A-17 Alden Mfg. Co., Brockton, Mass.
- A-18 Aladdin Mfg. Co., 602 E. 18th St., Muncie, Ind.
- A-19 All-American Mohawk Corp., 4201 Belmont Ave., Chicago, Ill.
- A-20 Allan Mfg. & Electrical Corp., 529 Broadway, N. Y. C.
- A-21 Allen-Bradley Co., 494 Reed St., Milwaukee, Wis.
- A-22 Allen-Hough-Carryola Co., 279 Walker St., Milwaukee, Wis.
- A-23 Alpha Wire Corp., 520 Broadway, N. Y. C.
- A-24 Aluminum Co. of America, 2400 Oliver Bldg., Pittsburgh, Pa.
- A-25 American Apparatus Co., Richmond, Ind.
- A-26 American Battery Corp., 2053 N. Racine Ave., Chicago, Ill.
- A-27 American Bosch Magneto Corp., Springfield, Mass.
- A-28 American Electric Co., 64th and State St., Chicago, Ill.
- A-29 American Hard Rubber Co., 11 Mercer St., N. Y. C.
- A-30 American Lava Corp., 29 William St., Chattanooga, Tenn.
- A-31 American Piezo Supply Co., 1101 Huron Bldg., Kansas City, Mo.
- A-32 American Porcelain Co., Akron, Ohio.
- A-33 American Radio Hardware Co., 135 Grand, N. Y. C.
- A-34 American Reproducer Corp., 1200 Summit St., Jersey City, N. J.
- A-35 American Storage Battery Co., 128 Dartmouth, Boston, Mass.
- A-36 American Transformer Co., 178 Emmet St., Newark, N. J.
- A-37 Amoroso Mfg. Co., 60 India St., Boston, Mass.
- A-38 Amperite Corp., 561 Broadway, N. Y. C.
- A-39 Amplex Instrument Labs., 132 W. 21st St., N. Y. C.
- A-40 Amplon Corp. of America, 133 W. 21st St., N. Y. C.
- A-41 The Amrad Corp., 205 College Ave., Medford, Mass.
- A-42 Anaconda Wire & Cable Co., 111 W. Washington St., Chicago, Ill.
- A-43 F. A. D. Andrea, Inc., Jackson, Orchard and Queen Sts., Long Island City, N. Y.
- A-44 Anylite Electric Co., Fort Wayne, Ind.
- A-45 Arc-Aerial, Inc., Green Bay, Wis.
- A-46 Arco Electrical Corp., 207 E. Columbia St., Fort Wayne, Ind.
- A-47 Arcturus Radio Tube Co., 260 Sherman Ave., Newark, N. J.
- A-48 Argon Tube Corp., 102 Livingston, Newark, N. J.
- A-49 Armstrong Electric Co., 187 Sylvan Ave., Newark, N. J.
- A-50 Armstrong & White, 9th and Liberty Ave., Pittsburgh, Pa.
- A-51 Arnold Electric Co., Racine, Wis.
- A-52 Aston Cabinet Mfrs., 1223 W. Lake St., Chicago, Ill.
- A-53 Atlantic Electric Lamp Co., Salem, Mass.
- A-54 Atlas Radio Corp., Peabody, Mass.
- A-55 Atwater-Kent Mfg. Co., 4700 Wissahickon Ave., Philadelphia, Pa.
- A-56 Auburn Button Wks., Inc., Auburn, N. Y.
- A-57 Audak Co., 565 Fifth Ave., N. Y. C.
- A-58 Audiola Radio Corp., 430 S. Green, Chicago, Ill.
- A-59 The D. L. Auld Co., 5th Ave. and 5th St., Columbus, Ohio.
- A-60 Automatic Radio Mfg. Co., 112 Canal St., Boston, Mass.
- A-61 Automobile Radio Corp., 1475 E. Grand Blvd., Detroit, Mich.
- B-1 Bailey-Cole Electrical Co., 1341 Flatbush Ave., Brooklyn, N. Y.
- B-2 Baldor Radio Corp., 80 4th Ave., N. Y. C.
- B-3 Nathaniel Baldwin, Inc., 3474 S. 23rd St., E., Salt Lake City, Utah.
- B-4 Balkett Radio Co., North Chicago, Ill.
- B-5 Baritone Mfg. Co., 844 W. Jackson, Chicago, Ill.
- B-6 Barkeley Electric Mfg. Co., Middletown, Ohio.
- B-7 The Wallace Barnes Co., Box 506, Bristol, Conn.
- B-8 Barrett Mfg. Co., 3712 San Pablo Ave., Oakland, Calif.
- B-9 Bassett Metal Goods Co., Derby, Conn.
- B-10 Bastian Bros. Co., 1600 Clinton Ave., N., Rochester, N. Y.
- B-11 Batteryless Radio Corp., 116 W. 65th St., N. Y. C.
- B-12 Beaver Mfg. Co., 625 N. 3rd St., Newark, N. J.
- B-12a Beede Electrical Instrument Co., Penacook, N. H.
- B-13 Belden Mfg. Co., 2300 S. Western Ave., Chicago, Ill.
- B-14 Benjamin Electric Mfg. Co., Des Plaines, Ill.
- B-16 Bernard Electrical Mfg. Co., 36 Flatbush Ave., Brooklyn, N. Y.
- B-17 Best Mfg. Co., 1200 Grove St., Irvington, N. J.
- B-18 Bethesda Crystal Lab., Bethesda, Md.
- B-19 Birnbach Radio Co., 254 W. 31st St., N. Y. C.
- B-20 Bisby Mfg. Co., 59 Warren, N. Y. C.
- B-20a B-L Electric Co., St. Louis, Mo.
- B-21 Bodine Electric Co., 2254 W. Ohio St., Chicago, Ill.
- B-22 Bond Electric Corp., Jersey City, N. J.
- B-23 Borden Electric Co., 480 Broad, Newark, N. J.
- B-24 Bosworth Electric Mfg. Co., Main and Lexington Ave., Norwood, Cincinnati, Ohio.
- B-25 Boudette Mfg. Co., 67 Crescent Ave., Chelsea, Mass.
- B-26 L. S. Brach Mfg. Corp., 55 Dickerson St., Newark, N. J.
- B-27 Braun Co., W. C., 551 Randolph, Chicago, Ill.
- B-28 Bremer-Tully Mfg. Co., 656 Washington Blvd., Chicago, Ill.
- B-29 Bright Star Battery Co., Hoboken, N. J.
- B-30 Broadcaster's Service Bureau, San Jose, Calif.
- B-31 Brooklyn Metal Stamping Corp., 718 Atlantic Ave., Brooklyn, N. Y.
- B-32 Browne & Caine, Inc., 2317 Calumet Ave., Chicago, Ill.
- B-33 Browning-Drake Corp., Calvary St., Waltham, Mass.
- B-34 Brunswick-Balke-Collender Co., 623 S. Wabash Ave., Chicago, Ill.
- B-35 Buckeye Electric Mfrs., Gladwin, Mich.
- B-36 The Buckingham Radio Corp., 440 W. Superior St., Chicago, Ill.
- B-37 Bud Radio, Inc., 2744 Cedar, Cleveland, Ohio.
- B-38 Burgess Battery Co., Harris Trust Bldg., Chicago, Ill.
- B-39 Bush & Lane Piano Co., Holland, Mich.
- C-1 Cable Radio Tube Corp., 84 N. Ninth St., Brooklyn, N. Y.
- C-2 Candy & Co., Inc., 2515 W. 35th St., Chicago, Ill.
- C-3 Cannon & Miller Co., Inc., Springwater, N. Y.
- C-4 The Capehart Corp., Fort Wayne, Ind.
- C-5 Carborundum Co., Niagara Falls, N. Y.
- C-6 Cardwell Mfg. Corp., 81 Prospect St., Brooklyn, N. Y.
- C-7 Carter Radio Co., 407 S. Aberdeen St., Chicago, Ill.
- C-8 Cary Cabinet Corp., 1427 N. 15th St., St. Louis, Mo.
- C-9 The Caswell-Runyan Co., Huntington, Ind.
- C-10 CeCo Mfg. Co., Inc., 702 Eddy St., Providence, R. I.
- C-11 Central Radio Corp., Beloit, Wis.
- C-12 Central Radio Labs., 16 Keefe Ave., Milwaukee, Wis.
- C-13 Champion Radio Works, Inc., 140 Pine St., Danvers, Mass.
- Items
- ADAPTERS, Tube**  
A-17, C-7, C-39, F-22, G-12, I-5, L-12, M-5, P-1, R-13, R-22, S-26, W-24.
- AERIAL EQUIPMENT, Leads, Lightning Arresters, Loops, Mastarms, Plugs, Poles**  
A-15, A-33, A-37, A-45, A-50, B-9, B-13, B-20, B-21, B-26, B-37, C-16, C-17, C-36, D-13, D-16, E-1, E-23, F-12, F-15, G-1, G-12, G-26, G-31, H-11, H-18, I-5, L-11, M-18, M-23, N-5, P-7, S-13, S-17, S-26, S-47, T-20, T-21, U-6, W-13, W-21, Y-1.
- AERIAL INSULATORS**  
A-12, A-15, A-16, A-29, A-30, A-32, A-50, B-6, B-26, C-32, C-35, F-14, F-16, G-12, H-6, H-11, I-4, I-5, J-4, K-15, L-11, M-11, P-7, P-18, P-24, R-11, S-26, S-31, T-18, U-4, U-5, W-21.
- ALUMINUM SHEET, ROD & TUBE**  
A-24.
- AMPLIFIERS, Audio**  
A-1, A-17, A-46, A-60, B-8, C-21, E-8, F-4, F-7, G-8, G-18, G-24, K-3, L-12, M-4, M-19, N-3, O-4, O-5, P-1, P-12, P-21, R-3, R-14, R-20, S-1, S-18, S-19, S-25, S-35, T-10, W-8.
- BATTERIES, Dry**  
B-1, B-22, B-29, B-38, D-8, F-20, G-4, N-2, S-20, S-41.
- BATTERIES, Storage**  
A-26, B-35, E-14, G-9, G-19, G-23, P-6, S-20, S-41, U-13, W-15.
- BATTERY CHARGERS**  
A-19, A-26, A-46, B-20a, C-21, D-1, E-12, E-13, E-18, G-6, G-20, K-4, K-17, P-6, S-3, S-24, T-12, T-15, U-15, W-2, W-11, W-27.
- BATTERY CHARGING RELAYS**  
A-19, A-46, C-24, C-25, F-17, H-6, H-11, L-4, R-24, T-7, U-5, W-2, Y-2.
- BATTERY ELIMINATORS (For Plate Current Supply)**  
A-19, A-25, A-35, A-45, B-16, B-22, C-18, C-39, D-6, E-10, E-18, F-4, F-17, F-18, G-7, G-8, G-27, K-4, K-14, K-17, M-17, N-3, P-1, P-6, P-12, P-20, P-21, P-23, S-18, S-20, S-24, S-39, T-12, T-16, W-7, W-15.
- BATTERY POWER UNITS (Combination)**  
A-35, A-46, C-33, D-1, D-14, E-12, F-17, G-8, G-23, G-29, H-7, K-4, K-12, P-6, R-8, S-9, S-20, S-24, T-13, V-3, W-15, W-27.
- BINDING POSTS**  
A-2, A-15, A-24, A-56, B-7, C-17, E-5, E-10, F-1, F-8, G-12, G-18, I-5, K-6, P-7, P-12, P-13, R-19, S-26, W-5, X-1.
- BRACKETS, Sub-Panel**  
A-13, B-14, E-8, E-10, F-22, I-5, K-3, P-12, S-18, S-25.
- BROADCASTING EQUIPMENT**  
B-8, B-30, E-15, E-19, F-7, F-22, G-6, G-12, G-25, H-12, J-3, K-5, L-3, R-9, R-17, S-1, S-20, T-10, W-11.
- CABINETS**  
A-9, A-52, A-59, B-34, B-36, B-39, C-8, C-9, C-15, C-26, D-2, E-4, E-21, E-24, E-25, F-6, F-10, F-19, G-30, H-2, H-21, K-16, L-8, L-9, M-12, N-3, P-11, P-14, P-17, R-5, R-6, R-12, R-23, S-15, S-22, S-30, S-34, S-37, S-38, S-43, U-1, W-4, W-6, W-16.



