RADIO

OCTOBER
1930

See Page 9

The Biggest Value Ever Offered in a Radio Set Analyzer

Dealers' Price $73.12
List Price - - - $97.50

The Jewell Pattern 199 is unequalled in accuracy, speed, and simplicity of operation by any other analyzer of comparable price.

WHY consider inferior set testers when a Jewell Pattern 199 Set Analyzer, proved through more than two years' service, costs so little?

Accuracy is vital in a radio service instrument. The large meters of the Pattern 199 are inherently accurate. These meters have been proved on thousands and thousands of industrial applications. Their clearly marked legible scales are easy to read accurately.

Why consider an instrument that requires an encyclopedia to tell how to operate it? The Jewell Pattern 199 is so simple to operate that if you leave the instruction book at home you need experience no difficulty.

Why experiment with cheap, inferior testers? The Jewell Pattern 199 is built to the highest standards by an exclusive manufacturer of instruments. The only changes in the Pattern 199 in more than two years are adjustments to take care of new factors in radio equipment.

In the Jewell Pattern 199 you get a proven set analyzer—there are more than fifteen thousand of them in service today—an analyzer with two large, easy-to-read meters—an analyzer that is inherently accurate, durable and reliable—an analyzer that is simple to operate—an analyzer that makes every worthwhile field test—at a price made possible only by quantity production.

Again we repeat—you may be able to buy some kind of a set analyzer for less money, but you can't get as much for your money in any other analyzer on the market as you get in the Jewell Pattern 199.

30 YEARS MAKING GOOD INSTRUMENTS

JEWELL

Pattern 199 Set Analyzer

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

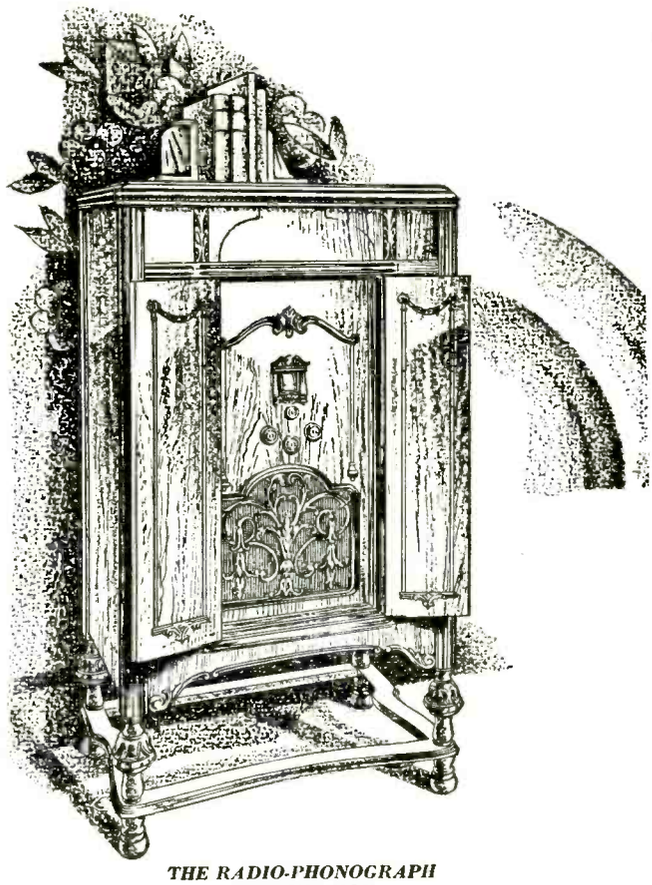
Mail your 16-page bulletin describing the Pattern 199 Set Analyzer and other Jewell Service Instruments.

Name ----------

Address ----------

"HOME RECORDING"
is Standard Equipment on the

FULL RANGE
Radio Phonograph Combination



THE RADIO-PHONOGRAPH COMBINATION

A handsome brown walnut cabinet, satin-finished. Fitted with TONE CONTROL and HOME RECORDING equipment . . . Price $285, less tubes. Remote control optional at additional cost.

HERE is a real high-light among the sales features of the G-E Radio-Phonograph Combination. Added to the already high value represented by this splendid screen-grid super-heterodyne receiver with its special tone-arm that gives such remarkable record reproduction, Home Recording makes the G-E Radio-Phonograph Combination a real sales winner.

The Home-Recording device has two outstanding features. It records broadcast programs direct from the receiver—giving a permanent record of favorite programs. It also records the speaking voice and home entertainment with an attached microphone. Equipment includes microphone, two special needles, and five blank, non-breakable six inch records.

• • •

THE HIGHBOY—A brown walnut cabinet with satin finish; French doors—(fitted with TONE CONTROL)... Price $179.50, less tubes. Remote control optional at additional cost.

THE LOWBOY—An attractive cabinet in satin-finish brown walnut. Super-heterodyne using nine tubes, four of which are screen-grid. Price $142.50, less tubes.

GENERAL ELECTRIC
FULL RANGE RADIO

RADIO

Established 1917 Reg. U. S. Pat. Office

PUBLISHED ON THE FIRST OF EACH MONTH
AT 428-430 PACIFIC BLDG., SAN FRANCISCO, CALIF.

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HECKERT L. PARKER - - - - - - *Merchandising Editor*
P. S. LUCAS - - - - - - - - - *Associate Editor*
H. W. DICKOW - - - - - - - - *Business Manager*
FRANK C. JONES - - - - - - - - *Technical Adviser*
A. I. RIVETT - - - - - - - - - *Draughtsman*

BRANCH OFFICES—

NEW YORK: 415 Lexington Avenue, Phone Murray Hill 5992
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BOSTON, MASS.: 86 St. Botolph Street, Phone Commonwealth 4873

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CONTENTS
for October, 1930

A Suggestion to the Reader:

After reading this October 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.

Obey That Impulse To Study

"NONE is so blind as he who will not see," and none is so dumb as he who will not study because he thinks he knows it all. Recently, a group of automotive jobbers, at great expense, hired an accounting expert to teach each of their dealers how to keep books. But most of the dealers were not interested and the plan failed miserably. Since then several of the non-coöperating dealers have been declared bankrupt.

These facts emphasize the value of studying such articles as those by Wm. E. Koch and G. S. Corpe in current issues of RADIO. Professor Koch's writings on the profitable management of retail stores have been pronounced as among the best possible teachments of the fundamental principles of the subject. Mr. Corpe's instructions are acknowledged to be the simplest and most detailed illustrations of practical bookkeeping that have ever been presented to the radio dealer.

Yet these articles, and others in these columns, are valueless if not studied and applied. A mere cursory reading is not sufficient. They should be read carefully three or four times and then tried out in practice.

There is an old saying that "you can lead a horse to water, but you can't make him drink, you can send a boy to college, but you can't make him think." Likewise, you can give a man business-building ideas but you can't make him use them.

The answer, of course, is to make the horse, the boy, or the man *want to*. In the case of the horse, feed him salt. In the case of the boy, get him interested. In the case of the man, sell him the idea of making money instead of losing it.

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SUPERHETERODYNE

What a Radio . . .

- So good it needs no aerial—just plug it in like a floor lamp; that's all.
- Five screen-grid tubes. No receiver has ever had such tremendous power.
- Ten tuned circuits — real hair line selectivity.
- Two screen-grid detectors—each one five times as good as the next best.
- All these outstanding features are EXCLUSIVE with Silver-Marshall Radio. Plus —
- Superheterodyne — the circuit that famous laboratories have been twelve years trying to beat.
- A product of Silver-Marshall—manufacturers of America's first screen-grid receivers and designers of the first popular superheterodyne in the whole world.
- And a 99 Year Franchise—complete protection for the life of your business.

Send in a corner of this ad with your name and address written on it. Your distributor will give you complete details at once.

99 YEAR FRANCHISE

SILVER-MARSHALL RADIO

SILVER-MARSHALL, INCORPORATED, 6441 WEST 65th STREET, CHICAGO, U. S. A.

F COMPETITION

BOTHERS YOU STEP OUT IN FRONT OF IT

.. WITH FADA

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

ONLY THE NEW FADAS HAVE
***ALL* THESE 14 FEATURES**

- ★ Noise Filter
- ★ Automatic Volume Control
- ★ Finer Tone
- ★ Flashograph
- ★ Beautiful Cabinets
- ★ Fada Dynamic Speaker
- ★ One Dial...One-Knob Tuning
- ★ Humless Operation
- ★ Phonograph Connection
- ★ Local Distance Switch
- ★ Pre-selector Tuning
- ★ Complete Shielding
- ★ Two-element Detector
- ★ Nine Tubes—including three screen grid.

★

OTHER NEW FADA MODELS

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

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

FADA Radio

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

IF only one car had 4-wheel brakes, wouldn't you like to sell that car? If only one refrigerator made ice cubes, wouldn't you like to represent it?

That's about the situation between Fada and the field. While other radio manufacturers make advertising hullabaloo over a stray feature or two . . . a phonograph jack or even a dynamic speaker . . . Fada blazes out with fourteen.

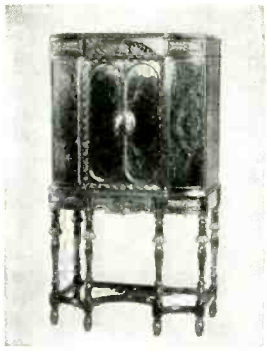
To sell radio readily in today's market, you must have something to sell. Fada fairly sparkles with exclusive selling points. It puts on a unique demonstration, overwhelmingly convincing to both eye and ear. Fada furnishes ammunition that is an inspiration to salesmanship. No other radio has so many of the features that the consumer itches to own.

Step out of the profitless area of cluttered-up competition. Sell a radio that is out in front, all by itself . . . provably the most advanced radio of the year. Sell Fada. Wire or write for the clinching details.

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

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

★



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

Fada Models 42, 44, 41 and 46 are also available for operation on 25 cycle or direct current (DC) at slight increase in price.

1920 · SINCE BROADCASTING BEGAN · 1930

THE TIDE OF TUBES HAS TURNED TO

Eveready Raytheon

DEALERS know a good thing when they see it. Radio-set owners know a good thing when they hear it. That is why both the trade and consumer are turning to Eveready Raytheon 4-Pillar Tubes. For these superior-quality tubes cost no more than other established brands!

Eveready Raytheons always deliver . . . and here's some of the proof: Thousands of new dealers from coast to coast are stocking full lines of these tubes. Dealers have found the improvement in reception with Eveready Raytheons to be so startling that customers are buying them in complete sets, rather than just one or two at a time.

Service-men are equally enthusiastic. They are engaged in a nation-wide house-to-house canvass of prospective tube-customers. They have found home-demonstrations remarkably successful with Eveready Raytheons . . . customers can always *hear* the difference and *see* the reason.

And customers! People in all parts of the country are *asking* for Eveready Raytheon demonstrations, in their own radio-sets, at home. The tide of popularity, demand, and sales has turned to Eveready Raytheon!

Eveready Raytheons come in all types, and fit the sockets of every standard A. C. and battery-operated radio in present use. Ask your jobber, or write us now for the names of jobbers near you.

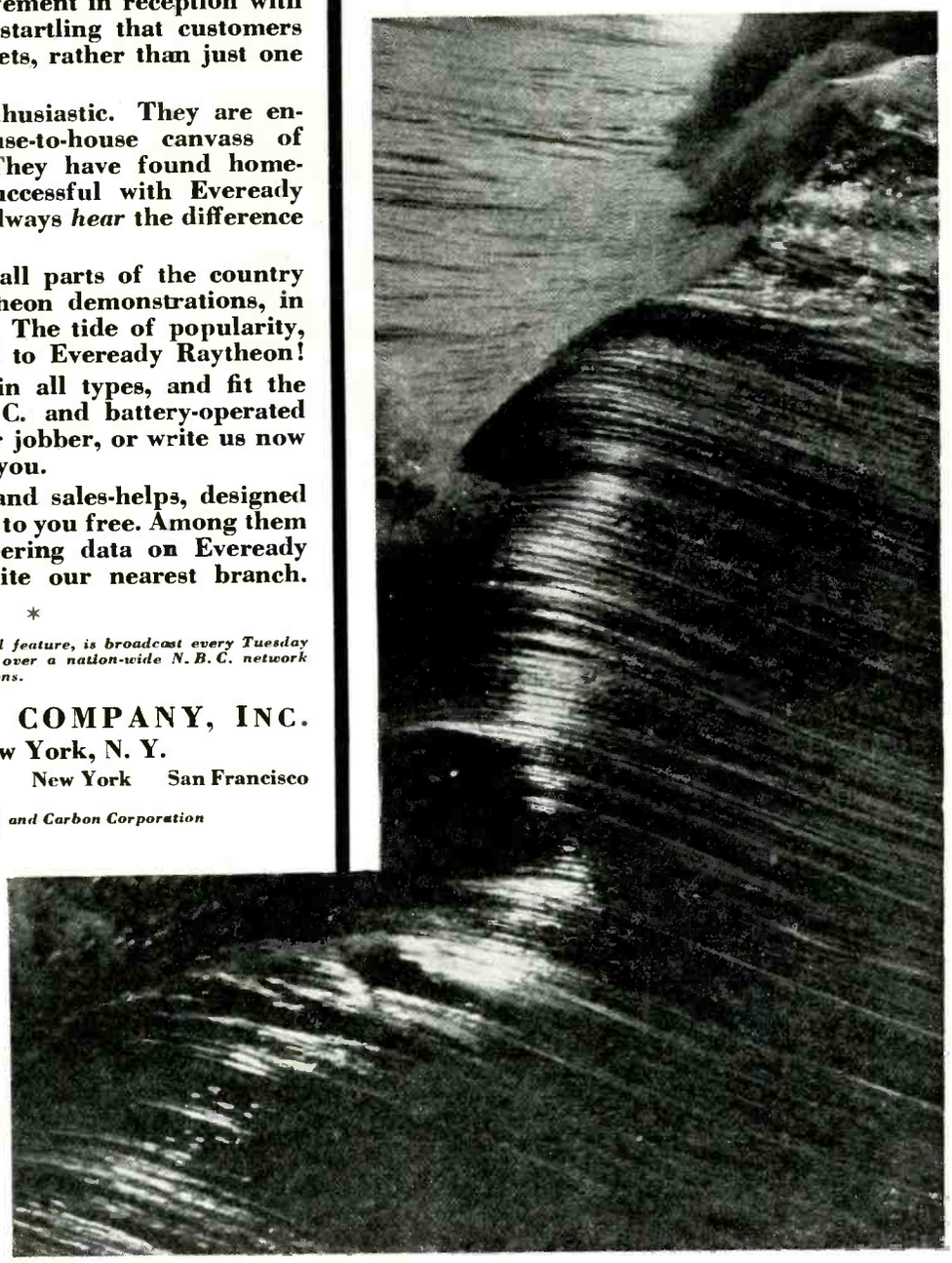
Service-men! **Information and sales-helps, designed for your use, will gladly be sent to you free. Among them is a blue-print, giving engineering data on Eveready Raytheon 4-Pillar Tubes. Write our nearest branch.**

* * *

The Eveready Hour, radio's oldest commercial feature, is broadcast every Tuesday evening at 9 (New York time) from WEAF over a nation-wide N. B. C. network of 31 stations.

NATIONAL CARBON COMPANY, INC.
General Offices: **New York, N. Y.**
Branches: **Chicago Kansas City New York San Francisco**

Unit of Union Carbide UCC *and Carbon Corporation*



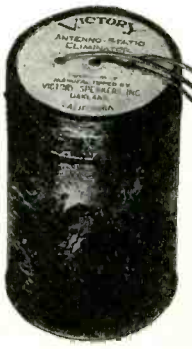
EVEREADY RAYTHEON

Trade-marks

ANNOUNCING THE VICTORY ANTENNA ELIMINATOR

An Altogether Different Eliminator

. . . IDEAL for Apartment Houses & Hotels



THERE'S a wider field for this new ANTENNA ELIMINATOR. New circuit design developed by Victory Engineers—patent applied for. Not at all like other antenna eliminators. Just try one — and expect RESULTS. Dealers acclaim it the finest antenna eliminator yet designed.

Guaranteed for the Life of the Set

Nothing to wear out. Nothing to replace. Sealed in moisture-proof container. Brings in distant stations. Reduces noises. The most skeptical have been convinced of its superiority. Order a sample TODAY.

$3.75 List

Write Immediately for Trade Prices

VICTORY

GIANT 16-INCH SPEAKER

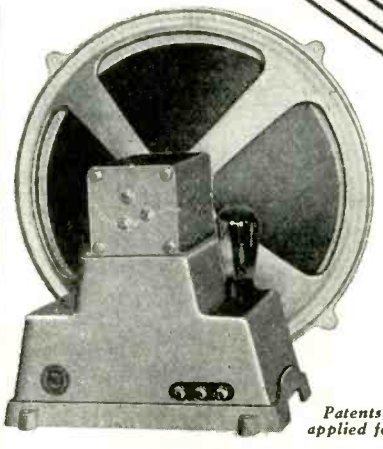
The Largest and Most Rigid Speaker on the Market. Ideal for Theater Jobs and for auditoriums and homes that demand the finest in reproduction

VICTORY GIANT SPECIFICATIONS

16" cone (inside)—(19" outside).
½" top plate.
2" movable coil—½" wide.
1—280 rectifying tube for field excitation.
Net weight complete with input and rectifying transformers, 38 lbs. New method of field concentration, more power and less distortion.

LIST PRICE $110.00.
(Less Rectifier Tube)

Victory manufactures a complete line of electro-dynamic speakers, ranging in price from $16.50 to $52.50 for D-C models and from $35.00 to $110.00 for A-C models. Special theater models on request.



Patents applied for

VICTORY SPEAKERS, INC.

7131 EAST 14th STREET, OAKLAND, CALIFORNIA

Cable Address—"VICSPEAK"

Reproduction of full page advertisement in Collier's, October 18, 1930

We're telling the world that CLARION is "*The Greatest Radio Value at any Price*"

Millions of people are being told about Clarion Radio in one of the strongest, most striking magazine and newspaper campaigns ever launched. The Clarion distributors listed above will testify that this great public is not only being told—but that it is being *sold.* The large sums of money spent in advertising Clarion Radio will come back still larger in the form of profits for the Clarion dealer. The Clarion line is already the sensation of the country—because it is nationally advertised—because it has the backing of a great organization—but principally because the product itself is "The greatest radio value at any price."

TRANSFORMER CORPORATION OF AMERICA

Keeler and Ogden Avenues, Chicago

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

Cable Address "CLARION, CHICAGO" All Codes Used

Clarion Radio

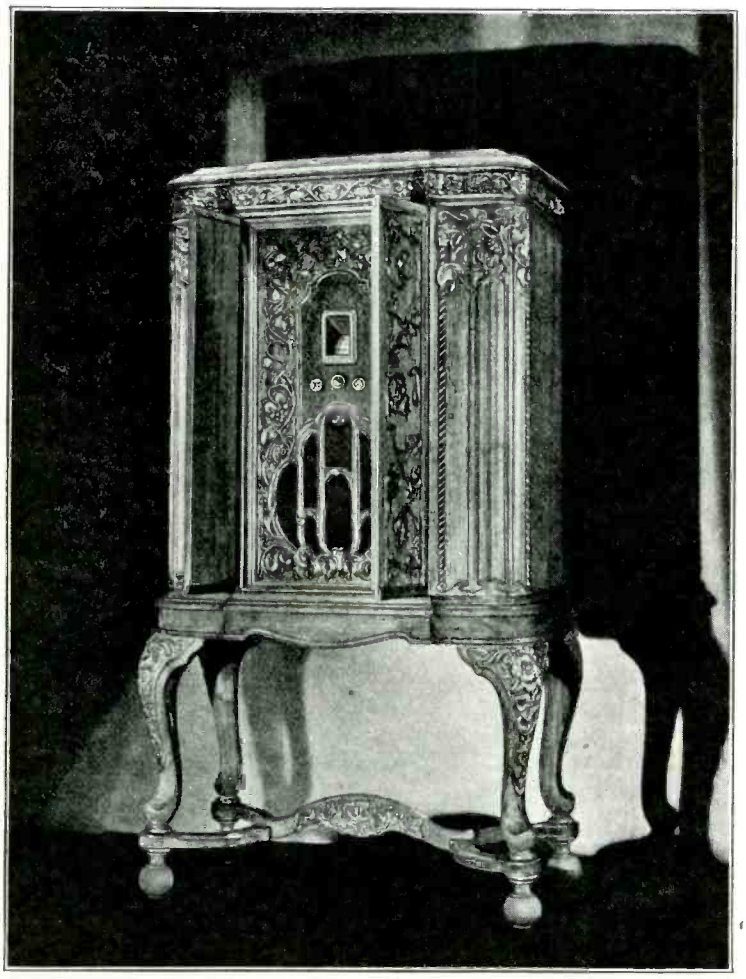
THE GREATEST RADIO VALUE AT ANY PRICE

Clarion Distributors

BIHL BROTHERS, Buffalo, N. Y.
BLACKMAN DISTRIBUTING CO. New York City, N. Y.
CAROLINA LUGGAGE CO., Greensboro, N. C.
DAKOTA ELECTRIC SUPPLY CO., Fargo, N. D.
J. E. DILWORTH COMPANY, Memphis, Tenn.
DOMESTIC ELECTRIC APPLIANCE CO. Seattle, Wash.
DUDA-MYERS CO., Hastings, Nebr.
ELECTRIC LAMP & SUPPLY CO., St. Louis, Mo.
R. F. & W. R. FITCH, Oskaloosa, Ia.
FORT SMITH RADIO CO., Fort Smith, Ark.
FRONT COMPANY, Wheeling, W. Va.
GREENVILLE TEXTILE SUPPLY, Greenville, S. C.
HERBERT HORN, Inc., Los Angeles, Calif.
INLAND RADIO CO., Spokane, Wash.
W. J. HOLLIDAY & CO., Indianapolis, Ind.
W. E. & W. H. JACKSON, San Francisco, Calif.
KELVINATOR-SYRACUSE, Inc., Syracuse, N. Y.
M. & M. CO., Cleveland, Ohio
McINTYRE & BURRALL COMPANY Green Bay, Wisconsin
McLENDON HDWE. CO., Waco, Texas
HARRY MOLL, Inc., Denver, Colo.
NATIONAL ACCESSORIES, Inc., Omaha, Nebr.
NORTHWEST RADIO SUPPLY CO., Inc. Portland, Ore.
PATTERSON PARTS CO., Cincinnati, Ohio
PHILIPS & CREW PIANO CO., Atlanta, Ga.
RAY & WALKER HDWE. CO. Chattanooga, Tenn.
REPASS AUTO & RADIO SUPPLY Waterloo, Iowa
E. M. WILSON & SON, Newark, N. J.
ROBERTS AUTO & RADIO SUPPLY Philadelphia, Pa.
ROBERTS TOLEDO CO., Toledo, Ohia
ROCKEFELLER ACCESSORY HOUSE Sunbury, Pa.
THOMAS B. SHARAR CO., Inc., Rochester, N. Y.
STANDARD SUPPLY CO., Portsmouth, Ohio
STAUFFER, ESHLEMAN & CO., New Orleans, La.
STERN & COMPANY, Hartford, Conn.
TOWNLEY METAL & HDWE. CO. Kansas City, Mo.
UNION TIRE & SUPPLY CO., Burlington, Iowa
U. S. RADIO CO. OF PA., Pittsburgh, Pa.
WAKEM & WHIPPLE, Inc., Chicago, Illinois
ISAAC WALKER HDWE. CO., Peoria, Ill.
WILLIAMS HDWE. CO., Minneapolis, Minn.

●

CLARION RADIO will be exhibited at the Ninth Annual Chicago Radio Show at the Coliseum October 20-26, 1930 Booth 3, Section G.



The highest note . . . in radio achievement

The Speaker of the Year

RADIO

by STORY & CLARK

SINCE 1857

Your best customers look to you for an understanding of their keener musical appreciation, and of their instinctive taste concerning enduring beauty in furniture.

They are the people who will recognize faultless achievement in Radio by Story & Clark—the people who know what to expect of a house that has built fine musical instruments since 1857.

Adopt
Wright-De Coster Reproducers

In manufacturing their new Radio Model 51 as shown above, Story & Clark endeavored in every way to preserve their past reputation for superb quality by incorporating in it only the finest of equipment. In view of this fact, their selection of the Wright-DeCoster Reproducer was only logical.

We take this means of answering the constant inquiries as to what radio manufacturers are incorporating Wright-DeCoster Reproducers in their receiving sets.

WRIGHT - DE COSTER, INC.

2217 University Avenue, St. Paul, Minn.

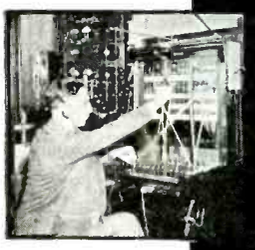
Export Dept., M. Simons & Son Co., 25 Warren St., New York ⁊ *Cable Address:* Simontrice New York

Radio Mechanic and Inspector $1800 to $4000 a Year

The only course in Radio sponsored by RCA

LET THIS SHORT-CUT HELP YOU INTO

SUCCESS *in* RADIO



Broadcast Operator $1800 to $4000 a Year

Land Station Operator $1800 to $4000 a Year

Broadcast Station Mechanic $1800 to $3600 a Year

THOUSANDS of men are making good money at Radio—and so can you!

Commercial training is all you need to give you the professional confidence and ability. You can secure this training in your spare time . . . through a marvelous home-laboratory course sponsored by the Radio Corporation of America. Our big FREE Radio book tells all about it.

Round out your knowledge with this home-laboratory training

Put the finishing touch to your Radio experience. Get the "How" as well as the "Why" of Radio with this commercial training. Only an hour or so a day—in spare time—is all you need. As part of your course, you receive absolutely free of extra charge—a magnificent outlay of fine apparatus. With this outfit you learn to build fine sets and solve the radio problems that bring good pay. You acquire not only the ability but the confidence to succeed in a real commercial way.

Training backed by Radio Corporation of America

Our graduates are in demand everywhere. They enjoy greater success because they're posted right up-to-the-minute in *everything* in Radio. Radio's progress each year is measured by the accomplishment of the great engineers at work in the research laboratories of Radio Corporation of America. This Radio organization sets the standards for the industry.

Money back if not satisfied

The lessons prepare you for success in all phases of Radio—manufacturing, servicing, selling, ship and shore broadcasting and all types of Radio equipment. A signed agreement backed by RCA assures you of complete satisfaction upon completion of the training—or your money will be promptly refunded.

Read this thrilling free book

It may mean the turning point in your life. It gives you the real "dope" about Radio and it describes in detail the famous training that has enabled us to place thousands of our students in fine positions, usually from 3 to 10 days after graduation! It tells in 40 fascinating pages and photos all about Radio's brilliant opportunities for adventure and success. Mail the coupon now—the book is absolutely free! RCA Institutes, Inc., 75 Varick Street, New York, N. Y.

RCA

RCA INSTITUTES INC.

(A Division of Radio Corporation of America)

RCA INSTITUTES, Inc., Dept. R-10
75 Varick Street, New York, N. Y.

Gentlemen: Please send me your big free 40-page book which tells about the great opportunities in radio and about your famous laboratory method of radio instruction at home.

Name .....

Address .....

.....

Occupation .....

"I'll be right out!"

"This program is coming to you through the courtesy of---" sizz-z-z bang!!!

"Market today closed with---" whee-e-e-e

"Suffering cats!!!" dot dash dot dash---zzzz

"The President of the United States------" screech---zzz whee-e-e-e

"Merciful goodness--for the love of Mike will somebody--- zzzzz---some idiot with a regenerative set!!!"

"Oh what's the use? PHONE FOR A SERVICE MAN!"

AN easy chair, soft slippers and a good pipe feel as good to him as they do to you.

Remember the old leg ache and the weariness after thirty-six holes on a hot day over a hilly course? Well—EVERY day is like that to your neighborhood radio man.

Shinning up ladders. Balancing on slate roofs. Hanging on by his teeth where only a fireman or a steeplejack would dare to climb—stringing aerials—fixing gadgets—listening to silly questions from people like you and me, who know nothing about radio—what it is—where it comes from or what it's all about. People like us, who turn it on and turn it off without once stopping to think what, in money and effort, it has cost SOMEONE to fill our homes with the music and the mirth and the wisdom of the world.

All this great benefaction, like the air and the sunshine, we take for granted—never once pausing to be THANKFUL.

* * *

Turn it on! Turn it off! Night after night this ear-feast keeps coming in to us with not one whisper of gratitude. But let one little thing go WRONG—and it's just too bad for the whole radio world, from the top down to the modest little trouble shooter with his quivering instruments of detection—a screw driver in one hand—pliers in the other.

The traffic cop of the air!

Without him—there is no radio. Only SILENCE.

* * *

Fourteen hours a day. No let up—EVER. For you and I must get our laugh tonight from Amos and Andy. We must get the fight of the century round by round—blow by blow. We must get our football—see through the "mike's" eyes the fleet-footed Elders, the elusive Booths, the crashing Nagurskis. Not a witticism nor a song shall escape us. We must keep tuned in with America. AND HE ALONE makes it possible.

* * *

Aching bones. Muscles of lead. If he hasn't been on the job at someone's home, he has been on the job at his store—ready at all times instantly to serve you.

It does seem that he is entitled to a little rest at day's end—but just let the 'phone ring and watch him leap out of his lethargy! For, no matter what happens—the lanes of the air must be kept OPEN

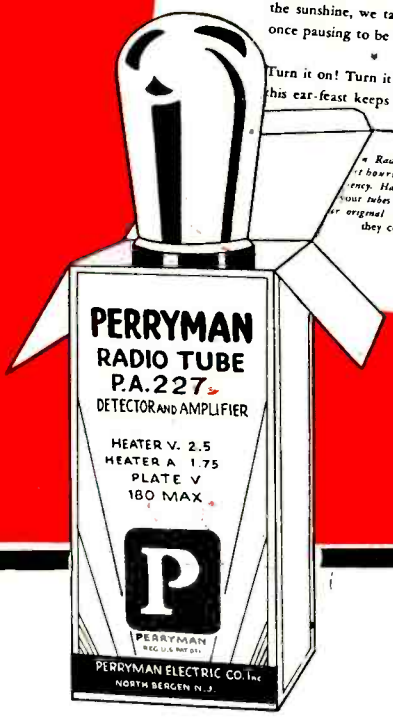
* * *

Radio! An incomprehensive MIRACLE! Yes, but what good's a miracle unless it WORKS?

And this is the man who MAKES it work Don't forget THAT

9 times out of 10
—it's the tubes

Excessive static, distorted tone, chronic fading, generally are caused by defective tubes. Your radio dealer is an expert judge of tube performance. Let him give your set the Perryman tube test . . . show you how Perryman Radio Tubes will snap up the tone and volume.



Radio Tubes will ... hours of service at ...ency. Have your local ... your tubes today. Specify ... original equipment or they cost no more.

PERRYMAN RADIO TUBES

Licensed under patents of R.C.A. and associated companies and patent claims of Perryman Electric Co., Inc.

PERRYMAN

Look it over. The full-page advertisement shown on the opposite page is just one of the many messages Perryman is sending out to millions of newspaper readers in the national advertising campaign now under way... a campaign that will bring Perryman Radio Tube dealers a big volume of profitable business this season . . . a campaign that crashes through the case-hardened shell of public indifference and establishes the dealer in his rightful place as a public servant of tremendous importance in every community . . . as well as a merchant to be trusted and supported.

This campaign is unique in the history of radio. Watch it. It is creating an amazing amount of interest. The idea of a manufacturer subordinating his own merchandise and devoting time, space and money to the cause of the retailer is radical and new. Perryman is doing it as a natural following-out of a five-year policy that has built up a close-knit, loyal and steady growing organization of well satisfied dealers.

Perryman Electric Co., Inc.
North Bergen, N. J.

Gentlemen:

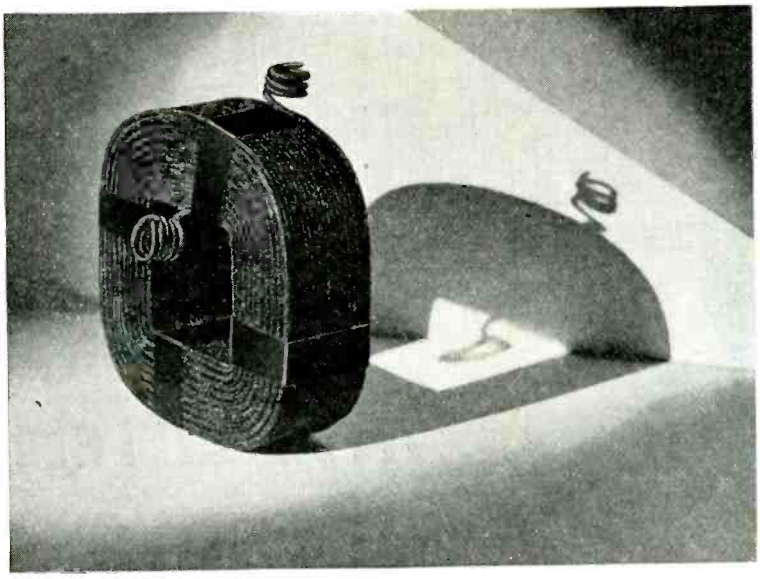
What are you going to do to help me get business this year?

_____

_____

_____

RADIO TUBES



Apply new

KNOWLEDGE

to your present coil design

Yesterday's most carefully engineered coils may be obsolete today. Constant research establishes new knowledge, new materials — even new fundamentals — which improve the efficiency of today's coils far beyond anything known heretofore.

General Cable, through its extensive research facilities, is responsible for much that is new in coils. It proceeds on the fact that every coil must be separately engineered to fit its specific job.

In the light of the new knowledge developed by this research, General Cable suggests a review, by competent General Cable engineers, of the characteristics of the coils you use in order that the general efficiency of your products may gain through coils modernly designed.

General Cable coil engineers await the opportunity to assist you, with all this experience and facilities.

GENERAL CABLE CORPORATION

EXECUTIVE OFFICES: 420 LEXINGTON AVENUE, NEW YORK · OFFICES IN PRINCIPAL CITIES

Radio's oldest
Radio's most

R. L. DUNCAN

Mr. Duncan is a member of the Institute of Radio Engineers, Veteran Wireless Operators' Association, Captain SCR, United States Army and a recognized author on the theory and practice of radio.

FOUNDED BY
MARCONI
in 1909

RCA Institutes, Inc., is the oldest radio school in existence, having been founded by the Marconi Co. in 1909. Signor Guglielmo Marconi, the noted pioneer of radio (wireless) communication is Honorary Chairman. Graduates of RCA Institutes hold responsible positions in radio throughout the world.

Radio's Most Modern
ANALYZER

List Price . . . $112.15

Dealers' Net Price.. $78.50
F. O. B. Greenwood, Miss.

RCA INSTITUTE, INC. WRITES OVER PRESIDENT DUNCAN'S SIGNATURE

"After many months careful consideration, test and comparison of the leading set testers, we have officially adopted 'Supreme Set Analyzer Model 90' as the standard testing equipment of this institution and are placing this instrument with our students as a supplement to our regular course of study.

"In making this decision we feel that we are adding to the thorough training our students receive the best mechanical equipment ever designed and that they will be prepared to meet the problems encountered in their chosen field of endeavor in a manner that will reflect credit both upon themselves and R.C.A. Institutes.

"Almost from its inception we have been using the 'SUPREME DIAGNOMETER' in connection with the 'Supreme Test Panel' in all of our resident schools and it is our acquaintance with this equipment that first gave birth to the confidence in 'SUPREME' products that culminated in the adoption of Model 90 as standard equipment for our students.

"Permit us to congratulate you upon superior design and construction of your instruments which we consider a valuable contribution to radio. With sincere wishes for your continued success, we remain,

SUPREME
Testing Instruments
SUPREME BY COMPARISON

school adopts modern ANALYZER!

SUPREME TESTING INSTRUMENTS are the recognized standard in the radio industry—"Supreme by Comparison." They are in use in practically all of the educational institutions and their outstanding merit is recognized by the leading radio engineers and technicians. Note also in Mr. Duncan's letter that choice of the SUPREME SET ANALYZER MODEL 90 was due to experience with the SUPREME DIAGNOMETER which has been used in all RCA Institute's resident schools since its introduction.

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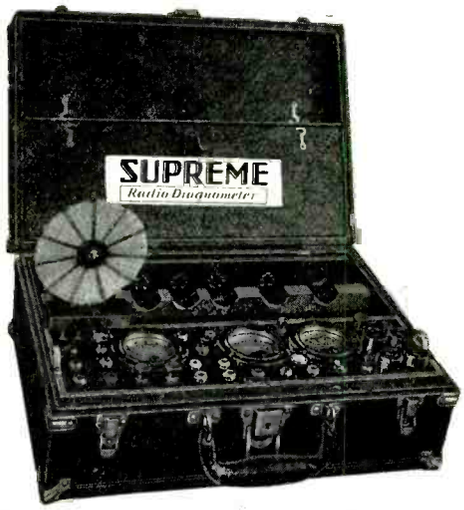
Model 400-B HISTORY MAKER IN RADIO "SUPER-SERVICE"

Like the RCA Institutes, the Supreme Diagnometer has helped make history in advancing radio service skill. And just as the Diagnometer built confidence in Supreme Products with the RCA Institutes, so it helps radio men to build enviable reputations for professional ability and the better income that inevitably follows. It is the one Testing Instrument that the true radio man feels he cannot be without if he is to be modernly equipped and function 100%.



List Price $199.29

Size 7½ x 12⅜ x 18⅞. Dealers' Net Price, f.o.b. Greenwood, Miss. **$139.50**

In an even smaller case without compartments for tools, etc.

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All leading distributors have full information on, and stock SUPREME TESTING INSTRUMENTS, including the Supreme Ohmmeter, Model 10, which is not shown here. If yours cannot serve you, use coupon to right.

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JENSEN

ANNOUNCES the appointment of Bushnell & Rayner as sales representatives for Jensen Electro-Dynamic Speakers in Northern California, Oregon and Washington, effective October 15th, 1930, with offices at 212 9th Street, Oakland, California. Telephone GLencourt 2325. A service department will be maintained by Jensen as heretofore at 212 9th Street, Oakland.

JENSEN RADIO MANUFACTURING CO.

