

RADIO

REG.
U.S. PAT.
OFF.

THE NATIONAL TRADE MAGAZINE
JUNE, 1932

MODEST **TRIAD** FACTS



THERE ARE NO BETTER TUBES

"Modesty Forbids" our claiming to have the "Best".

THERE IS NO MORE MODERN LINE

"Modesty Forbids" our mentioning that tubes, like the 210-S, were first made by us.

THERE IS NO MORE PROFITABLE LINE

"Modesty Forbids" our referring to our increasing number of price-maintaining sales outlets.

THERE ARE NO MORE "REPLACEMENTS"

"Modesty Forbids" our calling attention to returns during last year (Sh-h-h!! less than two per cent—including breakage in transit).

THERE IS NO FASTER GROWING LINE

"Modesty Forbids" our saying anything about the 300 per cent gain in sales for the first quarter of this Year, over 1931.

THERE IS NO MORE PROGRESSIVE LINE

"Modesty Forbids" our telling you about the seventeen new types we have announced, including photocells, television, short wave, ultra short wave and "amateur" use.

THERE IS NO BETTER EQUIPPED PLANT

"Modesty Forbids" our letting you know that our engineers are men of long experience and, under their capable direction, our modern machines can produce 30,000 "Honorbuilt" Triad Tubes a day.

THERE IS AT LEAST ONE TUBE COMPANY

"Modesty Forbids" our uttering the fact that Triad was first to recognize the importance of the "serviceman" and the small country dealer as a most important moulder of tube consciousness and developer of sales which stay sold.

BUT—

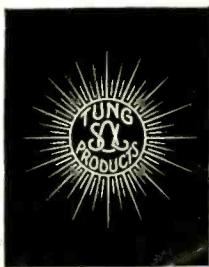
There Isn't A Single Reason Why You Should Not Learn
The Reason.

TRIAD TAKES OFF ITS HAT

TO NOBODY.

TRIAD MANUFACTURING CO., INC.

PAWTUCKET, R. I.



TUNG-SOL ANNOUNCES A CONSIGNMENT PLAN for the DISTRIBUTION and SALE of RADIO TUBES

MAY 1, 1932

Effective **MAY 1, 1932** Tung-Sol Radio Tubes will be distributed on a consignment basis, through carefully selected wholesale and retail agents. This is the first time any manufacturer in the tube industry has attempted such a plan of distribution on a nation-wide scale. Only a few leaders in the industry could operate such a plan successfully because of the large capital reserve which it obviously necessitates. The advantages to the entire trade are expected to be numerous. Broadly speaking, this plan will undoubtedly exert seven immediate stabilizing influences, which the entire industry sorely needs:

1. **By the selection of only high grade outlets, it will prevent unfair and ruinous competition.**
2. **It will assure both wholesaler and retailer of a fair margin of profit on all tube sales.**
3. **It will tend to create a retail price structure which the consumer can learn to depend upon as a standard of tube values.**
4. **It will fully protect both wholesaler and retailer against losses resulting from price reductions and obsolescence.**
5. **It will give the wholesaler an additional protection against credit losses which is not existent under present selling methods. This is very desirable in these especially trying times, particularly in the radio industry.**
6. **It will enable both wholesaler and retailer to carry sufficient stocks of all types of tubes to meet their requirements without any financial investment whatsoever on either merchant's part.**
7. **It will eliminate the wholesaler's usual investment in current accounts receivable.**

When viewed from all angles and carefully studied, this plan of distribution offers advantages to the individual dealer and wholesaler, which are almost illimitable. It is a revolutionary plan, but one which is soundly conceived. It will have a far reaching effect on the tube business of every section of the trade, and for that reason is of universal interest to all wholesalers and retailers of radio tubes. Wholesale and retail agencies are now being selected for unfilled territories. Interested merchants are invited to write for complete details or see us at the R. M. A. Show.

BOOTHES B-54 and B-55, BALLROOM, TUNG-SOL HEADQUARTERS, SUITE 1606, STEVENS HOTEL

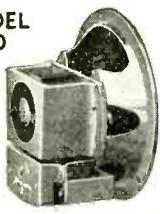
TUNG-SOL RADIO TUBES INC - NEWARK, N. J.

(Licensed under patents of Radio Corporation of America)

Sales Divisions: Atlanta, Baltimore, Boston, Charlotte, Chicago, Cleveland, Dallas, Detroit, Kansas City, Los Angeles, New York, St. Paul

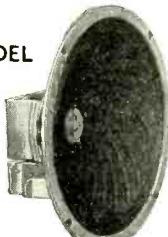
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MODEL
150



6 1/2 inch Dynamic Speaker

MODEL
152



10 1/4 inch Dynamic Speaker



Single
Stud
Mounting

MODEL 154--Auto Speaker



MERSHON
Electrolytic
Capacitor

Stud
Type
Mounting

MAGNAVOX Electrolytic
Capacitors



Lug
Terminals

MAGNAVOX Electrolytic
Capacitor



Flexible
Lead Terminals

Magnavox SPEAKERS AND CAPACITORS

◆ Mershon ◆ CAPACITORS

● MAGNAVOX SPEAKERS

Magnavox' 21 years of leadership in acoustics is significant. There is occasionally one manufacturer in an industry who will not compromise high standards of quality or performance, even in a price market and who continues to perfect and improve under all circumstances. The service which such a firm renders to the entire industry is apparent. Magnavox products which you may see at the R. M. A. Trade Show prove Magnavox' right to that position in the radio speaker industry.

● AUTO SPEAKERS

Magnavox engineering has mastered the tone problem—the most difficult in auto radio—and has added exclusive features assuring ease and simplicity of installation, with single stud mounting. Available in models 150 and 154, optional in wood or metal baffle cases.

● SPEAKER AND CAPACITOR COMBINATION

Illustration at the right shows the ideal adaption of capacitor and speaker combination mounting. Model 154 is shown with 2-8 Mfd. 450V. capacitors. This offers advantages both in space factor and ease of installing filter unit.

● MERSHON CAPACITORS

Improved, compact models in which space factor has been emphasized. Trouble-free—puncture-proof—self-healing—with a record of proven stability. Free from mechanical leakage. Made in several types of mounting for your convenience.

● MAGNAVOX CAPACITORS

Magnavox now offers a complete range of filter and By-Pass dry Electrolytic Capacitors in all standard capacities and voltages.

Magnavox engineering service is available to recognized manufacturers upon request, without obligation.

Welcome to the R. M. A. Trade Show Speaker and Capacitor Headquarters

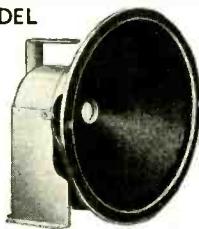
Stevens Exhibition Hall, Space 93-A. Stevens Demonstration Rooms, 704-A, 705-A, 706-A

MAGNAVOX MODEL 530

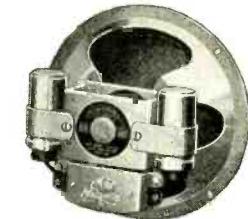
Dynamic Speaker

especially made and adapted for Class B radio sets. See and hear it at the R. M. A. Show.

MODEL
517



14 inch Dynamic Speaker



Speaker, Capacitor Combination

MERSHON Electrolytic Capacitors

Clamp
Type
Mounting



MAGNAVOX BY-PASS
Electrolytic Capacitor



Magnavox Company Ltd.

ESTABLISHED 1911

GENERAL OFFICES AND FACTORY, FORT WAYNE, INDIANA

Subsidiaries

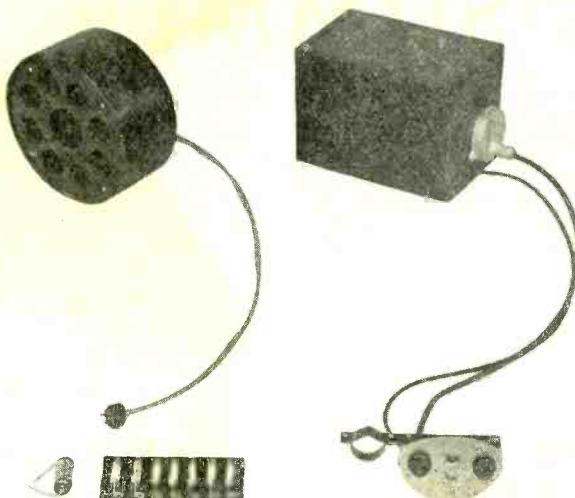
THE MAGNAVOX COMPANY, ELECTRO FORMATION, INC.,
MAGNAVOX (AUSTRALIA), LTD., MAGNAVOX (GREAT BRITAIN), LTD.

EL REY AUTO RADIO

WITH REMOTE CONTROL

\$4950
LIST

INCLUDES
REMOTE
CONTROL



\$2195

TO DEALERS
(Less "B"
Batteries)

*Cash with
Order.*

SPECIFICATIONS

FIVE TUBES including:
Three No. 51 Multi Mu
One No. 24 Screen Grid
One No. 47 Pentode

EIGHT-INCH FULL DYNAMIC SPEAKER,
mounted in box, easy to mount.
SEVEN SPARK PLUG SUPPRESSORS
ONE CONDENSER FOR GENERATOR
TEN-FOOT SHIELDED CABLE

All EL REY Auto Radios Equipped With Remote Control

Dealers

El Rey's new automobile radio sets, all of which are fully equipped with remote control, will prove to be fast sellers this summer with a fair margin of profit, though selling at low prices. They out-perform the old-type auto radios.

Specially designed circuit includes up-to-the-minute developments. Most sensitive of all radio sets. Remote control works at maximum peak efficiency at all times. Finest standard parts used throughout. Uniform tone; super selectivity. Fully complete, yet compact.

We also make a
4- and 5-Tube TRF SET.
Quality merchandise,
selling at
Attractive prices.



ILLUSTRATED IS THE
NEW 6 TUBE EL REY
SUPER RECEIVER.

\$1695
NET

COMPLETE WITH NEW
6 PRONG TUBES

CASH WITH ORDER

Export orders \$1 additional for packing charges.

EL REY RADIO MANUFACTURING CO.
8406 SOUTH BROADWAY LOS ANGELES, CALIFORNIA

LET'S GO! - RADIO'S BUSIEST SUMMER

JUNE . . . the exciting nominating conventions of both political parties, and then . . . "the battle of the century" . . . marking the peak for all time in number of radio listeners per hour. No radio owner wants to miss any part of this gripping drama . . . the oratorical onslaughts . . . and the tense final hours. Time is ripe now . . . to canvass, phone or write, lists of radio owners for a check-up and replacement service. And with this instrument so marvelously complete, accurate and speedy, you can make more service calls at less manpower cost and greater production profits. Designed to anticipate every possible "new" type or development in radio receivers. Say "Let's Go to Radio's Busiest Summer" by equipping with radio's most amazing service instrument . . .

SUPREME DIAGNOMETER AAA 1

5 ultra modern testing instruments in one for the price of **1**

SUPER DIAGNOMETER, plus SHIELDED OSCILLATOR, plus ADVANCED TUBE TESTER, plus OHM-MEGOHMMETER, plus CAPACITOR TESTER . . . 5 essential instruments in one at the price of one.



Dealers' Net Price
f.o.b. Greenwood, Miss.

\$147⁵⁰

Ask Your Jobber for Demonstration

It will open your eyes to the countless superiorities of this master instrument. Or send coupon below for full information on AAA 1, or any other new "SUPREME BY COMPARISON" testing equipment, namely . . .

SUPREME OSCILLATOR MODEL 70

A thoroughly shielded, completely attenuated Oscillator . . . output meter . . . high resistance ohmmeter.

Dealer's Net Price f.o.b. Greenwood, Miss., less tubes and batteries . . .	\$49.75
SUPREME OUTPUT OHMMETER	\$30.00
Handsome Carrying Case for both and Accessories	\$5.00

SUPREME OSCILLATOR MODEL 60

A "SUPREME" value in a handy Oscillator

Dealer's Net Price F.O.B. Greenwood, Miss. **\$30.00** Portable type **\$3.00** extra

SUPREME TUBE CHECKER MODEL 40

COUNTER TUBE CHECKER . . . "SUPREME BY COMPARISON"
Dealer's Net Price F.O.B. Greenwood, Miss. **\$30.00** Portable type **\$3.00** extra



SUPREME SET ANALYZER MODEL 90

The famous one meter set tester that offers some of the unequalled features of the AAA 1 Diagnometer . . . and all of its own famous 1932 superiorities.

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

SUPREME INSTRUMENTS CORPORATION
439 Supreme Bldg., Greenwood, Miss.

Please send me full particulars on . . .

- Supreme Diagnometer AAA 1
- Supreme Set Analyzer Model 90
- Supreme Oscillator Model 70
- Supreme Oscillator Model 60
- Supreme Tube Checker Model 40

Name _____
Address _____
City _____ State _____
Jobber's Name _____
City _____ State _____

Tell them you saw it in RADIO

Distributors in all Principal Cities
Foreign Division, 130 West 42nd St., New York City
Cable Address: LOPREH, New York

IF YOUR RADIO BUSINESS ISN'T WHAT IT SHOULD BE!

1931 has been Silver-Marshall's best year, because . . .

Silver-Marshall Superheterodynes are sold DIRECT to DEALERS.

The jobber's profit is used in more profit for the dealers and lower list prices.

Silver-Marshall has a COMPLETE LINE. Full-size superheterodyne consoles to sell from \$49.95 to \$139.50.

In addition to 6, 8, 9, 10 and 12-tube supers, Silver-Marshall dealers have an 11-tube short-and-long wave super.

Silver-Marshall has a unique \$10.00 plan to cover trade-ins, time payments, etc. They do not come out of the dealer's pocket.

A half-million dollars has been spent in the last six months to advertise S-M receivers.

Silver-Marshall dealers have exclusive territory.

