

WLW



WSAI

The CROSLEY

# Broadcaster...

VOL. VIII.

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NO. 14.

## Crosley Dealer Display Wins in Chicago



THE PARIS FURNITURE COMPANY, 3318 W. Madison Street, Chicago, Illinois, recently featured the new line of Crosley radio receivers in one of the most distinctive and original window displays on record. It is unnecessary here to go into an involved description of the window—the photograph is sufficiently clear to permit distinguishing its unique features. It is enough to say that this window, from the concensus of opinion of window display critics, was the best in Chicago from the standpoint of originality and ability to compel attention.

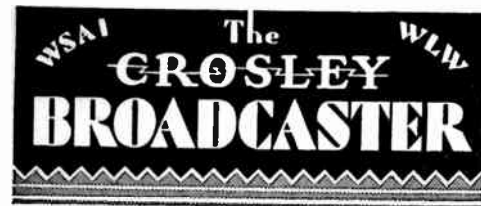
This is indeed a fine tribute to one of Crosley's most aggressive authorized dealers. This display was conceived and executed by Jack Weinberg, Manager of the Paris Furniture store.

The value of window display in your merchandising plan cannot be stressed too strongly. In so competitive a field as retailing it is necessary that every possible selling force be utilized to its fullest advantage. The most conservative authorities place window display in the front rank of selling factors; many

claiming that as high as 70% of sales is due to window display advertising.

The Crosley Radio Corporation is wide awake to the possibilities and the importance of proper window display in merchandising. The manager of the display department at the factory—a man with many years experience in window display advertising—is devoting his entire time to window decoration plans, window display properties, and merchandising helps calculated to arouse the maximum of interest, and to sell goods.





Published by the  
**CROSLLEY RADIO CORPORATION**  
 Manufacturers of Radio Apparatus  
 Colerain & Sassafras Streets  
 CINCINNATI  
 Telephone : Kirby 3200

Editor: Edward F. Mottern  
 Assistant Editor : Francis G. Wilson

**NEUTRODYNE** Crosley manufactures radio sets for radio amateur, experimental, and broadcast reception use, under patents of the Radio Corporation of America and Associated Companies, The Hazeltine Corporation, and the Latour Corporation.

All prices quoted in the Broadcaster are Eastern prices. Western prices are slightly higher.



This is your paper. Help make it interesting by sending in contributions. Material sent in is most welcome. Comments of every description will be appreciated. Let's all pull together.

### IMPORTANT NOTICE

A MANUFACTURING COMPANY IN Oakland, California, has succeeded in obtaining a registration of the world "dynamic" as applied to radio loud-speakers, telephone receivers and parts therefor.

Any use of the word "dynamic" in connection with radio loud-speakers, telephone receivers and parts thereof not manufactured by this company or under a license from them, is a violation of its rights under Federal statutes regulating Copyrights and Trade Marks.

For your own protection, to avoid costly litigation, The Crosley Radio Corporation advises that the word "dynamic" must not be used in connection with advertisements, publicity, and other literature relating to Crosley loud-speakers. The word may not even be used in a descriptive sense in referring to our speakers.

Avoid use of expressions such as these: "This receiver is equipped with a dynamic speaker. This speaker is full dynamic," and similar phraseology.

We are applying for registration of the name "Dynacoil" and we are entitled to this registration in view of the fact that we own the name "Dynacone." These two words can be used freely in our copy and literature. It is also, of course, permissible to refer to our Dynacoil speaker as being of the moving coil type.

## Icyball Endorsed by Woman's Magazine



A VERY GRATIFYING EVENT IN THE Refrigeration Division of The Crosley Radio Corporation was the presentation of the Certificate of excellence conferred by The Household Searchlight, a woman's publication of national prominence.

In presenting this certificate it was recognized that the Crosley Icyball Refrigerator had passed the high standards of quality, durability, suitability, efficiency and economy set forth by The Household Searchlight.

The Crosley Icyball Refrigerator is without a doubt one of the most important discoveries in the art of refrigeration yet devised. In rural communities and in remote and foreign places, it is unequalled. Not only does it supply refrigeration, almost a necessity in warm climates, but it does so at a minimum of expense. It is indeed pleasant to feel that The Crosley Icyball Refrigerator is receiving the recognition due it.

there. The advertiser is still feeding the public the highest possible kind of entertainment free.

### Advanced Course in Radio

BEGINNING IN THIS EDITION OF THE Crosley Broadcaster is the first of a series of ten lessons in advanced radio. This course is offered for those who have mastered to their satisfaction the principles and fundamentals of radio embodied in the series of ten lessons on radio completed several months ago in this publication. The theories advanced in this new course are offered primarily for servicemen; but it is well worth the serious study of radio dealers and radio salesmen.

The first series of lessons under the title of "The Crosley Dealers' Radio Course" will soon be in print in a single booklet, and will be distributed upon request. When the booklet is published, the BROADCASTER will carry a notice of publication. Many letters have been received asking for copies of the BROADCASTER containing certain, or all of the lessons. Due to the fact that our circulation is calculated to reach only those on the mailing list there has not been sufficient overrun to permit mailing additional copies. Watch for the announcement of publication of the first series of lessons and then send in your requests.



EVERY NOW AND THEN WE READ somewhere a bitter attack on the radio advertising program. Many people listen with delight to the extremely entertaining music, songs, and features, but protest because the man paying for the entertainment chooses to utilize a few minutes to mention his product. Many of these attacks are bitter and serious, others are humorous—but all are attacks.

This, in our way of thinking, is extremely unfair. If the advertiser is not permitted to announce his product or his company and to say a few appropriate words relative to the operations of his organization, or his product, it stands to reason that he will refuse to pay for radio programs. If he no longer advertises via air, it means that the greater majority of the entertainment now on the air will be withdrawn. The moral seems to be: "Don't bite the hand that feeds you".

There might be the alternative of government broadcasting supported by a personal property tax on radio as practiced in European countries. However, that is neither here nor

## A Way to Sell Eight Radio Customers Instead of One

WHEN I FIRST WENT INTO THE RADIO business. I put this question to myself. "What one thing more than any other will determine our success or failure?"

In searching for an answer to this question, I came to a very familiar object—the family pocket-book. At first, I didn't take it seriously, but time and time again I would find myself back to it—the family pocket-book. I just couldn't get away from this fact: my business must stand or fall upon the number of family pocket-books that vote for Crosley Radio.

So I began to study seriously the inside of the family pocket-book. Out of every ten, I found that only one earned \$5,000 or more a year; four earned from \$2,000 to \$5,000 a year; and five earned less than \$2,000 a year.

### 8 POCKET-BOOKS INSTEAD OF ONE

This convinced me that I could get the largest number of pocket-books to vote for Crosley Radio by making sets which eight or nine families could afford instead of only one. And so I decided upon the fundamental policy of our business: Fine radio for all—at the lowest cost of all!

This, as you know, is the same policy which Henry Ford has demonstrated so successfully in the motor car business. He has always adhered to the idea that in producing the lowest priced automobile he would be able to sell the greatest number of people. Of course, he has built value into his car, but he has always given the utmost in value at the lowest possible price. That's why he has been able to sell more automobiles than any other manufacturer in the world.

I have always been a firm believer in this principle, and our more successful dealers and distributors have shown splendid co-operation in carrying it through to the point of sale. Thus we have all prospered together.

Some dealers, however, run counter to this basic principle and are losing business as a result. In their natural desire to sell the higher unit per customer, they make the prospect dissatisfied with the lower-priced sets even though he cannot afford a set over \$100. As a result the prospect refuses to buy and goes away with the false idea that all good radio is high-priced.

For 1929-1930 we intend to demonstrate more strikingly than ever before, the success of featuring the low-priced models. In the new Crosley 31 at \$55.00, with its beautiful walnut finish cabinet and the new decorative Dynacone at \$18.00, the real enjoyment of modern radio is brought within the reach of practically every home in the country.

### FEATURE THE LOWEST-PRICED SETS

Right in your community are hundreds of families ready to buy Crosley 31 at \$55.00 in the table set, or Crosley 32 at \$99.50, the lowest priced console model. These are the sets you should feature in your advertising. These are the sets that will bring the largest possible number of prospects to your store. And these sets will ring your cash register more often than any others because they appeal to those hundreds of thousands of families who cannot afford to buy their pleasure in radio at a higher price.

Think of the advantage to you when you put your effort strongly behind these low-priced items! You can sell at least eight customers instead of only one or two, because you feature a set priced as low as it is possible to go on a really good radio. And this appeals strongly both to new purchasers and owners of obsolete sets. Furthermore, many customers will, of their own accord, buy higher-priced sets when they can compare values in your store. But it's the low-price appeal that brings them in.

### HOOK UP WITH CROSLLEY ADVERTISING

The public is still talking about "the big news in radio" which appeared on posters and in newspapers on June 18th. To carry on this selling drive for you, double page spreads in the Saturday Evening Post, July 20th; Collier's, July 27th; and a page in Liberty, July 27th, will feature Crosley 31 and Crosley 32.