6601 SOUTH LARAMIE AVE., CHICAGO, ILLS.

Announcing the Appointment of

BUSHNELL & RAYNER

As Exclusive Sales Agents for

SULMOCK MANUFACTURING CORP.

THE newly reorganized Sulmock Manufacturing Corporation of Oakland, California, makers of fine radio cabinets for all types and sizes of radio receivers, is now exclusively represented by Bushnell and Rayner. Cabinets can now be supplied to the radio trade in any quantity. Vast financial resources backed by powerful interests are now behind the SULMOCK product.

Sulmock Manufacturing Corporation also specializes in quality cabinets for midget receivers. Get a quotation from us before placing your next order. Sales and display rooms are now at 212 9th Street, Oakland, California. Bushnell and Rayner will be pleased to quote you on any type or size of cabinet or other radio furniture—in *any* quantity.

WRITE . . . . WIRE . . . . . OR PHONE

BUSHNELL & RAYNER

212 9th Street Oakland, California

THERE are dozens of styles and sizes of SULMOCK CABINETS at prices that you can afford to pay. The superior quality of SULMOCK workmanship and the low prices charged for SULMOCK cabinets prompts you to write immediately for further information.

LEADERSHIP MUST BE DESERVED

In the hard fought battle of commerce the title of Leadership is not won by any accident of chance.

Those who win success in this strongly disputed contest must be upheld by the knowledge that the merchandise they offer is right; that it is honestly built, and designed to outstrip all competition.

Brunswick with many years of experience in building fine musical instruments, brings to radio the tradition of genuine craftsmanship and the technical knowledge of acoustical engineering.

It naturally follows that the combination Radio-with-Panatrope bearing the Brunswick name, is a radio and record playing instrument *second to none in the industry!*

Who is more fitted to excel in the manufacture of a combination instrument than a house celebrated for many years in the world of music? The Brunswick Record Catalog reads like a roster of the great names in musical history; in its pages are famous entertainers, and artists of every nationality.

The dealer handling the Brunswick line can expect that a large proportion of his business will come from the sale of Brunswick Radio-with-Panatrope. *He is likely to be the type of dealer equipped to handle such business and Brunswick will attract it to him!*

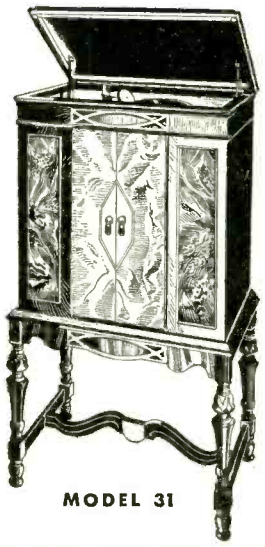
Brunswick Radio Corporation

MFRS. OF RADIO, PANATROPE AND RECORDS

Makers of the World Famous Brunswick Records

NEW YORK—CHICAGO—TORONTO

SUBSIDIARY OF **WARNER BROS. PICTURES, Inc.**



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THE RADIO-WITH-PANATROPE

This great combination offers sensational sales possibilities.

Model 31. Price, less tubes **$185**

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Ask your jobber about the Automatic Panatrope-with-Radio that handles 20 records without attention.

Model 42. Price, less tubes **$480.**

BRUNSWICK RADIO

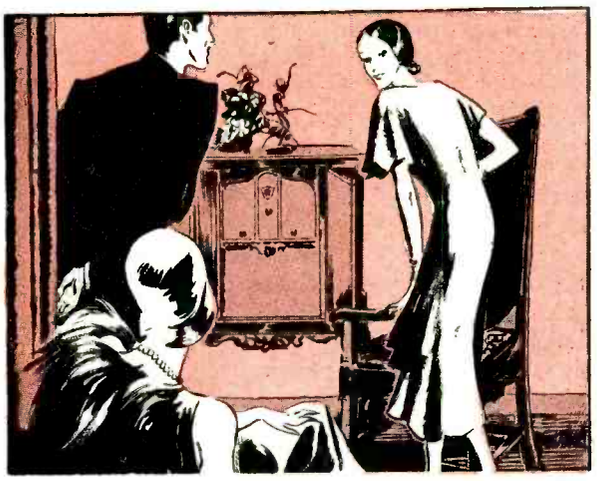
FUTURA SERIES

RADIO
The National Trade Magazine

VOLUME XII OCTOBER, 1930 No. 10

What a Radio Salesman Should Know About Furniture Designs

Some practical ideas for overcoming the sales resistance of women who are particular about the "effect" of a radio in the home.



By HECKERT L. PARKER

THE retail radio salesman ought to be almost as well posted about the cabinet he has to sell as he is about the chassis which it houses. The cabinet of a $100 radio usually costs about a third as much as the chassis, of a $200 set about half as much, and of a $300 set fully as much, or more, in some cases as high as 65 per cent of the total cost of the receiver being represented in the cabinet alone.

The most important factor in determining the "eye-value" of a cabinet is its design or style, other factors being the workmanship and the materials. If its appearance appeals to prospects it may sell four or five times as well as another design which costs just as much, but does not "click." Furthermore, good "eye-value" may be the clincher in the decision as to which of several sets will be bought.

While a salesman need not care a whoop about how design is secured, he should know why people select one design in preference to another. Usually a woman has the final decision, since she is the one who is most vitally interested in what is to be added to the furnishing of a home. If the salesman knows why "she likes it when she sees it," he can hasten her favorable decision.

Nor need he have an extensive knowledge of "period" design, since only about 10 per cent of the cabinets are designed for homes whose owners insist upon strict conformity to period. In most homes the question is that of conforming to the general style of the home or to the prevailing style of interior decoration.

Some women know how to create an agreeable harmony of color, light, line and pattern of proper proportions in their rooms and select a new piece of furniture accordingly. Others employ an interior decorator to advise them. Furthermore women are constantly being educated about the principles of proper home furnishing by means of magazine articles and advertising, by various books and by courses of instruction in which they take a surprising interest.

If any retail radio salesman will study furniture windows, attend "openings" and shows, and visit furniture stores he will not only appreciate this feminine interest in the most minute details of color and style, but he can also get some pointers for use in his own sales work.

Too much emphasis cannot be placed upon a salesman's understanding of a woman's remark, "We want a radio, but I don't know where I can put it." She did not mean that there was not room in her home for the cabinet, but she did mean that she could not picture what would be the "effect" of adding it to the room where it was to be installed. This knowledge can be acquired only by experience and study, and the salesman who possesses it has a great advantage over one who does not.

Evolution of Cabinet Styles

OF COURSE a salesman should also have a general knowledge about the historical development of styles in decorating. He should know that boxes and cabinets have been a part of home furnishing for hundreds of years. Originally they were mere boxes with a lid and were used to store treasures, papers or clothing. As cleanliness became more desirable, legs were added so that under them the floor could be swept, or stooping avoided. To conserve floor space, drawers appeared under the lidded compartment. The legs were made a little higher, a little more ornamental and the "lowboy" was used by every family who could afford one or more of them. More drawers were added, different sized compartments were made, and still higher legs were used until the

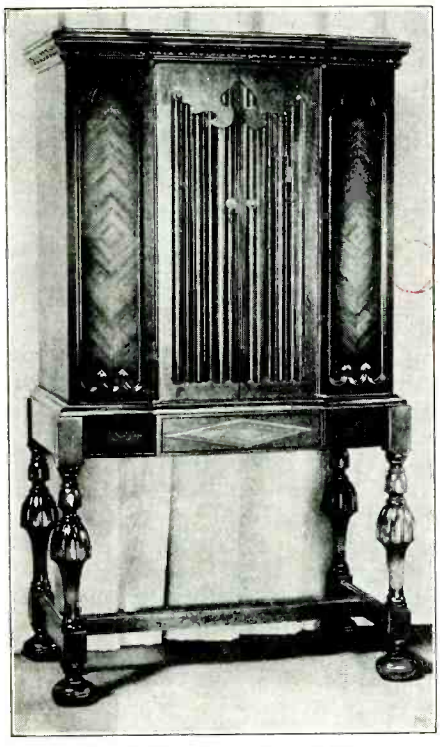
"tallboy" was evolved. (In later years this term has changed to "highboy.")

To supply a separate single cabinet for tableware or art objects, easy of access without stooping, longer legs were added to support an oblong cabinet, more or less ornamented, with curved or swelled front or sides. This became the "console" style cabinet.

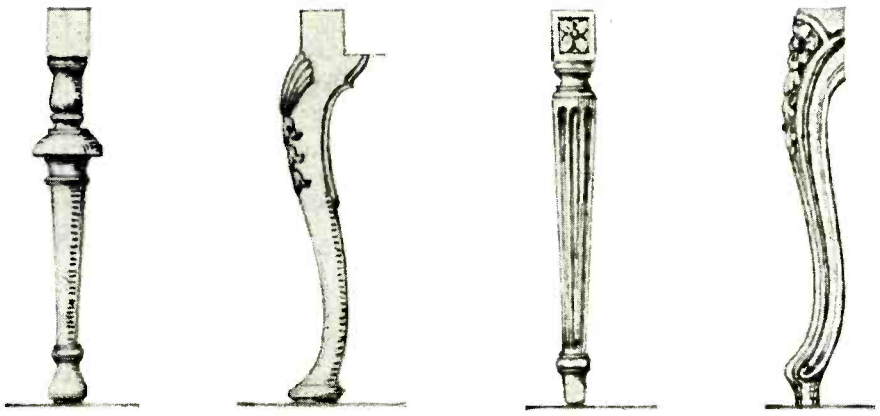
Though these originated in different ages or "periods" hundreds of years ago, we still have them in the home as furnishings to hold many things, including the mechanism of a radio receiver. Today, they are still called "lowboy," "highboy," and "console" type cabinets.

It is natural that as long as these cabinets had to be in sight, people would try to make them as beautiful as possible, using the materials available at the particular age. Not alone for beauty, but to impress others with the wealth of the owner, more and more elaborate and expensive became the decorations and shapes of these various types of cabinets.

Therein lies the nub of this question of style even today. Certain things are beautiful and produce a pleasing effect on everyone who sees. Other things are less beautiful or even ugly and jar on the nerves of everyone who sees. When modern furniture (and radio cabinets) incorporate in their shape and design details, whatever has proven over long ages to be pleasing to many people, and does not include design details of different periods which have been dropped because people did not like them, then that piece of furniture or radio cabinet sells to many people who like it whether or no they know why they like it.



Radio in Elizabethan Cabinet



Some Characteristic Designs of "Period" Legs

FURNITURE design styles from 1000 A. D. up to about the year 1700 were usually dictated by some king with a taste for the beautiful or by some duchess in court favor, pieces being executed according to their ideas. From about 1700 to the present day, furniture styles have been more or less dictated by the ideas of some outstanding artist or architect from whom the style has taken its name. Much bad decoration existed in the early days and still continues to be made for no other reason than that "it is different." But without something fundamentally sound in its design it does not live and establish something permanent in style, but is only a passing fad or fancy. Good decoration will continue to exist for ages and be copied over and over again and incorporated in good furniture, just as good classical music and good books will always be played and read over and over for years to come. All old furniture is not beautiful, some of it is quaint, some of it clumsy and useless and out of place in any room today.

When a radio cabinet incorporates those features of shape and design that have pleased people throughout the ages, and does not include those things which people have not liked, then that cabinet can be readily sold. People will like it whether or not they know why they like it.

The milestones that have marked these changes of styles are the historical periods giving names to the styles of decorations which have persisted. They are: Gothic, year 1100 to 1700; Italian Renaissance 1400 to 1643; Spanish 1700 to 1900; Dutch and Flemish 1300 to 1700; French Renaissance 1500 to 1643; Louis XIV 1643 to 1715; Louis XV 1715 to 1774; Louis XVI 1774 to 1793; Directoire and Consultant 1795 to 1804; Empire 1804 to 1815; French Provincial 1200 to 1800; Tudor 1554 to 1558; Elizabeth 1558 to 1603; Jacobean 1603 to 1689; William and Mary 1689 to 1702; Queen Anne and Early Georgian 1702 to 1749; Chippendale 1749 to 1792; Adam (brothers) 1758 to 1792; Hepplewhite 1750 to 1800; Sheraton 1790 to 1810; American Colonial 1630 to 1790; American Federal 1790 to 1825; American Victorian 1800 to 1900; American Mission 1890 to 1915; Art Nouveau 1915; Modernistic 1920.

There is no sharp dividing line between each of these periods. They overlap, some of the features of one merging into another as years pass. The good out of each has lived and continues to be the basis for good design details to this day.

It is not a difficult task to learn some of the more distinguishing features of each of the periods from which good present day designs are made. When the radio salesman is not sure of his ability to describe and talk about a cabinet, he should take a picture of it to some good interior decorator or furniture man and have him explain its distinguishing factors. For the salesman who desires to improve his knowledge of this important part of his job, reference to such books as "The Period Furniture Handboook" by Mr. and Mrs. G. Glen Gould; "The History of Decorative Furniture," by Edwin Foley, or "Style in Furniture" by R. Davis Benn will be interesting and instructive. What the radio salesman can get out of this is a superficial knowledge for conversation at least. Some of the high spots will remain with him.

It requires no expert to discover that the Renaissant periods in Italy and France and the Elizabethan age in England produced furniture more for castles and palaces, than for apartments and bungalows. These individual massive pieces appear at their best advantage only as a part of a massive room. The elaborately overstuffed and carved, gold-finished pieces of the first two Louis would be completely thrown out of balance with many of the ordinary walnut radio cabinets available.

On the other hand, William and

"PERIOD" CLASSIFICATION OF SOME OF THE NEW SETS

Amrad 84-C—Spanish Renaissance.
Atwater Kent 76—Tudor.
Audiola 70—Spanish Gothic.
Baldwin 90—Hepplewhite Highboy.
Brunswick 15—Composite of late Eighteenth Century.
Clarion 53—Spanish Renaissance with Early English influence.
Columbia C-20—Early English (about 1620).
Crosley Mate—English Gothic.
Edison R-7—Elizabethan, linenfold panel.
General Electric Highboy—Adam.
Lyric 19—English Gothic.
Majestic 132—Sheraton.
Philco 296—Romanesque.
Radiola 80—Jacobean Highboy with Spanish influence.
Radiola 82—Tudor Highboy.
Stromberg-Carlson 11—Modernistic Highboy with Eighteenth Century legs.
Westinghouse WR5—Elizabethan Lowboy.
Zenith 72—English Renaissance.

Mary leg turning, and the carved legs of the Queen Anne and Georgian periods are frequently adaptable and right as parts of cabinets for small rooms. Incidentally, the legs on cabinets, tables and chairs offer one of the best means for classifying furniture as to its period. Adam, because slender and practical, is another design quite popular for cabinets and tables for small rooms. As these last three periods named lend themselves to modern machine production methods, some adaptation of them is frequently seen in popular priced radio cabinets.

Spanish cabinets are mostly boxes on long legs with very distinctive ornaments of wrought iron and often with stamped leather panels, and nearly always with doors. Generally, Spanish type cabinets are so decided in character that they do not mix well with furniture of any other period.

Sheraton is always inlaid with some rare wood though easily distinguished from the elaborate inlays of many different rare woods common in Louis XV styles.

Ornamentation

ORNAMENTATION details sometimes help to identify the period of a cabinet. Real hand carving, the most expensive, can be distinguished by little irregularities in the repetition of the same pattern, while, machine made patterns are all exactly alike. Original hand carved patterns seldom can be reproduced faithfully by moulding or machine processes because the overhang of some parts does not permit their being drawn out of a mould or through dies on a strip moulding machine. The skill with which these necessary changes are executed in the casting or dies determines the artistic value of the modern machine made ornamentation.

For some of the less intricate and smoother designs, with shallow depressions, steel dies are used and beading run through in strips twenty or more feet long. These are cut and placed on a cabinet according to the fancy of the factory designer. If the die work is poor, or the "designer" uses a style of stock-made detail on a cabinet that is not consistent with the style of the cabinet itself, a bad impression may be made on the prospect, regardless of whether the latter can point out what is wrong.

"Ensemble" selling is the latest note in smart specialty shops and department stores who understand what women want in clothing and in house furnishings. A sympathetic salesman helps in matching all the details of new purchases so that they harmonize with the ensemble that the woman has in mind. The radio salesman who adapts himself to this new thought by helping a woman select a radio cabinet that is in accordance with her plans for her home is the man who will close many an otherwise difficult sale that has baffled his less understanding competitors.

Modern woodworking machines can, in some hands, produce rather intricate patterns of "routing," that is, slots cut into a flat surface, and these, combined with moulded wood or composition material ornaments properly chosen, can form really beautiful ornamentation, especially when full advantage is taken of the skill of good wood finishers.

Baroque and Rococo (pronounced ro kok'o) are terms frequently occurring in the conversations of artists and interior decorators. These terms are interchangeable and characterize the elaborate, often grotesque and fantastic use of scrolls, shellwork, broken lines and irregular curves used on much furniture popular in the seventeenth and eighteenth centuries. Rococo styles were carried along simultaneously in those periods with the more sedate and dignified styles equally characteristic of the same years. These liberties with the accepted designs which first characterized those particular periods were not confined to ornaments and openings alone but were also manifested in the queerly shaped legs and main parts of furniture pieces. Whole interiors are sometimes done in the baroque or rococo styles and are quite beautiful as a whole and somewhat adaptable to small rooms, but individual pieces, though beautiful cabinets in themselves, would not be acceptable because not harmonious with popular styles of interior decoration today.

Value of Artistic Details

THE loudspeaker opening of a radio cabinet has much to do with its general appearance. Properly handled, it can add to the beauty of the cabinet and be consistent with the style of other parts of the cabinet. Openings either for ventilation or for ornamentation are found in some of the most perfect specimens of period furniture.

In some of these old period cabinets, the openings are filled in with cloth, covered with a latticed or hand-sawed or hand-carved grill. This is a practical method of treating a speaker opening in a radio cabinet if the size, and shape of the opening, the pattern of beading around the edge, or the grill work is consistent with the other parts of the cabinet. A round opening is least expensive with modern machinery and often used in cabinets in which some other shape would be more harmonious. The dies for casting round metal or wood grills are cheaper if made round.

Tapestry in speaker openings may be a jarring note to many women who do not want any tapestry in some rooms, or want it to harmonize with tapestries that are already part of the decorations. While variegated colors and sometimes hand painted silk is characteristic for a particular style of cabinet, the color chosen by the factory may clash when set in some homes. The writer knows of instances where, by changing the color or material back of a speaker grill so as to have it harmonize with the colors of a certain room, sales have been made that otherwise would be balked

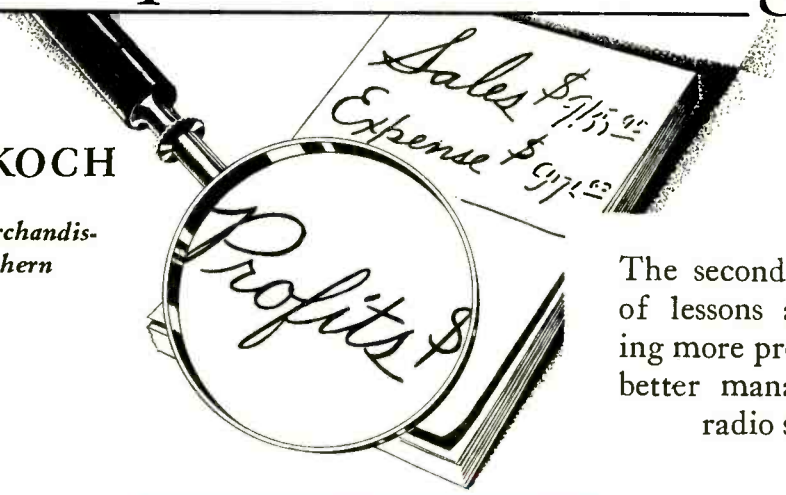
(Continued on Page 56)

Radio in Adam Cabinet

PROFIT PROMOTION *through* Proper Store Management

By WILLIAM E. KOCH

Associate Professor of Merchandising, University of Southern California



The second of a series of lessons about making more profit through better management of radio stores.

THE assumption that every radio dealer can build a better profit-making program is safe because none of us ever reach the point of permanent perfection. We humans may arrive at apparent perfection every now and then. Sooner or later, however, the progressive mind is sure to see where further improvement is possible.

"Is there ever a time when a business should not advertise?" The question was asked of B. C. Forbes. The reply was typically Forbesian—"Yes, when it is ready to die."

Mr. Forbes probably would have made the same reply if the question had been: "Is there ever a time when a business man should not strive for improvement?"

A Helpful Mental Influence

OUR most effective striving for improvement necessarily begins with a clear recognition of where betterment is possible. That is why it is wise occasionally to set ourselves deliberately to the job of locating and understanding our weak spots—provided, however, that we interpret them as points for possible improvement.

Some seem really to believe that looking for our weak spots is a dangerous sort of practice. They think it tends to develop a great progress-smothering mental attitude—the attitude that's commonly styled an "inferiority complex." Well, for those who do not recognize their weak spots as stepping stones to betterment, it may be so.

I am one of those who believe that the demon of discouragement, with all of its frills and in any of its many varieties, is more powerful in retarding the progress of many a potentially capable business man than all of the competition and all of the trade barriers that ever have or ever will come along.

EVERY RADIO DEALER CAN BUILD A BETTER PROFIT-MAKING PROGRAM

Building a profit-making program brings cumulative benefits. The radio store operates like a manufacturing institution, turning out the "finished product" of profit. All activities of the store aim at profit through sales. Buying is but a part of selling. Both current control and period control are necessary. An outline for your profit-making program is worth building and studying.

And that is exactly why I believe in looking for our weak spots with a view to making improvements. If we are not doing enough of nor the right kind of planning for profit, let us recognize the fact and make amends. Let us find the weak spot and strengthen it.

No radio dealer needs to be "sold" on the practical, profit-producing value of deliberate planning for profit. There is no need to review the generally understood benefits. But in view of the profit-killing and happiness-destroying influence of discouragement in any form, it is well to remind ourselves with every possible emphasis that:

The mental influence of a carefully thought-out program for the production of maximum profit is altogether too great to be in any way neglected. It helps enormously by keeping our minds on the constructive procedures over which we have control; and away from the destructive situations over which we have no control.

Constructive Planning Brings Cumulative Benefits

WHILE we are on the mind-influencing benefits of deliberate planning for profit, let us devote just a moment of our thinking to this great fundamental fact: Much of our planning always must be done subconsciously—that is, without our realizing that we are planning. We need to keep this fundamental truth in mind because it has an important bearing on *what* we do and *how* we do it.

That is one of the places where the cumulative benefits of deliberate planning come in. It amounts simply to this:

The better our conscious planning in the past, the better our subconscious planning at present; and the better our conscious planning at present, the better our subconscious planning in the future.

Another important phase of cumulative benefits resulting from thoughtful planning is clearly related to whatever element of truth there may be in the old saying that "practice makes perfect." When that saying is applied to a never-quite-perfect operation like planning for profit, it needs to be changed a bit. It might then read: *Thoughtful practice leads onward toward perfection.*

That is why it pays so big to devote some of our mental energy to a thorough study of the planning process, and make sure that our own planning for profit is as fundamentally sound as it should be.

Indeed, our preparation for planning is quite as important as the planning itself. It is decidedly possible, you know, to be far too impatient in the matter of suitable preparation for doing the thing to be done. It always pays to make sure that the groundwork is right.

Profit Is the "Finished Product" of Business

I LIKE to think of any retail store as being in effect a manufacturing institution, organized and operated to turn out a "finished product"—PROFIT.

This analogy emphasizes the tremendously important fact that profit does

not "just happen," but is *turned out* of the merchandising plant by a clearly definable *process*.

The basic essentials of the profit-producing process—planning, acting, controlling—were brought out in our preceding discussion. We are now ready to picture the process a bit more completely, always remembering that the "finished product" is PROFIT.

We proceed, then, with the first basic essential—*planning*.

Bear in mind that our conscious or deliberate planning can be devoted to only the most important phases of our merchandising operations. Our first consideration must therefore be turned to those elements which require our most fundamental attention in planning for profit.

Every radio dealer knows that his profit-producing process involves the making of sales; carrying a stock of merchandise; realizing a margin; meeting the cost of doing business. So we quickly recognize the four fundamental elements —sales, stocks, margins, expenses—which call for our first consideration in planning for profit.

These basic elements, as expressed in terms of planning, are known as sales quotas, stock limits, mark-ups and expense budgets. The four terms give us, therefore, the necessary divisions for the planning section in a topical outline of a "foundation" for the profit-making plan. Suitable subdivisions may be somewhat as indicated by the illustrative outline which appears herewith.

The careful construction and careful study of a fundamental outline, similar to the one illustrated in our insert, is well worth while for any radio dealer. It serves as the foundation of a complete profit-making program which always must be fashioned to meet the specific needs of the individual store.

Buying and Selling

Now, taking up the action portion of our fundamental outline, we readily see that this must embody the essential elements in the activities of our business. These are, of course, *buying* and *selling*.

Many other activities are necessary in the operation of a radio store, certainly. But all of these are related in one way or another to the primary activities—*buying* and *selling*. So far as our fundamental outline is concerned, nothing more needs to be added.

We might even go so far as to say that it is all a matter of just *selling*, since buying really is but an essential which makes selling possible. For the sake of helpful analysis, however, the separation is well justified. This is true because buying and selling, though they work together team-like in the production of our "finished product," stand as distinctly different operations.

So we turn our analytic thinking briefly to the basic activity of buying. The analysis quickly reveals that the buyer is confronted with just five fundamental questions, each of which he must answer: (1) What to buy? (2) When to buy it? (3) Where to buy it? (4) How much of it to buy? (5) At what price to buy?

Incidentally, these questions are worthy of some consideration to determine the order of their importance in right buying. Why not take a few moments to rate them according to your own view of their relative influence on ultimate profit?

An analysis of the selling activity shows at once that only three fundamental phases are involved. After the merchandise is bought, the profit-producing procedure simply resolves itself into:

(1) Displaying the goods to interest possible customers who pass by or come into the store.

(2) Advertising the goods and the store's service to bring more possible customers within the influence of the display.

(3) Personal contacts to make customers out of possible customers.

The Controlling Section

We come now to the last, the controlling section of our topical outline of a foundation for the profit-making program. You will remember that the mission of this basic essential (controlling) is to help us make sure that we accomplish as we planned to accomplish.

Just as planning may be said to be most important only because it comes *first*, so may controlling be said to be most important only because it comes *last*. Planning is essential because it determines how we *begin* a job, and how we *do* it. Controlling is essential because it determines how we *finish* the job.

One merchant, after getting a better hold on what controlling to assure profit really means, put it this way:

"I know now that I have been doing a lot of shooting in the dark. I bombarded the profit target vigorously enough, but without either seeing the target clearly or knowing just where my shots were hitting. Only since I learned to apply the principle of control more effectively have I felt the pleasing satisfaction which comes from realizing that your business is under steady control."

Yes, this matter of positive control is well worth thinking about, and studying. Like planning, it must be accomplished both consciously and subconsciously—through deliberate effort and through the force of habit.

Only the most fundamental of the elements employed to obtain positive business control are mentioned in our topical outline. They include, of course, the requirement for the final test which summarizes our score on our business target.

Current Control and Period Control

In selecting these fundamental elements, we find that our controlling must be carried on both currently and periodically. We have, therefore, what may well be called *current* control and *period* control. Current control calls for more or less constant attention, while period control requires deliberate attention only at the close of carefully determined time periods.

Current control concerns itself primarily with three essential elements—capital, merchandise, personnel. Period control concerns itself primarily with the four great fundamental divisions of every business—assets, liabilities, incomes, expenses. These elements are included, therefore, as the necessary subdivisions for the controlling section in our topical outline of the *foundation*.

The outline which accompanies this discussion will serve both as a summary and as an illustration. Remember that it represents only the foundation, not the complete profit-making program which always requires detailed application to fit the needs of the individual store.

A thoughtful study of our illustrative outline will prove decidedly helpful in building a better profit-making program for any radio dealer, and also will serve in making suitable preparation for getting the most out of the discussions to follow.

TOPICAL OUTLINE OF A "FOUNDATION" FOR THE PROFIT-MAKING PLAN

The Process of Profit Producing

I. Planning for profit:
  1. Sales quotas:
    a. For the entire store
    b. For time periods
    c. For merchandise divisions*
    d. For sales people
  2. Stock limits:
    a. For the entire store
    b. For merchandise divisions
  3. Mark-ups:
    a. For the entire store
    b. For merchandise divisions
  4. Expense budgets:
    a. Visible and invisible expense
    b. Expense by time periods

II. Action to produce profit:
  1. Buying:
    a. What to buy
    b. When to buy it
    c. Where to buy it
    d. How much of it to buy
    e. At what price to buy
  2. Selling:
    a. Displaying
    b. Advertising
    c. Personal contacts

III. Controlling to assure profit:
  1. Current control:
    a. Capital
    b. Merchandise
    c. Personnel
  2. Period control:
    a. Assets
    b. Liabilities
    c. Incomes
    d. Expenses

* Departments, lines, items.

What the *National Survey* Showed About *Radio Credits*

Wide differences in results secured; the relation of credit bureaus to radio credit losses; the soundness of the instalment principle; other vital facts.

By JOHN T. BARTLETT

THE editor has asked me to analyze for RADIO readers the results of the National Retail Credit Survey. This has proved, in many respects, the most ambitious project ever carried out by the United States Government for retail trade. Thousands of retailers communicated their credit experience.

There were ninety-two exclusive radio stores, with total net sales of $9,894,860, which participated. A complete section of the report, now available, was devoted to these. However, all of significance to radio dealers in the survey is not found here, because music, furniture, hardware, electrical appliance, and even other trades sell radios. These other trades will be considered in this analysis.

Low Average, but Wide Extremes, in Credit Losses

THE experience of the exclusive radio stores reflected a principle, not before well recognized, which can no longer be ignored. This is the controllable nature of credit losses. *If a radio dealer has a high credit loss, he need have it only by choice.* A study of the radio store figures shows that the loss range was as wide as .1 per cent to 17 per cent of instalment sales. Open credit losses, among sixty-five stores, showed twelve with losses of .2 per cent or less, while twenty-eight in all had losses less than 1 per cent. Thirty-three stores doing an installment business had losses on installment sales of less than .2 per cent.

On the other hand, there were twelve stores whose open account losses were in excess of 5 per cent. There were nine stores with losses of 2 to 2.9 per cent. Ten stores among sixty-seven had installment losses of 4 per cent or over.

Let's glance at the figures of some of the principal trades selling radios to see how these figures check with theirs. Among music stores, thirty-eight out of 106 reporting stores had losses below .2 per cent while sixty had losses below 1 per cent. Twenty-three stores had losses of five per cent or over. The open account tabulation, seventy stores contributing, shows fifteen with losses below .2 per cent, and seventeen with losses of 5 per cent and over. Twenty-eight stores had losses below 1 per cent.

Among electrical appliance stores, fifty-six out of 256 had losses of .2 per cent or less, while thirty-one had losses of 5 per cent and over, on open account sales. Well over half of the electrical appliance stores had open account losses below 1 per cent. The intalment showing for this group was amazing—100 had losses of less than .2 per cent. One hundred forty-seven had losses below 1 per cent. Eleven had losses of 5 per cent and over.

The open account losses of 142 furniture stores, among a group of 360, were less than .2 per cent; 252 stores had open account losses less than 1 per cent. The instalment analysis showed 112 stores, among 497, with less than .2 per cent loss; fifty-five had 5 per cent and over; 258 had losses of less than 1 per cent.

Among 533 hardware stores, eighty-nine had credit losses of .2 per cent or less on open accounts; thirty-two had open account losses above 5 per cent; 290, well over half, had credit losses of less than 1 per cent. The instalment showing of the hardware stores was equally good. Eighty-two of these had less than .2 per cent loss; eleven had over 5 per cent loss; 106 had less than 1 per cent loss. This was among 149 stores.

When among large groups of stores, a majority have low credit losses, both open account and instalment, a fact becomes clear which every radio dealer must accept as a principle. It is this—*Credit loss is controllable.* The expectation should be in every radio store that it shall be low, unless there is deliberate willingness to accept another condition.

How the High Losses Were Caused

HIGH credit losses are of two kinds. One is the product of inefficiency in credit extension. Most of this is among the small stores. Credit losses tend to decrease with size of business. There were eight radio stores doing less than $25,000 volume with credit losses of 2 per cent or over, but there were only three radio stores between $25,000 and $49,999 in this high-loss group, although there were more stores with the latter sales volume than the former.

More of the high credit losses are voluntary. No matter how steadfast a supporter of conservative credit methods a man may be, he had to admit that it is sometimes good business to voluntarily assume higher risks and incur a higher loss. The margin of profit may be such that additional business, though it involves considerable credit loss, will substantially add to net profits. Again, a merchant with an over-stock of sets, with new models soon to be announced, may with good judgment make deliberate use of credit as a sales device.

Occasionally, a radio dealer is forced by the terms policies of competitors to raise the credit risk he takes. Here, again, he feels that greater risks, and increased bad debt loss, will represent a much smaller loss than the sales lost by pursuing a strict policy.

All this sums up to the statement that, of the larger credit losses found in the National Retail Credit Survey, a considerable portion was voluntary, as credit was deliberately used in sales promotion.

No radio dealer has a right to have more than a very low credit loss unless, after careful weighing of factors, increased risk is well taken to make greater profit. This author believes that little encouragement to use credit in this way should be given to radio dealers, for the reason that it is far better to find other ways, more skilful salesmanship in particular, to get added volume.

The Facts About Terms

IN THE radio trade, the commonest method of increasing sales by assuming added risk is lowering of instalment terms. Studies in the automotive field first determined the revolutionary relation of down payment to credit result. Where groups are involved, the dealers using a very low down payment inevitably have higher bad debt ratios than dealers with a substantial down payment. The statistics of the National Retail Credit Survey established these facts thoroughly for the radio trade.

There were four stores, for example, whose terms were 10 per cent or less down payment. Based on instalment sales, the bad debt loss of one store was 4.7 per cent, and the average loss of three other stores was 6.6 per cent.

A group of stores whose credit terms were 10 per cent or less to 25 per cent fared very much better. The presumption here is that only an occasional high-grade customer got the minimum terms. The losses on instalment sales of one of these stores was .7 per cent, and of two others, averaged .4 per cent. The set of terms found most frequently was a down payment of 25 per cent and a credit period of seven to twelve months. Seventeen of these stores had an average credit loss of .3 per cent. Their credit loss based on total sales was .1 per cent.

No matter what terms are granted on radio sets, the element of the individual credit customer enters. Expert management consists in adaptation of terms to customer. In theory and practice, a radio may be sold far more safely to one individual on the basis of 5 per cent down than to another individual on the basis of 50 per cent down.

Some of the figures of the Survey illustrated the fact in an illuminating way.

There was one store whose down payment was uniformly more than 33½ per cent, and whose contracts ran six or less months to twelve months. Its bad debts were 17 per cent of its instalment sales. On the other hand, there was a store whose down payments were 10 per cent or less to 25 per cent, and whose contracts ran seven to twelve months, whose losses were only 4 per cent of instalment sales.

These figures do not contradict the principle, which is that the higher the down payment, other things being equal, the lower the credit loss.

Sources of Credit Information

THE National Survey took cognizance in all trades of the subject of credit investigations. Information is the basis of skilful credit granting. The significance of the modern credit bureau is clearly shown by the fact that, of eighty-four radio stores reporting on the point, sixty-four used the credit bureau. Eleven stores relied wholly upon it; fifty-three supplemented with their own investigations; twenty stores made no use of credit bureaus.

Among the electrical stores, 224 out of 303 used the credit bureau, of which fifty-seven depended wholly upon it for information and 167 supplemented credit bureau data with investigations of their own. Of the hardware stores, 381 out of 521 used credit bureaus, of which ninety-five relied wholly upon it for information. Among the furniture stores, 465 stores out of 629 used the credit bureau.

The average loss on open credit sales of stores relying wholly on the credit bureau was, among the exclusive radio stores, 1.9 per cent. The stores which supplemented credit bureau reports with their own investigation had an average loss of 1.3 per cent. Stores not using the credit bureaus lost 4 per cent.

On instalment credit, the first group lost 2.3 per cent; the second 1 per cent; and the third .8 per cent.

Among the electrical appliance stores, the average loss on open credit of those stores relying wholly on the credit bureau was .7 per cent; of those supplementing the credit bureau, 1.8 per cent; and of those not using the credit bureau, .9 per cent. The average loss on instalment credit sales of the first group was .9 per cent, of the second 1.7 per cent, and of the third 1.4 per cent.

In other words, the analysis for the electrical appliance stores is almost the exact reverse of that for the radio stores!

Successful credit granting without the bureau is possible, but the enormous majority of good stores using the bureau prove its worth. It is probable that nine out of ten of the stores not using the bureau could reduce their losses while expanding their credit volume if they would take membership.

Credit Policies

THE Survey found credit on the increase among exclusive radio stores and also among these stores commonly dealing in radio—furniture, department, electrical appliance, musical instrument. Credit appeared on the slight decrease in hardware stores.

Among the ninety-two radio stores reporting, seven sold for cash only, eighteen sold for cash and open credit only twenty sold for cash and instalment credit only, and forty-seven sold for cash, open credit, and instalment credit.

A Much Wanted Improvement
(As Overheard in a Radio Store)

(Elderly lady, approaching proprietor): I was sent in by a friend; she bought a radio here and it gave out too much advertising and you changed it for one that didn't give out so much. I want a radio that doesn't give out too much advertising.

(Proprietor, turning on radio and tuning to music): Here is a radio I think you will like.

(Elderly lady, listening attentively): I like that one; it doesn't give out too much advertising, does it? It isn't giving out *any* now.

(Proprietor): With this radio you can have as much or as little advertising as you like.

(Elderly lady): Yes, I like that radio. I'll bring my daughter in this afternoon. I don't like those radios that give out nothing but advertising!

(Above actually happened!)

It is safe to say that for most radio dealers, whether operating exclusive stores, or handling radio in connection with other lines, a policy of cash, open credit, and instalment credit, is the best. Successful credit occurs as there is co-ordination of various factors. The store which can only sell for cash loses a great many sales to buyers who want credit and are entirely qualified for it. The store which sells only for cash and open credit loses, if it is careful in credit matters, many sales which could safely be handled on instalment basis.