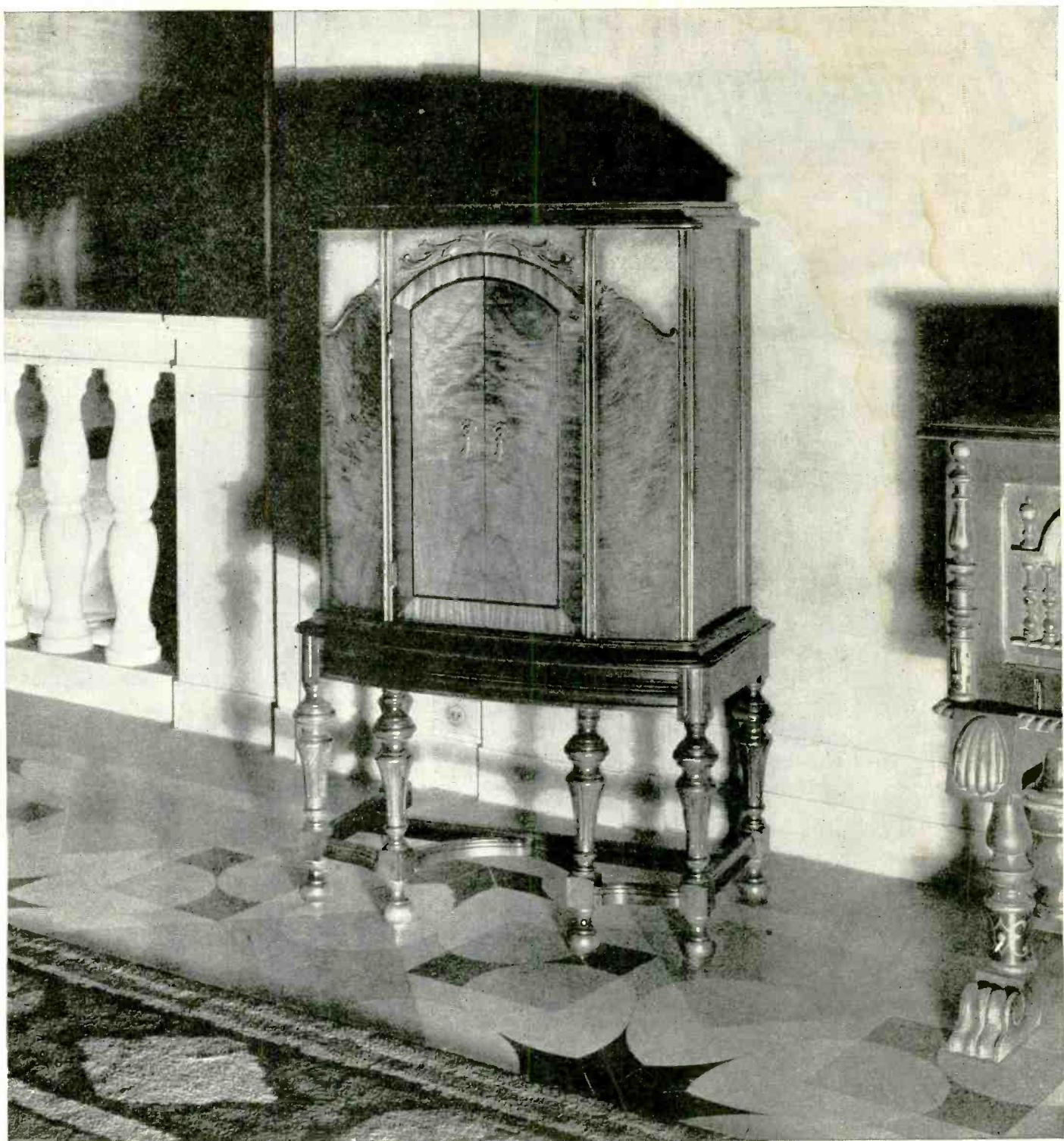
Those are SOME of the reasons. We will be glad to tell you the rest of them.

SILVER-
MARSHALL Inc.
6415 W. 65th St.
Chicago, U. S. A.
Please send me all
details.

Name

Address

SILVER-
Home Office: 6415 West 65th Street, Chicago



Model C-24. 12 tubes . . . superheterodyne . . . 3-unit construction . . . twin pentodes . . . double tone control . . . built-in tone chamber . . . meter tuning . . . automatic volume control . . . built-in aerial . . . 45-inch door console. A finer receiver is not possible. Complete with Eveready Raytheons . . . \$139.50 list.

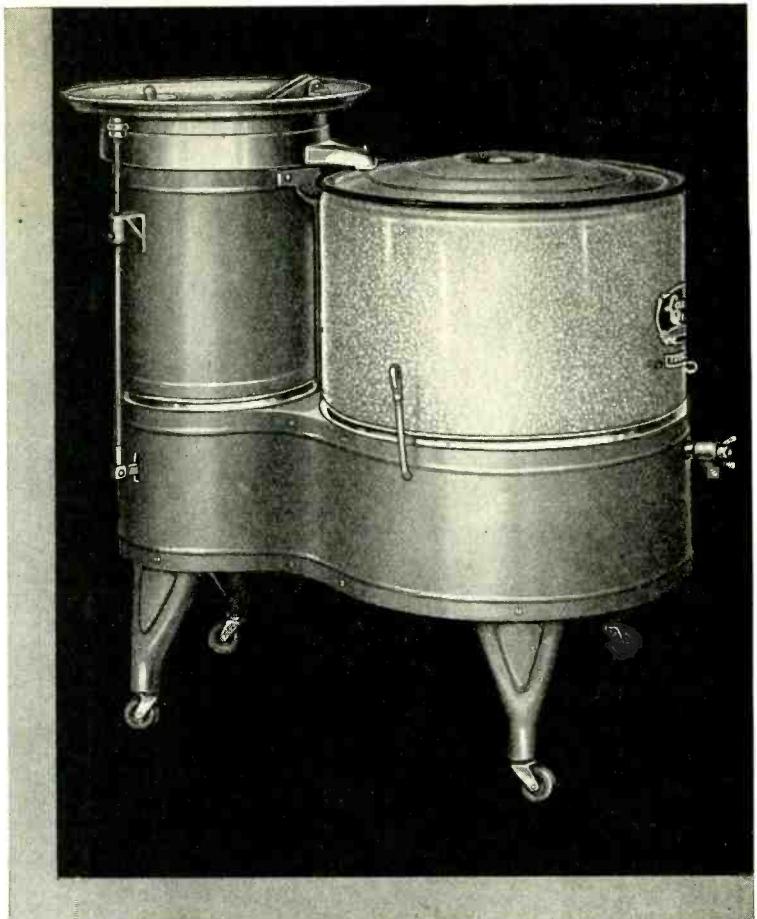
MARSHALL Inc.

S-M Sales Co.: 224 East 16th Street, Los Angeles

THE NEW
Laundry Queen
 DOUBLE TUB
SPIN-DRY
\$99⁵⁰
 EAST OF
 ROCKIES

A beautiful, fast, full size washer-spinner for only \$99.50! And with an honest-to-goodness margin of profit for you! Mail the coupon below today for complete description and unusually low dealer prices.

The Laundry Queen SPIN-DRY is finished in a rich blue enamel with tub of mottled blue Porcelain. Spinner tub is also Porcelain. Simple and fool-proof mechanically, it is a perfect—and a fast selling—washing unit!



The **GRINNELL**
Electric **REFRIGERATOR**

With
 "FLOATED
 UNIT" **\$99⁵⁰**
 F. O. B.
 GRINNELL

The "Floated Unit" and the many other features of this great refrigerator have caught the eye of the industry. Orders for so many thousands have poured in that we have had to double and redouble our production schedules. If you are interested in increasing your refrigerator profit this year, mail the coupon below for complete description of the GRINNELL Electric Refrigerator and new dealer price list.

GRINNELL WASHING MACHINE CORP.
 728 Main St., Grinnell, Iowa

Gentlemen: Send me complete description and dealer prices at once. Laundry Queen SPIN-DRY
 GRINNELL Electric Refrigerator

Name.....
 Store.....
 Address.....
 City..... State.....

MAIL COUPON for DEALER PRICES

Radiotorial Comment

By The Editor

THE high-lights of the inaugural address of Fred D. Williams, newly elected president of the R. M. A., follow:

"This industry must do something, must find some common plan or idea to face the consumers en bloc, because it is not only our duty but our salvation if we are going to stay in the radio business. We must all pull together and sell 'radio' instead of nuts, bolts, lumber and price. Our common interest must be to sell more radio sets. We must get behind the common interest of how to sell more radio sets to the public and do this through a sales manager committee dominated by the set and tube group members. They will be charged with the responsibility of finding out how to sell radios and if they, with their interests, cannot find a common slogan or a common thought as some of the other trade associations have, I think radio needs some new trade managers. This approach to the consumer has got to be made and we are going to have to do it."

* * *

WIT IS an ill-wind that blows no man good". Most of the new receivers on exhibit at the RMA trade show use two dynamic speakers. One manufacturer of national repute announces a new line in which three speakers are used. One is centered on the front panel; the other two are placed angularly so as to reflect sound from the sides of the cabinet. Speaker producers are anticipating a most active fall and winter business. The twin-speaker idea has taken hold in a big way. One of the best known midget manufacturers hastily announced a new low-priced table model with two speakers. Radio manufacturers express keen satisfaction over the manner in which the new innovations are being accepted by the dealers.

* * *

THE Lindbergh-baby-kidnap-case prompted a large radio manufacturer to invent a device which would make difficult a repetition of such crimes. The industry owes a tribute to Jim Fouch, president of Universal Microphone Co., for his ingenuity in developing and perfecting the new sensitive microphone and its accompanying amplifier which, when placed in close proximity to a sleeping child's crib, will transmit, electrically, the

faintest breathing of the infant so that the sound can be carried through the amplifier and emitted from a loud speaker in another location in the home. Cessation of breathing is, of course, indicated by a discontinuance of sound emanating from the loud speaker. Or, if the child should cry, the loud speaker at once carries the message to the parent who may be at work or at ease elsewhere in the house. The slightest whisper is amplified enormously so that everyone in the room where the loud speaker is located can hear it. At night, the device is switched over to the mother's bedroom. Any unusual sounds will bring forth a blast from the loud speaker of sufficient intensity to awaken a sleeping person. The cost of the equipment is negligible.

* * *

EXCELLENT business with actual sales of radio products aggregating several million dollars was reported by radio manufacturing companies exhibiting in the Sixth Annual Trade Show of the Radio Manufacturers Association at the Stevens Hotel in Chicago, May 23-26. According to Bond Geddes, executive vice-president and trade show manager for the RMA, the satisfactory results of the annual trade show were made possible by an official attendance of 14,611. This was about thirty per cent less than that of last year.

"While the attendance was about thirty per cent smaller this year many manufacturers reported better business and results from the trade show," said Mr. Geddes, "because those who attended the trade show came to Chicago for business. This also applied to the one hundred exhibiting manufacturers. Business was the keynote of the show, both by the exhibitors and by the thousands of visiting jobbers, dealers and others.

"Some leading manufacturers state that their actual sales at the trade show this year were greater than during any previous trade show period.

"A hopeful if not optimistic opinion regarding future conditions seemed prevalent. The approaching national political conventions and campaigns are expected to greatly stimulate radio sales. Radio is the one industry expected to benefit most and show an immediate upturn, possibly leading and aiding other industries toward improved business conditions."

Trade Show Report

THE radio industry is headed for steadily increasing business and is no more near the saturation point than the automobile industry was in 1921, J. Clarke Coit, retiring president of the Radio Manufacturers' Association asserted in an address to the eighth annual convention and trade show of the association in the Stevens Hotel.

Mr. Coit said in part:

"During the depression of 1921 an intimate friend of mine who was an automobile manufacturer concluded, after what he considered a thorough study of the situation, that the saturation point in automobile sales had been reached. So he disposed of his business. To the analytical mind of 1932 his decision of 1921 was silly—just as silly as an opinion of some that the saturation point in radio has been reached in 1932 would be to the analytical mind of 1942.

"Ten years from now the man who goes out of radio this year because he thinks that the radio industry is 'through' and has reached its saturation point will look just as silly as my automobile friend looks today to those who have made millions and millions of dollars in automobiles since he figured that that industry was 'through'."

FRED D. WILLIAMS New RMA President

FRED D. WILLIAMS, president of P. R. Mallory & Co., Inc., of Indianapolis, Ind., was elected president of the Radio Manufacturers' Association. Other officers were elected as follows: First vice-president, Harry A. Beach of the Stromberg Carlson Tel. Manufacturing Company, Rochester, N. Y.; second vice-president, Meade Brunet of the R. C. A. Radiotron Co., Inc., Harrison, N. J.; third vice-president, Leslie F. Muter of the Muter Co., Chicago; and treasurer, E. N.

Rauland of the Rauland Corporation, Chicago.

Four new members of the board of directors to serve for three years were elected as follows:

W. S. Symington, president of the Colonial Radio Co., Buffalo; S. W. Muldowny, chairman of the board of the National Union Radio Corporation, New York City; C. B. Smith, president of the Stewart-Warner Corp., Chicago; and Franklin Hutchinson, president of Kolster Radio, Inc., Newark, N. J.

Four resignations from the board and an equal number of replacements were announced. Resignations were accepted from A. L. Walsh of Newark, N. J.; R. W. Jackson, New York City; E. E. Kauer, Providence, R. I.; and E. V. Hughes, Peru, Ind. They were replaced by J. M. Spangler of the National Carbon Co., New York; J. Clarke Coit, president of the U. S. Radio & Television Corp., Marion, Ind., and past president of the R. M. A.; R. A. O'Connor, president of Magnavox, Ltd., and Roy Burlew, president of the Kenrad Corporation of Owensboro, Ky.

Fred D. Williams, the new president of the Radio Manufacturers' Association, is a salesman. His entire business life has been spent in selling, salesmanship of products ranging from minute radio parts to supplies for railroads.