Make doubly sure you get your share of Crosley 31 and 32. Call your distributor.

POWELL CROSLLEY, JR.

THE CROSLLEY RADIO CORPORATION has gone to great lengths in building up a line of merchandising helps. No expense has been spared. Banners, display cards, signs of all descriptions, and advertising novelties of all kinds, including advertising pencils with dealer imprint, have been selected with the most painstaking care. Their suitability as Crosley sales boosters for Crosley dealer use has been the criterion for their selection.

It is felt that these helps are primarily for Dealer use and for the sake of augmenting Dealer sales. Consequently the corporation makes a practice of distributing these merchandising helps below cost; there is never an effort to make a profit or commission on dealer advertising.



SO GREAT HAS BEEN THE DEMAND for the new outdoor Neon signs featured in the Crosley Broadcaster of July 1. that the manufacturer has agreed to offer a new price on these signs. The reduction is startling. Model CH-5B formerly listing at \$193.00 is now offered at \$175.00 Model CV-1B formerly listing at \$250.00, now is offered at \$215.00; Model CV-2 formerly listing at \$205.00, now \$190.00; Model CV-2B formerly \$355.00, now \$295.00! Models CH-5, and CV-1 remain the same.

Take this opportunity to identify your store as a RADIO store. Many Crosley dealers have discovered that the electric sign is one of the most compelling advertising features in this city. They realize that a prominent and comparatively inexpensive electrical display is more valuable than thousands of lines of type. Eye appeal is irresistible! Here is an opportunity for you who have not had the advantages heretofore of the finest in outdoor electric signs, to secure them now!

## TALKS TO THE TRADE

WE HAVE NOTICED IN radio and school publications of all kinds that the school of the air is gaining rapidly in popular favor. Many counties all over the United States have equipped their schools with receivers and many of them are planning to purchase receivers for the coming season. It is easily comprehended that school boards are unable to spend a great deal of money for high priced console, and high priced radio. Crosley radios, reasonably priced to meet every pocket book, should certainly fit the school treasuries. Now is the time to interest your local educational plants in Crosley receivers. Tell them about the schools of the air, if they do not know already. Here is a tremendous market built especially for you who have at your command fine radio at exceptionally low cost.

We have stressed the importance of featuring Crosley 31 and Crosley 32 in your advertising. It would seem that these models would be the type of receiver that would sell readily in the schools. They are fine receivers and their price is very low—so low that they meet easily any competition and should break down sales resistance. A big feature in merchandising these models would naturally be the part that our station WLW has played in the radio-educational field. Get your local school boards lined up now for the autumn. Here is a splendid market that is as yet practically untapped.

Powell Crosley Jr.



# Mr. Dealer, Would You Like To Hire a Very Efficient Radio Salesman Who Will Work For You For Nothing?

IF SOMEONE WOULD ASK YOU THAT question, you would doubtless snort contemptuously and say, "Of course, you blankety blank idiot. But where in the world is anybody going to get a salesman like that? Your brain must be simply seething with bats."

However, we have learned not only that you can secure a very efficient salesman for nothing, but you can also secure one who will not demand commission for the sale.

An authorized Crosley dealer who at this writing has expressed a desire not to have his identity disclosed has given us one of the most interesting stories of real sales psychology that we have heard for a long time. This intelligent gentleman to whom we shall refer as Mr. Blank has conducted an enterprising and aggressive business for Crosley for a number of years. He is known for unusual sales methods, but in this instance he has surpassed himself.

Space entered the portals of Mr. Blank's radio emporium. Mr. Space asked Mr. Blank with a show of amiability whether or not Mr. Blank sold radios.

Tempted at first to reply, "No, you darn fool, we are bricklayers," Mr. Blank instead replied most affably, "Of course." "Trot 'em out," suggested Mr. Space briefly but kindly.



... he proceeded on the work

At this injunction, Mr. Blank retired to the rear of his store and brought out a Crosley receiver.

"Have you ever, my dear sir," asked Mr. Blank, "have you ever, hooked up a radio yourself?"

"Why—ah—no," replied Mr. Space. "Then," smiled Mr. Blank, "here is a golden opportunity. Merely by way of demonstrating how simple it is even for one without knowledge of radio to hook up a Crosley, I suggest that you follow this instruction book and see what you can do about it."

Mr. Blank extracted from some hidden recess in his garments an instruction sheet which he placed in Mr. Space's hands. Mr. Space with keen interest struggling for mastery in his bosom, seized the instructions and began to read them with an avidity but slightly veiled. Mr. Blank noted this and smiled softly to himself.

Mumbling delightedly, Mr. Space perused the contents of the sheet from time to time comparing the diagrams and the reading material to the set itself. Having mastered the instructions to his satisfaction, he proceeded

on the actual work of hooking up the Crosley. He inserted the tubes, hooked up the ground and aerial, plugged in the Dynacone and inserted the power cable into a base-board socket. He turned on the switch and permitted the necessary minute to elapse and then began to dial for a station.

"Station Double You El Double You, The Crosley Radio Corporation in Cincinnati" boomed through the shop. Mr. Space with a cry of supreme delight bounded six feet into the air cracking his heels together.

"She works! She works!" he yelled, hugging himself. Then turning abruptly to Mr. Blank, "How much!" Mr. Blank named a small sum. "What!" fairly shouted Mr. Space. "Is that all?" and he began pulling money from his pocket.

Seriously, this is the true story of how a Crosley dealer permitted a customer to sell himself. An analogy to his methods may be seen in the automobile business when a



"How Much?"

salesman permits a prospect to drive a demonstrator. Here the customer proved to himself that not only was the set easy to operate and easy to install but that its performance justified everything that had ever been said about it. He had sold himself a Crosley receiver and had become a Crosley booster by the simple expedient of being permitted to do the work. And again we ask, "Mr. Dealer, would you like to hire a very efficient radio salesman who will work for you for nothing?"

## Crosley Hook-Ups Continue; Plan 2 Weekly Chains

HAVING DEMONSTRATED WITH THE Crosley Radio Corporation's own program on June 18, that selected stations can hook-up advantageously for particular broadcasts, the Crosley radio stations WLW, and WSAI, have continued with an increasing succession of such hook-ups.

The June 18 program was broadcast from WLW by WOR, New York, and WLS, Chicago.

On July 4, the Crosley station originated the first of a series of Marmon-Roosevelt programs to be broadcast every Thursday at 9:00 P. M., also by stations WOR, and WBBM, Chicago.

On Thursdays, too, but at 9:30 P. M., the Crosley radio station WSAI will originate the Frollickers program, as it did first on July 4, to be broadcast both by that station and by WOR.

Sunday, July 7, saw the linking of WRNY, the New York aviation radio station, with WLW for a program marking the start of a trans-continental airplane and railroad passenger service.

At that time, Ford Billings, director of Crosley broadcasting pointed out that the hook-up was the first one by which an event of national interest had been conveyed from a

metropolitan station to another away from the scene of action.

For the WLW and WRNY hook-up, their respective short wave stations, W8XAL and W2XAL, also transmitted the program.

Alfred J. McCosker, director of WOR, called the first WLW-WLS-WOR broadcast an "extraordinary success."

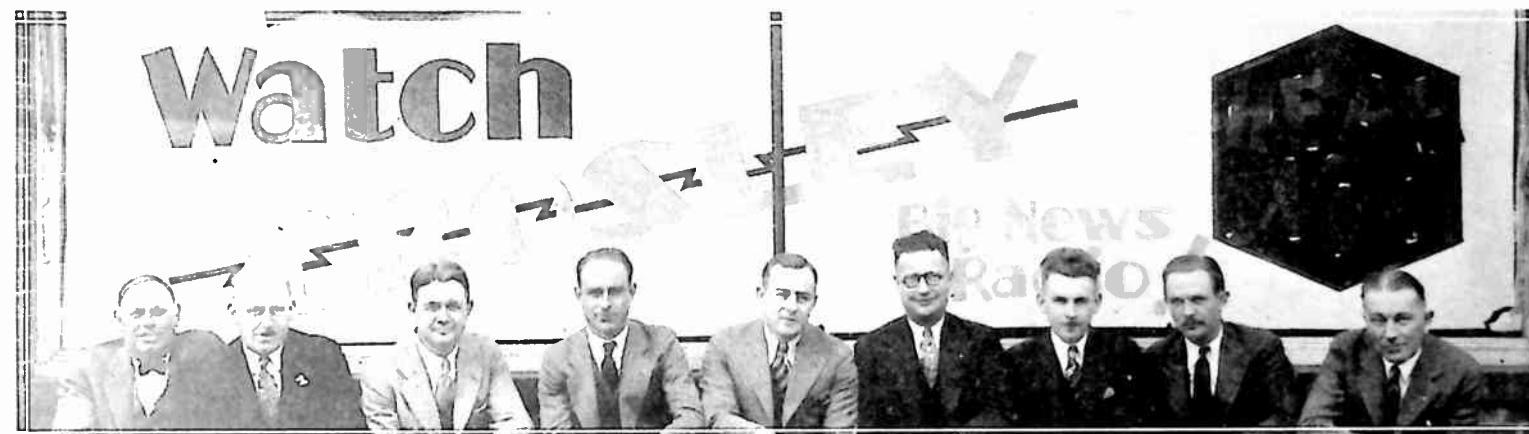
"We are not striving to form a chain in competition with the national networks, but are developing what might be termed a 'quality group' in broadcasting to accommodate program sponsors who desire to reach cities effectively," he said.