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- C-17 Clarostat Mfg. Co., Inc., 285 N. Sixth St., Brooklyn, N. Y.
- C-18 Cole Sales Co., 36 Pearl, Hartford, Conn.
- C-19 Colonial Radio Corp., 25 Wilbur Ave., Long Island City, N. Y.
- C-20 Columbia Phonograph Co., Inc., 1819 Broadway, N. Y. C.
- C-21 Columbia Radio Corp., 711 W. Lake St., Chicago, Ill.
- C-22 Concourse Elec. Co., 294 E. 137th St., N. Y. C.
- C-23 Condenser Corp. of America, 259 Cornelison Ave., Jersey City, N. J.
- C-24 Connecticut Electric Mfg. Co., Bridgeport, Conn.
- C-25 Connecticut Telephone & Electric Co., Meriden, Conn.
- C-26 The Conner Furniture Co., 5th and Oak Sts., New Albany, Ind.
- C-27 Consolidated Elec. Lamp Co., 88 Holten, Danvers, Mass.
- C-28 Consolidated Vacuum Tube Corp., 22 East 21st St., N. Y. C.
- C-29 Continental-Diamond Fibre Co., 1150 W. 3rd St., Cleveland, Ohio.
- C-30 Continental Electric & Mfg. Co., 1890 E. Fortieth, Cleveland, Ohio.
- C-31 Continental Radio Corp., Fort Wayne, Ind.
- C-32 Cook Porcelain Ins. Corp., Cambridge, Ohio.
- C-33 Cooper Corp., 8th and Main Sts., Cincinnati, Ohio.
- C-34 Cornell Elec. Mfg. Co., Rawson St. and Anable Ave., Long Island City, N. Y.
- C-35 Corning Glass Works, Corning, N. Y.
- C-36 Cornish Wire Co., Inc., 30 Church St., N. Y. C.
- C-37 Crescent Braid Co., Providence, R. I.
- C-38 Cresradio Corp., 166 Jamaica Ave., Jamaica, N. Y.
- C-39 Crosley Radio Corp., 3401 Colerain Ave., Cincinnati, Ohio.
- C-40 Crouse-Hind Co., Syracuse, N. Y.
- C-41 Crowe Name Plate & Mfg. Co., 1749 Grace St., Chicago, Ill.
- C-42 E. T. Cunningham, Inc., 370 Seventh Ave., N. Y. C.
- C-43 The Cutler-Hammer Mfg. Co., 12th and St. Paul Ave., Milwaukee, Wis.
- D-1 D. A. Radio Co., 30 Hollister St., Buffalo, N. Y.
- D-1a The Daven Co., 160 Summit St., Newark, N. J.
- D-2 Davis Industries, Inc., 314 W. 43rd St., Chicago, Ill.
- D-3 Day-Fan Electric Co., 1320 Wisconsin Blvd., Dayton, Ohio.
- D-4 DeForest Radio Co., Central and Franklin Sts., Jersey City, N. J.
- D-5 DeJur-Amsco Corp., 418 Broome St., N. Y. C.
- D-6 Demco Products Co., 1521 Market St., Wheeling, W. Va.
- D-7 Diamond Appliance Co., South Bend, Ind.
- D-8 Diamond Electric Corp., 780 Frelinghuysen Ave., Newark, N. J.
- D-9 Diamond Vacuum Products Co., 4049 Diversey Ave., Chicago, Ill.
- D-10 Diehl Mfg. Co., Elizabethport, N. J.
- D-11 Dilco Electric Corp., Harrison, N. J.
- D-12 Dongan Electric Mfg. Co., 3001 Franklin St., Detroit, Mich.
- D-13 Donle-Bristol Corp., Meriden, Conn.
- D-14 Dooley Rectifier Co., Wheeling, W. Va.
- D-15 Dubblet Condenser Corp., 342 Madison Ave., N. Y. C.
- D-16 Dudlo Mfg. Co., Fort Wayne, Ind.
- D-17 Duovac Radio Tube Corp., 360 Furman, Brooklyn, N. Y.
- E-1 Eagle Electric Mfg. Co., 59 Hall St., Brooklyn, N. Y.
- E-2 Eastern Coil Co., 56 Christopher Ave., Brooklyn, N. Y.
- E-3 Easton Coil Co., Keplers, Ind.
- E-4 Ebert Furniture Co., Red Lion, Pa.
- E-5 The H. H. Eby Mfg. Co., Inc., 4710 Stenton Ave., Philadelphia, Pa.
- E-6 Thomas A. Edison, Inc., Orange, N. J.
- E-7 The Ekko Co., 111 W. Monroe St., Chicago, Ill.
- E-8 Electrad, Inc., 175 Varick St., N. Y. C.
- E-9 Electrical Products Mfg. Co., Providence, R. I.
- E-10 Electrical Research Labs., Inc., 1731 W. 22nd St., Chicago, Ill.
- E-11 Electrical Specialty Co., 211 South St., Stamford, Conn.
- E-12 Electric Autolite Co., Toledo, Ohio.
- E-13 Electric Heat Control Co., 5902 Carnegie Ave., Cleveland, Ohio.
- E-14 Electric Storage Battery Co., Philadelphia, Pa.
- E-15 Electro Acoustics Products Co., 55 E. Wacker Drive, Chicago, Ill.
- E-16 Electron Relay Co., 83 Fourth Ave., N. Y. C.
- E-17 Elgin Cabinet Corp., Union and W. Chicago Sts., Elgin, Ill.
- E-18 Elkon, Inc., 200 Fox Island Road, Port Chester, N. Y.
- E-19 Ellis Electrical Lab., 333 W. Madison St., Chicago, Ill.
- E-20 Emerson Radio & Phonograph Corp., 635 Sixth Ave., New York City.
- E-21 The Empire, Ltd., 11th and Harrison, Rockford, Ill.
- E-22 Empire Steel Corp., Mansfield, Ohio.
- E-23 Essenee Radio Devices Co., 2016 W. Lake St., Chicago, Ill.
- E-24 Eureka Talking Machine Corp., 5939 S. Lowe Ave., Chicago, Ill.
- E-25 Excello Products Corp., 4820 W. 16th St., Cicero, Ill.
- F-1 Fahnestock Electric Co., East Ave. and 8th St., Long Island City, N. Y.
- F-2 Fairmount Elec. & Mfg. Co., 59th and Woodland Ave., Philadelphia, Pa.
- F-3 Fansteel Products Co., No. Chicago, Ill.
- F-4 Farrand Mfg. Co., Inc., Metropolitan Bldg., Long Island City, N. Y.
- F-5 John E. Fast & Co., 3982 Barry Ave., Chicago, Ill.
- F-6 Federal Wood Products Corp., 206 Lexington Ave., N. Y. C.
- F-7 Ferranti, Inc., 130 W. 42nd St., N. Y. C.
- F-8 Fibroc Insulation Co., Valparaiso, Ind.
- F-9 Fidelity Radio Corp., Walker Bank Bldg., Salt Lake City, Utah.
- F-10 Robert Findlay Mfg. Co., Inc., 1027 Metropolitan Ave., Brooklyn, N. Y.
- F-11 Fisch Radio Co., 1283 Hoe Ave., N. Y. C.
- F-12 Fishwick Radio Co., 133 Central Parkway, Cincinnati, Ohio.
- F-13 A. M. Flechthelm & Co., Inc., 136 Liberty St., New York City.
- F-14 M. M. Fleron & Son, Trenton, N. J.
- F-15 Foote-Pierson & Co., 75 Hudson, Newark, N. J.
- F-16 The Formica Insulation Co., Cincinnati, Ohio.
- F-17 France Mfg. Co., 10325 Berea Rd., Cleveland, Ohio.
- F-18 Freed-Eisemann Radio Corp., Junius St. and Liberty Ave., Brooklyn, N. Y.
- F-19 Jesse French & Sons Piano Co., New Castle, Ind.
- F-20 French Battery Co., 30 N. Michigan Ave., Chicago, Ill.
- F-21 S. Freshman Co., 225 N. Michigan Ave., Chicago, Ill.
- F-22 Herbert H. Frost, Inc., 1124 W. Beardsley Ave., Elkhart, Ind.
- G-1 Gardiner & Hepburn, Philadelphia, Pa.
- G-2 Gardner Electric Mfg. Co., Oakland, Calif.
- G-3 Gearhart Radio Co., Fresno, Calif.
- G-4 General Coil Co., Weymouth, Mass.
- G-5 General Dry Batteries, Inc., 13100 Athens Ave., Cleveland, Ohio.
- G-6 General Electric Co., Schenectady, N. Y.
- G-7 General Engineering Corp., Charlotte, Mich.
- G-8 General Instrument Corp., 225 Varick St., N. Y. City.
- G-9 General Lead Battery Co., 1 Lister Ave., Newark, N. J.
- G-10 General Motors Radio Corp., Dayton, Ohio.
- G-11 General Plastics, Inc., Walck Road, North Tonawanda, N. Y.
- G-12 General Radio Co., 30 State St., Cambridge, Mass.
- G-13 General Transformer Corp., 910 W. Jackson Blvd., Chicago, Ill.
- G-14 Gibraltar Radio Supply Co., 5 Union Square, N. Y. C.
- G-15 Gilby Wire Co., 150 Riverside Ave., Newark, N. J.
- G-16 Gilfillan Radio Corp., 1815 Venice Blvd., Los Angeles, Calif.
- G-17 Gillette-Vibber Co., New London, Conn.
- G-18 Globe Technolean Corp., Reading, Mass.
- G-19 Globe Union Mfg. Co., 14 Keefe Ave., Milwaukee, Wis.
- G-20 Gold Seal Electrical Co., Inc., 250 Park Ave., N. Y. C.
- G-21 The L. S. Gordon Co., 1800 Montrose Ave., Chicago, Ill.
- G-22 Gossard Radio & Wire Co., Belvidere, Ill.
- G-23 Gould Storage Battery Co., 250 Park Ave., N. Y. C.
- G-24 Gray & Danielson Mfg Co., 2101 Bryant St., San Francisco, Calif.
- G-25 Graybar Electric Co., Lexington Ave. and 43rd St., N. Y. C.
- G-26 Gray Products, Inc., Poughkeepsie, N. Y.
- G-27 A. H. Grebe & Co., Inc., 109 W. 57th St., N. Y. C.
- G-28 Frank Greben, 1927 So. Peoria St., Chicago, Ill.
- G-29 Frigsby-Grunow Co., 5891 W. Dickens Ave., Chicago, Ill.
- G-30 Gulbransen Co., 3232 W. Chicago Ave., Chicago, Ill.
- G-31 Gustin-Baker Mfg. Co., Kansas City, Mo.
- G-32 Guthrie Co., Elyria, Ohio.
- H-1 Halldorson Co., 4500 Ravenswood Ave., Chicago, Ill.
- H-2 Hamilton Mfg. Co., Two Rivers, Wis.
- H-3 Hammariund Mfg. Co., Inc., 424 W. 33rd St., N. Y. C.
- H-3a Hammond Clock Co., 2911 N. Western Ave., Chicago, Ill.
- H-4 Hardwick, Hindle, Inc., 215 Emmet St., Newark, N. J.
- H-5 Kenneth Harkness, Inc., 72 Cortlandt, N. Y. C.
- H-6 Hart & Hegemann, Hartford, Conn.
- H-7 Hartford Battery Mfg. Co., 47 W. 63rd St., N. Y. C.
- H-8 Hartford Metal Products Co., Hartford, Conn.
- H-9 Hartman Electrical Mfg. Co., 31 E. 5th St., Mansfield, Ohio.
- H-10 Harvey Hubbell Co., Bridgeport, Conn.
- H-11 Heinemann Electric Co., Trenton, N. J.
- H-12 Heintz & Kaufman, 311 California St., San Francisco, Calif.
- H-13 Herald Electric Co., 35 East End Ave., N. Y. C.
- H-14 Hickok Electrical Instrument Co., 10514 Dupont, Cleveland, Ohio.
- H-15 High Frequency Labs., 28 N. Sheldon St., Chicago, Ill.
- H-16 Hilet Engineering Co., Orange, N. J.
- H-17 The Holyoke Co., Inc., 621 Broadway, N. Y. C.
- H-18 Hope Webbing Co., Providence, R. I.
- H-19 Howard Radio Co., South Haven, Mich.
- H-20 Hoyt Electrical Instrument Works, 857 Boylston St., Boston, Mass.
- CABLE, CABLES AND CONNECTING WIRE**  
A-7, A-23, A-42, B-13, B-19, B-26, C-21, C-36, C-37, D-16, E-1, G-15, G-22, H-17, I-2, I-5, K-5, N-12, P-2, P-7, P-16, R-33.
- CLAMPS, Ground**  
A-50, B-7, B-13, B-23, B-26, C-17, C-24, C-40, E-1, E-2, F-1, F-2, F-22, G-17, H-6, H-11, I-5, M-18, M-20, M-23, R-31, T-8, Y-1.
- CLIPS**  
A-15, A-17, B-7, F-1, K-17, L-12, M-18, M-20, M-23, N-3, W-5.
- COILS, A-F Choke**  
A-4, A-5, A-7, A-46, C-7, C-14, C-22, D-12, D-16, E-3, E-18, F-7, F-17, G-3, G-5, G-8, G-12, G-13, G-24, H-1, I-2, K-11, M-23, N-3, P-12, P-16, P-23, P-25, R-3, R-25, R-27, S-5, S-18, T-16, W-8.
- COILS, R-F Choke**  
A-4, A-13, C-22, D-16, E-3, E-10, F-17, G-4, G-12, G-24, H-3, H-5, K-3, M-12a, M-23, N-3, P-12, P-16, P-23, P-25, R-3, R-25, R-27, S-1, S-16, S-18, T-4.
- COILS, R-F**  
A-4, A-6, A-13, B-14, B-19, B-21, B-28, B-35, C-11, C-21, C-22, E-2, E-3, E-10, F-17, G-3, G-12, G-24, H-3, H-5, K-3, K-11, M-4, M-12a, N-3, P-1, P-12, P-22, P-25, R-9, R-19, R-27, S-6, S-16, S-18, T-4, T-24, V-7.
- COIL WINDING MACHINES**  
A-5, B-13, H-1, M-12a, M-18.
- CONDENSERS, Fixed Electrolytic**  
A-14, A-41, C-23, C-39, D-15, E-18, I-1, M-9, P-16, P-19, P-23, S-27.
- CONDENSERS, Fixed Mica**  
A-14, A-39, C-23, C-39, D-15, E-8, E-10, F-22, M-13, M-23, P-12, P-16, P-19, S-2, W-19, X-1.
- CONDENSERS, Fixed Paper**  
A-7, A-14, B-32, C-22, C-23, C-34, C-36, D-15, E-3, F-5, F-7, F-13, G-12, I-3, K-5, K-17, L-12, M-13, M-23, P-12, P-16, P-19, P-21, R-4, S-27, T-12, W-19.
- CONDENSERS, Variable**  
A-13, C-6, C-39, D-5, E-10, G-1, G-3, G-8, G-12, G-24, H-3, H-12, K-3, L-3, M-23, N-3, P-1, P-12, P-22, P-25, R-7, R-9, R-19, S-7, S-18, U-11.
- CONDENSER SHAFTS AND COUPLINGS**  
H-3, N-3, P-12, P-22, S-7.
- CRYSTALS, Piezoelectric**  
A-31, B-18, G-12, R-30.
- DIALS**  
A-17, A-29, A-56, B-31, C-39, C-41, D-5, E-10, G-12, G-24, H-3, I-5, K-3, K-18, M-5, N-3, N-15, P-1, P-12, P-13, P-22, P-25, R-2, R-19, S-7, S-18, S-26, T-24, W-5.
- DIAL LIGHTS**  
B-12, M-5, M-8, N-2, N-3, P-12, P-25, Y-2.
- FIBRE, Vulcanized sheet, rod and tube**  
C-29, I-5, N-9, P-12, S-25.
- FILAMENT BALLASTS**  
A-6, L-12, M-23, P-12, S-25.
- GRID LEAKS, Fixed**  
A-14, A-21, C-5, D-15, E-1, E-8, H-5, I-6, L-12, M-13, M-23, N-3, P-1, P-12, P-16, P-16, S-10, W-2.
- GRID LEAKS, Variable**  
A-21, A-39, C-12, C-17, C-43, E-1, E-8, G-1, H-4, M-23, R-10, W-2.
- GRID LEAK HOLDERS (See MOUNTINGS, Resistor)**
- HEADSETS**  
A-15, A-34, B-3, C-3, F-11, F-22, G-25, P-1, T-15.
- INSULATION, Composition**  
A-7, A-17, A-29, B-36, C-2, C-29, F-16, G-11, I-1, I-5, K-18, L-11, M-14, N-9, P-13, S-8, S-26, W-5.
- INSULATORS (See AERIAL INSULATORS)**
- INTERFERENCE ELIMINATORS**  
A-14, T-12.
- JACKS**  
A-2, A-17, B-7, B-31, B-37, C-7, D-5, E-5, E-8, F-22, G-12, K-5, P-1, P-12, P-25, S-26, Y-2.