Born and reared on a farm near Henry, Ill., September 23, 1885, Mr. Williams, after graduating from high school, immediately entered life as a salesman and has continued as such. As a youth he started his salesmanship career for the U. S. Rubber Co. in Chicago and in six months was a department manager in its sales agency.

In 1900, in Chicago, his selling activities were turned into the distribution of railway supplies, for a period of ten years. For eight years following he was sales supervisor for the Johns-Manville Co. in Chicago and Milwaukee.

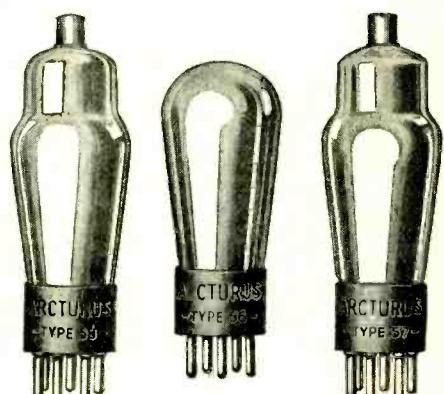
In 1918 Mr. Williams joined the L. H. Gilmer Co. of Philadelphia and continued his selling career of its products as vice-president and general manager.

In the early days of radium in 1922, Mr. Williams entered the radio industry as a sales manager of the Music Master Co., for many years prominent manufacturers of loud speakers. He has continued in radio ever since. In 1916, during the

advent of the B eliminator, Mr. Williams joined the Grigsby-Grunow Co. of Chicago. Two years later he joined the Raytheon Mfg. Co. of Newton, Mass., as sales manager in the radio tube field when A.C. tubes were being introduced, and when the National Carbon Co. took over the Raytheon Co. Mr. Williams became sales manager of the Radio Tube Division of the larger organization in June, 1929.

On January 1, 1932, Mr. Williams became vice-president and general sales manager, in charge of sales of all products, of P. R. Mallory & Co. of Indianapolis. This company has long been manufacturers of radio condensers as well as being prominent in the automotive field and in new metallurgy. Subsidiaries include Elkon, Inc., Indianapolis and Yaxley Mfg. Co., formerly of Chicago, manufacturers of radio parts.

Arcturus Also Announces New Tubes



THE new series of 2.5 volt tubes, types 46, 56, 57, 58 and 82, is announced by Arcturus Radio Tube Company, Newark, N. J., which is in production on all five types.

The type 46 is a duo-grid power amplifier tube, for use as a Class "B" amplifier, or as a driver tube in Class "A" amplifiers.

Type 56 is of small size and can be used as a detector, amplifier or oscillator. It is of the indirectly heated cathode type.

Type 57 screen-grid detector amplifier and type 58 variable-mu r. f. pentode tubes are of the "dome" type construction.



THE NEW MODELS HAVE EYE-AND-EAR-APPEAL

Here are shown some of the sets in the \$49.50 to \$99.50 price range. Dual Speakers. New Tubes. Magnificent Cabinets.

A FEW days ago the Radio Manufacturers Association closed the doors of its annual trade show in Chicago. It was crowned with success. Those who were fortunate enough in being able to attend the show in person proclaim it the outstanding business success of recent years. True, attendance was not what it was in the hectic boom days of the radio business but those who were there came to buy. Marked increase in jobber attendance was noted. The field of exhibitors narrowed itself to no more than a few dozen leaders in the industry. The old-time ballyhoo was conspicuous by its absence. There was nothing of an outstandingly sensational nature to create chaos either at the show or thereafter. Stability seems to have found its place in the radio business.

Principal among the newer developments is the improved line of tubes. The Wunderlich by Arcturus and the numerous improved tubes of the RCA and its licensees were two of the outstanding innovations at the show. The improvement which these tubes give to the modern radio receiver is nothing short of astounding.

A more defined line of price classification was in evidence. Some manufacturers will specialize in low priced merchandise whereas others will build receivers to cover the entire price range. Fewer models constitute the average manufacturer's line.

Twin speakers were found in many new models. However, both speakers are almost similar in their frequency range.

Nothing of a sensational nature was shown by the television manufacturing group. Cathode ray scanning was not in evidence, being guarded closely by those manufacturers who are diligently at work on its perfection.

Auto radio manufacturers exhibited some of the finest merchandise . . . using the new tubes . . . giving vast power output . . . fine distance reception and utmost stability of operation.

One radio tube manufacturer announced a consignment plan, similar to that now in use by the lamp manufacturers.

Noiseless reception, accomplished by means of the more powerful tubes and certain interference eliminating devices, helped much to arouse enthusiasm at the show. Much of the summer static and man-made interference will be minimized as a result of some important refinements which have been announced by a number of the exhibitors.

The short-long wave combinations held sway. Good summer business will result because of the vast improvements which are found in the new all-wave models and the ability of these sets to pull in long distance stations in the summer time.

It is evident that the dealer has many new talking points for his prospective customers in the months to come. The new tubes . . . twin speakers . . . all-wave combinations . . . attractive prices . . . more beautiful furniture . . . noise-proof reception . . . greater tonal fidelity and service-free construction give you an edge such as you have not enjoyed in previous years.

The manufacturers have done their share. They have given you the greatest dollar-value in the history of the industry. Your customers will want this new merchandise if you tell them of its vast superiority. This is the time for every dealer to tell every set owner and prospect what the new merchandise is all about. The sales cooperation which is being offered the dealer is far-reaching.

A Trip Through the Show

...From Booth to Booth

High-Lights of New Products and Prices

Arcturus Radio Tube Co.

The new Wunderlich tube which eliminates detector distortion . . . has four times the power output of 3-element tubes . . . automatic volume control self contained . . . improves tone quality . . . minimizes fading and prevents choking and detector blasting. A major contribution to the art and already widely heralded and used as initial equipment by important set builders.

Atwater Kent

Super-power 10-tube receivers with 5 gang condensers . . . new tuning light . . . 11 tuned circuits . . . local and distance switch . . . silent tuning and the new 2½ volt tubes. All models in the new A. K. line are superheterodynes.

Philco

A wide line of de-luxe console jobs, ranging in price from a hundred dollars up. Also various table models and an improved automobile receiver. The entire present-day price range is covered by Philco with its new line. Complete specifications of all PHILCO models were printed in last month's RADIO.

Ken Rad

The new WUNDERLICH tube is also manufactured by Ken Rad, in addition to the 56, 57, 58, 46 and 82 type tubes.

Kolster

Noiseless reception is strongly featured by Kolster in all of its new models. This is a major contribution to the industry and will result in creating a vast replacement market, especially during the summer months. Kolster receivers are now distributed by the Westinghouse jobbing organization from Coast to Coast.

RCA Victor

"Bi-acoustic" radio. A complete new circuit, in which is included "B" amplification . . . new dual grid power tubes . . . extended musical range . . . automatic tone stabilizers . . . tone equalizers which eliminate cabinet noises . . . dual automatic volume control . . . new speakers, and a list price of \$139.50 for the console with these features. The set has 12 tubes. Between-station whistles are eliminated.

Fada

A cleverly designed little table model at \$49.50 and a wide range of console models from \$79.50 to \$135.00. The latter has 11 tubes. The new FADA features include superheterodyne circuit . . . automatic flashograph station finder . . . illuminated station recorder . . . silent tuning . . . triple automatic volume control . . . duo-diode detector . . . automatic noise eliminator . . . multiple action dynamic speaker . . . super control triple grid r.f. pentode tubes . . . power pentode tubes in push pull . . . tone filter and noise suppressor . . . fractional microvolt sensitivity.

Gulbransen Co.

Five-tube superheterodyne mantel model and consoles with as many as 12 tubes. The larger sets employ class "B" amplification, the new tubes and the mercury vapor rectifiers . . . automatic noise control and automatic volume control.

Majestic

The Majestic feature is the new "ADAMS" console model at \$69.50 with the new type tubes and synchro-silent tuning control. The "President" line includes models with many of the newest refinements. Distortion-free duo-diode detection . . . mercury vapor power tube supply . . . spray shield tubes . . . image rejector circuit . . . double pentode audio amplification. Majestic also announced an all-wave 12-tube set at \$94.50 list.

Clarion

A 10-tube console with twin speakers, automatic volume control, new tubes and beautiful 6-legged cabinet. Retail price \$49.25. An instrument that will go far towards building up large sales volume for dealers who have clamored for just such a receiver.

Stromberg Carlson

A wide range of beautiful de-luxe console receivers, beginning at \$139.00. Meter tuning and automatic volume control. The new tubes are used. Direct from factory-to-dealer sales policy.

Weston-Jewell

New set analyzers . . . oscillators for balancing superheterodynes . . . tube checkers and special instruments. Weston-

Jewell sales and manufacturing activities are now merged at the Newark plant.

American Bosch

"VIBRO POWER" receivers. A new circuit and constructional features including sets with police signal switches . . . 10 and 12 tubes . . . double automatic volume control . . . a Grand Opera model with vibro-blended dual speakers. "VIBRO POWER", Bosch states, reduces static . . . eliminates swishing . . . whistles . . . blasts and in-between station noises. The new tubes are used.

Sylvania

All of the new tubes are in the SYLVANIA line. Manufacturing facilities have been stepped up and deliveries of the new tubes are already under way. SYLVANIA also exhibited its de-luxe tube testing equipment for dealers and service men.

Readrite

A new tube tester for service men and dealers. Portable. \$18.00 net.

Eveready Raytheon

Four-pillar construction continues to be the EVEREADY slogan.

Stewart-Warner

MAGIC DIAL radios for the new season . . . with new automatic tone control and new type automatic volume control.

The new Stewart-Warner duo-superheterodyne radio, it is claimed, has eight times the previous signal sensitivity, featured something new in tuning—the 2-speed Magic Dial. This dial puts both short and standard waves under one control on a single chassis.

The actual operation of the Magic Dial, which is really four dials in one although only one is visible at a time, is simple. At a flip of a switch, one dial disappears and another pops into view.

Another feature of the Magic Dial is two-speed tuning on the same knob—one speed for local stations and the other speed to facilitate fine tuning for distance stations on either short or standard waves.

Cunningham

A complete showing of the entire new line of 2.5 volt tubes.

Silver Marshall

All superheterodynes—from 5 to 13 tubes—ranging in price from \$29.95 to a maximum of \$139.50—the new beautiful "Q" model de-luxe at \$139.50 which incorporates all-wave chassis with one-dial control. It has three speakers. Class "A" Prime Audio Amplification and noise suppressor. Also a wide line of sets in the low-price group, incorporating the features found in the high priced models. New and more beautiful cabinets.

Lyric

The new price range is from \$42.50 for the table model to \$139.50 for a large console with channel control and the new tubes. One of the new Lyric consoles lists for \$49.95 complete with tubes.

Crosley

A new CROSLEY refrigerator at \$99.50 list. Features include temperature control . . . 9 sq. ft. shelf space . . . thermal cutout . . . defrosting switch . . . flat bar shelves . . . dry zero insulation . . . 3 ice trays . . . 63 cube capacity . . . 4½ cubic feet net capacity for food storage . . . self-contained removable unit . . . porcelain interior . . . completely self-contained unit, easily removable. The CROSLEY refrigerator has hardware in stamped brass, chromium plated. Automatic spring-closing lock on door.

Radio Receptor Co.

New POWERIZER "Micromike" address system. Portable. It is a small sized broadcast microphone with hand or pocket volume control which can be attached to an amplifier and speaker in a carrying case and used for public address work anywhere. The "micromike" can be attached to the lapel of a coat and the voice of the speaker carried to the amplifier by means of a long connecting cord. The list price is \$12.50.

RCA Radiotron

The entire new line of 2.5 volt tubes was on exhibit. The line includes a super-triode amplifier . . . triple-grid amplifier . . . triple-grid super-control amplifier . . . dual-grid power-output amplifier and the mercury-vapor rectifier tube.

Magnavox

The complete line of Magnavox dynamic speakers was on display. There are new types for manufacturers . . . new designs and more simplified mounting arrangements . . . new auto radio speakers and heavy duty speakers for powerful address systems. Also was shown the new line of Mershon and Magnavox condensers, made in a wide range of sizes and types for initial installation and for replacement purposes. Special power amplification instruments and condensers for industrial work.

Wright De Coster

The new line consists of many innovations and improvements in the standard line of speakers and the new low-priced Wright De Coster speaker for automobile radios.

Supreme Instruments Corp.

A complete line of modern test sets for every requirement. This popular line of instruments for dealers, service men, laboratorians and designers has met with most gratifying response.

Jackson Bell

An all-wave receiver with one dial for both short and long waves. \$59.95 list with tubes. 545 to 16,670 k.c. 8 tubes. Also model 26SW at \$49.95. 545 to 1717 and 2,400 to 6520 k.c. 6 tubes.

Apex-Gloritone

Marked refinements in cabinet designs and improvements in the receiver itself, including the use of the new tubes. A new table model, with the new tubes, at \$34.50 and a larger table model with magnificent cabinet at \$49.95. Also a new console at \$99.95 with all of the new tubes, class B amplification, matched dual speakers (one 10 inch and one 8 inch), tone control, automatic volume control and noise eliminator. Other consoles at \$69.95 and \$59.95. Also a new refrigerator at \$99.95.

Capehart

"THE COMBINAIRE" . . . a super de-luxe automatic record changing instrument with long and short wave radio combination. Will play the new long-playing records as well as standard records. The radio receiver has a 10-tube superheterodyne circuit, 12 in. dynamic speaker, automatic volume control, push-pull pentodes, vernier tuning and one dial control.

Hammarlund

The new "COMET PRO", a professional and most elaborate receiver for the short wave lengths. Designed for utmost efficiency and performance.

Sentinel

Long-short wave combinations with all of the new innovations. An 8-tube superheterodyne console at \$64.50 and other consoles selling up to \$99.50. Also a mantel style long-short wave combination receiver at \$59.50 and a complete line of Sentinel chassis for private brand merchandising. These new chassis can be had for the long-short wavelengths or for standard broadcast band reception only.