# CROSLLEY DISTRIBUTORS



## Harper-Meggee Holds Open House



HARPER-MEGGEE, INC., OF SEATTLE, Washington, rarely overlook an opportunity of pushing Crosley products. During the week June 17, "Open House" was held by Harper-Meggee at their headquarters in Seattle to which all dealers in their territory were invited to visit and inspect the new line of Crosley receivers. It is difficult, here, to describe the enthusiasm displayed by all dealers

attending the Harper-Meggee feature; but if the remarks passed by the dealers are any index of future sales, the Seattle distributor has already exceeded its quota.

The Harper-Meggee representatives played no small part in making the "Open House" successful. The large photograph above was taken during the showing of the receivers and

include from left to right: Puffer of Amrad Corporation; C. M. Anderson, sales manager; M. M. Curtis, W. S. Nash, R. D. Ludlow, L. H. Warner, J. D. Fall, H. S. Brown, salesmen; and P. W. Bialkowsky, Crosley representative. The small picture is the display in the demonstration room at Harper-Meggee headquarters. It is simple and dignified, and brings out the Crosley receivers to the utmost advantage.

### IMPORTANT NOTICE

THE ADVERTISING DEPARTMENT is frequently asked for broadsides featuring either Crosley receivers or some other Crosley product. In the corner of the broadside where postage is usually affixed appears the following imprint:

Section 435 1/2 P. L. & R.  
U. S. POSTAGE  
**PAID**  
CINCINNATI, OHIO.  
Permit No. 932

Under no circumstances is it to be assumed that postage is paid on these broadsides. In order to mail them out from distributor or dealer headquarters it is necessary to affix postage stamps sufficient to carry them; the same as if the government permit did not exist on the face of the broadside. This permit is only secured through the cooperation of the government and may be used only by The Crosley Radio Corporation in mailing.

Salesmen with swelled heads seem to wear the smallest hats.

### Harper-Meggee Display



ONE OF THE HARPER-MEGGEE DISPLAYS during their "Open House" which attracted favorable attention from the scores of dealers attending. This picture can not do sufficient justice to the display which was a veritable rainbow of color. Beautiful flowers, and crepe paper in attractive colors enhanced the natural beauty of the new Crosley models.

### Northern Hardware Holds Dealer Meeting

THE NORTHERN HARDWARE & SUPPLY Co., Crosley distributors in Menominee, Michigan, held a meeting of Crosley-Amrad dealers on June 27th, at the Riverside Country Club in Menominee. A. B. Lendved, Vice-President and Sales Manager, acted as Chairman of the meeting. George L. Hastings, Chairman of the Board of Directors, opened the meeting with an address of welcome.

F. A. Bremer, Jr., Crosley representative, presented the Crosley line which was received with a tremendous ovation. Bremer, in addition to stressing the merchandising points of Crosley receivers, introduced the Crosley Autogym Electric Vibrator, and touched on the Crosley Icyball Refrigerator line. Bremer further covered the important items of merchandising, advertising, store display, window display, outside selling, and other matters of general sales interest. Bremer was followed by F. P. Bartlett of the Amrad Corporation who talked on the new Bel Canto line.

Sixty-five dealers attended the meeting some coming into Menominee from distances of 100 miles. An idea of the interest displayed in the new lines may be inferred by the fact that large orders were placed by the dealers. A big news banquet was the closing feature of the meeting at which the dealers, their wives, and the Northern Hardware organization were present.



# Big News Dealer Meeting

## In Albany Huge Success



LEFT: Phillip Hotchkiss of Cooper & Hotchkiss; Charles F. Zehner, Vice-President of Ignition Service & Supply Co.; and Al Edison of Strand Temple of Music.  
 ABOVE: Jack Dalton, Crosley representative; Henry J. Zehner, President, Ignition Service & Supply Co.; Robert Brown, Amrad representative; Charles F. Zehner, Vice-President Ignition Service & Supply Co.  
 RIGHT: H. J. Zehner, President Ignition Service & Supply Company and Jack Dalton, Crosley representative shaking hands over a Crosley 32 one of the big features of the new line.

BETWEEN ONE HUNDRED AND ONE hundred and twenty-five of the liveliest Radio Dealers in North Eastern New York State received the "Big News in Radio" at the DeWitt Clinton Hotel, Albany, N. Y., on June 11th, just one week ahead of the "Big News" announcement date, June 18th. The Ignition Service and Supply Co., "Crosley Distributors Since 1922" were their hosts. It was declared as representative an attendance of Radio Dealers as has gathered in that territory in some time.

The new models were greeted with great enthusiasm by the dealers, and a record breaking year for Crosley Dealers was predicted. The principal models of both Crosley and Amrad lines were displayed and demonstrated

to Dealers before and after a splendid dinner. Music and other entertainment were features.

Keen interest was shown by the Dealers in the \$99.50 Crosley Model 32 which received an enthusiastic vote of approval. It is predicted that this model will go "great guns in this territory."

Then came Crosley's "ACE IN THE HOLE, THE SCREEN GRID LINE." Jack Dalton, Crosley's factory representative, introduced this line of Screen Grid Models and most of the boys being old poker players immediately bid their heads off placing orders for immediate delivery.

The meeting was timed well with newspaper advertising. An indication of the dealers enthusiasm is shown by the fact that fourteen dealers tied up with the "Big News in Radio"

announcement ad.

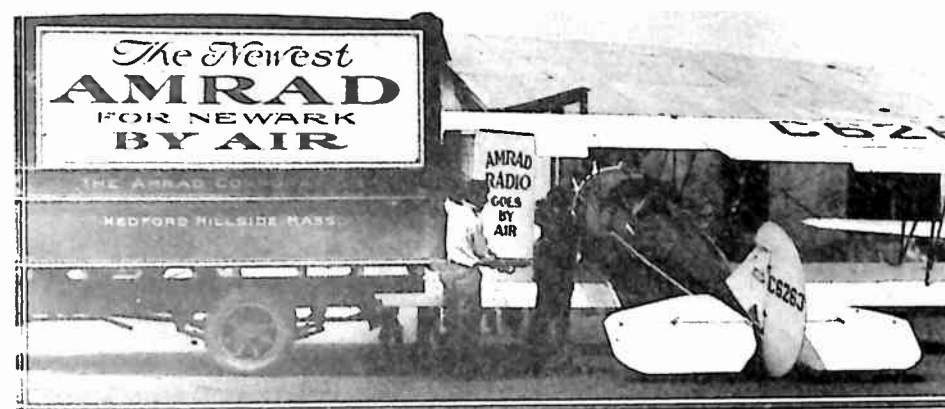
Dealers were present from Plattsburgh on the North, Poughkeepsie and Newburgh on the South, Gloversville on the West and Chatham on the East.

Mr. Henry J. Zehner, President of the Ignition Service & Supply Co. was toastmaster at the dinner and Chas. F. Zehner, Vice President, was in charge of the reception to local and out-of-town dealers. Mr. Frank P. Eldredge, Mr. L. S. Tholheimer, Mr. F. Turner and Mr. H. D. Comstock, Ignition Service & Supply Co. salesmen, were present to insure a good time for all dealers and to explain and demonstrate the new models, excellent orders being booked.

Bob Brown, Amrad representative, carried the Amrad colors and did a good job of it.

# Airplane Saves The Day

## Amrad Distributor Uses Newest Method to Get Newest Model on Time



Loading the D. W. May Airplane

WHEN D. W. MAY, NEW JERSEY DISTRIBUTOR of Crosley and Amrad Radios returned from the Chicago Convention, he was so enthused over the possibilities of the new Amrad models that he immediately staged a contest among the school children of Newark, and offered a new Amrad "Aria" model as a prize. Unfortunately he overlooked one fact—that between the first show models at the Convention and the first commercial models off the production line, there is usually a lapse of several months. As a result Walter Ferry,

his pilot the freedom of the Boston Airport, the Mayor of Newark addressed a special request to Mayor Nichols of Boston with that end in view.

In the midst of heavy fog, Pilot Hughes took the air at Newark at 9 o'clock, and after narrowly missing a skyscraper as he passed over the lower end of Manhattan, was finally able to rise above the fog and lay a direct course for the Hub. Promptly at 11 o'clock he nosed down on the East Boston Airport where executives of the Amrad factory were waiting



Pilot Hughes receiving letters to Mayor of Boston Sales Manager of D. W. May Co found himself in a position of offering a prize and no prize to give.