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B-H RECTIFYING  
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GET YOUR SHARE OF  
THIS REPLACEMENT  
MARKET!



Always have a display  
of this four-tube carton  
of Eveready Raytheon  
B-H Tubes


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MILLIONS of these tubes have been sold in the past few years. The B-H is standard with more than 100 "B" power units. Most units of this type were designed for it. Increase your business, and profits, by suggesting B-H tubes to your customers!

You can buy Eveready Raytheon B-H Tubes in handy cartons of four. Always have a carton on display. The Eveready Raytheon B-H is a friend maker—it gives a vast improvement in reception—is long-lived and reliable.

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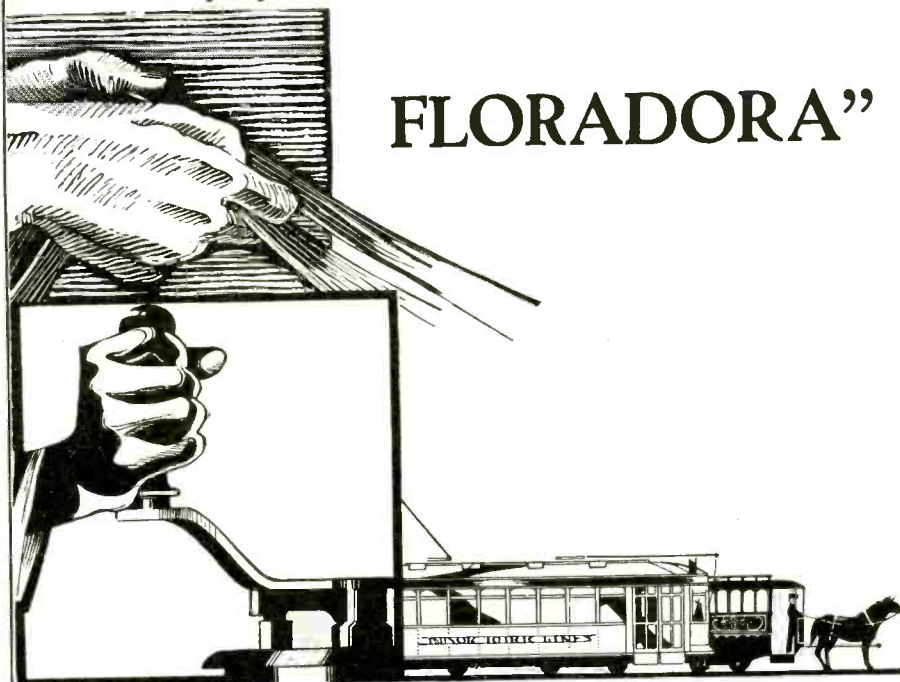
NATIONAL CARBON CO., Inc.  
General Offices: New York, N. Y.  
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Trade-marks

# "Whoa!"

## FLORADORA"



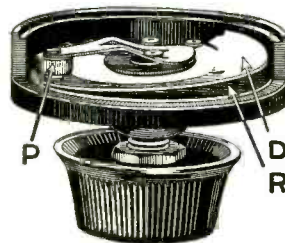
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Control, Voltage Control,  
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# Centralab

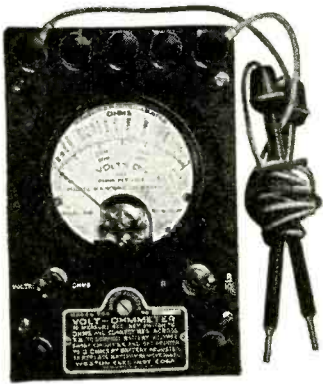
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Milwaukee, Wis.