Among the radio stores, open credit losses as a ratio of credit sales were 1.4 per cent, as a ratio of total sales .5 per cent, one between 20 per cent and 24.9 per cent, and one of 25 per cent or over. of credit sales.

The Problem of Returns and Allowances

WHILE one of the general findings of the National Survey was the astonishing proportion of returns and allowances in many trades, the facts shown for the radio trade were not especially disturbing.

On open credit sales, twenty-two stores gave their figures. Of these eight stores had returns and allowances less than 5 per cent; six had figures between 5 per cent and 9.9 per cent; four between 10 per cent and 14.9 per cent. There were two with returns and allowances above 15 per cent, below 20 per cent, one between 20 per cent and 24.9 per cent, and one of 25 per cent or over.

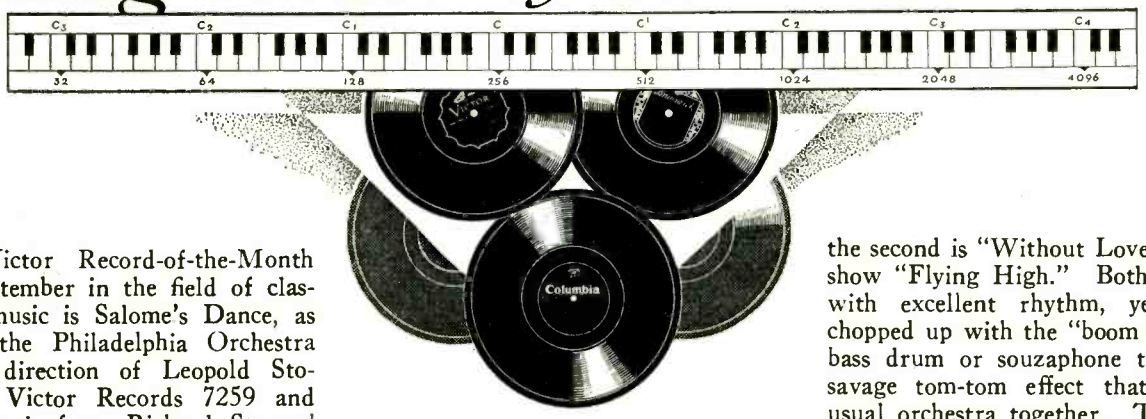
Among sixteen stores giving figures for instalment credit sales, ten had returns and allowances less than 5 per cent; five had returns and allowances between 5 per cent and 9.9 per cent, and one had returns and allowances between 10 per cent and 14.9 per cent. These did not include repossessions, not stated.

The percentage of returns and allowances were 3.6 per cent of gross cash sales, 10.3 per cent of gross open credit sales, and 6.9 per cent of gross instalment credit sales.

Considering the commodity which the radio dealer sells, this author is disposed to feel that the returns and allowances, especially on instalment sales, is quite reasonable. The fact seems to be established that well managed radio stores can expect to have a figure below 5 per cent for the item of returns.

It is to be hoped that in another two years another survey can be taken in the radio trade, under government, university bureau, or trade association auspices. Radio has been developing so fast, changes have come so rapidly, that a second survey would be of special worth. When this is taken, it should collect data from the dealers who combine radio with other lines as well as from the exclusive stores.

Selling Radio *by Recorded Music*



THE Victor Record-of-the-Month of September in the field of classical music is Salome's Dance, as played by the Philadelphia Orchestra under the direction of Leopold Stokowski on Victor Records 7259 and 7260. This is from Richard Strauss' opera "Salome," based upon Oscar Wilde's play of the same name, an opera which was the cause of much dissension among musicians and critics when it was first produced twenty-five years ago, but which has become recently popular through the introduction on symphony concert programs of an orchestral adaptation of the Dance of the Seven Veils, or Salome's Dance. The music is marvelously descriptive, weird dissonances and beautiful melodies combining to portray the gruesome plot of the dancer.

The second side has less of the dance in it, while the third and last part of the selection returns to the dreamy, slurred music with its Oriental twang, ending, however, in a very dramatic finale. Throughout the complete performance the violins and harps are prominent, fine reproduction of which requires a receiver capable of fine high frequency performance. No tone control is wanted in the playing of these records.

Salome, by the way, pronounces her name Sal Ohmay" with the accent on the "may," in reference to her operatic career. The original Roman had the accent on the second syllable, as did the English play by Oscar Wilde. But although it was a German who wrote the opera, and it is sung in German, the French influence has somewhere, somehow ripped the accent out of its logical place and put it on the tail end.

On the fourth side of this set of records is "Japanese Nocturne," by Henry Eichheim. This is also played by the Philadelphia Orchestra under the baton of Stokowski. It is an interesting piece of music, Oriental in character, favoring the harps in the main, and featuring an odd trap arrangement which fades out completely at the end.

THE "Serenade" from "The Student Prince" by Friml is sung as a splendid male quartet number, Victor No. 1478, with Richard Crookes taking the leading part. On the other side if this record Crookes sings that very beautiful and popular melody by Friml, "L'Amour, Toujours, L'Amour," as a tenor solo. It is sung in English in spite of its French name.

ANOTHER of the Brunswick European series that is well worth listening to, and that would make a very fine demonstration record, is the Brunswick 90050, containing two piano solos on each side. Alexander Brailowsky is the artist, playing, first, the "Ritual Fire Dance" and the "Dance of the Fire Worshipers," by Manuel de Folla, and on the other side, Prelude, Opus 11, No. 10, and Etude in D-flat Major. The recording is marvelous—astonishingly natural. The European methods of recording seem to be perceptibly superior to those in America. This record should sell many a good radio combination, not only to piano lovers, but to all who recognize good reproduction.

LONDONDERRY Air is a lovely old Irish tune from the County Derry. The name of the composer was lost long before the melody arrived at the Hall of Fame. The arrangement by Percy Grainger, played by the Philadelphia Chamber String Simfonietta, Victor No. 4186-A, is as beautiful and appealing as the arrangements for organ and symphony orchestra. Both frequency extremes are there, the double basses providing a fine deep background for the lovely melody. The Simfonietta is composed of eighteen artists, with their violins, violas, 'cellos and double basses, or bass viols—in short, nothing but stringed instruments.

On the other side of this record is a unique composition entitled "Gossips." It is played entirely with plucked strings, giving excatly the effect suggested by the title.

THE Popular Record-of-the-Month of September, as chosen from those produced in the Victor studios, is that containing a couple of foxtrots by Waring's Pennsylvanians, Victor No. 22486. The first number is entitled "So Beats My Heart for You," and the second is "Without Love," from the show "Flying High." Both are played with excellent rhythm, yet are not chopped up with the "boom boom" of a bass drum or souzaphone to give that savage tom-tom effect that keeps the usual orchestra together. The smoothness of the Pennsylvanians' music lifts dance music almost to the level of the lighter concert class, clearing its skirts entirely from any connection with jazz or excessive syncopation. It is probably this smoothness of style that elevated this record to the honor given it.

The trumpet solo in the first part of "So Beats My Heart for You" is brilliant as only a trumpet can be. Later on in the record the trumpet again takes the lead, but this time it is muted, making an entirely different instrument of it, devoid of harmonics and therefore completely lacking in brilliance. The tenor solo that nowadays finds its way into so many otherwise good musical numbers might just as well have been left to the small-town vaudeville stage, for the poor fellow doesn't seem to have much in back of a vibrating larynx. The words in "Without Love," however, are clever enough to cause the listener to overlook a lack in true vocal powers. The arrangement of both pieces is typically Waring, and well worth having in reach.

ANOTHER very descriptive number, tremendous in its effects, is the Columbia Record No. 67793-D, upon the first three sides of which are recorded Moussorgsky's "A Night on the Bare Mountain," as played by the Paris Conservatory Orchestra under the baton of Philippe Gaubbert. It depicts a storm scene the like of which has seldom been heard. The bass is terrific, as in most storm scenes, and the wailing of the wind over the rocks makes one pull the coat collar up around the neck. In the third part the storm passes and dawn is ushered in midst the pealing of bells and the soft, clear notes of the flutes and clarinets. The three sides of this group have everything needed to make a record valuable as a demonstrator. They will tax the receiver at both ends of its frequency range, and they will charm one and all who love good music. Don't make the fatal mistake of playing any single part and not the whole; rather let the music make its own appeal.

Opening *the Ledger*

Second article in series on Simplified Bookkeeping and Accounting System for the radio dealer.

By **G. S. CORPE**

THE LEDGER is the book to which totals from the Cash Book are posted. It is, in fact, the book in which all our figures are summarized and concentrated and put into shape to be of the greatest value to us. In our Ledger we have a sheet for each Department in the Cash Book, and a sheet for each account of any importance with the jobbers from whom we make purchases. Our Ledger is used only when we (a) post entries covering purchases from jobbers after invoices are entered in our Cash Book or payments made to jobbers on account, and (b) at the end of each month to post Department totals from the Cash Book.

Fortunately for most of us, Debits and Credits go into the Ledger to the Left and Right, respectively, exactly as they go on our Cash Book. This makes the transferring of totals extremely simple. Of course in the Cash Book the entire Left sheet takes the Debits and the entire Right sheet takes the Credits, while in the Ledger both are on a single page; but the Left and Right rule still holds. Fig. 1 illustrates a Ledger sheet, showing how each sheet is ruled to take both Debits and Credits.

Before starting to transfer entries from the Cash Book examples given last month it is necessary to take some time for a matter of the greatest importance; and I do not want a single reader to hurriedly glance over this part and think it too complicated or unnecessary; I want you to read this slowly and carefully. And I promise that if you will do so, and let the information herein given soak into you and then follow it you will always be thankful for having done so. I think the feeling that comes over a radio dealer after he has had a real set of books in operation a few months must be akin to that of a man who has been on the water-wagon for years, faces a great temptation to fall off, but finally resists it and gets away still on the wagon. Both the successful "resistee" and the dealer who had enough guts to put in a first-class set of books and strictly adhere to them have a "grand and glorious feeling," I am sure. So stay with me—absolutely without fail.

In order to make the set of books a complete story and tell the accurate condition of the business it is necessary that the Ledger be properly opened up. In other words, we don't want to build our house (the Cash Book entries and later postings to the Ledger) without first taking care of our foundation (this being the initial opening of the Ledger). And doing this is the dry, possibly uninteresting part that I spoke of in the previous paragraph as being afraid it might scare some of you off. But it is essential.

In order to get our opening figures we must know what we have on hand and what we own and what is due us and what we owe, and get the amounts thereof into the Ledger on the proper sides. So the first thing to be done is to take a full, complete inventory; and the importance of it is such that I will give you complete instructions as to how to go at it.

Taking Inventory

BETTER take an evening or Sunday or holiday when the store is closed. Separate your stock as nearly as possible into departments—that is, get all your tubes together, all your parts and accessories, etc., etc. If your business is too large to permit this due to displays, etc., all right—departments can be separated directly from your inventory list. Write a complete list of everything you own, putting the items well over to the Left of a sheet of scratch paper; or use a five cent paper-backed book.

After you get every bit of stock itemized (by the way, don't forget sets or other materials which may be on hand but outside the store) use the space at the Right of each entry to figure the price of all articles. In doing this, use this rule: Always inventory stock at either cost or present cost if the latter is lower than the former. For example, if you have on hand a set which cost you $150 less 40 per cent or $90, but which can be bought at the time of taking inventory for $140 less 50 per cent or $70.00, figure it at the latter amount. If your inventory includes items of doubtful value—and what radio dealer is so fortunate as to have none of that kind of merchandise on hand—either figure it at an extremely low figure or don't include it at all.

Taking any other figures for your inventory than the system outlined above results only in "kidding" yourself. It's all right occasionally possibly to "kid" someone else, but none of us want to be foolish enough to "kid" ourself; especially in such an important matter as knowing how much money our business is making or losing. So be sure to use conservative methods in figuring your inventory.

Now let's suppose we have all our stock written down, segregated into departments, figures totaled for each department, and ready to enter into our Ledger later. Ascertain your bank balance and amount of cash change in your cash register. Make a careful, accurate list of your IOUs from finance companies. After this we will carefully itemize all the bills we owe jobbers and others; and we will make a complete list of notes we owe. All of this of course is done on scratch paper, and let's suppose that our list looks about like this:

On Hand:		
Cash (change) in Register		$ 50.00
Cash in Bank		110.50
New Sets		1120.00
Used Sets		65.00
Parts and Accessories		201.30
Tubes		87.90
Due Us:		
Customers' Accounts Receivable		121.25
Notes Receivable		925.00
I.O.U.'s from Finance Companies		656.50
We Owe:		
Accounts to Jobbers		245.00
Divided into:		
National Sales Co.	194.00	
P. Dustin & Co.	31.00	
L. J. Roby	20.00	
Notes Payable		600.00

It is obvious that by adding what we Own in the above list and what is due to us, and then subtracting from that figure the total of what we Owe we will have a figure which gives us our net worth—that is, the amount above what we owe. But to make obtaining these figures easy and accurate we want them entered into our Ledger, and as already pointed out, from now on we will transfer our figures from our Cash Book into our Ledger in order to arrive at our financial status month after month.

Opening the Ledger

SO WE must next get the above into our Ledger properly. We are going to enter our Assets (what we own and what is due us) on the Debit side of our Ledger sheets; and we are going to enter what we Owe on the Credit side of our Ledger sheets.

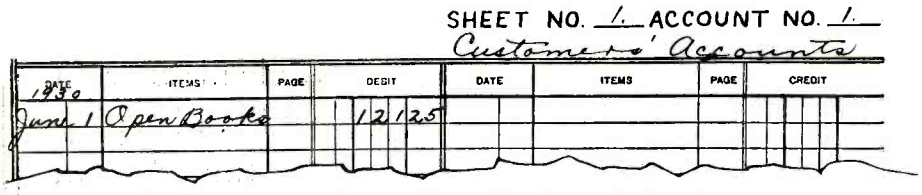


Fig. 1. Customers' Account Sheet When Ledger Is First Opened.

We therefore head up a Ledger sheet for each account as we go through the Ledger, all in accordance with the previous paragraph. Fig. 1 shows the opening Ledger sheet for Customers' Accounts.

As noted in our list the accounts due to jobbers totaling $245.00 are divided into three different accounts; so we open up a Ledger sheet for each of them, Crediting the amount due to each on each sheet. An example is given in Fig. 2—showing the opening Ledger sheet for P. Dustin & Co.

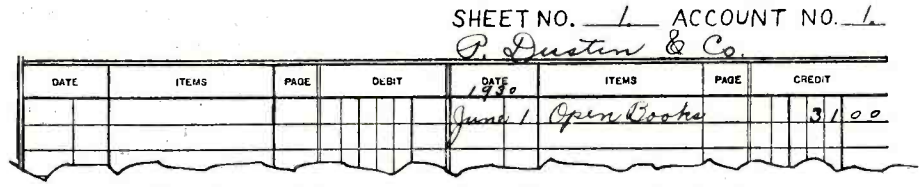


Fig. 2. P. Dustin & Co.'s Account Sheet When Ledger Is First Opened.

Now, using the figures already exampled, we will add up our Debits and find that they total $3337.45; our Credits total $845.00, and there is therefore a difference of $2492.45. In order to make our books balance we want that amount in our Ledger somewhere. Our question is therefore "Where does it go?" The answer is: We will open up a sheet and call it "Investment" and put the amount $2492.45 on the Credit side thereof; and our Ledger is in balance and ready to use intelligently from now on.

Before doing anything further, however, let's take our little paper-backed Trial Balance Book and go all through our Ledger, writing down accounts and figures in their proper columns in the Trial Balance Book; this will look like Fig. 3, and we see that each column balances, showing the correctness of our work.

All right; we now have our opening inventory taken and the resulting figures from it properly entered in our Ledger, the correctness of same being proven as previously mentioned by our Trial Balance. Let us presume that it is not yet the end of the month, and we are going to post to our Ledger the invoices and payments on account shown in last month's installment on the expense side of our Cash Book.

In starting your Ledger be sure to insert plenty of blank pages, so that you will not be bothered by adding pages too often.

TRIAL BALANCE IMMEDIATELY AFTER OPENING LEDGER

	Debit	*Credit*
Cash in Register	$ 50.00	$
Cash in Bank	110.50	
Customer's Accounts	121.25	
P. Dustin & Co.		31.00
I. O. U.'s from Finance Companies	656.50	
Investment		2492.45
Notes Receivable	925.00	
Notes Payable		600.00
National Sales Company		194.00
New Sets	1120.00	
Parts & Accessories	201.30	
L. J. Roby		20.00
Tubes	87.90	
Used Sets	65.00	
	$3337.45	$3337.45

Fig. 3. The First Trial Balance

Posting

ON LINE 2 of the expense side of our Cash Book we entered an invoice from F. H. Houser Co. where we bought $70.00 worth of merchandise. We will enter that in our Ledger, and since there is no account sheet yet for that firm, start one. The $70.00 will go on the Credit side, of course, because it is coming from the Credit side of our Cash Book. It is shown in Fig. 4.

May I call your attention to the little column to be used for showing where the entry came from? It is headed up "Page" or on some sheets "Fol." We write in that column "Ex 2" and that shows that we got that $70 entry from Page 2 on the expense side. It may be found of great help later in locating errors. Also, we will enter in the column in the Cash Book next to the Charge Account column, and headed up "Post or Explain," where the $70.00 went in our Ledger; it being the first account under the index letter "H" we will mark it H-1-1, meaning of course Page 1 of Account 1 of Index "H." This is also handy in locating errors at the end of the month.

Next, on Line 5, Cash Book, expense side, we paid P. Dustin & Company $31.00 on account; we therefore transfer that entry to our Ledger, putting the $31 on the Debit side, marking the check number page it came from, etc., just as in the above entry. (See Fig. 5.)

On Line 6 (Cash Book, expense side) we returned an accessory to L. J. Roby for credit on account; and we transfer that figure to our Ledger, following the procedure exactly as in the preceding entry, except that we explain on the Ledger sheet about paying the account by returned merchandise. See Fig. 6. Don't forget to enter in the proper little column on the Ledger sheet where the entry came from (Ex 2) and in the column "Post or Explain" in the Cash Book write in R-1-1, thus showing that the amount was transferred to page 1 of account 1 under the letter R in our Ledger.

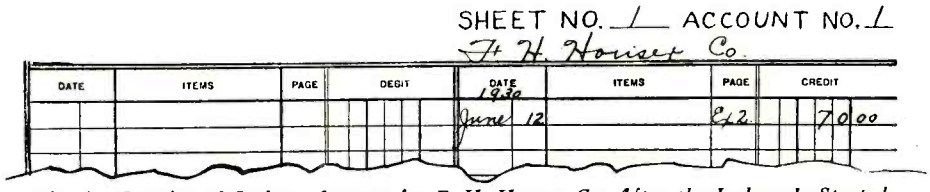


Fig. 4. Opening A Ledger Account for F. H. Houser Co. After the Ledger Is Started.

This takes care of transferring all accounts necessary in our example. Of course in your actual set of books you will have a greater number of jobbers'

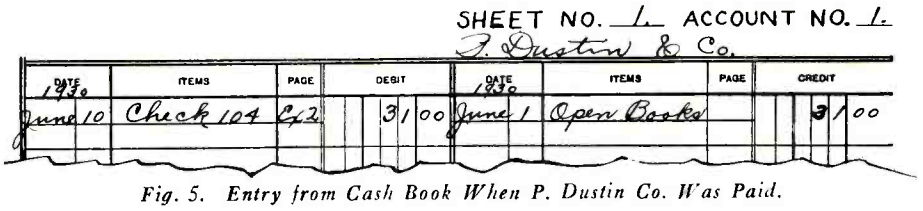


Fig. 5. Entry from Cash Book When P. Dustin Co. Was Paid.

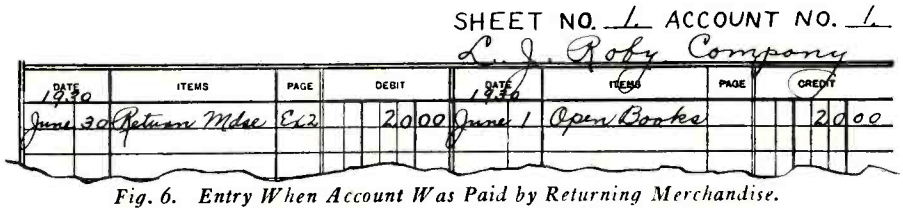


Fig. 6. Entry When Account Was Paid by Returning Merchandise.

invoices each month; but they will all be handled as per some of these examples.

So let's suppose it is now the end of the month and we are ready to close our books and post all our totals to our Ledger and see where we are.

At the end of each month the totals in the Miscellaneous Columns in the Cash Book are segregated into departments as we have previously done. As explained, that is done to permit them to be entered separately and properly in our Ledger.

With that done, we will transfer the final figures from our Cash Book to our Ledger. All Debits in the Cash Book go to the Debit side of the Ledger sheets—whether on the Income or Expense side, and the same applies to the Credits. Be careful that this is done accurately. The totals for the columns "Accounts Paid Off" and "Charge Amount" on the Expense side of the Cash Book are not posted, as we have already posted them in separate amounts and to proper accounts.

Since we had no sheet in our Ledger for Labor (because there was no "Labor" to account for in our Inventory when we opened our Ledger) we will open a sheet for it. This applies also to Interest and Discount, Sheet Music, General Expense, and Petty Cash—open Ledger sheets for each of these accounts. After an amount is transferred to the Ledger put a small check mark alongside it on the Cash Book, so that you will be assured at a glance that the figure has not been overlooked.

Because of the great number of cuts necessary, it has not been thought desirable or necessary to show more than two or three of the Ledger sheets after figures have been transferred from the Cash Book. The first of these is Fig. 7; it shows the Cash Account in the Ledger, as it appears after transferring figures to it, but before proceeding with what we may call "Summarizing."

SHEET NO. 1 ACCOUNT NO. 2
Cash in Bank

DATE 1930	ITEMS	PAGE	DEBIT	DATE 1930	ITEMS	PAGE	CREDIT
June 1	Open Books		1 1 0 50	June 30		Ex 2	1 8 5 00
June 30		Inc 1	3 5 9 05				

Fig. 7. Cash Sheet After Posting But Before Summarizing.

SHEET NO. 1 ACCOUNT NO. 2
Cash in Bank

DATE 1930	ITEMS	PAGE	DEBIT	DATE 1930	ITEMS	PAGE	CREDIT
June 1	Open Books		1 1 0 50	June 30		Ex 2	1 8 5 00
June 30		Inc 1	3 5 9 05				

Fig. 8. Cash Sheet After Summarizing.

SHEET NO. 1 ACCOUNT NO. 1
Parts & Accessories

DATE 1930	ITEMS	PAGE	DEBIT	DATE 1930	ITEMS	PAGE	CREDIT
June 1	Open Books		2 0 1 30	June 30		Inc 2	4 8 50
June 30		Inc 1	6 00	June 30		Ex 2	2 0 00
June 30	170.30	Ex 1	3 1 50				6 8 50

Fig. 9. Summarizing When Each Side Has More Than One Figure.

Summarizing

WHEN we have our totals all transferred to the Ledger, our next step is "Summarizing." This consists of adding the Debits and Credits of each account, putting each column's total in small pencil figures, ascertaining which side is larger and how much larger, and entering that amount in very small pencil figures on the larger side, somewhere out of the way of further work on the sheet. This is shown in Fig. 8 and 9.

Fig. 8, the Cash account sheet, required adding and placing a small total for the Debit side, only, since there was but one amount on the Credit side. Fig. 9, the Parts and Accessories sheet, having more than one entry on both the Debit and Credit sides, shows how each side is added and the small totals put in for each column, as well as the small $170.30 on the Debit side, which is the larger.

On sheets such as Cash in Register, or General Expense, or F. H. Houser Co. where there is but one entry, nothing need be done—that one entry furnishes the only figure we need.

Now, with all sheets taken care of as per above, we are ready to take another Trial Balance and see if our entries are correct. It is not thought necessary to show any more sample sheets; if you have followed carefully and made your entries correctly you will have enough data to permit taking care of all Ledger Accounts properly.

The Trial Balance

As in the first Trial Balance, taken after we opened our Ledger, we merely write down the name of each Ledger account in our Trial Balance Book and enter the amount shown by the small pencil figures in the proper column—Debit or Credit.

This is shown in Fig. 10. Before you look at it, use your own sample Ledger sheets and add your two columns of your Trial Balance and see if they balance; if not, you can then refer to Fig. 10 and correct any errors. Make sure that you understand the "whatness of the which" for everything you do. Study each entry and each example and reason them out and understand "why" and "how."

TRIAL BALANCE
July 1, 1930

	Debit	*Credit*
Cash in Register	$ 50.00	$
Cash in Bank	284.45	
Customer's Accounts	105.50	
General Expense	77.80	
F. H. Houser Company		70.00
I. O. U.'s	676.50	
Interest & Discount	1.00	
Investment		2492.45
Labor	12.20	
Notes Receivable	820.00	
Notes Payable		600.00
National Sales Company		194.00
New Sets	1004.20	
Parts & Accessories	170.30	
Sheet Music		2.00
Tubes	71.40	
Used Sets	85.00	
	$3358.45	$3358.45

Fig. 10. The Second Trial Balance

Any sheets that balance—that is where the Debit amount equals the Credit amount—should be ignored and not brought into the Trial Balance at all. This applies to P. Dustin & Co., Petty Cash, and one or two others.

Assuming that our Trial Balance checks up okeh, as shown in Fig. 10, we are ready to close off our Ledger sheets and get them ready for a new month.

This is done by writing in with red ink on the side that is smaller the words "June 30, Balance" and the amount; then drawing four lines with red ink (two on each side) putting the totals of each column between these red lines with black ink, and then entering on the proper side the words "July 1, Balance," and the amount. This is shown in Fig. 11 which is the Cash sheet

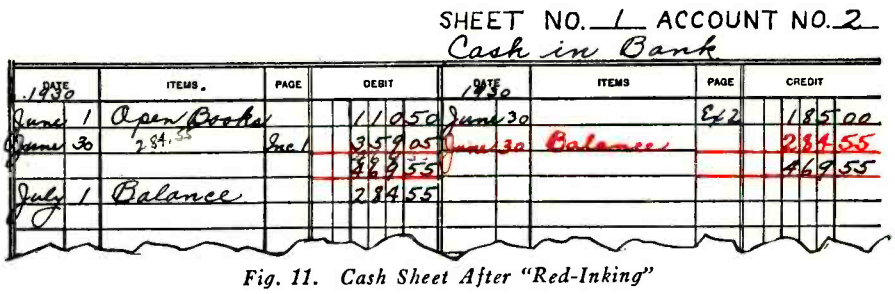


Fig. 11. Cash Sheet After "Red-Inking"

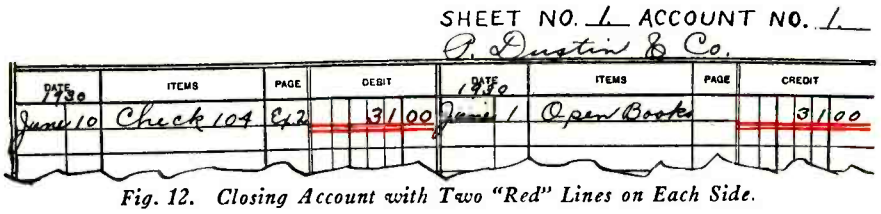


Fig. 12. Closing Account with Two "Red" Lines on Each Side.

after the above is taken care of okeh. Other sheets are of course handled in exactly the same manner; always being careful to get the final black ink data on the proper side.

When you come to a sheet with an account on it where the Debits and Credits are the same, draw two red lines under each figure, as shown in Fig. 12. These two red lines indicate that the account was in exact balance and that no amounts from it were used in the Trial Balance. The sheet of course just remains dormant in the Ledger, ready to take entries in future months.

After you have finished "red-inking" your Ledger, it is a pretty good idea to lay your Trial Balance sheet before you and run rapidly through the Ledger, checking each final black ink entry with the Trial Balance Sheet to be absolutely sure that each entry is on the proper side. I don't know anything that will make one madder than to hunt long and faithfully for an error that is throwing a Trial Balance off and then find that it is due to a wrong-side total entry the month before! Take two minutes and be sure.

Now with our Trial Balance completed we have an enormous amount of pertinent and important data relative to our business right before us on one sheet. Our cash balance is of course $284.55. We see that our customers owe us $105.50. We spent $77.80 for General Expense last month. We can see that finance companies owe us in IOUs $676.50. We lost $1 during the month on Interest and Discount. We likewise lost $12.20 on Labor. We have due to us $820.00 in Notes and we owe $600.00 Notes Payable. We can easily ascertain that we owe Houser Co. $70, and National Sales Co. $194.00, etc.

Inventory Entries

NEXT comes the important matter of understanding proper entries of inventories after the business is running and the books opened up and functioning properly. We have already covered it for opening the books but it is different afterwards, although still of the greatest importance.

When we opened up our books we had $1120.00 in new sets, as shown on the first Trial Balance sheet; a month later when we took our next Trial Balance the books indicate that we had on hand $1004.20 in new sets, or $115.80 less than we had the month previous. One might think just from comparing the two amounts a month apart in the Trial Balances that we had lost $115.80 on New Sets because our books show that much less. But we know that such cannot be true. During the month we sold a set for $130.00 and made our full profit on it. The other merchandise on hand is still new and worth what it was a month ago. What is the answer? Here it is: Inventory. We cannot arrive at an accurate figure of the amount of profit on New Sets, or Tubes, or Parts and Accessories, or any other account which we carry in actual stock without properly taking inventory and posting the figures therefrom into our Ledger. On such accounts as Interest and Discount or Labor where no Inventory exists the Trial Balance figures from the Ledger reflect True Profit or Loss; but not so for the other accounts.

In other words, the following process is necessary to know how much we make on an account such as New Sets or Tubes: First, take the value of sets on hand at the beginning of a certain period; second, add onto that figure whatever we buy during the period; third, deduct the amount we have sold during the period; and fourth, again figure the value of what is on hand at the end of the period and deduct from that amount the figure in Item 3. A simple example is: First, let us say at the beginning of a period we have on hand two sets that cost $100 each, total $200.00. Second, we bought during the period one set that also cost $100.00. Adding that to the $200 we now have a figure of $300.00 Third, during the period we sold one set for $200.00. Deducting that from $300 leaves us a balance of $100.00 Fourth, taking inventory again we of course find that we have on hand two sets that cost us $200.00; and deducting the balance of $100 from the Inventory of $200 leaves us a balance of $100 which is of course the profit for the period. (We have used even money figures to simplify the explanation, and these figures do not show anywhere else.) Now, all this laborious process is automatically done for us with our Cash Book and Ledger.

So after talking about the frequency of inventories and the reason for them, it remains only for us to explain how to properly enter your inventory in the Ledger and arrive at an accurate, true Profit and Loss statement.

I have talked to several proprietors of radio businesses who feel that inventories are unnecessary, either because they do not care about making any attempt at knowing where their business is going, or because they feel that the essential figures can be obtained without the trouble of taking inventory. The former reason we can immediately discard, because if you were not interested in watching your profits and losses you would not be studying this system. The latter reason will bear investigation.

The only way to arrive at your true Profit and Loss is to use the Ledger as already indicated—that is, posting figures to it that represent the value at cost of merchandise on hand. Therefore the question is: How can we most easily arrive at the necessary figures for such posting? There are two possible answers; one is taking the inventory as already indicated and the other is keeping a perpetual card file. To be of value this file must be absolutely complete. It necessitates a card for every different item carried in stock and every purchase and every sale must be entered on it. Needless to say it must be accurate or it is worthless. I have installed bookkeeping and accounting

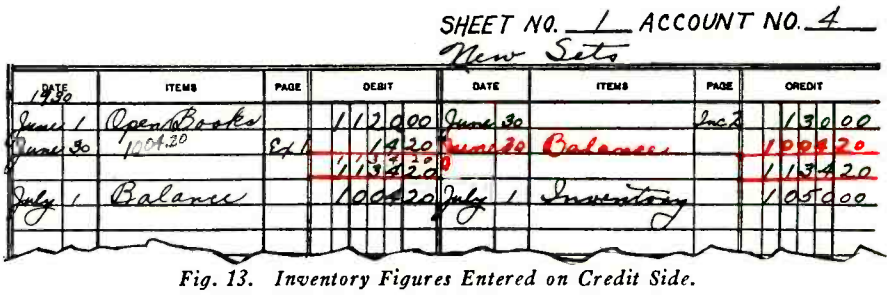


Fig. 13. Inventory Figures Entered on Credit Side.

systems in radio stores using both systems, and here is my conviction after watching them both:

First, the Card File system of keeping stock is actually more work than an occasional inventory, because every sale and every purchase must be posted to the cards.

2nd, the Card File System is not accurate because the best of us will forget to enter or make an error and enter on the wrong card.

3rd, unless your business is very large it doesn't take but a few minutes to both take and figure the inventory—and when you get it you know your figures are accurate.

4th, if your business is extremely large and you have one or more regular stockroom men the card system may be acceptable; but even then should be used in conjunction with an occasional inventory.

5th, we will therefore recommend the Inventory system, first, last, and all the time.

Now comes the question. How often should an inventory be taken?

The answer depends upon a number of important factors. Years ago the country storekeeper either never took inventory at all, or did it not oftener than once a year—generally much farther apart than that. If, however, we go to the other extreme, and take inventory too often it may become a burden and discourage us. Of course, the oftener we get our inventory and post it to our Ledger, the oftener we know right to the penny where we stand. If your business is small and you don't carry too much stock, I suggest that you try taking inventory and figuring it's accompanying Profit and Loss statement at the end of each month. If that sounds like too much work, do it at the end of each three months—each quarter. If your business is doing well and you are sure that there are no serious leaks or other dangers, possibly the inventory only at the end of each year is okeh. A fairly good rule to follow is: frequent inventories and Profit and Loss statements are more essential when times are tough and business bum. The sicker the business the more you need a mighty frequent check-up on everything.

The proprietor of any average radio business employing four or five men can take inventory, close the books, and post the whole thing up completely in one evening at the end of a month. It is worth an extra effort once a month to *know*—isn't it? So use your own judgment; but I hope you won't make your inventories farther apart than each three months at the most.

Now for posting the inventories and arriving at a Profit and Loss figure. We will use the same figures and amounts that we have used throughout the explanation, and the examples shown can be easily used by substituting your own figures all the way through.

After getting our Trial Balance and our Ledger "red-inked," as already explained, take your inventory and prepare the figures on it exactly as we did for opening the Ledger.

Let us suppose now that our completed list of Inventory figures looks like this:

New sets	$1,050.00
Used Sets	75.00
Parts and accessories	190.00
Tubes	82.00

Each inventory figure is transferred to its respective Ledger sheet and *placed on the credit side thereof.* (This portion of the work being done from inventory figures only, of course, and the Cash Book is not used for this.)

Fig. 13 shows what the New Set Ledger sheet looks like at this stage. It is of course as it was when we took our last Trial Balance with the inventory amount of $1050 placed on the Credit side.

After this we deduct the amount on the Debit side, $1004.20, from our entry just made of $1050, and arrive at the figure $45.80. Using red ink enter that figure on the next line below the Balance $1004.20 line, with the explanation "Profit and Loss" before it, and the date, of course. Then draw two red lines on both the Debit and Credit sides below the red figures $45.80 and in between the two red lines enter with black ink the total of each column, which of course is $1050.00. Then on the Debit side enter the date, the word "Inventory" and the amount, $1050.00. The procedure so far is shown in Fig. 14.

Profit and Loss

IF WE were to stop right here and try to take a Trial Balance our Ledger would never balance, because instead of a final Debit figure for the New Set

SHEET NO. 1 ACCOUNT NO. 4
New Sets

DATE 1930	ITEMS	PAGE	DEBIT	DATE 1930	ITEMS	PAGE	CREDIT
June 1	Open Books		1200 00	June 30		Inv 2	1050 00
June 30	1004.20	G/L	1420	June 30	Balance		1004 20
			1134 20				1134 20
July 1	Balance		1004 20	July 1	Inventory		1050 00
July 1	Profit & Loss		45 80				
			1050 00				1050 00
July 1	Inventory		1050 00				

Fig. 14. Completed Sheet After Entering Inventory Figures and Posting to Profit and Loss Sheet

SHEET NO. 1 ACCOUNT NO. 1
Used Sets

DATE 1930	ITEMS	PAGE	DEBIT	DATE 1930	ITEMS	PAGE	CREDIT
June 1	Open Books		65 00				
June 30		Inv 1	20 00	July 1	Inventory		75 00
			85 00	July 1	Profit & Loss		10 00
July 1	Inventory		75 00				85 00

Fig. 15. Also After Inventory Figures Have Been Completely Entered.

SHEET NO. 1 ACCOUNT NO. 1
General Expense

DATE 1930	ITEMS	PAGE	DEBIT	DATE 1930	ITEMS	PAGE	CREDIT
June 30		G/1	77 80	July 1	Profit & Loss		77 80

Fig. 16. General Expense Sheet After Posting to Profit and Loss Sheet.

SHEET NO. 1 ACCOUNT NO. 2
Profit & Loss

DATE 1930	ITEMS	PAGE	DEBIT	DATE 1930	ITEMS	PAGE	CREDIT
July 1	Used Sets		10 00	July 1	New Sets		45 80
July 1	General Expense		77 80	July 1	Parts Accessories		19 70
July 1	Interest & Discount		1 00	July 1	Tubes		10 60
July 1	Labor		122 00	July 1	Sheet Music		2 00
			210 00	July 1	Balances		22 90
			101 00				101 00
July 1	Profit & Loss		22 90				

Fig. 17. Completed Profit and Loss Sheet.

Account of $1004.20, as it was when we got our last Trial Balance, we have a figure of $1050.00. But on this sheet we entered in red ink the difference between the two amounts, $45.80, and explained by writing before the figures the words "Profit and Loss." Therefore we open up a sheet for the "Profit and Loss" account and on the first line on the Credit side write in the words and figures "New Sets $45.80," with the date at the left.

Considering these two accounts together shows that our New Set Account reads $1050.00 instead of $1004.20, as it did before, or $45.80 more than it was, on the Debit side; but also our Profit and Loss Account has the entry of $45.80 on the Credit side, which of course offsets the $45.80 increase on the Debit side of the New Set sheet, and therefore as things stand right now the Ledger would balance O. K.