A hurried call to the Amrad factory revealed the fact that the first "Aria" model would be off the line Thursday morning at 11 o'clock. Unwilling to lose a single minute or risk the delays of rail shipment, Ferry immediately arranged for an airplane to pick up the missing model, and set it down in Newark by 3 P. M. that afternoon, the hour set for the award of the prize. To expedite matters, and to assure



Pilot Hughes presenting letters to Mayor Nichols of Boston

with a set already for shipment.

A hasty trip to City Hall—where Mayor Nichols received the message of the Mayor of Newark, and entrusted a message in return to Pilot Hughes—a hasty bite of lunch—and right back to Newark, with a beautiful new Amrad model just off the production line, destined to bring many hours of happiness to the fortunate school child who won the prize.

At 3:15 that afternoon the laconic message was received from Ferry: "Aria" arrived by Air."

A NEW MERCHANDISING BULLETIN featuring Dealer Helps will soon be published. Among the new additions to the line are window cards, and outdoor Neon signs (featured in this issue); a novelty airplane card, indoor Neon signs; beautiful paper mache displays, and many others. New displays will be featured from time to time in THE BROADCASTER.

THE CROSLLEY COMMERCIAL CREDIT plan makes it possible for a Crosley Dealer to dispose of his installment paper at the lowest discount rates prevailing, to maintain his business on a cash basis and greatly increase his sales volume.

# Wilkening Open House

WILKENING, INC., CROSLLEY DISTRIBUTOR in Philadelphia, recently held an open house from June 17-June 21. Despite the fact that the thermometer hovered around 93 in the shade, the turnout of Crosley dealers was highly flattering. Approximately 90 percent of the 750 invitations were answered in person at the open house.

This unusual attendance indicates that the dealers have been following the national advertising of Crosley radio and were interested sufficiently to get further details.

Large key accounts and department store buyers as well as every dealer that came into Wilkening expressed the opinion that the Crosley line for 1930 is "red hot."

The Amrad line also was enthusiastically received.

Wilkening's first floor showroom was decorated with palms and banners. The Crosley Icyball Water Cooler, and the Crosley Icyball pop refrigerator were in constant use. The result of this policy was the signing up of numerous dealers to handle the Icyball line.

In addition to the active Icyball display, all of the cabinet models without chassis were on display. On the second floor luncheon and refreshments were served and on the third floor in the specially constructed demonstration room Crosley and Amrad sets were in operation. By arranging their open house in this manner, Wilkening gave the visiting dealers an opportunity to see everything that they had to offer, rather than offering only a few items to catch the dealer's eye. They found it a much more advantageous plan.

The guests were 100% enthusiastic over the new Crosley line and Wilkening, Inc., feels confident that their open house was successful.

## Icyball In The Congo



Rev. J. J. Davis who is a missionary with the Methodist Episcopal Church South sailed last Friday on the Red Star Liner, The Lapland, for the Belgian Congo, taking with him the Crosley Icyball Refrigerator. After demonstrating this outfit to him he said it was just what he had been looking for. Frank P. Jenkins, the Crosley dealer at Culpepper, Virginia made the sale which was furnished them in a few hours' notice by the Crosley distributor, the Tower Binford Electric and Manufacturing Company of Richmond, Virginia.

Mr. Jenkins says there will be a big increase in the demand for the Crosley Icyball in the missionary field.

# NEW!

## Buy Them by the Set!

THIS beautiful set of window cards suggesting free trial; extended payment plan; trade ins; and open evenings—signs that convey your message to the passerby—is now available in the new paint process at less than the cost of printing!

These signs are in the newest of new type faces, and so closely duplicating hand-lettered signs that they appear on close inspection to be the original work of a master letterman, rather than a copy.

In keeping with Crosley policies, more than half the burden of producing these signs is borne by Crosley.

Order from Your Distributor.

HAVE YOU HEARD THE new CROSLLEY "THE BIG NEWS IN RADIO" Let us tell you about our extended PAYMENT PLAN

hear the NEW CROSLLEY the big news in radio open evenings for your convenience

Come in and hear THE NEW CROSLLEY THE BIG NEWS IN RADIO TRADE IN YOUR OLD SET ASK INSIDE FOR LIBERAL ALLOWANCE PLAN



Standard Battery and Electric Company Big News Plane



AMONG THE FLEET OF SHIPS THAT dropped into Cincinnati during the airplane campaign was the fast plane of the Standard Battery & Electric Company of Waterloo, Iowa, Crosley distributor in that territory. W. J. Decker, Standard representative, is shown handing the 41-S receiver to John Hanson, president of Standard. Before the big news arrived in Waterloo the pilot of the plane had dropped a set at the Cedar Rapids branch.

R. K. Hardy Makes Splendid Record with Bel Canto Line

R. K. HARDY OF B. H. SPINNEY CO. Amrad distributor in Springfield recently made a very fine record for Amrad sales. The following letter explains everything and is an exceedingly strong endorsement of Amrad: June 26, 1929.

"Dear Mr. Lowrie:— Here is the story in regard to Mr. Reynolds working on Amrad. It consists of thirteen and one-half working days; he made thirty-five demonstrations and sold twenty dealers, or a total of twenty-five Amrad sets.

The set worked 100% in every place, and you must remember that this set was right with him in his car as he was making these calls which we think speaks very well for the stability of the Amrad chassis. This is Mr. Reynolds' report up to June 22nd. Mr. Reynolds has already done further work this week and secured more orders.

You perhaps did not realize at the time we asked you for this chassis and speaker this is what could be accomplished in putting Amrad over in this way, but we think we have proven beyond a doubt to ourselves and to you, that this is the ideal way, because after you have set this up in the dealers place of business or at his home, which is oftentimes the case, as a great deal of this work has been done in the evening, he is allowed to play with it himself and actually sells himself on the radio.

Amrad certainly looks good to the B. H. Spinney Co. and their sales force."

Radio in Rio



ONE OF THE MOST NOTABLE OF THE displays at the Radio Show held in Rio de Janeiro from May 17-30, was the Crosley exhibit from the Estabelecimentos Mestre e Blatge, Crosley distributor in the South American capital. The Gembox, Showbox, Jewelbox, Gemchest, Showchest, and Merola, were exhibited. A feature of their exhibit was a

Crosley Showbox housed in a cabinet of rare wood.

The Crosley receivers throughout the meeting were the foci of all eyes, and the Rio distributor was gratified by the attention constantly directed toward his display. The exhibit is a fine one and adheres to the highest standards of display principles.

Southern Tier Dealers Combine Business With Pleasure

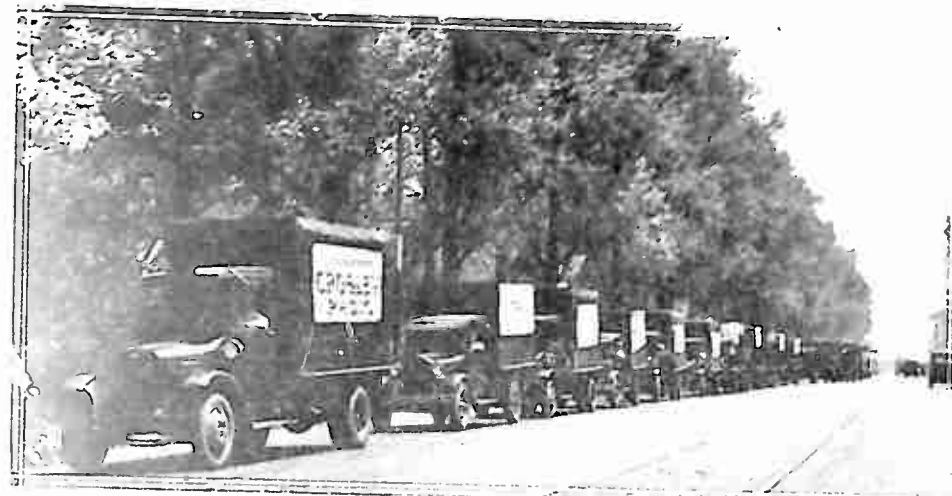


"ALL OF HIS TIME DEVOTED TO arduous labor without sufficient opportunity for recreation develops John into a stupid fellow" (Harvard translation) is an old saw to which considerable heed is paid by Southern Tier Electrical Supply Co., Inc., Crosley distributor in Binghamton, N. Y. They believe that strenuous play in the great out-of-doors is as essential to success as concentration on business matters. Supporting their belief in

this code, they requested their dealers at their recent big news meeting at the Kalurah Country Club to prepare themselves for sport. Photographs above give some conception of how Southern Tier dealers disported themselves before being shown the Big News in Radio.

J. E. Green, president of Southern Tier, is shown in the central picture with our own Jack Dalton, and Representative Carey.

Bob Himmel Stages Parade of Polite Truck Drivers



MR. ROBERT HIMMEL, PRESIDENT OF Hudson-Ross, Inc., exclusive Crosley and Amrad distributors for the Chicago territory again demonstrated his ability to accomplish the unusual in "Hot Publicity" on Monday, June 17th, in connection with the announcement in the national newspapers by the Crosley Radio Corporation of "THE BIG NEWS IN RADIO."

