

Production-Engineering-Distribution • Radio-Television-Sound Projection

RADIO Industries

With which is incorporated Radio Manufacturers' Monthly

JUNE • 1930

The Show Is On

•
The Double Heterodyne

•
Radio in Foreign Lands

•
The Load of a Power Tube

•
Specialization in Merchandising Radio

THE PLANT PAPER



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A PRODUCT OF SPECIALISTS IN RESISTORS EXCLUSIVELY

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Say You Saw It in Radio Industries

Institute of Radio Engineers Fifth Annual Convention Toronto, Ontario, Canada August 18 to 21, 1930

If you are interested in radio engineering, either as an engineer or a manufacturer, you cannot possibly afford to miss the **Fifth Annual Convention** of the **Institute of Radio Engineers**, to be held at the **King Edward Hotel** in **Toronto** between August 18 and 21.

Over a score of technical papers will be presented. They will cover the radio field from many angles and insure that whatever your interest may be, it will be represented. In addition to the meetings at which papers of general interest will be presented, special technical sessions offering papers of prime interest to the radio manufacturer, and his design and production engineers, have been arranged.

A number of inspection trips to radio manufacturing plants, broadcast stations, The Welland Canal, Chippewa Power Plant and Niagara Falls are scheduled and these, together with sight-seeing trips for the ladies, will make this a never-to-be-forgotten convention.



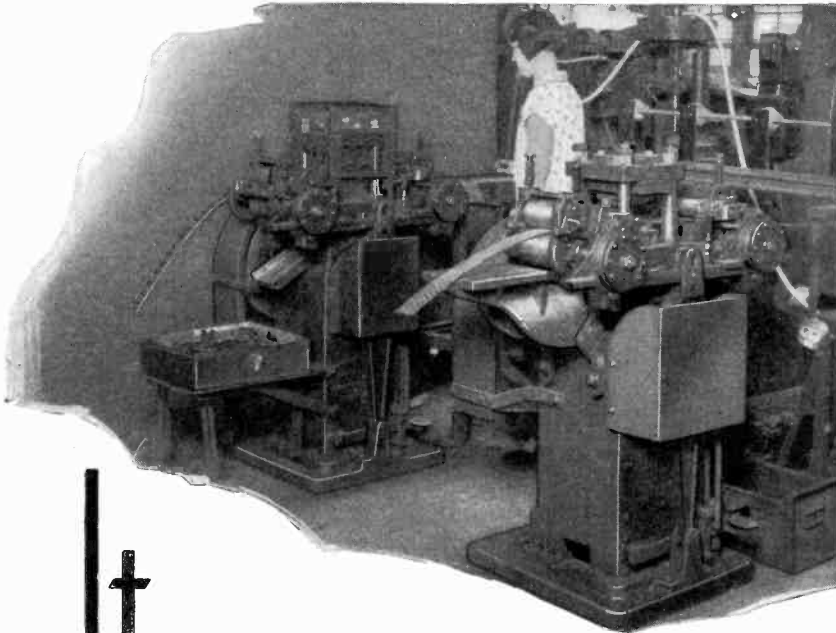
For Further Information Address—Convention Committee

Institute of Radio Engineers

King Edward Hotel

Toronto, Ontario, Canada

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**cold punches
 cleanly-smoothly**

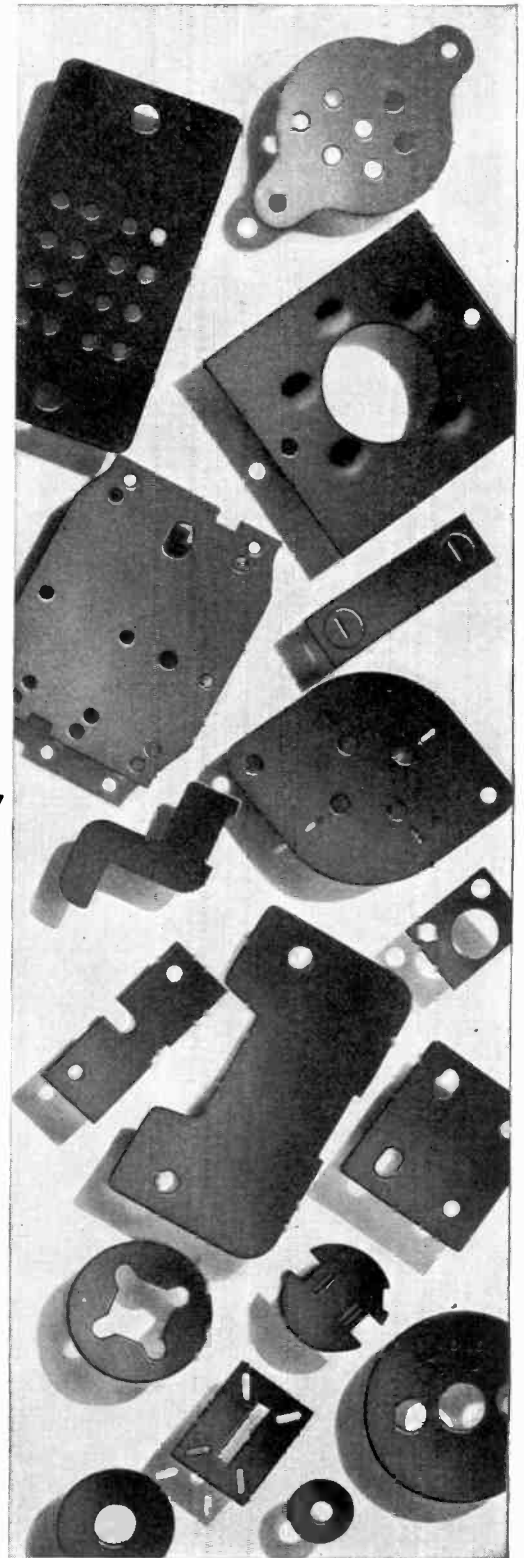
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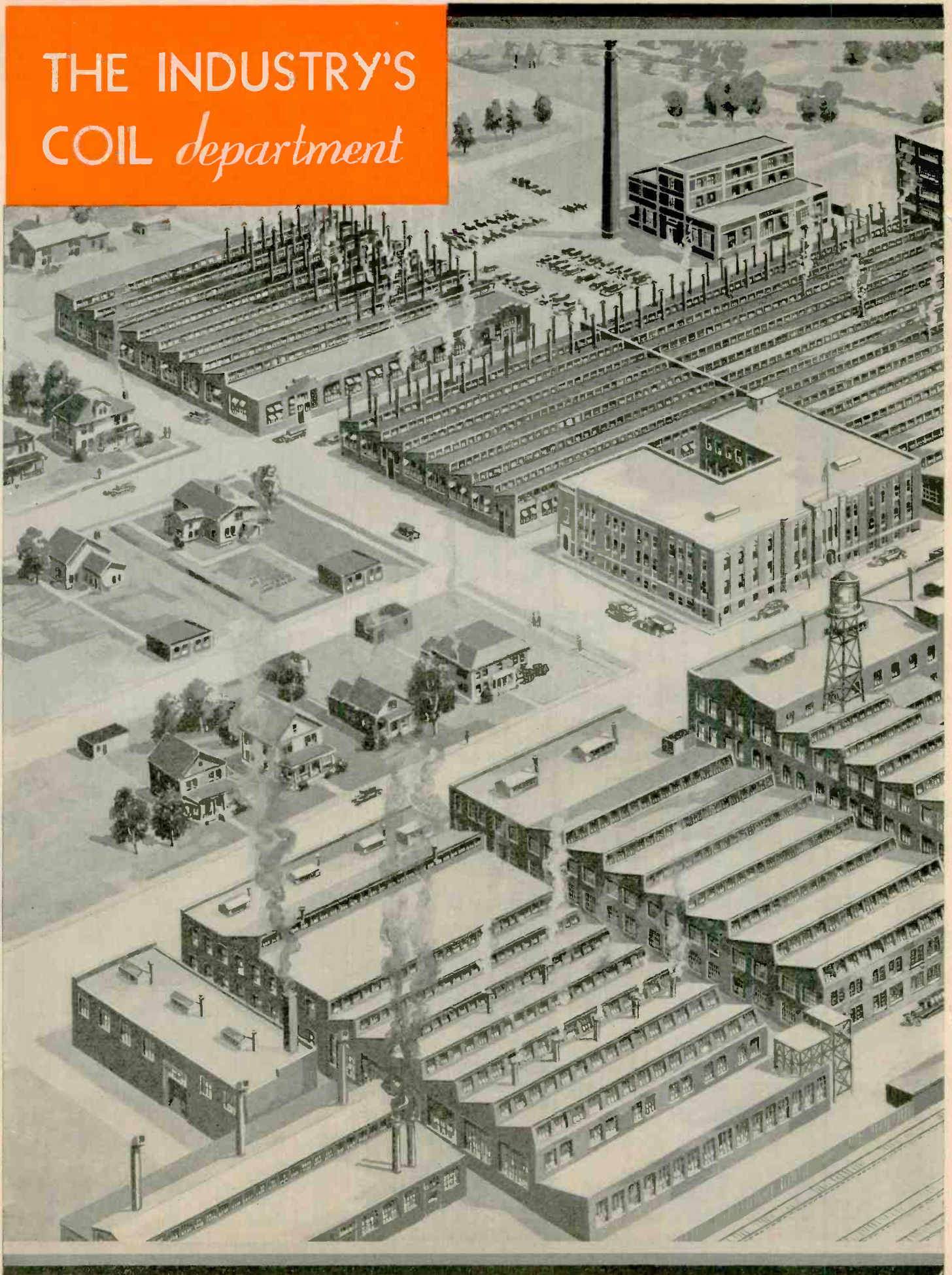
JOIN US IN THE GENERAL ELECTRIC HOUR, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

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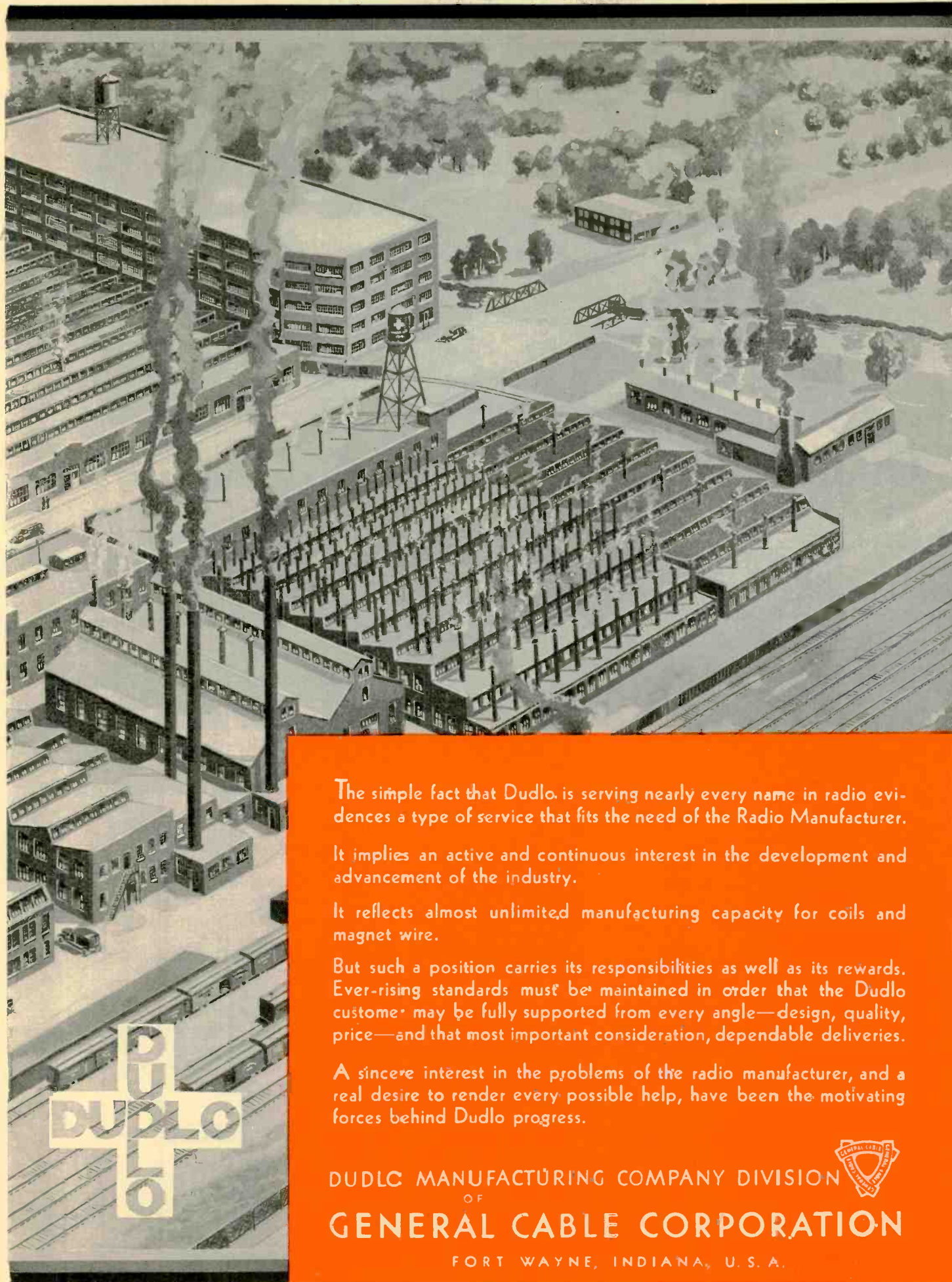
GENERAL  **ELECTRIC**
 SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

Say You Saw It in Radio Industries

THE INDUSTRY'S COIL *department*



R.M.A. Exhibit, Booth 53 and 54, Section D



The simple fact that Dudlo is serving nearly every name in radio evidences a type of service that fits the need of the Radio Manufacturer.

It implies an active and continuous interest in the development and advancement of the industry.

It reflects almost unlimited manufacturing capacity for coils and magnet wire.

But such a position carries its responsibilities as well as its rewards. Ever-rising standards must be maintained in order that the Dudlo customer may be fully supported from every angle—design, quality, price—and that most important consideration, dependable deliveries.

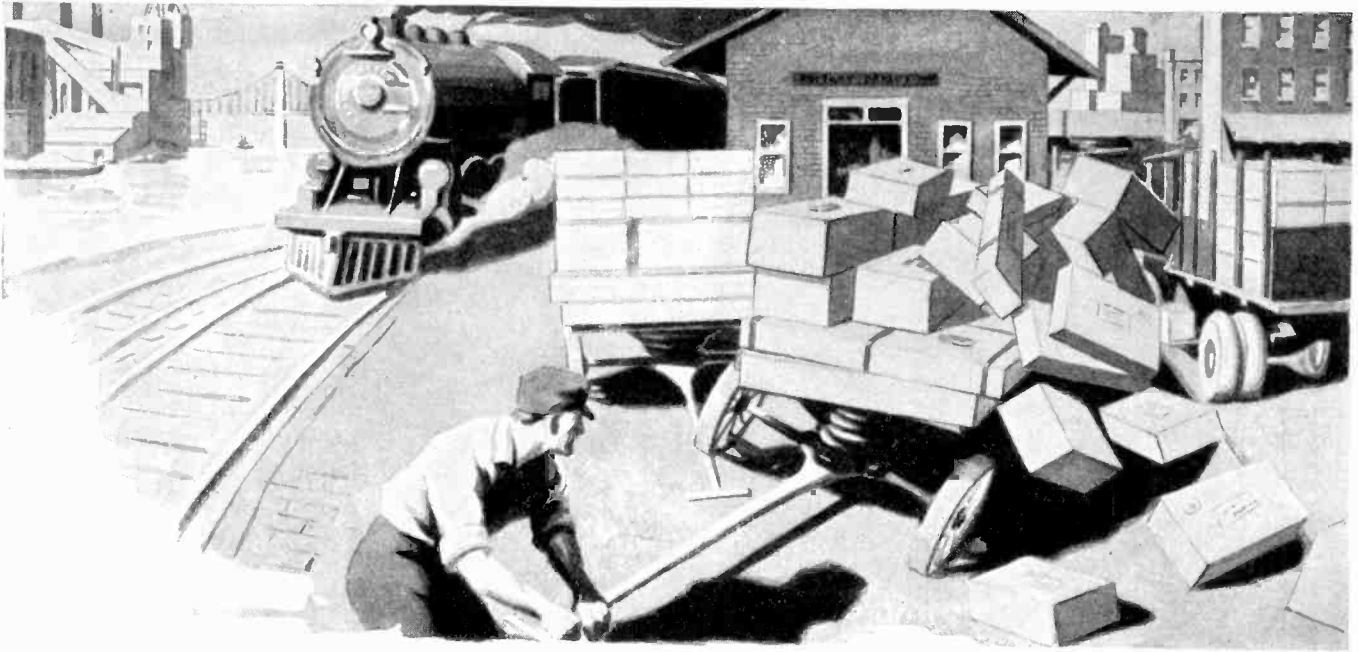
A sincere interest in the problems of the radio manufacturer, and a real desire to render every possible help, have been the motivating forces behind Dudlo progress.

DUDLO MANUFACTURING COMPANY DIVISION
OF
GENERAL CABLE CORPORATION

FORT WAYNE, INDIANA, U.S.A.

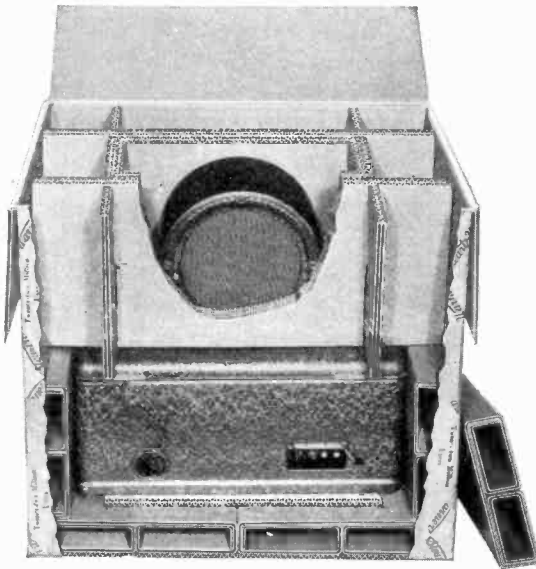


R.M.A. Exhibit, Booth 53 and 54, Section D



Quality Containers Neutralize Abuse

Rough usage during transportation, of which the above illustration is suggestive, is something that you as a shipper must foresee and provide against when you buy your fibreboard shipping boxes. You must buy boxes that have the strength, the backbone, the resistance and the aggressiveness which enable them to deliver your goods, intact, at destination—as your customer would want them delivered. You cannot afford to court trouble with a temperamental customer by shipping in poor quality boxes that do not stand up under abuse.



How a delicate radio can be packed and shipped in a corrugated fibreboard box. Note double wall reinforcements for protection

If you use corrugated fibreboard boxes, our high cushion corrugations will be found effective in neutralizing transportation abuses because they run 36 to the foot with $\frac{3}{16}$ of an inch between the heavy liners, giving a board caliper of practically $\frac{1}{4}$ inch over all—an unusually strong, tough board, which meets every railroad requirement.

These high corrugations have become extremely popular wherever our corrugated products are used in hundreds of our biggest industries because they are always dependable in protecting shipments, incidentally reducing troubles with carriers and customers, and demonstrating their lower final cost.

On a par with our corrugated quality our solid fibre products are extensively used and in demand by industrial fields.

Give our fibreboard containers a fair, square trial. You will find that they are always dependable, high quality boxes, lowest in cost in the long run, that stand up strong and aggressive in the defense of your goods under punishing conditions in transit. When you write refer to Dept. 18 for quick service.

CONTAINER CORPORATION OF AMERICA

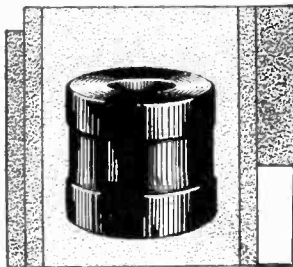
Mid-West Box Company Sefton Container Corporation

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Capacity ♦ 1300 Tons Per Day



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Say You Saw It in Radio Industries



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USERS of dynamic speakers will find that the new INCA field coil supersedes the achievements of the past. It is a better coil, containing many departures from the conventional. The insulating sheath *completely seals the coil*. This affords mechanical and electrical protection to the winding—and *creates as near a moisture and water-proof coil as it is possible to make*. Still another appreciated innovation is the ingenious arrangement of the terminals, permitting the furnishing of these coils *with or without external leads*. The new INCA product is a marked improvement in the coil art, contributing to the economy and efficiency of dynamic speaker production. Samples of this coil, wound to your own specifications, will be gladly furnished without obligation.



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Inca engineers will be glad to confer with you on any of your copper wire or coil problems

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Division of NATIONAL ELECTRIC PRODUCTS CORPORATION

Say You Saw It in Radio Industries



every move must be fundamentally sound ... today more than ever before

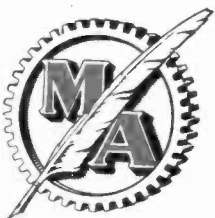
Today's shifting markets and varying demands require a new and undistorted perspective of the advertising viewpoint.

Constructive merchandising must take the place of uncorrelated ventures and unwarranted expenditures. Sporadic attempts must give way to careful planning in which every move is of strategic importance.

That each product and problem require individual treatment is the policy and practice of this organization. We have no sympathy with stereotyped campaigns and "mass production" advertising.

If you have no advertising service now, or if your present connection is in any way unsatisfactory, we believe that an interview should be of benefit to you. Representatives from any of our offices are at your service without obligation.

Campaigns such as those exemplified on pages 67, 70, 71, 81 and the back cover of this issue, reflect the specialized experience of this organization.



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Jefferson at 19th

FORT WAYNE
214 Central
Building

CHICAGO
Engineering Bldg.
205 W. Wacker Drive

DETROIT
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Building

Say You Saw It in Radio Industries

LARGEST EXCLUSIVE MANUFACTURERS OF COILS IN THE U. S.

5 GOOD REASONS WHY EASTON QUALITY COILS ARE *Right* AND *Not Expensive*

- 1. *Materials and Structure*** — All materials used in the manufacture of Easton Quality Coils must meet with the most rigid tests. Easton Coils are either of the multiple paper interlayer type or the random or solid wound type. Easton recommends vacuum treatment, varnish or compound, to render all paper interlayer wound coils moisture proof.
- 2. *Performance, Uniformity and Endurance*** — Easton Coils have a long and impressive record for superlative performance, endurance and uniformity which is proved by continued patronage from outstanding manufacturers who have specified Easton Coils exclusively for years.
- 3. *Manufactured to Exacting Specifications*** — Easton Coils are made to your specifications or to specifications supplied you by our long experienced engineering department to meet your individual requirements.
- 4. *Economy*** — The Easton multiple paper interlayer coil assures uniform layer winding at a minimum cost. All types of Easton quality coils are manufactured in a modern plant where reduced costs are passed on to you.
- 5. *Easton Free Engineering Service*** — The Easton Coil Company has gained an outstanding reputation by assisting the engineering and manufacturing divisions of important firms to design coils that qualify to exacting specifications. Send your specifications to Easton. All information and data furnished to our engineering and data department will be held in strict confidence. Samples and quotations promptly furnished.

EASTON COIL COMPANY

EASTON, PA.

P. O. Box 237

LARGEST EXCLUSIVE MANUFACTURERS OF COILS IN THE U. S.

Say You Saw It in Radio Industries



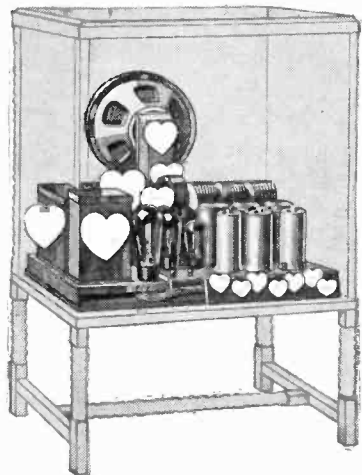
POLYMET PRODUCTS

*The HEART of
Things
Electrical*

determine heart-strength in advance! They can incorporate units, at the birth of equipment, which insure long life, stamina, leadership!

Polymet produces tested essential parts for many successful radio receivers, motors, ignition devices, clocks, telegraph and signal systems —where electricity actuates or controls. Such wide acceptance proves these carefully made Polymet Products are Strong Hearts, too!