Now for the Used Set Account. Our Trial Balance showed a balance of $85.00 on the Debit side; but when we invoiced them let's suppose that we decided that the stock of Used Sets was worth only $75.00. All right; turning to the Used Set sheet in our Ledger we enter in the Credit side "Inventory $75.00." In this instance we notice that our Inventory figure of $75.00 is less than our last figure of $85.00 on the Debit side. (It was the other way 'round on the New Set sheet, you will remember.)

However, the procedure is practically the same. We still must make an entry in red ink to bring both sides into balance. Therefore on the next lower line on the Credit side, using red ink, we write in "Profit and Loss $10.00." Then draw two red lines on each side, and then with black ink total both columns, $85.00, between the red lines, and over on the Debit side write in with black ink "Inventory $75.00." See Fig. 15.

As things now stand the Ledger would be off balance, of course, because we show a final debit figure of $75 rather than $85.00; so we want to get the proper entry into the Profit and Loss sheet to again bring our Ledger into balance. This time it is done by turning to the P and L sheet and on the Debit side, writing in the words and figures "Used Sets $10.00." You will see that in this way our whole Ledger has picked up an additional $10 on the Debit side of the P and L sheet, which of course offsets the $10 that we are short on our Used Set sheet.

Next turn to the Parts and Accessories account. The Trial Balance figure was $170.30, and our Inventory figure $190.00; the entries for this are exactly similar to those for the New Set sheet. The difference between the two amounts is $19.70, and that amount is of course entered on the Credit side of the Profit and Loss sheet after the words "Parts and Accessories," the books of course still being in balance because our Inventory figure on the Debit side of the Parts and Accessories sheet is $19.70 more than it was, so that the increase and the entry on the P and L sheet offset each other and the Ledger still balances O. K.

Tubes account is exactly similar, and the inventory figure of $82 being $10.60 more than the Trial Balance figure of $71.40 causes us to enter on the P and L sheet on the Credit side "Tubes $10.60," after taking care of the Tube Account Ledger sheet.

This completes the entering of all invoiced items, and we must next give our last Trial Balance a once-over and ascertain what other accounts need attention in order to see how much money we have made or lost. The first three items—cash in register, cash in bank, and Customers' Accounts—obviously stand pat. Next, though, is General Expense; we want that posted to our P and L sheet because it enters very much into our Profit and Loss result. It is handled by merely writing in with red ink on the Credit side of the General Expense sheet the words "Profit and Loss $77.80," and drawing two red ink lines under both sides, thus closing the account out. Then turn to the P and L Sheet and on the Debit side enter "General Expense $77.80." You will see that the Ledger still balances, because while we cut out the Debit entry of $77.80 on the General Expense sheet we picked up $77.80 on the Debit side of the P and L sheet. Fig. 16 illustrates the General Expense sheet after this procedure has been followed.

Now going on down our Trial Balance list, Houser & Co. and IOUs remain "as is"; but the next item is Interest and Discount $1.00. Handle it exactly like we did the General Expense sheet. The Investment account remains without change; but we want to get the Labor account into our P and L sheet. It, too, is handled exactly as we handled the General Expense account.

After Labor we find the Notes Receivable and Notes Payable accounts. These, of course, remain; also the National Sales Co. account. New Sets we have already taken care of; likewise Parts and Accessories. We come then to the little account "Sheet Music." Since there is but the one figure in the Ledger for this account—the $2.00—we close it out like we did the other similar ones, except that our red ink work is on the Debit side of the sheet, and when we move it to the P and L sheet it goes on the Credit side.

This completes our transferring figures to the P and L sheet, and we are now ready to close that sheet up and take another Trial Balance. We add each side of the P and L sheet and enter the totals with small pencil figures, the Debit side being $101.00 and the Credit side $78.10. Proceeding exactly as with any other account when we are closing our Ledger, we find that the difference between the two sides is $22.90; enter that on the proper (lesser) side in red ink (in this instance the Credit side) to bring the columns into balance; enter the totals of each column, $101.00, in black ink between red ink lines, and on the Debit side make the final entry in black ink—"July 1, Profit and Loss $22.90." And there we are. Our figure of $22.90 in this instance is Loss. I hope none of you have your first actual Trial Balance in your own books turn out with the balance on the Debit side, showing a Loss as we have here.

The Profit and Loss Sheet as it appears after making all entries as explained appears in Fig. 17. These sheets will give you a concentrated story of your business; practically everything is there. We can see what accounts lost us money and which ones made us money, and how much. We will try to build up those which lost money, and make their losses as small as possible. Or, better yet, get all of them that we possibly can out of the Debit side and over on the Credit side, where they indicate a profit.

We next run through our Ledger and quickly take another Trial Balance, and thus prove the correctness of our work; it is shown in Fig. 18.

TRIAL BALANCE AFTER INVENTORY AND INCLUDING PROFIT AND LOSS

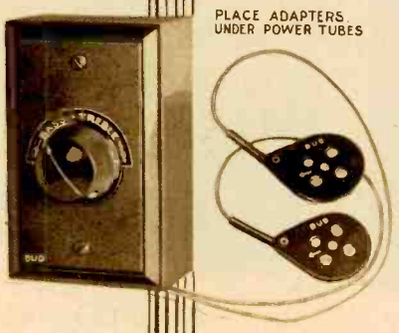
	Debit	*Credit*
Cash in Register	$ 50.00	$
Cash in Bank	284.55	
Customer's Accounts	105.50	
F. H. Houser Company		70.00
I. O. U.'s	676.50	
Investment		2492.45
Notes Receivable	820.00	
Notes Payable		600.00
National Sales Company		194.00
New Sets	1050.00	
Parts & Accessories	190.00	
Profit and Loss	22.90	
Tubes	82.00	
Used Sets	75.00	
	$3356.45	$3356.45

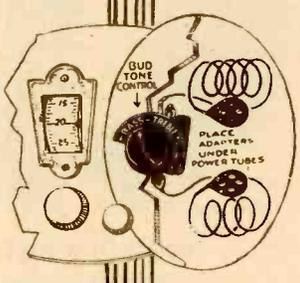
Fig. 18. The Third Trial Balance, Incorporating the Profit and Loss Amount. A statement of your business can be quickly prepared from the above.

This seems to be as good a time as any to give another definite rule which may simplify handling your Ledger sheets in working out a Profit and Loss Statement. It is this: You will notice that on the sheets or accounts we have been especially considering (such as New Sets, Used Sets, etc.), the Inventory amount may be either larger or smaller than the figure last used in obtaining a Trial Balance. (This applies only if the figure last mentioned is on the Debit side.) If the Inventory figure is larger, the entry to the Profit and

(Continued on Page 56)

There's Profits for You
In This New Bud Product





The New **BUD** Tone Control

Tone control will be the big thing this season and every set owner will want a Bud on his set. Here is a chance for enormous profits to those dealers and jobbers who take advantage of the opportunity at once.

The Bud tone control gives absolute tone control from treble to bass with just a turn of the knob.

Every Set Owner A Prospect

Tone control is **new!** Every set owner who bought a set prior to this time needs a Bud, wants one and will buy one. Imagine the tremendous opportunity for profit in your territory. All you have to do is install it, demonstrate it and it stays there.

Easy to Install

Just remove the power tubes, install the adapters and replace the tube—that's all there is to it. Nothing could be simpler. Even though the purchaser knows nothing of radio, he can easily connect it.

Order Them Now

Here is a chance for volume sales, quick turnover and enormous profit. Send in your trial order today and see how fast they will sell.

BUD RADIO, Inc. 28TH & CEDAR AVE. CLEVELAND, OHIO

The EXECUTIVE PERSONNEL of the SUPREME INSTRUMENTS CORPORATION

SUPREME
Model 90 Set Analyzer

B. F. DULWEBER, President

SUPREME
Radio Diagnometer

A. JOHNSON
Chief Engineer

D. N. DULWEBER, Sec. and Treas.

SPENCER PIERCE
Sales Manager

FLOYD FAUSETT
Service Engineer

G. A. DILL
Production Manager

L. D. PEPPER
Vice-President

J. CARTRIGHT
Asst. Sales Manager

Again Sterling

Still Radio's most Golden Voice

SETS THE PACE

The New
Sterling Little Symphony

(Size 18 inches high, 14 inches wide)

A beautiful burl walnut clock style cabinet houses this entirely new model. Has no equal in performance. Its screen grid circuit, with Loftin-White amplification system, gives all the power of a console size model, and the compact cabinet contains a standard dynamic speaker of unusual perfection and beauty of tone. Only five tubes are required.

List Price **$69.00**
Less tubes

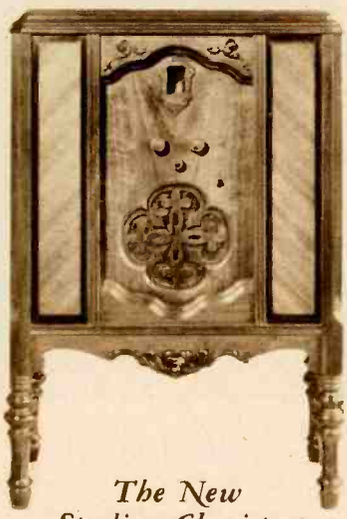
A MARVELOUS ENGINEERING ACHIEVEMENT! New developments have improved the lifelike tone which already seemed perfect! And the new Sterling Concertone is growing in popularity daily.

Power, Volume, Selectivity, Sensitivity, Beauty—everything you want in radio. And above all, matchless balanced TONE, faithful and lifelike, from the highest treble to the deepest bass. And all console models have variable tone control.

Prices to interest discriminating buyers, and a proposition that means both volume and profit to any established radio dealer.

This is your opportunity to participate in Sterling's popularity—to share in Sterling's success. Act now.

THE STERLING MANUFACTURING COMPANY
Cleveland, Ohio
ELECTRICAL MANUFACTURERS FOR 25 YEARS



The New
Sterling Chorister

An improved radio frequency circuit with four screen grid tubes, and power detection provides an actual surplus of sensitivity and selectivity. Two stages of audio frequency, in push pull. Dynamic speaker of unusual excellence. Variable tone control and phonograph hook-up. Cabinet of proven popularity and great beauty. Chassis of heavy rigid metal, silver finished. Operates with 8 tubes.

List Price **$107.50**
Less tubes

The New
Sterling Minstrel

A walnut cabinet of unusual design and exceptional beauty and an 8-tube screen grid receiver of marvelously faithful performance—here indeed is the last word in radio. Variable tone control of improved design permits infinite modulation, to suit the individual taste, or for adaptation to changing types of programs. Selectivity, sensitivity, beauty, balanced tone, phonograph hook-up—everything the finest radio should have.

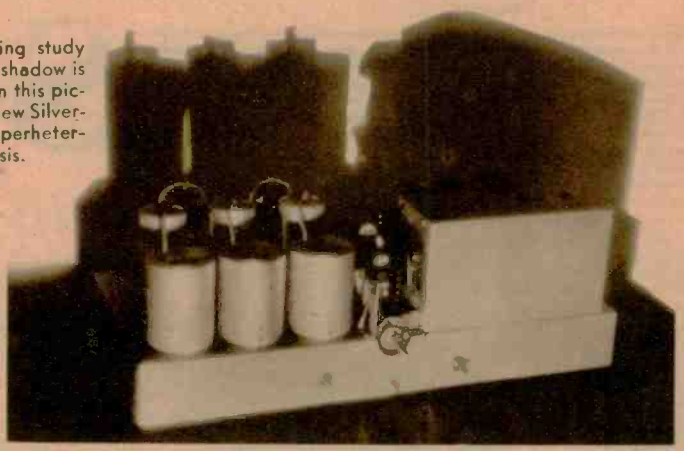
List Price **$137.50**
Less tubes

Sterling
OF CLEVELAND

SILVER-MARSHALL Super-Heterodyne

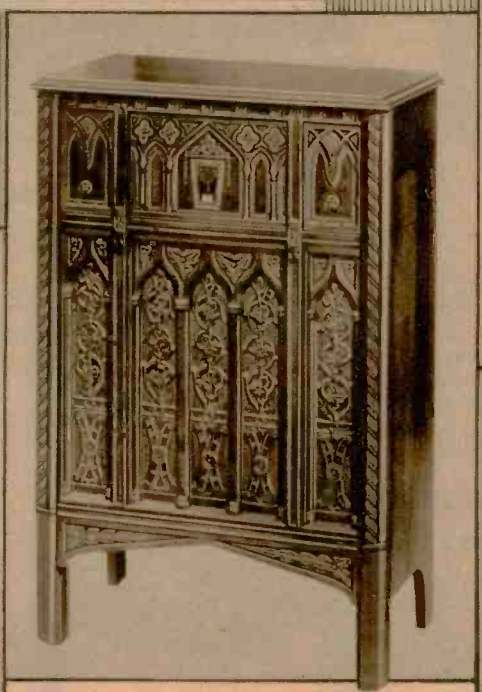
Mrs. Geneva Browne, wife of Mr. Burton Browne, advertising manager of Silver-Marshall, Inc., tunes in with one of the first of the new Silver-Marshall superheterodynes to be released from the factory.

An interesting study in light and shadow is presented in this picture of the new Silver-Marshall superheterodyne chassis.

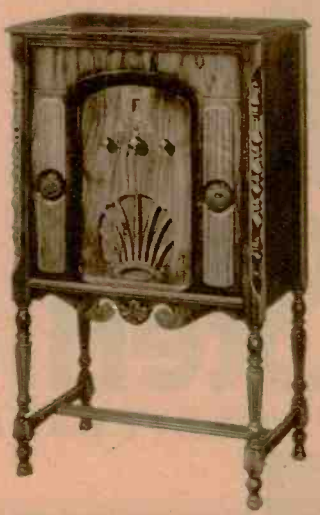


«SENTINEL»

SENTINEL No. 11
7-tube screen-grid compact console for apartment and small home. $130.00, less tubes.



SENTINEL No. 15
Gothic model for drawing room. 7-tube screen-grid chassis. $137.50, less tubes.



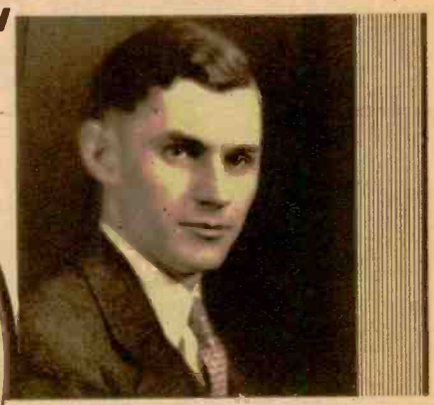
SENTINEL No. 12
Phono-radio combination. Louis XV period. $180.00, less tubes.

SENTINEL No. 8
Lowest priced model of the line. 8-tube chassis. $99.50, less tubes.

OFFICIALS OF THE

TRANSFORMER CORPORATION OF AMERICA

"CLARION"



JAMES J. McCARTHY
Vice-President in charge of production

EDWARD J. DOYLE
Vice-President in charge of engineering

ROSS D. SIRAGUSA
President, Transformer Corporation of America

E. J. DYKSTRA
General Sales Managing Director

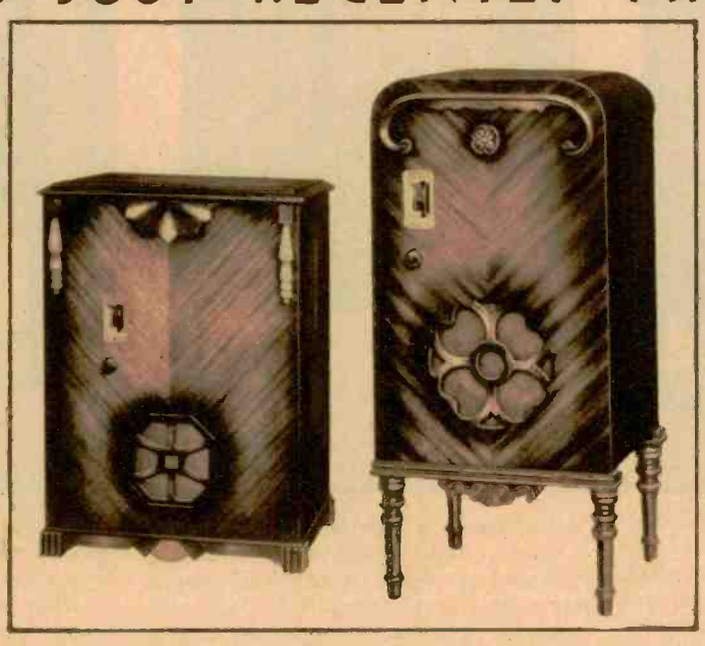
W. EDWIN HALL
Director of Advertising and Sales Promotion

ARTHUR E. MAYBRUM
Director of Export Division

JEAN CAMPBELL
Director of Publicity

NEW SETS JUST RECENTLY ANNOUNCED

LYRIC Model D-34
Made by All-American Mohawk Corp. of North Tonawanda, N. Y. Price, $134.00, less tubes.



"GLORITONE" Model 27P
Made by U. S. Radio & Television Co. Combination phonograph and radio in compact cabinet. $99.50, with tubes.

—and the new Chair Style Model 27S "GLORITONE." Duo-tone satin finish walnut cabinet. 29¼"x14¼"x11¾" $75.00, complete, with tubes.

Paul Ware's new "BANTAM" A midget receiver with electro-dynamic speaker and ball-bearing gang condenser. List price, $55.00. Made by Ware Manufacturing Corporation of New York—one of radio's oldest manufacturers.

New HAMMOND Electric Calendar Clock

tells the time of day . . . the day of the week . . . and date of the month

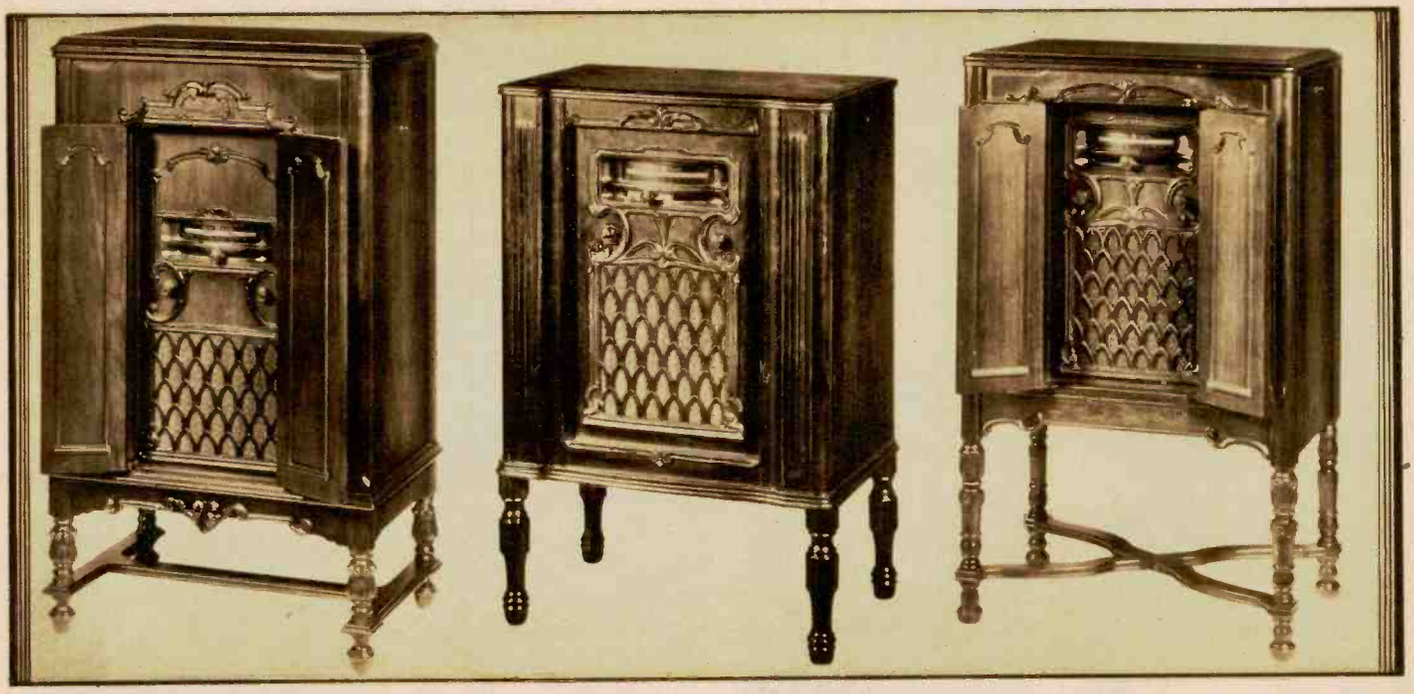
Telephoto of new HAMMOND "MYSTERY MODEL"

THE Gregory—an electric calendar clock. Besides being a perfect time-keeper, it shows the day and date which change automatically at 12 o'clock midnight.

The case is modern in design of black bakelite. Dial is 3 1/4 x 4 3/4" silver finished with raised numerals. The second hand and minute marks are green. This is the clock that not only gives the exact time by electricity but also serves as a calendar.

Height	6 1/2"
Width (over all)	5 3/4"
Depth	2 3/4"
Weight pkd.	4 lbs.
Retail price	$12.50

New VICTOR Sets Have Many Improvements



Pictured above is the Victor Radio-Electrola with Home Recording, RE-57. The Home Recording device makes permanent records of whatever musical and speaking subjects—including broadcasts—the owner wishes. The Cabinet is of classical Italian pattern, walnut-veneered, 46 inches high, 27 1/2 inches wide, and 18 1/4 inches deep. The front is composed of carefully selected Oriental woods with panelled doors and brass handles.

Shown above is the Victor Radio, R-39. It employs eight tubes in a five tuned circuit hook-up with a screen grid chassis, has a new and corrugated cone loudspeaker; simplified straight-line tuning; Victor-perfected tone control; with a cabinet which is a modern adaptation of the classical Italian.

The Victor Radio, R-35, which is pictured above, retains the micro-synchronous principle of last year's Victor Radio but in other respects has been radically altered. It employs five tuned circuits with four screen grid tubes including the new power detector. It has simplified straight-line tuning, and corrugated cone loudspeaker and Victor-perfected tone control.

IT'S POPULARITY INCREASES DAILY

This Record Is SELLING RADIO SETS

DEALERS—Increase Your Sales. Demonstrate your radio sets by means of this TONE TEST DEMONSTRATION RECORD. It gives the prospect an automatic demonstration of all of the low and high notes in the musical scale—together with short vocal descriptions of what each demonstration means. It's a fascinating and interesting way to convince the prospect that the line of radio sets which YOU are selling can pass the TONE TEST as recorded on this record. Most of all, it's a PROFITABLE way to make more sales. Some dealers have as many as six of these records in use. Get one for yourself—and one for each of your salesmen—TODAY!

JOBBERS—Stock these records. Sell them to your dealers. Catalog them. Once the dealer hears this record he will BUY it.

SERVICE MEN—This record enables you to make Tone Tests of a receiver before it is placed on the sales floor. A time saver for you—a profit builder for your store.

$1.00 EACH or a Standard Package of Six for $5.00

C. O. D. ORDERS TAKEN

"RADIO"
PACIFIC BUILDING
SAN FRANCISCO, CALIFORNIA

Ship..... Tone Test Demonstration

Records at once. I enclose $.....
in full payment.

PRICES—$1.00 Each—or a standard Package of Six Records for $5.00

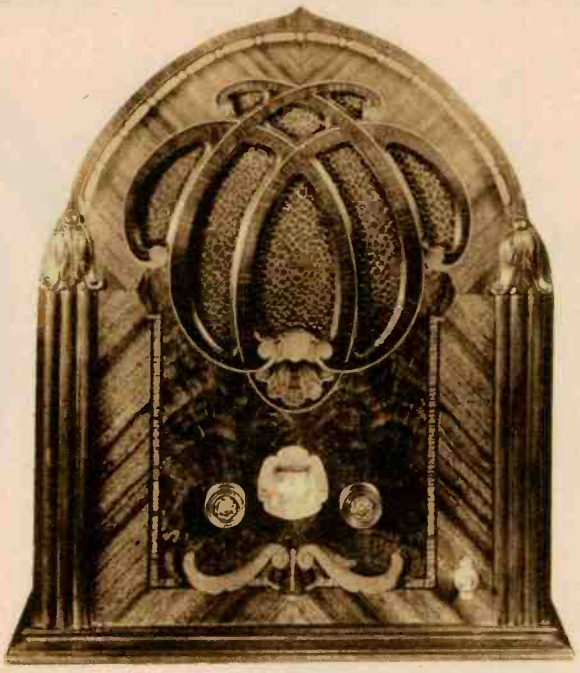
Name.....

Street and Number.....

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

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

COLONIAL Announces MIDGET SET



At the Seventh Annual Radio World's Fair, the Colonial midget set made its first appearance.

The size of the chassis is 12¾" wide, 6½" deep and 7" high. It features inductive volume control and employs six tubes as follows:

2 R. F. Screen Grid
1 Screen Grid Detector
2 345 Push Pull Output
1 380 Rectifier

The cabinet is finished in walnut, in a distinctive Gothic design. Its dimensions are 15" wide, 7¾" deep, and 16½" high.

THE THREE MILLIONTH ATWATER KENT SET

A. Atwater Kent congratulates his Production Manager, G. I. Macharen, on the completion of the 3 millionth Kent receiver.

The production of 3,000,000 radios by the Atwater Kent Company sets a record for number of sets manufactured by any one single company. A. Atwater Kent, president of the company, and looked upon as one of radio's outstanding leaders, in commenting on the production of his 3,000,000th set, said:

"The best answer I can give to what I think of the future of the radio industry is the 3,000,000th Atwater Kent Radio, produced this week.

"With the demand for the new Golden Voice radio exceeding all expectations and our factory steadily increasing production, the immediate outlook is indeed bright.

"We are starting toward the production of our 4,000,000th radio with an unshaken faith in the future of American business prosperity."

ZENITH "SUPER EIGHT"

(At left) The new ZENITH Model 10. An elaborately designed lowboy. Front reproduction of Georgian mirror design. List price, $155.00, less tubes.

(At right) Zenith Model 11. A semi-highboy, open face type. List price, $155.00, less tubes.

These models contain the new "Super Eight" chassis—a screen grid push-pull circuit, tone control, new type antenna compensating circuit and separate power unit.

Radiotorial Comment

By the Editor

ONE of the greatest mistakes that is being made in selling radio resides in the all-too-common assumption that the buyer knows something about the subject. This has done more than perhaps any other single factor in retarding the sale of modern sets which should replace old models. The general public simply does not understand what is meant by such terms as tone control, automatic volume control or remote control of tuning, to quote only a few common expressions. These expressions might just as well be in Greek, so far as the average person is concerned. Consequently he is perfectly content to get along with his old set simply because he does not realize what he is missing in not having a modern radio.

Tell the Story Simply

The logical way to meet this condition is a unified campaign of advertising devoid of competitive selling arguments. The entire radio industry should prepare a simple explanation of all the facts which make the radio set of today a better instrument than that of three years ago. This should be in language that is easily understood by the man on the street and should explain that no single set need contain all the improvements in order to give satisfactory reception. Such a statement contains no selling arguments from individual manufacturers, but represents a sincere combined effort to inform the public.

THE widespread publicity that has recently been given to the expected progress in the development of television by radio is again causing some sales resistance in moving standard broadcast receivers. It is also arousing some demand for equipment which will receive the broadcasts that are actually being made in several localities. It therefore becomes necessary for the radio dealer to be informed as to the facts so that he can advise his customers intelligently.

What About Television?

Call letters and frequency bands have already been assigned to thirty-two visual broadcasting stations in the United States. All of these assignments are somewhat temporary in character and are solely for experimental work. With one exception they are for wavelengths between 136 and 150 meters, or between 102 and 109 meters, and are for 100 kilocycle channels, or ten times the frequency band allocated for audio broadcasting. Consequently the first requirement is a short-wave receiver which will give uniform amplification of all frequencies in a 100-kilocycle band.

Most of these experimental stations work at irregular intervals. Regular schedules, however, are maintained by the Jenkins station at Jersey City and by the Daily News station at Chicago, with likelihood of others announcing regular schedules in the near future. The receiving results which are obtainable from these stations under ideal conditions are about on a par with the crystal audio reception of the haywire broadcast station of ten years ago. They are of tremendous interest to the experimenter,—God bless his soul!—but of little or no interest to the family. Like the present stock market, all the activity comes from the professionals, with but little public participation.

But the "big idea" which will ultimately bring radio movies into all the homes of the land has not yet been conceived, much less perfected. The technicians have not finished their job and the mere layman should be advised to remain satisfied with audio radio and to get ready for the fine programs that are billed for the coming months.

THE popularity of pee-wee golf, small furniture, miniature cars and midget radios might seem to indicate that the American public is becoming midget-minded. While all of these articles yield more or less satisfaction, so far as the purse is concerned, none of them provides the full benefits that are to be enjoyed from the full-sized article. All of them represent a reduction instead of an increase in the standards of living, excepting in the case of those people who could not otherwise afford them.

Midget-Mindedness

The prices are low enough to be within reach of the masses. In the case of radio sets they certainly have created a big market for tubes which would otherwise be non-existent. And they certainly have enabled many a dealer to slide over the shoals of business depression.

But after giving this deserved credit there is danger that the ease of selling them will tempt the salesman to slacken in his efforts to sell the better article to those who can afford to pay for it. By the very nature of its construction, a midget radio cannot be expected to produce the same high quality of tone as is obtainable from a larger and more expensive instrument. What is satisfactory to the masses will not satisfy the discriminating classes if the salesman is on to his job. So sell the midget to those of limited income, but do not let the wealthy customers become midget-minded.

Prices and Specifications of Radio Receivers

MAKE	TUBES RF	Det.	AF	Rect.	Phono Jack	PRICE East	West
ACME							
88	3-'24	'27	1-'27, 2-'45	'80	Yes	135.00	135.00
88	3-'24	'27	1-'27, 2-'45	'80	Yes	155.00	155.00
ALL-AMERICAN LYRIC							
11-D	2-'24	'24	1-'27, 2-'45	'80	No	99.50	99.50
19-D	2-'24	'24	1-'27, 2-'45	'80	No	119.00	119.00
19-H	3-'24	'24	1-'27, 2-'45	'80	Yes	134.00	134.00
29-D	2-'24	'24	1-'27, 2-'45	'80	No	139.00	139.00
29-H	3-'24	'24	1-'27, 2-'45	'80	Yes	154.00	154.00
34-H	3-'24	'24	1-'27, 2-'45	'80	Yes	149.00	149.00
*39-D	2-'24	'24	1-'27, 2-'45	'80	..	199.50	199.50
69-D	2-'24	'24	1-'27, 2-'45	'80	No	169.00	169.00
69-H	3-'24	'24	1-'27, 2-'45	'80	Yes	184.00	184.00
Table	2-'24	'24	2-'45	'80	No	74.00	74.00
Bat.	2-'32	'32	1-'30, 2-'31	..	No	99.50	99.50
K-165	2-'24	'24	1-'27, 2-'45	'80	Yes	265.00	265.00
AMRAD							
‡Rondeau	3-'24	'24	2-'45	'80	Yes	150.00	150.00
‡*Sondo	3-'24	'24	2-'45	'80	..	240.00	240.00
ANDREA FADA							
41	3-'24	2-'27	1-'27, 2-'45	'80	Yes	218.00	218.00
42	3-'24	2-'27	1-'27, 2-'45	'80	Yes	159.00	159.00
44	3-'24	2-'27	1-'27, 2-'45	'80	Yes	188.00	188.00
46	3-'24	2-'27	1-'27, 2-'45	'80	Yes	228.00	228.00
*47	3-'24	2-'27	1-'27, 2-'45	'80	Yes	328.00	328.00
†APEX							
27 Midget	2-'24	'27	'45	'80	No	59.50	59.50
30 Automobile	2-'24	'26	'01A, '71A	..	No	79.50	79.50
28A (60 cycle)	3-'24	'27	1-'27, 2-'45	'80	No	105.00	109.50
28AX (25 cyc.)	3-'24	'27	1-'27, 2-'45	'80	No	109.00	113.50
31B (60 cycle)	3-'24	'27	1-'27, 2-'45	'80	No	127.50	135.00
31BX (25 cyc.)	3-'24	'27	1-'27, 2-'45	'80	No	131.50	139.00
31C (60 cycle)	3-'24	'27	1-'27, 2-'45	'80	No	175.00	182.50
31CX (25 cyc.)	3-'24	'27	1-'27, 2-'45	'80	No	179.00	186.50
31D (60 cycle)	3-'24	'27	1-'27, 2-'45	'80	No	185.00	192.50
31DX (25 cyc.)	3-'24	'27	1-'27, 2-'45	'80	No	189.00	196.50
30 (Automobile)	....	..	....	..	..	75.00	75.00
54 (Bat.)	2-'24	'26	1-'01A, 1-'71A	..	No	95.00	99.50
55 (Bat.)	2-'24	'26	1-'01A, 1-'71A	..	No	58.00	60.00
ATWATER KENT							
70	3-'24	'27	1-'27, 2-'45	'80	..	117.00	125.00
74	3-'24	'27	1-'27, 2-'45	'80	..	125.00	131.00
*75	3-'24	'27	1-'27, 2-'45	'80	..	195.00	205.00
76	3-'24	'27	1-'27, 2-'45	'80	..	145.00	152.00
AUDIOLA							
60	3-'24	'27	2-'45	'80	No	97.00	104.00
70	3-'24	'27	2-'45	'80	No	107.00	111.00
80	3-'24	'27	2-'45	'80	No	119.00	125.00
BOSCH							
58A (60 cycle)	3-'24	'24	1-'27, 2-'45	'80	No	144.50	148.50
59A (25 cycle)	3-'24	'24	1-'27, 2-'45	'80	No	144.50	148.50
58B (60 cycle)	3-'24	'24	1-'27, 2-'45	'80	No	159.50	163.50
59B (25 cycle)	3-'24	'24	1-'27, 2-'45	'80	No	159.50	163.50
‡60D (60 cyc.)	3-'24	'24	1-'27, 2-'45	'80	Yes	195.00	199.50
‡61D (25 cyc.)	3-'24	'24	1-'27, 2-'45	'80	Yes	195.00	199.50
‡63D (DC)	3-'24	'24	1-'27, 2-'45	..	Yes	195.00	199.50
‡60E (60 cyc.)	3-'24	'24	1-'27, 2-'45	'80	Yes	250.00	257.50
‡61E (25 cyc.)	3-'24	'24	1-'27, 2-'45	'80	Yes	250.00	257.50
‡63E (DC)	3-'24	'24	1-'27, 2-'45	..	Yes	250.00	257.50
†Automobile	3-'24	'24	'12A	..	No	140.00	140.00
Motorboat	3-'24	'24	'12A	..	No	80.00	80.00
BROWNING-DRAKE							
69	2-'24, 2-'27	'24	1-'27, 2-'45	'80	Yes	129.50	139.50
‡70	3-'24	'24	1-'27, 2-'45	'80	Yes	159.50	173.50
‡71	3-'24	'24	1-'27, 2-'45	'80	Yes	192.50	210.50
‡§70-R	3-'24	'24	1-'27, 2-'45	'80	Yes	229.50	243.50
‡§71-R	3-'24	'24	1-'27, 2-'45	'80	Yes	262.50	280.50
BRUNSWICK							
15	3-'24	24	2-'45	'80	Yes	139.50	139.50
22	3-'24	'24	2-'45	'80	Yes	170.00	170.00
*31	3-'24	'24	1-'27, 2-'45	'80	..	185.00	185.00
¶42	3-'24	'24	2-'45	'80	Yes	.....	.....
CARDON PHONOCRAFT CORP.							
*234	6-484	484	1-484, 2-183	'80	..	275.00	294.50
¶103	6-484	484	1-484, 2-'27, 2-183	2-'81	..	580.00	595.00
CLARION (Transformer Corp. of America)							
AC-51	3-'24	'27	1-'27, 2-'45	'80	Yes	109.00	109.00
AC-53	3-'24	'27	1-'27, 2-'45	'80	Yes	129.00	129.00
*AC-55	3-'24	'27	1-'27, 2-'45	'80	..	200.00	200.00
COLONIAL							
Princess	2-'24	'24	1-'27, 2-'45	'80	Yes	129.50	129.50
Mayflower	2-'24	'24	1-'27, 2-'45	'80	Yes	139.50	139.50
Windsor	2-'24	'24	1-'27, 2-'45	'80	Yes	149.50	149.50
Remote Control at $34.00 extra.							
COLUMBIA							
C-20	3-'24	'24	1-'27, 2-'45	'80	Yes	145.00	145.00
C-21	3-'24	'24	1-'27, 2-'45	'80	Yes	185.00	185.00
990 Automatic Phonograph only						295.00	295.00
¶991	3-'24	'24	1-'27, 2-'45	'80	..	350.00	350.00
CROSLEY							
26H (Bat.)	2-'22	'12A	3-'12A	..	No	45.00	45.00
26J (Bat.)	2-'22	'22	2-112A	..	No	84.50	84.50
26K (Bat.)	2-'22	'22	2-112A	..	No	88.50	88.50
†Buddy	2-'24	'24	'45	'80	No	64.50	64.50
Mate	2-'24	'24	'45	'80	No	75.00	75.00
Pal	2-'24	'24	'45	'80	No	69.50	69.50
Partner (Bat.)	2-'22	'12A	3-'12A	..	Yes	88.50	88.50
*Arbiter	2-'24	'24	2-'45	'80	..	137.50	137.50
‡Director	2-'24	'24	2-'45	'80	Yes	107.50	107.50
Roamio (Auto)	2-'24	'27	2-'12A	..	No	75.00	75.00
EDISON							
B-4	3-'27	'27	1-'27, 2-'45	'80	Yes	215.00	223.00
B-5	3-'27	'27	1-'27, 2-'45	'80	Yes	175.00	177.00
*C-4	3-'27	'27	1-'27, 2-'45	'80	..	325.00	336.00
R-6	3-'24	'27	2-'27, 2-'45	'80	Yes	297.00	306.00
R-7	3-'24	'27	2-'27, 2-'45	'80	Yes	268.00	270.00
GENERAL ELECTRIC							
TRF	3-'24	'24	2-'45	'80	No	.....	.....
‖Lowboy	3-'24	1-'27, 1-'24	2-'45	'80	Yes	142.50	142.50
‖Highboy	3-'24	1-'27, 1-'24	2-'45	'80	Yes	179.50	179.50
*‖Comb.	3-'24	1-'27, 1-'24	2-'45	'80	..	285.00	285.00
GENERAL MOTORS							
Heppelwhite	3-'24	'27	1-'27, 2-'45	'80	Yes	136.00	136.00
Sheraton	3-'24	'27	1-'27, 2-'45	'80	Yes	152.00	152.00
Italian	3-'24	'27	1-'27, 2-'45	'80	Yes	175.00	175.00
*Queen Anne	3-'24	'27	1-'27, 2-'45	'80	..	198.00	198.00
*Georgian	3-'24	'27	1-'27, 2-'45	'80	..	270.00	270.00
GRAYBAR							
678	3-'24	'24	2-'45	'80	No	.....	.....
‖700	3-'24	1-'27, 1-'24	2-'45	'80	Yes	142.50	142.50
‖770	3-'24	1-'27, 1-'24	2-'45	'80	Yes	179.50	179.50
‖*900	3-'24	1-'27, 1-'24	2-'45	'80	..	285.00	285.00
GREBE							
SK4 Chassis							
21950-A	3-'24	'27	2-'45	'80	Yes	219.50	223.50
265	3-'24	'27	2-'45	'80	Yes	260.00	272.00
285	3-'24	'27	2-'45	'80	Yes	285.00	292.00
*450	3-'24	'27	2-'45	'80	..	450.00	465.00
AH-1 Line							
160	3-'24	'27	2-'45	'80	No	160.00	165.00
189	3-'24	'27	2-'45	'80	No	189.00	194.00
225	3-'24	'27	2-'45	'80	No	225.00	230.00

Note—All models made for 110 v. DC also.