Whether because of the alleged activities of Chicago gunmen or for other reasons it has been practically impossible for any Chicago merchant to obtain police permits for the holding of a public parade but Mr. Himmel succeeded in accomplishing the almost impossible by obtaining such a permit.

A parade of 30 immense trucks bearing a giant Crosey banner with a different reason for buying Crosley painted on each was sent from the southeast limits of the City of Chicago by a devious route for 42 miles through every important business center in the city of Chicago clear through to the northern-most limits.

Mr. Himmel then succeeded in doing the next almost impossible thing when he obtained publicity for this parade in the various Chicago newspapers as evidenced by the following extract which appeared in the Chicago Herald and Examiner on the morning of June 17th:

RADIO CARAVAN BOASTS POLITE TRUCK DRIVERS.

42-Mile Route of 30 Hudson-Ross Delivery Vans Will See "Something New"



Found—or rather promised—the world's first group of polite truck drivers, and in Chicago, too.

This unusual development in truck circles is about to be demonstrated this afternoon, be-

ginning at 1 o'clock, when a thirty-truck caravan of Hudson-Ross, Inc., local Crosley radio distributors, begins weaving its 42 mile parade from Seventieth St. and Stony Island Avenue around various neighborhood centers and finishing, at about 5 o'clock, at Howard and Greenview avenues.

"I am going to demonstrate, for the sake of Crosley radio receivers and their good name," said Robert Himmel, president of Hudson-Ross, that truck drivers can be polite, if so instructed, and are generally a downtrodden lot."

The trucks, forming at the start will have just completed the greatest single delivery of radio sets to radio dealers ever made. The sets are the sample models of the new "Big News in Radio".

The outstanding new line will be on display at all Crosley dealers. Merely to sample dealers, Mr. Himmel said, it requires nine carloads of sets.

In organizing his "Parade of the Polite Truck Drivers," as the head of Hudson-Ross chronicles the parade, Mr. Himmel has instructed the drivers as follows:

1. Stop to let aged folk, women with babies, children and blind pass.
2. Do not cut in or out of traffic.
3. Do not exceed a speed of ten miles an hour.
4. Avoid repartee with pedestrians and other drivers. Conduct yourselves as gentlemen."

"Glorious" Fourth Is Wet, Say WLW Staff Musicians

Small boys with banging firecrackers made life miserable for the performers at the Crosley radio station, WLW, on the Fourth of July.

To keep the popping of hundreds of explosions from going out on the air, the windows in the studios had to be tightly closed all day.

To keep the musicians from leaving radio for ditch digging was the thought that in the five new studios now under construction for WLW, the air will be washed continuously and will be kept at a temperature of 72 degrees. The studios will be completely enclosed and will have no windows.

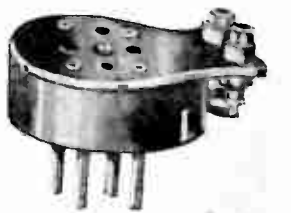
NEW Crosley Gold Metallic Banner



CROSLLEY is offering this beautiful velour like banner decorated with letters in gold metallics. Gold cords and gold support! This is a very rich and attractive banner for use as a central decoration in a window display or an interior decoration. Approximately 18 x 24 inches.

Order from Your Distributor.

The Crosley Dynacone Adapter



Often a set is blamed needlessly because of a faulty power speaker. The Crosley Dynacone, undisputed master in the field of power speakers may now be used, due to the invention of the Dynacone Adapter, on any A-C receiving set other than Crosley utilizing a 171-A output tube having 135 or more volts on the plate; or radio sets having an output tube with a plate current of 20ma.

\$1.00

List

f. o. b. Cincinnati





# CROSLY DEALERS



## Davidson Service 100%



I. M. DAVIDSON, AUTHORIZED CROSLY Dealer in Petersburg, Tenn., attributes his success with Crosley receivers to the fact that he handles Crosley exclusively and gives each set a very rigid test before installation. Service with Crosley is 100%, Davidson claims. The above picture shows Mr. Davidson using a Radio Set Analyzer in his final tests. Any defect in the set is immediately apparent in this test and the defect is corrected before the set finds its way into the home.

## Showbox Reproduces for Sound Pictures

J. D. BOYD OF BOYD'S RADIO SHOP, Crosley dealer in Fayetteville, N. C., recently had a service call from a local theatre using sound pictures. The theatre used a system of electric pickups, power amplifier, etc., to reproduce records co-ordinated with the picture.

The theatre depended entirely upon this form of music and when their amplifier gave trouble the manager was at a loss to know what to do for music, inasmuch as the theatre, being small, did not have room for a piano. J. D. Boyd, seeing that it would take some time to trace out the trouble in the amplifier, connected their electric pickups and speakers to a Crosley Showbox. The manager of the theatre was very much surprised at the improved tone quality as they had been using 250 tubes and the Crosley Showbox used only 71's. Needless to say, everyone was well pleased with the perfect quality of reproduction of the Showbox.

This is just another of the splendid possibilities of Crosley receivers. J. D. Boyd received excellent publicity because of this stunt.

## Keeping Track of Sets on Demonstration

**Chamberlain Brothers**  
2405 W. COLORADO AVE.

**Demonstration Record**

Name \_\_\_\_\_  
Street Address \_\_\_\_\_ Phone \_\_\_\_\_  
Make of Set \_\_\_\_\_  
Type of Set \_\_\_\_\_  
Serial Number \_\_\_\_\_  
(If Customer Has Old Set)  
Make \_\_\_\_\_  
Accessories \_\_\_\_\_  
Allowance \_\_\_\_\_  
Remarks \_\_\_\_\_

Date of Demonstration \_\_\_\_\_  
Date Sold \_\_\_\_\_  
Date Returned \_\_\_\_\_  
If wishing to Buy in Future, Date \_\_\_\_\_  
Remarks \_\_\_\_\_

Salesman \_\_\_\_\_

WE ARE REPRINTING ABOVE N. M. Chamberlin's method of checking up on Crosley receivers out on demonstration. Mr. Chamberlin is one of the brothers of Chamberlin Brothers of Colorado Springs, Colorado, Crosley dealer in that vicinity.

One of the slips above is filled out when a set is taken out of their store. The slip is filed. If the set is purchased the slip is filed among "Sets Purchased"; if not a salesman is sent out to visit the prospect. If the set is returned the slip is filed in another cabinet and is kept for reference. In the same cabinet a record is kept of prospects who anticipate buying in the future.

## Behind the Scenes at WLW

STATION WLW WILL PUBLISH IN THE near future a twelve page magazine, "Behind the scenes at WLW" which will be mailed to WLW fans throughout the world in order to give them a more definite conception of radio broadcasting in general and Station WLW in particular. The booklet will trace a program feature from the time it enters the microphone in the studio to the time it reaches the radio audience via the loud speaker. Two pages are devoted to the new studios, the last word in comfort and convenience and engineering skill.

## Count Buddy Listening to His Master's Voice



AMONG THE HIGHER CLASS GENTLEMEN canines of New York City, there is a definite severing of allegiance with the time honored phonograph. No longer does the dawg look wistfully into a horn for the sound of his master's voice. Instead he listens eagerly over the radio.

The above photograph shows one of the bluebloods of dogdom, Count Buddy, listening to Al Bernard, his owner, doing his stuff over WJZ. Count Buddy sits every Tuesday and Friday while his owner is on the air during several nationally known advertisers' hours.

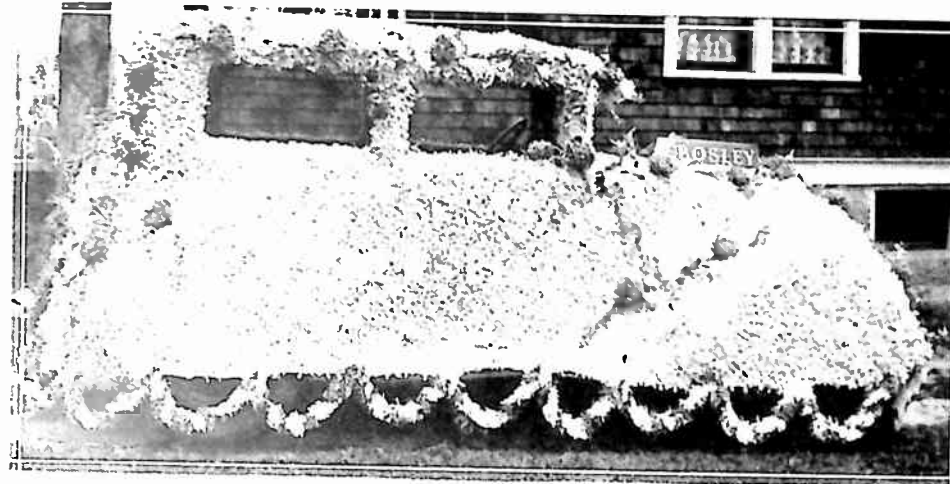
Mr. Bernard, it must be added is a strong Crosley booster, having tried out four other competitive receivers before deciding on the Crosley receiver shown in the picture.