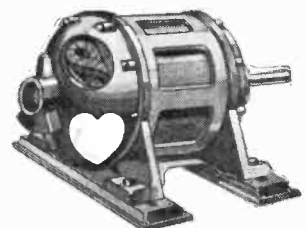
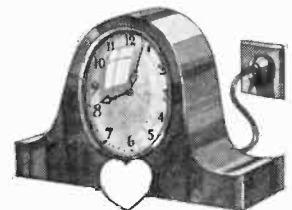
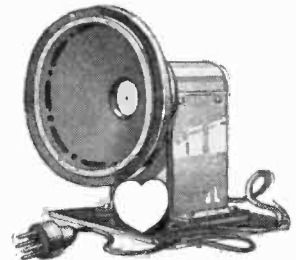
PAPER, MICA, AND
ELECTROLYTIC
CONDENSERS,
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WIRE, RADIO
ESSENTIALS



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Manufacturers parts specifications are solicited for prompt quotation.

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Polymet Manufacturing Corporation
833 E. 134th St.
New York City

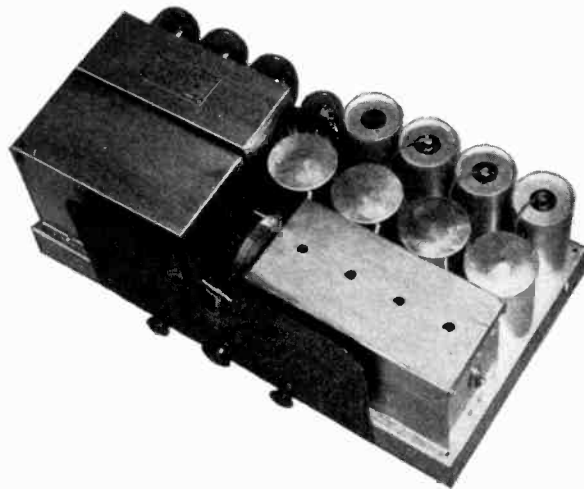
Say You Saw It in Radio Industries

THE OUTSTANDING RADIO CHASSIS FOR 1931

**Keen Competition
means that you
must give
Unusual Values**

*8 Models
To Choose From
8 Tubes
3 Screen Grid
245 Push-Pull
A.C.*

Give your customers the most for their money—Make an excellent profit for yourself. This superior chassis with its well known speaker will enable you to build a big business in radio, for it gives amazingly fine results and can be sold at an attractive price.



The extreme selectivity of this set is immediately noticeable—stations are separated perfectly. The 4 gang condenser assures tuning perfection — shielding is perfect. Its fine appearance, due to excellence of parts, construction and finish, is an important sales factor.

R.C.A. LICENSED

**This Remarkable Private Label 8 Tube Chassis
with Utah Auditorium
DYNAMIC SPEAKER**

\$85⁰⁰
LIST

The sweetness of tone, the power and entire absence of hum in this set are rarely found in any set regardless of price.

A.C. 60 cycle 110 volt. An extra charge for 25 cycle.

Built with long or short shafts, either for use with regular metal panel or without for cabinets drilled. Fully cadmium plated and finished in aluminum or bronze finish.

There is a small die cost for your own Private Brand name.

Be sure to try it. Let us show you. Write to us today for discounts.

Has jack and switch for phonograph pick-up connections. Size—20" long, 10½" deep, 7½" high.

Arrangements
for Cabinets
May Be Made
Through Us
Write and Tell
Us Your
Requirements

VISIT OUR EXHIBIT AT THE RADIO TRADE SHOW SPACE D-40

NATIONAL TRANSFORMER MFG. CO.

205 W. WACKER DRIVE, DEPT. 10

CHICAGO, ILL.

FACTORIES AT NORTH CHICAGO

"The Plant Paper"

Published by
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 Chester A. Darling
 President
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 Secretary-Treasurer

RADIO Industries

**PRODUCTION
 ENGINEERING
 DISTRIBUTION**
 •
**RADIO
 TELEVISION
 SOUND PROJECTION**

With which is incorporated Radio Manufacturers' Monthly

VOLUME V

Contents

NUMBER 2

JUNE, 1930

EDITORIALS	80
THE SHOW IS ON	83
PRACTICAL USES OF THE RADIO TUBE	84
LEE DE FOREST, PH.D.	
THE LOAD OF A POWER TUBE	86
R. R. RAMSEY, PH.D.	
RADIO IN FOREIGN LANDS	90
CHARLES J. HOPKINS	
THE DOUBLE HETERODYNE	93
J. BARTON HOAG, PH.D.	
A NEW DEAL FOR THE DEALER	95
CHESTER A. DARLING	
WHO IS THIS FELLOW HUDDY?	97
FRANKLIN SNOW HUDDY	
A PRODUCTION SIGNAL GENERATOR	98
JOHN W. MILLION, JR.	
FROM RADISHES TO RADIO	100
KENDALL CLOUGH	
A NEW SALES APPEAL	101
GEORGE GRUSKIN	
SPECIALIZATION IN MERCHANDISING RADIO	103
HARRY ALTER	
LOOKING OVER THE EASTERN MANUFACTURERS	104
K. A. HATHAWAY	
THE VALUE OF POLO TO THE RADIO INDUSTRY	106
LETTERS FROM OUR READERS	108
NEWS OF THE INDUSTRY	109
NEW DEVELOPMENTS	114
LIST OF EXHIBITORS AT R.M.A. SHOW	118
RADIO SERVICING	120
H. G. BOYLE	
ASSOCIATION NEWS	121
TURNING THE DIAL	123
FRANK ROMER	
WEST OF THE ROCKIES	124
RALPH L. POWER PH.D.	

MONTHLY CHATS

The significance of the Atlantic City Trade Show and its anticipated effect upon the Industry is very ably put in an editorial appearing in the current issue of *The R.M.A. News*. "Men of the Radio Industry are going to come to Atlantic City this year to do more than see the displays, more than discuss personalities and the past; they are coming to learn at first hand what to expect in the future," reads this editorial.

Continuing we learn that "the Forum spirit will prevail to a greater extent, and certainly in a more organized degree than characterized previous conclaves.

"Individualism has been taught its lesson. From now on the prosperity of individuals in radio is going to be governed by their ability to work with and for the group.

"The men assembled in the interest of radio at Atlantic City are going to write into the records of the industry more that will be used as a guide and a plumb in the months and even the years to come than can be predicted in advance."

The R.M.A. and other radio trade associations have done much toward stabilizing the industry. Because of the ever increasing cooperation shown by individual members, the work of each association has been showing definite and worth while progress.

We believe every word of the editorial quoted and predict much success to result from discussions of the various problems to come before the conventions.

The staff of *Radio Industries* will be very happy to greet its many friends and extends a cordial invitation to everybody to visit them at Booth B 57.

RADIO INDUSTRIES

520 North Michigan Ave.
 CHICAGO, ILL.
 PHONE WHITEHALL 4840

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GEORGE GRUSKIN	Managing Editor
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 NEW YORK CITY—Pennsylvania 1589

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 Forms for July issue close June 20th.

CHANGE OF ADDRESS. Instructions for change of address should be sent to the publisher at least two weeks before the date of effect.



In Support of Your Priceless Asset— GOOD WILL!

YOU have built good will by building good cabinets. In doing this you have set a standard of construction and finishing in keeping with the type of stock you produce. In maintaining that standard, you strive to avoid the use of inferior material or workmanship—you insist upon specifications you know to be correct.

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HDE standards for hardwood dimension have earned for it, a gratifying preference. In creating these standards, one of the important factors has been, and is, the attitude of our own workmen—their pride in the product bearing our trade-mark—the skilled intelligence they contribute to the practice of our tested methods of manufacture, air and kiln drying, and re-working to specifications.

Here then is hardwood dimension upon which you may depend to maintain your own highest standards, confident that it will meet to the letter—and in spirit—the specifications upon which you rely to retain and enhance the good will of your trade.

Hillyer Deutsch Edwards, Inc.
Oakdale Hardwoods—Pine Louisiana

Branch Offices: DETROIT, 7-252 General Motors Bldg. CHICAGO, 223 Railway Exchange Bldg.
HIGH POINT, N. C., P. O. Box 700, 908 Johnson St.

In Charge of Export Sales
AMERICAN PITCH PINE EXPORT CO., New Orleans, La.

EDITORIALS

Several large radio set manufacturers are promising to gear their production to the demand this coming season. That listens good—if true. The evils of over-production, with the accompanying wild dumping and slashed prices, are too well-known to require reiteration at this time.

PRODUCTION GEARED TO DEMAND

For years past, *Radio Industries* has advocated regulated production. It has pointed out that it is possible to determine how many radio sets the market can absorb at the beginning of the season, and, once having determined that total, to get the various manufacturers to agree more or less to a sensible division of that market. In the past, however, no market figures have been available. So-called figures have been fantastic guesses. And even with the fantastic guesses to go by, practically each and every manufacturer has insisted on making all the receivers he could possibly turn out, even working two and three shifts a day.

Well, the recent business depression has its blessings. For one thing, it has made many of us stop, look and listen. It has brought sanity into the radio industry—a really delightful novelty. This season we are promised production geared to demand. If manufacturers go through with that program, we are going to see some healthy profits earned despite so-called “hard times.”



As a logical off-shoot of the avowed policy of gearing production to demand, several radio set manufacturers have announced new side lines. There are variations of the usual radio sets, such as centralized radio equipment. There are photo-cell devices for industrial applications. There are home movie outfits including synchronized sound equipment. And now there are several products quite afield from radio, such as electrical refrigerators. Certain radio set manufacturers have already announced electrical refrigerators which set new low price standards in that field, and promise to keep the factories busy with such side-line production.

There is sound logic behind the move towards side lines. Many radio set plants are certainly capable of far greater radio production than is warranted today. Therefore, rather than over-produce as in the past, or waste room and equipment, the manufacturers are turning to lines other than radio.



By this late date many manufacturers have learned something about dealers from Missouri. It seems that every dealer called on these days, is exceedingly hard-boiled with regard to taking on any radio line. The dealers are listening to the promises, but there is ob-

viously plenty of doubt in their minds as to the advisability of taking on any radio line which has failed to stand by them during the past season.

And why not? After all, the manufacturer, heretofore, has been in position to dump the balance of his production at the end of the season, with little trouble. Meanwhile, the dealer has been left with some similar merchandise on hand, facing a veritable bombardment of indignant protests from his customers. Those who bought at original prices, have been angered. Those ready to buy, have refused to pay higher prices than the ones asked by purveyors of junked radio goods. The dealer has had plenty of grief. And, like the elephant, he is developing a long memory.

You are going to have a tough job lining up dealers. But there is one compensating feature: those dealers you do line up are worth while dealers, who intend to remain in business. They want to handle good merchandise. They want to handle merchandise that's profitable. They want to make money, create good will, and build a bigger business—and that goes for you as well as for themselves. Those Missouri dealers are worth fighting for!



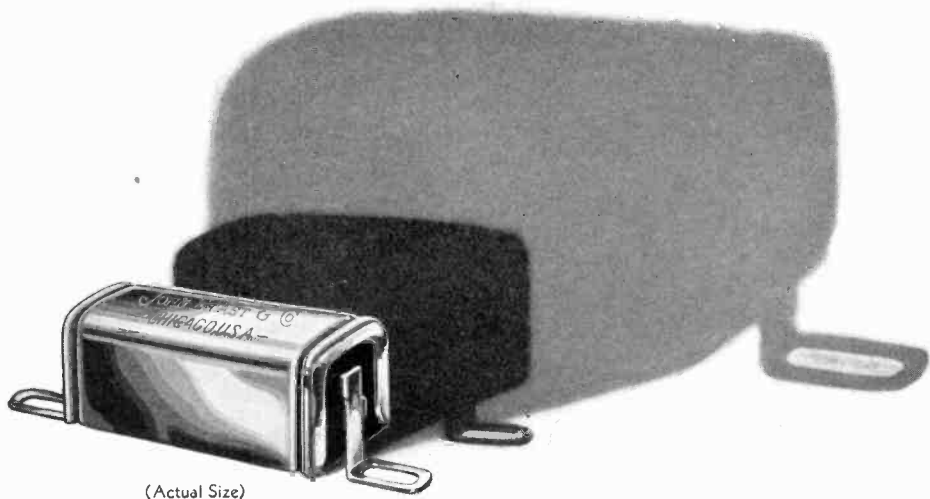
The radio business—is it really as bad as many of us seem to think? Actually, and very much to our surprise, we learn that last year's business exceeded the two previous years by at least 25 per cent, according to the best estimates now available. The year 1929 was an exceptional year in most lines, truly abnormal, with big business piling up sales and production and credits at a fantastic pace. Indeed, it was very much of an inverted pyramid proposition, and those on the “inside,” holding the financial bag, were truly wondering when the entire structure would topple over. The sale of stock here and there served to keep the pyramid right-side up for a long while, but the crash had to come—and did.

This year, so far, is about on a level with 1928, which was a good healthy business year. Things are opening up. As these lines are written—in the middle of May—various big production schedules are just about getting under way. The shell-shocked industry appears to be getting its senses together and is ready for another advance, perhaps more cautious, due to recent experiences, but none the less full of pep and bound somewhere.

But by all means, let's cut out the pessimism. We can do more harm to this industry of ours by discussing how terrible conditions are, than by any other means. A group of men talking about “hard times” are certain to create harder times. Pessimism is death to good business. Let's be optimistic. Things are not so bad after all.

BUSINESS IS NOT SO BAD

DEALERS FROM MISSOURI



(Actual Size)

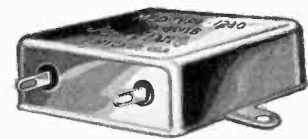
Radio's newest **condenser**

**BUILT TO CARRY A
HEAVY RESPONSIBILITY**

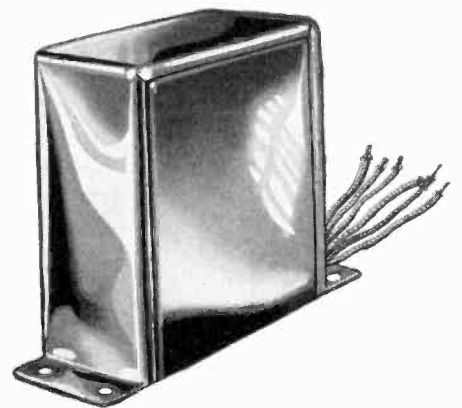
One of the smallest condensers in Radio . . . yet ready and able to assume the responsibility which its correct functioning means to the modern receiving set. Its compactness and exceptional neatness are an interesting development of condenser design. Like all other Fast condensers, it is impervious to moisture and shares the same reputation for unfaltering performance.

Considering the small cost involved, any compromise with quality is but false economy. For the condenser is one of the few units in radio that has to be perfect.

SAMPLES GLADLY FURNISHED
WITHOUT OBLIGATION



(Half actual size)



See the Fast Exhibit at the R. M. A. Show . . . Booth 26, Section A



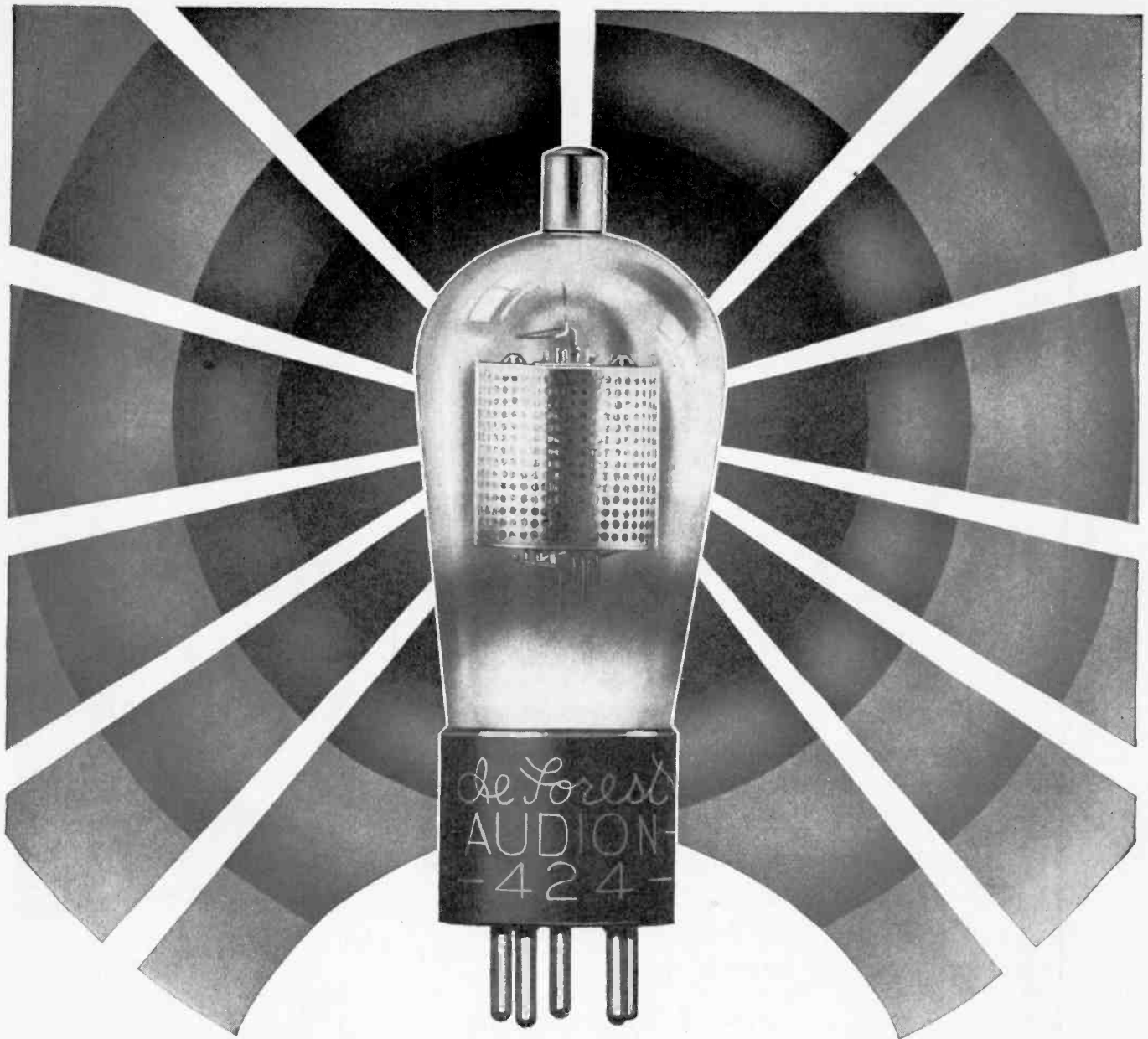
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Visit the De Forest Exhibit at Booths B3 and B4 at the 4th Annual R. M. A. Trade Show—Atlantic City Auditorium, June 2nd to 6th. Everybody of importance in radio will be there.

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PRODUCTION
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RADIO Industries

RADIO
TELEVISION
SOUND PROJECTION

With which is incorporated Radio Manufacturers' Monthly

THE SHOW IS ON

**Ambitious Five Day Program Arranged for R.M.A.
and Other Radio Associations—Something
Doing Every Minute**

AS this issue of *Radio Industries* is being delivered by the postman to readers throughout the United States and Canada, the 4th Annual Trade Show and the 6th Annual Convention of the Radio Manufacturers Association open in Atlantic City. All through the year and especially during the past few months, the Industry has waited eagerly for this event. Much should be accomplished toward the stabilization of the Industry and it is felt that, in bringing the producers and sellers of radio together at this time, new policies, better understandings and closer relationships will result.

From all indications the attendance, this year, points to a record. Atlantic City officials have cooperated generously with R.M.A. officials toward insuring everyone a "hot" time. "The play ground of America" welcomes a young, but gigantic industry.

A Condensed Program for the Five Days Follows:

Monday

- 10:00 A. M.—Registration of R.M.A. Delegates, Dealers, and Jobbers in the left entrance lobby of Auditorium.
11:00 A. M.—Open meeting N.F.R.A. and R.W.A. Auditorium.
1:00 P. M.—Trade Show opens. Closes 10:00 P. M.

Tuesday

- 10:00 A. M.—Meeting of Institute of Radio Engineers. Dr. Lee de Forest presiding. Auditorium.
1:00 P. M.—Trade Show opens. Closes 10:00 P. M.
8:00 P. M.—Radio Club of America meeting. Auditorium.

Wednesday

- 10:00 A. M.—R.M.A. closed Membership meeting. Auditorium.
10:00 A. M.—Open meeting of R.W.A. Auditorium.
10:30 A. M.—N.A.B. Directors Meeting. Auditorium.
10:30 A. M.—National Newspapers Radio Editors Association meeting. Auditorium.
1:00 P. M.—Trade Show opens. Closes at 5 P. M. because of Annual R.M.A. Banquet.
2:00 P. M.—Meeting of Radio Press Association. Auditorium.
2:00 P. M.—Radio Research Foundation meeting. Auditorium.
7:00 P. M.—R.M.A. Banquet in Grand Ballroom of Auditorium by Louis Sherry, Inc. Entertainment features under direction of B. G. Erskine, Chairman of Convention Committee.

Thursday

- 10:00 A. M.—R.M.A. closed Membership meeting. Auditorium.
1:00 P. M.—Trade Show opens. Closes 10:00 P. M.
2:00 P. M.—Meeting of Radio Press Association. Auditorium.

Friday

- 12:30 P. M.—Joint luncheon meeting boards of directors of R.M.A., N.F.R.A., R.W.A., N.A.B., I.R.E.
1:00 P. M.—Trade Show opens. Closes 6 P. M.

Get the complete Program at Registration Information Desk. Auditorium.



Above, H. B. Richmond, President of the Radio Manufacturers Association

Below, G. Clayton Irwin, Jr., Show Manager, in charge of all the details



PRACTICAL Uses of the RADIO TUBE

Enumerating the Audion's Industrial Applications and Commenting Upon the Problems Encountered in the Development of Home-Talkies

By LEE DE FOREST, PH. D.

Vice-president, De Forest Radio Company

FOLLOWING the development of the amplifier tube for long-distance telephony and the public address system, it was logical that it should next be applied to solve the problems of the Talking Picture. And indeed the Talking Picture is the outgrowth, the child of Radio. Without the technical advances which the Radio Broadcast has brought about, the Talking Picture would still remain where it was for so many years prior to 1922—a mere curiosity, a laboratory experiment.

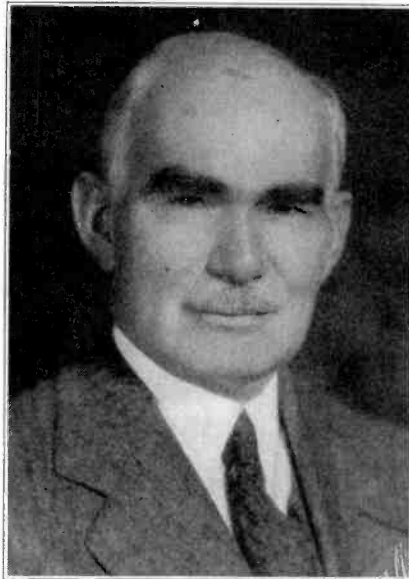
Other devices which were developed for the Radio Broadcast have also been adopted, taken bodily over into the Studio of the Talking Picture. For example, the microphone used in broadcasting stations is identical with that employed as a "pick-up" in the Talking Picture Studio. You do not see the microphone in the Motion Picture as thrown on the screen, but it was there when the picture was made, none the less, just outside the line of vision of the Camera.

IN addition to the Broadcast microphone, the Talking Picture engineer has borrowed from the Radio Broadcasting Studio the large and powerful amplifier, has in fact taken this over almost without change. The purpose of this amplifier is to increase the very weak telephone currents from the microphone until they are sufficiently powerful to operate the sound-recording apparatus. If the sound is to be recorded on a phonograph record, as in Vitaphone pictures, the recording apparatus is a sapphire needle, or cutter, which is made to cut the sound record in the wax disc. If, on the other hand, the sound is to be recorded photographically upon the film, the sound-recording apparatus consists of a special type of lamp, whose light is made to fluctuate in accordance with the amplified telephone currents.