* Phonograph Combination.
† Prices quoted with tubes
‡ Extra tube used as automatic volume control.
§ Remote Control.
¶ Automatic Combination.
‖ Superheterodyne—Extra '27 tube used as Oscillator; RF and IF tubes listed together.

Prices and Specifications of Radio Receivers

MAKE	TUBES RF	Det.	AF	Rect.	Phono Jack	PRICE East	West
HOWARD							
Consolette	3-'24	'27	2-'45	'80	No	185.00	195.00
Puritan	3-'24	'27	2-'45	'80	No	210.00	220.00
Plymouth	3-'24	'27	2-'45	'80	..	165.00	175.00
‡Patrician	3-'24	'27	2-'45	'80	..	215.00	225.00
Hepplewhite	3-'24	'27	2-'45	'80	..	245.00	255.00
Florentine	3-'24	'27	2-'45	'80	..	275.00	285.00
Gothic	3-'24	'27	2-'45	'80	..	275.00	285.00
*Combination	3-'24	'27	2-'45	'80	..	325.00	335.00
JACKSON							
NJ-30 (Chas.)	2-'24	'27	1-'24, 1-'45	'80	Yes	77.50	77.50
KELLOGG							
523	3-K-24	K-27	1-K-27, 2-'45	'80	Yes	175.00	190.00
*525	3-K-24	K-27	1-K-27, 2-'50	'81	Yes	225.00	240.00
524	3-K-24	K-27	1-K-27, 2-'50	'81	..	395.00	415.00
Note—25-cycle models $10 more in each case.							
KENNEDY							
220	3-'24	'27	1-'27, 2-'45	'80	Yes	159.00	159.00
220-B	....	...	.....	..	..	140.00	.....
320	3-'24	'27	1-'27, 2-'45	'80	Yes	189.00	189.00
426	....	...	.....	..	..	159.00	.....
526	....	...	.....	..	..	169.00	.....
626	....	...	.....	..	..	189.00	.....
726	....	...	.....	..	..	726.00	.....
§726A	....	...	.....	..	..	285.00	.....
§¶726B	....	...	.....	..	..	390.00	.....
826	....	...	.....	..	..	199.00	.....
*826A	....	...	.....	..	..	242.00	.....
826B (Long & Short Wave)	.....	...	.....	..	..	252.00	.....
*826C (Long & Short Wave)	.....	...	.....	..	..	304.00	.....
LEUTZ							
Seven Seas	3-'24	'27	1-'27, 2-'50	2-'81	Yes	295.00	295.00
"	3-'24	'27	1-'27, 2-'50	2-'81	Yes	295.00	295.00
"	3-'24	'27	1-'27, 2-'50	2-'81	Yes	610.00	610.00
*Do (Comb.)	3-'24	'27	1-'27, 2-'50	2-'81	..	395.00	395.00
Silver Ghost	4-'24	'27	2-'27, 2-'50	2-'81	Yes	2400.00	2400.00
MAJESTIC							
†‖52 Compact	2-'24	1-24, 1-'27	2-'45	'80		112.50	112.50
90	4-G27	G27	2-G45	G80	No	95.00	95.00
91	4-G27	G27	2-G45	G80	No	116.50	116.50
92	4-G27	G27	2-G45	G80	No	158.00	158.00
93	4-G27	G27	2-G45	G80	No	146.00	146.00
*102	4-G27	G27	2-G45	G80	..	183.50	183.50
*103	4-G27	G27	2-G45	G80	..	203.50	203.50
130	3-G24	G-24	2-G45	G80	..	117.50	117.50
131	3-G24	G-24	2-G45	G80	..	137.50	137.50
132	3-G24	G-24	2-G45	G80	..	167.50	167.50
233	3-G24	G-24	2-G45	G80	..	245.00	245.00
NORDEN-HAUCK							
Super DX5 (Short Wave)	1-Pen.	'27	1-'27, 2-'45	'80	No	150.00	150.00
‡Admiralty	6-'24	2-'27	2-'50	2-'81	Yes	350.00	350.00
‡Admiralty	6-'24	2-'27	2-'50	2-'81	Yes	450.00	450.00
RM-4 (Bat.)—4 English tubes used						125.00	125.00
PHILCO							
*296	3-'24	2-'27	1-'27, 2-'45	'80	..	198.00	212.60
96 Hiboy	3-'24	2-'27	1-'27, 2-'45	'80	No	145.00	152.60
96 Loboy	3-'24	2-'27	1-'27, 2-'45	'80	No	127.50	132.60
96 Table	3-'24	2-'27	1-'27, 2-'45	'80	No	85.00	90.10
*96 Concert Grand	3-'24	2-'27	1-'27, 2-'45	'80	No	350.00	372.60
77 Loboy	2-'24	'24	1-'27, 2-'45	'80	No	110.00	117.00
77 Console	2-'24	'24	1-'27, 2-'45	'80	No	95.00	97.00
77 Table	2-'24	'24	1-'27, 2-'45	'80	No	55.00	59.50
41 (DC) Hiboy	2-'24	'24	1-'27, 2-'71A	..	No	149.50	155.40
41 (DC) Loboy	2-'24	'24	1-'27, 2-'71A	..	Ne	119.50	125.40
41 (DC) Console	2-'24	'24	1-'27, 2-'71A	..	No	99.50	105.40
41 (DC) Table	2-'24	'24	1-'27, 2-'71A	..	No	.....	67.90
30 (Bat) Hiboy	3-'32	2-'30	1-'30, 2-'31	..	No	129.50	136.10
30 (Bat) Loboy	3-'32	2-'30	1-'30, 2-'31	'80	No	99.50	106.10
20 Baby Grand	2-'24	'24	1-'27, 2-'71A	..	No	49.50	51.00
RCA							
48	3-'24	'24	2-'45	'80	No	.....	.....
‖80	3-'24	1-'27, 1-'24	2-'45	'80	Yes	142.50	147.50
‖82	3-'24	1-'27, 1-'24	2-'45	'80	Yes	179.50	184.50
‖*86	3-'24	1-'27, 1-'24	2-'45	'80	..	285.00	285.00

MAKE	TUBES RF	Det.	AF	Rect.	Phono Jack	PRICE East	West
SENTINEL							
8	3-'24	'24	1-'27, 2-'45	'80	..	99.50	.....
* 9	3-'24	'24	1-'27, 2-'45	'80	..	149.50	.....
11	2-'24	'24	1-'27, 2-'45	'80	..	130.00	.....
*12	2-'24	'24	1-'27, 2-'45	'80	..	180.00	.....
15	2-'24	'24	1-'27, 2-'45	'80	..	137.50	.....
16	2-'24	'24	1-'27, 2-'45	'80	..	150.00	.....
SILVER							
‡Queen Anne Nine	3-'24	'24	1-'27, 2-'45	'80	Yes	185.00	185.00
‡Elizabethan	3-'24	'24	1-'27, 2-'45	'80	Yes	225.00	225.00
Princess	2-'24	'24	1-'27, 2-'45	'80	Yes	135.00	135.00
Queen Anne Seven	2-'24	'24	1-'27, 2-'45	'80	Yes	165.00	165.00
Remote Control optional.							
SPARTON							
49 (Bat.)	6-686	'01A	1-'01A, 1-'71A		Yes	76.00	89.00
*†101	5-484	484	2-226, 2-586	2-'81	..	.....	495.00
110	5-484	484	2-226, 2-586	2-'81	Yes	395.00	395.00
111	5-484	484	2-226, 2-586	2-'81	Yes	395.00	395.00
301	5-484	484	2-250	2-'81	Yes	.....	255.00
589	6-484	484	2-182B	'80	Yes	169.50	174.85
591	5-484	484	1,484, 2-182B	'80	Yes	145.00	149.50
593	5-484	484	1-484, 2-182B	'80	Yes	145.00	149.50
600	6-484	484	2-183	'80	Yes	169.50	179.50
610	6-484	484	2-183	'80	Yes	169.50	179.50
620	6-484	484	2-183	'80	Yes	184.50	194.50
740	6-484	484	2-586	2-'81	Yes	235.00	255.00
750	6-484	484	2-586	2-'81	Yes	275.00	295.00
870	6-484	484	2-'26, 2-586	2-'81	Yes	380.00	395.00
STEWART-WARNER							
953	3-'24	'27	1-'27, 2-'45	'80	Yes	99.75	104.50
R100-2	3-'24	'27	1-'27, 2-'45	'80	No	.....	142.25
-3	3-'24	'27	1-'27, 2-'45	'80	No	.....	167.50
-4	3-'24	'27	1-'27, 2-'45	'80	No	183.50	203.00
* -5	3-'24	'27	1-'27, 2-'45	'80	No	197.50	222.50
STERLING							
Troubadour	3-'24	'27	1-'27, 2-'45	'80	Yes	129.50	139.50
Serenader	3-'24	'27	1-'27, 2-'45	'80	Yes	149.50	165.00
Imperial	3-'24	'27	1-'27, 2-'45	'80	Yes	187.50	201.00
C3-60	2-'24	'24	1-'45	'80	Yes	110.00	110.00
Little Symphony	2-'24	'24	'45	'80	No	69.00	.....
Chorister	3-'24	'24	1-'27, 2-'45	'80	Yes	107.50	.....
Minstrel	3-'24	'24	2-'45	'80	Yes	123.50	.....
STORY & CLARK							
36	3-'24	'27	2-'45	'80	Yes	208.00	.....
‡43	3-'24	'27	2-'45	'80	Yes	248.00	.....
‡51	3-'24	'27	2-'45	'80	Yes	317.00	.....
STROMBERG-CARLSON							
10	3-'24	'24	2-'45	'80	Yes	259.00	.....
11	3-'24	'24	2-'45	'80	Yes	285.00	.....
641	3-'24	'27	'45	'80	Yes	155.00	165.00
642	3-'24	'27	'45	'80	Yes	259.00	277.00
‖645 (DC)	3-'24	'27	1-'27, 2-'45	..	..	272.50	.....
652	3-'24	'27	'45	'80	Yes	239.00	257.00
654	3-'24	'27	'45	'80	Yes	369.00	387.00
‡846	3-'24	'27	†1-'27, 2-'45	2-'80	Yes	347.50	377.50
WESTINGHOUSE							
WR-4	3-'24	'24	2-'45	'80	No	.....	.....
‖WR-5	3-'24	1-'27, 1-'24	2-'45	'80	No	142.50	142.50
‖WR-6	3-'24	1-'27, 1-'24	2-'45	'80	Yes	179.50	179.50
‖*WR-7	3-'24	1-'27, 1-'24	2-'45	'80	..	285.00	285.00
ZENITH							
61	2-'24	'24	3-'27, 2-'45	'80	Yes	155.00	198.00
62	2-'45	'24	3-'27, 2-'45	'80	Yes	185.00	235.00
71	3-'24	'24	3-'27, 2-'45	'80	Yes	185.00	200.00
72	3-'24	'24	3-'27, 2-'45	'80	Yes	210.00	225.00
73	3-'24	'24	3-'27, 2-'45	'80	Yes	265.00	280.00
§74	3-'24	'24	3-'27, 2-'45	'80	Yes	315.00	330.00
*75	3-'24	'24	3-'27, 2-'45	'80	Yes	375.00	390.00
77	3-'24	'24	3-'27, 2-'45	'80	Yes	375.00	390.00
563 (DC)	3-'01A	'12A	1-'12A, 2-'01A, 4-'71A	..	Yes	250.00	300.00

* Phonograph Combination.
† Prices quoted with tubes
‡ Extra tube used as automatic volume control.
§ Remote Control.
¶ Automatic Combination.
‖ Superheterodyne—Extra '27 tube used as Oscillator; RF and IF tubes listed together.

Prices and Specifications of Midget Receivers

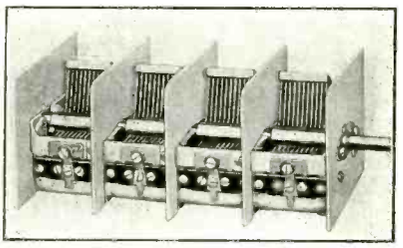
	TUBES R-F	Det.	A-F	Rect.	PRICES East	West
Advance Electric, 1260 W. Second St., Los Angeles, Calif.						
Falck 77†	2-'27	'27	1-'24, 1-'45	'80	59.50	59.50
Falck 88†	1-'24, 1-'27	'27	1-'24, 1-'45	'80	69.50	69.50
Atchison Radio, 125 N. Sixth St., Atchison, Kan.						
12†	3-'26	'24	'45	'80	64.50	64.50
Automatic Radio Co., 112 Canal St., Boston, Mass.						
Tom Thumb†	2-'24	'24	1-'27, 2-'45	'80	69.50	
Nathaniel Baldwin, Inc., 1601 S. Michigan Ave., Chicago, Ill.						
Baldwinette	2-'24	'24	'45	'80	75.50	75.50
Brown & Manhart, 6219 Hoover St., Los Angeles, Calif.						
Ranger 44†	2-'24	'24	1-'27, 1-'45	'80	....	69.50
Cardinal Radio Co., 2812 S. Main, Los Angeles, Calif.						
70*†	2-'24	'24	1-'27, 1-'45	'80	99.50	99.50
80†	2-'24	'24	1-'27, 1-'45	'80	69.50	69.50
Carteret Radio Lab., 254 W. Eighteenth St., N. Y. C.						
AC-7	2-'24	'24	'45	'80	59.00	59.00
AC-8	2-'24	'24	2-'45	'80	65.00	65.00
DC-8	3-112A	112A	1-112A, 1-'71A	..	59.00	59.00
DC-HW	3-'24	'24	2-'45	..	65.00	65.00
Champion Radio, 1865 W. Gage Ave., Los Angeles, Calif.						
82†	2-'24	'24	1-'27, 1-'45	'80	....	59.50
Crosley Radio Corp., Cincinnati, Ohio						
Buddy†	2-'24	'24	'45	'80	64.50	64.50
Davidson-Haynes, 1012 W. Washington Blvd., Los Angeles, Calif.						
Angelus 69A†	2-'24	'24	1-'27, 2-'45	'80	69.50	69.50
Echophone Radio Mfg. Co., 968 N. Formosa Ave., Los Angeles, Cal.						
Echophone†	2-'24	'24	'45	'80	59.50	59.50
Elec. Research Lab., Inc., 2500 Cottage Grove Ave., Chicago, Ill.						
Erla†	2-'24	'27	1-'27, 2-'71A	'80	69.50	69.50
Elmore Lambing Radio Co., 1205 S. Olive, Los Angeles, Calif.						
Singer†	3-'24	'27	1-'27, 1-'45	'80	69.50	69.50
Flint Radio Co., Inc., 3446 S. Hill St., Los Angeles, Calif.						
.....†	2-'24	'24	'45	'80	69.50	69.50
Jesse French & Sons Piano Co., New Castle, Ind.						
Junior†	2-'24	'24	'45	'80	69.50	69.50
R. W. Gilbert, 2357 W. Washington Blvd., Los Angeles, Calif.						
69†	3-'24	'24	'45	'80	69.50	69.50
Gray & Danielson, 2101 Bryant St., San Francisco, Calif.						
Remler Cameo†	2-'24	'24	1-'27, 1-'45	'80	64.50	64.50
Griffin-Smith Mfg., Ltd., 1224 Wall St., Los Angeles, Calif.						
Royale†	2-'24	'24	'45	'80	69.50	69.50
Herbert H. Horn, 1629 S. Hill St., Los Angeles, Calif.						
Tiffany Tone†	2-'26	'24	1-'26, 2-71A	'80	59.50	59.50
Hyatt Elec. Corp., 406 N. Madison St., Woodstock, Ill.						
AC-7†	2-'24	'27	1-'27, 2-'45	'80	75.00	75.00
Jackson Bell Co., 1682 W. Washington St., Los Angeles, Calif.						
62†	3-'24	'24	45	'80	59.50	59.50
Jewel Mfg. Co., 222 S. West Temple St., Salt Lake City, Utah						
M†	2-'24	'24	'45	'80	59.50	59.50
Kemper Radio Corp., 1238 S. Santee St., Los Angeles, Calif.						
Kompak 80†	2-'24	'27	1-'27, 1-'45	'80	69.50	69.50
Master Radio Co., 3550 S. Western Ave., Los Angeles, Calif.						
70†	3-'26	'24	'45	'80	59.50	59.50
Mission Bell Radio, 1125 Wall St., Los Angeles, Calif.						
Mantle†	2-'24	'24	'45	'80	69.50	69.50
National Transformer Co., 205 Wacker Dr., Chicago, Ill.						
Balkeit	2-'27	'27	1-'27, 1-'45	'80	54.50	54.50
Patterson Radio Corp., 239 S. Los Angeles St., Los Angeles, Calif.						
5-69†	2-'24	'24	1-'27, 1-'45	'80	59.50	59.50
7-69†	3-'24	'24	1-'27, 1-'45	'80	69.50	69.50
Philadelphia Storage Battery Co., Philadelphia, Pa. (Philco)						
Baby Grand 20	2-'24	'24	1-'27, 2-'71A	'80	49.50	49.50
Baby Grand 20A	2-'24	'24	1-'27, 2-'71A	'80	56.50	56.50
Pierce-Airo, Inc., 113 Fourth Ave., N. Y. C.						
Dewald 524†	2-'24	'24	'45	'80	....	....
Plymouth Radio Corp., 2625 N. Main St., Los Angeles, Calif.						
3†	2-'24	'24	'45	'80	64.50	64.50
Powell Mfg., 6121 S. Western Ave., Los Angeles, Calif.						
Cathedral†	3-'24	'24	'45	'80	59.50	59.50
Premier Electric Co., Grace & Ravenswood, Chicago, Ill.						
Home-Pal†	2-'24, 1-'27	'24	'45	'80	62.50	62.50
Republic Radio Co., 3940 Grand Ave., Chicago, Ill.						
31M†	2-'24	'24	'45	'80	59.50	59.50
31J†	2-'24	'24	'45	'80	64.50	64.50
Seeley Elec. Co., 1818 W. Ninth St., Los Angeles, Calif.						
5†	2-'24	'24	'45	'80	79.50	69.50
6†	3-'24	'24	'45	'80	89.50	79.50
Simplex Radio Co., Sandusky, Ohio						
H†	2-'24	'24	'45	'80	69.50	69.50
I†	3-'24	'27	'31	..	59.50	59.50
J†	3-'32	'30	'31	..	59.50	59.50
Fred W. Stein, 1200 Main St., Atchison, Kan.						
130C (Aztec)†	2-'24	'24	'45	'80	59.50	59.50
Steinite Mfg. Co., Ft. Wayne, Ind.						
410†	2-'24	'24	1-'27, 1-'45	'80	64.50	68.50
Sterling Mfg. Co., 2831 Prospect Ave., Cleveland, Ohio						
F-1-60†	2-'24	'24	'45	'80	82.50	....
Transformer Corp. of America, Keeler & Ogden, Chicago, Ill.						
Clarion Jr.†	3-'24	'24	2-'45	'80	63.30	63.30
Trav-ler Mfg. Co., 1818 Washington Blvd., St. Louis, Mo.						
A†	2-'01A	'27	1-'01A, 1-'71A	'80	59.50	59.50
B†	3-'26	'24	'45	'80	69.50	69.50
U. S. Radio & Television, 3301 S. Adams St., Marion, Ind.						
Apex 27†	2-'24	'27	'45	'80	59.50	59.50
Waltham Radio Corp., 4228 S. Vermont, Los Angeles, Calif.						
31†	3-'24	'24	'45	'80	59.50	59.50
Zaney-Gill Corp., 5914 S. Western Ave., Los Angeles, Calif.						
Clarion†	2-'27	'27	1-'24, 1-'45	'80	49.50	49.50
Clarionette†	2-'24	'24	2-'45	'80	49.50	49.50

* Phonograph Combination.
† Prices quoted with tubes.

New *Radio* Equipment

New Hammarlund Equipment

A new group of products developed by the Hammarlund Manufacturing Company of New York City includes completely shielded gang condensers, short wave condensers and coils, complete r-f units, and components for r-f and a-f amplification. The shielded condensers for broadcast frequencies are offered in two, three and four gang styles, all having a maximum capacity of 370 mmfd. The plates and frames are of aluminum, the shields are removable, and each section has an individual trimmer. The use of Parmica insulation is claimed to reduce insulation losses to one-tenth that with the usual insulation.



Hammarlund New Gang Condenser

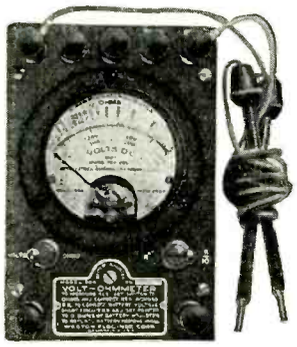
The same comment applies to the short-wave condenser which uses brass plates with twice the standard spacing.

The new r-f units are two in number, one a three-stage pre-selecting tuner without tube and the other a three-stage screen-grid amplifier. Both use three-gang condensers.

The new components include filter chokes, condenser block and audio transformers. The 30-henry choke is rated at 100 ma and has 600 ohms d-c resistance. The 40-henry choke is rated at 40 ma and resistance of 600 ohms. The block contains all the condensers required for the new Hi Q-31 receiver power supply. The audio transformers consist of a 3:1 first audio, a high impedance second audio, and a push-pull input for '45 tubes. The new line also includes a power transformer with 110-volt primary tapped for use with a 90-volt voltage regulator. The secondaries include a 750-volt, 105 ma for the plates of an '80 tube, a 5-volt, 2-ampere, center-tapped secondary for the filament, of an '80 tube, a 2.5-volt, 3-ampere center-tapped secondary for the filaments of a pair of '45s, and a 2.5-volt, 9-ampere secondary for the heaters of five '24s or '27s.

Weston Volt-Ohmmeter

Weston Model 564 volt-ohmmeter is a compact, self-contained d-c instrument for measuring ranges of 3, 30, 300 and 600 volts with a resistance of 1000 ohms per volt and of 0-10,000 and 0-100,000 ohms. These six ranges are



Weston Volt-Ohmmeter

brought out to binding posts. Two toggle switches connect the meter in circuit and also change the sensitivity of the meter to either 1 or 10 milliamperes when making continuity tests in high or low resistance circuits. The instrument is 5½ by 3⅝ by 2⅛ in. in size and weighs 2.3 pounds, including self-contained *C* battery.

Fada D-C Sets

F. A. D. Andrea announces four console models equipped for operation from 90 to 130 volts d-c circuits. Twelve tubes are used to obtain an undistorted power output equal to that obtained by an a-c set. These comprise three '24 tubes in the r-f stages, three '27 tubes in a two-element detector and first audio, and six '71 tubes in two banks of three each. These sets have all the improved features of the new Fada a-c sets.

Pacent Oil-Damped Pickup Unit

Pacent Electric Company has developed an oil-damped phonograph pickup unit which is claimed to add one octave to the possible range of reproduction, to eliminate record-jumping and to reduce record wear. A constant viscosity oil is used instead of rubber in the bearings and prevents the armature from going on a rampage at the frequencies to which the unit is most responsive. The new radio unit differs from the theater unit only in the use of a pressure adjusting device in the base instead of a counterweight.

A New Resistance Unit

Hardwick, Hindle, Inc., Newark, N. J., are offering a new enameled slide resistor which combines the ruggedness and high wattage of the vitreous enameled resistor with the convenience of being continually adjustable. Along the surface of a refractory tube is space-wound a resistance wire having a low temperature coefficient of resistivity,

New H H Enameled Slide Resistor

with suitable terminals at both ends. This assembly is then enameled with a vitreous coating by a special process, which leaves a small arc of the upper surface of the turns exposed along a straight narrow track. A suitable adjustment band and shoe are employed to furnish contact with the coil at any desired point.

Acme Chassis Kit

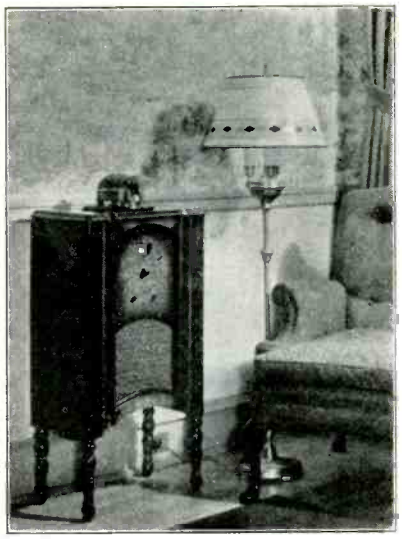
The Acme Electric and Manufacturing Company, 1445 Hamilton Avenue, Cleveland, announce an 8-tube chassis kit which lists at $65 and which can be easily assembled and wired in a few hours. It has three r-f stages with '24 tubes, power detector with '27 tubes, resistance-coupled first audio with '27 tube, push-pull audio with two '45 tubes, and rectifier with '80 tube. It has an electrolytic condenser and is intended for use with a d-c dynamic speaker. The chassis is 21 by 11 by 7½ inches and weighs 35 pounds when completely assembled. The component parts are of the best grade and designed for great sensitivity, selectivity and fidelity.

New Switch Plug

The Eagle Electric Manufacturing Company, Inc., of 59-79 Hall Street, Brooklyn, N. Y., announces a new appliance switch plug in bakelite. It is small, neat in appearance and very compact. The switch mechanism is of sturdy construction, assuring long life operation. The same heat-resisting phosphor bronze contact clips used successfully in their other types of plugs are embodied in the construction of this new plug.

Philco Baby Grand Console

Philco's latest addition is a walnut and maple console which stands 33¾ inches high and houses an electro-dynamic speaker and the same chassis as is used in the Philco Baby Grand. It uses screen grid tubes in the two r-f and power detector stages, a '27 in the first



Philco Baby Grand Console

resistance-coupled audio and two '71-A tubes in the push-pull output stage. It lists at $69.50, less tubes.

New De Forest Photo-Electric Cell

Greatly increased sensitivity is the feature of the new De Forest caesium type photo-electric cell, aside from extreme compactness. This cell, in a -99 size glass bulb, with the standard four-prong base, has an output of 35 to 75 micro-amperes per lumen, or several times the output of the larger potassium photo-electric cells heretofore extensively employed. As an example of its sensitivity, an automobile headlight bulb a foot away from the cell, shining through a half-inch hole, will result in an output of 4 to 7 micro-amperes. To obtain a corresponding output from the potassium type cell, a large-sized incandescent lamp of many times as much candlepower would have to be employed as the light source. The new De Forest caesium photo-electric cell has been employed for several months past in the radiovision pickup equipment of the De Forest experimental transmitting station W2XCD, maintained by the De Forest Radio Company at Passaic, New Jersey.

New Pickup Unit

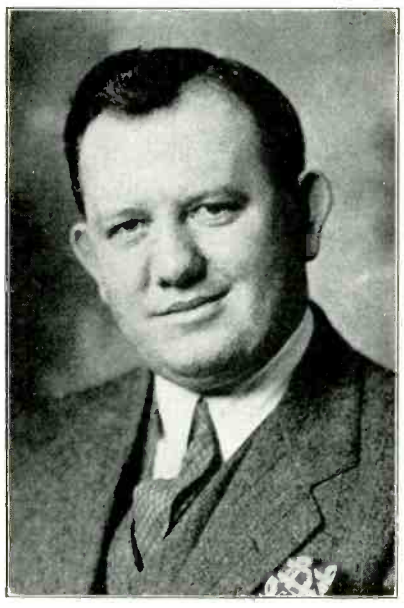
Unit Reproducer Co., Rochester, N. Y., is making three models of the Hydro sound head for use in phonograph combinations, talking pictures, and broadcast studios respectively, differing only in the type of steel used in the pole pieces and armature. The armature is designed to have but one resonance point, is of one-piece construction, and is suspended by two very small rubber bearings. The poles have concave faces. The units are claimed to cause a minimum of wear on the record and to reproduce very low and very high notes. They are matched to either high or low impedance as specified.

Precision Resistor

Type W. W. 2 is the latest type of Precision wire-wound resistor manufactured by the International Resistance Company. This resistor is made in ranges up to and including 2½ megohms. The unit has a moulded cap as against a soldered wire contact and the wire itself is carefully tested and properly insulated. These resistors are held to accuracies as close as ¼ of 1 per cent. They are adaptable to test meter equipment, voltage amplifiers and as standards in laboratory equipment.

Precision Resistor

H. E. Capehart, president of The Capehart Corporation, Fort Wayne, Indiana, in analyzing the sales of radio or phonograph combinations, finds that the automatic feature of radio music, its con-



H. E. Capehart

venience, is an important factor in its appeal to the public. Consequently he argues that similar convenience in the reproduction of phonograph music, as provided by the Capehart automatic record changer, should promote the popularity of the radio-phonograph combination. Furthermore, this greatly increases the sale of records and builds the dealers' prestige among music-lovers.

DURING SEPTEMBER

Atwater Kent Mfg. Co. made its three millionth radio set.

Powel Crosley, Jr., was announced as the first radio manufacturer whose life has been insured for $1,000,000.

Zenith Radio Now on Profitable Basis

Paul Klugh, vice-president and general manager of the Zenith Radio Corporation, said current operations are on a profitable basis and that the current quarter, which began August 1, should show earnings considerably better than in the preceding three months, when a net loss of $6,092 was reported. He added that the profits in the next quarter, which included the peak months of the radio season, should be considerably larger than in the current quarter.

Stromberg-Carlson Sets Sales Record

Business volume at the plant of Stromberg-Carlson Telephone Manufacturing Company for the first eight months of the current year was about 25 per cent ahead of the 1929 period, which shattered all previous records for production and earnings, according to W. Roy McCanne, president and general manager.

RCA-Victor Employs 17,000

The RCA-Victor Co. has stepped up production to provide employment for over 17,000 men and women at Camden, N. J. President E. E. Shumaker says: "To talk prosperity means nothing. We must provide work for the individual; labor must be usefully employed and prosperity will follow."

Arcturus Steps Up Production

The production department of the Arcturus Tube Co. had 800 employees working during September, as compared with 180 in July and 65 some months ago. This increase is necessitated by actual orders and is not based upon anticipated business. "Indications are that the most trying period of the depression is past, with the Arcturus Company in a healthy position," states President Chester H. Braselton. "Demand for Arcturus products is steadily increasing. During the entire period of the general depression the company has consistently discounted its bills and has not borrowed a dollar. The only fixed debt is one small purchase money mortgage on factory real estate. Substantial cash balances are maintained in the banks and the ratio of current assets to current liabilities is in excess of 12 to 1."

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."

National Union Radio Corporation

New distributors for National Union Radio Tubes include Talbot, Brooks & Ayer, Portland, Me.; Standard Electrical Co., New Bedford, Mass.; Kentucky Ignition Co., Lexington, Ky.; M & W Radio Co., Columbus, Ohio; Motor Supply Co., Chattanooga, Tenn.; Auto Supply Co., Wilmington, N. C.; Glasgow-Allison Co., Charlotte, N. C.; Battery & Electric Co., Greenville, S. C.; Norfolk Motor Equipment Co., Norfolk, Va.; Van Zandt-Leftwich Co., Huntington, W. Va.; Flat Top Auto Supply Co., Bluefield, W. Va.; Altoona Storage Battery Co., Altoona, Pa.; Keps Electrical Supply Co., Pittsburgh, Pa.; Williams Hardware Co., Clarksburg, W. Va.; B. K. Sweeney Electrical Co., Denver, Colo.; M. E. Way, Inc., Oklahoma City, Okla.; Central Electrical Co., Green Bay, Wis.; McLaughlin Electric Supply, Aberdeen, S. D.; Farwell, Ozmun, Kirk & Co., St. Paul, Minn.; Cumings Brothers, Flint, Mich.; Cloud Brothers, Peru, Ind.; House of Crane, Indianapolis, Ind.; Hawkes Sales Corporation, Lansing, Mich.; Ft. Wayne Iron Store, Ft. Wayne, Ind.; Fisher Bros. Paper Co., Ft. Wayne, Ind.

Edison

The H. O. Harrison Co. of San Francisco has become Northern California distributor for Edison radio, with H. J. Zeusler in charge. Townley Metal and Hardware Co. of Kansas City has taken over the distribution of Edison radio for that trading area. The Capital City Auto Co., New Orleans, has been named a distributor for Edison radios throughout Louisiana, western Alabama, eastern Texas and southern Mississippi. H. E. Porter is in charge of sales.

Perryman Tubes

The Perryman Electric Company, Inc., is represented by the following jobbers:

Pacific Coast: H. R. Curtiss Co., Los Angeles and San Francisco; Fobes Supply Co., Portland and Seattle; L. D. Heater Co., Portland and Seattle; L. C. Warner Co., Seattle; United Radio and Service Company, Spokane.

Middle West: Omaha Central Paper Co., Omaha, Neb.; Camp Distributing Corp., Des Moines, Iowa; Frew-Clark Co., Kansas City, Mo.; Henshaw-Dudley Co., St. Louis; Specialty Accessory Co., Indianapolis, Ind.; Rockford Battery Co., Rockford, Ill.; John B. Hand Co., Davenport, Iowa; Childers Electric Co., Louisville, Ky.; Motor Batteries, Inc., Memphis, Tenn.; H. C. Schultz, Inc., Detroit, Mich.; Fitzgerald Electric Co., Muskegon, Mich; Red Rooster Sales Co., Grand Island, Neb.; Biltwell Products Co., Bay City, Mich.; Arnold Woodenware Co., Cleveland, Ohio; John B. Bettz Co., Akron, Ohio; Julius J. Bantlin Co., Cincinati, Ohio; R. R. Robinson Co., Lincoln, Neb.; General Sales Co., Detroit, Mich.

East: New England Distributing Co., Boston, Mass.; Capitol Light and Supply Co., Hartford, Conn.; E. M. Wilson Sons Co., Newark, N. J.; New York Kennedy Co., New York; Battery Sales and Equipment Co., Brooklyn, N. Y.; Morocco Distributing Co., Poughkeepsie, N. Y.; Stewart-Warner Sales Co., Buffalo, N. Y.

Erla Midget

Among the distributors of the new Erla miniature receiver are: Raub Supply Co., covering Lancaster and Wilkes Barre, Pa., territory; H. E. Sidles Co., at Scotts Bluff, Neb., covering western Nebraska, eastern Wyoming and parts of South Dakota and Colorado; Phillips & Buttorff, at Nashville, Tenn., covering central Tennessee and parts of Kentucky and Alabama, and Rosenberg Brothers, at Lexington, Neb., covering the central parts of Nebraska.

Lyric

The All-American Mohawk Radio Corp., maker of Lyric radios, is now represented in the Pittsburgh territory by the Anchor Lite Appliance Co.

Hammond Electric Clocks

Kaemper-Barrett Corp. has taken over the San Francisco distributing business of Listenwater & Gough for Angelus radio sets, Hyvoc radio tubes and Hammond electric clocks.

Radio by Story & Clark

New distributors of radio by Story & Clark include Raub Supply Company of Lancaster, Pa., with branches at Harrisburg and Wilkes-Barre; Bihl Bros. of Buffalo, N. Y.; American Phonograph Company of Albany, N. Y.; U. S. Radio Company of Penna, Inc., of Pittsburgh; Maass Radio Corporation of Washington and Baltimore, Md.; Norge Distributing Company of Detroit, Mich., and Marshall Wells Company of Duluth, Minn., with branches at Minneapolis, Billings, Great Falls, Portland, Seattle, Spokane and several Canadian cities.

WILL IT COME TO THIS?

Jewell

B. F. Keith Co. of Atlanta, Ga., represents Jewell Electrical Instrument Co. of Chicago in Florida, Georgia, South Carolina and northern Alabama.

Zenith

Zenith radio products are to be distributed throughout Louisiana and southern Mississippi by A. Baldwin and Company, Incorporated, of New Orleans.

Erla

Included among the additional distributors on the Erla miniature receivers are the Electric Supply & Equipment Company, covering eastern New York state, Butler Brothers Co., Inc., at Columbus, Georgia, covering Alabama and Georgia, Raub Supply Company, Lancaster, Pa., covering eastern Pennsylvania, Musical Products Distributing Company, covering metropolitan New York, Phillips & Buttorff, Nashville, Tenn., covering Tennessee and parts of Alabama and Kentucky, G. Somers & Company and Automotive Supply Company in St. Paul and Minneapolis trading areas, Warren Electric Company, Sioux City, Iowa, Rosenberg Brothers, Lexington, Nebraska, covering the eastern part of Nebraska and H. E. Sidles Company, Scotts Bluff, Nebraska, covering parts of Nebraska, South Dakota, Wyoming and Colorado.

Bosch

B. K. Sweeney Electrical Co., Denver, Colorado, have been appointed distributors of Bosch Radio for Colorado, Wyoming and New Mexico.