Howard

A 19-tube combination short-long wave de-luxe receiver in the higher-priced brackets (\$395.00). Super-sized dynamic speaker and power supply.

Sparton

A new Sparton circuit, using an amplifier which delivers 20 watts of undistorted output. New two-tube rectifying detector system and special level control for suppressing noises between stations. Automatic volume control and static control. Console models and phono-radio combinations in more attractive cabinets. The new "History Making" Sparton uses three dynamic speakers and a 13-tube superheterodyne circuit.

Speed

Cable Radio Tube Corporation's new "SPEED" tube line includes the new innovations in tubes and a new line of photoelectric bulbs.

Utah

A new "B" Power unit for motor car, motor boat or airplane radio. \$18.00 list. Consumes 1½ amperes from the battery when delivering 25 milliamperes at 135 volts. Uses a vibrating interrupter in conjunction with a mercury vapor rectifying tube.

"Repealer"

Sparton's new auto horn is named "Repealer" because of the tune which it plays. Press the horn button and the tuneful notes of "How Dry I Am" emanate from the four horns. List price \$24.50 in enamel; \$34.75 in chromium plate.

Electrad

"Vitmonel" electric resistors with uniform contraction and expansion of all parts. Heralded as an important step forward in resistor design and construction. Electrad also offers a complete line of control, amplifiers, chassis and miscellaneous small parts.

Elkon

Mallory-Elkon exhibited the new \$19.95 auto-B eliminator. Uses the new Elknoden element and a rectifying tube. Delivers 180 volts for auto radio.

Kennedy

"De Luxe Promotional Radio". A new line for dealers who "sell-up". 16-tube superheterodyne circuit. New class B amplification. Matched twin speakers. The new tubes. All-Wave. One dial for all bands. Selectone tone control, automatic volume control and tuning meter. Also two new midgets to meet the low price competitive class.

Bond

The Bond Electric Company display included the new Bond Stedyvolt "B" Battery, especially designed for use in motion picture theatre sound equipment; a new special radio battery for use in police cars; a rubber case storage battery for pleasure cars radio sets; a complete display of Bond radio receiving tubes, (Continued on page 27)

First of a Series of Monthly Analyses of Sales Programs

Philco's Plans for the New Radio Season



TWO OF THE NEW PHILCOS
The one at the right sells for \$250.00
and the other for \$100.00.

Editor's Note—"RADIO" will present the new sales plans of many other manufacturers in subsequent issues.

Five hundred and fifty distributors and sales executives in convention at Atlantic City at the Hotel Traymore on May 19th and 20th, heard President James M. Skinner announce the Philco Radio program for 1932-33. They were amazed, enthused, filled with confidence, and left for their own territories so that they could begin immediately to enjoy the volume of business and the profits from it, which this new program promises.

The line has been lengthened . . . the sets have been tremendously improved . . . more and more important exclusive, patented features have been built into the sets . . . prices have been lowered . . . more X models have been brought out . . . combination long and short wave sets have been increased in number and tremendously increased in simplicity and economy of operation . . . cabinets have been almost unbelievably beautified . . . magazine advertising has been increased 50 per cent . . . with the hint that newspaper and radio advertising will also be largely increased . . . and greater selling effort than ever before is to be applied to the line. The depression has been totally disregarded insofar as confidence, aggressiveness and policies are concerned. The only concession to depression that the company made, was in the creation of extraordinary values to wake consumers from any reluctance to buy that might possibly hold volume down. Other than that, the whole spirit and

atmosphere of the convention was that of an organization riding on the crest of the wave in a period of rollicking prosperity.

And while the spirit of the convention and the comprehensiveness of the program were both in amazing contrast to the general sentiment and policy of the day, President Skinner proved in his address which was received with wild applause, that everything said was amply substantiated by experience and fact, and that the program as outlined was dictated by sound business sense. Mr. Skinner said in part:

"Paradoxical as it may sound, the depression gave us the opportunity to win leadership. The depression has brought about no change in business fundamentals. Business always looks tough. Before the depression, we had powerful competition to meet. During depression, we have reluctance to buy to overcome. I had rather have reluctance to buy to overcome than powerful competition because always there are people with money to buy what you want to sell if you make it good enough, price it right, tell them about it through advertising and then place it so that you make it convenient for them to buy what you offer."

"When times were good, competition did that too, and that lessened the proportionate effectiveness of what we did. Of course it takes confidence or courage, or whatever you want to call it, to go out and do just the opposite of what practically all, if not all of your competitors are doing, but Philco is an old established manufacturer. We have been through depressions before and we have emerged from every depression stronger, more active, more experienced and more confident than ever before."

"In 1928, only four years ago, we were in twenty-sixth place in the industry. In 1929, we jumped into second place and we have been first in the industry during 1930, 1931 and 1932, with an ever-widening margin in our leadership. We have not slackened selling effort. Quite to the contrary, we have increased it. We have not curtailed our advertising to save money. Again, quite to the contrary, we have increased our advertising appropriation every year and this year we have increased our budget for magazine advertising alone, by 50 per cent. Our increase in newspaper advertising may be even more than that. We believe that money 'saved' by not spending it in advertising during times like these, is money inexorably wasted because markets are just like anything else . . . if you want them, you have to buy them, and what else are you doing when you spend money in advertising but trying to buy a market for your goods. You can buy a market much cheaper when nobody else is making a serious bid for it than you can when everybody else is spending just as much as you are. We are getting more for our advertising dollar today than we ever did before: that is why we are spending so largely, so confidently and so willingly.

"There is no depression for any leader who is getting 50 per cent or more of the total volume of business of his industry. That is why there is no reason for thinking of or talking about the depression at Philco. There is no lessening of employment at the factory; there is no slackening in production; there is no slackening in our laboratory research or in our engineering development departments.

"We are making better sets and selling them for less money. The buying public recognizes these extra values and buys. That is the important thing. The pressure of difficulties makes better workmen of us all . . . if we are determined to keep on working . . . and these new sets are almost unbelievably good. If I had not been in such constant touch with their development, I should not yet believe that our engineering and production departments could have done so much without taking infinitely more time and adding prohibitively to the cost of what they finally produced.

"The superheterodyne circuit has been redesigned to give range, selectivity and power far beyond anything previously accomplished. More than that because Philco tubes were redesigned to fit this new circuit we now save from one to three tubes as we progress from the five to the eleven-tube sets. Number of tubes is no longer a standard by which to judge the desirability of any radio. If the circuit is properly designed, the number of tubes can actually be reduced. That is what our engineers accomplished. Their new circuit design assures use of the full power and efficiency of all tubes used, and therefore affords tremendously powerful and selective radio receivers that effect most desirable economies through lower current consumption, longer life and fewer tubes to maintain and replace. Philco engineers, therefore, have become the first in the radio industry to design circuits and tubes as a balanced

unit just as they were first to design both chassis and cabinet as a supreme musical instrument.

"In the new sets, there are more new things than were ever incorporated in a radio receiver before and everyone of them is more important than ever before. We have not added a single gadget for sales ballyhoo but we have made many improvements for performance. The most important single improvement, I believe, is shadow tuning which enables the owner to tune by sight instead of by sound. Tuning a radio by ear is a whole lot like tuning a kettle drum. Very few people can tune either one absolutely but shadow tuning, exclusive with Philco, makes it possible for anybody to tune radio to the hair line of perfection. The explanation is this:

"All broadcasting stations vary at times from their true, rated and correct channel numbers. With the receiving capacity and the selectivity of sets so tremendously increased, absolute tuning becomes more and more difficult. That is, tuning by ear, but shadow tuning lets the operator see instantly whether the correct spot on the dial is exactly on the line of the channel number or a little to one side or the other of it. The shadow is controlled by station power and when it comes down to its narrowest width, whether exactly on the channel number or not, that is where reception will be brought in clear, crisp and true. Many owners have had difficulty with tuning. Their tuning troubles are now over.

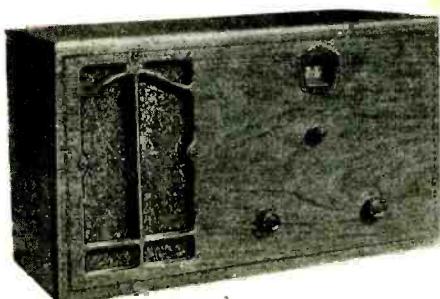
"Another important improvement is automatic silencing of radio noises between stations as the dial is turned from one station to another. It is automatic: there is no added control to complicate operation and it is as great a contribution to radio enjoyment as automatic volume control which was also a development by Philco engineers. This new automatic tuning silencer makes it possible to turn the scale from top to bottom without bringing in static or other objectionable noises.

"The new models also have twin speakers. Contrary to the generally accepted theory, Philco engineers have proved that, in the case of twin speakers, one should not be tuned to carry the high notes while the other should be tuned to carry the low notes. It is a reasonable sounding theory but Philco engineers reasoned that we can see with one eye and we can hear with one ear, but we need two eyes for depth and fulness of hearing just as we need two eyes for depth and roundness in sight. Exhaustive experiments and scientific measurement of sound, show that two speakers properly used, give to radio tone, fulness, roundness and relief that are impossible with a single speaker.

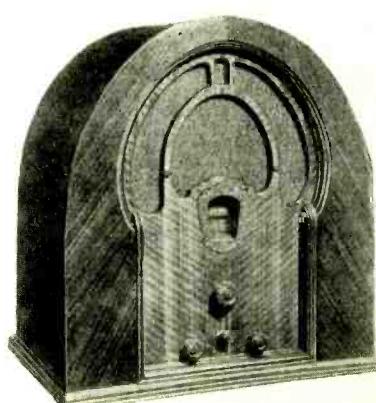
"Something like the old stereoscope which, through twin lenses made people, trees and buildings stand out from the background in a plain, flat photograph. Using the stereoscope, we see the picture through both lenses and because of the twin lens arrangement, the picture gains depth. However, one lens is not for the high lights while the other is for shadows any more than one eye picks out the high lights and the other the

(Continued on next page)

THE other extreme . . . Sets in the lower-price brackets.
Two table models in the new Philco line.



In addition to these models there are a number of medium priced consoles and the new Philco TRANSITONE auto radio.



shadows. Therefore, it is phonetically wrong to set one speaker for high notes and the other for low notes because when this is done, there is conflict between the speakers and they have a tendency to nullify the sound waves released by each other.

"More models featuring the inclined sounding board have been added to this year's line. The inclined sounding board is a new feature that was introduced at the first of the year and has proved a tremendous improvement and success. Philco engineers learned that to purify sound, it must be poured UP-hill. The explanation is that the waves which sound the high notes travel in straight lines as they come out of radio loud speakers. They are slow to spread out and unless directed upward into the field of hearing, will only partially reach the ear of the listener. In fact, some of them will be absorbed and smothered in the floor covering. By tilting the sounding board, and the loud speakers, these high notes are carried into the field of hearing and the reproduced sound takes on the 'brilliance' of the original. This lack of 'brilliance' has been one of the outstanding faults in radio tone.

"Philco has also improved its famous dynamic speaker. The cone of the new speaker is of lighter, more flexible, extremely sensitive material. The rim and the cone are pressed in one piece so that no heavy rim or glued joints restrict responsive action. The result is that tone is reproduced with all the fidelity of its fine modulations.

"And one of the greatest improvements is the Philco floating chassis. This is to radio what floating power is to automobiles and was made necessary, as in the automobile field, by the tremendous increase in power. Sets became so powerful that the whole set vibrated. Vibrations from the loud speaker were transmitted back through the wood of the cabinet to the vital circuit parts of the chassis causing audio feed-back with resulting microphonic howling and tone distortion. Now the heavy chassis and tuning condenser ride smoothly and freely on their rubber cushions and shock absorbers and are entirely freed from the influence of any amount of cabinet and speaker vibration.

"These are just a few of the more spectacular improvements that are features of the new sets. In the new combination long and short wave receivers, the number of tubes has been reduced to eight for both efficiency and economy. The explanation is that in the old twelve-tube long and short combinations, only part of the tubes worked at a time. One combination of tubes worked on short wave and another combination worked on long wave. That meant burning, maintaining and replacing of tubes that never worked all together. The new circuit uses all the tubes all the time and reduces the needed tubes to eight."

In closing, the speaker indicated how Philco again is proceeding contrary to the general idea of today as regards price. He said:

"Contrary to the most general reports, we did not achieve leadership on price. We brought out the low priced Baby Grand when the public thought it wanted that kind of a radio. It was low in price but high in value, and that is what Philco has achieved leadership on . . . value at the price the consumer wanted to pay.

"As a matter of fact, we never have had the lowest prices and we have been winning constantly a larger and larger percentage of the high priced market because we have put so much more value into our sets. Radio was still pretty much of a novelty when we brought out the low priced Baby Grands. Their limited capacity and performance were thoroughly satisfying at that time, but now that people have become educated to full range radio and its enjoyment, and because the novelty of radio no longer satisfies them since they expect to hear words as spoken, songs as sung and music as played, they are willing to pay more to get satisfying performance.

"So today, because of the increasing patronage of an appreciative public, and despite the depression, the demand for higher priced sets because of their far superior performance and greater capacity, is constantly growing and Philco finds itself in the happy position of enjoying the patronage not only of more people, but of more people distinguished in the arts than any other radio. We have decided that manufacturers and merchants are more obsessed with the idea that we are dealing with a 'price market' than the public is, and we are governing ourselves accordingly. Our experience has always been that the public is a shrewd appraiser of values. They may be misled for a while by the attraction of low price and they may even mislead themselves for a while with the notion that they want to pay far less for a thing than their own common sense tells them that it can be properly made and sold for, but after the phase passes, and it doesn't take long for it to pass, they buy again according to the dictates of their own common sense and find it true economy to pay in the proportion of five dollars and get five dollars worth of value than to pay in the proportion of three dollars and get only two dollars worth of value. It is the foundation cost in radio, just like the foundation cost in anything else, that puts a big hole in the total cost unless you pile value upon value on that foundation. When that is done, the proportionate cost of the foundation becomes insignificant, and today's radio buyers, we have found out, want more than the foundation no matter how good it may be."