Now let us consider the Talking Picture Theatre. There in the projection booth one also finds equipment based on the engineering principles of Radio. The amplifier takes the very weak telephone currents from the "pick-up" device (which responds to the sound-record on the disc or on the film) and amplifies these weak currents until they are powerful enough to actuate the large loud-

speakers, which are located behind the theatre screen. The Talking Picture, however, is just one of a great

number of industrial applications of the Radio tube outside of Radio itself. In the field of wire communication, the Radio tube has numerous applications. That of long-distance telephony I have already mentioned. There is today no long-distance telephone circuit in the world where from one to a dozen telephone-repeater stations, using this three-electrode audion amplifier, are not installed. These repeater stations are located along the line every hundred miles or less. Their function is to boost or amplify the voice currents which otherwise would become so weakened, or attenuated, as to be quite inaudible or unintelligible. By means of these amplifiers it is easy to talk from Chicago to Havana, Cuba, and to speak no louder than if one were telephoning to Evanston. The amplifier has become to electric current and to the human ear what the microscope is to light, and the human eye.



Dr. De Forest as he appears today. At present, he is engaged in the difficult task of designing a 16 m.m. film for talking-pictures. The obstacles he is faced with are described in the latter part of the accompanying article

IN addition to its inestimable value for ordinary long-distance telephone connections, the Radio tube makes possible carrier-current telephony, and telegraphy, over telephone lines, and also over power-transmission lines. By this I mean that it is now possible to transmit many simultaneous telephone or telegraph messages over the same wire without any conflict or confusion. You will at once recognize what must be the future value of this application to the Telephone and the Power Transmission Companies. And right in this connection I wish to prophesy that before many years are passed you will be able to receive radio-broadcast programs in your home by means of the electric light wires instead of, as at present, through the air alone. This will enable us all to escape the annoying disturbances and interruptions from static or atmospheric electricity, or from numerous other causes.

AND later on (I dare not say how much later for I am sure no one today has any idea *when*) we will receive *Television pictures*, entertainment, etc., over the electric-light wires, or over the telephone wires. For the next few years, however, Television will be entirely by radio.

There is another marvelous new development which has at last been realized, *Television*, made possible entirely by means of the Radio tube. Even now if one resides within 50 miles of a good Television Radio Transmitter Station, like the Jenkins Transmitter at Jersey City, or the ones at Pittsburgh or Chicago, he can receive every night very good pictures transmitted by Radio. The Jenkins station actually transmits both the picture and the voice of the speaker. Usually these are transmitted from a talking motion picture film which is reeled off at the transmitter and received by radio in a small "shadow-box" in the home. Very rapid progress is being made by countless Radio engineers hard at work on Television problems. And the era of Radio Vision (as it is sometimes called) is not far away. Today Television is about where Radio Broadcast was in 1922. But its progress will be rapid from now on, just as was that of the Broadcast industry after that date, because many of the problems which had to be solved for the Radio Broadcast are already solved for Television. Many of the principles involved are the same for both — radio-frequency amplification, antenna structures, band-pass tuners, modulation, detection, etc.

Television, however, necessarily presents many peculiar problems of its own, exceedingly intricate and difficult of solution. For example, scanning the image at both transmitter and receiver, accurate and simple synchronism, proper illumination of the object at the transmitter and of the image of the receiver, etc.

ALTHOUGH Radio Vision is really "just around the corner," is in fact a reality today, and will be in thousands of homes by next Christmas—still the Television of our dreams, the large, brightly illuminated picture on a screen at home reproducing in all fidelity of detail, expression, and motion some charming distant scene—some out-of-door spectacle, some theatre presentation—such is a long time away, and when this comes into homes it will be by way of the wires and not by radio.

The technical reasons for this are too many and too involved for me to discuss at this time.

But many other industrial applications of the Radio tube may be briefly mentioned: For example—the elevator companies are now using this oscillating radio tube

for elevator control, for automatically leveling the elevator car at floors.

In combination with the "electric eye" or photoelectric tube, of which you hear so much just now, the Radio tube amplifier serves as a smoke-indicator in plant stacks, also to turn on lights in schools or factories when daylight fades, or a cloud hides the sun, and to turn them off again when the daylight brightens outside.

THE tube amplifier is used with extremely sensitive microphones for listening to stresses and strains in materials and in manufactured products. Also, for surgeons and physicians, in the diagnosis of heart murmurs by comparison with existing standard phonograph records. Also, for the surgeon's cold cauterizing knife.

The Radio tube is used in Railway Signals; for traffic control; for remote control of torpedo boats, airplanes, etc. For radio compasses, radio beacons, in landing systems for airplanes in time of fog, and for blind-flying, and to determine the altitude from the ground. In ship navigation for location of channels, and for fog signalling.

In Medicine, the high-power high-frequency tube oscillator is becoming invaluable for body-tempera-

ture control, for "electric fever"; or fevers in the blood artificially produced and exactly controlled to eliminate special disease germs.

In Physics, the tube is used as a voltmeter of extraordinary sensitiveness and to measure minute electrical currents down to the millionth of a billionth part of an ampere.

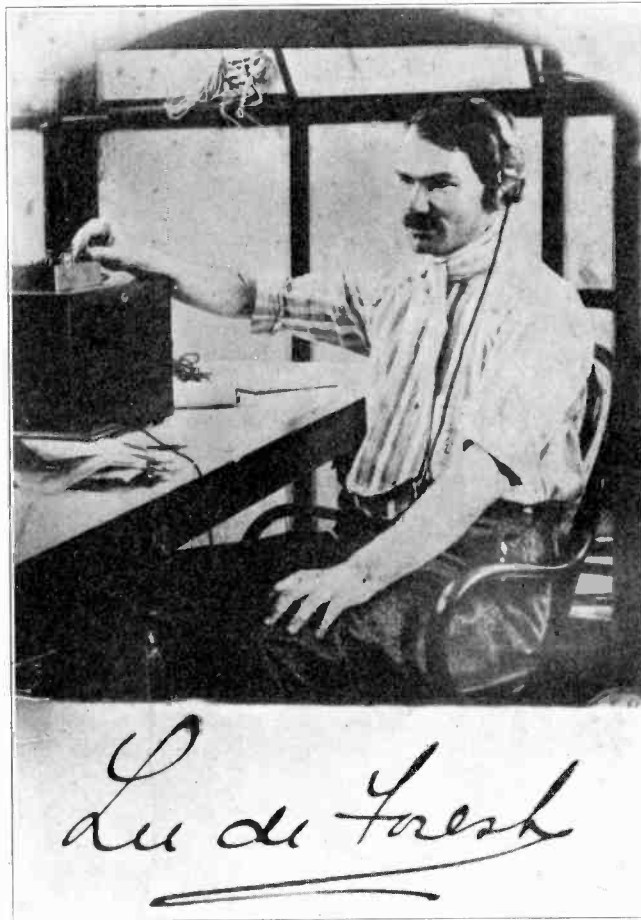
In Astronomy, for the measurement of the light and heat of distant stars; and for mechanical measurement, to the one-hundred-millionth of an inch.

SO astonishingly accurate are the measurements which are now made possible by the audion tube that if an ordinary house-fly alights on the end of a three-inch plank a few feet long the amount of deflection thus caused can be exactly determined!

In Chemistry, the tube is continually finding new and useful applications.

In Mining and Metallurgy, the Radio tube now serves as a detector for locating mineral and oil deposits. Also,

(Please turn to page 133)



The "Father of Radio"—from an autographed photo taken several years before he actually came into his "Parenthood." The above picture is dated 1902, four years prior to his epoch-making development of the three-electrode tube. Notice the striped shirt, collar and tie to match

The LOAD of a

Should It Be One or Two Times the Resistance of the Tube?

IN the construction of ordinary circuits such as power lines containing lamps, motors, and other electrical machinery, the object in the mind of the engineer is efficiency. The purpose is to deliver as much as possible of the energy generated at the power station to the point of consumption. Efficiency may be defined as the output divided by the input. To get a high efficiency the losses in generator and lines must be kept as small as possible.

Although there is an endeavor to keep the wave form that of a sine curve, wave form or distortion does not enter into the problem of the efficiency engineer. Since any number of sine waves of a certain frequency will combine into a sine wave of the same frequency, reflections, or distortion due to reflection, is not considered.

In modern radio circuits the problem is different. Efficiency is lost sight of in the endeavor to get quality transmission or transmission without distortion. The power engineer is concerned with one frequency only, 60 cycle say, while the radio engineer is concerned with frequencies from perhaps 30 to 10,000 cycles in the audio band of frequencies. He tries to amplify all frequencies in the audio band the same amount so that the complicated wave form of the voice or of a musical instrument as found in the amplifier output will be a magnified exact reproduction of the wave form of the voice or instrument as found in the input. The input is usually construed to mean the wave form of a sound as

found in the air or in the musical instrument itself, instead of the wave form of the current as found in the microphone or the detector tube circuit. Under this definition of wave form, the radio engineer is concerned with radio circuits as well as audio circuits.

In this discussion, audio circuits alone will be considered. We start with this definition: a perfect audio amplifier is one in which the wave form of the current in the plate circuit of the last or power tube is an exact reproduction of the wave form of the E.M.F. delivered to the grid circuit of the first tube. With the radio engineer the ultimate goal is fidelity or exact reproduction of wave form instead of efficiency. The radio engineer is ready to sacrifice efficiency and almost any thing else if he can get exact amplification of the original wave form.

IT is commonly understood among radio men that the input and output impedance should be equal. This is the condition for maximum output of a machine. It seems that this is nothing more than the old problem of connecting a battery of a number of cells in such a way as to get the maximum current through a given fixed resistance or load. The solution of this problem is to connect the cells in multiple series in such a manner that the internal resistance of the battery is equal to the given external resistance. This condition gives the condition of maximum output but the efficiency is 50 per cent. One half of the energy is used in heating the battery. This same condition for maximum output holds with an ordinary electric generator. However, as generators are constructed today the machine will burn up under such a load. An efficiency of 50 per cent is not tolerated and machines are designed for a much higher efficiency when the load is the "maximum safe load."

In radio circuits it happens that one of the conditions for no distortion is that the input and output impedance must be equal. This also happens to be the condition for maximum output. Since this is true it seems that many radio engineers have confused no distortion with maximum output. Perhaps if the question were asked why the input and output impedances are made equal a large per cent of those answering would say the reason is to get maximum output. As stated before, the radio engineer is ready to sacrifice efficiency, maximum output, and almost anything else to get amplification without distortion.

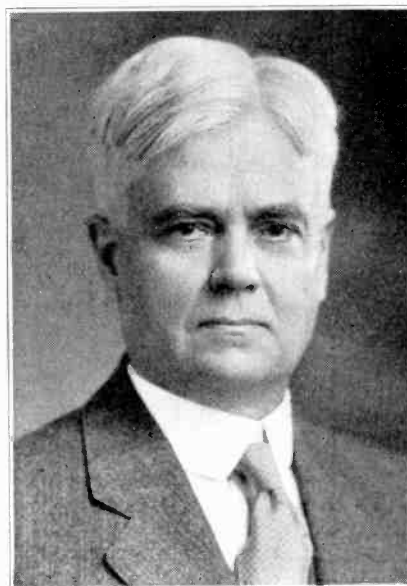
IT might be well to consider the definition of distortion and the cause of distortion. Distortion is any change of wave form due to any cause whatever. If a wave of certain form combines with another wave of different form the form of the resultant wave is changed. In an auditorium, reflections from the walls of the room often cause distortion of the wave-form to the point that it is difficult for one to understand the speaker. In this case distortion is caused by the fact that the speaker makes

From "Who's Who" we gather the following information relative to Dr. Ramsey's past activities: Ramsey, Rolla Roy, Indiana University; res., Bloomington, Ind.; Professor of Physics; b. Morning Sun, O., Apr. 11, 1872; ed. Country Schools Preble Co. Ohio; High S. Oxford, O.; Miami Univ.; Ind. Univ.; A.B. 1895, A.M. 1898; Scholar, Clark Univ. 1899; Cornell Univ. Ph. D. 1901; Sigma Xi, Phi Beta Kappa; Instructor, High School, 1895-96; Ind. Univ. 1896-97; Cornell Univ. 1899; Univ. of Mo., 1901-03; Asst. Prof., Ind. Univ. 1903-06; Assoc. Prof. Ind. Univ. 1906-19; Chief Instructor, U. S. School for Radio Electricians (Ind. Univ.) 1918; Prof. of Physics, 1919 to date; Model of the Atom, Mfg. by Welch Scientific Co., Chicago; Author "Experimental Radio", first ed. 1922, third ed. 1923; "Fundamentals of Radio" 1929, Fifty articles in "The Physical Review", "Philosophical Magazine", "Am. Jour. Sci.", "Science", "Ind. Acad. Sci.", "Wireless Age", "Q S T", "Proc. Inst. Rad. Eng."; Bureau of Standards Specialist in Radio-activity of Waters; Fellow, Am. Phys. Soc.; Fellow, (President at present) Indiana Academy of Science; Member, Inst. Rad. Eng.

POWER TUBE

By R. R. RAMSEY, PH.D.

Professor of Physics, Indiana University



certain sounds and these sounds or waves combine with certain other sounds which the speaker made at a previous time and which are reflected to the ear by the walls. This combination of sounds does not sound like either sound. The waves of a certain frequency combine with waves of another frequency and produce complicated wave forms.

In electrical circuits we may have the same effect. We may have distortion due to reflections. All electrical circuits may be considered to be made of a chain of circuits having one or more links in the chain.

IN Figure 1 we have a chain of four circuits which are connected or coupled together in various ways. The circuits are coupled beginning at the left and proceeding to the right by transformer coupling, M; resistance coupling, R; capacitance coupling, C; and inductance coupling, L. Certain links may have resistance, inductance, and capacity in the link. Certain links may have resistance alone, others may have inductance alone, and others may have capacity alone.

In such a chain of circuits as in Figure 1, as a usual thing, there will be reflections. If the generator, which may be an amplifying tube, gives off a certain frequency, this frequency may combine with another wave or frequency which was generated at an earlier time and which traveled down the chain of circuits to some junction and there has been reflected and has traveled back to the generator and reflected again in time to unite with the wave which the generator is giving off. The resultant wave will be distorted to a different form than the wave which the generator is emitting and the result is distortion, exactly like that in an auditorium plastered with hard plaster.

We shall not develop the theory farther but suffice it to say that in order to prevent these reflections the input and output impedance of each and every link in the chain must be equal. This condition as mentioned before happens to be the condition for maximum output.

TO explain the phenomena we shall use an analogy of waves on a stretched rope. If we have a long rope stretched between two posts and if we strike the rope at one end a sharp blow we will cause an indentation or trough. This trough will not remain at the end but will travel with a definite velocity. The velocity depends on the size of the rope and the tension with which it is stretched. The trough can be seen to travel to the far end and there to be reflected and return to the first end and there to be reflected again. This disturbance can be seen to travel back and forth on the rope several times. It will be noticed that the indentation or trough will be reflected as a hump or as a crest from the far post and that the crest will be reflected as a trough at the near post.

If instead of hitting the rope only once we hit it several times, the hitting being timed to a definite frequency, two times per second say, we have waves of frequency two. If, before the first disturbance has had time to be reflected back, we change the frequency of the hitting to three times per second, we are now sending

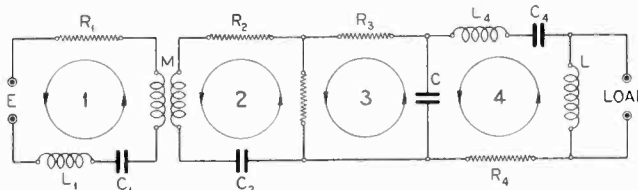


Figure 1. Chain of circuits. Each link contains either resistance, inductance, or capacitance. Usually each link has all three at the same time. The input and output impedance of each link should be the same. The links may be coupled by transformer coupling, resistance coupling, capacitance coupling or inductance coupling

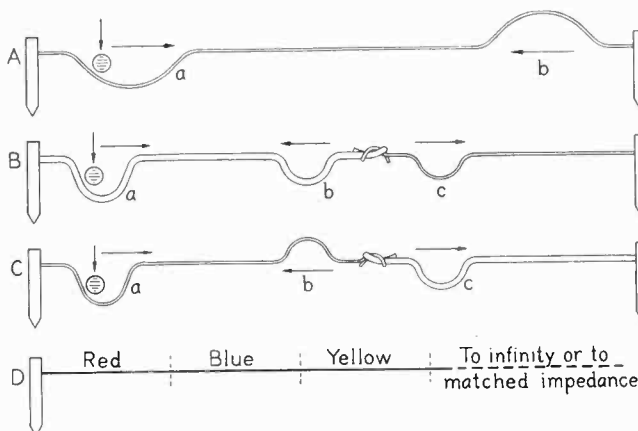


Figure 2. A, represents a stretched rope; a trough travels to the far end and is reflected as a crest. B, represents a heavy rope tied to a light rope; a trough travels to the Junction and is reflected as a trough; a trough is transmitted by the light rope. C, represents a light rope tied to a heavy rope; a trough is reflected as a crest; a trough is transmitted by the heavy rope. D, represents several sections of rope of the same structure; there are no reflections at the Junctions; the input and output impedances are equal

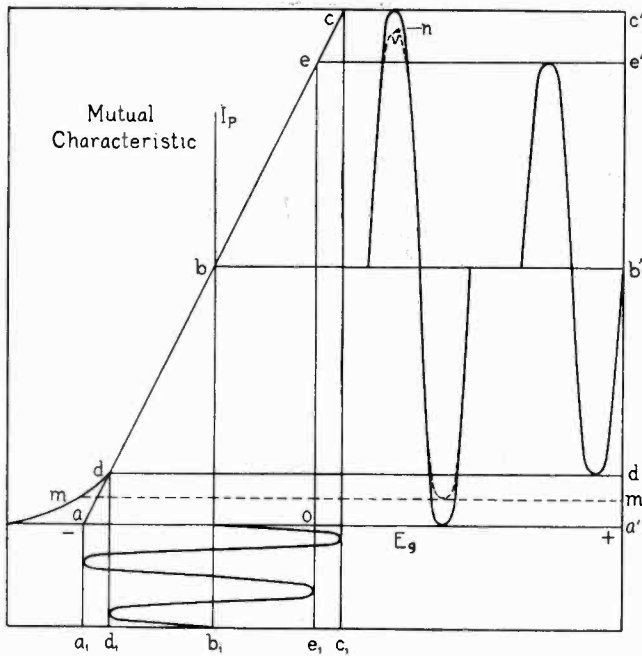


Figure 3. If the characteristic curve is a straight line there is amplification without distortion. If there is curvature or if the grid draws current there is distortion. Distortion introduces overtones. Distortion due to curvature or grid current is independent of load resistance

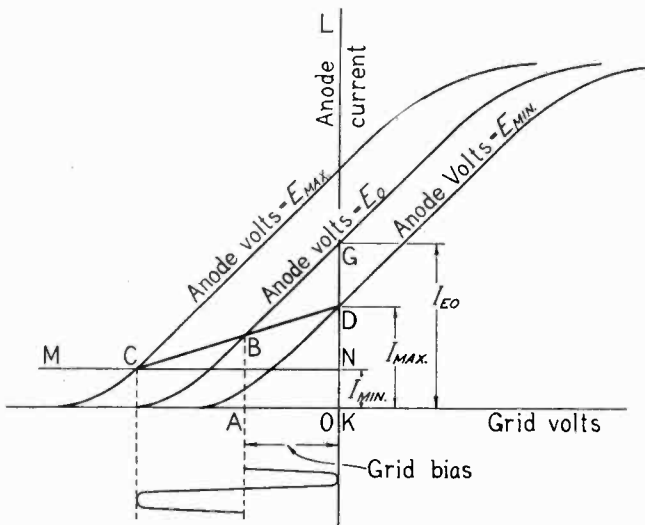


Figure 4. Reproduced from a photograph of a drawing from W. J. Brown's paper, Proceedings of the Physical Society of London. The curves are assumed to be straight parallel lines except near the foot of the characteristic

toward the far end of the rope waves of frequency three. If, while we are striking the rope at the rate of three times per second, the first disturbance has had time to be reflected from the far post and again reflected from the near post we will have waves of two frequencies running together. These waves combine and the combination will not be a simple frequency but a complicated frequency. If it is necessary to send a wave of simple frequency three a short time after the wave of frequency two has been generated it will be necessary to arrange some device which will absorb all of the energy of the first frequency so there will be no energy to be reflected back.

If, instead of tying the rope to a post at the far end, we tie it to another rope we shall find that there are reflections from the junction of the two ropes. If the rope is a lighter rope we shall find that troughs are reflected as troughs and crests are reflected as crests from the junction. If the rope is a heavier rope we shall find that the reflection from the junction of the two ropes is much the same as that from a post. Troughs are reflected as crests and crests are reflected as troughs. There will be a certain amount of the disturbance transmitted but there always will be some reflection from the junction if the ropes are of different weight. If the rope has the same weight and structure as the first rope or in other words if the rope is a piece of the original rope there will be no reflection at the junction and all the energy of the first rope will be absorbed by the second rope. Since the ropes are exactly the same, we may say the impedances of the two ropes are the same—or that the output impedance of the first rope is equal to the input impedance of the second rope.

If the rope is the same size throughout and has an infinite length, there will be no reflection, since the wave never hits a junction and never reaches the far end. If the rope can be tied to some sort of junction which moves in a viscous fluid, such as heavy oil, and the viscosity of the oil changed so that the end of the rope moves exactly like it did when it were joined to the section of infinite length, then all the energy which is transmitted by the rope is dissipated by the oil viscosity or friction and there will be no energy left to be reflected. Then we can say the output resistance is equal to the input impedance. If the oil is too heavy, the reflection is like the reflection from a post. If too light, the reflection is like that from a light rope.

If we wish to make the analogy between the rope and a balanced chain of electrical circuits, we may make the rope into several sections by covering the first section red, the second blue, and the third yellow—as in figure 2—making as many sections or links as we please; then, since the input and output impedances of all sections are the same, there will be no reflections.

In our chain of electrical circuits it can be shown that reflections can be avoided if we make the input and output impedances equal or if they are matched. In the case of two sections coupled by a transformer, unequal impedances can be matched if the ratio of the impedances are equal to the square of the ratio of the turns of wire in the transformer coils. By means of a transformer a low impedance dynamic speaker in the secondary can be made to match or act like a high impedance in the primary circuit. In telephone transmission care is exercised to see that impedances are matched throughout the line. In radio circuits the practice should prevail if quality transmission is wished.

Tube Distortion

If a tube is overloaded or if the plate voltage and grid bias are not adjusted properly the tube may cause distortion. If we assume the mutual characteristic *abc*, Figure 3, is a straight line and if the grid potential varies between the limits *aa₁* and *cc₁*, and is a sine curve about the line *bb₁*, then the plate current will vary between the limits *aa₁* and *cc₁* about the line *bb₁* and will be a true

sine curve, the exact duplicate of the grid potential curve. But since the foot of the characteristic bends at m the current curve will be limited by the line mm^1 and the sine curve will be distorted into the dotted portion at m^1 .

Since the grid swings to positive potentials from the line ee_1 (which is assumed to be "zero" potential) to the line cc_1 there will be grid current flowing in the grid circuit while the grid is positive and this will cause an "IR" drop in potential causing the upper portion of the curve to be distorted at n . This distortion in the current curve can be duplicated by combining with the sine curve other sine curves with higher frequencies. Conversely this distortion will introduce higher frequencies or harmonics into the circuit.

IF the grid swing is limited by the line dd_1 and by the line ee_1 such that there will be no grid current then there will be no distortion, since the characteristic curve is a straight line between these points. The normal or average value of the grid potential is held at bb_1 by means of a negative C battery. As long as the grid swing is not greater than these last limits there will be no distortion. If the grid potential swings more than these limits the tube is "over loaded" and distortion will be produced. The characteristic curve is supposed to be the characteristic curve of the tube when loaded with its "load" resistance. The energy output of the tube depends on the resistance or load in the plate circuit. Here is where maximum output and distortionless output have been confused.

It can be shown that maximum output of the tube for no distortion due to curvature and grid current can be obtained when the load resistance is twice that of the tube. Nothing is said about distortion due to reflections. In a chain of circuits the condition for no distortion is that the input and output impedances be equal. This is also the condition for maximum output in transmission circuits. Therefore, the condition for maximum output under the peculiar conditions found in the tube has been taken as the condition for no distortion.