Stromberg-Carlson

M. C. Schoenly, Inc., of Dallas, Texas, has been appointed southwestern representative for the Stromberg-Carlson Telephone Manufacturing Company of Rochester, N. Y., with offices in the Allen Building.

De Jur-Amsco in New Quarters

The De-Jur Amsco Corp., manufacturers of variable condensers and power rheostats, has moved to 95 Morton Street, New York City, where they have sufficient equipment and space to produce 10,000 gang condensers daily.

Arch R. Strong is organizing a coast-to-coast sales campaign for manufacturers of radio, electrical and allied equipment. Headquarters have been established in the Daily News Building, Chicago.

Kenneth King has been appointed Bosch radio sales representative for the intermountain district with headquarters at Salt Lake City, Utah.

BOOK REVIEWS

"Radio Operating Questions and Answers." By Arthur R. Nilson and J. L. Hornung. 267 pages 5½x8 inches. Published by McGraw-Hill Book Company, New York City. Price $2.00.

This is the third edition of a text first published in 1921 and contains new questions and answers which cover development since the publication of the second edition in 1929. It is divided into eleven parts and contains two appendices as well as a useful index. Written in catechism form it contains questions which are similar to those asked an applicant for a commercial license, together with appropriate answers for the questions. To anyone preparing for such an examination, the book is exceedingly helpful, being comprehensive enough to anticipate almost any question that may be asked. The information on broadcast equipment and recent radio laws is particularly useful.

"Radio Theory and Operating." by Mary Texanna Loomis. 1006 pages, 5 by 8 in. Published by Loomis Publishing Company, Washington, D. C. Price $4.25.

This, the fifth edition of a text intended to teach the theory of radio to a commercial radio operator, comprehends a great mass of information. The first 274 pages are devoted to the principles of transmitting and are concerned primarily with the fundamentals of electricity. The next 45 pages deal with the principles of receiving. The following 380 pages cover the theory and various practical applications of vacuum tubes and continuous waves, including a chapter on facsimile transmission and television and a chapter on practical receiver construction and trouble shooting. The concluding chapters are devoted to the details of a practical radio operator's work. There is also an appendix which contains various useful tables and other information. The man who masters the contents of this volume and who learns the code should have no difficulty in passing the government examination for license.

NEW RADIO CATALOGS

"The Romance and Reality of Television" is recounted in a 32-page pamphlet from the Shortwave and Television Laboratory, Inc., Boston, Mass., makers of Baird shortwave receivers and Baird television receivers and kits. This pamphlet will give the layman a good understanding of the fundamental principles of the subject.

A new bulletin from A. M. Fletchtheim, Inc., New York City, contains complete engineering data, illustrations, prices, sizes, etc., on a complete line of condensers for filters and amplifiers.

"Microphones," from Universal Microphone Co., Ltd., Inglewood, Calif., is a 20-page catalog of microphones and accessories, together with circuit diagrams which show how a radio set can be used for public address work and play.

A new 32-page manual on electrolytic condensers, their uses, advantages and limitations, with detailed data and characteristics of the Aerovox Hi-Farad Dry Electrolytic Condenser, has been published by the Aerovox Wireless Corporation of Brooklyn, New York.

The Story & Clark de luxe sales portfolio, after outlining the company's aims and ideals, illustrates and explains their extensive advertising campaign and describes an ingenious plan of direct-by-mail selling.

PERSONAL MENTION

Reuben M. Colburn, formerly in charge of New York sales for Kolster and Majestic receivers, has been appointed manager of sales for the Ware Mfg. Corp., makers of Ware brand selector receivers which are now made under RCA license.

Nathaniel C. Greene, formerly vice-president of the Polymet Mfg. Corp., became president when Otto Paschkes became chairman of the board.

J. A. Nadon, San Francisco, has become California representative for the Bodine Electric Company of Chicago.

Howard H. Curran is now Chicago manager for the Edison Distributing Corp., having been transferred from Kansas City.

Captain William Sparks of the Sparks-Withington Company is attending several foreign radio exhibitions and conferences as the official representative of the Radio Manufacturers' Association.

Major Harry P. Disbecker has been appointed Radio Manufacturers' Association show manager and assistant to Bond Geddes, executive vice-president. As show manager he will have active direction of the Radio Manufacturers' Association trade show through the association's show committee of which H. H. Frost is chairman.

Major Harry P. Disbecker

Jesse Marsten, formerly chief engineer with the Freed Eisemann Radio Corporation, has become chief engineer for the International Resistance Company of Philadelphia, Pa., to whom he brings a wide knowledge of radio circuits and resistor applications.

R. A. Burke has been appointed secretary of the Story & Clark Piano Company after nearly twenty years' service with the company.

Louis H. Sullivan has resigned his connection with the Atwater Kent Manufacturing Company to become manager of distributor's relations for Lyric Radio, North Tonawanda, N. Y.

Bernard E. Klank, formerly with the Singer Sewing Machine Co., has become director of publicity for the Transformer Corporation of America, makers of Clarion receivers.

FACTS ABOUT RADIO SECURITIES

Essential stock price data and earnings of some of the more active issues which are listed on the various stock exchanges are summarized below.

American Bosch Magneto Corporation, 209,000 shares outstanding, listed on New York Stock Exchange; 1929 high 76½ and low 27; 1930 high 54⅞ in February and low 21 in September; earnings $2.16 in 1926, $2.26 in 1927, $5.02 in 1928, $4.22 in 1929; deficit of $0.10 for first six months of 1930; closing bid on September 30 was 21½.

Arcturus Radio Tube Company, 600,000 shares outstanding, listed on New York Curb; 1929 high 55⅜ and low 7½; 1930 high 23⅞ in March and low 7 in September; deficit of $0.26 in 1927; earnings of $0.31 in 1928 and $0.89 in 1929; closing bid on September 30 was 7⅞.

CeCo Manufacturing Company, 8% stock 97,000 shares outstanding, listed on Chicago Stock Exchange, adjusted prices for 1929 showed a high of 82¾ and a low of 15⅜, for 1930 a high of 19¾ in January and a low of 3¾ in September; adjusted earnings were $2.17 in 1926 and 1927, $5.16 in 1928 and deficit of $1.06 in 1929 after extraordinary changes; closing bid on September 30 was 3¾.

Crosley Radio Corporation, Class A, 543,000 shares outstanding, listed on New York Stock Exchange; adjusted prices for 1929 showed a high of 120⅛ and a low of 15, for 1930 a high of 22 and a low of 10¼ in January; adjusted earnings were $1.05 in 1926, $1.37 in 1927, $6.66 in 1928, and $2.00 in 1929; the first six months of 1930 showed a deficit of $1.84; at a price of 16 its dividends yield 6.8%; closing bid on September 30 was 12½.

De Forest Radio Company, 1,350,000 shares outstanding, listed on New York Curb; prices for 1929 showed a high of 26⅞ and a low of 3, for 1930 a high of 8⅜ in April and a low of 2½ in January; no earnings statements are available aside from a deficit of $0.15 in 1929; closing bid on September 30 was 2⅝.

Dubilier Condenser Corporation, 304,000 shares outstanding, listed on New York Curb; prices for 1929 showed a high of 20 and a low of 4, for 1930 a high of 13⅛ in January, and a low of 3 in September, there was a deficit of $0.40 in 1926 and $0.43 in 1927; earnings of $0.56 in 1928 and no statement for 1929 nor 1930; closing bid on September 30 was 3¼.

Grigsby-Grunow Company, 1,998,000 shares outstanding, listed on New York Stock Exchange; prices for 1929 showed a high of 70 and a low of 14¼, for 1930 a high of 28 in June and a low of 6 in September; adjusted earnings were $0.21 in 1926, $0.56 in 1927, $2.93 in 1928, $0.87 in 1929; closing bid on September 30 was 6.

Hazeltine Corporation, 175,000 shares outstanding, listed on New York Curb; prices for 1929 showed a high of 70¼ and a low of 14¼, for 1930 a high of 35 in May and a low of 17 in September; in 1926 earnings were $0.09, in 1927 the deficit $0.25, in 1928 earnings were $0.91 and in 1929 were $1.38; the first six months of 1930 showed earnings of $1.19; at a price of 27 the dividend yield is 7.4%; closing bid on September 30 was 17¾.

Kolster Radio Corporation, 824,000 shares outstanding, listed on New York Stock Exchange; prices for 1929 showed a high of

78¾ and a low of 3½, for 1930 a high of 8½ in April and a low of 1¾ in January; the indicated earnings were $0.87 in 1927, $0.20 in 1928, and estimated as nil for 1929 and 1930; closing bid on September 30 was 2.

National Union Radio Corporation, 419,000 shares outstanding, listed on New York Curb; prices during 1929 showed a high of 43¾ and a low of 3⅝, for 1930 a high of 10¼ in April and a low of 3 in May; the indicated earnings were $3.00 in 1928, a deficit of $5.08 in 1929 and estimated as nil and 1930; closing bid on September 30 was 3¾.

Polymet Manufacturing Corporation, 200,000 shares outstanding, listed on New York Curb; during 1929 prices reached a high of 41½ and a low of 11⅞ and during 1930 a high of 18¾ in April and a low of 3 in September; earnings were $2.89 in 1929; closing bid on September 30 was 3.

Radio Corporation of America, 13,161,000 shares outstanding, listed on New York Stock Exchange; prices reached a high of 114¾ during 1929 and a low of 26, during 1930 the high was 69⅜ in April and low 26 in September; adjusted earnings were $0.57 in 1926, $1.23 in 1927, $3.20 in 1928, $1.58 in 1929, with a deficit of $0.17 for the first six months of 1930; closing bid on September 30 was 28⅛.

Sparks-Withington Company, 685,000 shares outstanding, listed on New York Stock Exchange; the high during 1929 was 73 and the low 13⅛, during 1930 the high was 30½ in April and the low 13⅛ in January; adjusted earnings were $0.28 in 1926, $1.82 in 1927, $3.64 in 1928, estimated at $2.65 for 1929; closing bid on September 30 was 15⅞.

Stewart-Warner Corporation, 1,299,000 shares outstanding, listed on New York Stock Exchange; the adjusted price during 1929 was high at 72⅝ and low at 28⅝, during 1930 the high was 47 in April and the low 19¼ in June; adjusted earnings were $3.89 in 1926, $3.99 in 1927, $5.97 in 1928, $5.26 in 1929, and as estimated at $2.25 for 1930; the stock yields 8% in dividends at a price of 25; closing bid on September 30 was 20¼.

Stromberg-Carlson Telephone Manufacturing Company, 268,000 shares outstanding, listed on New York Curb; 1929 high was 35⅛ and low 15, 1930 high was 30 in April and low 26 in September; earnings were $3.63 in 1926, $1.25 in 1927, $2.16 in 1928, $3.75 in 1929; at a price of 29 it pays dividends of 4.3%; the closing bid on September 30 was 26¼.

U. S. Radio and Television Company, 143,000 shares outstanding, listed on Chicago Stock Exchange; 1929 high was 141 and low 5½, 1930 high 29½ in May and 8 in January; the earnings of predecessor companies were $1.34 in 1926, deficit of $0.49 in 1927, and earnings of $1.24 for ten months of 1928, and $0.04 for 1929; the closing bid on September 30 was 17½.

Utah Radio Products Company, 393,000 shares outstanding, listed on Chicago Stock Exchange; 1929 high was 56 and low 4, 1930 high was 10⅞ in May and low 4¼ in January; adjusted earnings of predecessor companies for 1926 were $0.93, for nine months of 1927 were $0.73, for eleven months of 1928 were $2.47, and as estimated for 1929 were $2.42; the closing bid on September 27 was 5¾.

Zenith Radio Corporation, 400,000 shares outstanding, listed on New York Stock Exchange; 1929 high was 52¾ and a low 6½; 1930 high was 16¾ in June and low 5⅝ in January; adjusted earnings for 1926 were $0.29, for 1927 were $1.58, and for 1928 were $2.77, with a deficit of $0.65 for 1929; the closing bid on September 30 was 6.

What a Radio Salesman *Should Know about* Furniture Designs

(Continued from Page 27)

by the prejudice of a woman customer. Every woman knows that colors or dyes may be "fast," or may quickly fade on exposure to sunlight. Satisfy her on that point at least even when the color does not suit her.

Another example of the value of artistic details was brought home to a radio manufacturer who copied the top part of a window in a famous cathedral in Belgium. The artists who designed the original no doubt spent days in getting a beautiful color scheme for the glass in the crevices of the window grill that would harmonize with the shape and style of the grill itself. The radio manufacturer used a variegated silk backing for the grill that completely destroyed its beauties. By searching a little more, or by a few cents added cost, he could have secured a cloth of the same harmonious coloring as was determined by the architect of the old cathedral, and proven by the admiration of thousands of people to be the best for that window grill which was used for a speaker opening.

The shape and ornamentation of the visible parts of hardware, such as hinges, escutcheons, door latches and knobs are also characteristic of the periods. These are easily reproduced by modern machine methods. Metal finishes are just as beautiful, and where good materials and good processes are employed, metal finishes today can be more lasting than much that has appeared on old pieces that are copied. The escutcheons and knobs essential for tuning and controlling a radio receiver should conform in design and finish to the other ornamental parts on a cabinet and be as inconspicuous as possible for practical use.

These are examples of the high spots about design details and styles easily acquired by the intelligent radio salesman who will but expose himself in places where other trades make money by knowing something about home furnishing and the importance which women buyers place on the question of getting the right appearing things for their homes.

Special Cabinets

WHILE this article is intended more particluarly for radio salesmen who are called upon to sell low and medium priced receivers, for which an extensive knowledge of design detail is not essential, there is a different requirement for salesmen who work with the highly specialized and limited field of prospects who can and will pay any amount of money to get exactly what they want in a receiver and cabinet. One, two and three thousand dollars is not an uncommon price for this class of prospect to pay for a receiver in a special cabinet. Such cabinets are generally copies of some historical old piece and valued for strict conformity to some particular period or for special beauty or for association with some famous historical character.

There are concerns who make duplicates and imitations of famous and beautiful period cabinets, tables, chairs etc. Some of the wood carvers and artisans in these places are just as expert as the workman on the original, copying faithfully every detail, even of the hand-slips at certain places, which students of these matters know exist on the original. Even the worm holes in aged pieces are faithfully copied. No price is too high for these pieces if they meet the demands of this class of prospect.

There is still another class of prospect interested in a standard radio chassis in a more or less exclusive class of cabinet which costs from $200 to $600 exclusive of the price of the chassis. These people want to conform to an established mode of decoration in their home, or will not buy a radio in a cabinet which might be seen in too many other homes in that neighborhood. They want to be different and are willing and able to pay for it. To deal satisfactorily with this class, considerable knowledge of general furniture design and interior decorating is required on the part of the salesman. He must talk the prospect's language. There are a few cabinet manufacturers who turn out a limited number of these high grade cabinets each year. Generally the number of each design is so restricted that the prospect can be assured that he is getting the one and only cabinet of that type in his neighborhood.

Some dealers are so situated that they can well afford to stock three to five differently designed cabinets in which a standard make chassis can be installed. At least they can secure good photographic reproductions from which to sell, in order to be able to satisfy those customers who are just a little bit more fussy about design than the average prospect. Where this is done, the salesman will be required to know more about design and interior decorating styles, and keep posted on the changes and new ideas that women know and appreciate.

The material and workmanship in the cabinet and its finishing will be covered in a following article together with a short synopsis of a standard sales talk which can be prepared by the salesman about the cabinet, and also be used as a specification or guide to the points where value should be looked for in a cabinet.

Opening *the Ledger*

(Continued from Page 38)

Loss Sheet will always be to the Credit side; if the Inventory figure is smaller, the entry to the P and L Sheet will always be to the Debit side. If you have sold enough of any department so that it happens that your last Balance on the Ledger sheet is on the Credit side (which is the side where the Inventory amount is always entered), the two amounts are of course added together in arriving at the Profit and Loss figure. It will be better if you just use common sense in working each Ledger sheet out, probably, rather than following any such rule as the above; but it may possibly help occasionally.

We are now through with our explanations of handling the General Ledger. I am afraid it may all sound a little complicated and long-drawn out; but a few hours' work and following examples will serve to thoroughly facilitate your using a similar book, and I want again to assure you that you will never regret learning it and keeping accurate books.

(To be continued)

BITS FROM THE GINGER JAR

1. "Bad breaks" are usually the result of "set brakes."
2. The "S" at the beginning and end of "sales" both stand for "Service."
3. Competition is the sand under any organization's wheels—it makes them take hold.
4. Yesterday is gone—tomorrow never comes—sell 'em today.
5. A good salesman is made up of equal parts of information and perspiration with a good dash of common sense to make the mixture jell.
6. No Frigidaire salesman ever found a commission dollar on a "Tom Thumb" golf course.
7. Alibis are the lies a failure tells his conscience.—*Frigid Era.*

ASSOCIATION NEWS

RADIO MANUFACTURERS ASSOCIATION

The RMA board of directors has endorsed Senate Resolution No. 176, which proposes to transfer the duties of the Radio Division of the Department of Commerce to the Federal Radio Commission, pending final disposition of legislation to establish a Federal Communications Commission. The board has also requested the Commission to increase the number of high-powered broadcast stations on cleared channels, in the interest of better broadcasting for the American public.

Other business transacted at the September 22 meeting of the Board included a recommendation for provision to protect the interests of radio manufacturers and broadcasters in pending copyright royalty legislation, and an agreement to coöperate with electrical organizations in the preparation of a telegraph and cable code for the radio and electrical trade.

Applications were received from Pittsburgh, Chicago, Detroit and St. Louis as the location for holding the 1931 RMA trade show. The time and place is to be chosen later, with the assurance that more business and less carnival will be the keynote of next year's show.

Plans for greater service to the radio public in eliminating interference with radio reception were discussed by H. B. Richmond of Cambridge, Mass., director of the RMA Engineering Division. Reports on progress of RMA service to members were made to the Board also by Chairman George C. Furness of the Statistics Committee, Chairman C. Clarke Coit of the Traffic Committee, Chairman Arthur Moss of the Foreign Trade Committee, Chairman N. P. Bloom of the Membership Committee and Chairman Leslie F. Muter of the Credit Committee, which has recently issued a new credit and collection manual.

* * *

R. W. Jackson, general manager Brunswick Radio Corporation, has accepted appointment as chairman of the Radio Manufacturers' Association merchandising committee.

* * *

Arthur L. Walsh of Thomas Edison, Inc., has succeeded Captain William Sparks, resigned, as chairman of the Radio Manufacturers' Association receiving set manufacturers' group.

RADIO WHOLESALERS ASSOCIATION

In order to cope with the severe problems of sales and credits as well as keen competition, President Harry Alter suggests that every distributor plan to handle a smaller volume of business, at a profit. He further suggests that this can be done by eliminating extravagant methods, impractical promotional schemes and unwise advertising expenditures.

With regard to the latter he says:

"I never could quite understand why a wholesaler should advertise in the newspapers under his own signature; neither could I understand why a wholesaler should give up part of his legitimate profit in the form of advertising allowances. Yet these evils have existed in the past, and I might say that my own company in the past has been a victim of such wasteful methods."

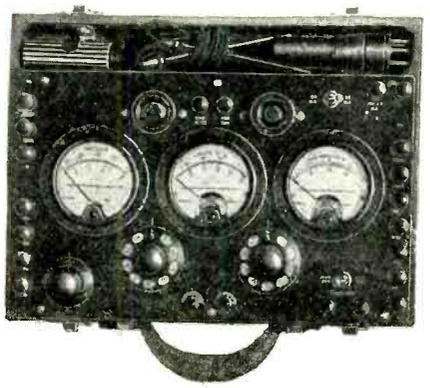
He recommends that the distribution of radio sets be put on a business-like basis so as to eliminate (1) coöperative dealer advertising, (2) extra volume discounts on "key" accounts, (3) unlimited credit extensions, and (4) carrying past-due accounts.

"If all distributors were to observe a policy based on the foregoing fundamentals, there would be a profit in it for the wholesaler; and the unfit, undesirable and poorly financed retailer would be forced out of a business in which he has no place."

TWO OUTSTANDING SERVICE INSTRUMENTS

Forty odd years of world wide instrument supremacy is reflected in the Weston Radio Test Equipment.

When selecting your servicing and test instruments bear in mind this fact that no other manufacturer has been able to successfully compete with Weston quality and dependability.



MODEL 547—A complete Test Set for all types of A.C. and D.C. Radio Receivers and Tubes. It is fast, convenient and reliable in operation. Extensively used by radio service men. Also suitable as a handy portable test set for general factory and laboratory purposes.

MODEL 555 — Counter Tube Checker. Widely used by better radio dealers to test tubes at time of sale. Checks all type tubes, A.C., D.C., and Rectifiers (both plates). Speed and ease of operation have made it very popular.

WRITE FOR DESCRIPTIVE LITERATURE

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PIONEERS SINCE 1888
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AIREX SPECIALS

Adjustable Ground Clamps (9-in.), doz.	50c
Insulated Lead-ins (with clips), doz.	50c
Aerovox Filter Condenser Blocks, tapped 19 mfd., 600 volt test	$3.25
Kolster Twin Audios (two), pair	$1.50
Shielded Lead-in Wire (stranded) 100 feet (coil)	$2.00
500 feet (reel)	$7.50
Spintite Wrenches (three Stevens)	14c
Airex Universal Audios (3½:1 & 5:1)	90c
Airex Uni. Push-Pull (3½:1, 5:1 & 1:1)	95c
U. V. 196 Rectron (Rectifier for Super Ducon)	85c
Atwater Kent Replacement Audio Trans.	$1.45
Eagle Raytheon "B" Transformer	$1.75
2/10 Mfd. Cond. (Laboratory Standard)	25c
Grimes Unshielded Audio (3½:1)	30c
El Menco Moulded Mica (.002)	10c
Dongan 250 Push Pull Power Transformer (250 & 281 tubes)	$4.75
Synchronous Motor (Allen Hough)	$3.25
Moulded Bakelite Sockets (4 & 5 prong)	12c
Replacement Block for A. K. No. 38 sets	$4.75
Nat. Baldwin A. C. Dynamic Speaker Chassis	$7.50
Kolster K 6 Speaker (walnut cabinet)	$5.00
Yaxley Tip Jacks	25 for $1.20
Dongan Step-Down (220 to 110 volts) Transformer	$4.25
30 Henry Choke, 125 mils, 400 ohms	$1.35
Screen Grid Caps (silvered), doz.	25c
Bryant Toggle Swith (bronze finish)	15c
Single pole, double throw (Bryant T. S.)	20c
Bryant Moulded Snap Sw. (¼-in. shaft)	20c
Centralab Pot. (1000 ohm)	25c
Airex, Bronz Shell, Push-Pull Transformer	$1.50
Bradleyohms (2-195 & E-25)	25c
Cutler Hammer, Single Pole triple throw and off, Toggle Switch	25c
Frost Variable Resistors (roller type)	25c
Airex Power Tube No. 182 replaces 171 tubes giving greater volume	$1.00
Replacement Condenser for Kolster 6-J sets	$1.85
Tyrman 250 Power Amplifier (Imperial 80). This amplifier delivers 100 mils at 400 volts, has one stage 250 power, and will operate a D. C. Dynamic Speaker	$13.25
Replacement Condenser Block for Majestic "B" Elim.	$2.90
Beede Radio Set Analyzer & Tube Tester (1931 model)	$14.25
Sky-Sweeper Aerial (a new idea in Antennae)	$1.50

Airex Impregnated Filter Condensers:

Size mfd.	Rating D.C.	Dim. Inches	Price Each
1	1000V.	4⅛x¾x4⅛	90c
.5	1000V.	1⅜x 2x4⅜	50c
1	800V.	2½x⅞x4¼	60c
2	600V.	2½x 1x4¼	60c
1	600V.	2½x⅞x4¼	40c
4	200V.	2½x¾x4¼	45c
2	400V.	2½x⅞x4¼	45c
2	200V.	2x½x4¼	25c
1	400V.	2x½x4¼	25c

SUPER 250 PUSH-PULL AMP. KIT

Complete Kit Consists of

1 Dongon 750-volt full-wave transformer	$4.75
1 Faradon Condenser Block (1000 v. test), 9.1 mfd.	3.50
1 Chicago Choke (weight 3 lbs.)	1.35
1 Splitdorf Choke (weight 4 lbs.)	1.40
1 Pair Push-Pull Audios (250 tube type)	4.00
1 Audio Transformer (heavy duty)	1.00
4 Baked Porcelain Wire-Wound Resistors	1.00
2 Metal Baseboards, rubber feet, Bradleyohm (for detector control), hook-up wire	1.00
Total	$18.00
Price of Complete Kit	$15.75

TERMS: 20% with order, balance C. O. D. 2% discount allowed for full remittance with order only.

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The First Tube Tester Which Indicates Directly Normal Wear and Noisy Tubes

APPLIES CORRECT D.C. PLATE VOLTS.
APPLIES CORRECT D.C. GRID VOLTS.
APPLIES CORRECT FILAMENT VOLTS.
INDICATES DIRECTLY, DYNAMIC MUTUAL CONDUCTANCE AND PLATE CURRENT.
TESTS ALL TYPE TUBES INCLUDING THE NEW 2-VOLT TYPE.

The AC-47 Radio Tube Tester is the first jobbers and dealers type tester to be placed on the market operating from 110 volt A.C. line, which actually applies D.C. TO THE PLATE, and at the same time, delivers the correct amount of D.C. GRID BIAS.

In all other types of tube testers now on the market, Raw A.C. is applied to the plate, and the tube is made to act as its own rectifier. It is impossible to get an accurate check of any tube unless D.C. is applied to the plate.

In the AC-47 Radio Tube Tester, all the voltages are standardized and are absolutely INDEPENDENT OF LINE VOLTAGE FLUCTUATIONS.

MUTUAL CONDUCTANCE is the most important determining constant of the excellence of any radio tube, and the AC-47 is the first to be placed on the market, which actually indicates this constant DIRECTLY ON A METER.

Write for Bulletin No. 27, containing complete description and prices.

Write for Bulletin No. 26, which contains complete description and price of the New Hickok SG-4600 Radio Set Tester, which contains direct reading ohmmeter and capacity meter.

The Hickok Electrical Instrument Co.

CLEVELAND, OHIO

OCTOBER 1930—SECTION II

IN TWO SECTIONS

RADIO

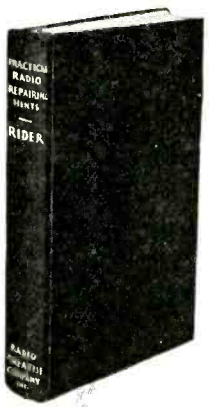
THIS SECTION OF "RADIO" IS SENT TO ALL SUBSCRIBERS TO THE MAGAZINE AS A PART OF THEIR REGULAR SUBSCRIPTION

RADIO BOOKS for PRACTICAL WORKERS

By

JOHN F. RIDER

Practical Radio Repairing Hints



is something "different" in radio books. It is written for the practical man who needs practical data, and the service man who must have his data in a hurry. . . . NO THEORY and NO FORMULAE. . . . Practical dope, facts and figures, hints and kinks from the first page to the last.

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Practical Testing Systems

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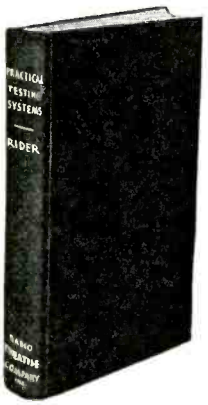
PRACTICAL TESTING SYSTEMS is complete in every sense of the word. Nothing is left undone. Electrical values and constants and constructional details are given in explicit clear form so that anyone can build the units. Resistance values and coil winding data is furnished wherever such units are employed. . . Operating details and possible applications are also cited.

Some of the testing systems found in this work are: General utility tube tester; A. C. Tube Comparator for dealers; A. C. tube tester for portable use; Eliminator voltage and current tester; Eliminator continuity tester; Simple self-modulated R. F. oscillator; Complete signal generator for receiver testing; Dynatorn beat note oscillator; Output meters; vacuum tube voltmeters; Capacity measuring system; Resonance indicators, etc. THIS IS NOT A REPRINT . . . IT IS AN ENTIRELY NEW BOOK!!



Trouble Shooter's Manual

by JOHN F. RIDER is the most widely read trouble shooting book in this country. The first of its kind, it has been received with great favor and is the accepted textbook in many famous radio schools in this country and Canada. . . . **Now complete with the Screen Grid and Automatic Volume Control Supplement it becomes the most up-to-date and modern trouble shooting book!!**

In it you will find accurate technical data about radio receivers, eliminators, loudspeakers and other accessories. In addition the book contains the wiring diagrams of old receivers now in use, but of which the diagrams are not generally available.

Truly a great volume! Its use as a textbook in such famous radio schools as Samuel Curtis Radio School, Boston, Mass.; Radio Corporation of Pennsylvania, Pittsburg, Pa.; Oregon Institute of Technology, Portland, Ore.; National Automotive and Electrical School, Los Angeles, Calif., proves its worth and authenticty. It is used in many other schools. . . . It is a reference trouble shooting book the world over! Wherever American radio receivers are sold! 240 pages . . . Bound in flexible black Sturdite binding. Gold letters.

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Among the receivers shown are Grebe, Stromberg-Carlson, Stewart-Warner, Fada, Crosley, Kennedy, Philco, Brunswick screen grid models. . . All diagrams are black on white, 8½" x 11". Clear and easy to read. Many show all electrical values of condensers and resistances.

The Mathematics of Radio

is the first practical book on radio mathematics for the rado worker. Here is the first comprehensive volume devoted to the solution of simple mathematical problems which confront the practical radio man. It is written for the practical man in a practical manner. . . . Learn how the various voltages are secured. . . . This book is a technical education. . . . It is a popular work and is employed as a standard text book in many radio schools.

Do not let the title frighten you. . . . To understand it you do not require an engineering education. If you can add, multiply and subtract, you will secure much valuable data from this book. . . Here you will find practical problems as they are applied to a radio receiver. . . .

The following are the chapter headings in THE MATHEMATICS OF RADIO: 1. Ohm's Law; 2. Resistances; 3. D. C. Filament Circuits; 4. A. C. Filament Circuits; 5. Capacities; 6. Voltage Divider; Systems for B Eliminators; 7. Inductances; 8. Inductances Required in Radio Circuits; 9. Reactance and Impedance; 10. Resonant Circuits; 11. Iron Core Chokes and Transformers; 12. Vacuum Tubes; 13. Three Element Tubes; 14. Power Amplification; 15. Graphs and Response Curves; 16. Multiple Stage Amplifiers; 17. Alternating Current Tubes; 18. Screen Grid Tube; 19. A and B Eliminators. 128 pages. Bound in flexible cover. 119 illustrations. . . A valuable addition to your library and an excellent source of technical data.

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A New Test Panel for the Shop

In which several new ideas are introduced: Rectifier Meter, Speaker Comparison, Pick-up Comparison, Eliminator Load, Superheterodyne i-f Oscillator.

By J. EDWARD JONES

THERE is a crying need by the average small dealer for an adequate, yet inexpensive panel for the shop bench. A canvass of twenty-five average dealers proved that the panel described herein fills this long-felt want. Properly built it will prove an asset to any shop, and where only a reasonable amount of service work is done it will not only pay for itself in a few months, but will remain a lasting time-saver for many years.

In the design and layout every need has been taken into consideration, based upon the operation of a large distributor's shop, and the expressed needs of many dealer service men over a period of years.

No attempt has been made to introduce a set analyzer into the panel, as all dealers have one or more portable analyzers, and it is an acknowledged fact that every set entering the shop, granting it has been properly checked in the home, must be removed from its cabinet, thereby rendering all parts accessible for measurement and test. In addition, and as part of shop equipment, the dealer should have a speaker mounted suitably, above the panel and properly baffled, a turntable and a standard pickup.

Let us build the panel, then see what can be done with it. First collect the material, not forgetting the junk drawer, or old trade-in sets piled up in the back room. We need a bakelite panel 22″x15″x$\frac{3}{16}$″. It would be nice to have it engraved, and with the dealer's own name in the center, as it would create quite an impression on customers who were accidentally allowed to see it.

The one meter is a comparativly new development and can be obtained from the Weston Instrument Company, the General Electric Company or the General Radio Company, or, should the builder so desire, a copper oxide rectifier could be obtained and used in conjunction with any standard one milliampere meter. To allow utter flexibility of purpose we will leave the scale readings, therefore current shunts and series voltage resistors to the choice of the individual. The drawings show suggested current and voltage readings.

A word of caution is sounded by the Weston Company, who feel that the copper oxide rectifier meter's use is limited to the laboratory. They say it has limitations due to frequency change, wave form and temperature. There is quite an effective variation in the resistance of the rectifier as the current swings the needle from zero to maximum deflection. This, however, is taken care of in the scale of the meter, and while it makes calculation of shunt resistances difficult, it will cause no appreciable error if shunts are "fitted" to the meter by the comparison method. This method merely consists of hooking another ammeter in series with the one to be shunted and clipping the shunt resistance until the indicators of the two meters read alike. Because resistances in meters vary, and because even if the proper resistance for the shunt is determined, which would require a Wheatstone bridge (and then the resistance of the soldered joint would upset the apple cart all over again), the comparison method is the only practicable method for the service man. If the extra meters for comparison are not available in the shop they certainly should be "borrowable," either from the nearest competitor or a high school laboratory.

Special attention is called to the current jacks marked A to E inclusive. The connections are made so that the shunt is closed before the meter circuit so as to protect the meter at all times. The voltage jacks, F to J inclusive, are simple open circuit jacks. Yaxley No. 1 type will be found very satisfactory.

To follow the alphabet we next come to the ohmmeter continuity tester. K is a Yaxley No. 3 filament control jack. It puts 1 ohm across the meter to allow measurements of low resistances. This low reading is a little hard on the 771 C battery used in conjunction with it, but the battery lasts many months, and with this arrangement it is possible to measure and read with ease as low as 5 ohms. The high side L, No. 1 Yaxley open circuit jack, uses no shunt and the meter gives an easily definable deflection at a quarter of a megohm. The low side uses a Yaxley 400-ohm variable resistance, and the high side a Yaxley 5000-ohm variable resistor. These are the series resistors, and if set before each reading the results must be accurate. The method for setting is to short probe tips and adjust to maximum deflection of

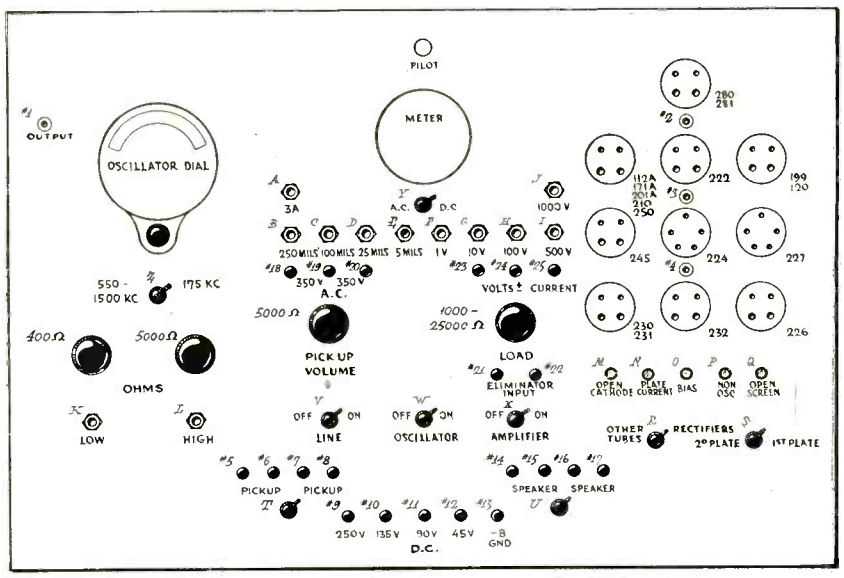


Fig. 2. Suggested layout for Front Panel

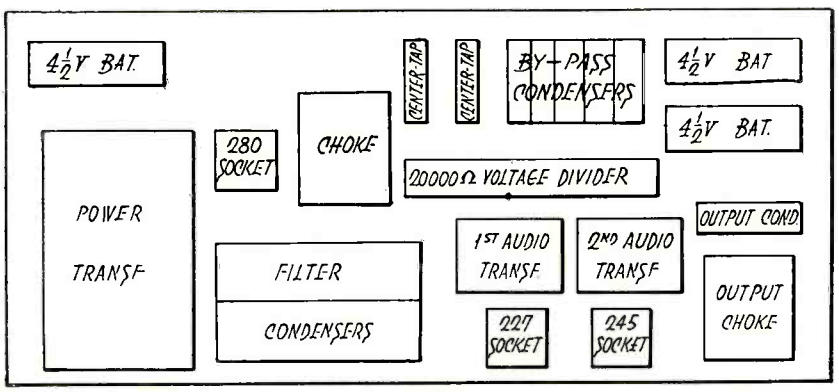
meter. This is done to offset any change of voltage in the battery. It is merely a simple problem in Ohm's law. Current equals voltage divided by resistance; therefore, if our voltage drops a trifle we drop the resistance in like proportion and our current remains the same. The builder should plot a curve, using known values to obtain as many points as possible.

The Tube Tester

Ten sockets are used in the tube tester, seven UX and three UY. The lone socket on top is for rectifiers and is operated in conjunction with switches R and S. The switch R is merely thrown to the desired position and the switch S manipulated to get each plate of a 280. Switch R is so connected that a shunt allowing a measurement of about 100 ma is used. The filament of this socket goes to a five-volt winding on the power transformer, taps from which are taken off for the pilot light. The next row of three sockets are UX, their filament terminals being connected to the same five-volt winding. The inner left-hand one gets the full five volts, being used for all the five-volt tubes, as well as for the 210s and 250s. The other two sockets of this row are connected through a resistance of six ohms in each leg. The middle socket of this row is used in conjunction with Yaxley pup jack marked No. 2 to test UX 222 screen grid tubes, and the right-hand one is for 199s and 120s.