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- H-22 Hyatt Electric Corp., 836 N. Wells St., Chicago, Ill.
- H-23 Hygrade Lamp Co., 60 Boston, Salem, Mass.
- H-24 Hytron Corp., Salem, Mass.
- I-1 Imperial Molded Products Corp., 2925 W. Harrison St., Chicago, Ill.
- I-2 Inca Mfg. Co., Fort Wayne, Ind.
- I-3 Ingrad Condenser & Mfg. Co., 4322 Lake Ave., Rochester, N. Y.
- I-4 Insulation Mfg. Co., Herkimer and N. Y. Aves., Brooklyn, N. Y.
- I-5 Insuline Corp. of America, 78 Cortlandt St., N. Y. C.
- I-6 International Resistance Co., 2006 Chestnut St., Philadelphia, Pa.
- J-1 Jaeger Research Labs., 270 Park Ave., Weehawken, N. J.
- J-2 Jefferson Electric Co., 1500 S. Laflin St., Chicago, Ill.
- J-3 Jenkins & Adair, Inc., 3333 Belmont Ave., Chicago, Ill.
- J-4 Jenkins Glass Co., Kokomo, Ind.
- J-5 Jenkins Television Corp., 346 Claremont Ave., Jersey City, N. J.
- J-6 Jensen Radio Mfg. Co., 6601 S. Laramie Ave., Chicago, Ill.
- J-7 Jewell Electrical Instrument Co., 1640 Walnut St., Chicago, Ill.
- J-7a Johnsonburg Radio Corp., Johnsonburg, Pa.
- J-8 Howard B. Jones, 2300 Wabansia Ave., Chicago, Ill.
- J-9 Jones-Motrola Sales Co., 370 Gerard Ave., N. Y. C.
- K-1 K & H Electric Corp., 68 Springfield Ave., Newark, N. J.
- K-2 F. Kallus Mfg. Co., 104 Court St., Hoboken, N. J.
- K-3 Karas Electric Co., 4040 N. Rockwell St., Chicago, Ill.
- K-4 Kato Co., 727 So. Front, Mankato, Minn.
- K-5 Kellogg Switchboard & Supply Co., 1066 W. Adams St., Chicago, Ill.
- K-6 Kendrick & Davis Co., Lebanon, N. H.
- K-7 Colin B. Kennedy Corp., 212 W. Ewing Ave., South Bend, Ind.
- K-8 The Ken-Rad Corp., Owensboro, Ky.
- K-9 Kersten Radio Equipment, Inc., 1415 Fulford St., Kalamazoo, Mich.
- K-10 Kester Solder Co., 4201 Wrightwood Ave., Chicago, Ill.
- K-11 Keystone Radio Labs., Inc., 129 N. Jefferson St., Chicago, Ill.
- K-12 Kimley Electric Co., 2665 Main St., Buffalo, N. Y.
- K-13 King Mfg. Corp., 254 Rano St., Buffalo, N. Y.
- K-14 Knapp Electric, Inc., Port Chester, N. Y.
- K-15 Knox Porcelain Corp., Knoxville, Tenn.
- K-16 The Knoxville Table & Chair Co., P. O. Box 1087, Knoxville, Tenn.
- K-17 The Kodel Electric & Mfg. Co., 507 E. Pearl St., Cincinnati, Ohio.
- K-18 The Kurz Kasch Co., 1415 S. Broadway, Dayton, Ohio.
- K-19 Kwik Test Radio Labs., 4464 Cass Ave., Detroit, Mich.
- L-1 Langbein-Kaufman Radio Co., 62 Franklin, New Haven, Conn.
- L-2 La Salle Radio Corp., 143 W. Austin Ave., Chicago, Ill.
- L-3 C. R. Leutz, Inc., 195 Park Place, Long Island City, N. Y.
- L-4 Liberty Bell Mfg. Co., Minerva, Ohio.
- L-5 Liberty Electric Corp., of New York, 342 Madison Ave., N. Y. C.
- L-6 Liberty Radio Corp., 123 N. Sangamon, Chicago, Ill.
- L-7 Lincoln Radio Corp., 329 So. Wood St., Chicago, Ill.
- L-8 The Logan Mfg. Co., 338 E. Front St., Logan, Ohio.
- L-9 I. A. Lund Corp., 1018 S. Wabash Ave., Chicago, Ill.
- L-10 Lundquist Tool & Mfg. Co., Worcester, Mass.
- L-11 Luzerne Rubber Co., Muirhead Ave., Trenton, N. J.
- L-12 Lynch Mfg. Co., Inc., 1775 Broadway, N. Y. C.
- M-1 Magnatron Corp., 406 Jefferson, Hoboken, N. J.
- M-2 The Magnavox Co., 1315 S. Michigan Ave., Chicago, Ill.
- M-3 Markel Electric Products, Inc., 145 E. Seneca St., Buffalo, N. Y.
- M-4 Marti Radio Corp., 18th and Springdale Ave., E., Orange, N. J.
- M-5 Martin-Copeland Co., Providence, R. I.
- M-6 Marvin Radio Tube Corp., Irvington, N. J.
- M-7 Master Engineering Co., 122 So. Michigan Ave., Chicago, Ill.
- M-8 Matchless Electric, 1500 N. Ogden Ave., Chicago, Ill.
- M-9 Mayo Laboratories, Inc., 281 E. 137th St., N. Y. C.
- M-10 L. C. McIntosh, 4163 Budlong Ave., Los Angeles, Calif.
- M-11 McKee Glass Co., Jeannette, Pa.
- M-12 McMillan Radio Corp., 1421 S. Michigan Ave., Chicago, Ill.
- M-12a Meissner Mfg. Co., 522 S. Clinton St., Chicago, Ill.
- M-13 Micamold Radio Corp., 1087 Flushing Ave., Brooklyn, N. Y.
- M-14 Micarta Fabricators, Inc., 500 S. Peoria St., Chicago, Ill.
- M-15 Midwest Radio Corp., 410 E. 8th St., Cincinnati, Ohio.
- M-16 Minerva Radio Co., 154 E. Erie St., Chicago, Ill.
- M-17 Modern Electric Mfg. Co., 312 Mulberry, Toledo, Ohio.
- M-18 Morris Register Co., Council Bluffs, Iowa.
- M-19 C. E. Mountford, 105 Sixth Ave., N. Y. C.
- M-20 Mueller Elec. Co., 1583 E. 31st St., Cleveland, Ohio.
- M-21 Munder Electrical Co., 97 Orleans, Springfield, Mass.
- M-22 Wm. J. Murdock, Chelsea, Mass.
- M-23 Leslie F. Muter Co., 8440 S. Chicago Ave., Chicago, Ill.
- M-24 Mutual Phone Parts Mfg. Corp., 610 Broadway, N. Y. C.
- N-1 Nassau Radio Co., 60 Court St., Brooklyn, N. Y.
- N-2 National Carbon Co., Inc., 30 E. 42nd St., N. Y. C.
- N-3 National Co., Inc., 61 Sherman St., Malden, Mass.
- N-4 National Electrical Products Co., 10 E. Kinzie St., Chicago, Ill.
- N-5 National Electric Specialty Co., 314 N. St. Clair, Toledo, Ohio.
- N-6 National Radio Corp., 680 Beacon St., Boston, Mass.
- N-7 National Radio Tube Co., 3420 18th St., San Francisco, Calif.
- N-7a National Transformer Corp., 205 W. Wacker Drive, Chicago, Ill.
- N-8 National Union Radio Corp., 400 Madison Ave., N. Y. C.
- N-9 National Vulcanized Fibre Co., Maryland Ave. and Beech St., Wilmington, Del.
- N-10 Neonlite Corp. of America, 500 Chancellor Ave., Irvington, N. J.
- N-11 Neutrowound Radio Mfg. Co., 3409 W. Madison St., Chicago, Ill.
- N-12 New England Electrical Works, Lisbon, N. H.
- N-13 Northern Mfg. Co., 371 Ogden St., Newark, N. J.
- N-14 Northwestern Cooperage & Lbr. Co., Gladstone, Mich.
- N-15 Norton Labs., Lockport, N. Y.
- O-1 Ohmite Mfg. Co., 613 N. Albany Ave., Chicago, Ill.
- O-2 Old Masters Paper & Pulp Corp., 154 Nassau St., N. Y. C.
- O-3 O'Neil Mfg. Corp., 715 Palisade Ave., West New York, N. J.
- O-4 Operadio Mfg. Co., 613 N. Albany Ave., Chicago, Ill.
- O-5 Oxford Radio Corp., 3200 Carroll Ave., Chicago, Ill.
- P-1 Pacent Electric Co., Inc., 91 7th Ave., N. Y. C.
- P-2 Packard Electric Co., Warren, Ohio.
- P-3 R. M. Peffer, Harrisburg, Pa.
- P-4 Peryman Electric Co., 33 W. 60th St., N. Y. C.