W. J. Brown, in the proceedings of the Physical Society of London, p. 218 Vol. 36, 1924, proves that for no distortion due to curvature and grid current the maximum output of the tube is obtained when the load resistance is twice the resistance of the tube. In his proof he uses the mutual characteristic curves. Figure 4 is a photograph of the curves from Brown's paper.

WARNER and Laughren in the Proceedings of The Institute of Radio Engineers, 1926, prove the same thing using the plate characteristic curves. Figure 5 is copied from this paper. The two proofs are much the same. The proof given here is based on Warner and Laughren using the plate characteristics. It will be noted that in Figures 4 and 5 that both sets of curves are essentially a family of straight parallel lines except near the lower ends below the line marked I_{min} . The reciprocal of the slope of the plate characteristic curves is the resistance of the tube. Or the reciprocal of the tangent of the angle MAN is the resistance of the tube. The straight line AOB is drawn such that the reciprocal of the tangent of the angle DBO is the resistance of the load resistance, R , which is in series with the plate circuit. This is true since $Pd = E$

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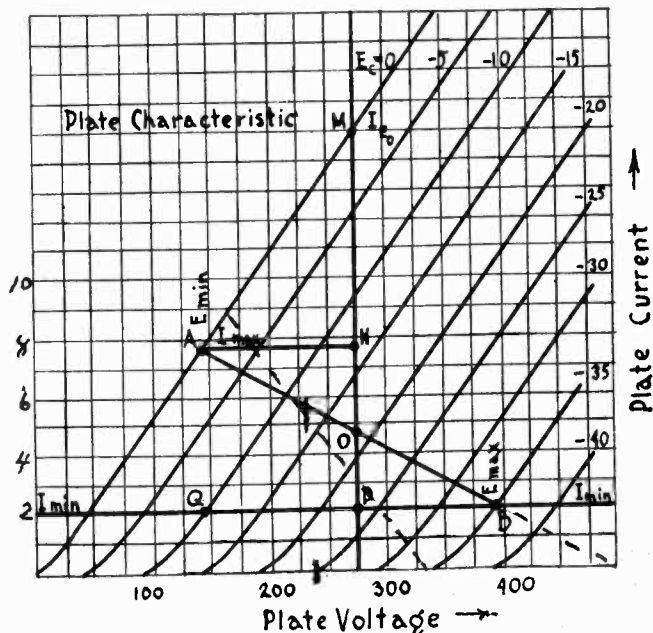


Figure 5. Reproduced from Ramsey's "Fundamentals of Radio." Drawing copied from Warner and Laughren's paper, Proceedings Institute of Radio Engineers. The Plate curves are straight lines except near the foot

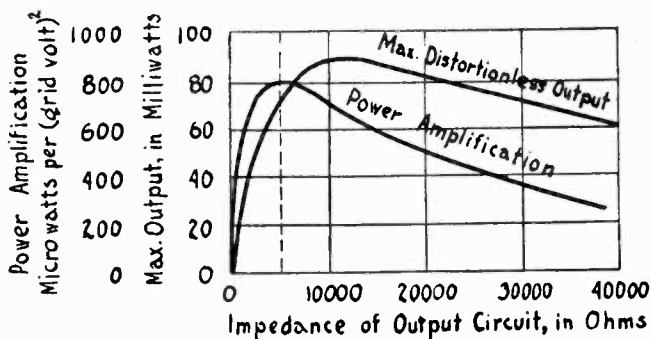


Figure 6. Reproduced from The Fundamentals of Radio. Drawing reproduced from Brown's paper. The maximum output with load of R_p is 20% less than when the load is $2R_p$. Until the tube is overloaded the power amplification is 10% greater with a load of R_p

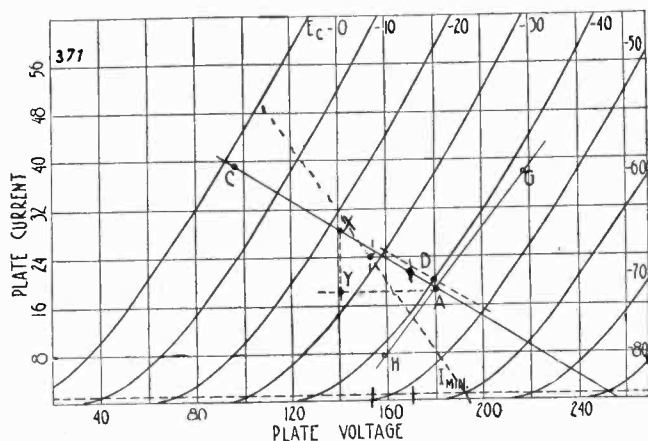


Figure 7. Reproduced from Ramsey's "Fundamentals of Radio." Drawing copied from Cunningham Data Book. Actual curves are not exactly straight or parallel

The GROWTH of RADIO

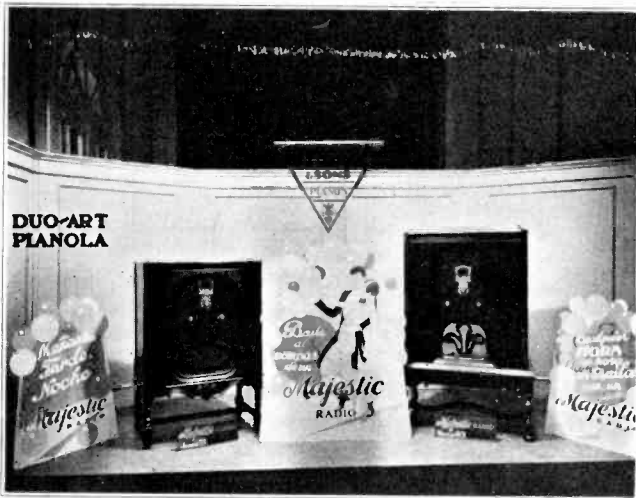
By CHARLES J. HOPKINS

Manager, Foreign Department, Crosley Radio Corporation

IT may be surprising to the average American that there are actually countries in the world where it is not possible to "tune in" any time during the day or night on a couple of dozen or more programs, and where the voices of "Amos 'n' Andy" are unheard in the land. Such places are getting fewer and more remote, but nowhere outside of the United States is the art of broadcasting carried on to anything like the same extent.

First has come the broadcasting and then the business. If "trade follows the flag" it no less certainly follows the voice of the announcer. Every ship now sailing to a foreign port carries radio equipment of one sort or another and usually a consignment of radio men who are terribly intent upon establishing or developing the radio industry.

Europe got into radio just about the same time that the United States did, but it is a pity that they started off on the wrong foot. Here the radio broadcast band for entertainment was set at a wave-band between 200 and



Window Display of Cia. De Efectos Musicales Giralt, S. A., Havana, Cuba, Majestic Distributors

550 meters. Unfortunately, however, in Europe and some other countries they adopted not only this band but also used a wave length of anywhere above 550 up to 3,000 meters, and confusion reigned. Gradually matters settled themselves to a certain extent and such countries as Australia, Italy and Spain, reduced their wave bands to come within the American band. The countries later building stations came into line with American practice. Europe, generally, being more conservative has not been able to see it, and today the important broadcasting stations in Europe, outside of Italy, Spain, Roumania, and Portugal are broadcasting on two wave bands, between 200 to 550 and 1,000 to 2,000 meters. Eiffel Tower in Paris stuck out at 2,750 meters for a long time, but finally came down to 1,444, and there are today no sta-



Window Display of the Johnson Radio & Music Company, Honolulu, Hawaii, Majestic Distributors

tions in the world broadcasting on a higher wave length than 1935 meters.

During the last International Radio Congress, held in Washington in the Fall of 1926, a determined effort was made to get the European stations to bring their broadcasting bands within the American limits, but the plea was made that so many millions of dollars were invested by Governments and organizations in broadcasting equipment, and by the public in radio sets that would be obsoleted by the change, that they would not hear of it. One of the Canadian delegates smartly remarked that this reason was not adequate as their equipment and sets were obsolete anyway, due to the great improvements continuously made in the American industry. Perhaps there was another reason, as some of us rather suspected, namely, that the European manufacturers fear that if the wave band is reduced, their markets would be opened to American sets.

The growth of the business in the United States has been so great and so rapid that no American manufacturer has, as yet, seriously undertaken the construction of a set that would operate on the two wave bands. When this is done, and several manufacturers are experimenting with it, the market will be opened up in territories now closed which will add immeasurably to the exports.

Tubes and Electric Currents

As to the question of tubes, the Europeans seem to have been ahead of us. Two and a half years ago, I brought back with me from Europe screen-grid tubes that were in common use, and only within the last year have the American manufacturers come to the screen-grid idea. European sets are now mainly constructed for the use of the "Pentode" tube, which is at present providing material

in FOREIGN LANDS

Despite Innumerable Handicaps Radio Is Constantly on the Increase in Most of the Alien Countries



Up-to-date Showroom of F. Armida and Cia, regular Crosley Distributors in Mexico

for great arguments and uproar in the American industry. Another unfortunate thing that happened was that the Europeans adopted a different base for their tubes (the holes in the base were differently spaced for the prongs of the tubes) and this greatly militated against the exportation of American sets and tubes.

Generally speaking, the whole of Europe excepting Italy, Spain, Portugal, Switzerland and Roumania, is closed to American exports of radio sets and tubes for the reasons above stated, although the newer American and European tubes are approximating their characteristics.

IN the United States the electric current is fairly well standardized, and the voltage is almost universally AC 110 volts, 60 cycles. There are some sections where AC 110 volts, 25 cycles is used and others use DC 110 volts.

These voltages are easily taken care of in this country by furnishing radio receivers with the different transformers for these three currents, but outside of this country AC 110 volts, 60 cycles is practically unknown, excepting in such places as Hawaii, Porto Rico, Alaska (U. S. possessions) and a few other unimportant points.

The voltages universally used abroad range from AC 110 to 125 volts, from 25 to 60 cycles; AC 220 to 240 volts, 25 to 50 cycles, and DC in both 110 and 220 volts. There are two methods of meeting this condition. One is by furnishing sets made for the American voltage of AC 110 volts, with "step-down" transformers that will permit their being operated on the required current. The other and by far the better method is by *constructing* the sets with the proper transformers for the current in local use.

Over a period of years, we have secured the necessary

information as regards voltages and today our lists will show us immediately the voltage in use in any part of the world. For our export business we have for a long time been furnishing sets made for certain currents, which cover practically every voltage where the business is of sufficient importance to be prosecuted. Therefore, we do not export sets for the American voltage with step-down transformers, but manufacture sets for—AC 110 to 125 volts, 25 to 60 cycles; AC 220 to 240 volts, 25 to 50 cycles; DC 110 volts (that can be operated on DC 220 by the attachment of a small resistor to the outlet plug).

Where American Radio Is Sold

Japan was formerly a great market for American sets, but it was a cheap market and when the quality was improved and prices increased the business fell off and today but few American sets are exported to Japan. The Japanese are making their own sets—cheap but effective for their needs. As an instance, in 1926 Japan was per-

When asked for a biography of his life, Mr. Hopkins, author of this article, sent along the following in the form of a letter:

"Born in Washington, D. C. and graduated in medicine from Columbian (Now George Washington) University with degree of M.D. Joined Columbia Phonograph Co., and became Manager of St. Louis branch. Went to Paris, France, in 1900 and later to London in charge of wholesale and export business, and completed a trip around the world, establishing the Company's branches in South Africa, Australia, China and Japan. Manager of Russian business in St. Petersburg for two years and then organized the Company's business in South America with headquarters in Buenos Aires. Was fourteen years in Europe, nine in South America and two in India, Australasia and the Far East. Returned to the United States at the beginning of 1925 and joined the Music Master Corporation of Philadelphia. In January 1926, joined the Crosley Radio Corporation in Cincinnati as Manager of Foreign Department where I have remained."

haps the most important foreign country for radio exports, but during 1929 the total exports from the United States to Japan, notwithstanding the enormous increase in exports generally, dropped to a shadow of its former volume.

AUSTRALIA and New Zealand have been very large markets for American radio sets for the last few years. Prior to 1926 the two principal broadcasting stations in Sydney and Melbourne in Australia employed the high wave band, but in that year they came down to the American band and the business immediately assumed large proportions. The duties assessed on radio in New Zealand have always been moderate, although they have lately been increased from 20 per cent to 30 per cent, but in Australia the duty has been very high. Up to the beginning of this year it amounted to practically 60 per cent ad valorem when the stamps and taxes were con-

sidered. Notwithstanding this handicap, the business has grown to be a great one.

AT the beginning of this year, however, the Labor Government in power in Australia adopted an alternative tax on radio sets, in place of a specific duty, amounting to thirty shillings (\$7.50) per tube holder, making the tax on an eight tube set \$60.00, which might conceivably be more than the net cost of the set itself. The former high duty was bad enough as it made the public pay a very high price for radio, but this alternative tax was a soaker, as it was practically prohibitive.

Then, about the first of April last, we were astounded to receive cables announcing that the Labor Government had passed a resolution absolutely prohibiting the importation of radio sets (among other articles) into Australia. The ostensible reason is that the imports were largely exceeding the exports. The balance of trade was so against the country that the value of the Australian currency was rapidly falling, and the Government concluded to prohibit the importation of so-called luxuries to force the people to save their money. This is all very well from a paternal standpoint, but the real reason is that the Labor Government is merely throwing a sop to the working classes by leading them to believe that radio will be manufactured in the country and thus provide work for that class.

Only time can tell the tale. Radio of a satisfactory nature can hardly be expected to be manufactured in Australia as they have neither the facilities nor the experience, and it is very problematical if any American manufacturer will be inclined to open foreign factories for a market of as little relative importance as Australia. In the meantime, the public will have to go without radio or put up with very inferior locally made products; and the Government itself will be kept out of important collections for duties until they have a change of heart. It is estimated that the loss in duties on the prohibited articles will amount to twenty million pounds a year, which is nearly \$100,000,000. The deficit will have to be made up by additional internal taxation which may give the public a chance to think.

THE above remarks show the darker side of the picture, but even so the cloud has a silver lining. As regards Europe, American manufacturers will probably come to the point of making a dual wave machine that will operate on the two wave bands now in use. In Japan, there is already being manifested an interest in better sets such as are now made in this country and some of the more far-sighted Japanese importers will suddenly discover a potential market for good American sets. In the case of Australia, it really seems as if the present embargo can be only temporary and they will wake up to the enormous loss and inconvenience that will come of this prohibition.

New Zealand has been and remains one of the most important outlets for American radio sets.

Central and South America are the largest markets today for American radio, and of these countries the Argentine Republic is by far the leader. There are in Argentina now some 40 broadcasting stations (about 20 in Buenos Aires) transmitting excellent programs which are heard all over South America. Brazil,

Chile and Uruguay also have adequate and pleasing programs to offer. In the balance of South America, each country has one or more broadcasting stations of varying power but generally sufficient for their needs. Mexico and Cuba can quite well "tune in" on the American stations, and both countries have some good stations of their own. Some American stations transmit occasionally Spanish programs, and our own large station—WLW in Cincinnati—has a regular weekly Spanish program under the name of "Los Amigos" (the friends). Thousands of fan-letters are received commenting favourably on these delightful programs. Broadcasting is the "life blood" of radio whether in this country or abroad.

The West Indies (and also the Dutch East Indies) are troubled with "static" a good part of the time, but this is overcome by the use of short wave sets, which are much in vogue. Also, short wave transmission from the larger American stations is picked up by many foreign stations and re-broadcast on the higher wave for which the ordinary sets are constructed. This provides a pleasing means for many foreign fans to hear the excellent programs transmitted in the United States.

SPAIN, Italy, Portugal, Switzerland and Roumania in Europe, are large purchasers of American radio sets—the two former naturally the largest—and the business is growing by leaps and bounds.

The Union of South Africa was dormant for a long time, owing to local conditions into which it is unnecessary to go, but these adverse conditions have now been overcome, and the business in that large and important section is growing rapidly.

China is evincing an interest in radio that is surprising. While orders are small, they are frequent and increasing in value, and when the country becomes pacified, if it ever does, there will be an immense growth in the business. Just now, the hardest thing to combat is the practice of the military officials in periodically clapping on a "ban" against radio. Things will go on for a while and orders will be executed. Then the dealers are stopped from selling by the imposition of the "ban," and their stocks are held in quad until the ban is lifted.

So far, only the relatively important countries have been discussed, but there are many other places in the world where radio is becoming of increasing importance. Every day new markets are being opened up—Spanish Morocco and the whole north coast of Africa as far East as Egypt when we come to the influence of the Turkish "high-wave" station—and new broadcasting stations are being erected in many localities. There seems to be an inclination for them to conform to the American band—probably because the stations are erected by the use of American machinery and material.

INDIA is alive once more. Formerly, there was a fair market for American radio, but the broadcasting was indifferent and there was an inclination to favor English sets, perhaps from sentimental reasons, but more likely because they were cheaper and of smaller power. Even today, the radio receiving set made in England is of rarely more than three or four tubes, and a five tube set is looked upon as something a bit extraordinary. The

(Please turn to page 139)

The DOUBLE HETERODYNE

Describing an Apparatus Applicable to Many Industrial Requirements, Which Can Be Made So Sensitive as to Measure to One One-Hundred Millionth of an Inch or to One One Millionth of a Degree



WHAT I have to describe is not new to the Physicist and has found a few industrial applications but has not been used as much, I believe, as its truly remarkable properties justify.

By **J. BARTON HOAG, PH. D.**
Instructor in Physics, University of Chicago

The principle of the double heterodyne or beat apparatus is easily understood. Imagine two oscillators, one having a frequency of one million vibrations per second and the other one million plus 999 vibrations each second. The beat note between these two oscillators will be 999 or the difference between their respective frequencies. Let this beat note operate a loud speaker located near a tuning fork or audio oscillator whose frequency is 1000 cycles. There will result a second or "double" beat note, audible to the ear, whose frequency is the difference between 1000 and 999 or one vibration each second. If, now, the million cycle oscillator remains constant and the other changes to 1,000,998, or by approximately one in a million, the first beat note will drop to 998 and the second will change from one to two vibrations a second, a very readily measured difference.

The change in frequency of the oscillator, which may be immediately observed and measured with the great accuracy of one part in a million by the double heterodyne method, may be caused by a change in the inductance, capacity or resistance of the oscillating circuits. Extracting energy from the oscillator by means of an auxiliary tuned circuit will reduce the inductance and increase the resistance of the oscillator which may be measured by this method. The change of frequency due to a change in filament current or plate voltage, with attendant change of resistance, may be observed and measured.

ONE of the most useful results of the double beat method follows from the change of frequency resulting from a change of the capacity in the oscillating circuit. The analysis of this application follows. The frequency (f) of an oscillator is given to a first approximation by

$$f = \frac{1}{2 \pi \sqrt{LC}} \text{ cycles}$$

where L is the inductance in henries and C is the capacity in farads. Differentiating this equation with respect to

the capacity gives, for the rate of change of the frequency with capacity, $df/dc = -f/2C$. The negative sign indicates that the frequency is lowered as the capacity is increased and may be neglected. Then

$$dC = \frac{2 C df}{f}$$

which gives the change of capacity dC of a condenser of capacity C in an oscillating circuit of frequency f which results in the change of frequency df . For example, if the double beat method gives a change of one cycle for a 500 micro-microfarad condenser in a million cycle circuit, the capacity has changed by only one one-thousandth of a micro-microfarad.

THE double beat method may be used to measure small changes in distance by determining the frequency change when the plates of a condenser are moved toward or away from each other. The capacity of a plane parallel plate condenser, neglecting edge effects, is given by

$$C = \frac{K A}{4 \pi t} \text{ electrostatic units.}$$

where K is the dielectric constant (1 for air), A is the area of one plate in square centimeters and t is the distance between the plates in centimeters. (Dividing by 900,000. would give microfarads). Substituting in the first equation gives

$$f = \frac{1}{2 \pi \sqrt{L K A t}}$$

Keeping all quantities constant except the distance between the condenser plates, we differentiate and find that the rate of change of frequency with the distance t is $df/dt = f/2t$, from which the change of distance dt is

$$dt = \frac{2 t df}{f}$$

To illustrate this, imagine the plates are one millimeter apart ($t = 0.1$ cm.), the change of frequency as

observed by the second beat note is $df = 1$ and the frequency of the oscillating circuit f is one million cycles. Then the movement of the condenser plate was

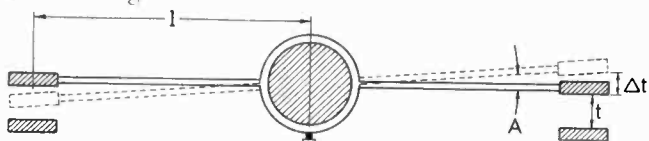
$$dt = 2 \times 10^{-7} \text{ cm.}$$

or less than a ten millionth of an inch.

Using higher frequencies and Lissajou figures formed by reflecting light from mirrors on the loud speaker diaphragm and tuning fork or by the use of a cathode ray oscillograph, the accuracy may be increased ten-fold so that a displacement of the condenser plate of one one-hundred millionth of an inch may be determined. In practice it is customary to adjust the second beat note to zero and keep it there by changing a small, vernier-controlled standard condenser connected in parallel with the one under test. These measurements are not free from difficulty when carried to the limit of accuracy described above. It is necessary to have a solid foundation for the apparatus and careful screening of each oscillator, each amplifier and the second beat note circuit in order to prevent "pulling into step" when the frequencies are nearly equal. The batteries must maintain constant voltage and the tubes must be operated for some time before starting measurements to prevent resistance changes which result in small changes of frequency of oscillating circuits.

SINCE one of the high frequency oscillators must maintain a constant rate of vibration, quartz crystal control with constant temperature must be used. The method of double beats has been used at the University of Chicago to study, among other things, the change of frequency of quartz crystal oscillators at various temperatures. Thus it has been found that at 65 degrees centigrade a quartz crystal will change its natural frequency of vibration by 22.7 parts in a million for each degree change in temperature. At 23 degrees centigrade, or approximately room temperature, the change per degree is 19.5 parts in a million, and at minus twenty-seven degrees centigrade the coefficient is 14.9.

I WOULD like to suggest the following method for measuring small angular displacements. For example, suppose we wish to measure the angle through which one can twist a two inch steel bar by a light touch of the fingers. Let one end be firmly fixed in a heavy base-plate. Then fasten a rigid insulating bar across the other end, as in the figure.



On the ends of this are fastened metal plates, each of which is to serve as one plate of the condensers in the two high-frequency oscillating circuits. Twisting the rod then decreases one capacity and increases the other. The angle A , greatly exaggerated in the drawing, through which the rod turns, is given in radians as $A = dt/l$, or in degrees as

$$D = \frac{360 dt}{2 \pi l}$$

COMBINING this with the equation previously given for dt and allowing for the fact that the frequency of one circuit increases while the other decreases, thus doubling the effect, one gets

$$D = \frac{180 t df}{\pi l f} \text{ degrees}$$

where t is the average distance between the plates of one condenser in centimeters, l is the length of one arm in centimeters and df is the total change of frequency as measured accurately by the second beat note. f is the frequency of the oscillators which is made the same for both at the start. To see the sensitiveness of the method, assume $t = 1$ mm., $l = 10$ cm., $f = 10^6$ cycles and df is observed to be equal to one cycle. Then the rod was turned through approximately one one-millionth of one degree. This corresponds to the angle made by the head of a pin sixty-six miles away.

For practical purposes, the extremes of sensitiveness outlined above, with accompanying difficulty in operation, need not be used. As a class room experiment in a radio course, I have the students place the condenser of a high frequency oscillator under a bell jar which is slowly evacuated. They observe the change of pitch of the *first* beat note as the pressure is reduced, as measured by a calibrated audio frequency oscillator. This illustrates very well the change of dielectric constant of air with pressure.

SINCE any factor which effects the frequency of the oscillator may be measured by the double heterodyne principle with great precision, one may apply it in innumerable ways. Thus it may be used to measure small changes in inductance, capacitance, resistance, distance, temperature, dielectric constant; to measure linear expansions and compressions, minute vibrations, small forces, change in thickness of strips of dielectric moved between the condenser plates, small masses, small angles, stretch of wires, flexure of beams, pressure; to detect air bubbles in dielectrics or any foreign body in an insulator; to test the exact centering of rotating bodies; and a host of other applications.

This article discusses a device with a great number of industrial applications, capable of measuring a distance corresponding to the angle made by the head of a pin sixty-six miles away.