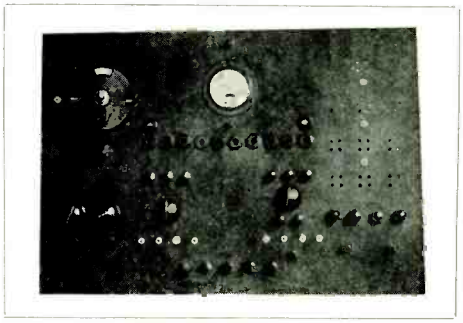
The next row of three are 2½-volt sockets, the first, a UX, is for 245s, the second, a UY, in conjunction with Yaxley pup jack No. 3, is for 224s, and the other UY for 227s. The left and center of the bottom row are for the 2-volt tubes. The filaments of these 2 UX sockets are tapped across the 2½-volt winding through 2½ ohms of resistance in each leg. The first is for 230s and 231s, the middle one, in conjunction with Yaxley pup jack No. 4, is for the UX 232 screen grid 2-volt tube. The filament of the right-hand socket is also tapped across the 2½-volt winding, but through resistances of ½ ohm in each leg. This is for the 226.

Push buttons M to Q inclusive operate the tester. M and Q are buttons normally closed, N is a button normally open, while O and P are single pole double throw, or "break one-make one" buttons. Tubes are tested first in an oscillating condition. The oscillating coils are plainly indicated. Those as used in Radiola 25 are recommended with a .004 μf condenser across the grid coil. Pressing button N puts a particular shunt in action on the meter, which should be such as to give about 25 mils full scale. Meter now reads plate current with tube oscillating; this reading should be noted. Then with another finger press button P. Note reading. The difference between it and first reading is a direct indication of the sensitivity of the tube with oscillatory current on the grid. Low plate impedance power tubes give only small difference. Now release P and press O, and again note reading. The difference now is the change in plate current with 9 volts d-c impressed on the grid and is a direct indication of its amplification factor, or so-called sensitivity. For tubes with indirectly heated cathodes, such as 227s and 224s, hold down on button N and press button M. If reading remains the same the tube's cathode is shorted to its heater. For all screen grid tubes, while still pressing N, press Q also. If reading remains the same, there is a screen plate short. This is an excellent test for tubes. While lengthy description is required, in practice it is very rapid. Push buttons can be obtained at all meter manufacturers or can be made from old jacks. It is recommended that the builder test several known good tubes of each type and keep the three readings until he becomes familiar with the variations. Tubes giving good readings on this tester will give excellent service, and if all tubes are tested before being put in a new installation, many free service calls will be eliminated and generally greater satisfaction obtained by the customer.



Subpanel Layout

Next we come to switches T and U, both single-pole double-throw toggles. Both work in conjunction with four binding posts or pup jacks. Very few dealers have a set hooked up at all times, yet speakers will persist on coming in for repair or adjustment. Also the repair, test and adjustment of pickups is on the increase. Hence our recommendation for a standard pickup and turntable and a standard properly mounted speaker as part of shop equipment. Pickups can be repaired, then compared with the standard on the same record, amplifier and speaker by merely flipping switch T. The repaired speaker also can be tested and compared, using same pickup, record and amplifier, by merely throwing switch U.



The Completed Job

Switch V turns on the 110 a-c, and must be on when any power is used from the panel, such as tube tester, amplifier, oscillator and a-c and d-c voltages. It can be off when using continuity circuit, when using the meter for straight measurement, or when testing load output of eliminators and power packs.

Switch W turns on the filament of the modulated oscillator and switch X turns on the filaments of the two amplifying tubes. Either of these may be off when their respective appliances are not in use. They, like V, are merely on and off toggles.

Switch Y is also an on and off toggle and is used in conjunction with the meter. It is thrown to a-c if alternating voltages or currents are to be measured, and vice versa. Full instructions for operating this come with each meter.

The oscillator needs little comment. The circuit is self-explanatory. While GR coil 277 C is recommended, any r-f transformer secondary may be used, just by tapping it at the center turn. It makes no difference how large or small it is, or how large the wire is, or how many turns there are, as long as it was once a good r-f coil and covered the broadcast band with a .0005 μf variable condenser. For the low frequency coil, to give 175 kc for RCA superheterodyne intermediates, 200 turns of No. 30 DSC wound on a two-inch form, with an XL .0001 to .0005 μf adjustable condenser shunted across the coil ahead of the switching arrangement, is recommended. This gives quite a range each side of 175, can be shifted up or down, and will undoubtedly cover other makes of supers that will make their appearance on the market during the coming season. A Radiola 60 intermediate with trimmer and neutralizing condensers removed makes a pretty good makeshift 175 kc oscillator coil for this arrangement. For the grid condenser

and leak, while values shown have been used with satisfactory results, a different pitched note may be obtained by different combinations. Generally the higher the resistance of the grid leak the higher the frequency of the modulated note. The switch Z is a double-pole double-throw Yaxley jack switch, and changes from the broadcast band to 175 kc and vice versa. The pickup coils consist of 5 turns wound on the plate end of each coil, one end left open, the other end taken to Yaxley pup jack No. 1. Various ways of pickup can be tried. A wire between pup jack and antenna post of set will give a terrific signal in the broadcast band, or an open-ended coil can be plugged into the pup jack and the coil then brought into juxtaposition with one or other coils in the set being aligned. For gain indication the meter is used, connection being made to the output of the set, clipped across the voice coil if accessible and plugged into any jack from A to J, whichever gives the best reading. The meter will be found an excellent gain indicator, and as alignment increases the output scales of higher value may be used, saving manipulation of the set's volume control or the oscillator output.

Remember, fifty per cent of the sets in use today would give better results if properly aligned, and many sales have been lost to a competitor because his was better balanced, even though accidentally. Alignment means distance and selectivity, and as a specialty can be developed into a lucrative source of income to the well appointed service department.

We have mentioned Yaxley pup jacks 1 to 4. Numbers 5 to 25 can be either the same pup jacks or binding posts, whichever the builder desires. Numbers 5 to 8 are used with switch T aforementioned, as are 14 to 17 with switch U. Numbers 9 to 13 are merely extensions of taps on the voltage divider and are arranged to give various voltages d-c that may at times be necessary for flash tests on condensers, etc. Numbers 18 to 20 give high voltage a-c, 19 being ground and 18 and 20 being connected to the rectifier plates in the power supply. Therefore, between 19 and 20 or 19 and 18 we obtain half the voltage of the high voltage secondary, or approximately 350 volts a-c, while between 18 and 20 we get the full voltage, or about 700 volts a-c. Uses for this appendage will suggest themselves, for instance, a capacity measurement. Connect a known value of condenser, say 1 μf, in series with one 350-volt side and about the 100-mil scale of the meter, a certain definite reading will be obtained. Do this with various sized condensers of known value and you can plot a curve that will then give reasonably accurate measurements on unknown condensers. As a warning, it is advisable to make sure the condenser is not shot before attempting to test it.

(Continued on Page xiv)

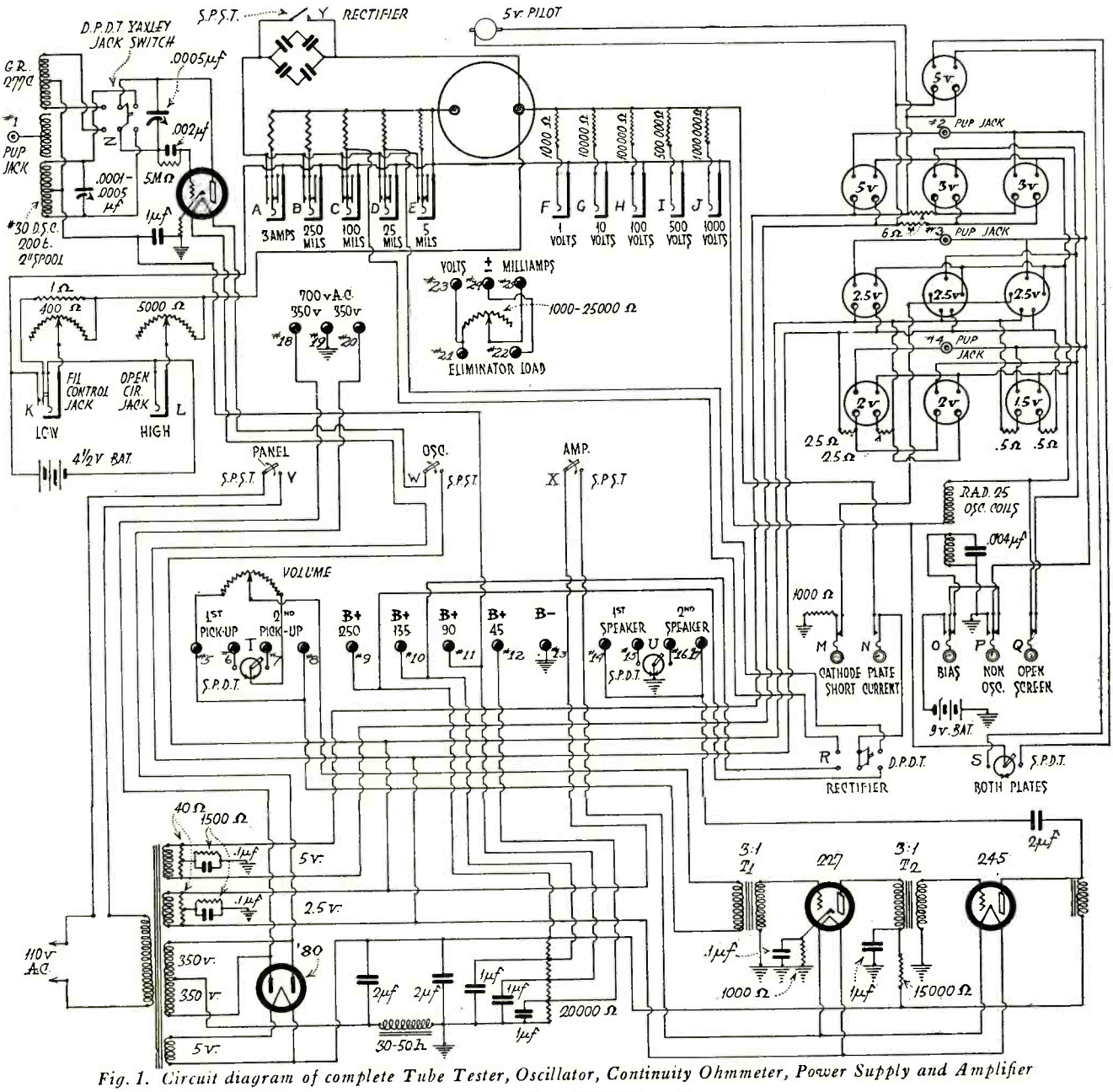


Fig. 1. Circuit diagram of complete Tube Tester, Oscillator, Continuity Ohmmeter, Power Supply and Amplifier

There Are Times—

A truck salesman argues that sometimes a radio service man should take a receiver down to the shop for repair.

By **WM. R. PHILLIPS**

"NO BUSINESS, Mr. Johnson. I have no use for a truck, light or heavy, four wheels, eight wheels or pin-wheels. The only thing I need transportation for are my own carcass and my nine-by-twelve service kit, and these things fit just beautifully in the enhancing phaeton that has carried them around for going on ten years." And Radio Smithy stoked his pipe with filings from his twist. "If the old boat ever falls apart under me I'll get even more democratic and buy me a motorcycle. Save gas, oil, air, water and rubber. And the only advantage a truck would have would be in carrying a big sign around town, as if the view wasn't already spoiled enough by such unsightly sights."

"Of course I don't know much about the radio service business, Mr. Smith," said the truck salesman, "but it strikes me that it is often necessary to take a set down to the shop and work on it, in which case a truck would be—"

"Not me, it ain't!" asserted the smithy. "Why? Because I know my stuff, that's why. In all my experience I've never come across a set yet that stumped me. Give 'er a lissen and get the symptoms, stick on the tester and find the cause, then rip her up and stick in a new condenser or resistor and put her back together just like the doc does to an appendicitis victim."

"Why does the doctor always haul his victims to the hospital, then?" queried Mr. Johnson.

"So he can soak 'em room rent and nurse hire. That's just the trouble; he builds himself a hospital and then he has to pay for it, and when a man's works goes wrong he's the guy that has to pay the doctor's bills for him. Every time he takes a joy ride in an ambulance he pays the monthly installment on the hack. And that's the way with radio service men who fix up a swell shop and buy a high-toned truck. They have to have the truck to drag the set down to the shop so they can use their fine gear. Then the poor goof who has trouble with his radio set has to cough up alms to pay for the shop and the truck, too."

"Did you ever get a spot on anyone's rug?" Mr. Johnson asked.

"Oh, what's a rug? Cost you twenty bucks and last a lifetime. A little spot don't hurt 'em any."

"The kind of rugs you and I buy cost twenty bucks, but some people spend a hundred or maybe a thousand dollars for one, and they're usually pretty particular about 'em."

"A thousand dollars for one rug?" Radio Smithy guffawed loud and long. "For a thousand bucks you could put rugs all up and down Main Street. Wait'll I answer this phone."

"Hello!"

(Animated female voice vibrating receiver diaphragm.)

"Why, sure, Mrs. Applegate. It only took me ten minutes, but I had to go all the way out there and back. My minimum charge for a call is two-fifty."

(More vibrations.)

"No, I didn't put any new parts into it, but I would of if I had been one of these dumb clucks with a fancy wagon and no brains."

(Rattling sound, like overloaded speaker.)

"Well, make it a dollar and a half. Sure was worth that much. O. K., Mrs. Applegate. Goodbye."

"Can you beat that? If I'd fussed around awhile and spent a couple of hours unscrewing things and screwing 'em up again I could of collected five bucks. Some people don't appreciate brains."

"Of course not, Mr. Smith. That's why it's good psychology to drag the set out and work on it where they can't see you."

"Yeah? That's crooked business."

"No, it isn't. It's just letting them take for granted the fact that it takes brains to fix a set and that it costs you money to go and come, rather than trying to explain it to them every time. No use trying to reason with people when they're paying out money. If she had paid it this time she would have said 'Never again' and would have coughed up five dollars to your competitor next time without a whimper because he had to take the set down to his shop and give it expert care."

"I gave it expert care, I guess. Right there in her own home."

"Sure you did. And you fixed it. But you let her think that anybody could do it with a screw driver and a monkey wrench. People can't tell one service man from another, but they can tell one car from another or a fine shop with a lot of burnt-out meters stuck up in front from your little test kit that looks like a plumber's tool box. You have to use psychology."

"Maybe Mrs. Applegate has repented," remarked the smithy, as the phone rang again.

"Oh, good morning, Mrs. Adams."

"You say the radio doesn't sound as good as it used to? It was perfect when I left it."

"No, that little red thing was the same kind of resistor as the one I took out."

"Yes, I connected the wires back all right. The set's as good as it was when it was new."

"Well, I'll come out and listen to it, but I'm sure you're mistaken about its quality.'

"Well, goodbye, Mrs. Adams. I'll be out at two thirty."

"Get a lot of 'em like that," grumbled Mr. Smith, as he made a note of the time in his call book. "Especially old ladies. Once they see the guts of their beloved radio sets out in the open they are sure they will never be the same. Same type that is always sure the doctor sewed up a pair of scissors in some friend's tummy."

"Yes, it's a shame to let 'em see the innards. They might faint, or otherwise embarrass themselves." Mr. Johnson was developing a new clue.

"Sure causes me a lot of wasted time and gas," the smithy moaned.

"Might be a good idea to ask 'em to leave the room, or perhaps drag the set down to the shop—oh, that's right, you don't bother with that business, do you?"

"I been telling you there's too much overhead, ain't I?"

"Sure, I don't blame you for not wanting to shoot in all your profits on a shop and a gas buggy. Of course these return trips give the old ladies a lot of satisfaction—"

"Dadblame the old ladies and their satisfaction. Now who's this? Let's see if one out of three phone calls can be a new job." Mr. Smith was beginning to grow impatient.

"Mr. Harrison? Oh, yes. Radio giving you trouble again?"

"How do you know it isn't in the power pack this time?"

"You've got it all to pieces? Parts all over the kitchen? My gosh, Mr. Harrison! Now how'm I to know what came from where?"

"Well, I'll come out and take a look at the remains. Say about four o'clock. Goodbye."

"Talk about your old women! This old codger thought because he saw me take his set apart last time that he could do it himself and now he has parts all over the kitchen. Good gosh, what a mess!"

"Maybe if you give him a couple more lessons—"

"Oh, shut up! Say, what'll you give me for old Henrietta out there, and how much a month on this delivery job?"

Circuit Analysis of the BRUNSWICK

Models 15, 22, 32 and 42

THESE Brunswick receivers are comprised of three r-f stages in which screen grid tubes are used, a screen grid detector and a pair of '45s in parallel. An '80 is used as a rectifier.

The antenna is inductively coupled to the first grid circuit, a local-distance switch disconnecting the input circuit from the antenna, except for the capacity leakage through the switch itself, and shunting a .0002 μf condenser around the coupling coil and a small r-f choke in series with it.

Each r-f grid is grounded, after having passed through the grid coil. Each plate is coupled to the succeeding grid through a very small capacitance, being supplied with d-c through an r-f choke. The capacitance that couples the first plate to the second grid circuit is variable and has a small section which allows some of the r-f current to go to ground. This is a very simple way of controlling the volume of the receiver without affecting the operation of any tube.

The three r-f cathodes are joined together and connected to ground via a 300-ohm resistor, which drops 2.58 volts for grid bias. Incidentally, the method used in drawing this circuit is worthy of much commendation and appreciation from those who would grasp the significance of each and every component. It is absolutely self-explanatory—but this page must be written. The plates are supplied with their d-c from the low potential end of the a-f choke in the filter, through a 180,000-ohm resistor which drops 186 volts, leaving 180 for the plates. This line further supplies the screen grids, dropping 105 volts through the 35,000-ohm resistor. The 50,000-ohm resistor between the screen grid line and ground serves to stabilize the voltage. The detector screen grid is fed from the same source of supply, another 180,000-ohm resistor being connected in series and a 250,000-ohm resistor acting as a bleeder. All of these resistors, of course, are by-passed and serve as r-f filters as well as voltage reducers.

The detector grid circuit is similar to the others except that a .02 μf condenser is in series with the tuning condenser and the former is shunted with a 4-megohm resistor. A 25,000-ohm resistor supplies the voltage drop for grid bias.

Resistance coupling is used between the detector and a-f amplifier. The detector plate feeds into a two pi filter section, plate voltage being supplied from the high voltage line after it has passed through the speaker field winding, a 50,000-ohm resistor and the 250,000-ohm coupling resistor. A .02 μf condenser couples the detector plate and a-f grids, and a 500,000-ohm resistor forms the secondary of the a-f coupling unit. The power tube plates are fed into the output transformer through a 1 μf condenser.

(Performance Curves on Page xiv)

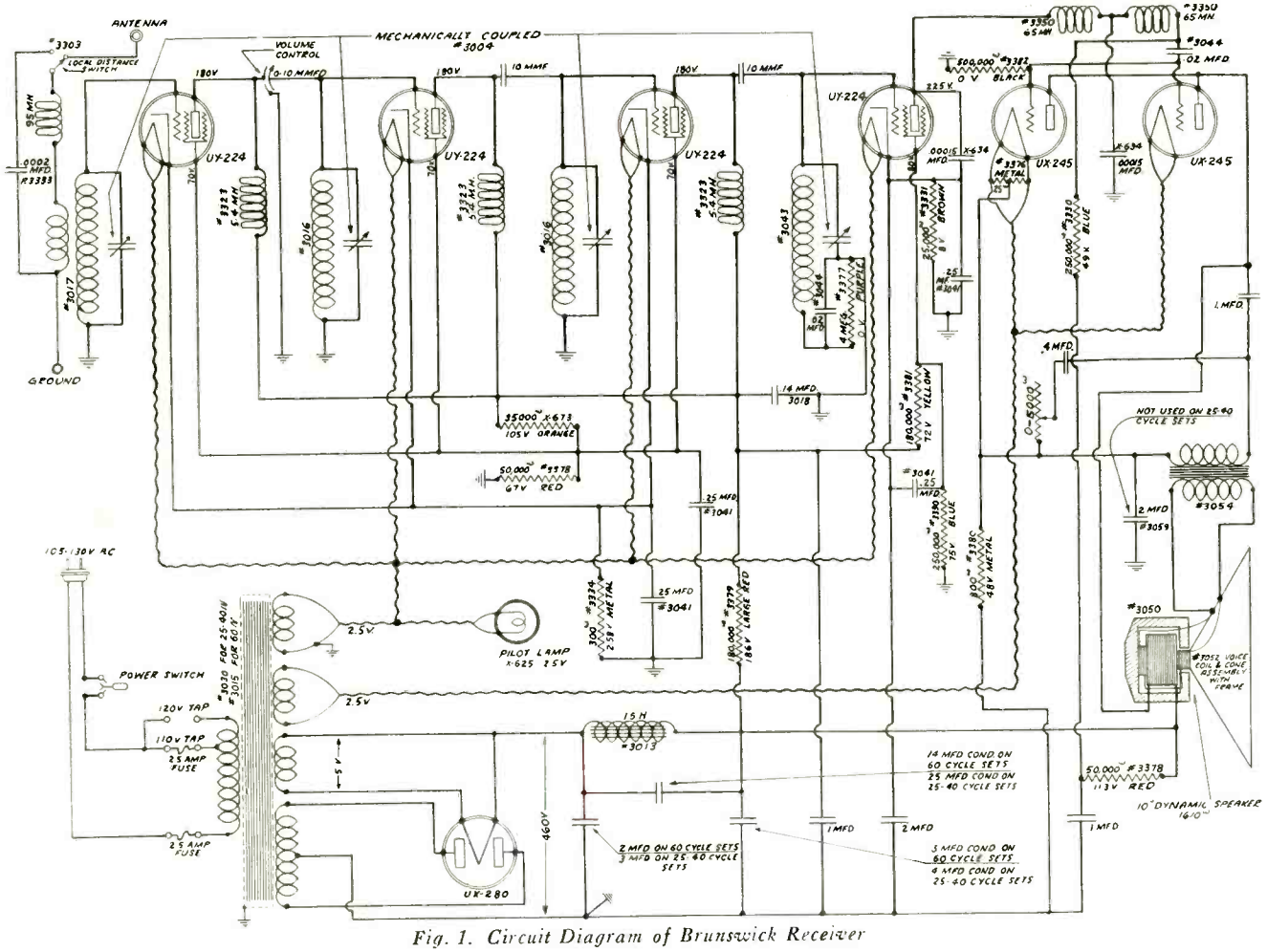


Fig. 1. Circuit Diagram of Brunswick Receiver

Models 60 and 61

Circuit Analysis of the BOSCH

THESE receivers have three screen-grid r-f stages, a screen-grid detector, a resistance coupled a-f stage with a '27 and a push-pull power stage with two '45s. An '80 is used for a rectifier and another '24 screen-grid tube is used as an automatic volume control. Five tuned circuits are employed, one of them being a pre-selector circuit ahead of the first grid circuit, another being coupled inductively to the plate circuit of the second tube and the other three in the grid circuits of the first and third r-f tubes and the detector. The second r-f grid is untuned.

The local-distance switch couples the pre-selector circuit to the antenna for distance reception and to ground, through a 500-ohm resistor, for local use. The antenna trimmer condenser setting seems to be very constant over the whole frequency band.

The plates of the first two r-f stages are supplied with the full output of the filter. The screen-grids are fed through a 20,000-ohm resistor from a point in a voltage divider that shunts the speaker field winding. The first grid is connected to the second through a 1000-ohm resistor, and the two of them are joined to a point in another voltage divider through two .5 megohm resistors. This point is negative with respect to the end of the divider to which the first two cathodes are connected, giving the r-f grids their normal bias. The elements of the automatic volume control tube are also connected to various points in this voltage divider, the grid going to ground or the negative end through the secondary of the detector r-f transformer, the phono switch and the detector grid bias resistor. The plate goes through one of the .5 megohm resistors in the r-f cathode lead. Therefore, when greater signal current is put onto the detector grid and the automatic volume control grid in parallel with it the plate current of the latter increases, causing a voltage drop in the .5 megohm resistor with a subsequent rise in grid bias for the first two r-f tubes. This, of course, decreases the volume automatically. The meter in the cathode circuit gives a reading of the r-f plate current, showing a peak at resonance which cannot be perceived by the ear, due to the fact that the volume is the same over several kilocycles. This volume control system takes hold at a very low input and operates very accurately.

Two tuned circuits separate the second r-f tube from the third. The grid bias for the third stage is obtained from the 1000-ohm resistor. Two phonograph switches are thrown by the gang condenser shaft; one shorting the third r-f grid direct to ground and the other throwing in the phonograph pickup. The third r-f plate receives its voltage from the low potential end of the speaker field winding, which serves as the second a-f choke.

The detector grid bias is supplied from a 50,000-ohm resistor between cathode and ground, the screen-grid voltage from the same source as the automatic volume control tube and the plate voltage from the line that supplies the third r-f plate. This voltage passes through the .5 megohm coupling resistor. While the r-f component in the detector output circuit is filtered out of the a-f circuit it is not kept from the power supply, although a .5 μf by-pass condenser is supplied for this purpose. The path of lowest resistance, in other words, is not through the by-pass condenser but direct to the power supply. Ordinarily the r-f filter would be connected between the plate and the plate resistor.

The .5 megohm grid coupling resistor is variable, serving as the manual volume control. The 160-ohm resistor section of the third voltage divider, the one between the '45 filament center tap and the positive lead, supplies the bias for the first a-f grid. The plates of the two power tubes are fed from the junction between the choke and the speaker field winding, grid bias being supplied by the drop through the 950-ohm resistor on the low potential end of one of the voltage dividers, connected between ground and the center tap of the filament shunt resistor. A tone control is connected across the two '45 grids, and consists of a variable .5 megohm resistor and a .006 μf condenser.

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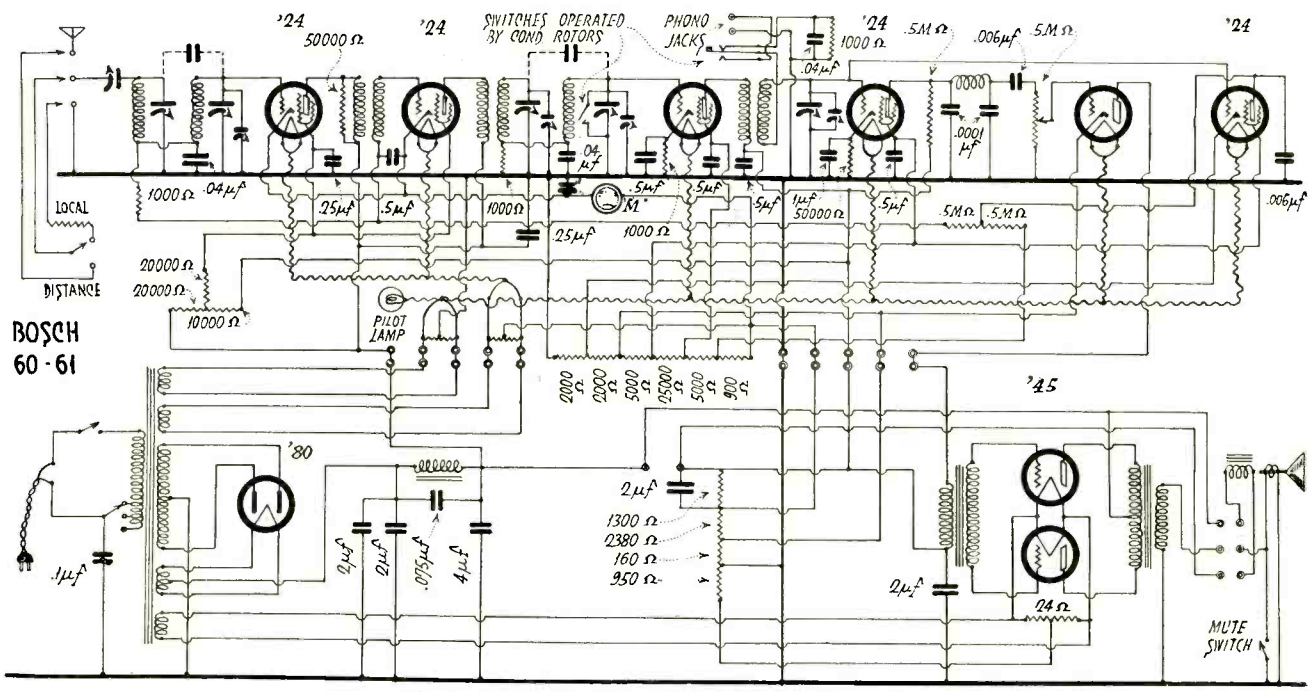

Fig. 1. Circuit Diagram of Bosch Models 60 and 61

Circuit Analysis of the PHILCO

Models 96 and 96-A

THE Philco receiver employs three '24s in the r-f stages, a '27 detector with a detector-amplifier of the same type, a '27 first a-f tube and a pair of '45s in push-pull for the power stage. The rectifier is an '80. The antenna circuit is untuned, and coupled to a tuned circuit which precedes the grid circuit of the first tube. This is sort of a preselector arrangement, giving four tuned circuits instead of three, and thereby increasing the selectivity noticeably.

The three r-f cathodes are grounded, while the grid of the first tube is connected to the grid of the second through a 70,000-ohm resistor, and the two of them pass through a 500,000-ohm resistor to the junction between the grid of the detector amplifier and the 250,000-ohm resistor which separates the latter from the grid and plate of the detector. These two elements of the detector are tied together, allowing the tube to act as a two-element linear detector. The third r-f grid goes to the detector grid and plate also, but through another path; *i. e.*, through a separate 500,000-ohm condenser and the upper of the two 100,000-ohm resistors between detector grid and cathode.

The a-f component of the detector output is small, therefore it is amplified by the detector-amplifier tube, which might just as well be called the first stage of a three-stage amplifier. The d-c component is large enough to control the bias on the r-f grids, hence the volume. When no signal voltage is passing through the r-f circuit a constant bias of 3 volts is applied to the grids of these tubes. When a signal is tuned in and amplified by the r-f stages the d-c output of the detector adds to the grid bias, blocking the passage of too greatly increased signal voltages.

The plates of the three r-f tubes as that which supplies the plate of the detector-amplifier; from the low potential end of the speaker field winding. The screen-grids are also fed from this line after a part of the voltage has been dropped through a 13,000-ohm resistor. The 70,000-ohm resistor which connects this point to ground is used as a bleeder for the stabilization of both the plate and screen-grid voltages. A 1 μf condenser by-passes this bleeder resistor. Two separate resistance-capacitance filters are employed in both the r-f plate supply line and the screen-grid supply line, one filter being connected between the first and second tubes in each line and the other between the third tube and the power supply.

The output of the detector-amplifier is filtered of its r-f component through a .00025 μf condenser between plate and ground. Then it is coupled to the grid of the first a-f tube by the usual resistance-capacitance method, the plate resistor being divided between the 250,000-ohm section and the 500,000-ohm section and by-passed to ground at the junction. The same thing is true of the grid resistors, the filter condenser, in this case, being one of those in the main condenser block. The resistor closest to the grid has a variable potentiometer arm and is used as a manual volume control.

A tone control is supplied in the output circuit of the first audio tube, and acts to by-pass the high-frequencies at varying rates according to the amount of capacity across the plate and ground. The cathode is grounded and the grid return leads to the center tap of the high voltage secondary. As this point is separated from ground by two 70-ohm resistors the bias is supplied to the grid from the voltage drop through the latter. The plate of this tube, after going through the primary of the a-f transformer, passes through a 25,000-ohm resistor, which reduces the plate voltage to the required amount, to the low potential end of the speaker field winding.

The grids of the two '45s are biased by the drop in the 800-ohm resistor between the filament center-tap and the negative high voltage lead. The plates are supplied, through the two sections of the output transformer secondary, from the high potential end of the speaker field winding. The output of the '80 rectifier is filtered through an a-f choke, which, with a 3 μf condenser on each side, forms a single filter circuit. This choke is shunted with a .3 μf condenser which has the effect of tuning the LC circuit to the greatest possible reactance at 120 cycles.

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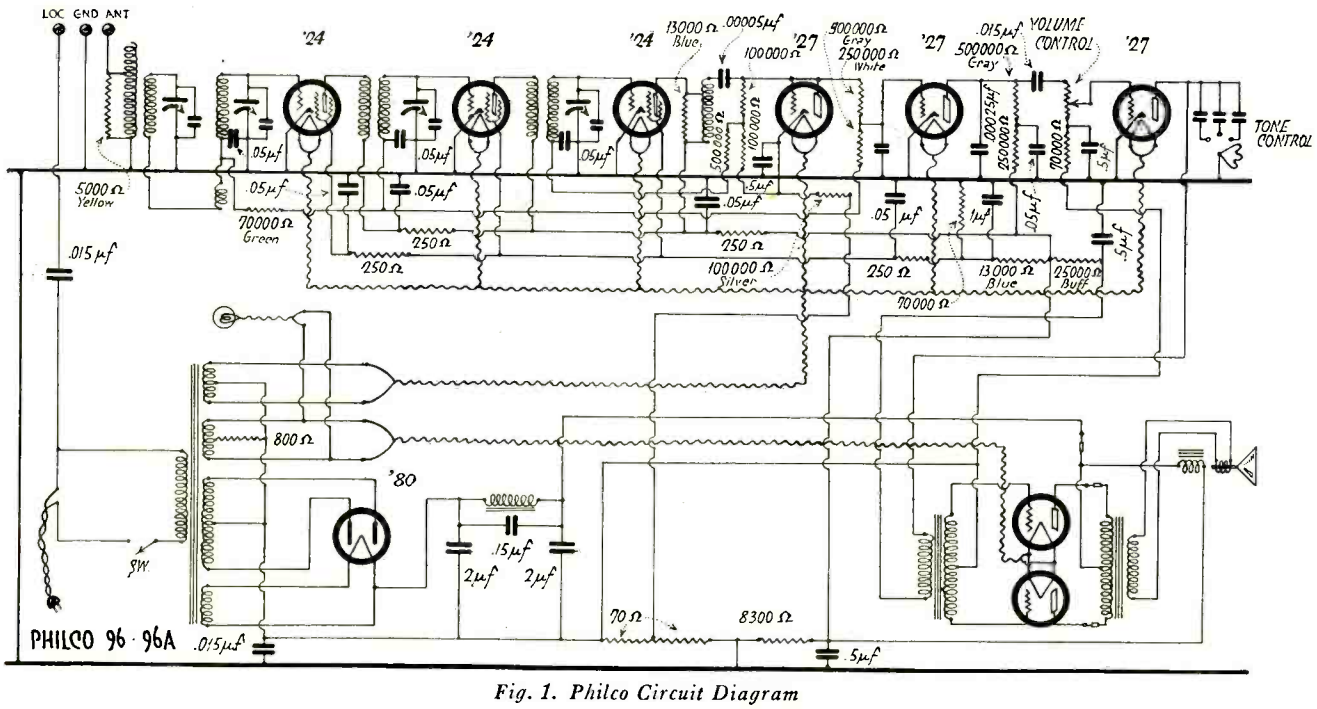

Fig. 1. Philco Circuit Diagram

Circuit Analysis of the

Model 230-A

MAJESTIC

Screen Grid Receiver

THE Majestic screen grid receiver has three r-f stages in which G-24 tubes are used, a screen grid detector and a pair of G-45s are employed. A G-80 is used for the rectifier.

The local-distance switch shorts across the ground and antenna posts for local reception. The antenna is coupled to the first of the two tuned circuits which precede the first r-f stage through a small compensating condenser. The two circuits are magnetically coupled and connected to ground through a by-passed 500-ohm resistor. The circuit following the first tube is untuned, and designed for greatest gain, while the second tube is followed by another double tuned circuit similar to the first except that it is inductively coupled to the preceding plate circuit. The third r-f tube is coupled to the tuned grid circuit of the detector inductively also.

The first two r-f cathodes go to the movable arm in the 1260-ohm volume control resistor which is a section of the voltage divider, while the cathode of the third r-f tube goes direct to the negative end of this resistor. The screen grids are fed from the junction in the divider between the 7900-ohm unit and that of 3340 ohms, that for the third tube being reduced slightly through a 500-ohm resistor. The r-f plates are supplied from the terminal between the 5230 and 4875 ohm units, and again a slight reduction is made for the third plate.

The phonograph switch in the detector circuit is interesting. When thrown to the right for radio reception the screen grid voltage for the r-f tubes is applied, the detector bias is taken from the drop through a 35,000-ohm resistor between the cathode, switch and ground, and the grid return is grounded. When thrown to the left for phonograph reproduction the r-f screen grid voltage is grounded through an artificial load, the detector grid bias is obtained from the drop through another resistor, 7900 ohms, and the grid return is connected to the output of the phonograph pickup.

The output of the detector is filtered through one pi filter section and passed to the primary of the audio transformer. A 1-megohm resistor in series with a .002 μf condenser across the detector plate and cathode serves to knock off a few of the high frequencies. The detector plate is fed from the output of the third a-f choke, the voltage being of the order of 263 volts. The screen grid goes direct to a point in the voltage divider between the 3340 and 5230 ohm units.

The power tube grids are grounded, through their respective secondary sections, grid bias for these tubes being supplied by the drop of the 800-ohm resistor between the filament center-tap and ground. The plates are fed from the output of the second choke. The speaker field winding is shunted across the voltage divider.

The power supply transformer is tapped in the primary for voltage adjustment. Four secondaries are provided; one for the r-f and detector heaters, one for the high voltage, one for the rectifier filament and one for the filaments of the two '45 tubes. Three audio frequency chokes are used in the filter circuit, the first two being of low inductance and the third somewhat higher. The three filter condensers are of 2 μf each, although for 25 cycles the first filter condenser is of 4 μf capacity, the second is the same and the third has a capacity of 2 μf.

The phonograph pick-up is connected across the primary of a transformer, the secondary of which is shunted with a .007 μf condenser and a 500,000-ohm volume control potentiometer. This resistor is mounted on the same shaft as the volume control resistor of the radio receiver, eliminating the necessity for more than one knob. As the section of resistance between the movable arm, or the grid of the detector, and the grounded end of the potentiometer is increased the volume is increased.