"A \$200,000,000.00 Bet"

The radio industry is betting \$200,000,000.00 for hire and advertising, Mr. Coit declared. J. Clarke Coit, Chicago, president of the Radio Manufacturers' Association stated on the eve of the opening of the eighth annual convention and trade show of the association at the Stevens Hotel.

Much of this money has already been wagered by the manufacturers in expenditures on new machinery, new dies, re-tooling and other items required for changes in product and the balance will be spent during the next few months in purchases of stocks of raw material, la-

"The radio industry has suffered during the past three years along with business in general," he asserted. "Radio has taken a lot of punishment, but the industry as a whole has weathered the storm quite well, and refuses to be disheartened.

"We take the attitude that business in general is just three years nearer a return to profitable operation than it was at this date in 1929.

"Just how soon business will start on the upgrade no one can say but some of us

feel that a slow recovery is now under way. In any event our industry is betting \$200,000,000 that conditions will be much better during the next 12 months.

"There are some 16,000,000 radio sets in operation in homes and a great many of them are obsolete. We therefore look forward to a good volume of replacements. Also, we must consider the fact that there are approximately 13,500,000 homes in the United States that are not equipped with radios.

"Approximately 3,500,000 sets and nearly 55,000,000 tubes were sold during the past year. This volume should be materially exceeded this coming year."

NEWS



JOHN S. WATTERS,
Columbia's Phonograph Record Manager.

ADRAMATIC revival in the merchandising of recorded music is forecast by John S. Watters, sales manager of the Phonograph-Record Division of the Columbia Phonograph Co. Inc., because, says Mr. Watters, the American public wants recorded music.

Active in the phonograph and radio industries for ten years since his graduation from the United States Naval Academy, Mr. Watters makes this prediction in the knowledge of experiences covering the succeeding waves of popularity of both radio and the phonograph. From January, 1929, until joining the executive staff of Columbia, he was with the Rudolph Wurlitzer Company as merchandise manager of the retail division, in which capacity he became thoroughly familiar with the problems of the record dealers.

Mr. Watters is convinced that there is a profitable business in recorded music for the merchant who will think; he sees phonograph records as a type of sound-photography, portraying and preserving for all time the music of the world.

"The radio presented a temporary obstacle in the path of the business of recorded music," says Mr. Watters, "because through the radio, more faithful reproduction of the original was possible."

"When reproduction of recorded music was improved, an immediate increase in its popularity resulted in marked advance in sales of records and phonographs (the Orthophonic period). Further perfection in the development of radio again relegated the phonograph into the background, until now, when radio is an integral part of the phonograph, it itself

affords the means of staging a dramatic revival in the merchandising of recorded music.

"The American public wants recorded music—when it accurately depicts, in its reproduced state, the color and the inspiration of the original. Columbia records make that objective possible.

"Fully alive to the truism that, no matter how good the product, it will not sell itself—it still must be sold—Columbia's aggressive new sales policies include plans which will bring back to the record merchandiser, the clear-cut, profitable day-in and day-out business he formerly enjoyed. 'Go forward with Columbia' might well be adopted as the slogan of the music trade."

A NEW Photoelectric Relay has been brought out by the G-M Laboratories, Inc., 1735 Belmont Ave., Chicago, embodying a unique feature permitting all wiring to be concentrated at one point. This single unit combines the amplifier, photoelectric cell and light source within a single case, greatly simplifying the work of installation.

Another advantage of this type of unit lies in the fact that no separate and bulky light source is required. The rays from the lamp behind the right hand lens are focused on a special mirror, and reflected to the lens in front of the Photoelectric



Cell. This mirror can many times be mounted in a space too small to accommodate a separate light source, or in a location where it would be difficult to bring in special wiring to supply lighting current.

Many other unusual features are said to be embodied in this new unit. Removal of a small front plate permits ready adjustment. All wiring and interior parts are attached to a central section of the relay entirely independent of front and back covers. The case is of cast aluminum and so designed that the entire unit may readily be weather-proofed for outdoor use. In addition, this unit is capable of operating at speeds as high as 600 light interruptions per minute.

ECHOPHONE TO MANUFACTURE FULL LINE OF RADIOS AND TELEVISION RECEIVERS

Western Television to Concentrate on Research and Construction of Television Broadcast Equipment

ACLOSE working agreement between Echophone Radio Mfg. Co., Waukegan, Ill., and Western Television Corp., Chicago, was announced in a joint statement by the respective presidents of the two concerns, A. U. Magnan and Clem F. Wade.

The deal involves a substantial purchase of Echophone stock by Western Television, and a change in the latter's manufacturing activities whereby Echophone, in addition to the manufacture of midgets and consoles, will produce Western Television sight receivers.

Two pioneer companies are thus linked together.

Echophone has been in continuous operation as a radio manufacturer since 1921. Two years later it produced the first selective set, commercially; in 1928 made the first midget, and in 1930 was the first to introduce the superheterodyne midget. Western Television is one of the largest television companies in the country, and is the oldest manufacturer in the West.

The complete line of radio and television receivers was exhibited by Echophone at the RMA trade show. The television line consisted of a small screen job for the home, a larger combination voice and picture receiver, which projects pictures eight to fifteen inches, and a kit for amateurs. The radio line featured twin-speaker-superheterodyne midgets and consoles.

Western Television Corporation, according to the announcement, is to devote its entire attention to television research and to the manufacture of television transmitting equipment, such as is used by broadcasting stations, experimenters and amateurs in Illinois, Wisconsin, Indiana, Michigan, Iowa, Missouri, California and Montreal, Canada.

New Arcturus type 46tubeduo-grid power tube and Arcturus 82 fills the demands for increased power and the use of Class "B" amplification. The voltage drop across the tube remains almost constant as the load is increased until the total emission of the filament is approached, insuring improved regulation and long life.



Elmer T. Cunningham

Explains Purpose of the New Tubes

"TRADE-UP...and TRADE-IN" ...is his advice to you

By E. T. CUNNINGHAM

WITH approximately 17,000,000 A.C. receivers in homes, the best prospect for a new radio set is the person who already has one, particularly a 1927 or 1928 model. In the automobile industry, 3 out of every 4 new passenger cars are sold to those who already own a car. According to a recent estimate by Radio Retailing, 48.5% of new sets sold are bought by old-set owners. The percentage will be much higher as dealers are in a position to offer outstanding comparative values with a policy of reasonable trade-in allowances on old sets. For years the radio industry has enjoyed "easy selling" from a relatively unsaturated market. Now we must go to work and trade-ins must play a big part in developing sales volume—trade-ups in developing dollar volume.

Up to the present time, sets in the lower price range have performed about as well as sets in the higher price range, practically speaking. The average person, listening to a good midget, would say it sounded about as well as a high-priced console. The principal incentive to buy the console was the appearance of the cabinet—strictly a furniture appeal. The average person can be more readily traded up by increasing radio values rather than just furniture values alone.

The sensational new Super-phonie RCA Radiotrons and Cunningham Radio Tubes—types 56, 57, 58, 46 and 82—featuring Dual Grid Power, Mercury Vapor Rectification, Triple Grid Amplification and Super Control, etc.—have been designed with the single aim of enabling set designers to create new and outstanding Radio Performance Values.

The 1932-33 radio receivers now being announced and using the Super-phonie RCA Radiotrons and Cunningham Radio Tubes offer radio performance immeasurably superior to that of yesterday, demonstrable performance that adds new en-

thusiasm to selling, new attention—and action-compelling interest by consumers. All former values are obsolete. Superior richness in tone, freedom from noise and distortion, life-like reproduction at all volumes can be demonstrated. A trained ear is not necessary to note the improvements.

Analyzing Radio Receiver Values

Radio receiver values that determine the consumer's purchase are tone quality, eye value (furniture appeal), selectivity, volume control and sensitivity.

The radio performance factors can be divided into two main divisions, the radio frequency system controlling selectivity, sensitivity, volume control and incidentally tone quality and quietness of operation, and the audio frequency system determining tone quality, volume and fidelity.

Super-phonie Radiotrons and Cunningham Tubes improve both the "radio frequency" performance and the "audio frequency" performance. All 1932-33 Radio Receivers using Types 56, 57, 58 in the "radio frequency system" will offer the last word in selectivity, sensitivity, volume control and quietness of operation. Tube for tube, circuits using types 56, 57, 58 outperform the earlier types 27, 24 and 35 or 36, 37 and 39. Today's 5 tube job excels yesterday's 6 tube performance.

The radio frequency performance factors are only part of the consumer sales demonstration. The number of tubes largely measures the overall r.f. features.

Tone quality and fidelity is the outstanding radio value in a consumer demonstration. The 46 and 82 have made an outstanding advance in these features. The biggest cost variation in a radio receiver is in the audio system and results in the widest demonstrable performance variation. Audio performance in 1932 receivers will be based on three main systems:

1. Type 47 pentode output operating directly from the detector and sacrificing tone quality and fidelity for volume. This output will be utilized in low priced table models.
2. Type 45 singly or push-pull fed by a preliminary audio stage for improved tone quality with moderate volume. Fidelity at low volume is impaired and sudden volume changes cannot be readily handled. Type 46 with the double grid tied together may be used instead of a type 45. Will be found in the medium price class.
3. Dual Grid Power output. Two type 46 with special driver stage fed by the instantaneous power response of the 82 Mercury Vapor Rectifier. This system is the last word in tone quality, volume, fidelity and flexibility. Handles all loads without blasting or distortion, capable of feeding dual speakers. A comparative demonstration of this output system gives a new radio thrill—makes radio truly a musical instrument. Dual grid power will be used in all the best quality receivers.

Trading-Up

Therefore, the new Super-phonie RCA Radiotrons and Cunningham Radio Tubes have developed a price range of radio sets based on demonstrable radio performance in addition to eye and furniture value. This step by step increasing performance values makes practical trading-up because the demonstration supports the selling talk. The \$150.00 sale can be made instead of the \$100.00 sale, \$100.00 over the \$75.00, \$75.00 over the \$50.00, etc.

Trading-In

A successful radio set trade-in plan depends upon (1) demonstrating to the customer a radio receiver immeasurably superior to that which he now possesses, and (2) giving the customer an allowance on his old set.

How the New Double Automatic Volume Control Works

S. W. MULDOWNY, Board Chairman of National Union Radio Corporation, announced that National Union engineers have perfected a new Automatic Volume Control. The device is known as a "Double Automatic Volume Control" and has been the subject of many months of experimentation in the National Union Laboratories.

In commenting on this new National Union development, Mr. Muldowny said:

"The past year has witnessed an increasing number of manufacturers placing on the market radio sets incorporating an automatic volume control system. Offering such features as the elimination of blasting on strong stations, and the reduction of fading on distant stations, it at first appears that the inclusion of automatic volume control in a receiver would make that receiver extremely attractive to the public.

"The reaction which radio dealers have received from a large portion of the customers who have bought A. V. C. receivers is to the effect that automatic volume control is not an unmixed blessing. The average owner of an A. V. C. receiver feels that his set is too noisy between stations, that it lacks selectivity and that, furthermore, it is difficult to tune correctly. This criticism is valid, notwithstanding the fact that it is engendered by a lack of knowledge of the manner in which the customary automatic volume control system operates.

"There is little doubt but that the addition of A. V. C. to a receiver makes that receiver noisy between stations. Some of the makers of A. V. C. receivers have built into the chassis a 'silence switch' which, when properly used eliminates the noise encountered when tuning between stations. The use of a silence switch, which must be operated by the person tuning the radio set, is not, however, an ideal solution of the problem.

"Lack of selectivity" complained of by many owners of A. V. C. receivers is of course in reality lack of apparent selectivity, rather than lack of real selectivity. This lack of apparent selectivity, however, often-times reacts to the disadvantage of a receiver having automatic volume control, when such a receiver is demonstrated alongside of a receiver which does not have an automatic volume control.

"The use of a tuning meter in A. V. C. receivers is an indication of the difficulty encountered in tuning such a receiver. While undoubtedly, when used correctly,

IT'S A SMALL WORLD

THIS photograph, taken in the tropics of Ecuador, shows an American radio set equipped with Arcturus Tubes. Recently the owner of this set, an American, picked up WOR, and was so thrilled with the performance of blue tubes, that this picture is the result.

As an example of the far reaching effects of radio, a program broadcast by the globe trotter from WOR was copied in shorthand by this radio owner and the next day was featured in the local newspaper.

"This accomplishment is almost unheard of in the tropics," says I. C. Clements, assistant export manager of



Arcturus Radio Tube Company. "Having spent many years in that country, I can fully appreciate this feat. In fact, for more than a year, we didn't know that the World War was on. This case is a remarkable tribute to American radio and equipment."

the tuning meter is a means for enabling the owner of the set to tune that set correctly, still, the tuning meter is not a happy solution of the difficulty.

"A system of overcoming the above mentioned objectionable features of automatic volume control receivers has been devised by National Union Laboratories. Simply stated, this system may be described, as one which provides an automatically operated silence switch. The action of this automatic silence switch is such that only when a station is correctly or almost correctly tuned in does the loud speaker receive a signal. By proper ad-

justment, this automatic silence switch can be made to operate so that there is no noise whatsoever encountered in tuning between stations, and also the apparent selectivity of the receiver can be made extremely good without in any way impairing the quality of the received signal. Furthermore, this automatic silence switch may be so adjusted that the operator of the set will be compelled to tune same correctly without the conscious effort required when using a tuning meter."

A number of set manufacturers featured this double automatic volume control in their new sets at the R. M. A. Show.

"30"

Another pioneer has passed into the great beyond. M. J. Friel, Pacific Coast representative for Howard Radio, Clarostat, Dubilier and other prominent radio manufacturers, passed away on May 30th after an illness of but three hours' duration. Friel had been associated with the radio business from its inception. A gentleman of character, of reputation and reliability . . . his loss is mourned by all who knew him and worked with him.