The author, Dr. J. Barton Hoag, is on the Physics faculty of the University of Chicago. He was born in 1898 at Colorado Springs, Colo., and has been interested in amateur radio since 1918. He was an Instructor in the Army Radio School at Colorado College, in 1918, and became an Instructor in Physics, including radio, at that institution in 1921.

Dr. Hoag was appointed an Assistant in Physics at the University of Chicago in 1923, receiving his PH.D. degree there in 1927, and continuing on as Instructor in Physics, including radio courses.

He is the author of "Electron Physics," recently published by the D. Von Nostrand Company. He has contributed frequently to the scientific journals.

Dr. Hoag is a member of the American Physical Society, and the Institute of Radio Engineers. He belongs to both Phi Beta Kappa and Sigma Xi.

A NEW DEAL for the DEALERS

In Which We Discuss Some of the Offers Being Made to Dealers in Return for Their Support

By CHESTER A. DARLING

Editor

THIS will be the dealer's year. Make no mistake about it. The dealer right now is letting the line of manufacturers and distributors form on the right. He is listening to one at a time. The various propositions are being analyzed, digested, passed upon. And what propositions they are, too! All of which may be well worth noting at this time in planning production and distribution at the beginning of another radio season.

Now just what does the dealer want? Well, here are a few general pointers as to some of the things being talked about, and some which are being actually offered to the dealers.

Exclusive Territories: The trend this season appears to be towards exclusive territories for dealers, in return for exclusive dealers. That is to say, the dealer commits himself to handle only one line of radio sets, for which he receives an exclusive territory. Having an exclusive territory, the dealer can spend money for space advertising in local newspapers and other mediums. He can afford surveys, lining up his potential customers. He can afford public demonstrations. In fact, he can do anything and everything which will tend to sell the particular line of radio sets which he is handling, knowing that no one else can step in and take away the fruits of his labors.

EXCLUSIVE territories means a marked reduction in the number of dealers. Thus in the metropolitan New York territory, say within a 50-mile radius of City Hall, it is estimated that the average nationally-advertised radio line has some 2500 dealers. Under the present scheme of exclusive territories of generous proportions, there would be only 100 dealers, or a ratio of 1 to 25. As for the size of the territory, it depends largely on conditions. However, one manufacturer, working on exclusive territories, estimates that the dealer should have about 50,000 to 75,000 population to work on, so as to keep going year after year. The territory in many instances may include a group of scattered towns and villages. The dealer may appoint sub-

dealers, who handle the dealer's stock on consignment, collecting a commission for what they sell. In at least one instance, the main dealer is limited to just the one line of radio sets. He cannot sell any other radio line nor again any other line of goods. The sub-dealer, on the other hand, can handle other lines of goods, but not radio goods, aside from the given line.

How does the dealer feel about the past? In the first place, he is wrought up because he has not received the proper protection. He has been betrayed time and time again by manufacturers dropping prices, making no rebates to the dealer, selling to department stores which set new low prices and advertise the fact extensively, and the appointment of too many dealers in a given territory.

Then too, manufacturers have in many instances failed to aid the dealer in his servicing problems. The necessary data has not been supplied; often, replacement parts have not been provided.

Also, manufacturers have been too little concerned with the trade-in, figuring that it was the dealer's business and not a manufacturing proposition.

Finally, manufacturers have failed to provide the average dealer with local advertising, which, after all, is the thing that clinches the local sales.

All in all, as this article points out, the manufacturer will have to wake up to the situation, or find himself minus a large number of retail outlets.

MANY dealers are naturally squawking at the time of being tied up exclusively with one line. We cannot blame them. If the manufacturer is on the level, has a good line that will stand the season's test, and means real business, there is nothing wrong with exclusive representation. But if the dealer is going to be tied up hands and feet with a manufacturer who goes back on his word, who turns out defective sets, and who changes his policy from month to month, the dealer is indeed in a bad way. Hence, it would seem, only the top-notch manufacturers can put over the exclusive representation idea. There are, however, plenty of inducements to make it worth the dealer's while to sign up exclusively.

Protection: Any dealer can make a fair profit on the usual 40% discount. It is not so much the percentage that interests the dealer as the assurance that he

can make the full 40%. The reason why dealers have heretofore asked for higher and still higher discounts has been the fact that list prices could not be taken seriously. Manufacturers have made a joke of discounts in many instances. Dealers have learned of large sales to department stores and job lot houses, whereby list prices have been slashed. The shady practice of selling to dealers under the guise of jobbers, so as to give cut-price dealers the advantage of an extra 10 and 5%, has caused no end of trouble.

THIS year, manufacturers are promising protection to their authorized dealers. Those seeking exclusive dealers are promising not to sell goods to department

stores and job lot houses. They are promising not to over-produce. Such expressions as "production geared to demand," are being heard, and, we hope, believed—although an industry that has over-produced year after year has a hard time convincing anyone of its reformation. How can production be geared to demand? One manufacturer is setting the quotas for his exclusive dealers so low that his production is bound to be no greater than a conservative demand. As an indication, he expects only 600 sets to be sold for a territory of 75,000 population. That's reasonable, even admitting that there will be other lines sold in the same territory.

NO doubt the dealer will get real protection this year, because many manufacturers this season are positively on probation. One slip, one mistake, one false statement, and they will be thrown out of the dealers' shops. Many know this fact and are behaving accordingly.

If production is kept down to sane figures, based on a conservative estimate of what each dealer believes he can sell, then there should be no over-production and no chance to dump goods. If the production capacity of the factory is not satisfactorily absorbed by the production of radio sets, other lines can be turned to, which is a growing practice today in the industry.

Local Advertising: Your dealer this season is interested in local advertising. Radio must be sold to his public—and sold hard. Advertising in the local newspapers, local magazines, on the billboards, by direct mail and so on, must be engaged in on a lavish scale in order to sell a fair volume of radio goods.

WITH the exclusive representation idea, some manufacturers are making the dealers a real proposition. They are either going 50-50 with the dealer on a campaign which benefits the dealer who spends his money, or they are setting aside a certain percentage of the cost of each set for local advertising. One manufacturer at least is making an allowance of \$8.00 on each set to go towards local advertising.

This year the dealer is ready to listen to sales promotion ideas. He needs them. He is willing to mail out direct mail advertising. He will do these things if he knows that he is building up his own sales, and not those of other dealers handling the same lines in his territory.

Trade-Ins: The automobile industry, which is much older than the radio industry, is still struggling with the trade-in problem. Hence the radio industry may well be expected to have a problem of its own. However, the better radio manufacturers are at last taking an interest in this situation, realizing that no radio dealer can take his profit in the form of unsalable old sets.

One radio manufacturer is endeavoring to set a certain

sum on each set it ships to the dealer, that sum to be applied towards trade-ins. The dealer must produce proof that he has expended that sum on trade-ins, which may be broken up or otherwise destroyed.

The industry would go far towards solving the trade-in evil if it set a price or prices on certain classes of trade-ins, so that dealers might more or less agree among themselves as to what to allow.

Of course the legal aspects would have to be observed, for there is danger in anything that smacks of restraint of trade. But this is not restraint of trade so much as it is to decide what old sets are really worth, so that many dealers may not go broke making elaborate allowances on old sets in order to make sales without profit.

THE manufacturer must give some thought to trade-ins this season, for the dealer is vitally interested in that phase.

Service: And then there is service. Heretofore, the dealer has spent lots of his hard-earned profits in service. Some manufacturers are ready to talk profitable service to the dealers. At least one manufacturer with automobile experience is setting a flat-price schedule on all service work, so that the dealers may handle such work at a profit.

Further, this manufacturer is opening up service branches throughout the country, where dealers may go for spare parts, replacements, and the more troublesome service jobs. Also, this manufacturer is sending his service experts to the various dealers, in order to check up on equipment, personnel, methods, problems and so on.

FORTUNATELY, the radio sets this season are almost certain to demand less servicing than ever before. With the strains placed on filter condensers, power transformers, resistors and other components better understood and appreciated, manufacturers are building with a greater factor of safety so as to avoid unreasonable breakdowns.

How about the distributor? There is a slight indication that the distributor is on the pan this season. He will have to prove his worth this year or be dispensed with next year. Too many distributors have been mere order takers, doing nothing more than errand boy work. Many manufacturers have come to realize that the money paid to distributors might better be spent at the dealer's end for trade-ins and local advertising. One manufacturer selling direct to dealers actually turns back about \$15.00 per set to the dealer for use in financing trade-ins and local advertising.

There are some distributors who really build up the manufacturer's business. There are more who don't. With the competition that exists this year in the industry, it

(Please turn to page 142)

The dealer has been very unhappy, dissatisfied, and in a good many cases is ready to cease operations. It is estimated that at least twenty-five percent of the radio dealers who were in business last fall, have dropped out for good. More may drop out within the next few months, presumably over the summer. And, according to the author of this article, the remaining sixty percent or so are going to be a hard-boiled lot, for the reason that they have stayed in business despite all handicaps and therefore know what's what by way of sound business methods.

Who IS This HUDDY Fellow?

He Received His Amateur License at the Age of Ten
and Has Been Doing Things in Radio
Ever Since

A Short Biographical Sketch of
FRANKLIN SNOW HUDDY

Assistant to Chief Engineer, CeCo Manufacturing Company

FRANK HUDDY was born in Providence, R. I., some twenty-five years before he began his now-famous debate with Kendall Clough. It is doubtful if—back then in 1905—he ever dreamed that in June, 1930, his biography would appear in the "Men Who Have Made Radio" section of *Radio Industries*, but the idea must have surely taken root in his mind when, at the age of ten, he had a license to transmit and was operating his own station. His transmitter was the first one in the state—and probably in New England—to communicate directly with Europe. At the age of sixteen, he was writing for technical magazines.

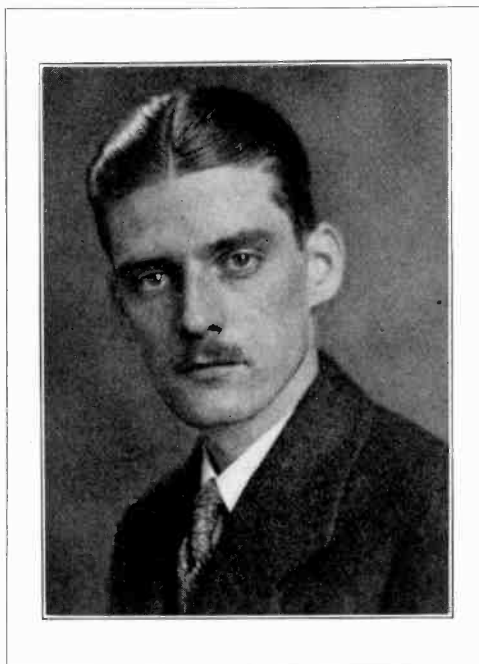
In 1923, he designed WILMP, Bridgeport, Mass., one of the most famous amateur stations in the world, and the first amateur station on the East Coast of America to have been heard in Australia—half-way 'round the globe.

FRANK went to England in '24. Having heard that, in Europe, the reception of American signals was impossible on the wave-lengths then employed, he took a comparatively crude set of his own design along and tried his luck. This set had only one tube; its coils were wound on a drinking tumbler and tied together with cotton thread. He went all over Europe listening for American signals, and—in spite of the fact that it was said to be impossible—picked up as many as fourteen American stations in one night from as far East as Florence, Italy.

On his return to Providence, he founded the Associated Radio Amateurs of Southern New England—the second club in the United States to own its own building, its own land, and its own station. It was the first club in which the members built everything—including the clubhouse and radio equipment—by themselves. Frank designed and constructed the transmitter, which has since turned out to be among those giving the loudest and best signals in the East.

In 1928, he graduated from a four year engineering course at Brown University, with the degree of B.Sc. Immediately following his Commencement, he went to England to study radio further, and while there built one

of the most powerful and effective amateur transmitters in Great Britain.



THIS English trip had several interesting sidelights. When he started, he wanted to be in communication with his folks, so he put up a station in his home that he was sure would send signals wherever he might go. On a preliminary test, this station was received in New Zealand, which assured him that the signals would be heard in England without difficulty. His receiving-set was a two-tube, short-wave outfit of his own design.

Since his mother, father and young lady friend were all operators, a schedule was agreed upon whereby, every day, his mother was to send to him at 5:15 P.M. for fifteen minutes; his father, at 7:15; and his young lady friend, at 10:30. He crossed on the Berengaria, and every night, all the way over, he listened in and learned

exactly what was going on at home. The messages were received perfectly during the entire trip, the signals actually getting louder as he approached England.

Throughout the British Isles, no matter where he happened to be located, he maintained these regular communications with his family. Oftentimes, when at a transmitting station, he was able to literally hold conversations with them.

On his return ocean trip, friends in England sent to him from one side and his folks from the other side.

IN America again, he went into the employ of the General Electric Company, where he worked on the testing of the largest transmitting tubes in the world, and designed the short-wave station W2XAF.

Leaving the General Electric Company, he went with CeCo in June, 1929, and was given the post of Development Engineer, in which capacity he developed their pentode. Afterwards, he was made Assistant to the Chief Engineer.

Frank Huddy is a profound student of Radio. Where most people find their recreation in games and sports, he is much happier when pondering over some new text

(Please turn to page 143)

JOHAN W. MILLION, JR. whose writings on the subject of Test Engineering are familiar to readers of *Radio Industries*, is a Missourian by birth. Prior to the world war, he was engaged in amateur operations, and immediately after his graduation from the University of Michigan, in 1920, he turned to experimental radio work. At college he had specialized in the sciences.

FROM July, 1920, to July, 1921, Mr. Million did research on dental amalgams, as assistant to Dr. A. W. Gray, Director of Research of the L. D. Caulk Co. Following this, until September, 1922, he was Instructor of Mathematics and Physics at Des Moines University, Des Moines, Iowa. During his stay in Des Moines, Mr. Million was Radio Editor of the Des Moines Register, at which time he was instrumental in furthering the success of the A.R.R.L. Convention, held at Des Moines that year. As a sideline, he maintained a basement factory, typical of the industry's early days, in which he manufactured, jobbed, and retailed radio sets and parts.



Mr. Million carried graduate studies and was research assistant to Dr. A. H. Compton, at Washington University, St. Louis, from September, 1922, to July, 1923. In this capacity he aided Dr. Compton in verifying the "Compton Effect" which subsequently won a share of the 1927 Nobel prize in Physics.

FOR two and a half years after July, 1923, Mr. Million was employed as Research Engineer with the Bell Telephone Laboratories, developing small filament current vacuum tubes for receivers and field strength measuring equipment for field surveys, including automatic gain control.

In January, 1926, he took a position as Chief Engineer with the King-Hinners Radio Co., Buffalo, N. Y. manufacturing neotrodnyes. January, 1927, found him Chief Engineer of the King Manufacturing Corporation, also of Buffalo.

HE became Chief Engineer with the Bremer-Tully Manufacturing Co. in October, 1929, where he designed sets and test equipment for Bremer-Tully and Brunswick, and supervised the testing of receivers in production.

On January 1, 1930, Mr. Million was appointed Research Engineer with the Utah Radio Products' group of three companies, where he is now located. His function is the bringing about of closer engineering coordination between the engineering departments of the group and those set manufacturers supplied by this group.

Mr. Million's remarkable engineering ability and ingenuity are bound to contribute to the further progress of the industry.

A Production

By **JOHN W. MILLION, Jr.**

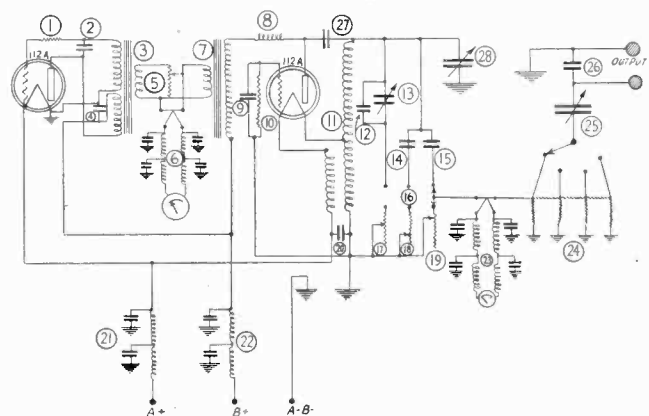
*Research Engineer, Utah Radio Products Co.
Formerly Chief Engineer, Bremer-Tully Mfg. Co.*

FOR the final test of a radio receiver all modern factories now use gain test made with a signal generator or its equivalent. For this a large number of equivalents have been devised with varying degrees of satisfaction. The reasons for the use of anything other than a signal generator in the accepted meaning of the term are several, namely: Inability to obtain delivery, high cost of such equipment as could be purchased, and the fact that such equipment was not designed for the speed required in production testing. Since many engineers have built production Signal Generators, or are now in the process of doing so, the following is described stressing particularly the points making for speed in production.

The design and construction are patterned after the General Radio Signal Generator built for laboratory use. Certain changes are immediately evident. The frequency is changed by means of a three position switch. It will be seen from the schematic diagram that the method of changing the frequency uses separate condensers for the oscillating circuit determining the frequency. This accomplishes two things. By means of a variable resistance in series with each condenser it is possible to vary the output at each frequency independently of that at the other frequencies. At the same time it gives an exact frequency at each position. This checks the calibration of the receiver without the errors of an operator setting a dial. In this design three frequencies are used. More can easily be added.

A control is provided for adjusting the percentage of modula-

Specifications for Signal Generator



1. 3,500 Ohm Carbon Resistor.
2. .008 Mfd.
3. 60 Cycle Choke Tapped to make plate and grid coils; 40 turns of No. 20 D.C.C. Wire wound on top for low impedance circuit. Core cut to this shape "T" to allow room for extra winding.
4. 1 Mfd.
5. 15 Ohm Carter Midget Pot. (M. P. 15).
6. Filters for meter leads. Condensers 1 Mfd. Chokes, wound on W. E. coil form, of No. 22 D. C. C. Copper wire to a resistance of 1 ohm.
7. Standard output transformer as used on the Model 81. One coil—secondary—not used.

SIGNAL GENERATOR

The Third of a Series of Articles on Test Engineering

tion. The method of measurement follows General Radio, and as this is a production test unit no provision is made for external modulation. This can be added if desired.

FOR controlling the output a novel system is used which has several advantages. First, there are no sliding contacts in the adjustable output circuits. The use of capacity while giving a peculiar calibration of output on the dial is very easy and quick to adjust with no wearing out or change with time. My experience has been that slide-wires for radio frequency are a nuisance in production.

For the larger variations a network is used with four positions. This covers ample range for regular production testing, and some sample checking.

In the construction of this generator the method of shielding is important. No attempt is made here to show the shielding as it is quite complicated. Best results will be obtained by following closely the construction of General Radio making the generator a

unit on the front panel.

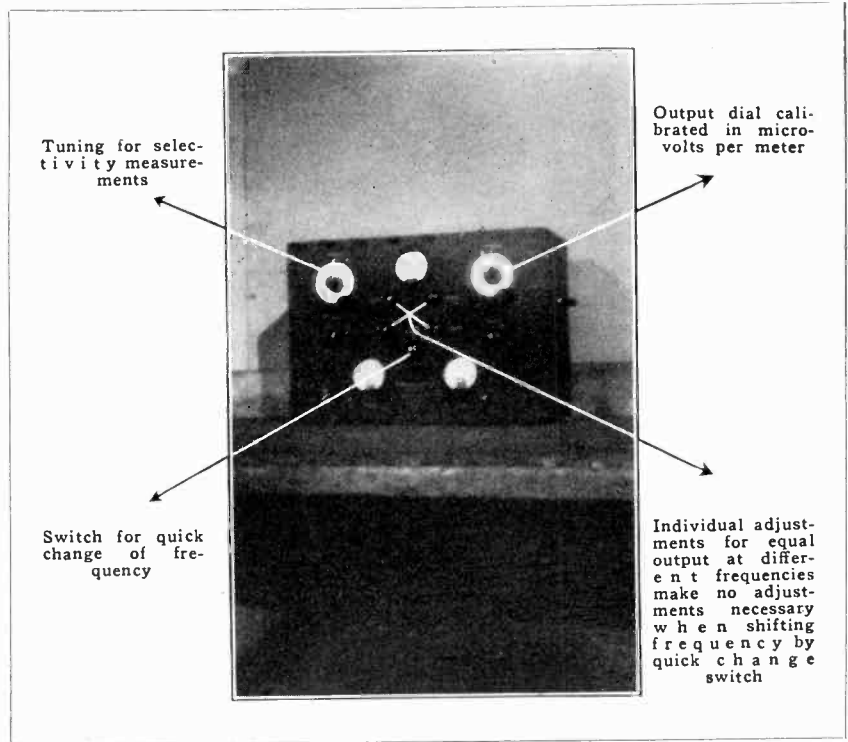
In production testing using a rotating table for heating the tubes the operator has only to apply the antenna and output connectors in addition to operating the generator.

This makes possible the checking for alignment and gain at two frequencies on about 200 chassis per day. If all chassis are correctly aligned and do not require regang on any of the circuits, one operator can do about 250. These quantities are based upon daily operations during which the output was sample checked regularly on approximately every tenth receiver from six operators.

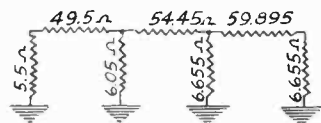
Additional articles by Mr. Million will appear in future issues of *Radio Industries*.

Since the matter of test equipment is of utmost importance to every radio manufacturer, we invite our engineer-readers to contribute their views and experiences on the subject.

There are many special types of test equipment in use, a knowledge of which would be extremely valuable to the industry. The distribution of this knowledge through our pages is therefore highly desirable.



8. B-T R. F. Chokes—two in series.
9. .00025 Mfd.
10. 5000 Ohm—5 Watt.
11. R. F. Coil wound of No. 28 D. S. C. on 1/2" bakelite tube. Plate end of large coil 32 turns; grid end—16 turns. Small coil—16 turns.
12. .00004 Mfd. Shunted Capacity.
13. .0005 Remier twin rotor variable condenser with five plates added to each rotor, to bring capacity up to approximately .00065 Mfd.
14. App. .0006 to give frequency of 600 K. C.
15. App. .0001 to give frequency of 1400 K. C.
16. Double pole triple throw switch.
17. 30 Ohm Carter Midget Pot. (MP-15).
18. 30 Ohm Carter Midget Pot. (MP-15).
19. 30 Ohm Carter Midget Pot. (MP-15).
20. .1 Mfd.
21. "A-Plus" Filter. Condensers—1 Mfd; Chokes of No. 22 D. C. C. wound on W. E. coil form to 1 Ohm Resistance.
22. "B-Plus" Filter. Condensers—1 Mfd; Chokes of No. 28 D. S. C. wound on W. E. coil forms to 30 ohms Resistance.
23. Same as No. 6.
24. Non-Inductive Resistances, Wound Double, Parallel Strand Method.



25. .0005 Mfd. Remier Twin Rotor Variable Condenser.
26. .001 Mfd.
27. .002 Mfd.
28. 16 M. M. F.

From RADISHES to RADIO

Tall Corn and Excellent Radio Engineers
Seem to Grow in Iowa

A Short Biographical Sketch of

KENDALL CLOUGH

Chief Engineer, Silver-Marshall, Inc.

A GROUP of radio executives were seated in a restaurant. They were finishing their first course—chicken okra soup.

"I wonder where okra comes from?" said one of them, studying the little green pod-like vegetable that rested in his spoon.

"From Africa," answered the man on his left.

"From Iowa," contradicted the dark, good-looking fellow with the mustache, sitting across the table. "I know they grow in Iowa," he continued, "because just about twelve years ago I was raising them out there. I worked on a truck farm."

The Iowa truck farmer was Kendall Clough—now Chief Engineer with Silver-Marshall—whose debate on the pentode with Frank Huddy has been featured in recent issues of *Radio Industries*.

Kendall was born in 1903 in Sioux Falls, South Dakota, and moved to Sioux City, Iowa, five years later. He became actively interested in Radio when eleven years old, winning the coveted amateur license and operating 9AAM.

At the age of fourteen he secured employment on the truck farm mentioned above, where he remained for a little over a year.

MIGRATING to Chicago in 1918, he finished High School, and then went to work for the American Telephone and Telegraph Company, Long-Lines Division.

Two years at Crane College were his next step toward an education, after which he spent a year at the research laboratory of the Kellogg Switchboard and Supply Company. All this time, and during several of the years that followed, Kendall was taking private tutoring in higher mathematics, which accounts for his present fundamental understanding of many scientific principles incomprehensible to the average run of radio engineers.