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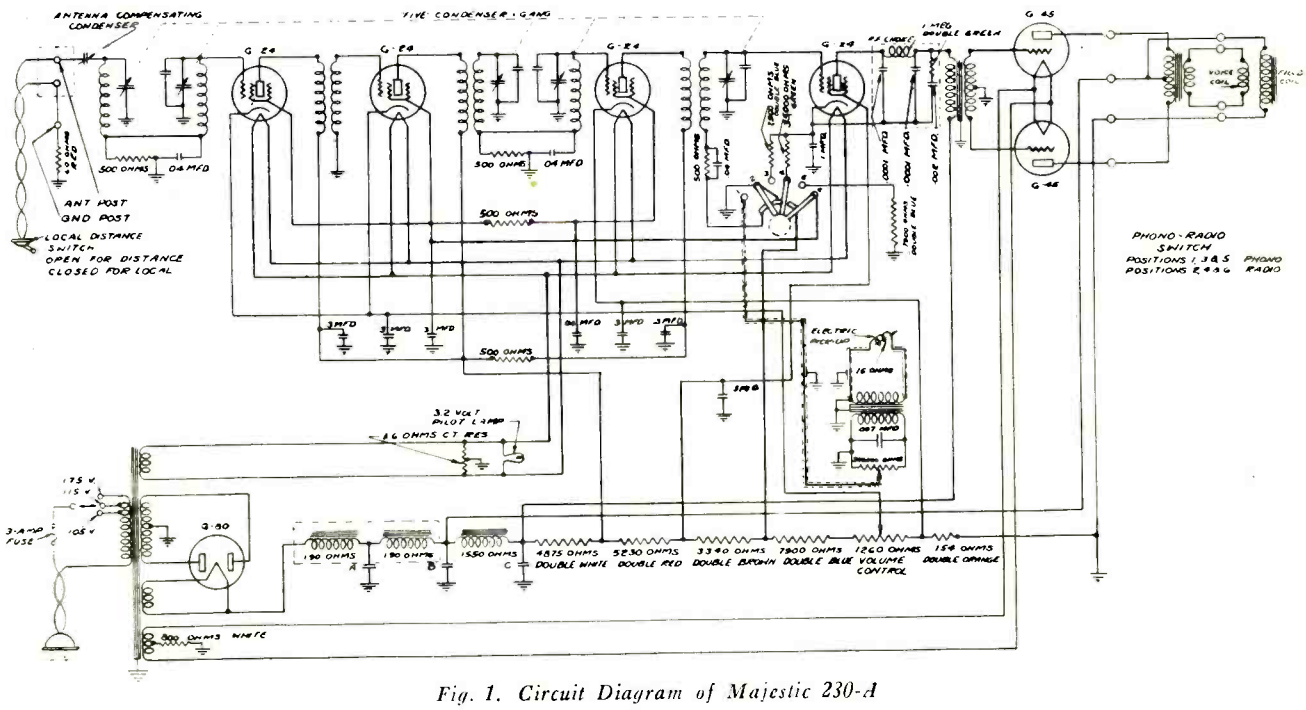


Fig. 1. Circuit Diagram of Majestic 230-A

? s That *Service Men* Are Likely to Meet in *Forthcoming Examinations*

By J. EDWARD JONES
President, Pacific Radio Service Managers' Association

Q. What is the maximum allowable peak grid swing of a power tube?

A. The peak grid swing must never exceed the grid bias, or the grid will go positive and distortion will result.

Q. What is the principal function of a shielded lead-in and ground system? Why?

A. The principal function is to limit all pick-up to the flat top of the antenna, because interfering disturbances are greatest at ground level, while space a few feet above roof is usually clear. Lead-ins usually pass down or through buildings paralleling a multiplicity of radiating metallic surfaces and circuits. Shielding the lead-in effectively removes interference from these sources, but care should be taken to ground the shield at several places to the water pipe system to which practically all other wiring systems are grounded, with the set itself to an independent ground.

Q. Given a radio frequency transformer tuned by a given condenser to cover the broadcast band, at what part of the band does the greatest transfer of energy from plate to grid circuit take place?

A. At the high frequency (low wavelength) end because the mutual inductance increases with increase of frequency between circuits magnetically coupled.

Q. What would be the apparent effect of a shorted filter choke?

A. All voltages would be generally higher, the amount depending on the normal drop in the choke now removed. Also reproduction would be accompanied by excessive hum tending to modulate music and voice.

Q. In an audio frequency transformer, as the turn ratio between primary and secondary windings governs the voltage step-up, why is it that very high ratio transformers are not used?

A. For code work, where one single note of approximately 400 cycles per second is used, transformers as high as 1 to 12 ratio are sometimes used, but in broadcast work where the audio frequency range extends at least from 100 to 3000 cycles per second, it is desirable to amplify these frequencies at about the same proportion or poor quality of reproduction will result. It is extremely difficult to design a transformer having both a high gain and a flat characteristic over such a wide band.

Q. Which of the following combinations will give the greatest resultant capacity when connected in series? First, two condensers, each having .0005 μf capacity; second, two condensers, one having .0006 and one having .0004 μf capacity. Also the combinations in parallel. Show figures.

A. Condensers in series: The reciprocal equals the sum of the reciprocals, or $\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2}$ therefore $C = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2}} = \frac{C_1 \times C_2}{C_1 + C_2}$

Using formula; first combination, $C = \frac{.0005 \times .0005}{.0005 + .0005} = \frac{.00000025}{.001} = .00025$. Second combination, $C = \frac{.0006 \times .0004}{.0006 + .0004} = \frac{.0000024}{.001} = .0024$. The first combination is largest by .00001 μf. Parallel: $C = C_1 + C_2$, 1st, $C = .0005 + .0005 = .001$; 2nd, $C = .0006 + .0004 = .001$. Therefore they are the same when connected in parallel.

Q. What is the approximate capacity between plate and grid in a '27 type tube, and to what extent has it been reduced in the '24 screen grid type?

A. The '27 type has a grid-plate capacity of approximately 3.3 μμf while in the '24 it has been reduced to .01 μμf. In other words, the '27 grid-plate capacity is 330 times greater than that of the '24.

Q. What is the usual proportion between the plate current and the screen-grid current of a '24 type tube?

A. The screen current should never exceed one-third the value of the plate current.

Q. What method of volume is used on the Radiola 64?

A. This set uses two volume controls. One, called sensitivity control, is a 2000-ohm potentiometer connected between antenna and ground, the center tap going to the grid of the first r-f tube. The other is a manual control regulating the action of an automatic volume control tube. The action is briefly as follows: The grid of the volume control tube is connected to the grid of the second detector by means of a small condenser which puts a certain predetermined proportion of the signal energy on the grid of the volume tube. This varies the plate current of the volume control tube which is made to flow through a definite portion of the biasing resistor of the r-f and i-f tubes, thus the volume is kept constant. The manual control regulates the amount of variation of the bias, and therefore regulates the output to any desired level.

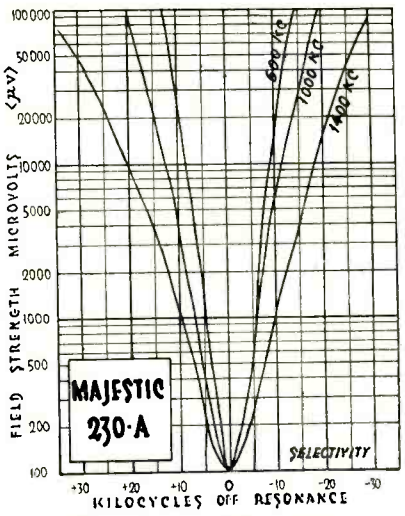
Q. What is the relationship between frequency and wavelength, and how do those used in broadcasting compare with visible light?

A. Frequency is the number of complete cycles taken by an alternating or oscillating current in one second. Wavelength is the distance from peak to peak of waves traveling through certain media. Radio waves travel through the so-called ether approximately at the rate of 300,000,000 meters per second, therefore speed is the true link or relationship between wavelength and frequency. The speed of light or electricity being fixed, if the wavelength is increased the frequency must be decreased, and vice versa, as shown in the following formula, where λ is the wavelength, V velocity and F frequency. $\lambda = \frac{V}{F}$ or, of course, $F = \frac{V}{\lambda}$.

In comparison, light waves are similar to radio waves, the only difference being that the frequency is many thousands of times greater, therefore the wavelength very much shorter for the same formula holds true for both.

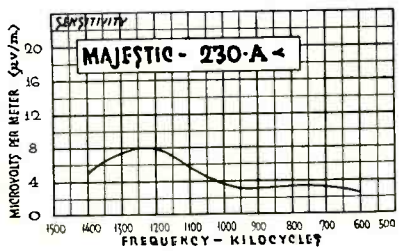
Q. What is meant by the term "per meter height of antenna"?

A. It is a term used in the measurement of the sensitivity of a receiver. Voltage from a passing ether wave is impressed upon an antenna according to the height of the antenna above ground and the strength of the wave. Antennas are of various heights, therefore measurements are reduced to a standard value, and for comparison's sake the number of microvolts for each meter height of antenna that will produce 50 milliwatts in the loudspeaker is taken as a standard of measurement.



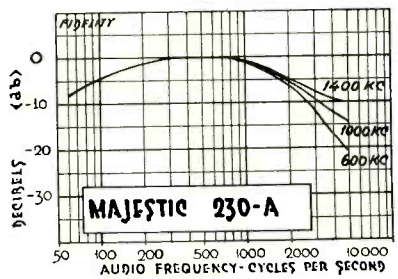
Majestic Selectivity Curves

THE selectivity of the Majestic Model 230-A is very good on all frequencies; a good deal better, in fact, than that of any Majestic model heretofore. The interference ratio, looking at the 1400 kc curve, is 460 to 1 at 30 kc off resonance, and 12 to 1 at 10 kc off resonance.



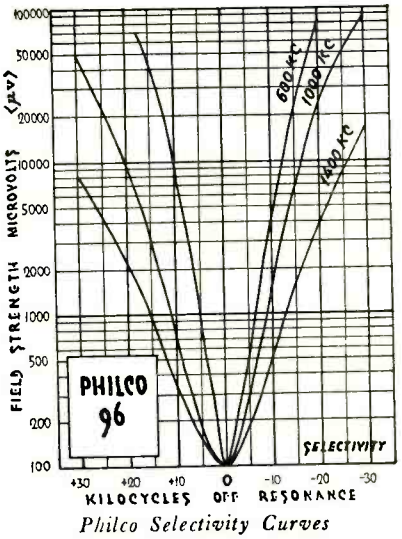
Majestic Sensitivity Curve

THE sensitivity of the Majestic screen grid model is well down into the small figures. While the curve touches five microvolts per meter at 1400 kc it takes a rise, hitting eight at 1200 kc, then drops down to three at 950 kc and even a little lower at 600 kc.



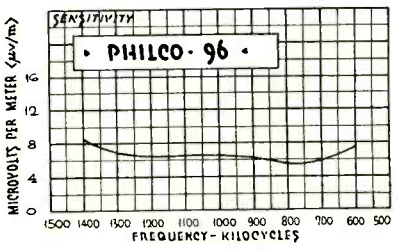
Majestic Fidelity Curves

THE fidelity of the Majestic screen grid receiver might be considered a little better than average. The low notes are dropped eight decibels at 60 cycles; i. e., the bass notes of this frequency are heard with eight sound units less volume than those notes of the middle register. The high frequencies begin to decline at six or seven hundred cycles, getting down to a ten decibel loss when the receiver is tuned to 1400 kc, a fifteen decibel loss at 1000 kc and a loss of about twenty-one decibels at 600 kc. Most of this attenuation is due to cutting of the sidebands, caused by the shape of the selectivity curve. This is necessary until the day when a selectivity curve can be horizontal for five kc each side of the resonance point, then take a vertical course the rest of the way. An attenuation of twenty-one decibels for the 5000 cycle tones is very good reproduction at the present stage of the art.



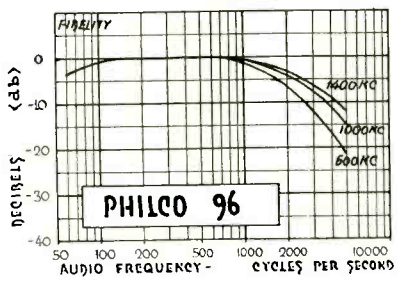
Philco Selectivity Curves

THE Philco 96 receiver is as selective as the usual receiver with four tuned circuits. At 1400 kc a 100 microvolt signal would have the same output as an 8000 microvolt signal on 1430 kc, while the interference ratio between the resonant signal and one at 10 kc away is but 3.3 to 1. The 600 kc curve, as is usually the case, shows much greater selectivity than those of the higher frequencies.



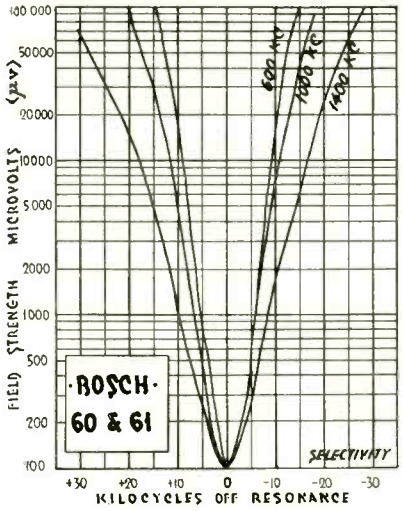
Philco Sensitivity Curve

THE sensitivity of the Philco receiver ranges from 8½ microvolts per meter to 5½ microvolts per meter, the most sensitive frequency being around 800 kc. While this may not be considered extreme sensitivity it is just about all that can be used, due to the fact that atmospheric and other electrical disturbances make reception pretty noisy under such conditions. The field strength of these disturbances can be measured, and has frequently been found to be of a value of more than 25 microvolts per meter, although ordinary winter time atmospherics and man-made "static" varies in strength from a fraction of one microvolt per meter to several hundred.



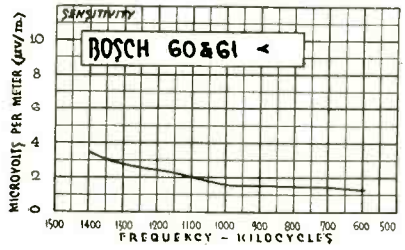
Philco Fidelity Curves

THE Philco fidelity curves show a very small attenuation of the bass notes, dropping, at 60 cycles, only 3½ decibels. At the high frequencies the 1400 kc curve drops 12½ db while that at 1000 kc goes down to 15 db and the 600 kc curve drops to 22 db at 5000 cycles. The reason that the 600 kc curve cuts off the highs more than the higher frequency curves is that the greater selectivity cuts off more of the sidebands.



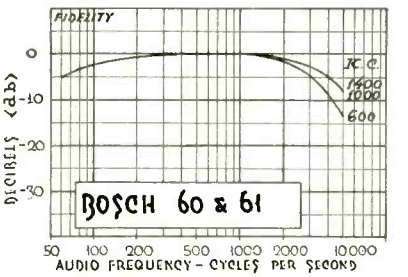
Selectivity Curves of Bosch 60 and 61

EACH year radio receivers get more selective. The improvement in this year's Bosch over last year's model is striking, especially along the lines of selectivity, although fidelity and sensitivity show great improvement also. The Sixty and Sixty-one 1400 kc selectivity curve is sharper by a good bit than the 600 kc curve of the Forty-eight of last year, whereas the 1400 kc curve of the latter passed over the thirty kc line on each side of the resonance point before getting out of the first quadrant. The 1400 kc curve of this model has a voltage ratio of a little over 700 to 1 when it crosses the thirty kc line, and 11 to 1 as it passes the ten kc line; meaning that it would take 700 times as much field strength from a station thirty kc off the receiver setting to effectively block the weak signal to which the set is tuned.



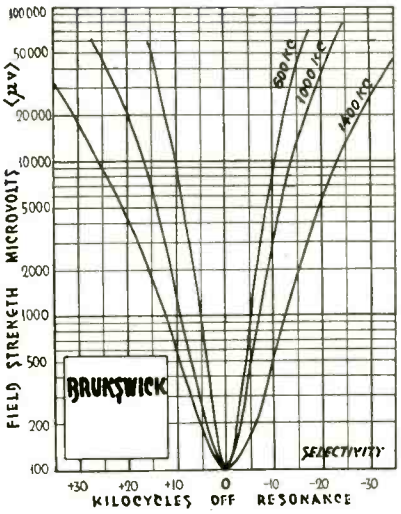
Sensitivity Curve of Bosch 60 and 61

THE Bosch's sensitivity curve is well down toward the bottom of the graph, touching three and one-half microvolts per meter at 1400 kc and increasing in sensitivity at the lower frequencies until it reaches one and one-quarter microvolts per meter at 600 kc. This means that the field strength required from a broadcast station to give average room volume is but from one and one-quarter to three and one-half microvolts per meter.



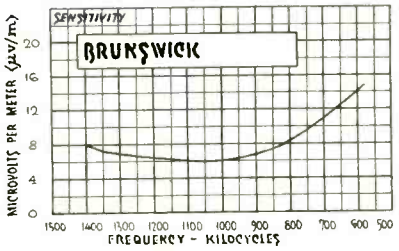
Fidelity Curves of Bosch 60 and 61

BOSCH fidelity is also something to brag about. The five-decibel drop at sixty cycles is average while the fourteen db attenuation at 5000 cycles is unusually low, indicating splendid high frequency reproduction.



Brunswick Selectivity Curves

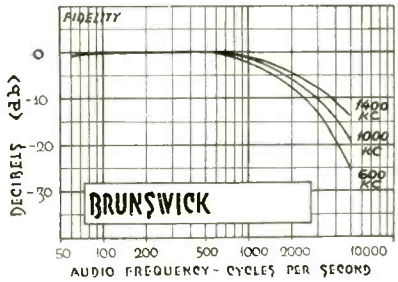
THE selectivity of the Brunswick receiver is a little better than average. At 1400 kc it would require a field strength of 17,000 microvolts to completely interfere with a 100 microvolt field strength. That is, if a distant station with a local field strength of 100 microvolts were tuned in on the dial 30 kc away from a local station, the field strength of that local station would have to be 17,000 microvolts in order to be heard with the same volume as the distant station. If it were half, or even a smaller fraction of 17,000 microvolts, it might still be heard in the background.



Brunswick Sensitivity Curve

BRUNSWICK sensitivity makes a shapely curve, reaching a maximum sensitivity of six microvolts per meter between 1000 and 1200 kc. It is slightly less sensitive at 1400 kc and drops to 14 microvolts per meter at 600 kc. This curve shows the amount of voltage needed in the antenna pick-up in order to obtain an output of 50 mw, the I. R. E. standard. This output is enough to give fair room volume.

THE reproduction of bass by the Brunswick receiver is unusually fine. At 60 cycles the curve shows the first inclination to drop, having held to a straight line up to 500 cycles per second. The deep bass notes, therefore, are to be heard with the same strength as those in the middle register. The highs drop gradually to values depending upon the radio frequency to which the receiver is tuned. At 600 kc the attenuation of 5000-cycle notes is but 26 db.



Brunswick Fidelity Curves

New Test Signal Generator

The General Radio Company has recently announced a Test-Signal Generator, Type 404, for the use of the service man. This is a portable instrument, designed especially for neutralizing and aligning radio receivers, but is equipped with an accurate attenuator so that, in conjunction with an output meter, quantitative sensitivity measurements may be made. These are especially valuable to the service man who is interested in checking up on the improvement resulting from changing tubes or making adjustments in the receiver. The output range of the instrument is roughly 10 to 1000 microvolts. The General Radio Type 486 Output Meter is an oxide rectifier type of voltmeter with the necessary voltage multipliers to give it ranges of 3, 15, 60 and 150 volts. It may be used for measuring the receiver output in connection with the Test Signal Generator, or for hum measurement, a-c filament and line voltages or for any audio frequency voltages.

A NEW TEST PANEL FOR THE SHOP

(Continued from Page v)

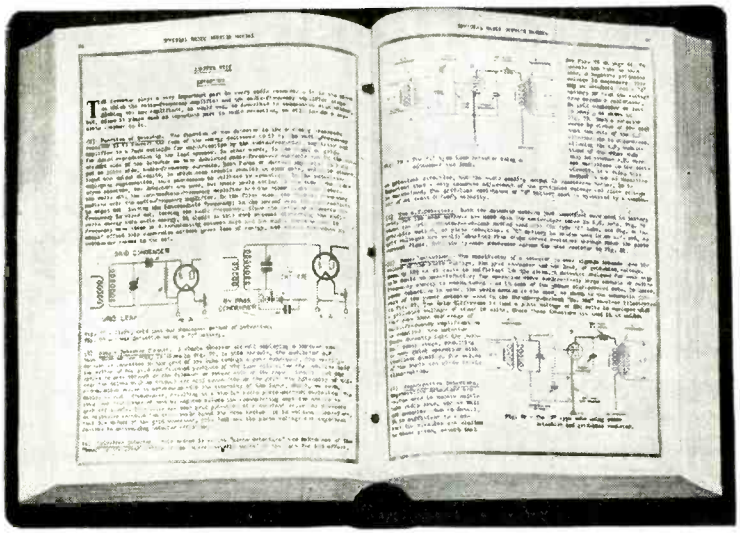
The eliminator load test requires but a few words of explanation. The output of an eliminator or powerpack is connected to terminals 21 and 22. Connections from 24 and 25 are plugged into one of the milliampere jacks and the Clarostat adjusted until a desired current is obtained. The plug is then removed from the meter and connections changed to 23 and 24 and now plugged into one of the voltage jacks. The reading will give voltage obtainable with output current previously determined and measured, and as volts times amperes equals watts, therefore the watt output is determined.

The power supply and filter needs little description. Many transformers with the desired windings are obtainable at various prices. Filter and bi-pass condensers can also be obtained of various makes and prices, or can be salvaged. The monitor speaker field may be used as the filter choke. For the voltage divider a 20,000-ohm Electrad, 6 inches long, with various bands for taps, is recommended. The amplifier may be constructed after any standard plan, good transformers of about a 3-to-1 ratio. Push-pull is not recommended, as it is not so flexible in testing various speakers. It is suggested that the power supply and amplifier be mounted on a metal sub-panel fastened to the rear of the front panel by brackets. All grounds should be connected to this sub-panel. It is also advisable to entirely shield the oscillator, also grounding the shielding.

While it is difficult to suggest the cost of the entire panel, due to many alternatives, all parts, entirely new and of reasonable quality, can be purchased for about $100 list, but, as we said in the beginning, many parts can be obtained from the junk drawer and obsolete sets. All in all it should cost a dealer about $60 net, exclusive of labor, tubes, speaker, turntable and pickup. The expenditure, however, is justified, for such equipment will facilitate sales, create sales and clinch sales. The oscillator feature alone can be made to pay for the entire equipment in one season, for every dealer has many customers on his books who would gladly pay for greater sensitivity, greater selectivity and greater radio satisfaction.

"Official
RADIO SERVICE MANUAL

and Complete Directory of all Commercial Wiring Diagrams



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Prepared Especially for the Radio Service Man!

NEVER in the history of radio has there ever been published a service manual, so complete, as this new OFFICIAL RADIO SERVICE MANUAL. It is a veritable encyclopedia of service information—worth several times its price. It is invaluable not only for the Service Man, but for everyone interested in radio.

$3.50 A COPY

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There has been collected for this manual wiring diagrams and data of nearly every commercial set, of which there is any available record, manufactured since 1927, and many earlier ones.

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- Automotive Radio
- Antennas
- Condensers
- Detectors
- Eliminators
- Meters
- Power Supply Systems
- Radio Phonograph Equipment
- Resistors
- Short-Wave Sets
- Speakers
- Tubes

THE BIGGEST RADIO VALUE IN AMERICA TODAY!

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Over 1,000 illustrations, diagrams, etc.

WHAT THEY SAY

NOTHING CAN COMPARE WITH IT

I have received my copy of the OFFICIAL RADIO SERVICE MANUAL. I expected it would be good for I think you know as much as any of them what the average radio man wants, but I'll wager not very many expected to receive a book comparable to this one. I think you deserve a lot of credit for being the first to put out a real service manual that the amateur or professional can make good everyday use of. It's a good practical book and one that every service man will be proud of.—E. D. HANA, Haslett, Mich.

BEST BOOK IN THE FIELD

I received your book OFFICIAL RADIO SERVICE MANUAL and I find it is as yet the best book I have found in this field of radio. You are well justified in that this is the peer of service manuals. I wish you all the success possible in the publishing of future books on radio which are sure of great necessity.—WILLIAM R. BROWN, Brown Radio Service, 1010 Buckingham Street, Toledo, Ohio.

WORTH A GREAT DEAL MORE

Received your copy of OFFICIAL RADIO SERVICE MANUAL and am greatly pleased with same. It is worth a great deal more than it costs.—HAROLD AIGUIER, 41 Rutland Ave., Arlington, N. J.

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Just to let you know we received my MANUAL this A.M. and—OH BOY!! She is sure a BIRD! You sure did strut your stuff, AND HOW!!—V. H. HERNDON, Herndon's Radio Shop, Odon, Indiana.

EXTREMELY PLEASED

I acknowledge receipt of the OFFICIAL RADIO SERVICE MANUAL and I am extremely pleased with it.—EDW. JOHN SMITH, 337 E. 26th St., Erie, Penna.

A VERITABLE GOLD MINE

I received the OFFICIAL RADIO SERVICE MANUAL. I am well pleased. It is a veritable gold mine for the Service Man.—EUGENE BINFORD, Arkansas City, Kansas.

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Received my copy of the OFFICIAL RADIO SERVICE MANUAL this A.M. "She is what you call him? Magnifique! Exquisite!" A timely aid for the troubled sets. Thanks.—E. BOICE, 1118 W. Dauphin, Philadelphia, Pa.

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Just received the RADIO MANUAL. It sure is the finest thing I have seen.—E. J. SCHWARM, 465 Eddy Road, Cleveland, Ohio.

IT ASTOUNDED THEM

Everywhere I have exhibited the MANUAL it has taken the boys by surprise and its completeness has astounded them. For instance, Saturday morning last I had occasion to run into the service plant of the Mackenzie Radio Corp., New York District Distributers for Zenith Radio, in connection with replacement units, and when I showed the Service Manager, Mr. Wandelt, the MANUAL, he was agreeably surprised and called the men to see the work. Delightedly yours, and always a booster for Gernsback Publications, of which I read practically all, and study them.—IRA C. HALDERMAN, 44 Leroy Place, Ridgewood, N. J.

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As per your special offer, I enclose herewith $3.50 for which you are to send me postpaid, one copy of the OFFICIAL RADIO SERVICE MANUAL.

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When They Phone You... *"My Radio Set Won't Work"*

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STERLING TESTERS

BE IN A POSITION to give the sort of service that makes friends and profits for your service department. Equipped with Sterling Testers, your service man goes out on the job, spots the trouble *instantly,* without fussing around; makes the necessary repairs and is back in your shop in half the usual time. One call—and you send out your bill to a satisfied customer. That's what Sterling Testers mean to you.

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The Sterling R511 Tube Tester instantly shows the condition of every type of tube. Reactivates, too. It's small, good looking and never fails. No batteries. Simply plug it into the light socket to operate.

Write to Sterling of Cleveland for full information.

R511 TUBE TESTER
List Price $35.00

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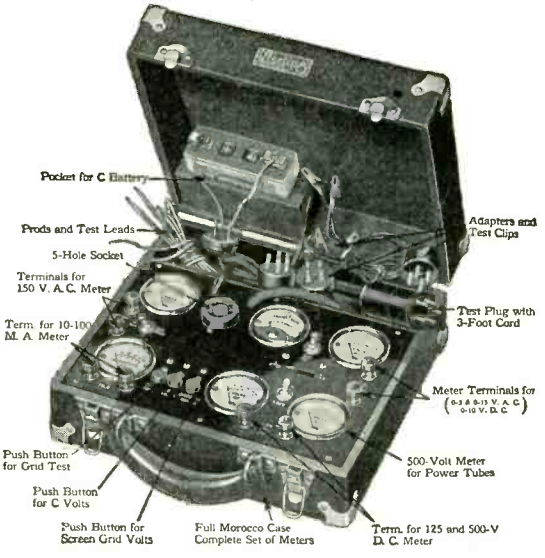
Sterling R522 All-Purpose Testers are neat, compact, efficient. In a handsome leather-grained case, weighing but 7½ pounds complete. Simply plug in the tube sockets of the set. Instantly the meters register the filament and plate voltage, "C" bias and milliampere drain, and definitely locate the trouble. Tests tubes, too—all types, including the new screen-grid tubes.



R522 ALL-PURPOSE TESTER
List Price $67.50

Sterling

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MAKERS OF STERLING CONCERTONE RECEIVERS

The Crosley NEW COMPANIONSHIP SERIES

SCREEN GRID POWER SPEAKER — NEUTRODYNE A. C. ELECTRIC

The Crosley NEW BUDDY

The hand carved effect shown in The NEW BUDDY is, as in all of the NEW Companionship Series models, produced by the use of the new and exclusive Crosley Repwood—an entirely different material of ground, long-fibre wood combined with a composition which makes it possible to mold Repwood into any shape or form, producing exact duplicates of the most expensive and delightful wood carvings. For the first time such a compact radio receiving set bearing a name which means "quality" is offered. The set itself is entirely NEW. While the chassis is different in physical appearance from that used in The PAL and The MATE, it embodies the same circuit, delivers the same performance and uses the same type tubes. The newest type Crosley electro-magnetic power speaker is incorporated. Dimensions: Only 15⅜" high, 15⅜" wide, 9¾" deep. Nothing like this wonderful set has ever been offered at the low price of.....

$64.50 With Tubes

The Crosley PAL

Here is a magnificently beautiful cabinet the front and sides of which are of the new Crosley Repwood. The top is of 5-ply Walnut veneer. Newest type Crosley electro-magnetic power speaker is incorporated. Tubes required are: Two Screen Grid type -24 in the radio frequency stages, one Screen Grid type -24 in the detector stage, one type -45 in the power output stage and one type -80 as a rectifier. Dimensions: 25⅝" high, 21" wide, 11" deep. An astonishing value at.....

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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, 20⅜" wide, 12¼" deep. The price is amazingly low—only.....

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The Crosley NEW LEADERSHIP SERIES

SCREEN GRID POWER SPEAKER — NEUTRODYNE A. C. ELECTRIC

The Crosley DIRECTOR

This handsome cabinet is a master-piece of harmony and beauty. The sides and top are of genuine 5-ply Walnut veneer. The exquisitely designed center front panel is of the new, sensational Crosley Repwood. Has new and astonishingly efficient automatic volume control. The latest type Crosley moving coil dynamic-power speaker is incorporated. This set requires three Screen Grid tubes type -24; one tube type -27; two type -45, and one rectifier tube type -80. Dimensions: 31¼" high, 23¾" wide, 13⅜" deep. The price is sensationally low—only.....

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Available with D. C. Chassis at same price.

The Crosley ARBITER

Electric Phonograph and Radio Combination

This beautiful cabinet, housing an electric phonograph and radio combination, is the last word in radio cabinet design. The sides and top are of genuine 5-ply Walnut veneer, while the embellished center panel is of genuine Crosley Repwood. The electric phonograph is exposed when the lid is lifted. The power speaker is the latest Crosley moving coil dynamic-power type. Uniform volume is maintained by the new automatic control. The chassis is the same as used in The DIRECTOR and requires the same tubes. Dimensions: 35" high, 23¾" wide, 15" deep. Sold at the astonishingly low price of.....

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$147.50 with induction type self-starting motor.

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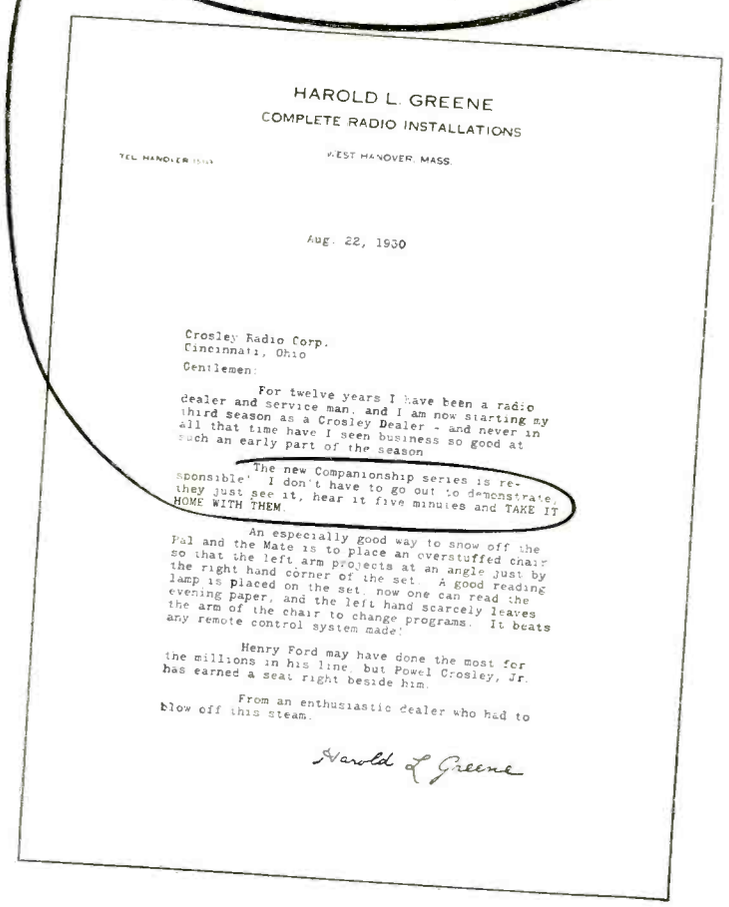

HAROLD L. GREENE
COMPLETE RADIO INSTALLATIONS

YEL. HANOVER 1111 — WEST HANOVER, MASS.

Aug. 22, 1930

Crosley Radio Corp.
Cincinnati, Ohio

Gentlemen:

For twelve years I have been a radio dealer and service man, and I am now starting my third season as a Crosley Dealer - and never in all that time have I seen business so good at such an early part of the season.

The new Companionship series is responsible. I don't have to go out to demonstrate, they just see it, hear it five minutes and TAKE IT HOME WITH THEM.

An especially good way to show off the Pal and the Mate is to place an overstuffed chair so that the left arm projects at an angle just by the right hand corner of the set. A good reading lamp is placed on the set, now one can read the evening paper, and the left hand scarcely leaves the arm of the chair to change programs. It beats any remote control system made.

Henry Ford may have done the most for the millions in his line, but Powel Crosley, Jr. has earned a seat right beside him.

From an enthusiastic dealer who had to blow off this steam.

Harold L Greene

—and letters such as this are pouring in daily from enthusiastic Crosley dealers and distributors throughout the country. Every single model of the NEW Crosley line has proved a direct hit—and the better values Crosley gives at lower prices completely satisfy the public demand for popular priced merchandise this year. Never before have Crosley dealers had so much eye-value in the line, so much ear-value in the super-performance of every model. Those who buy Companionship or Leadership models are unanimous in their satisfaction that Crosley offers more for less money than has ever been the case in the history of radio. See your Crosley distributor *at once*—tie up with this most sensational and profitable of all radio lines.

The Crosley Radio Corporation

POWEL CROSLEY, JR., *President* — Home of *"the Nation's Station"*—WLW
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Also manufacturers of CROSLEY *Battery Radio Receivers, the* CROSLEY ROAMIO *Automobile Radio Receiving Set, and the famous* AMRAD RADIO

YOU'RE *THERE* WITH A CROSLEY

CROSLEY RADIO

Watch

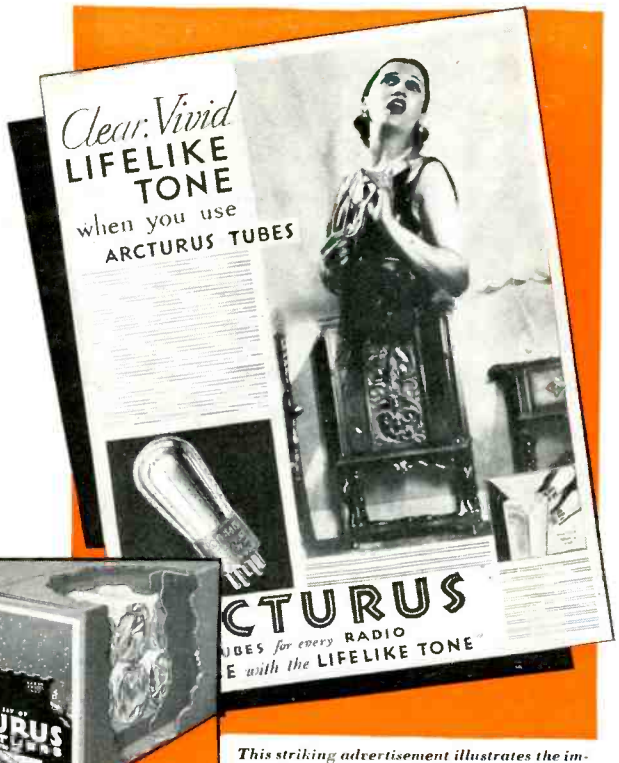
For This First Announcement

OF A DISTINCTIVE SELLING FEATURE..

LIFE-LIKE TONE

in the

SATURDAY EVENING POST *and* COLLIER'S WEEKLY



This striking advertisement illustrates the improved reception provided by Arcturus Tubes, "the Tubes with the Life-like Tone." See it in the Saturday Evening Post for November 1st, Collier's Weekly for November 15th.

THIS INDESTRUCTIBLE CARTON *contains a complete set of Arcturus Blue Tubes ready for delivery with any radio receiver you sell — with the assurance that the tubes cannot be damaged in transit. The kits are easily identified by the black and blue design, similar to the well known Arcturus Tube Carton. Ask your jobber for the details of this attractive Arcturus plan.*

CLEAR, brilliant reproduction...that's the kind of performance you get with Arcturus Blue Tubes. Every note and word comes in with *Life-like Tone.*

Radio set owners everywhere want this kind of reception. We are telling them how to get it in a new series of unique advertisements. The opening "shot" of this big 1930 Arcturus Campaign appears in two of America's leading magazines, the Saturday Evening Post of November 1st, and Collier's Weekly of November 15th.

Radio tube buyers in your community, prospective customers of your store, will see and read these interesting advertisements. Many of them will ask you about Arcturus *Life-like Tone.*

Be ready to answer them; be ready to show them the advantages of *Life-like Tone.* Be ready to get the extra profits that *Life-like Tone* can bring. Sell Arcturus Blue Tubes, "The Tube with the *Life-like Tone,*"— and know that you can back them up with the reputation of your store. See your jobber, or write us for unusual Arcturus Facts. Arcturus Radio Tube Company, Newark, N. J.

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