Television In Its Present Development and Some Constructive Suggestions from the Federal Radio Commissioner

ADDRESS OF
HON. HAROLD A. LAFOUNT
Federal Radio Commissioner
Washington, D. C.
OPEN MEETING EIGHTH ANNUAL
R. M. A. CONVENTION
Stevens Hotel, Chicago

I AM pleased to have this opportunity of attending your Annual Trade Show and Convention. It is likewise a pleasure to renew old acquaintances and I hope to make some new friends.

Doubtless you realize the many problems confronting the Federal Radio Commission and the necessity of commissioners remaining at the capitol most of the time, yet I feel it a duty and a rare privilege to sometimes mingle with the "trade" to exchange ideas and to obtain your viewpoint concerning our problems. In this way many conflicting views may be reconciled and helpful suggestions proposed and perhaps adopted. It is in that spirit of co-operation and helpfulness that I address you. I am extremely anxious to say something that will be helpful to you and your organization.

Naturally, the Federal Radio Commission are interested in your welfare and progress. Under our present system of regulation we realize that your success is a criterion of our success. It is self-evident that we must establish rules and regulations that are fair, just, equitable and workable, otherwise radio broadcasting would be thrown back into the chaotic state which existed some years ago, and your industry would probably be at the foot of the list of American industries instead of being near the top.

You manufacturers of radio equipment deserve much credit for your initiative and optimism. Some people are talking depression and unsatisfactory business conditions while you are anticipating normal business. I congratulate you. I believe you are right: the evidences of a return to normal business conditions are as obvious as the budding trees are a sure sign of the approach of spring.

Your record of achievement is an inspiring one and undoubtedly your optimism and faith in America will be an inspiration and a blessing to more timid souls who have retired and are not now willing to take a chance. Your noble example may brace them up and strengthen their backbones.

You have kept pace with the rapid developments of the radio art, in the production of new receiving sets with fine selectivity and sensitivity, in making new tubes that produce such marvelous results, new short wave apparatus,

Next month's "RADIO" will bring you a reply to this address by a television authority who will tell you of the progress which has been made in recent weeks.

new automobile receiving sets, new loud speakers and amplifiers, new cabinet designs, and other new products on display here. Even a casual survey of the exhibits here must convince the most skeptical of your confidence in the future of radio broadcasting and conditions generally. You have provided receiving equipment for the finest communication service the world has ever known. American companies have established circuits connecting practically all nations on the globe, opening up the very remote sections, thus stimulating trade and international good will.

Your products have also added much to the development of aeronautics, and the little army of 20,000 amateurs are constantly kept on their tiptoes by new inventions and improvements.

There seems to be no limit to the resourcefulness and ingenuity of radio engineers, future possibilities stagger the imagination. As new devices are proposed, which theoretically solves some radio problem, you manufacturers are quick to anticipate the possible market, and soon the new gadget is made available for general use.

The fact that you have on display here more new products than at any period during the past five years speaks volumes for your vision and confidence in the future. It is just such courage and foresight, as you are manifesting, that will win this war against depression and unemployment.

In providing 17,000,000 homes with receiving sets (the latest estimate) you have contributed much to the advancement of our nation, providing, as you have, a marvelous vehicle for the dissemination of vital news concerning our public welfare, for stimulating music appreciation and providing entertainment, education and diversion for our people in their own homes and at very little cost.

Interest in radio on the part of the general public shows no abatement. The American system of broadcasting with all its defects, appears to us to be the best yet devised. The army of listeners increases daily.

Those engaged in the broadcasting business are most optimistic. They are constantly seeking to expand, operators of local stations desire

regional assignments, those with regionals desire cleared channels, and those on cleared channels desire maximum power.

While those ambitious souls add much to our worries and perplexities, it is a healthy situation.

The majority of broadcasters in this country are doing a magnificent job. It is an "off night" if there is not a \$100,000 performance on the air. We hear a \$5.50 show every evening in our homes without any effort on our part.

Radio broadcasting is one of the greatest contributions ever made by Divine Providence and man's ingenuity to our home-loving people. It provides high class entertainment, reliable information on all live topics, eliminates provincialism and sectionalism, and cements our people into a mighty phalanx—imbued with rare patriotism and nationalism.

Although our broadcasters are "way out front" in the matter of providing interesting, instructive, educational, and helpful programs, there is still room for improvement and expansion.

To make the most of the radio facilities at our disposal, there must be absolute cooperation between manufacturers, broadcasters, and the Government. A perfect allocation and the use of ultra modern transmitters is useless unless receiving sets are equally modern and properly installed. Consequently the Federal Radio Commission must intelligently direct radio traffic by making scientific allocations. On that subject may I say the Commission have not only required broadcasters to install the most modern equipment on the market, but at least on one occasion ordered the installation of equipment that had to be designed and manufactured. Of course ample time was allowed but I want you to appreciate the efficiency of the ultra modern transmitting equipment now being installed. Although I thoroughly appreciate the modernism of receiving sets, I actually believe they are not as selective as transmitters are accurate. In requiring such efficient transmitting equipment, the Commission considers public interest as paramount. Frequencies must be used to capacity consistent with the requirements of the listeners and good engineering practice.

Broadcasters must know and understand their listeners and present programs which appeal to them. It should be comparatively easy for a broadcaster to feel the pulse of his audience. As you know, the American people are not slow in making known, in various forms their likes and dislikes. Broadcasters must know that the majority of their listeners are right, and if the mail, telephone calls, and comments indicate public disapproval of any particular program it should be taken off the air. Only in this way can the public be served and good will developed and maintained.

Broadcasters are showing a fine spirit of cooperation with the Commission in its effort to render the listening public the best possible service. A concrete example is the fact that the vast majority of stations have already installed the necessary equipment to keep within 50 cycles of their assigned frequency consistent with a commission order which goes into effect June 22, 1932.

As you know the observance of that order will eliminate whistles and heterodyne now prevalent on many regional channels thus increasing the service areas of many stations. Listeners unable to satisfactorily receive programs from regional and local stations because of interference from other stations on the same channel will be greatly benefited. It is also gratifying to note that while our regulations call for not less than 75% modulation, many stations are adding equipment which insures 100%.

You manufacturers, as I have said already, have done much for radio broadcasting in the United States, but if I may be permitted to say so, you and your distributors and retailers are woefully lacking in one thing, and that is, service to the receiving set owner. This is, in my judgment, a real weakness in your present marketing plan.

Your responsibility must not cease when the receiving set is paid for. If full tone value is to be maintained, and if the receiver is to accurately reproduce that which is broadcast, then sets must be serviced at least twice a year. Old, practically worn out tubes are inefficient and require so much amplification that signals are distorted and noise produced that actually make the receiver sound like an old graphophone. One of the joys of listening to radio is that it faithfully reproduces that which is broadcast; in fact, modern receiving sets when properly installed and in first class condition are so efficient that one can scarcely believe the artist is not actually performing in his own home. This high type reception must be maintained if interest in radio programs is to continue. A small service charge could be made which the average listener would welcome. However, the listener usually does not appreciate the necessity of such service and often blames the broadcaster, or the Government for poor reception, when, as a matter of fact, his set has been in operation for perhaps two years without having been checked by an expert and perhaps he is still using the original tubes.

Then, too, frequently receiving sets are improperly installed with poor antenna systems and connections. Personally, I believe more than one-half of the 17,000,000 radio receiving sets now in use in this country are improperly installed, and this I say is partly due to the fact that manufacturers and distributors have failed to explain to the public that their receiving set is a highly technical device, which must be frequently checked by a capable expert. No one would think of leaving his piano for years without having it tuned. We all realize the necessity of keeping our automobile in first class condition, replacing spark plugs and tuning up our motors, but many seem to think that a radio receiving set is almost human and can provide for itself.

The public should also be advised of the necessity of properly adjusting and tuning their sets.

Before taking up my main topic I want to emphasize President Hoover's recent statement: "This is a serious hour which demands that all elements of the Government and the people rise with stern courage above partisanship to meet the needs of our national life." I sincerely believe you manufacturers are squarely behind this movement and will do your full part in restoring confidence and normal business conditions.

As to my assigned topic, "Television", a child of science appears to be as illusive as its twin "prosperity". Both have been said to be

just around the corner, but the question is which corner. There is magic in the name "Television". It is something new and little understood by the general public, its possibilities are speculative, consequently are often exaggerated.

Ever since 1925 when C. Francis Jenkins gave his first public television demonstration, consisting of flickering shadows of a little girl in silhouette bouncing a ball, the laboratories have become a magnet for the promoter who pictures to his prospective clients the untold wealth to be found in this new field, which in his opinion will far outstrip such prosaic industries as were created by the automobile and radio.

Ever since its creation, the Federal Radio Commission has been frequently petitioned to put television on a commercial basis, as if the Commission by the passing of rules and regulations could create for an industry a state of technical perfection which the best engineers of the country have not yet been able to achieve.

The position of the Commission is very clear and quite simple in this respect. As soon as the television art is perfected to the point where the average layman can expect a comparatively fair amount of entertainment from his television receiver, it seems reasonable to suppose that the Commission will not arbitrarily bar the way to economic progress in this field.

Nor has the Commission played the ostrich and stuck its head in the sand. The individual commissioners and their engineers have travelled far and wide to see at first hand the latest developments of television in the laboratories. Frequent reports have been made to the Commission and such policies as have been adopted have in every instance been motivated by an acute perception of facts as they then existed. Very frankly, gentlemen, we are not yet convinced that television has emerged from the laboratory and is ready to matriculate into the more severe course of adult entertainment and education.

True, most of us have seen remarkable pictures in the laboratory—pictures whose depth and detail compare not unfavorably with the amateur motion picture projection. To the layman, however, there is always a missing element. While we may gaze in fascination for ten or fifteen minutes at a picture that has penetrated the mysterious ether through steel buildings and brick walls, to astonish the "looker-in", yet after a quarter of an hour of such pleasing surprise, the mind becomes impatient and critical. The amount of action is strangely confined. We not only have the three unities of Greek tragedy, time, place and action, but the actors themselves are limited to one, two, or three persons at the most, whose visibility changes in inverse proportion to their number.

We have all dreamed of the day when the complete action and crowds of a football game could be seen in every home simultaneously with their occurrence, through simple television apparatus. But this dream is a long way from present actualities. The very best television picture of today can only show a comparatively small group of persons at any one time, whose features are in any way recognizable.

These imperfections and limitations of present-day television result from the comparatively small number of what are known as television scanning lines. A number of years ago television was being developed on the basis of 48 scanning lines per picture, which means that whether the picture was an inch high or was projected to a large screen, the number of lines still remained at only 48. From a projection standpoint it can be readily seen that if the ordinary motion picture screen is divided into 48 horizontal strips, the amount of resulting detail must necessarily be meager. The number of lines has been gradually increased

from 48 to 60, and we are now told that 120 lines are being used with the possibility of doubling this to 240 lines. Such an increase in line scanning will of course give a considerable increase in the detail of the picture transmitted, but the picture will still be far from approaching the quality of present-day motion pictures. Rather complex engineering problems are involved in the development of the associated apparatus for both low and high frequency amplification which will permit full advantage to be taken of the increased detail accompanying the increase of the number of scanning lines.

Just at this point is where some of the television problems of the Federal Radio Commission are encountered. The normal 60-line picture used by the majority of television experimenters today requires a single sideband modulation width of 43,200 cycles, or 86,400 cycles emission for double side band transmission. If the number of lines is increased to 120, at 24 pictures per second, which is the standard talking picture speed, maintaining the five by six proportion of height to width, the number of cycles required per sideband increased to 207,360, or a total band width of 414,720 cycles required for double sideband transmission. It can thus be seen that if 240 lines are used with the methods known today, a single sideband emission of 829,440 cycles would be required, or using double sideband transmission, a total band width of 1658.88 kc. would be required for a single picture, which is almost twice the entire width of the whole present broadcasting band from 550 to 1500 kc. As you know, the radio spectrum below 20,000 kc. is now crowded, and does not contain space for such wide band emissions unless we abolish many other important services.

For this reason it became evident that for pictures having any reasonable degree of detail it was necessary to find an entirely new part of the radio spectrum where comparatively wide frequency bands could be found for this new type of service, and consequently the so-called ultra-high frequency bands were selected. These bands run from 43,000 to 46,000 kc., from 48,500 to 50,300 kc., and from 60,000 to 80,000 kc. including a total frequency space of 24,800 kc. This appears to be a relatively large amount of space for such a new service, but we have already been informed by engineers of some of our leading companies that eventually for good service to the public, channels having widths of approximately 2000 kc. will be required, and on such a basis it can be seen that this apparently tremendous expanse boils down to only ten channels.

Perhaps this single reason more than any other justifies the policy of extreme caution which has been followed by the Federal Radio Commission in the approval of new television stations. If what has the essentials of a huge industry in the making must grow, live, and prosper within perhaps only ten channels, only the most extreme caution in the original granting of television applications can prevent chaos.

The Federal Radio Commission in its determination of public interest, convenience and necessity must consider the use by any of its licenses of radio frequencies for purposes other than those intended in the license, such things as stock manipulations are not passed unnoticed. Our justification, however, for what appears to many to have been an unnecessarily severe control over television stations, is not based upon the question of stock promotion at all, but on a protection of the industry itself. We wish to avoid the degeneration which occurred in broadcasting due to the breakdown of control, and to prevent such possibilities in television by subjecting all television applicants to the most rigid scrutiny before, rather than after, the damage is done. I am very happy to say that fortunately we have received the hearty support of the industry.

There's Something On the Radio Horizon

IT IS NOT A MIRAGE!