The old Rauland Manufacturing Company, forerunner of the All-American Radio Corporation, next claimed his services. While there, he worked on audio equipment.

In January, 1925, he was appointed Chief Engineer of Electrical Research Laboratories. Unfortunately, however, just eleven months later, ill-health made a temporary invalid of him and he was forced to rest.

Then, while still hobbling about on crutches, in April '26, he organized the Research Laboratories of Chicago, Inc. Undaunted by his sickness and its consequent incon-

veniences, he set out cheerfully and determinedly to make a success as a Consulting Engineer. His worth was immediately recognized, for among his clients were such discriminating firms as Silver-Marshall, Aero Products, Nathaniel Baldwin, Tyrman Electric Company, Columbia Radio Corporation (now a part of Wextark), Tobe Deutschmann, American Hairfelt Company, and Amsco Products. Incidentally, Research Laboratories, Inc. was one of the very few independent research and consulting organizations to have been highly successful financially.



IN August, 1928, Research Laboratories was purchased by Silver-Marshall, Inc., and Kendall became Chief Engineer with S-M.

Last June, while travelling via airplane on business, his motor stopped. When extricated from the resultant crash, his injuries were found to be so serious that for several days little hope was held out for his recovery. Instead of going on a vacation motor-

trip with his wife, as had been originally planned, he spent the summer in the hospital.

Besides his recent articles in this journal, Kendall—until a year or so ago—was a frequent contributor to various radio publications, on such subjects as "super-heterodynes" and "audio amplification." He developed one of the first screen-grid circuits, and is well-known as the designer of the "Clough Audio Transformer." Lately, he has evolved a new and superior automatic volume control which will be described in the July *Radio Industries*.

AS far as scientific cleverness, general competence and understanding of his subject are concerned, he is one of the most respected set engineers in Radio. Almost without exception, his colleagues in the industry are highly complimentary in speaking of him—a rare tribute these days, when jealousy so frequently warps men's opinions of fellow-members of their profession.

Not long ago, the slang phrase, "He Knows his Vegetables" was popularly used to denote a man admired for outstanding talents and knowledge. That phrase might easily be applied—only with a double meaning—to the truck farmer-radio engineer from Iowa whose life is the subject of this article.

For Kendall Clough certainly knows his vegetables.

A New SALES APPEAL

A Long-Neglected Part of the Radio Set May Now Prove Helpful in Stimulating the Public's Buying Mood

By GEORGE GRUSKIN

Managing Editor

PRIMARILY, at this time, the radio industry is interested in *stabilization*. After a year that will long be remembered for its happy "ups" and tragic "downs", manufacturers, distributors and dealers alike are cautiously observing a policy of conservatism. They are afraid to take chances. Only when they once more find themselves on a solid footing will their courage return. In the meantime, they are bent on re-establishing a stable industry.

For this reason, they have been quick to veto the introduction of any new developments that might upset standard production—or that might, in any way, cause further unrest in either the public or manufacturing mind. The wisdom of this attitude can not be denied. Very few of them, considering their respective financial statuses, could afford to junk existing plans in favor of radical changes, where increased working capital would be required. The extremely limited number of organizations whose bank balances might allow such expenditures are restrained from falling out of line by reason of the unwritten agreement among members of the R.M.A which makes it understood that—until stabilization is achieved—individual members will not attempt to disrupt the present order of things. In other words, no drastic *production-disturbing* innovations will be adopted until the industry returns to normal.

BECAUSE of the above-mentioned facts, it is obvious that—unless unexpected developments are exhibited at the Atlantic City Trade Show—not a single item of unusual sales appeal will be available with which to entice the public's money into the billfolds of the radio industry. Last year, the screen-grid tube was capitalized upon with great success. What have we this year to take its place? By now, its magic selling-power has spent itself and the public has come to accept it as a matter of course; its mention provokes no fresh interest.

That this is generally recognized was well-illustrated when one of the greatest of the set manufacturers, while announcing his forthcoming products over a recent broadcast, could mention but *one* feature in describing them—namely, that they were "1930 models". More, he could

not say—because there was nothing more to be said. Other manufacturers are in the same predicament. What special means, then, will they employ to arouse the public into a buying mood?

Let us concede, now, that stabilization of the industry is our most important consideration of the moment. Let us also grant the absolute necessity of allowing existing production mechanisms to proceed without interruption or disarrangement. Finally, let us agree that the industry is sadly in need of a novel "sales appeal" with which to provoke new consumer-interest.

This article enumerates three fundamental points which the industry—if it wishes to regain its feet in a strong healthy way—must observe during the coming year. In analyzing these prerequisites to normalcy, the suggestion is made that a new type of radio cabinet may prove instrumental in furthering the desired comeback. A careful, economic consideration is given the subject, and the cabinet in question is described.

HOW fortunate we would be, then, if we could find a means of carrying out all three of these points, without interfering with any one of them! *Radio Industries* feels that it has, perhaps, discovered a method by which this can be accomplished.

It is our belief that a possible solution to the problem rests in a part of the receiving-set to which comparatively little attention has been paid in the past—the cabinet.

Not long ago, it was the good fortune of this writer to be present at a conference attended by

D. D. Grassick and J. L. Jeffers of the Insulite Company, Minneapolis, manufacturers of synthetic wood, and G. H. Carlstrom of the Rockford Furniture Company. These gentlemen had on exhibition a radio cabinet produced by the two above-named companies in collaboration with the E. I. DuPont de Nemours Co., manufacturers of Duco and other well-known paint and varnish products. In the course of the conversation, various truths were pointed out which seemed to lend weight to the assumption that the exhibited cabinet might be instrumental in helping to solve the industry's present troubles, as listed in previous paragraphs.

TWO years ago, Mr. Jeffers, an Acoustical Engineer, feeling that radio cabinets, in general, were not constructed as basic components of the receiver, conceived the idea of producing cabinets designed scientifically—as intrinsic *set-parts*—in order that perfect tone-value would be attained. He put his proposition before Mr. Grassick, Industrial Manager with the Insulite Company, and the two of them worked on the problem for about a

year. Convinced of their success, they then told their story to the Rockford Furniture Company and the E. I. DuPont de Nemours Company, both of which concerns were quick to unite with the Insulite Company in the manufacture of the finished product.

FOR a year, DuPont chemists conducted intensive experiments, developing—for the Insulite cabinet—a special and unique surfacing on which they can duplicate the outward appearance of practically any grain or design, regardless of colors or finish. Nine distinct colors were used on the specimen exhibited for this writer's benefit, and as far as his own untrained eyes were concerned, the cabinet was apparently hand-painted. In reality, however, a specially-devised DuPont machine-process is employed in the application of the patterns and colors.

To date, an unlimited number of perfected individual designs may be used in the decorative surfacing process. Because a peroxylin finish is used as a base, the surfacing is water-proof, stain-proof and washable. Particularly startling to this writer is the fact that when the sharp edge of a quarter is rubbed energetically across the surface of the cabinet, it does not scratch, nor does the slightest mark remain.

THE insulite, itself, is a synthetic board made of wood-fibres, ground chiefly from spruce logs and re-manufactured or felted together into a rigid board, about one-third the weight of lumber. Before the fibres are put in board form, they are treated chemically to preserve and waterproof them. Insulite has been manufactured at International Falls, Minnesota, for the last sixteen years, during which time it has been used for heat insulation and sound correction.

Due to its porous nature, it is said to have excellent sound-absorbing qualities and to be vibrationless. Also, its lack of grain should insure uniform sound reflection. Unlike wood, it is non-resonant. It was first used in radio cabinets as a baffle-board to soften dynamic speakers. As illustrated in the accompanying graph, its absorption coefficient is more nearly constant—throughout the audible range of lower and higher frequencies—than is the coefficient of many other materials used for acoustic

correction. Because it has just the right amount of absorption, according to Mr. Jeffers, it is able to tone down the shrillness so annoying in the average reproduction of a woman's voice, and can handle to perfection such otherwise blatant instruments as the clarinet.

In order to provide the exact amount of resonance necessary to properly reproduce string instruments, insulite cabinets are furnished with wooden tops. The frame, too, is built of lumber. Otherwise, insulite is used throughout.

THE Insulite-DuPont-Rockford process has been patented, and those cabinet manufacturers who wish to adopt it in the future will have to secure licenses.

For the coming year, a production of 300,000 cabinets is planned. Although many of the larger set-manufacturers to whom a sample cabinet has been shown have each expressed a desire to buy up the entire lot of 300,000, those in control are wisely apportioning their cabinets among several manufacturers.

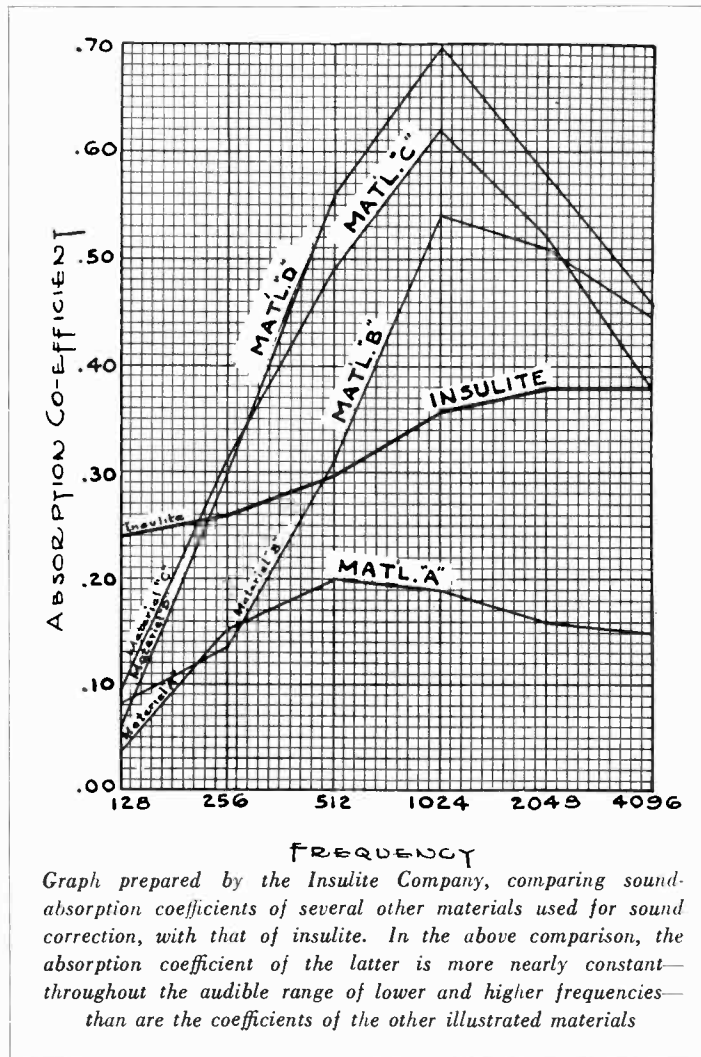
In the future, each set-manufacturer will be sold individual cabinet designs, to distinguish

his sets from those of competitors. The fact that color is the outstanding feature of these cabinets means that those manufacturers who desire to pioneer may do so by ordering cabinets of brilliant hues. On the other hand, they may use a more conventional type—in exact imitation of a wood-cabinet, if desired—until public taste is more thoroughly educated to the colored cabinet.

It is significant that these cabinets will be sold only in large orders and to manufacturers selling *complete units*. This will materially aid the present movement toward exclusive dealerships—which in itself will go a long way toward stabilization of the industry. Thus, we already have a partial answer to the three immediate wants of the radio industry enumerated earlier in the article: (1) stabilization; (2) non-interference with existing production; and (3) a new "sales appeal" to the public.

CERTAINLY, too, referring to the second "want", the introduction of a new type of cabinet will have no bearing whatsoever on mechanical production. In

(Please turn to page 143)



SPECIALIZATION in Merchandising Radio

MORE and more is the trend towards specialization in selling radio. Most wholesale distributors today are concentrating on one line and every day we see retailers doing the same.

The question that must be decided is whether the advantages of merchandising one line of radio outweigh the disadvantages. Careful analysis leads to only one conclusion, namely specialization.

From a wholesaler's standpoint, by concentrating on one line, there is no question about the advantages, providing, of course, the manufacturer represented has a line of radios meeting with some degree of popularity.

The difficult phase of specialization is in the retailer's store. Many retailers carrying as high as ten to fifteen makes, wonder, oftentimes, where their profits are at the end of a fiscal period. True, possibly, they do a larger volume of business than the dealer concentrating on one line does, but what good is volume without profit?

THE advantages in favor of specializing and concentrating on one line of radio are as follows:

First: Minimum Merchandise Inventory. It is very apparent that by concentrating on one make, a retailer can operate with a much smaller inventory, thus making available additional cash for installment selling or open accounts receivable.

Second: Minimum Loss Through Obsolescence. By specializing on one make, a retailer has better control of his inventory at all times, and so should never be in a position of having obsolete sets on his floor except through repossessions or trade-ins.

Third: Helps Solve Trade-in Problems. Assuming that when a dealer becomes exclusive on one line, that in return he gets better territorial protection, the exclusive dealer then is in a better position to control the trade-in allowances that he is forced to make.

Fourth: Faster Rate of Turn-Over. Obviously, with



By **HARRY ALTER**

President, Radio Wholesalers Association

a single line and a small inventory, the capital and dealer investments in merchandise can be turned over more often than otherwise when many lines are handled.

Fifth: Economies in the Service Department. If the service men of a dealer specializing in one make are thoroughly trained on the repair of that particular make, more efficiency and lower service costs are bound to follow.

SIXTH: Closer Cooperation Results. When a dealer is operating exclusively on one make of radio, he is bound to secure much closer cooperation from his manufacturer or wholesaler, not only along sales lines, but also from a credit standpoint.

Seventh: Specialized Selling Is Easier. Not only do the public prefer dealing with a retailer who carries but one line, but also the retailer is in a stronger sales position because:

- A. There is no doubt or confusion in the mind of his prospect when he enters the store.
- B. Neither is there doubt or confusion in the mind of the retail salesman as to what set should be sold to the customer when the most direct sales effort is concentrated on the prospect, and can only be so where the store has but one make of radio to sell.

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**A List
of the
Various
Advantages
To Be Derived
From Following
This Trend
of the
Industry**

Looking Over the

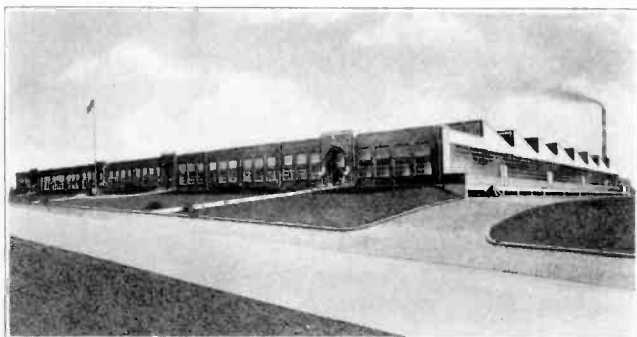
Our Associate Editor Goes on Tour and Reports that Box Car Numbers Do Not Loom as Production Figures as Was the Case Last Year

CALLS at the radio factories located outside the Chicago area have been bringing out many interesting things this spring. It is gratifying to note the decided trend toward improving the quality of radio receiving sets, and without exception those set producers called upon during the last few weeks signified their intention of submitting for the approval of the public a product worthy of the names placed upon the escutcheon plates.

At Fort Wayne, the addition to the new Inca plant was in the throes of completion. The floor had been laid and within a few days the temporary partition that was put into place while the east end of the building was being constructed will have been removed to provide more space into which the various departments may be expanded. The Inca plant is a sight well worth seeing. A well-lighted modern manufacturing plant of the single floor saw-tooth construction allowing natural daylight to cover the entire floor area; clean modern apparatus for enameling wire, and the orderly appearance such as only a new building with new equipment can afford presents a picture that one will not soon forget.



Above, the unit system of manufacture of radio vacuum tubes is being tried, with success, at the Hygrade Plant in Salem



Inca's home in Fort Wayne is a well-lighted modern manufacturing plant of the single floor saw-tooth construction

At the same time the sales force of the Inca organization reports a goodly amount of business, and that department's claim was substantiated by the activity in the production departments of the plant.

A little further south at Marion, Indiana, the engineering department of U. S. Radio and Television have designed an automobile radio receiver. One of the production lines has been turned over to the manufacture of a few hundred of the sets as an initial stock. A battery type receiver for the rural trade is another of the big items in the Apex plant today.

A NOVEL and interesting plan has been inaugurated by the Acme Electric and Manufacturing company of Cleveland. An attempt is being made to aid the small local radio receiving set producer by furnishing him a chassis punched and partially equipped with the apparatus for the completed job. It is intended that the small producer do the engineering from the radio frequency standpoint in order that the service work might be localized. By the plan proposed by C. H. Bunch of the Acme plant, the tooling cost of the small producer can be materially lowered, and at the same time individual enterprise on the part of the small producer who serves only a limited market will not be hampered.

Over at the Sterling plant, the principal point of interest from the production viewpoint was the speaker for use in automobiles. Several different types have been designed and are now in the process of fabrication, but the one that seems to meet the demand the most satisfactorily is of the dynamic type.

The Johnsonburg Radio company, makers of the JRC vacuum tubes, is an offspring of the Castanea Paper company and was organized for the primary purpose of equalizing the labor situation within the town of Johnsonburg, Pennsylvania. A change in the activities of the paper company eliminated the necessity for female labor and in order to create a market for female help, the radio tube plant was started.

THE Sylvania Tube Company's plant at Emporium, Pa., was found teeming with activity. The force was below normal peak production times, but it was remarkable that so much work was being done at this season of the year. The Sylvania plan at present calls for a certain definite production for each month and the plant works until that quantity of tubes is produced. If it can be put out in three weeks, the plant shuts down for the remainder of the month. At the same time, if the quantity set requires the full month the plant will work throughout the entire time.

The transition of the Wurlitzer plant at North Tawanda from its position as a source of circus music ap-

EASTERN MANUFACTURERS

A Survey of the Season's Production Tendencies

By **K. A. HATHAWAY**

Associate Editor

paratus to that of one of the leaders of radio receiving sets is noteworthy. The cabinet works where the consoles for the Lyric sets are fabricated is one of the most modern plants in the industry.

Stromberg Carlson's policy of quality products has proved itself worthy. Even in the slack period of the spring months the factory has been kept in continuous operation. The visit was made on Saturday morning, a time when the majority of factories are closed down at this time of the year, and this correspondent parked his car a block from the factory, the nearest space available.

The main point of interest at the Bosch plant was the automobile receiver which they announced several months ago and then said nothing about for a time due to the propaganda circulating throughout their home state, Massachusetts, purporting to show that radio was an evil so far as motoring was concerned. With the decision against the introduction of legislative action, however, Bosch took up their production program again.

THE unit system of manufacture of radio vacuum tubes is being tried at the Hygrade plant in Salem. The tubes are not racked from the time the mounts are completed until the tube is ready for the basing operation. The system has not been given a thorough trial but if the lamp game is a criterion, the method should be satisfactory for the making of vacuum tubes.

Eveready-Raytheon is forging ahead with automatic machinery for making tubes. A machine combining three operations was in process of fabrication at the time of the visit. A new inspection process making use of the X-ray has been instituted. The cathode assembly including the filament element when subjected to the X-ray shows the internal condition of the elements exactly as they appear, and the operator removes those in the tray alongside the negatives that correspond to defective ones she finds on an illuminated X-ray plate.

More of the set manufacturers would do well to get acquainted with the work being done in the interference laboratory operated by Tobe Deutschmann at Canton, Mass. An effort is being made to rid the users of radio sets from the annoying effects of man-made static and the latest acquisition is a fleet of automobiles to be used in the tracing of local interference. The research work on interference elimination has been costly, but the producers of interference causing machines have recognized the necessity for some such device and today we find reference to the lack of radio interference in some of the advertising copy covering refrigerators, oil burners, and like apparatus.

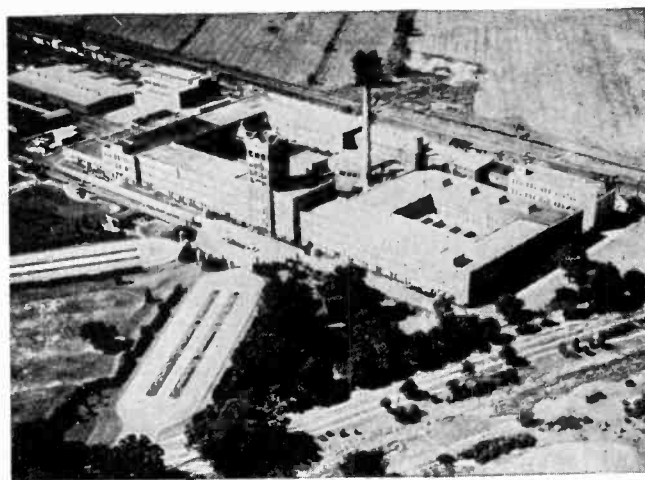
Samson Electric company at Canton and Watertown

are interested in furnishing schools with radio apparatus as their largest field. The increase in the use of radio in schools gives indication that the demand for apparatus of this kind will grow accordingly.

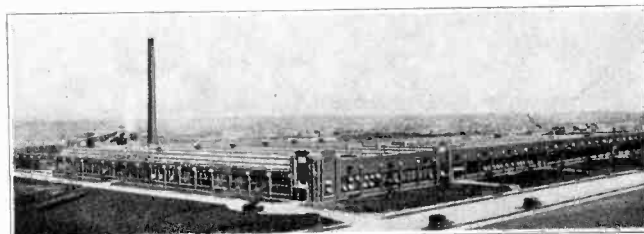
GENERAL RADIO company, makers of the testing apparatus that the manufacturers have in their laboratories, are in the midst of a building program. A new wing is being added to the present structure and into the new addition will go the laboratories which have been gradually becoming more crowded as the demand for precision apparatus has increased with the rise of the industry.

Triad in Pawtucket, R. I., laid out their factory in a way that is different from the general run of tube plants. They have no overhead pipes for the utilities and instead they carry them through the floor at each of the machines and hang them on the ceiling of the floor below to give more room around the machines. The production departments were laid out with a view to expansion and spaces have been provided for additional machines as the

(Please turn to page 144)



Above, the cabinet plant in the Lyric factory at North Tonawanda, N. Y., is one of the most modern in the industry



Stromberg-Carlson's new plant at Rochester is of monitor type construction with a floor space of 360,000 square feet

The Value of POLO

The Industry's Future Sales Success Is Dependent
on the Adoption of Competitive Games
Between Rival Firms

WHEN the news first leaked out that the young executives of a large Radio manufacturing organization had gone in for the game of Polo, a great number of people sadly shook their heads—as if to say, “There’s no doubt about it. This industry’s going to the dogs.”—“What,” they questioned, “Can be the value of a sissy game like Polo to the Radio Industry? How will it benefit the wireless Art or the business situation if these young fools put on close-fitting little white pants and riding boots, and go around swinging a mallet at a wooden ball from the top side of a horse?”

At first thought, these peoples’ doubts seemed entirely justified. It was felt, however, that the guilty parties must have had *some* economic or scientific reason for taking up Polo, and the task of explaining their apparently senseless actions was turned over to the Research Department of *Radio Industries*.