- P-5 Pfannstiel Radio Co., 10 E. Kinzie, Chicago, Ill.
- P-6 Philadelphia Storage Battery Co., Ontario and C Sts., Philadelphia, Pa.
- P-7 Philmore Mfg. Co., 106 7th Ave., N. Y. C.
- P-8 Phono-Link Co., 490 Broome, N. Y. C.
- P-9 Phonomotor Co., 121 West Ave., Rochester, N. Y.
- P-10 Pierce-Airo, Inc., 119 Fourth Ave., N. Y. C.
- P-11 The Pierson Co., Cedar and Pleasant Sts., Rockford, Ill.
- P-12 Pilot Electric Mfg. Co., 323 Berry St., Brooklyn, N. Y.
- P-13 Pioneer Radio Corp., Plano, Ill.
- P-14 Platter Cabinet Co., Madison Ave., North Vernon, Ind.
- P-15 J. L. Polk, 41 Belle Ave., Troy, N. Y.
- P-16 Polymet Mfg. Corp., 829 E. 134th St., N. Y. C.
- P-17 The Pooley Co., 1600 Indiana Ave., Philadelphia, Pa.
- P-18 Porcelain Products, Inc., Findlay, Ohio.
- P-19 The Potter Co., 1950 Sheridan Rd., North Chicago, Ill.
- P-20 Harold J. Power, 5 High St., Medford Hillside, Mass.
- P-21 Powrad, Inc., 121 Ingraham Ave., Brooklyn, N. Y.
- P-22 Precise Products, Inc., 254 Mill St., Rochester, N. Y.
- P-23 Precision Mfg. Co., 1020 Santa Fe Ave., Los Angeles, Calif.
- P-24 Premax Products, Inc., Niagara Falls, N. Y.
- P-25 Premier Electric Co., Grace and Ravenswood Aves., Chicago, Ill.
- P-26 Premier Radio Corp., Defiance, Ohio.
- P-27 Presto Machine Products Co., Inc., 70 Washington St., Brooklyn, N. Y.
- P-28 Prime Mfg. Co., 653 Clinton, Milwaukee, Wis.
- P-29 M. Propp Co., 524 Broadway, N. Y. C.
- Q-1 QRS-DeVry Corp., 1111 Center St., Chicago, Ill.
- Q-2 Quam Radio Products Co., 9705 Cottage Grove Ave., Chicago, Ill.
- Q-3 Quinn Tube, 1890 E. 40th, Cleveland, Ohio.
- R-1 Racon Electric Co., Inc., 18 Washington Place, N. Y. C.
- R-2 Radiall Co., 50 Franklin St., N. Y. C.
- R-3 Radiart Corp., Inc., 13229 Shaw Ave., E. Cleveland, Ohio.
- R-4 Radio Appliance Corp., Springfield, Mass.
- R-5 Radio Cabinet Co., 818 Butterworth St., Grand Rapids, Mich.
- R-6 Radio Cabinet Co., Seminary St., Rockford, Ill.
- R-7 Radio Condenser Co., Copewood and Davis Sts., Camden, N. J.
- R-8 Radio Corp. of America, 233 Broadway, N. Y. C.
- R-9 Radio Engineering Labs., 100 Wilbur Ave., Long Island City, N. Y.
- R-10 Radio Foundation, Inc., 1 Park Place, N. Y. C.
- R-11 Radio Insulation, Parkersburg, W. Va.
- R-12 Radio Master Corp., Bay City, Mich.
- KEYS, SOUNDERS AND BUZZERS**  
K-5, M-10, S-17, S-26, T-3, V-6.
- LOUDSPEAKERS**  
A-2, A-15, A-18, A-19, A-27, A-34, A-40, A-43, A-44, A-55, A-59, B-3, B-5, B-17, B-25, B-28, B-33, B-34, B-35, C-3, C-32, C-39, E-18, F-4, F-9, F-11, F-18, G-25, H-13, J-6, K-7, K-9, M-2, M-22, M-23, N-2, O-3, O-4, O-5, P-1, P-6, P-11, P-14, P-17, P-27, Q-2, R-1, R-8, R-10, R-17, R-29, S-18, S-19, S-22, S-28, S-33, S-35, S-36, S-39, T-6, T-15, T-22, U-3, U-7, U-9, U-10, U-12, U-16, V-2, W-14, W-23, W-26.
- LUGS, Soldering**  
A-17, B-6, B-19, K-5, L-6, S-7, W-5, Y-2.
- MARKERS, Metal Cable**  
C-41, W-5, Y-2.
- METERS, D-C, A-C and Thermo**  
B-12a, D-12, F-7, G-6, H-14, H-20, J-7, R-13, R-22, S-33, S-45, W-11, W-12.
- MOTORS, Phonograph**  
A-22, A-51, B-21, B-34, D-10, G-6, G-21, H-3a, J-9, K-6, L-5, P-1, P-9, P-28, S-17, S-22, S-35, S-40, U-7, U-16, W-11.
- MOUNTINGS, Resistor**  
A-14, C-17, D-5, E-1, E-8, I-6, K-5, L-12, M-19, M-23, N-3, P-12, P-16.
- OUTLETS, Convenience Wall**  
B-12, B-37, C-7, E-1, F-22, H-10, R-28, S-47, Y-2.
- PANELS, Composition**  
A-29, F-7, F-14, F-16, F-22, I-5, L-11, P-12, P-23, R-19.
- PANELS, Metal**  
A-24, A-59, B-10, B-35, C-11, C-29, C-39, C-41, N-3, P-12, R-14, R-19, S-7, S-33, U-3, V-4.
- PICKUPS, Phonograph**  
A-17, A-22, A-27, A-28, A-40, A-41, A-55, A-57, B-36, C-3, C-39, E-9, E-10, G-21, H-4, M-24, P-1, P-8, P-27, R-3, S-17, S-35, S-39, S-40, T-14, T-22, U-2, U-7, U-15a, U-16, W-8.
- PLATES, Name**  
A-15, A-59, B-7, C-7, C-41, S-7, W-11.
- PLUGS, Phone and Multiple Connector**  
B-12, B-26, D-5, E-1, F-22, G-12, H-10, M-5, M-23, N-3, P-7, P-12, P-16, S-26, Y-2.
- REACTIVATORS, Tube**  
I-6, J-2, S-33.
- RECEIVING SETS**  
A-3, A-11, A-19, A-27, A-39, A-41, A-43, A-55, A-58, A-60, A-61, B-2, B-3, B-4, B-11, B-24, B-28, B-33, B-34, B-35, B-36, B-39, C-19, C-20, C-21, C-31, C-39, D-2, D-3, D-4, D-6, E-6, E-9, E-10, E-20, F-18, F-19, G-16, G-24, G-25, G-27, G-29, G-30, G-32, H-9, H-19, K-5, K-7, K-11, K-13, L-1, L-3, L-6, M-4, M-12, M-15, M-16, N-1, N-2, N-3, N-4, N-6, N-11, P-5, P-6, P-7, P-10, P-11, P-13, P-25, P-26, Q-1, R-8, R-13, R-17, R-32, S-6, S-11, S-12, S-13, S-14, S-15, S-17, S-18, S-19, S-22, S-23, S-32, S-33, S-36, S-38, S-39, T-6, T-9, T-11, T-16, T-17, T-23, U-7, U-9, U-11, U-12, V-1, W-1, W-3, W-4, W-9, W-11, W-14, W-22, W-24, W-25, Z-1, Z-2.
- RECEIVING SET KITS OR CHASSES**  
A-13, B-33, E-1, G-24, G-27, H-3, H-5, H-15, K-3, L-3, L-7, N-3, N-7a, P-12, P-25, R-9, R-27, S-6, S-11, S-18, T-24, V-7.
- RECTIFIER UNITS**  
A-1, A-46, A-47, B-4, B-20a, D-6, E-18, F-4, F-17, G-8, K-14, K-17, N-3, P-6, R-14, S-19, T-15.
- REMOTE CONTROL UNITS**  
B-3, C-19, U-16.
- RESISTORS, Fixed Carbon**  
A-21, C-12, C-17, H-4, I-6, M-13, M-19.



## WESTON Model 564 Volt-Ohmmeter

For checking  
*Voltages + Resistance  
Continuity of Circuits*

**T**HIS instrument is ideally suited to the needs of radio service men. Besides it is very useful for general purposes in radio laboratories.

Model 564 is compact, completely self-contained. It is typically Weston in design and manufacture. Even though moderately priced, it gives that same dependable service for which all Weston instruments are famous.

It consists of a Model 301, 3 1/4" diameter meter with ranges of 3, 30, 300 and 600 volts and two resistance ranges 0-10,000 and 0-100,000 ohms. Two toggle switches serve to connect the meter in circuit. All voltage ranges have a resistance of 1,000 ohms per volt. A pair of 30" cables with long test prods is provided with each instrument.

Change from voltage to resistance measurements and different ranges can easily be effected by connecting test leads to correct binding posts as indicated on the meter and by use of the two toggle switches.