Count Buddy is the only dog possessing a written invitation to visit at will the NBC studios and the Astor Hotel in New York.

## Crosley Service Man Invents Washer Wrench

F. E. KLOSS, SERVICE MAN IN THE radio department of the Mead Drug Store, Crosley dealer in Merrill, Wis., has invented a wrench which is used in tightening up the copper washer back of the volume control just ahead of the condenser shield. It often happens in a number of receivers that this washer becomes loose and the dial also becomes loose and will not hold in any one position. In such cases heretofore it has been necessary to remove the entire metal cabinet to repair it. Patents are now pending on the wrench although it has not as yet been manufactured in quantities.

## Crosley Float in Wisconsin Cherry Festival



THE JENSEN MACHINE CO., CROSLY dealer in Sawyer, Wisconsin, featured this beautiful float during the annual Cherry Festival in Sawyer. The float attracted a great deal of favorable attention and is notable for its good taste.

The float attracted a great deal of favorable attention and is notable for its good taste.

## Shuler Dealers Welcome Big News by Air

A LARGE GROUP OF CROSLY DEALERS from Louisiana and Mississippi were convened at the Monteleone hotel for their first annual convention. After the registration the dealers were welcomed by Rabbi Louis Binstock. A short talk was given to the dealers by Mr. Shuler of the Shuler Supply Company, Crosley distributor in New Orleans. J. J. Nolan, representative of the Amrad Corporation, and W. G. Amspoker, Crosley representative, gave talks and demonstrated their respective lines of radio receivers. At noon the dealers were the guests of Mr. Shuler at luncheon. Afternoon talks by E. L. Chesney, of the Commercial Credit Company and D. B. Mouldous, credit manager of the Shuler Supply Co., were given.

At 3:30 p. m., the dealers, escorted by motorcycle police left from Wedell-Williams airport to await the arrival of the Ryan monoplane which W. A. Shuler had chartered for a flight to Cincinnati and return for the Crosley 41-S receiver which constituted the freight.

A large group of Crosley dealers were thrilled at the sight of the plane as swooped into view above the trees of the swamp to the north of the Airport. The big Ryan monoplane had hopped off at Cincinnati on Wednesday June 12 during a heavy rain and had battled with head winds all the way. They dragged their skids at the Wedell-Williams port nine hours after leaving the Queen City.

After bringing the plane safely through storm, down-drafts, and buffeting head winds, which reached high velocity, Pilot Jimmy Wedell brought the plane to a perfect landing. The crowd rushed forward before the plane had come to a full stop to congratulate the pilot and passengers, and to view the newest Crosley receiver.

After the arrival of the monoplane with its news, the dealers returned to the hotel for a banquet tendered by Mr. Shuler. The new set was demonstrated and was accepted with a great deal of enthusiasm by the dealers. Substantial orders were the result of its excellent performance.

## Illinois Dealer Pushes Icyball Employs Direct Mail to Arouse Interest

HAROLD WESSLER OF THE WESSLER Electric Shop, authorized Crosley dealer in Arenzville, Illinois, is basing his campaign for merchandising the Crosley Icyball Refrigerator largely upon direct mail. He has arranged an interesting letter designed to arouse curiosity and compel attention. It is written in a dignified and forceful manner and is reprinted here.

Dear Sir:

With the gradual approach of warmer weather comes the common thought of food preservation, which to the average farmer is quite a problem and often passed up as an impossibility much to the inconvenience of the entire family.

Today Powel Crosley, Jr. presents to the public the new and improved Crosley Icyball Refrigerator. The Icyball is the only type of refrigeration available in areas without electric current and fills a long-felt want in the rural home.

The Icyball is very simple, both in principle and in construction and has proven very successful in thousands of homes in every part of the world. It requires but a few minutes of attention and about two cents worth of kerosene a day.

We have been appointed exclusive dealer in this territory and have a refrigerator on display in our store in actual operation. We would appreciate an opportunity to demonstrate either in our store or in your home and explain the many advantages and improvements in this new unit.

The enclosed circular describes the Icyball fully and it is absolutely guaranteed to do all claimed for it.

Yours for Health and Economy,  
WESSLER ELECTRIC SHOP,  
By Harold Wessler.

P. S. Tune in to WLW's "Top 'O the Morning" program every morning 5:30 to 6:30 central standard time and hear a very interesting agricultural program and more about the Crosley Icyball.

# MEROLA

Phonograph  
Pick-up  
**\$15**  
List



Switch from Radio to phonograph and back again to radio at pleasure!

Crosley A. C. electric receivers are equipped with MEROLA posts, thus making a MEROLA installation the work of a few minutes.

Order from Your Distributor

## TAYLOR ELECTRIC CO. MADISON, WIS.

Exclusive Radio  
Wholesale Only  
CROSLY DISTRIBUTOR

## SCHUSTER ELECTRIC COMPANY

WHOLESALE  
CROSLY DISTRIBUTOR  
2109 Spring Grove Avenue  
412 Elm Street, Cincinnati, Ohio  
West 141—PHONES—Main 820

## TUNE IN!

We broadcast daily at  
11:00 a. m. and 1:30 p. m.

Financial News  
Market Reports  
Government Bond  
Quotations  
Call Money Rates  
Foreign Exchange  
Grain and Live Stock  
Quotations

## FIFTH THIRD UNION COMPANY

14 West Fourth Street  
Cincinnati, Ohio



Important Price Changes!



Important Price Changes!

CROSLLEY DEALERS' ADVANCED RADIO COURSE

This is the first lesson of an advanced course in radio published as a sequel to the "Crosley Dealer's Radio Course" which appeared in "The Crosley Broadcaster" some months ago. The advanced course will be completed in ten lessons.

LESSON I.

(Radio Tubes As Amplifiers)

As was outlined in Lesson VIII of the "Crosley Dealers' Radio Course," the radio tube (or "three electrode vacuum tube," as it is termed in more technical language) consists of three elements—a filament, a grid, and a plate—enclosed in an evacuated glass bulb. The filament is heated, by means of an electric current, to a temperature at which it emits electrons (negative particles of electricity). These electrons are attracted to the plate, maintained positive with regard to the filament. Thus a continual flow of electrons, or an electric current, is set up in the plate circuit, from the filament through the tube to the plate, and thence through the outside circuit back to the filament. The grid (or third electrode), interposed between the filament and plate, acts simply as a control element, regulating by the sign and magnitude of its charge the magnitude of the plate current.

The amplifying action of the three-electrode tube depends upon the fact that a relatively small charge placed upon the grid will cause a relatively large change in the plate current. Since the effect of charges on each other decreases very rapidly as the distance between them is increased, a charge on the grid, close to the filament, will have a much greater effect on the electrons emitted from the filament than a charge on the plate, farther away.

If a three electrode tube is connected as shown in fig. 1 a continuous current will flow in its plate circuit. Any variation in the charge on the grid, however, will cause a change in the plate current. Suppose an alternating current is applied to the grid circuit through the medium of the "input transformer". This will cause the potential of the grid to alternate continuously between a maximum positive and a maximum negative value. As the grid changes in potential the plate current will change in magnitude, decreasing when the grid becomes more negative and increasing when the grid becomes

the output of the tube will be a much-amplified replica of the alternating current input.

Characteristic Curves

By connecting a battery in the grid circuit of the tube, adjusting the grid to different known potentials, and measuring the plate current corresponding to each grid potential, the relation between the plate current and grid potential may be studied experimentally.

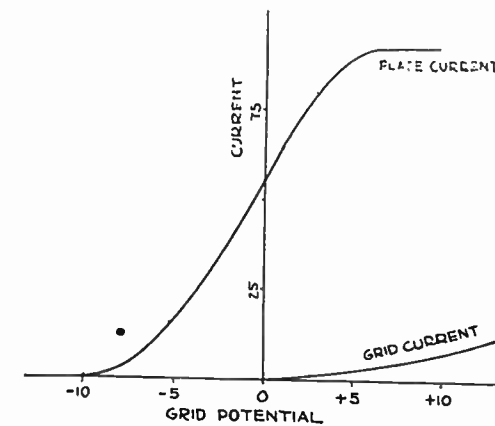


Fig. 2

A curve, such as that shown in fig. 2, may be drawn for the data thus obtained. Such a curve is called a "characteristic curve." If the data is obtained in such a manner that the only resistance or impedance effect in the plate circuits that within the tube itself, it is called a "static characteristic curve." Data may be obtained under conditions more similar to those in radio sets, in which there is a resistance or impedance effect in the external plate circuit as well as within the tube itself. Curves drawn from such data are called "dynamic characteristic curves."

Blocking And Saturation

The curve in fig. 2, indicates that as the grid becomes more negative the plate current decreases and as it is made more positive the plate current increases. This is true only within limits, however. As the grid is made more negative a value of the grid potential is eventually reached at which the passage of all electrons from filament to plate is effectively blocked. Grid potential more negative than this have no effect, the plate current remaining zero no matter how great the grid voltage below this value.