The farsighted man needs no telescope to see it. The foresighted man is getting ready for it now. It is television by means of the newly-perfected cathode ray receiver, producing brilliant black and white motion pictures by radio so that they can be seen in a lighted room on a screen a foot or more in width; pictures providing sufficient detail to satisfy the most critical lover of entertainment in the home. Here is something new and compellingly attractive for the radio man to sell or service.

ALTHOUGH the exact date of its announcement cannot yet be told, it will be soon, probably by fall. Then there will be a scramble to find out about it. But if you want, you can now at your leisure find out how and why it works. Whether you plan to sell or service it, the first essential is to know its underlying principles of operation. "Know your product."

THIS necessary knowledge of cathode ray television receivers can be acquired by any man who already understands the simple principles of a radio receiver which is used to reproduce broadcast speech and music. And in acquiring knowledge of television, he gains a clearer conception of the underlying principles of radio.

PERHAPS the easiest and quickest way for getting this knowledge is to study the clearly written text which is the basis of the lectures on television which are being given for the University of California Extension Division by Arthur H. Halloran. These lessons require no previous knowledge of mathematics. They have been prepared primarily for radio service men. They are concerned with the receiver rather than with the transmitter problems which require mathematical interpretation.

THE lessons are ten in number, as listed on the facing page. One is mailed each week during a ten weeks' period. Each is accompanied by questions which emphasize the salient facts in the text. The student can mail his answers to these questions, if he desires, so that they can be corrected and graded, a certificate as to his passing being sent to him at the end of the course. The price for this service is one dollar per lesson.

ANY radio dealer, service man, jobber, or salesman can profit from the information in this course. By studying it slowly now, instead of hurriedly when television does "break," he can be ready for immediate, intelligent action. The first men to qualify should be the first to profit.

This is a NEW non-mathematical course for men who understand only the elementary principles of radio.

Enrollment

Arthur H. Halloran, Television Consultant,
430 Pacific Building, San Francisco, Calif.

ENCLOSED is \$ for your non-mathematical course of instruction on Cathode Ray Television Receivers in 10 lessons. Send the first lesson immediately.

Name

Address

City

State



Synopsis of the Course

Lesson 1: The Physical Problems of Television. The Optic Nerve. Peculiarity of the Eye. Disk Scanning. Cathode Ray Scanning. Amplification and Transmission.

Lesson 2: The Electron Theory of Matter. Nature of Substances. Liberation of Electrons. The Periodic Table. Periodic Classification of the Elements. Photoelectric Action. Secondary Emission.

Lesson 3: Radiation. Conduction in Vacuum. Gaseous Conductors. Conduction in Solids. Electrostatic Effects. Electromagnetic Effects.

Lesson 4: Applied Electrical Theory. Electromagnetics. Capacitance. Electromagnetism. Inductance. Transformer Design.

Lesson 5: Physical Optics. Interference of Light. Law of Reflection. Dispersion of Light by Prism. Color Wavelengths. Diffraction. Refraction. Formation of Images. Mirrors and Lenses. Properties of Lenses. The Eye as an Optical Instrument.

Lesson 6: Photoelectric Cells and Neon Tubes. Photoconductive Effect. Photo-voltaic Effect.

Lesson 7: Mechanical Scanning. Light Sources and Modulators. The Kerr Cell. Scanning Methods. Disk Scanning. Baird, Jenkins, Sanabria, Gramophone Ltd., Ives and other Systems. Rotating Mirror Scanning. Vibrating Mirror Scanning. Nicholson System. Zwoykin System.

Lesson 8: Synchronization of Mechanical Scanning. The A. T. & T. System. Baird System. Jenkins System.

Lesson 9: The Cathode Ray Tube. Fluorescent Screens. The Electron Gun. Focusing the Beam. Deflecting the Beam. Varying the Intensity of the Beam.

Lesson 10: Rosing's Cathode Ray Receiver. Electrical Scanning Methods at the Receiver. The Duvalier Tube. Zwoykin's Telescop. Farnsworth's Oscilights, and, finally, the system of electrical scanning which will be used in commercial television receiving sets for the home.

THE Student is asked to remit \$5.00 with the enrollment coupon. This pays for the first 5 lessons. Then another \$5.00 is payable; this being the final payment. Or, if you prefer, you can remit the entire amount of \$10.00 with your enrollment. Because of the short time that may elapse before the cathode ray tube is commercialized it is advisable that you be prompt in sending the coupon.

A Trip Through The Show

(Continued from page 15)

while the Condenser Corporation of America, a subsidiary of Bond, displayed their new Semi-Dry Electrolytic Condenser line along with the new round aluminum type of midget condenser known as the Acracon "mike".

Bud

Bud Radio, Inc., displayed a complete line of radio specialties, accessories and radio replacement parts as well as a 24-page catalog.

Colonial

The Colonial Radio Corporation exhibited a full line of A.C. battery and automobile chassis, consisting of five and six-tube superheterodynes; 7-tube long and short wave superheterodyne; 7-tube class "B" amplifier superheterodyne; 8-tube class "B" amplifier long and short wave superheterodyne; 12-tube long and short wave "B" amplifier AVC with phantom tuning; 5-tube battery model; 8-tube AVC long and short wave battery set; 6-tube AVC automobile set; and 8-tube AVC superheterodyne class "B" amplifier automobile model.

Echophone

THE pioneer spirit which has characterized the efforts of Echophone Radio Company since its inception in 1921 were again in evidence at last month's RMA trade show in Chicago. This company which created the midget announced its affiliation with Western Television Corporation just prior to the trade show, and when the show opened presented the first radio-television combination for general home use.

Another exclusive model in the line was the dual-speaker, all-wave midget. For purposes of comparison, A. U. Magnan, Echophone's president, displayed it in the demonstration suite in close proximity to the first midget receiver ever constructed. This No. 1, original Echophone was built in November, 1928, and was the "daddy" of all the millions of midgets which have been built by all companies since that time.

The console models, likewise equipped with dual-speakers, cover all frequency bands from 17 megacycles to 550 kilocycles.

The new two and one-half volt, low current tubes were employed throughout the line. Another feature introduced by the company's engineers was the noise suppressing circuit, or quiet automatic volume control. For purposes of tuning short wave stations, the circuit can be cut out instantly by an in-and-out switch, operating on the volume control switch.

The audio system of Echophone's de luxe model has a double push pull system, resonated at very low frequency, which gives an excellent frequency response.

Hourly television demonstrations were held throughout the show, in charge of Clem F. Wade, president of Western Television Corporation, and his staff of engineers. More than a score of Echophone dealers placed orders for Junior Western Television transmitters in order that their sales and service staffs may become thoroughly acquainted with television fundamentals.

Canadian Eskimos Are Progressive

Ottawa, Canada, May, 23—There are approximately 7,000 eskimos in Arctic and sub-Arctic Canada, including the Hudson Bay area. They are progressive and some even have radio receiving sets in their igloos. Many Eskimos own their own schooners with auxiliary gasoline engines and at Aklavik near the mouth of the Mackenzie River as many as twenty-five of these schooners will be anchored at a time in summer.

ON'T lose service business. You need never be stuck in an emergency if your bag contains AD-A-SWITCH. You can convert from plain to switch control in a jiffy. Snaps on without tools. Ask your jobber or write us direct.

FREE! Write for your copy of the most complete handbook on every type of variable resistance—from tiny Center Taps and Volume Controls up to Heavy Motor Speed Controls.

Every experimenter, service man and engineer should have a copy of the Clarostat Control Handbook.

CLAROSTAT MFG.CO.
285-287 N. 6TH ST. BKLYN. N.Y.

MILES REPRODUCER CO.
26 EAST 22nd ST. NEW YORK, N. Y.

GUARANTEED Microphone Repairs

Any make or Model—24 hour service. Stretched diaphragm double button repairs \$7.50. Others \$3.00. Single button repairs \$1.50.

Write for 1932 Catalog with diagrams.

Universal Microphone Co., Ltd.
INGLEWOOD, CALIF.

Hotels for Radio Travelers

**HOTEL
NORMANDIE**

The Normandie offers comfort at reasonable cost. Located just outside the heart of Los Angeles yet close to the best shops, theaters and churches, the NORMANDIE offers every advantage you desire in your selection of a temporary or permanent home.

Rates

Room with Bath, single, \$2.50 per day
Room with Bath, double, \$4.00 per day
Monthly Rates on Application

The cuisine, excellent service and reasonable rates in the COFFEE SHOP AND CAFE combine to make your stay a pleasant one.
(Garage in Connection)

CORNER SIXTH & NORMANDIE
LOS ANGELES

HEATHMAN HOTELS - 530 ROOMS

Just location in Portland in the hub of the shopping and theater districts and just across from the Convention garage just across the street.

RATES

Single room with bath \$12.50 and up
Double room with bath \$13.50 and up
Concerts twice daily on \$25,000 organ

HARRY E. HEATHMAN Manager

Cafe Heathman Park at Saloon
The New HEATHMAN BROADWAY AT SALON

Portland, Oregon

**The
ARCADY**

Rising twelve stories above the exclusive Wilshire district, overlooking the beauties of Westlake and Lafayette Parks, the Arcady offers every comfort and convenience for the traveler

LOS ANGELES
WILSHIRE at RAMPART

A

**hotel
DEL MAR**

DEL MAR is a resort of the first class—no commercialism—no concessions—just one of the most beautiful spots in the world where fine people and world travelers congregate to enjoy nature's special gifts.

Write for reservations today to Manager Hotel Del Mar or Los Angeles Office, 740 South Broadway, rates from \$6-\$8 to \$10 per day single; \$11 to \$20 double room and three delicious meals.

20 miles north of San Diego—9 miles from La Jolla and 105 miles south of Los Angeles along the King's Highway "The Garden Spot of the South Coast"

SOUTHERN CALIFORNIA

The Gaylord
AN APARTMENT HOTEL

OPPOSITE AMBASSADOR GARDENS

In Los Angeles

Wilshire at KENMORE

THE GAYLORD fulfills with lasting satisfaction the desires of a discriminating clientele; offering two, three and four rooms furnished, one and two baths. Rates from \$100.

Cafe - Room Service

**20-Watt D.C.
Power Amplifier**

Write for full details.

**\$65.00 LIST, with
Cunningham Tubes**
VICTORY SPEAKERS, INC.
7131 East 14th St. OAKLAND, CALIF.

A Brand New

SHORT WAVE LOG

The Simplest, Most Fool-Proof, Complete Log Ever Designed.

HERE is a new type of SHORT-WAVE LOG that absolutely beats any log you ever saw! It is so simple any woman can understand it and yet complete in every detail. Short-wave stations of the world are clearly arranged, giving both megacycles and kilocycles. A complete, legible map of the world tells you where every station is, and the time divisions of the world. All stations listed have been actually logged and complete information about their time on the air, location, quality of reception, etc., is included.

The new SHORT-WAVE LOG has an exclusively patented feature in a movable clock-dial, giving accurate time at any point in the world. In addition, Don Wallace, nationally-known short-wave expert, has written an introduction that explains in clear detail exactly how to install and operate a short-wave set to get the best reception.

Designed and edited by
Don Wallace

Winner of Hoover Prize for
the best amateur short wave
station in America.

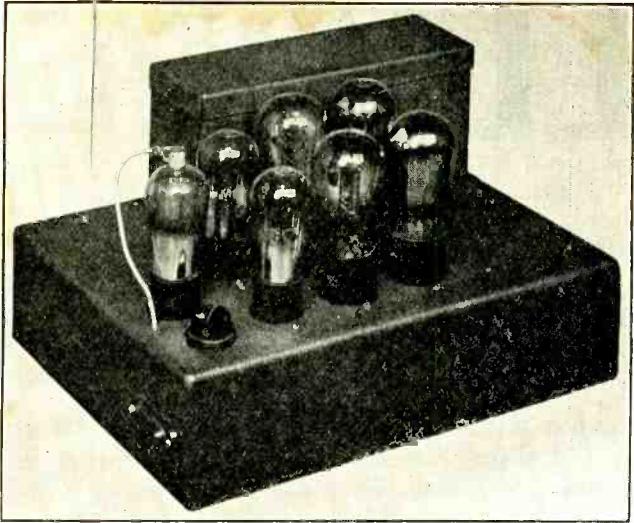
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LIST PRICE 25c

1 to 100 copies . . . 12½c ea.
100 to 1000 copies . . . 10c ea.
1000 or over 8c ea.
(If imprint or advertisement is desired on logs, please send copy with order and include \$2.00 for imprinting, regardless of quantity.)

•••

DON C. WALLACE
4214 Country Club Drive
Long Beach California



VICTORY 20 WATT AMPLIFIER

A 20 Watt D.C. \$
Power Amplifier for **65**

LIST PRICE

COMPLETE WITH CUNNINGHAM TUBES

Power Amplification Now Available for Automobile
Public Address Systems of a New Principle in Design—
Giving Enormous Undistorted Output

This amplifier will find uses in thousands of places where
the old system is not applicable. It will undersell any other
old system three to one for the same power output.

AGAIN Victory startles the country with the announcement of their 60 watt amplifier, the 20 watt amplifier which eliminated the necessity for expensive generators in sound cars. The 20 watt amplifier had many advantages that no other amplifier of its superb performance could offer. It weighs about twelve pounds and operates from the ordinary automobile storage battery with the insignificant drain of 2.9 amperes, for its filament, and six heavy duty dry B batteries furnish its plate supply over long periods of time. It is hard to think of an amplifier using four 112 tubes supplying 20 watts of truly undistorted power, is it not? Hard to conceive an amplifier which will remove the expense from the operation of automobile and similar installations and that can be removed from the car and with the addition of the Victory Power Supply operated anywhere that 120 volts —50 or 60 cycles is available. After oper-

ating the DC 20 as a semi-portable installation in your dance hall or theatre lobby in ten minutes or less, put it back in your car and be soliciting business in the modern way—with SOUND. Mr. Service Man . . . go to your jobber and let him tell you how you may sell completely equipped sound cars built around the Victory DC 20 and make money in a time when money is hard to make. With the public reticent about their buying, every merchant who represents progress in your town is fortifying his sales by increasing his advertising budget. He is looking for a medium that will give him more for his money in the way of placing his concern in the limelight than any other. Your theatre wants a sound car, your dance hall and resort needs a sound car. Put one in your own car and solicit sales. Show it to your customer who wants more constructive publicity for his money. Use it to sell your own products and your services.