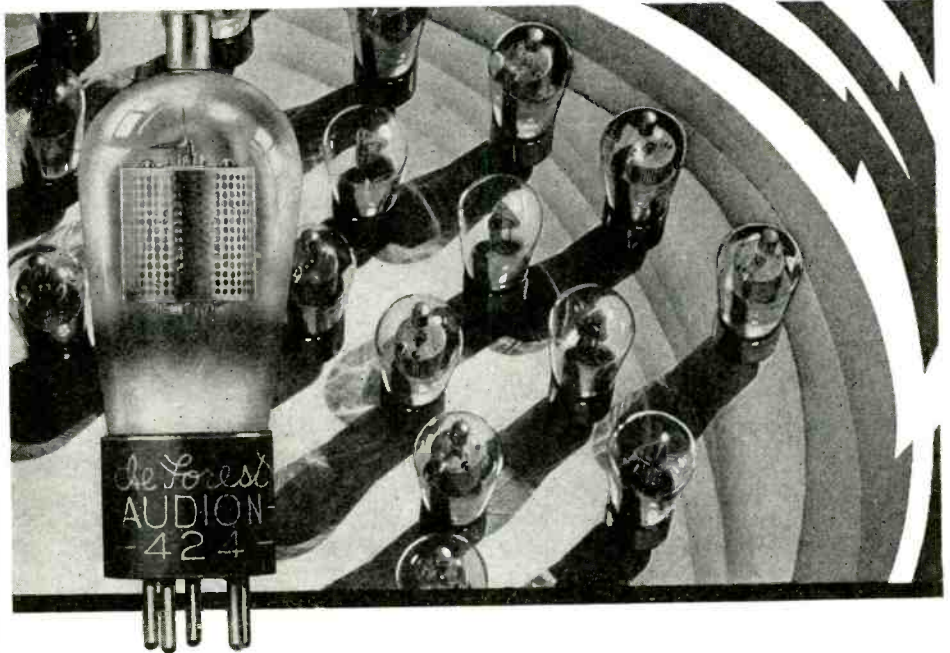
Testing continuity of high and low resistance circuits is simplified by means of a toggle switch which easily changes the sensitivity of the meter to either 1 or 10 milliamperes. Accuracy 2%. Size 5 1/2" x 3 3/8" x 2 1/8" deep (excluding binding posts). Weight 2.3 lbs. (including self-contained "C" battery).

#### PACIFIC COAST REPRESENTATIVES

Graybar Electric Co., Inc. 84 Marion St. Seattle, Wash.	A. A. Barbera Los Angeles, Calif. Repair Service Laboratory 682 Mission St. San Francisco, Calif.
J. H. Southard San Francisco, Calif.	

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PIONEERS  
SINCE 1888  
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WESTON ELECTRICAL  
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It pays you to handle de Forest Radio Tubes because they stand up longer under constant use—your profits are not erased by an excess of service calls.

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Rigid mechanical construction, the sturdiness of the element assembly, the husky, non-fragile oxide-coated filament, the improved insulation of the cathode heater and the higher vacuum of these precision-built tubes are some of the features which contribute to their long life.

Once again: Don't overlook the lowered prices on de Forest Tubes. The recent reduction of 20% to 25% gives you one more powerful selling weapon to help you expand your business on radio sets, as well as on tubes.

#### De Forest Radio Company

Passaic, New Jersey

Export Department:

304 E. 45th Street  
NEW YORK CITY, N. Y., U. S. A.

**de Forest**  
(AUDIONS)  
**RADIO TUBES**

## SILVER THE KING

24 Kt. Gold  
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AMAZING DX RECEPTION. 50% IMPROVEMENT  
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Decidedly Improves any set. U. S. Pat. 1738828  
No. 14, 100 ft., \$4.00; 75 ft., \$3.25; 50 ft. \$2.50

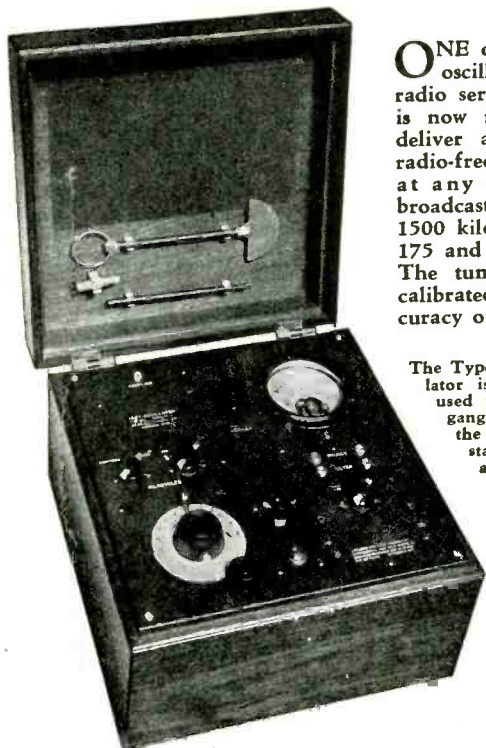
Factory Representatives Write  
GOSILCO RADIO PRODUCTS CO., 6420 Marbrisa Ave., Huntington Park, Calif.