On the positive side, a grid potential is eventually reached at which all electrons from the filament, except those striking the grid itself, are carried over to the plate. This is the maximum plate current obtainable for the filament temperature in question, for there are no more electrons available to carry current to the plate. The point on the characteristic curve at which the plate current arrives at this maximum is known as the "saturation point." Further increase in the positive grid potential results only in more electrons striking the grid itself, thereby slightly lowering the plate current.

The Cause Of Distortion

Careful consideration of these facts will

make it clear how tubes may be overloaded so as to produce distortion. Suppose the alternating current applied through the input transformer to the tube causes fluctuations in the grid potential between the points A and B on the characteristic curve (fig. 2). The corresponding plate current will then be a fairly good replica of the input current. On the other hand, if the alternating current input is of such magnitude as to fluctuate the grid potential between the values C and D, there will be considerable distortion, because changes in grid potential on the portions AC and BD of the curve will have little effect on the plate current. As a result, the alternating current input will be reproduced in the output in a distorted form, with its peaks flattened off.

In order to prevent distortion it is necessary for the input to the tube to be small enough so that the grid fluctuations correspond to the approximately straight portion AB of the characteristic curve. If current of greater magnitude must be handled it is necessary, in order to avoid distortion, to employ tubes especially designed to handle such currents. The signal currents are of considerable magnitude in the output, or last audio, stages of radio sets. To avoid distortion it is now customary to use special power output tubes, such as, UX 171-A, CX 371-A, UX 245, and CX 345, in these stages. These tubes have characteristic curves with a long straight portion, extending between wide limits of grid voltage. Another method of overcoming distortion in output stages is to use two tubes together connected as "push-pull" amplifiers. This method will be described later.

Effect Of Plate Voltage

The characteristic curve reproduced in fig. 2 shows the relation between grid voltage and plate current for one value of plate voltage and one value of filament current only. If the plate voltage is increased, the effect is to shift the whole curve toward the left. The plate current at each grid potential will be

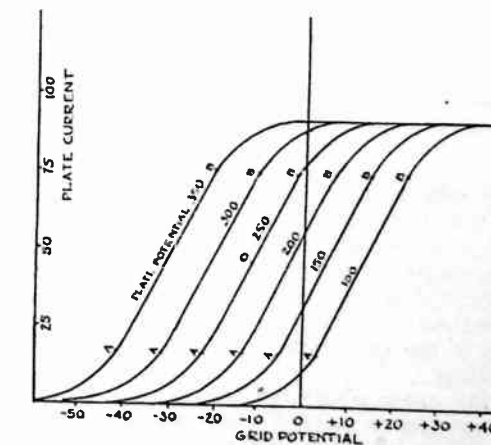
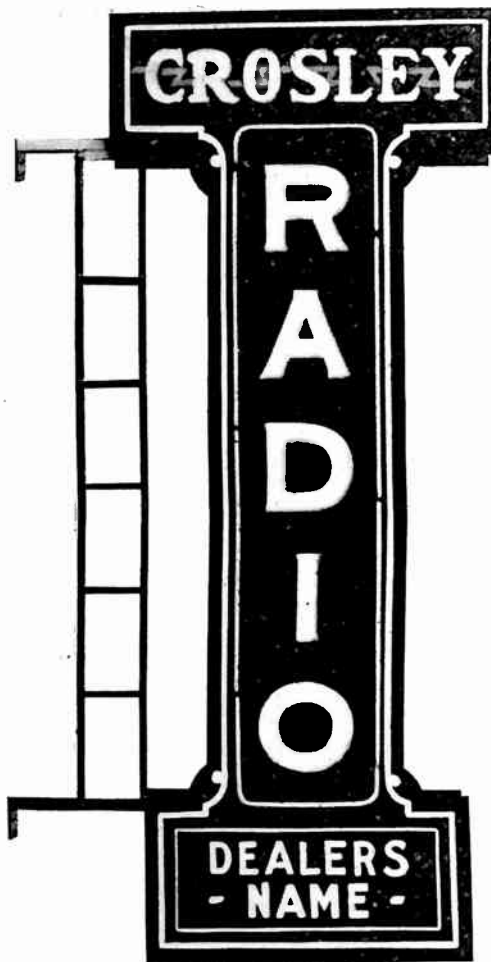


Fig. 3

greater with the increased plate potential attracting electrons to the plate. If the plate voltage is decreased, the curve is correspondingly shifted toward the right.

A group of curves may be drawn showing the relation between grid voltage and plate



STYLE CB-5B \$175.00
This is a horizontal sign, 5' long by 3' 5" high, "CROSLLEY" in 7" high stencilkraft letters; "RADIO" in 10" high letters; dealer's name panel 4' long by 6" high with letters approximately 4" high, depending upon number of letters in name. Fifteen millimeter red neon tube border around word "RADIO". Number of interior sockets—25. Approximate shipping weight—400 Lbs.
STYLE CH-5 \$82.00
Same as Style CB-5B save that the neon border is not included. Approximate shipping weight—370 Lbs.

CROSLLEY Electric-Neon Signs

THE ELECTRIC SIGN IS ONE OF THE MOST compelling advertising features of our cities. It has life, light, color and novelty! It cannot be ignored!

The electric sign transforms your store front into a living salesman—it puts your name and your business forcibly before the public. The electric sign has attained a strong position as an advertising medium because it pays.

Today, tomorrow, especially at night the electric sign on your store front is catching the eye of the possible customer telling of your location, your name, your goods.

The Neon sign or the sign embodying the Neon principle is the most popular sign of today—and from all indications it will continue to be so. With customary thoroughness Crosley has prepared three models, in six different styles—two all electric, and four combination electric and Neon. The fact that these signs are purchased in large quantities permits Crosley to offer them to you at a price considerably below the price you would pay on the open market.

GENERAL DESCRIPTION

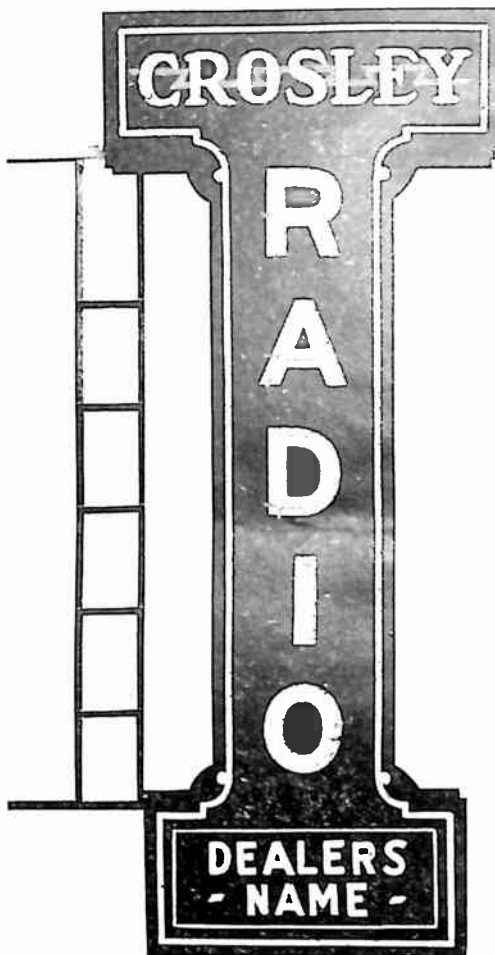
The inner frame work is of angle iron, cross-braced construction, so designed as to produce a substantial rigid frame, which with porcelain enamel finished faces produces a sign of exceedingly attractive, tailor-made appearance of lasting quality.

These signs are illuminated from the inside, and the lamp receptacles are so placed as to produce an even and well balanced illumination, with a minimum of current cost. Properly placed doors for lamp renewals are provided. The dealer's name on the etched glass is covered with a plate of transparent glass to protect the lettering from the weather.

STYLE CV-1B \$215.00
This is a vertical sign, 9' 1" high by 3' 10" wide; "CROSLLEY" in 6" high opal glass letters, "RADIO" in 10" high raised opal glass letters; dealer's name panel 11" high by 30" long, size of letters to depend upon number of letters in name. Fifteen millimeter red neon tube border around word "Radio". Number of interior sockets—20. Approximate shipping weight—445 Lbs.
STYLE CV-1 \$97.00
Same as Style CV-1B save that neon border is not included. Approximate shipping weight 400 Lbs.

ALL THREE TYPES OF THESE SIGNS ARE of the interior illuminated type, double-faced—reading from both sides. Letters "CROSLLEY" and "RADIO" in the horizontal signs are cut out of 18-gauge porcelain enamel steel and finished in vitreous porcelain enamel; background black, border stripe yellow and folder red. The letters in CV-1B are of raised opal glass and the letters in CV-2 are raised opal glass in "CROSLLEY" and red neon tubes in "RADIO".

The dealer's name panel is of acid etched, opal art glass, containing the dealer's name in white letters of approximately 4" in height, depending upon the number of letters in the name.