With customary thoroughness, our research men applied themselves to the case and made every effort to discover the exact value of Polo to the Radio Industry. After several weeks of profound study and far-reaching calculations—during which time such books as Ramsey’s “Fundamentals of Radio,”

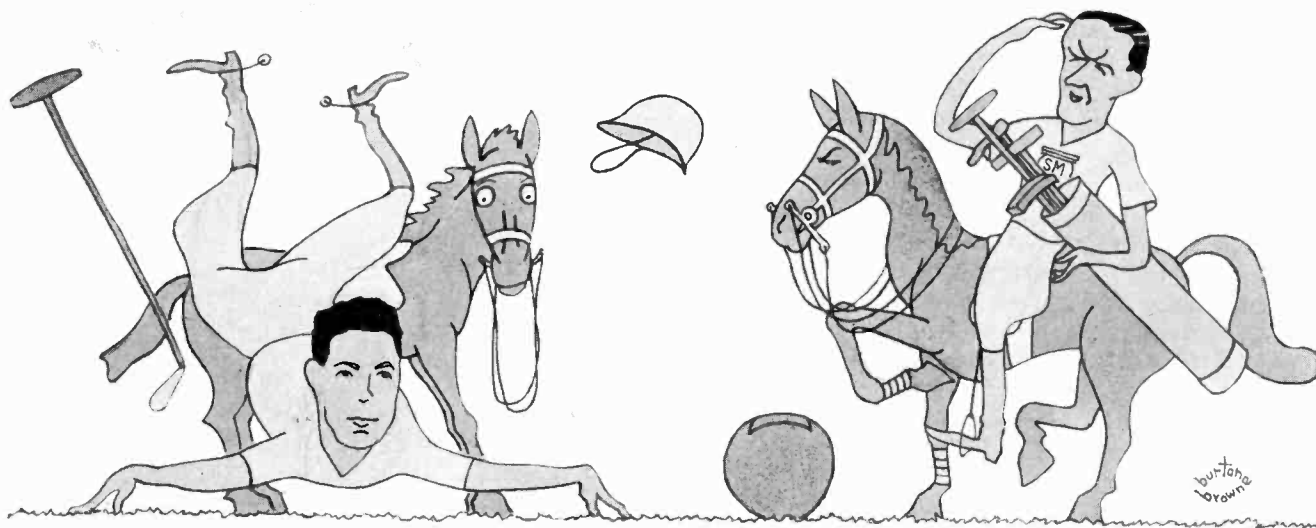
Hoag’s “Electron Physics,” Henney’s “Principles of Radio” and Morecroft’s “Principles of Wireless Communication” were diligently searched through for possible explanations—the problem has finally been solved. We are happy to turn the solution over to our readers:

As a group, the people who buy radio sets in this country—the great American public—are lovers of good clean sport. Whether or not they have been nursed into this passionate enjoyment of competitive athletics—as some critics claim—by subtle newspaper publicity, is aside from the point. The fact is, they talk, eat, sleep and *thoroughly understand* all matters pertaining to so-called physical “games.”

Mr. Average Citizen, however, is downright ignorant when it comes to the subject of Radio. As far as *he* is concerned, a vacuum tube is merely a glorified and comparatively expensive electric-light bulb; and a loud-speaker is simply the area of the cabinet from which sound is given forth when the set is turned on. Usually, too, he has never even heard of such devices as transformers, condensers and resistors. From this picture, it is quite evident that when radio salesmen try to impress him with



The masked marvel of Radio Industries' Polo team. Note the typewriter attachment which allows him to write as he plays



to the Radio Industry

Our Research Department Finds Young Executives Justified in Taking Up Apparently Useless Sport

engineering data, in explaining a set's superior qualities, the sales-talks are falling on ears that have little idea as to the nature or meaning of the arguments advanced.

But when the salesmen have finished chanting about tube characteristics and automatic volume control, Mr. Average Citizen is glad to speak with them, knowingly and intelligently, on Babe Ruth's home-run streak and the possibility of Bobby Jones winning four major golf titles this year.

It would be ideal, therefore, if, instead of using technical phrases when selling Radio, we were able to employ a language certain to be understood by the customer—the language of sport. In order to accomplish this, however, we would necessarily have to find some aspect of the receiving-set which would lend itself to public enthusiasm and which would satisfy the natural human instinct to take sides and root for a favorite.

This is what the executives mentioned in the first paragraph intend to bring about by introducing Polo to Radio. They are going to make the industry *sport-conscious*.

In time, it is hoped, manufacturers will begin to organize Football, Basketball and Baseball teams, which

will compete with squads representing rival manufacturers. Gradually, in the public mind, these contests will grow in importance until they are on a par with Big-League Baseball and College Football.

When Mr. Average Citizen, after a hard day's work, sits down to his evening meal, instead of inquiring how the Chicago Cubs made out against the New York Giants, he'll ask for the score of the Atwater-Kent—Philco game.

"Philco won," his wife will reply. "Their Chief Engineer, Mr. Holland, hit a three-bagger with the bases loaded to put over the winning run."

"Shucks," Mr. Citizen will say, "I should have bought a Philco last Christmas instead of that Atwater-Kent set."

"But you forget," Mrs. Citizen will chime in, "It was a different story yesterday, when Mr. Kent himself was pitching. He didn't let a Philco man get to first base and the Atwater-Kent team walked away with the game."

"You're right, dear," Mr. Citizen will admit, smiling contentedly, "I guess I should be pretty well satisfied with the old A-K receiver after all."

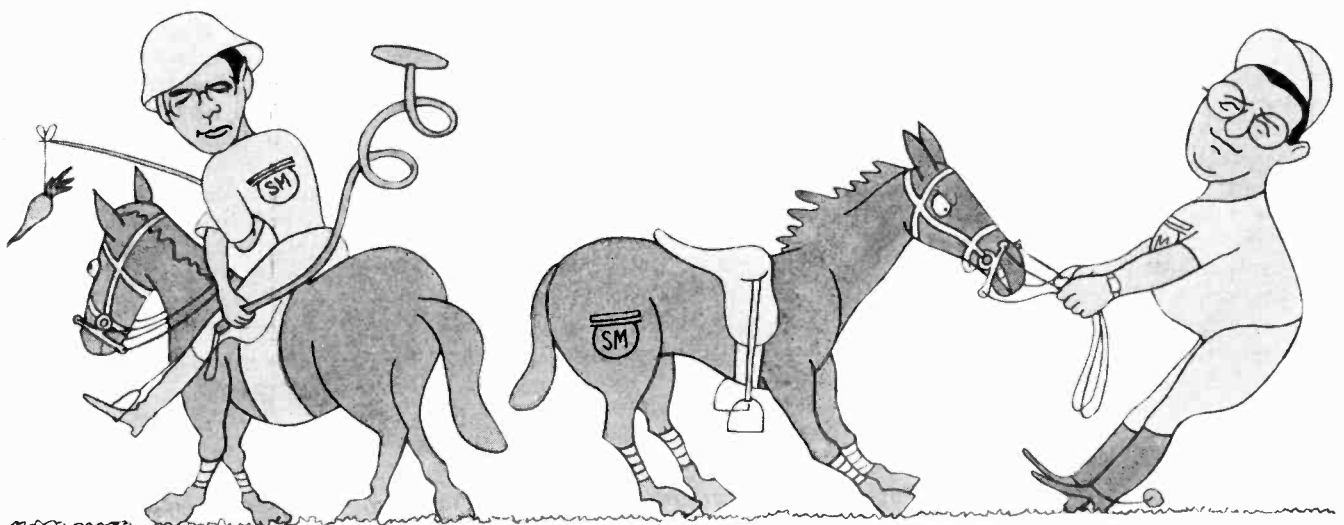
The dealer will have an easy time of it, once this sys-

(Please turn to page 141)

POLO MATCH!

On Wednesday afternoon, June 4th, at 4:00 P. M. The RADIO INDUSTRIES Polo team will engage in combat with the Silver-Marshall team. The match will take place at the Atlantic City Armory, Apecon Blvd. and New York Avenue. Admission will be free to the Trade. Entrance tickets may be secured gratis at the Silver-Marshall or RADIO INDUSTRIES booths in the Auditorium. The game will be broadcast by the 5,000 watt Columbia Chain Station WPG.

At the bottom of the page, Artist Burton Browne has illustrated various characteristic poses of the Silver-Marshall athletes. At the far left, taking his usual swan dive, is McMurdo Silver. Next, in order, are Laurence Chambers, Burton Browne and William Halligan. From the appearance of the S-M team pictured below, RADIO INDUSTRIES is confident of victory.



LETTERS FROM OUR READERS

MR. RICHMOND COMMENTS

In commenting on the article entitled "Courage, Mr. Part Manufacturer!," which appeared in the May Radio Industries, President H. B. Richmond of the R.M.A. wrote in to say:

One of the things that a trade association must avoid is anything in any way pertaining to price fixing. It would be splendid if groups could get together and agree on prices, but this is illegal. Our Association has, therefore, avoided anything that in any way approximates price fixing. We even find it necessary to be very cautious on the question of standard costs as related to prices.

There is another situation that we must consider, namely, that of the purchasers of radio parts. They too, are members of the Association. Should they feel that any one group was getting together to increase their costs, they would be very hostile.

Then comes that very important third factor, namely, the definition of a cost. A true cost is usually looked upon as the material, labor, all the necessary overhead with a reasonable return on the investment. This is the ideal figure at which we should try to sell. There are, however, times when companies consider it advisable to sell for bare labor and material costs, which may be as low as one-half or even less than one-half the charge I have just referred to as the ideal selling price. That situation exists at the present time in the East in several lines of business very remote from radio. In order to keep the men employed, particularly in answer to President Hoover's request, several organizations have found it advisable to take on a certain amount of business at bare cost, just to keep their important men employed. There is no money in swapping dollars, but there are times when it may even be desirable to swap dollars. It is part of a plan of making the swap profitable in the future.

The point that you are really bringing out is that it is not possible for a company to supply material below its full, profitable selling price for any great length of time and still stay in business. In this we heartily agree. When a company goes out of business it often is embarrassing, not only to that company but to the company purchasing its material. It is this problem that you are asking for a solution. The solution is, however, not simple, and at the present moment the suppliers of radio parts do not seem to be in a frame of mind to do very much about it. Therefore, there is very little that a third party can do, whether that party be a trade association or a trade publication.

Yours very truly,

5-12-30

H. B. Richmond, President

HE LIKES OUR EDITORIAL

Kindly send us ten copies of your May edition, or perhaps you can let us have 100 reprints of your editorial in your May edition entitled "Courage Mr. Parts Manufacturer."

This editorial is the finest I have read as regards the present condition of a great many parts manufacturers, and there is no question but that this condition prevails today.

We are anxious to obtain these editorials and trust that you will be able to supply them to us within the next few days.

Yours very truly,

Micamold Radio Corp.

5-16-30

A. P. Hirsch, Pres.

WANT SURPLUS MERCHANDISE

Will you kindly insert the following letter in the "LETTERS FROM OUR READERS"?

We are interested in buying surplus Radio Merchandise finished or unfinished and are paying cash for same.

Thanking you in advance for your attention, we remain,

Yours very truly,

Raysol General Brokerage Co.

5-14-30

Radio Div. S. Altenhaus.

RECONSTRUCTS MACHINERY

I find lately that some of our foremost Radio parts Manufacturers are going in for a little expansion, which proves business is on the up grade.

Should you get any inquiries regarding enameling machines, for copper magnet wire, condenser winding machines for foil and paper, or wire coil winders, and silk and cotton insulating machines, I suggest that you give my name and address to the parties interested.

I build, design, reconstruct and improve these machines.

Polymet Manufacturing Corporation has used my services in their 1929 expansion program; during that year, I personally designed and supervised the construction of all the new production machinery in the Bronx factory, and at the Winsted branch factory.

I have much valuable information that can be of good use to many of your subscribers in the trade.

Thanking you for your courtesy in filing my name in your records against future possible inquiries, I remain,

Yours very truly,

5-9-30

Jack Allen

HERE'S A MAN WHO LIKES US

We thank you very kindly for your valued response. Your splendid courtesy is appreciated, and we look forward to an early opportunity to be able to do as much for you.

Might we add that your marvelous publication has done more for yours truly in apprising him of important activities than all of the periodicals in this business put together. This writer has read anything and everything pertaining to Radio, almost since its inception, and is therefor in a position to know whereof he speaks.

Again we thank you for your almost unprecedented courteous reply, taking into consideration that it really is the first time if memory serves correctly—that a "radio" magazine actually acknowledged our communication within—well, say about seven days.

Thanking you again and wishing you more than a host of luck.

Saul Schier

Sec'y-Treasurer

4-23-30

Radio Schier Company

FREIGHT RATE REDUCTION

I would ask that you be good enough to find space in your valued publication to make mention of the fact that the revised classification on Radio Receiving Sets and Radio Phonograph Combinations which has been under discussion between the Official Classification Committee and the Traffic Committees of the Radio Wholesalers Association and Radio Manufacturers Association for over a year will become effective on June 15.

Official Classification No. 6 containing these changes and giving full information will be published on May 1. An agreement was reached last October with the Official Classification No. 5, as the limit of the supplements had been reached except for such rulings as were necessary to comply with orders of the Interstate Commerce Commission. However, a new general freight classification has been compiled in the past several months and its issuances on May 1 is the first opportunity that the Classification had to publish the new radio rulings.

Yours very truly,

Francis E. Stern, Chairman

Traffic Committee, Radio

4-28-30

Wholesalers Association

CREDIT MANAGER AVAILABLE

For several years I was Credit Manager with a prominent radio manufacturer who is now in receivership. My services will be available June first.

(Editor's note: This man can be reached by addressing Box 2X, care of Radio Industries.)

NEWS OF THE INDUSTRY

Our readers are interested in live news of the industry

STORY AND CLARK IN RADIO

Announcement has been made of the completion of plans for the production and marketing of Story & Clark Radio—built by Story & Clark Radio Corporation, a subsidiary of the Story & Clark Piano Company, makers of fine musical instruments since 1857. Active production of Story & Clark Radio is now in force in the extensive Story & Clark plants at Grand Haven, Michigan. The executive offices and central laboratories are located in the Story & Clark Building at 173 North Michigan Avenue, Chicago. Officers of the Corporation are: President, Frank F. Story; Vice-president, L. P. Bull; Secretary, Walter H. Huth; Treasurer, H. M. Robertson; Otto N. Frankfort, in charge of Advertising and Merchandising.

The new company has purchased all of the patents, rights and engineering equipment of the Walbert Manufacturing Company, radio manufacturer of Chicago, and has been directly licensed by the Radio Corporation of America and Affiliated Companies.

The plant at Grand Haven, Michigan, is thoroughly equipped for radio manufacture and the new Story & Clark Radio is new in regular production.

DR. MYERS BEGINS RESEARCH

A \$500,000 manufacturing plant and research laboratory at 57 State Street, Newark, N. J., has been turned over by National Union Radio Corporation to Dr. Ralph E. Myers, famous vacuum tube engineer, for intensive research in the production of new developments in tubes, according to an announcement by E. A. Tracey, first Vice-president of National Union.

Dr. Myers early this year was appointed Vice-president in charge of National Union's engineering and production and was elected to the board of directors.

He had been chief engineer in charge of lamps and radio tubes at the Westinghouse Lamp Company, where he had made a distinguished record in twenty-one years service. He was one of the scientists who developed the 227 tube and the general line of oxide-coated filament tubes. His services as research and production chief were secured by National Union, the new merger of tube manufacturers in which R.C.A. has a financial interest.

Dr. Myers was at one time professor of electro-chemical engineering at Pennsylvania State College. He was granted a Ph.D. degree at the University of Pennsylvania. He is a member of the American Institute of Chemical Engineers, and the American Institute of Electrical Engineers.

A. A. KENT AWARDED MEDAL

A gold medal and citation for meritorious services was conferred upon A. Atwater Kent, president of the Atwater Kent Mfg. Co., Philadelphia, Pa., world's largest makers of radios, by the Wanderers, an or-



ganization of Union League Members of this City, at a dinner at the League on Tuesday evening, April 21st.

Colonel Louis J. Kolb, president of the Wanderers, presented the medal in the presence of men of business and science, including Cyrus H. K. Curtis and Franklin Spencer Edmonds, who had been similarly honored in previous years.

The medal, Mr. Kolb said, is in recognition of Mr. Kent's "many activities in the field of science, invention and industry, and in high appreciation of his many benefactions to the young men and women of the country interested in music, and his many gifts for the benefit of humanity."

The speakers included Mr. Curtis, Mr. Edmonds, Herman L. Collins, Maj. General William G. Price, Jr., and George W. Elliott. Mr. Kent said much of the credit for his successful services belongs to his associates in business.

JOIN FORCES WITH AEROVOX

Charles Golenpaul, formerly sales manager of Clarostat Manufacturing Co., Inc., has recently joined the Aerovox Wireless Corp., Brooklyn, N. Y. in an executive sales capacity. Mr. Golenpaul's many friends in the industry will be very interested to learn of his new connection, and he will be happy to continue serving the radio manufacturers with quality

INTRODUCE RADIOS IN JUNE

Four outstanding companies in the radio industry—Radio Corporation of America, General Electric Company, Westinghouse Electric & Manufacturing Company and Graybar Electric Company—will have simultaneous premier showings of new radio sets at the time of the Fourth Annual Radio Trade Show, at Atlantic City, June 2-7. The showings will be private, at hotels, and by invitation only. The sets will not appear at the show itself. First formal announcement to the trade will appear in the July issues of business papers. Consumer advertising will follow.

The sets of the four companies are all being manufactured by the R.C.A.-Victor Company, a division of the Radio Corporation and are said to be identical in all major particulars, except cabinet and name plate. Their price range will be about the same. They will be merchandised and advertised separately, however—the Westinghouse advertising being handled by Lennen & Mitchell, General Electric and R.C.A. by Lord & Thomas and Logan, and Graybar by Newell-Emmett Company.

The new General Motors radio, first formal announcement of which appeared this week, it is said, is also manufactured by R.C.A.-Victor, at Camden, and will be similar to the others. The Victor set, however, manufactured by the same company for distribution through Victor dealers, is essentially different in features and price range.

The largest "campaign" for radio in the ten years' history of the industry is expected materially to stimulate the radio business as a whole. Several other large companies are working on new models to be introduced at the show and some of them—including De Forest and Grigsby-Grunow—have entered the experimental television field. One company is reported to be perfecting a combined radio-television-phonograph set.

Concentration of radio manufacturing operations by R.C.A., General Electric and Westinghouse, and their plans to establish a "General Motors in radio," is probably the first step toward the establishment, as the result of intensive competition, of other large groups in this industry.

components for the highest standard of efficiency of radio apparatus.

Howard E. Rhodes, formerly technical editor of Radio Broadcast magazine, has also joined Aerovox Wireless Corp in an engineering capacity, and brings to his new situation a vast amount of technical experience in radio research work.

DAMARIN WITH TUNG-SOL

Fred L. Damarin, now Sales Manager with Tung-Sol Condensers, Inc., began his career in the field of Railway Signal Engineering, where he remained for two years after leaving school. He then became a Carburetor Engineer with the National Equipment Co., Chicago, and in 1914 developed a kerosene-burning carburetor. Following this, he spent three years in the automotive racing end of the industry, both racing and engineering with the Frontenac team.



In 1916, the thunderous war clouds caught his fancy, and until 1920 he was actively engaged in war work as a member of the Railway Artillery.

On his return, he went into the business of manufacturing mica condensers. This lasted till 1922 when Commonwealth Edison claimed him as Buyer for their radio department. Soon afterwards, he became assistant to the Chief Engineer of the U. S. Radio Corporation, Chicago, where the first metal panels and cabinets were developed. His next three years were spent as Radio Buyer with the Fair Store, Chicago.

April, 1925, found him Chief Engineer with Grigsby-Grunow Company, in which position he remained for about nine months, after which he went into their Sales Department and was Sales Manager of the Chicago division until March 1, 1927 when he joined Dubilier Condenser Corporation as Sales Manager of the Central States.

On April 1, 1929, he associated himself with Brown and Caine, Inc., now Tung-Sol Condensers, Inc.

To appreciate Fred Damarin, one has but to hear him utter a few of his favorite expressions—such as "All right, fella" and "O. K."—said as only he can say them. Hearing them, and knowing the man, you can't help falling into the general opinion that Fred is one Prince of a fellow.

EVERY HOME A THEATRE

David Sarnoff, President of the Radio Corporation of America, predicts that the talking motion picture of the future, possessing the four elements of sound, color, motion and perspective, will bring a totally new form of entertainment not only into the theatre, but also into the home."

"I have not been worried," Mr. Sarnoff said, "by the fact that two or three organizations have control of the theatres of this country, because there are only 20,000 theatres in the United States, of which 10,000 are first rate houses and the other 10,000 second and third rate houses. Potentially there are 26,000,000 theatres in this country awaiting development. Every home can ultimately become a theatre itself."

REPLOGLE LEADS TELEVISION

There will be plenty of talk about radio television or radiovision at the R.M.A. Trade Show. And many will seek the opinion of D. E. Replogle, Treasurer of the Jenkins Television Corporation, Chairman of the Television Standards Committee of R.M.A. and, what is perhaps the highest honor, just plain "Rep" with almost everyone.

Rep is the mainspring behind the technical progress of the Jenkins Television Corporation. Aside from the many duties of Treasurer, he finds time and energy to direct the vast engineering activities of that organization, ranging from the design and production of television cameras, film pick-ups, transmitters and other radiovision broadcast equipment, to the home radiovisors, and again to the choice and preparation of programs to be put on the air. A Jack of All Trades—and a Master of Most Trades—that describes the present work of one who is working night and day in bringing radio television to the commercial stage. Meet him at Atlantic City—and let him show you his bag of radiovision tricks!

HYGRADE CLAN GATHERS

The Hygrade Lamp Company, manufacturers of Hygrade Radio Tubes and Hygrade Lamps, will take an active part in the Atlantic City Radio Show, to be held from June 2nd to 6th inclusive.

Hygrade will have two booths at the Show—Nos. 48 and 49 in Section D of the Exhibition Hall, in which the complete line of radio tubes manufactured by the Hygrade Lamp Company will be exhibited.

The entire tenth floor and roof garden of the Hotel Madison, located at Illinois Avenue, has been reserved for Hygrade Salesmen and guests during the course of the show, and attractive displays of next season's Hygrade advertising will be shown there.

Salesmen from the Chicago, Baltimore and Cleveland offices will be at Atlantic City during the Show, in addition to a group of executives and salesmen from the home office at Salem, Mass.

HARDY WINNING PERSONALITY

If there was ever a chap in the radio industry with a clean-cut, winning personality, that chap is Larry Hardy, General Sales Manager with the CeCo Manufacturing Company.

Larry was born in New Orleans in 1901 and went to school at Georgetown University Law School, where he belonged to the Class of '23. He started in the radio business in 1924 as Assistant Director with an exhibition firm in Washington who



staged shows. During his first year in this position, when radio was just getting popular, he conducted a Retail Merchant's Radio Show, the main feature of which was the presence of Roxy and his Gang, from New York, as entertainers, and the fact that one-half the proceeds went for the installation of radio sets in the Walter Reed Hospital, at Washington. That was the first time radios had ever been installed in a government hospital.

In 1925, Larry dropped radio for awhile to go with Landers, Frary and Clark—one of the oldest metal manufacturers in the country—whose electrical department he graced, merchandising small electrical appliances. He was placed in charge of the New England territory, in six New England states.

From 1927-8, Larry was employed in General Electric's merchandising department, operating out of 120 Broadway, New York City.

On the first of January, 1929, he started with the CeCo Manufacturing Company, and was placed in charge of the Western Division, with offices in Chicago, and a territory embracing twelve states, from Detroit to Omaha, and from Minneapolis to Louisville.

Larry was put in charge of General Sales, at the CeCo Factory, the first of the present year.

BUSINESS TOPICS

75% of All Radio Sets and Equipment Used Throughout the World is Made in the U. S.

GENERAL CABLE REORGANIZES

A new field sales policy has been made effective by General Cable Corporation, by the establishment of eighteen district and territorial sales offices, and the assignment of the entire district sales personnel of Dudlo, Rome, Safety and Standard Underground Divisions to these new territories.

Until this change, the sales organizations of the four Divisions had functioned in parallel, maintaining the industry contacts which each had established over many years of service. Subsequent to the formation of General Cable in 1927, the industry has made increasing use of the combined manufacturing and engineering facilities of the Corporation, through the channels of the individual Divisions. This reorganization of sales forces further consolidates these facilities and makes them more readily available.

The identities of the thirteen Companies comprising the four operating Divisions will be continued as manufacturing and shipping units. All present trademarks will also be continued.

Resident Engineers will be located in the district and territorial sales offices. They will represent locally the Headquarters Consulting Engineering Staff, which has been recently organized by General Cable to coordinate for all wire and cable users the engineering knowledge and the experience in design and application of all Divisions of the Corporation.

OPEN REPLACEMENT MARKET

The CeCo Manufacturing Company, according to a statement from Edward T. Maharin, Vice-president in charge of Sales, is inaugurating a new sales policy this year whereby dealers are to let the customer be the judge and if tubes sold do not live up to the claims made for them, the purchase price is refunded without question.

This new plan has for its principal aim the opening up of the replacement market. It is the estimate of Ernest Kauer, President of CeCo, based on data which has been analyzed by his office, that there exists an immediate market for 10,000,000 tube replacements in sets now in homes.