Tell them you saw it in RADIO

- R-13 The Radio Products Co., Fifth and Norwood Sts., Dayton, Ohio.
- R-14 Radio Receptor Co., 106 7th Ave., N. Y. C.
- R-15 Radiotron Corp. of America, 233 Broadway, N. Y. C.
- R-16 Radio Utilities Corp., 67 Winthrop, Newark, N. J.
- R-17 Radio-Victor Corp., 233 Broadway, N. Y. C.
- R-18 Radio Wire Corp., 6629 Central Park Ave., Chicago, Ill.
- R-19 Ranger Coil Co., W. Davenport, N. Y.
- R-20 The Rauland Corp., 3341 Belmont Ave., Chicago, Ill.
- R-21 R. B. M. Mfg. Co., Logansport, Ind.
- R-22 Readrite Meter Works, 15 College Ave., Bluffton, Ohio.
- R-23 Red Lion Cabinet Co., Red Lion, Pa.
- R-24 Reliable Parts Mfg. Co., Wellington, Ohio.
- R-25 A. E. Rittenhouse Co., Honeoye Falls, N. Y.
- R-26 Rival Radio & Battery Co., 180 E. 123rd St., N. Y. C.
- R-27 Robertson-Davis Co., 361 W. Superior St., Chicago, Ill.
- R-28 Rodale Mfg. Co., 200 Hudson, N. Y. C.
- R-29 The Rola Co., 4250 Hollis St., Oakland, Calif.
- R-30 J. T. Rooney, 4 Calumet Bldg., Buffalo, N. Y.
- R-31 Rosenbeck & Sons, Torrington, Conn.
- R-32 Roth-Downs Mfg. Co., 2512 University Ave., St. Paul, Minn.
- R-33 Runzel-Linz Electric Mfg. Co., 1751 N. Weston Ave., Chicago, Ill.
- S-1 Samson Electric Co., 227 Washington St., Canton, Mass.
- S-2 Sangamo Electric Co., Springfield, Ill.
- S-3 Sarras Electric Co., 67 Park Place, N. Y. C.
- S-4 Saturn Mfg. & Sales Co., 48 Beekman St., N. Y. C.
- S-5 Scanlon Electric Mfg. Co., 1113 N. Franklin St., Chicago, Ill.
- S-6 Scott Transformer Co., 4450 Ravenswood Ave., Chicago, Ill.
- S-7 Scovill Mfg. Co., 99 Mill St., Waterbury, Conn.
- S-8 Scranton Button Co., Scranton, Pa.
- S-9 See Jay Battery Co., 915 Brook Ave., N. Y. C.
- S-10 Shallcross Mfg. Co., 700 Parker Ave., Collingdale, Pa.
- S-11 Shamrock Mfg. Co., 196 Waverly Ave., Newark, N. J.
- S-12 Shelby Co., 10 Prince, Trenton, N. J.
- S-13 Shinn Mfg. Co., N. Racine Ave., Chicago, Ill.
- S-14 Shortwave & Television Lab., 104 Brookline Ave., Boston, Mass.
- S-15 Showers Brothers Co., 10th and Morton Sts., Bloomington, Ind.
- S-16 The F. W. Sickles Co., 191 Chestnut St., Springfield, Mass.
- S-17 Signal Electric Mfg. Co., Menominee, Mich.
- S-18 Silver-Marshall, Inc., 6401 W. 65th St., Chicago, Ill.
- S-19 Simplex Radio Co., Sandusky, Ohio.
- S-20 B. H. Smith, Danbury, Conn.
- S-21 Sonatron Tube Co., 1020 S. Central Park Ave., Chicago, Ill.
- S-22 Sonora Phonograph Co., Inc., 50 West 57th St., N. Y. C.
- S-23 The Sparks-Withington Co., Jackson, Mich.
- S-24 A. R. Spartana, 806 N. Gay, Baltimore, Md.
- S-25 Spaulding Fibre Co., Inc., 484 Broome St., N. Y. C.
- S-26 Specialty Insulation Mfg. Co., Hoosick Falls, N. Y.
- S-27 Sprague Specialties Co., 1511 Hancock St., Quincy, Mass.
- S-28 Standard Radio Corp., 41 Jackson St., Worcester, Mass.
- S-29 Standard Transformer Co., Warren, Ohio.
- S-30 The Starr Piano Co., S. 1st and A, B, C and D Sts., Richmond, Ind.
- S-31 Starr Porcelain Co., Trenton, N. J.
- S-32 Steinite Radio Co., Fort Wayne, Ind.
- S-33 The Sterling Mfg. Co., 2831 Prospect Ave., Cleveland, Ohio.
- S-34 Stettner Phonograph Corp., 310 E. 75th St., N. Y. C.
- S-35 Stevens Mfg. Corp., 46 Spring St., Newark, N. J.
- S-36 Stewart-Warner Speedometer Corp., 1826 Diversey Parkway, Chicago, Ill.
- S-37 St. Johns Table Co., Cadillac, Mich.
- S-38 Story & Clark Piano Co., 172 N. Michigan Ave., Chicago, Ill.
- S-39 Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.
- S-40 Studner Bros., 67 W. 44th St., N. Y. C.
- S-41 Sturges Multiple Battery Corp., Jamaica, N. Y.
- S-42 Sunlight Lamp Co., 76 Colt, Irvington, N. J.
- S-43 Superior Cabinet Corp., 206 Broadway, N. Y. C.
- S-44 Supertron Mfg. Co., Hoboken, N. J.
- S-45 Supreme Instruments Corp., Bright Bldg., Greenwood, Miss.
- S-46 Swaboda Co., 612 E. Pike St., Seattle, Wash.
- S-47 Swan-Haverstick, Inc., Trenton, N. J.
- S-48 Sylvania Products Co., Emporium, Pa.
- S-49 Sturges Multiple Battery Corp., Jamaica, N. Y.
- T-1 Taylor Electric Co., Madison, Wis.
- T-2 Tectron Radio Corp., 1270 Broadway, N. Y. C.
- T-3 Toplex Co., 76 Cortlandt, N. Y. C.
- T-4 Teleradio Engineering Corp., 484 Broome St., N. Y. C.
- T-5 Televocal Corp., 588 12th St., West New York, N. J.
- T-6 Temple Corp., 5253 W. 65th St., Chicago, Ill.
- T-7 Therm-A-Trol Mfg. Co., 52 Willow, Springfield, Mass.
- T-8 Thomas & Betts Co., 15 Park Place, N. Y. C.
- T-9 Thompson Radio Co., 25 Church, N. Y. C.
- T-10 Thordarson Electric Mfg. Co., 500 W. Huron St., Chicago, Ill.
- T-11 Tilman Radio Corp., Lagro, Ind.
- T-12 Tobe Deutschmann Co., 136 Liberty St., N. Y. C.
- T-13 Todd Electric Co., 42 Vesey, N. Y. C.
- T-14 Toman & Co., 2621 W. 21st St., Chicago, Ill.
- T-15 Tower Mfg. Corp., 124 Brookline Ave., Boston, Mass.
- T-16 Transformer Corp. of America, 2301 S. Keeler Ave., Chicago, Ill.
- T-17 Trav-ler Mfg. Corp., 1818 Washington Ave., St. Louis, Mo.
- T-18 Trenle Porcelain Co., East Liverpool, Ohio.
- T-19 Triad Mfg. Co., Inc., Fountain and Blackstone Sts., Pawtucket, R. I.
- T-20 Tri-Boro Radio Mfg. Corp., 62 W. 21st St., N. Y. C.
- T-21 Trico Products Corp., 817 Washington, Buffalo, N. Y.
- T-22 Trimm Radio Mfg. Co., 847 W. Harrison, Chicago, Ill.
- T-23 Trutone Radio Sales Co., 114 Worth, N. Y. C.
- T-24 Tryman Electric Corp., 314 W. Superior St., Chicago, Ill.
- U-1 The Udell Works, 1202 W. 28th St., Indianapolis, Ind.
- U-2 Ultraphonic Products Corp., 270 Lafayette, N. Y. C.
- U-3 Ultratone Mfg. Co., 1046 W. Van Buren St., Chicago, Ill.
- U-4 Union Electrical Porcelain Works, Muirhead Ave., Trenton, N. J.
- U-5 Union Insulating Co., 296 Broadway, N. Y. C.
- U-6 Union Metal Products Co., 2938 Pillsbury Ave., Minneapolis, Minn.
- U-7 United Air Cleaner Co., 9705 Cottage Grove Ave., Chicago, Ill.
- U-8 United Radio & Electric Corp., 500 Chancellor Ave., Irvington, N. J.
- U-9 United Reproducers Corp., Springfield, Ohio.
- U-10 United Research Labs., Inc., 864 W. North Ave., Chicago, Ill.
- U-11 United Scientific Lab., Inc., 113 Fourth Ave., N. Y. C.
- U-12 U. S. Radio & Television Corp., Marion, Ind.
- U-13 Universal Battery Co., 3410 S. La Salle, Chicago, Ill.
- U-14 Universal Electric Lamp Co., Newark, N. J.
- U-15 Universal Electro Chemical Corp., 30 W. 15th St., N. Y. C.
- U-15a Upco Products Corp., 270 Lafayette St., N. Y. C.
- U-16 The Utah Radio Products Co., 1737 S. Michigan Ave., Chicago, Ill.
- V-1 Vaga Mfg. Co., 720 Atlantic Ave., Brooklyn, N. Y.
- V-2 Valley Appliances, Inc., 634 Lexington Ave., Rochester, N. Y.
- V-3 Valley Electric Co., 4221 Forest Park Blvd., St. Louis, Mo.
- V-4 Van Doorn Co., 160 N. La Salle St., Chicago, Ill.
- V-5 Van Horne Tube Co., 280 Center St., Franklin, Ohio.
- V-6 Vibroplex Co., 825 Broadway, N. Y. C.
- V-7 Victoreen Radio Co., 2825 Chester Ave., Cleveland, Ohio.
- W-1 Walbert Radio Corp., 1000 Fullerton Ave., Chicago, Ill.
- W-2 Ward Leonard Electric Co., Mt. Vernon, N. Y.
- W-3 Ware Mfg. Corp., Broad St. Bank Bldg., Trenton, N. J.
- W-4 Wasmuth-Goodrich Co., Peru, Ind.
- W-5 Waterbury Button Co., Waterbury, Conn.
- W-6 Watsontown Table & Furniture Co., Watsontown, Pa.
- W-7 The Webster Co., 850 Blackhawk St., Chicago, Ill.
- W-8 Webster Electric Co., Racine, Wis.
- W-9 Wells Gardner & Co., 816 N. Kenzie Ave., Chicago, Ill.
- W-10 Western Felt Works, 4029 Ogden Ave., Chicago, Ill.
- W-11 Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.
- W-12 Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark, N. J.
- W-13 T. C. Wheaton Co., Millville, N. J.
- W-14 Wilcox Labs., Charlotte, Mich.
- W-15 Willard Storage Battery Co., 346 E. 131st St., Cleveland, Ohio.
- W-16 Winnebago Mfg. Co., Rockford, Ill.
- W-17 Wireless Corp. of America, 1744 N. Robey, Chicago, Ill.
- W-18 Wireless Egert Eng., Inc., 179 Greenwich St., N. Y. C.
- W-19 Wireless Specialty Appliance Co., 76 Atherton St., Jamaica Plain, Mass.
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- W-21 Wirt Co., 5221 Greene (Germantown), Philadelphia, Pa.
- W-22 Wiz Mfg. Co., 225 Sixth Ave., N. Y. C.
- W-23 J. W. & W. L. Woolf, 133 W. 21st St., N. Y. C.
- W-24 Workrite Radio Corp., 1838 E. 30th St., Cleveland, Ohio.
- W-25 World Electric Co., San Dimas, Calif.
- W-26 Wright-DeCoster, Inc., 2233 University Ave., St. Paul, Minn.
- W-27 Wubco Battery Corp., Swissvale Sta., Pittsburgh, Pa.
- X-1 X-L Radio Labs., 1224 Belmont Ave., Chicago, Ill.
- Y-1 Yahr-Lang, Inc., 207 E. Water, Milwaukee, Wis.
- Y-2 Yaxley Mfg. Co., 1528 West Adams, Chicago, Ill.
- Z-1 Zaney-Gill Corp., 5912 So. Western Ave., Los Angeles, Cal.
- Z-2 Zenith Radio Corp., 3620 Iron St., Chicago, Ill.
- RESISTORS, Fixed Processed**  
A-14, C-5, C-7, C-17, C-38, E-8, H-4, I-6, L-12, M-13, M-19, N-3, P-12, P-16, R-2, W-21.
- RESISTORS, Fixed Wire Wound**  
A-14, A-36, C-7, C-17, C-38, D-14, D-5, E-8, E-10, F-7, F-22, G-6, G-12, K-19, L-3, M-9, M-13, M-19, M-23, N-3, O-1, P-1, P-12, P-16, R-22, R-27, S-10, W-2, W-21, Y-2.
- RESISTORS, Variable Carbon**  
A-21, B-31, C-7, C-17, E-8, F-22, K-5, P-12, P-16.
- RESISTORS, Variable Wire Wound**  
C-7, C-17, C-43, D-5, E-8, E-10, F-22, G-8, G-12, H-4, K-19, M-19, M-23, N-3, P-1, P-7, P-12, P-16, R-19, U-11, V-7, W-2, W-21, Y-2.
- SHIELDS**  
A-24, C-7, C-11, C-39, G-24, L-3, N-3, P-12, S-18.
- SOCKETS, Tube**  
A17, A-29, A-56, B-14, C-11, C-43, D-5, E-5, E-10, F-22, G-12, G-24, I-1, I-5, K-5, K-17, K-19, N-3, N-15, P-1, P-12, P-13, P-25, R-19, S-4, S-11, S-18, U-5.
- SOLDER, Self-Fluxing**  
K-10.
- SWITCHES AND SWITCH CONTACTS**  
A-15, B-6, B-12, B-31, C-7, C-12, C-43, E-10, F-1, F-11, F-22, G-12, H-10, H-11, H-15, K-4, K-5, M-23, P-1, P-12, P-22, R-11, R-19, S-4, U-5, W-19, Y-2.
- TESTING EQUIPMENT, Tube and Set**  
B-12a, E-13, F-7, F-11, G-12, H-12, H-14, H-20, J-7, K-19, L-3, L-10, N-3, P-3, P-29, R-9, R-13, R-22, S-17, S-33, S-45, T-1, T-22, W-2, W-12.
- TRANSFORMERS, Audio**  
A-4, A-5, A-13, A-36, A-39, B-8, C-7, C-14, C-21, C-22, D-16, F-5, F-7, F-14, G-2, G-3, G-8, G-12, G-13, G-22, G-24, H-1, H-3, H-5, J-2, K-3, K-5, L-6, M-23, N-3, N-15, P-1, P-12, P-16, P-22, P-25, R-19, R-20, R-25, R-27, S-1, S-2, S-4, S-5, S-18, S-29, T-10, T-16, V-4, V-7, W-8.
- TRANSFORMERS, Power**  
A-4, A-5, A-6, A-13, A-36, A-46, B-8, B-24, B-31, C-7, C-14, C-22, D-12, D-16, E-13, E-18, F-1, F-7, F-8, F-17, G-3, G-4, G-8, G-12, G-13, G-22, G-24, H-1, H-12, J-2, K-3, K-5, K-11, K-12, K-17, K-19, L-3, M-9, M-23, N-3, N-12, P-12, P-16, R-2, R-3, R-10, R-25, S-11, S-18, S-20, S-29, T-10, T-24, U-5, V-7, W-7, W-19.
- TRANSFORMERS, R-F (See COILS, R-F)**
- TRANSMITTING APPARATUS**  
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- TUBING, Spaghetti**  
A-7, A-15, I-5.
- UNITS, Loudspeaker and Phonograph**  
A-2, A-13, A-22, B-3, B-5, B-17, C-20, E-7, E-10, E-18, F-9, F-11, H-15, M-23, R-29, S-22, S-46, T-15.
- VACUUM TUBES**  
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- VOLTAGE REGULATORS**  
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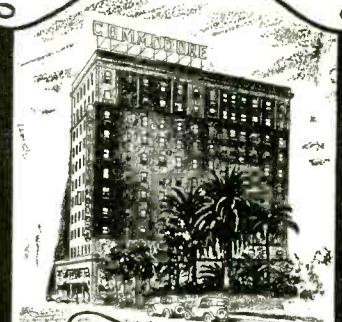
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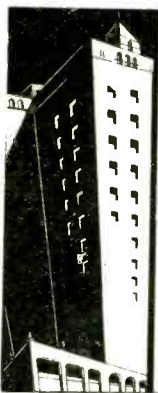
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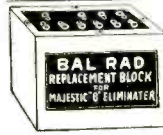
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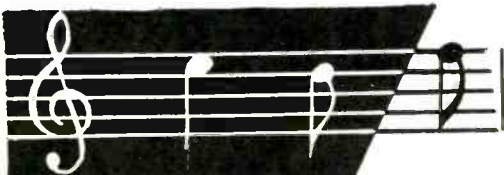
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# TONE TEST DEMONSTRATION RECORD