STYLE CV-2 \$190.00
This is a vertical sign, 9' 1" high by 3' 10" wide; "CROSLLEY" in 6" high raised opal glass letters, "RADIO" in 10" high twelve millimeter red neon tube letters, dealer's name panel 11" high by 30" long, size of letters to depend upon number of letters in name. Number of interior sockets—14. Approximate shipping weight 410 Lbs.
STYLE CV-2B \$255.00
Same as Style CV-2 save that "RADIO" is enclosed by 15 millimeter red neon tube border. Shipping weight approximately 455 Lbs.

These signs are built in accordance with the specifications and requirements of the National Board of Underwriters governing electric sign construction, both as regards materials used and construction details and design. Each sign is provided with end irons, 12" in length for extension from wall of building, as well as required wall plates for attaching end irons, expansion shells and bolts, and required guy cables and turnbuckles for proper installation.

The horizontal sign is recommended wherever this type can be used. In such instances where ordinances do not permit a 6" extension from the building, then a vertical sign should be used. Lamps are not included with sign

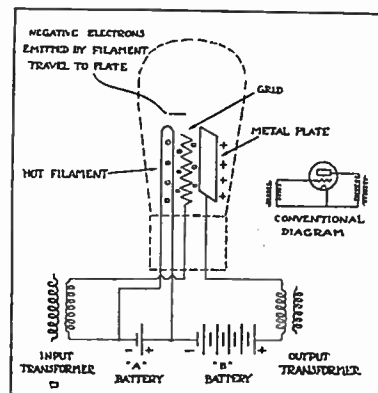


Fig. 1

more positive. The result will be a fluctuating, direct plate current, reproducing in wave form (unless the tube is overloaded) the alternating current applied through the input transformer. Since small changes in the grid potential result in large changes in the plate current,



current for various values of plate voltage. From an examination of these curves (fig. 3) it is apparent that for plate voltages exceeding a certain maximum value (in the curves shown, 250 volts) all of the straight line portion of the curve AB corresponds to negative values of grid potential. For instance on the 250 volt curve, the average value O of grid potential corresponding to no incoming signal is 12 volts, the grid potential corresponding to the point A on the curve is 22 volts, and that corresponding to the point B is 0 volts. In order to maintain the grid at the potential corresponding to 0 when no signal is coming in, it is necessary to use a battery of 12 volts (or other source of potential of similar voltage) in the grid circuit. The voltage thus constantly applied to the grid is known as the "C" voltage or "biasing voltage."

**Advantage Of "C" Biasing**

The advantage of working the tube at high plate voltages and negative biasing potentials, such that the entire straight portion of the curve (or most of it) lies within the negative range of grid voltages, is that this prevents the grid from "stealing" current from the plate circuit. If the grid is made positive, a certain number of electrons will be attracted to and strike the grid itself, and will flow around through the grid circuit instead of travelling to the plate and thence around through the plate circuit. The result will be a loss of plate current from the plate circuit of the grid circuit. The more positive the grid the greater will be this tendency for it to by-pass part of the plate current. The result is that if the tube is operated so that the grid swings to highly positive potentials, the loss of current to the grid at these positive potentials causes a distorted plate current.

In the radio-frequency stages, plate voltages from 80 to 100 are common, with biasing resistances ranging from 3 to 9 volts. In the output tubes the voltage fluctuations of the grid must be considerably greater, since the signal has been greatly amplified before it reaches these tubes. To work the grid of an output tube at negative voltages only, a greater biasing voltage must therefore be used, and the plate voltage must be correspondingly higher. Common biasing voltages used for output tubes vary from 9 to 45, and common plate voltages range from 90 to 180.

**Effect Of Filament Current**

Another factor which may be varied so as to change the characteristic curve is the filament current. The hotter the filament, within limits, the greater will be the emission of electrons from it. If the filament current is increased, so as to heat the filament more, there will be greater electron emission and a corresponding increase in plate current. This has the effect both of shifting the characteristic curves to the left and of raising the saturation points. The saturation point (at which practically all electrons flow to the plate) is raised because more electrons are available to flow to the plate, with a lower filament temperature.

The above considerations illustrate why it is desirable to instruct radio set owners not to operate their sets at too great volume. If the volume control is turned on full in receiving strong local signals, and if the station is tuned to accurately, the signal strength may exceed that which can be handled adequately by the tubes—especially in the later stages. The result will be distortion. The volume which can be handled without distortion will depend,

of course, upon the type of tubes used, voltages at which they are operated, etc. One can easily adjust the volume within limits that give satisfactory reproduction. Many persons, however, have a tendency to turn the volume on full, overload the tubes, and then blame the speaker or set for the resulting distortion.

**Amplification Constant**

As has been explained, the amplification action of radio tubes is a result of the fact that a small change in grid voltage causes the same change in plate current as a comparatively large change in plate voltage. The ratio of the change in plate voltage to the change in grid voltage necessary to produce the same change in the plate current is known as the "voltage amplification constant," or simply "amplification constant." It is sometimes represented by the letter "k". We may express this definition in symbols, as follows:

$$\frac{d E p}{d E g} = K$$

where: d E p—the change in plate voltage necessary to cause a given change in plate current.

d E g—the change in grid voltage necessary to cause the same change in plate current.

K—the amplification constant.

**Internal Plate Resistance**

A certain amount of power supplied by the plate battery (or "B" supply) is used up in sending the electrons from the filament to the plate through the tube. At first thought it might seem that these electrons should travel through the vacuum of the tube without loss of energy. It requires energy to start them in motion, however, just as it requires energy to start a train or automobile in motion. The energy used in speeding them up is practically all lost when they strike the plate, being converted into heat. The continual bombardment of the plate by electrons generates heat in some tubes sufficient to cause the plates to glow brilliantly.

This dissipation of energy in speeding up the electrons and heating the plate with their impacts is similar to the dissipation of energy by the heating of a resistance when an electric current is sent through it. The opposition to current flow through the tube, represented by the energy necessary to speed up the electrons and the energy lost in heating the plate, is thus equivalent to a resistance between the filament and the plate, inside the tube. This effective resistance is known as the "internal plate resistance" of the tube. Since by Ohm's law, voltage divided by current equals resistance, we may write:

$$\frac{d E p}{d I p} = R$$

where: d E p—change in plate voltage.

d I p—corresponding change in plate current.

R—internal plate resistance.

**Mutual Conductance**

Another factor commonly used in defining the characteristics of tubes is the "mutual conductance." Conductance may be defined as the ability to conduct a current. It is the opposite, or inverse, of resistance, which represents opposition to the flow of electric current. Resistance equals the ratio of the voltage applied across a resistance to the current flowing through the resistance, (R=E/I). Conductance equals the ratio of current to the

corresponding voltage necessary to force the current through a conductor (C=I/E). The mutual conductance of a vacuum tube is defined as the ratio of the change in plate current. In symbols:

Mutual Conductance=change in plate current—corresponding change in grid voltage.

$$M = \frac{d I p}{d E g}$$

The mutual conductance may be expressed in terms of the amplification constant "k" and internal plate resistance "R" of the tube as follows:

$$M = \frac{d I p}{d E g}$$

Now the plate voltage change corresponding to a given grid voltage change is equal to Kxd E g, where "k" is the amplification constant (see above). Consequently

$$M = \frac{k d I p}{d E p}$$

but d I p I (from above).

$$\frac{d E p}{d E p} = \frac{K}{K}$$

therefore M=—  
R

**Capacity Between Tube Elements**

In addition to the resistance effect between the filament and plate of the tube there is also a capacity effect, for the filament and plate act as the charged portions of an air condenser. In order to be strictly accurate in calculating the effect of the tube in opposing the flow of plate current, one must consider this opposition as an impedance made up of a resistance and a condenser in parallel.

There are also capacity effects between the grid and the plate. The grid to plate capacity tends to cause energy to be transferred from the plate, or output circuit back into the grid, or input circuit. If this energy transfer is sufficient (as was explained in the preceding course) the tube will develop sustained oscillations. The result will be squealing and howling instead of clear reception. The causes of and various remedies for these sustained oscillations will be dealt with in detail in a succeeding lesson.

**Voltage And Power Amplification**

Suppose an alternating current is impressed on the grid circuit of an amplifier tube. This current will be reproduced in the plate circuit as amplified fluctuations in the direct plate current. The value of the plate current fluctuations at any instant are the same as though the entire plate circuit had applied to it a plate voltage "E p" equal to k E g where "E g" is the voltage of the grid and "k" is the amplification constant. This voltage "E p" represents the voltage drop throughout the entire plate circuit, both inside and outside the tube.

It may be shown from this that in order to get the greatest voltage amplification in the output circuit (plate circuit outside the tube) the highest possible impedance should be used in the external plate circuit. It may also be shown that in order to get the greatest possible power amplification, the impedance of the external plate circuit should equal the filament to plate impedance inside the tube. It is beyond the scope of this course to demonstrate these propositions, but they may be shown to be true by means of Ohm's law and certain power relations. These are the necessary conditions for greatest voltage or power amplification, but other considerations often make it necessary to depart widely from these values in practice.