ELECTRICAL SPECIFICATIONS

Output—20 watts, 5% distortion—3.8% in 3rd harmonic.
Gain—90.9 D. B. at 60 cycles.
Input required for 20 watts output, 0.25 volt.
Input impedance 100,000 ohms.
Output impedance, 5 - 20 ohms—maximum output at 8 ohms.
Filament voltage 6 volts D. C. or A. C., any frequency. Filament voltage may be varied between 5 and 7 volts without detrimental effect on tubes.
Filament current, 3 amperes at 6 volts.
Plate voltage—300 volts (from 180 to 350 may be used with corresponding output—voltage over 300 is not recommended.) Six heavy duty B batteries may be used economically.
Plate current—25 M. A. no signal—average drain with signal 60 M. A.
Tubes required: 1—236; 2—237; 4—112A.

PHYSICAL SPECIFICATIONS:

Weight—12 pounds.
Height—(overall) 7 inches.
Width—9½ inches.
Length—12 inches.

List Price—\$65.00 complete with Cunningham Tubes.

Complete power supply to operate amplifier from 110 volts A. C., 50-60 cycles. List price \$35.00.

The amplifier and power supply are finished in crinkle lacquer, baked on a heavy pressed steel base.

... And a New Victory 60 Watt Amplifier

WHILE you're with us we'd like to tell you about our two new 60 watt amplifiers and what they will do. Unlike the DC 20, it is not economical to operate the DC 60 from storage battery and it would run down the 400 volts of dry B batteries that would be necessary to operate it in short order. Where tremendous audio power is required in a sound car the plate and filament supply for this amplifier may be economically obtained from a very small gasoline driven generator that generates directly 400 volts at 400 milliamperes and which has an additional winding which charges the car storage battery at 20 amperes which more than compensates for the amplifier drain which is 9.35 amperes. This leaves a reserve for floodlighting the car. Then there is our AC 60, the same amplifier ready to plug in your light socket. The 60 line of amplifiers will modulate a 120 watt class C radio amplifier over 100%. A 1/16 horsepower motor will start and run from its output if you put a small 60 cycles voltage into it. Not that we recommend this way of running motors. One dynamic speaker will fold up in short order and if the voice coil holds out the cone will be torn from its housing. What is

it good for? Electric carillons, hotel and school installations, amplifying a church service with speakers in the belfry so it may be heard for miles. IT HAS POWER—TREMENDOUS AUDIO POWER, a fit big brother for the DC 20. Don't forget, we specialize in speakers for heavy duty service.

Wire for a Sample Today

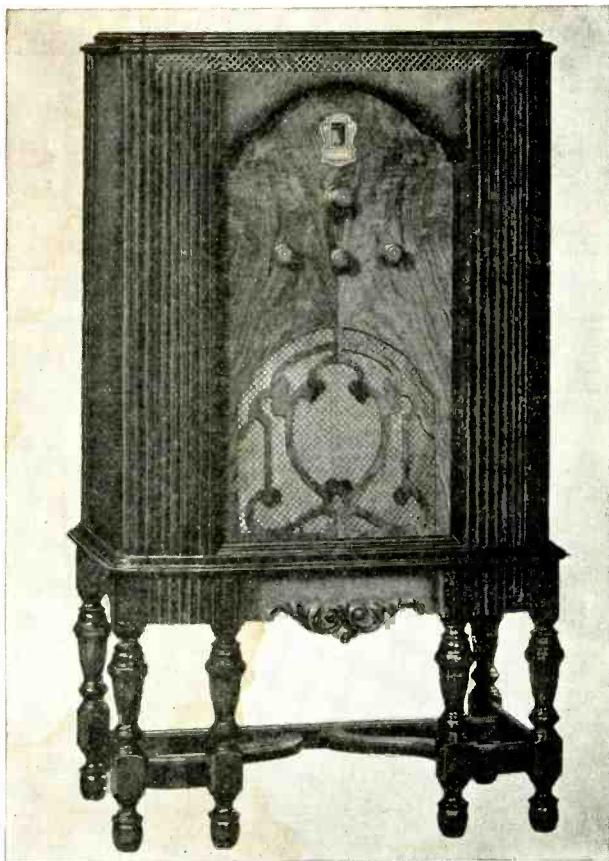
Manufactured by VICTORY AMPLIFIERS

A Subsidiary of

VICTORY SPEAKERS, Inc.
7131 East Fourteenth Street
OAKLAND - CALIFORNIA

A Pioneer in the Manufacture of Quality Electro-Dynamic Speakers

Sentinel ALL-WAVE



Sentinel No. 125 Eight-Tube All-Wave Superheterodyne Console, with Automatic Volume Control and Tone Control. Furnished in a beautiful **\$8950** six-legged walnut cabinet of Tudor design. List price, with tubes

13 to 550 Meters With Only One Knob

Here is the all-wave set for which you have been waiting. A triumph of tuning simplicity and radio performance. Four bands all calibrated on one dial. Complete control of dial with a single two-speed knob. Special band selector switch. Eight-tube superheterodyne. Greatly improved automatic volume control. All parts mounted on a single chassis pan. Matched electrodynamic speaker.

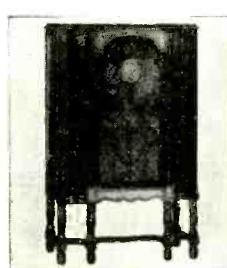
These features will answer your demand for a practical all-wave set. Send for complete information.



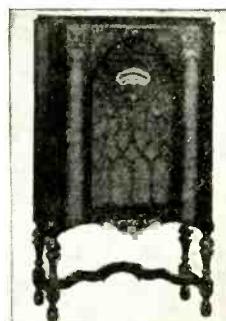
No. 118 Ten-Tube Superheterodyne Console with Automatic Volume Control and Tuning Meter. Deluxe walnut semi-Tudor cabinet with doors. Full-vision dial. Tone control. List **\$9950** price, complete with tubes



No. 120 Eight-Tube Superheterodyne Console, with Automatic Volume Control. Walnut Tudor cabinet. Full-vision dial. Tone control. List **\$7950** price, complete with tubes



No. 116 Five-Tube Superheterodyne Console. A big value in a small set. Full-vision dial. Tone control. Complete, with tubes **\$5650**



No. 110 Seven-Tube Superheterodyne Cabinet, Walnut Tudor Cabinet. Full-vision dial. Tone control. List **\$6250** price, complete with tubes



No. 116 Five-Tube Superheterodyne Table Model. Same chassis as above. Big-set performance in an attractive walnut cabinet. List price, complete with tubes **\$3995**



No. 110 Seven-Tube Superheterodyne Table Model. Same chassis as above. Big-set performance in an attractive walnut cabinet. List price, complete with tubes **\$4675**

Sentinel offers you the most up-to-the-minute line in radio. A complete range of models. Each set upholds the Sentinel name for outstanding performance and value. Furnished as complete sets, or chassis only. Wire or write for samples; also for new sales plan for jobbers and dealers.

**SENTINEL RADIO DIVISION
UNITED AIR CLEANER CORP.**

9705 Cottage Grove Ave., Chicago, Ill.

Sentinel
SURPASSING RADIO PERFORMANCE

TONE QUALITY~SELECTIVITY~SENSITIVITY~CONSTRUCTION

CROSLEY

FULL SIZE

[4½ CUBIC FEET NET CAPACITY]

[NOT A MIDGET]

ELECTRIC REFRIGERATOR at a SENSATIONALLY LOW-PRICE



Model C-45

4½ cu. ft. NET capacity.
9 sq. ft. shelf space
58½" high, 25¾" wide, 21" deep.

Crosley Refrigerators are available in two other sizes—3½ cubic feet NET capacity, 50" high, 24¾" wide, 20" deep at only \$89.50—3½ cubic feet NET capacity, 58½" high, 31¾" wide, 21¾" deep, at \$139.50. All prices f. o. b. factories.

CAPACITY of the Crosley Refrigerator is 4½ NET cubic feet; larger than the "midget" refrigerators advertised at low prices.

SHELF SPACE is 9 square feet. Generous spacing between shelves.

FLAT BAR SHELVES to prevent bottles and containers tipping over.

THE CROSLEY UNIT is completely self-contained and is easily removable.

COMPRESSOR assembled with motor on metal base suspended by coil springs to eliminate vibration. Compressor driven by V-type belt in grooved pulleys. Motor mounted on rubber.

Amply large for average family

Temperature Control	Flat Bar Shelves
9 sq. ft. Shelf Space	Dry Zero Insulation
Thermal Cutout	3 Ice Trays 63 Cubes
Defrosting Switch	4½ cu. ft. NET Capacity
Self-contained Removable Unit	
Porcelain Interior	

OVER a million radio sets bearing the *Crosley* name have been sold and used in as many homes in this country. Nearly every American family is familiar with the *Crosley* name from "the Nation's Station"—WLW of the *Crosley Radio Corporation*, Cincinnati.

Now the weight and prestige of the name of *Crosley* has been extended to the refrigerator field. After more than five years of experimental work in the *Crosley* laboratories, comes the full family size, startlingly low priced *Crosley* Electric Refrigerator—not a midget.)

The big *Crosley* factories are working day and night to take care of the unprecedented demand for this sensational refrigerator. Don't let the summer rush leave you waiting. See your *Crosley* Distributor at once. Or write us direct. Get full details of this season's greatest sales opportunity.

NOTE THESE FEATURES

CONDENSER is of maximum capacity with forced air cooling.

FREEZING UNIT is of corrugated, completely rust-proofed metal faced with white porcelain.

THREE ICE TRAYS, each holds 21 cubes—63 in all.

TEMPERATURE CONTROL adjustable for quick and slow freezing.

HARDWARE is stamped brass, chromium plated. Automatic spring-closing lock on door.

INSULATION—3 inches Dry Zero insulation on sides, top and bottom.

IN ADDITION—Flat top convenience. Broom-legs. Beautiful white lacquered cabinet. Interior white porcelain.

Prices subject to change... Any Federal or State taxes which may be levied must be added to these prices.

THE CROSLEY RADIO CORPORATION

Powell Crosley, Jr., President

CINCINNATI

Home of "the Nation's Station"—WLW

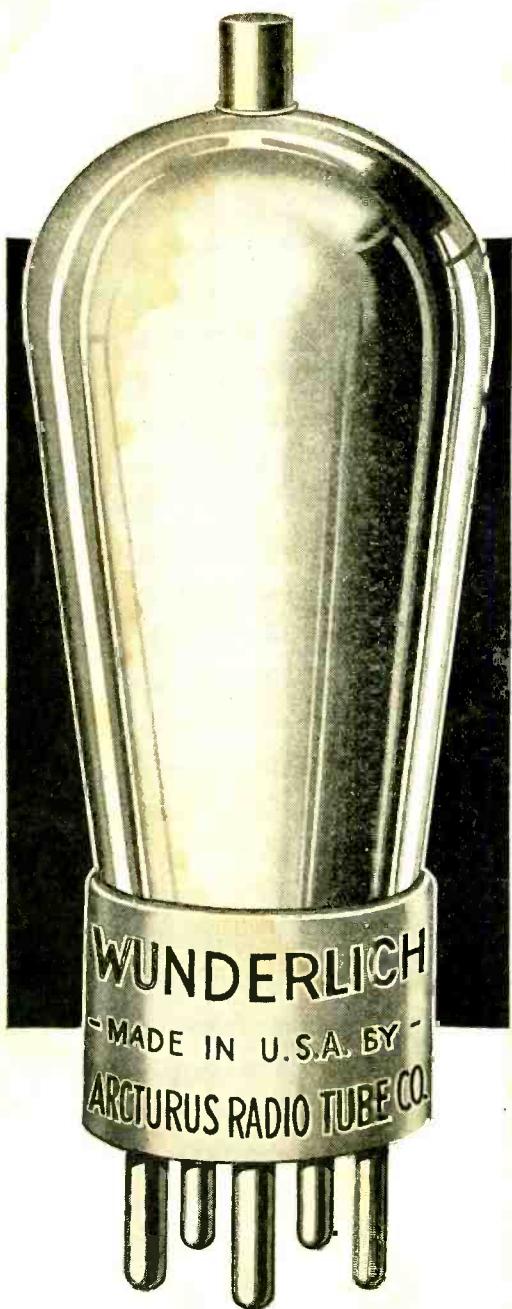
CROSLEY

Electric

REFRIGERATOR

HEARN'S
1160 HOWARD ST
SAN FRANCISCO CALIF

The WUNDERLICH TUBE



***the FIRST NEW STEP
in DETECTION since
the A.C. Tube***

● The Wunderlich Tube is specifically designed to overcome the weakness inherent in tubes that have been used as detectors, though developed for other purposes.

● With one auto-balanced set of elements the Wunderlich Tube gives full wave grid detection with a minimization of overloading. Thus it provides an essential self-governor or floating control of tone and quality. All signals, weak or strong, are detected and automatically adjusted to the most favorable operating conditions. Tone is not sacrificed with volume nor mellowness lost through suppression.

● The Wunderlich Tube—the *blue tube* with the *red base*—is the modern auto-balanced detector. Its salient features are:

1. Eliminates detector distortion.
2. Four times the power output of 3-element detectors.
3. Automatic Volume Control self-contained.
4. Improves Tone Quality.
5. Minimizes fading.
6. Prevents choking and detector blasting.

WUNDERLICH TUBE

The BLUE TUBE with the RED BASE

manufactured by ARCTURUS RADIO TUBE CO., NEWARK, N.J.

WESTERN DIVISION: Arcturus Radio Tube Co., 1855 Industrial Street, Los Angeles, Calif.