## SAVE TIME AND MONEY SELL MORE SETS!

**P**LAY this demonstration record on any radio set, phonograph, amplifier, pick-up or speaker. Let your prospective customers hear an unusual six-minute demonstration of all the high and low notes of the musical scale. Why jump from station to station when this record gives you a COMPLETE demonstration of everything a radio set should do, insofar as tone testing is concerned? The tremendous first month sales of this record and the powerful testimonials received from radio dealers prove that this record SELLS SETS. Furthermore, it enables you to detect any defects in cabinet construction—loose parts in metal chassis—and unsatisfactory tubes. The rumbling low notes show up loose parts in a cabinet. The shrill high notes show up loose metal parts in the chassis. **USE THIS RECORD TO TEST ALL SETS BEFORE THEY GO ON YOUR SALES FLOOR.** Put your merchandise through a complete test in six minutes. Play it for your prospective customers. Give them a demonstration such as they never heard before.

Recorded and produced for the publishers of "RADIO"  
and sold to you on a money-back guarantee.

Only \$ **1.00**  
POSTPAID  
IN THE U.S.

### SPECIAL INTRODUCTORY OFFER

Buy a standard package of 6 of these records and give one to each of your salesmen. **SIX RECORDS FOR \$5.00, postpaid.**

—Shipments made  
on same day your  
order reaches  
us . . .

## RADIO

Pacific Building,  
San Francisco, California.

Send..... Demonstration Records  
to me immediately upon receipt of this order.

I enclose \$..... in full payment.  
(Prices: \$1.00 each, or \$5.00 for six)

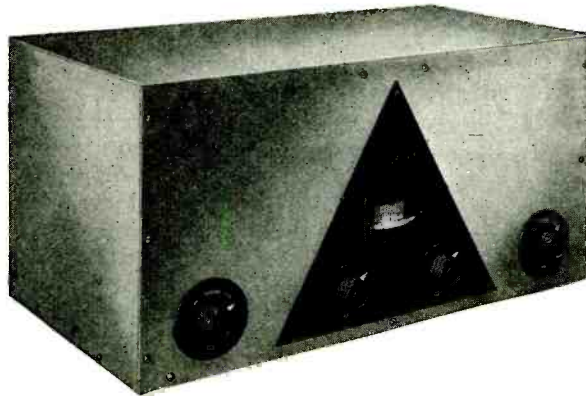
CHECK HERE IF C. O. D. SHIPMENT IS WANTED

Name.....  
Street and Number.....  
City.....  
State.....



Tell them you saw it in RADIO

WORLD-WIDE  
RECEPTION  
WITH THE NEW  
**NORDEN-HAUCK**  
SHORT-WAVE  
**SUPER DX-5**



*Size: 9 x 19 x 10 inches. Weight: 30 pounds*

ENTIRELY NEW  
ADVANCED DESIGN  
NEW PENTODE TUBE  
SENSATIONAL DISTANCE  
RANGE 11½ TO 205  
METERS  
RELIABLE PERFORMANCE  
A-C AND D-C MODELS  
ADAPTABLE FOR LONG  
WAVES

Write, telephone or cable TODAY for  
Complete Information

**NORDEN-HAUCK, INC.**

ENGINEERS

1-9 South Street

PHILADELPHIA, PA., U. S. A.

# CROSLEY Amazes Radio World With Sensational NEW Line!

The Crosley NEW  
COMPANIONSHIP SERIES  
SCREEN GRID NEUTRODYNE  
POWER SPEAKER A. C. ELECTRIC

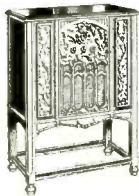
## The Crosley PAL



type -80 as a rectifier. Dimensions: Only 25 3/8" high, 21" wide, 11" deep. An astonishing value at...

**\$69.50**  
Less Tubes

## The Crosley MATE

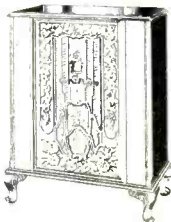


The exquisitely designed front of this beautiful cabinet is made of the famous Crosley Repwood. The substantial posts and stretchers are of the finest 5-ply walnut veneer. The newest type Crosley electro-magnetic power speaker is built in. Contains the same powerful and wonderfully selective NEW Companionship Series chassis as The PAL. Dimensions: 30" high, 20 3/4" wide, 12 3/4" deep. The price is amazingly low—only

**\$75.00**  
Less Tubes

The Crosley NEW  
LEADERSHIP SERIES  
SCREEN GRID NEUTRODYNE  
POWER SPEAKER A. C. ELECTRIC

## The Crosley DIRECTOR



high, 23 3/4" wide, 13 3/4" deep. This price is sensationally low—only...

**\$107.50**  
Less Tubes

## The Crosley ARBITER Electric Phonograph and Radio Combination



requires the same tubes. Dimensions: 35" high, 23 3/4" wide, 15" deep. Sold at the astonishingly low price of...

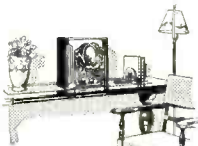
**\$137.50**  
Less Tubes

\$147.50 with induction type self-starting motor

NEW Chassis and NEW Power Speakers in Cabinets of NEW Beauty, Originality, Individuality and Distinction at Astonishingly Low Prices > >



ON THE MANTEL



ON THE TABLE



NEXT TO EASY CHAIR



## The Crosley NEW BUDDY

SCREEN GRID—NEUTRODYNE—POWER SPEAKER—A. C. ELECTRIC  
ONLY 15 3/8" HIGH, 15 3/8" WIDE, 9 3/4" DEEP

In one clean sweep Crosley has split wide open the way to greater sales, faster turn-over and greater profits for Crosley dealers with a sensational new line featuring The CROSLY NEW Buddy, the most startling, most popular and lowest-priced radio for the value received, that has ever been offered.

This marvelous little set has everything your customers look for in radio. Its performance is extra-ordinary. Its beauty is exceptional. Its design is original. Its captivating charm is irresistible. It may be placed on the mantel, at the side of an easy chair or on a table.

The exquisitely designed front of The NEW Buddy is made of genuine Repwood, a new Crosley product which makes possible the exact duplication of a beautiful hand carving. The newest type Crosley electro-magnetic power speaker is incorporated. Requires two Screen Grid tubes type -24 in the radio frequency stages, one Screen Grid type -24 in the detector stage, one type -45 in the power output stage, one type -80 tube as a rectifier. Dimensions: 15 3/8" high, 15 3/8" wide, 9 3/4" deep. Amazingly low priced at only

**\$64.50**  
COMPLETE WITH TUBES

Backed with extensive national advertising, this remarkable Crosley line will be the fastest-selling, biggest profit-making line on the market. Get in touch with your Crosley distributor immediately and learn more about this wonderful new line.

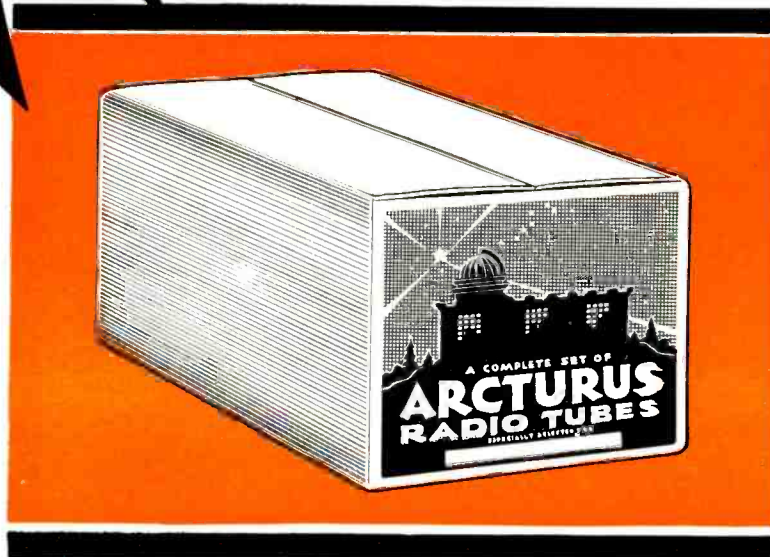
## The Crosley Radio Corporation

POWEL CROSLEY, JR., President Home of "the Nation's Station"—WLW  
CINCINNATI

Also manufacturers of the CROSLY "ROAMIO" Automobile Radio Receiving Set and the famous AMRAD RADIO

YOU'RE THERE WITH A CROSLEY  
**CROSLEY RADIO**

# NEW!



## ARCTURUS BLUE TUBES

packed in KITS for all leading radio sets

Now, a new package is available containing a complete set of ARCTURUS Tubes for each leading radio receiver. Include the right Arcturus Kit with any receiver you sell and give your customers "radio insurance"—assurance that they are getting a quality tube that will get the most out of any radio set.

And—with the added exclusive advantages of 7-second action,

clear, humless reception and exceptionally long life—you can be sure that Arcturus Blue Tubes in these convenient new kits will satisfy any set buyer.

Use Arcturus Blue Tubes, in kits or individual cartons, for best results with every make of radio receiver you sell.

ARCTURUS RADIO TUBE COMPANY  
Newark, N. J.



# ARCTURUS

## TUBES for every RADIO

### ACT · IN · 7 · SECONDS

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