DOUBLES PLANT FACILITIES

The Condenser Corp. of America, of Jersey City, N. J., is practically doubling plant facilities to speed production of their new By-Pass and Electrolytic Condensers which the company recently added to its line.

STRONGEST REMAIN—SILVER

In a special statement to *Radio Industries*, McMurdo Silver, President of Silver-Marshall, Inc., says: "The radio industry has been through an elimination period—leaving fewer but stronger manufacturers



and dealers to supply a steadily increasing consumer demand.

"Dealers can buy with confidence that few changes will be made during the coming season. Manufacturers whose lines they carry have survived the severest test of competition and finance.

"Consumers can rest assured that the aggressive merchant from whom they buy a set will be in business months later to back up his service guarantees."

PACENT APPOINTS SPAHN

Pacnet Reproducer Corp., manufacturers of talking picture equipment, through its president, Louis Gerard Pacnet, announced last month the appointment of Robert H. Spahn as Special Sales Manager. Mr. Spahn, who has had many years experience in the piano field, will direct sales for the corporation in the non-theatrical field. Coincident with Mr. Spahn's appointment to direct sales in the new field embracing clubs, schools, educational institutions, lodges, camps and similar places where sound equipment is rapidly finding favor, the Pacnet Corporation started an intensive sales drive in the non-theatrical field.

Mr. Spahn will have his headquarters in the home office of the corporation in the Film Center Building, 630 Ninth Avenue, New York City, but considerable out of town work is anticipated.

OUTLINES SALES POLICY

The Colonial Radio Corporation, is the official name for the recently combined firms of the Colonial Radio Corporation of Long Island City, New York, and the Valley Appliances Incorporated, of Rochester, New York. Since the merger, these firms have co-operated closely in all departments. The new models for 1930-31 are completed and will soon be announced to the trade.

Through its sales chiefs, Mr. Fred G. Carson, Vice-president in charge of sales, and Mr. Joseph Gerl, General Sales Manager, it now announces its Sales Policy for 1930-31, which touches also on advertising and service: Constant and conservative expansion in the national markets. Distribution through reliable distributors and dealers. Concentration of sales effort in territories where good distributors are available for the Colonial franchise. Allotment of exclusive territories to distributors. Competitive discounts to distributors and dealers. Guarantee of protection on prices. Liberal national advertising campaign together with appropriations to Distributors to use in local appeal for the benefit of their dealers. Generous and constructive service co-operation.

G-M RADIO FEATURES LISTED

A center of interest at the R.M.A. trade show at Atlantic City this year will be the new General Motors Radio, with five models, priced at from \$136 to \$270 and featuring a "tone selector" by which either the bass or treble may be emphasized at the will of the operator.

Sharing interest is the new merchandising plan of the General Motors Radio Corporation, providing the following features: Direct factor-to-dealer operation through a direct nation-wide system of zone offices. Radio dealerships handling General Motors Radio exclusively. Protected territories. Distribution through warehouses, completely stocked, in strategic centers to eliminate heavy dealer inventories. National authorized service through strategically located major service stations, insuring speedy major repair work. Dealer and purchaser financing through General Motors Acceptance Corporation. Factory financial participation in junking of certain classes of trade-in radios. Factory-controlled dealer newspaper advertising.

With orders from the field received since the set was introduced to the public on May 10 exceeding quota estimates, the new system is proving its strength, it was stated by John E. Grimm, Jr., vice-president in charge of sales.

NEW CLARION DISTRIBUTORS

Roy A. Whipple, president of Wakem & Whipple, Chicago, Illinois, announces his company's appointment as exclusive distributor for Clarion Radio in metropolitan Chicago, northern Illinois, and north-western Indiana. This connection with Transformer Corporation of America manufacturers of Clarion Radio brings together two alert aggressive organizations.

Wakem & Whipple enjoy a splendid dealer following and have a background



of years of successful experience in distributing nationally known merchandise in the Chicago territory.

Roy A. Whipple, President of Wakem & Whipple, Inc. has associated with him J. J. Reilly, Treasurer and General Sales Manager and H. N. Smith, Secretary and Credit Manager. This personnel have had years of experience in radio merchandising and are thoroughly alert to the present condition in the radio industry.

RICE JOINS DE FOREST

The appointment of Charles A. Rice, former Sales Manager for the Champion Radio Works, Inc., as Eastern Sales Manager of the De Forest Radio Company of Passaic, N. J., has just been announced. Mr. Rice is well-known in radio trade circles. During the World War, he was a radio operator in the Navy, having served previously with the old Marconi Company. From 1922 to 1925, he was Manager of the Radio Department of the Electric Appliance Company, Chicago. In 1925 he served as District Sales Manager of the De Forest Radio Company of the Chicago area, becoming Assistant Sales Manager of that company and later Director of Sales, being most active in the Clause 9 litigation in behalf of the De Forest interests. From 1928 until recently he was General Sales and Advertising Manager of the Champion Radio Works, resigning that position in order to join the De Forest organization.

SPARTON JUBILEE SET READY

Guarded statements coming from Sparton give evidence that they are preparing to celebrate their thirtieth anniversary this year in a manner that measures up to the occasion. Details regarding their new models have been concealed, but they have let it be known that a new line of "Jubilee" Spartons will be presented and that the name indicates its unusual nature.

The first showing of the new Spartons was at a thirtieth Anniversary Birthday party of several thousand dealers, in Jackson, May 28th. Following this, they are to be presented to the trade at the Atlantic City Show. No hints or promises have been made regarding new developments, but the fact that Sparton announcements in the past have invariably been of much interest leads Sparton dealers to anticipate something even more important than usual, considering the occasion.

EHLE LAUDS VACUUM TUBES

According to Francis R. Ehle, President of the International Resistance Company of Philadelphia, the development work in the use of vacuum tubes during the past two years has been exceedingly active.

Not only has the use of the vacuum tube been responsible for the very rapid development of radio receivers for home use, but, in addition, has branched into many other industrial fields where vacuum tubes are used as prime movers for control devices, signalling apparatus, radio beacons and various other more or less "magical" uses in all types of industry.

Mr. Ehle states that it has been necessary for the manufacturers of resistors to conform to entirely new standards of manufacture, in that the present day resistors required for vacuum tube work must be extremely stable, noiseless and capable of being produced in large quantities at low expense. During the past two years in the radio industry alone, the number of fixed resistors per radio receiver has increased from an original quantity of possibly two to an average of nearly ten or twelve.

Mr. Ehle states that the vacuum tube is just as important a development in the electrical field as the original development of the motor and generator and will have just as widespread a use in years to come.

BEG YOUR PARDON!

In the biographical sketch of D. T. Siegel, general manager of the Ohmite Manufacturing Company, presented in the "Men Who Have Made Radio" department of the May, 1930 issue, it was stated that Mr. Siegel was some years ago employed in the engineering department of the Thomas Engineering Company. The interviewer intended to state that it was the Thomas Elevator Operating Company, 20 South Hoyne Avenue, Chicago, and tenders his personal apology for the error.

ROBERTS JOINS GULBRANSEN

Mr. John S. Gorman, Vice President and General Manager of the Gulbransen Company, Radio and Piano manufacturers, of Chicago, has announced the appointment of Mr. Henry T. Roberts, formerly of the U. S. Radio and Television Company, as salesmanager of the Radio Division of the Gulbransen Company. In commenting on the appointment which was made effective April 15th, Mr. Gorman said, "The Gulbransen Company considers itself quite



fortunate in the acquisition of Mr. Roberts. He is a pioneer in the merchandising of radio, having founded the H. T. Roberts Company back in 1921. His sales managerial experience dates back to the early automobile days and the phonograph field.

LENK CARRIES ON RESEARCH

The Lenk Manufacturing Company, Newton Lower Falls, Massachusetts, have been co-operating with radio and parts manufacturers doing considerable engineering research, leaning toward the application of their product, Super Aluminum Solder, in the manufacture of condensers and other parts of radio sets where aluminum is used.

The engineering research work is in charge of D. Allen Lenk and sales development is being carried on by Maxwell Edelman, president of the company.

HAVE TAKEN OVER COTO-COIL

Coils, Incorporated, located at 1183 Eddy St., Providence, R. I., has recently taken over the equipment of the Coto-Coil Division of the Universal Winding Company and is operating with practically the same personnel that has been serving radio manufacturers for many years with cross-wound inductances, speaker coils, and so forth.

F. C. Henrickson, formerly associated with the Coto-Coil Company for the past nine years, is general manager of the newly formed firm, Coils, Incorporated.

AMONG THE LEADERS

After twenty-eight splendid chapters by as many authorities on every branch of radio, which Martin Codel has placed between the covers of his book, "Radio and its Future," comes the twenty-ninth and closing essay by Dr. Lee De Forest, on the subject, "The Future of Radio." An article by Dr. De Forest appears in the current *Radio Industries*.

* *

Among the executives of the Crosley Radio Corporation who have planned to attend the R.M.A. Show are: Powel Crosley, Jr., President; Lewis M. Crosley, Vice-President and General Manager; Frank G. Macomber, General Sales Manager; R. H. Langley, Director of Engineering; Neil Bauer, Assistant Sales Manager; C. W. Hamilton, Publicity Manager, and a number of others.

* *

H. J. Scheel, Foreign Sales Manager with Grigsby-Grunow Company, reports most encouraging reports from those countries in the tropics where adverse atmospheric conditions have, in the past, seriously hampered rapid progress in radio development.

* *

Sensing the growing importance of short waves in the broadcasting and communication fields, together with the demand for more elaborate and efficient receiving equipment than has heretofore been available, C. R. Leutz, well-known receiving set constructor of Altoona, Pa., now announces two new short-wave receivers.

* *

Wider exchange of radio industry statistics between R.M.A. members is reported by Chairman George Furness of the R.M.A. Statistics Committee. Monthly reports regarding sales and stocks on hand are being exchanged between members through the R.M.A. central bureau and are of increasing value to the Association's members, according to Mr. Furness. Further development of the statistical service is planned in the near future.

* *

Henry S. Tenny, president of The Rola Company, with plants in Cleveland, Ohio and Oakland, California, is touring the east and middle west contacting the various set manufacturers with the latest Rola developments.

* *

A recent addition to the staff of the Arcturus Radio Tube Company, Newark, New Jersey, is C. E. Stahl. Mr. Stahl was elected to the Board of Directors and appointed General Manager. He comes to the Arcturus Company with a wide experience of the radio business gained since the early days of the industry.

* *

Among the New York executives and sales heads of E. T. Cunningham, Inc., who will be in attendance at the R.M.A. Show will be: George K. Throckmorton, Executive Vice-president and General Manager; C. R. King, Vice-president and Assistant General Manager; M. F. Burns, Vice-president and General Sales Manager; and D. F. Schmit, Chief Engineer. Cunningham headquarters will be at the Ambassador Hotel.

* *

General Transformer Corporation announce the removal of their office and factory from 940 Jackson Blvd., Chicago, to their new and larger home at 1900-10 N. Kilbourne Ave., Chicago.

* *

David E. Kahn, President of Federal Wood Products Corporation, announces the removal of their offices and radio furniture show-rooms to the Albert Pick Barth Building, 419-21 Lafayette St., New York City, on June first, 1930. New phone number—Spring 6100-1-2.

When Captain William Sparks, president of the Sparton organization, goes south for a few weeks each winter it isn't altogether for a season of pure play. He moves his office with him. With what amounts almost to leased wire telephone communication, he keeps in constant touch with his officials in Jackson and continues his direction of the Sparton business.

* *

Transformer Corporation of America announces the appointment of A. J. Hutter and associates, with Offices at 10 South LaSalle street, Chicago, Illinois, as director of Transformer Corporation's Export Division. Mr. Hutter and his associate, Mr. A. E. Maybrun, are well known to the trade as highly successful exporters of radio products.

* *

Henry Burbig, famous humorist and star of the CeCo Couriers heard every Monday evening over the Columbia Broadcasting System, will be present at the R.M.A. Trade Show as the guest of the CeCo Manufacturing Company. Mr. Burbig will be at the CeCo booth in Convention Hall and also at the CeCo administrative headquarters in the Hotel Ambassador.

* *

Three prominent radio set manufacturers have adopted the new Utah automatic radio remote control device for their forthcoming models, according to Major Herbert H. Frost, president of the Utah Radio Products Company.

* *

Congratulations are being extended to Mr. Roy Burlew, President of the Ken-Rad Tube & Lamp Corporation, Owensboro, Kentucky, on the occasion of the birth of a fine seven-pound boy. Mrs. Burlew and the baby are doing splendidly.

* *

The All American Mohawk Corporation announce the completion of their move of their entire factory to the great Wurlitzer plant at North Tonawanda, N. Y. and a change of address of the Chicago office, from where sales and advertising are handled to 2330 Daily News Building. The offices of Mr. E. R. Farny, president, and Mr. J. H. Wimberly, Jr., advertising manager, are retained in Chicago. All matters pertaining to the factory production, auditing and other executive offices are maintained in North Tonawanda at the factory where the complete Lyric Radio receiver and Cabinet are made and manufactured.

* *

In line with Uncle Sam's policy of remembering those veterans of the World War who have been unable to forget the horror of the trenches, a centralized radio installation has just been completed in the U. S. Veterans Bureau Hospital at Fort Lyons, Colorado. The installation takes the form of a complete powerizer sound system, according to Ludwig Arnson, Vice-President of the Radio Receptor Company of New York City.

* *

H. L. Kunz, Manager of the Radio Sales Division, Sangamo Electric Company, Springfield, Ill., was host to members of the *Radio Industries* staff, during a recent visit to the Sangamo factory. After going through the plant, a portion of the party took in a round of golf.

* *

According to F. S. Jarrett, Vice-President of The Pooley Company, Philadelphia, samples of the Pooley Radio line will be shown at the Hotel Ambassador during the Atlantic City Trade Show. The Pooley line will be sold through only one large outlet in each metropolitan city, each dealer having exclusive rights so long as the sets are properly merchandised.

NEW DEVELOPMENTS

NEW EDISON LIGHT-O-MATICS

Two new Edison Light-O-Matic Radios, Models R-6 and R-7, are being displayed by Thomas A. Edison, Inc., at the Atlantic City Radio Trade Show, in addition to their present line of Edison Light-O-Matic Radios, Models R-4, R-5 and C-4 (Radio-Phonograph Combination).

The two new models, R-6 and R-7, being added to the Edison Light-O-Matic Radio Line, represent the Edison development of the triple screen-grid circuit, combining unusual selectivity with super-sensitivity. Broadcast impulses are introduced into this new receiver system through three tuned circuit input filters and then conveyed through three stages of radio-frequency amplification, two of which are tuned and one semi-tuned, and utilizing three type '24 screen-grid tubes.

The detector stage is of special two-element design, in which is used a heater type '27 tube. Audio amplification of exceptional fidelity and tonal beauty is accomplished by a system of three audio stages, consisting of two resistance coupled stages employing two heater type '27 tubes, and a final transformer coupled stage utilizing two type '45 power tubes in balanced push-pull arrangement. One type '80 tube for rectification completes the nine tube equipment required for operation.—*Radio Industries*, June, 1930.

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LYRIC HAS FOUR MODELS

The New Lyric Line consists of four Models. The entire line is equipped with the one chassis—exceedingly compact and yet all parts are readily accessible. The entire chassis embodies the very latest developments of their engineering laboratory, being completely shielded, employing 3-224 screen-grid tubes, 1-227 first audio amplifier tube; 2-245 tubes in push-pull and 1-280 full wave rectifier tube.

The circuit is tuned radio frequency employing 3 screen-grid tubes and power detection, giving a straight line amplification characteristic or equal signal volume on both high and low frequencies; the tone control switch allows equalization of the resonant qualities at all frequencies giving faithful reproduction of musical sounds; the high-low voltage regulator fuse block provides insurance against overloading the tubes with the consequent shortening their life; phonograph pick up jacks; every chassis is tested on the air before shipment and is subjected to very rigid mechanical and electrical tests to insure freedom from repairs and replacements.—*Radio Industries*, June, 1930.

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DIAMOND TUBES REINFORCED

The Diamond Electric Corporation of Newark, New Jersey, is showing a reinforced Screen-Grid tube that overcomes any possibility of the elements getting jarred out of place, after the tube is once made, either through rough handling in shipment or while in use in auto radio sets or aeroplanes.

It is a frequent occurrence in radio tubes of all types, when the various electrode elements are not strongly reinforced and held in proper position, that these elements are displaced and their positions relative to each other are altered due to shocks or strains during rough handling or use. Such displacement results in serious changes in the electrical characteristics of the tube.

The new construction shown by the Diamond Electric Corporation employs embracing means engaging the top of the electrode structure which is securely anchored in the bulb.—*Radio Industries*, June, 1930.

NEW POLYMET CONDENSERS

Polymet Mfg. Corp. has developed and is supplying for manufacturer's use an entirely new electrolytic condenser. The manufacturers point out this has gone through many months of laboratory developments and the product contains several unique features. 1st: Improved venting system. 2nd: A fool-proof valve which cannot become detached from the condenser. 3rd: Individual terminals permanently attached to the electrode with no nuts to loosen up. 4th: Unique method of joining electrode rod and aluminum foil without the use of an extra piece of metal to accomplish this joint. 5th: Internal shields drawn from one piece of copper which cannot fall apart. 6th: Novel seam arrangement provides a perfect seal at the edges, resulting in a liquid tight container. 7th: Laminated Bakelite top-plate reduces leakage between terminals to a minimum. 8th: Special electrolytic solution, the result of long development.

The Polymet Electrolytic Condenser, known as the Polymet "E" Condenser, is available in capacities up to 72 mfd., and is supplied in round cans either 3" diameter, this can size taking up to four electrodes, or in single unit form the can is 1 1/2" diameter. Single units are supplied either with standard top



terminals, or for "upside down" mounting with bottom connections. Thorough tests indicate continuous reliability at voltages not exceeding 400 volts.—*Radio Industries*, June, 1930.

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RACON BABY DYNAMIC UNIT

A new dynamic unit, which is stated to be the most powerful one in the world for its size, has just been developed by the Racon Electric Company, 18 Washington Place, New York City.

The Racon "Baby Dynamic" weighs only 6 1/2 pounds and is only slightly larger than a man's fist. It is four inches in thickness and has a maximum diameter of five inches. Although a dwarf in size, the "Baby Dynamic" has the voice of a giant. It will handle an undistorted output of 10 watts without rating, and even at the maximum volume, the tone quality is brilliant and pure.

The diaphragm is made of an extremely light metal, using a patented method of cloth suspension. Hence, inertia is reduced to a minimum. The diaphragm is dome-shaped for maximum strength. The cloth used for suspension is chemically treated. Due to the method of suspension, the diaphragm is capable of relatively great movement, without the least possibility of cracking. The casing of the "Baby Dynamic" is made of specially selected magnetic steel of high flux density. This metal, although expensive and difficult to machine, is used for the purpose of obtaining a concentrated magnetic field, with a minimum of material and therefore with the least weight.

The "Baby Dynamic" is meant to be used in conjunction with horns of the exponential type. It will list at about \$3.00.—*Radio Industries*, June, 1930.

NEW OXFORD DEVELOPMENTS

Oxford announces a new 14 inch speaker. This is a large diaphragm electrodynamic speaker, and is available in a wide range of D.C. specifications for the use of radio set manufacturers. This new 14 inch speaker brings the Oxford line of sizes available to set manufacturers up to four sizes viz; 9 inch, 11 inch, 12 1/2 inch and 14 inch. In addition Oxford makes the 15 1/2 inch Jumbo. The 12 1/2 inch, 14 inch and Jumbo sizes are all available for theatre installations. Price Range D.C. Models \$29.00—\$55.00. Price Range A.C. Models \$33.00—\$190.00.

Most important of all, however, Oxford announces the development of an elaborate home musical instrument called the Oxford Chromatrope. This will be presented for the first time at the Atlantic City Trade Show. In this instrument Oxford Engineers claim they have obtained a startling, outstanding reproduction of sound, tremendous full bass drums, the entire range of musical instruments, natural voice and the brilliant high over-tones, found in such instruments as the violin and piccolo. It is understood that this is accomplished by means of multi-electrodynamic speakers, multi-channel amplifiers and other new, unique arrangements. It will be shown primarily as an electric phonograph for home use, with space provided for adding a radio tuner, or electrical provision for connection to your present radio set.—*Radio Industries*, June, 1930.

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STRONGER TUBES STAND WEAR

For the past year, CeCo engineers have worked steadily on the problem of increasing the mechanical strength of their tubes in order that they might better withstand abuses suffered in handling.

In the CeCo 280 type, a special nickel alloy has been used in all supporting members and plates have been substituted by four heavy braces so arranged as to take a shock from any angle. In the 224, screen-grid type, insulating bushings have been attached to the plate leads making it possible to mechanically tie the plate and screen together. Mica separators have been introduced to hold a double support control grid firmly in place and these features, together with the new stem leads, make this new tube extremely rigid.—*Radio Industries*, June, 1930.

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CARTER FUSE ADAPTER PLUG

Carter Radio Company, Chicago, announces a protective fuse adapter plug. This plug fits into the regulator socket and can easily be removed when it is necessary to install the regulator unit. The fuse being in the 110 volt line pro-



fects the set from abnormal voltages and will indicate the need of a regulator. This is an economical method of providing for voltage regulators.—*Radio Industries*, June, 1930.

NEW DEVELOPMENTS

GENERAL MOTORS RADIO

The new General Motors radio comprises four tuned r.f. circuits, using three '24 screen grid-tubes, a power detector stage using a '27 tube, and a last audio stage consisting of two '45 type tubes in push-pull amplification. An '80 type full wave rectifying tube is used, making a total of eight tubes.

The tone control, an exclusive feature, consists of a fixed condenser and a variable resistor, connected in series between the grid terminals of the two '45 type tube sockets. This permits adjustment of the speaker pitch for each particular type of concert, or for the individual taste of the operator. A strip type dial on the panel, calibrated "bass" and "treble," shows at all times at which pitch the device is set. The tone shifts smoothly as the control knob is manipulated. Keeping the indicator equidistant from the two extremes brings about an equal distribution of both low and high tones.

Perfect volume control under all conditions, even when near a powerful local broadcasting station, is accomplished through having one volume control in the antenna circuit and one in the screen-grid r.f. circuit, with both controlled by one knob. This eliminates use of the so-called soft and loud switch. The speaker is of the electro-dynamic type of construction, amply large enough to handle a large volume.—*Radio Industries*, June, 1930.

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AUTOMATIC POST GROOVER

The first Automatic Hopper Feed Production Post Groover ever built anywhere has been developed and placed on the market by the S. A. Woods Machine Co., Manufacturers of Woodworking Machinery, Boston, Mass., and it is expected this machine will revolutionize the manufacture of radio cabinets, among other things.

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R-C AMPLIFIER UNITS

Supplementing its engineering developments in the loud-speaker field, aiming at the most realistic rendition possible, the engineering staff of the Stevens Manufacturing Corporation, Newark, N. J., has now developed a line of unique resistance-coupled amplifiers.

The new resistance-coupled amplifiers are available in several types, ranging from a simple three-tube chassis with single -45 type power tube, to a most elaborate unit with two -45 type power tubes in push-pull, preceded by two screen-grid tubes and a single three-element tube, including meters and controls if desired. The units are compactly designed, with self-contained power pack, for ready incorporation in any radio set console or cabinet. For radio



or electrical phonograph manufacturers desiring the exceptional tone quality, the Stevens organization now offers a unique line of resistance-coupled amplifiers precisely matched to its speakers including the latest design of burtex or fabric diaphragm.—*Radio Industries*, June, 1930.

NEW REVOLUTION COUNTER

A new and improved revolution counter is now being manufactured and marketed by the Meissner Manufacturing Company, Chicago, Illinois, coil winders and designers of special coil winding machinery.

The new Meissner Revolution Counter counts from 0 to 10,000 or from 10 to 100,000 revolutions, covering for all practical purposes the complete range of coil winding.

It can be equipped with a solinoid and mercury switch mechanism to release a brake which stops the coil winding machine instantly. The counter can be set for any required number of turns and when the coil is wound to that number of turns, the revolution counter stops the coil winding machine.

This counter supplied a long felt demand in the industry inasmuch as the large six inch dial is readily visible and also can be re-set instantly.

Outstanding mechanical features of the Meissner Revolution Counter are the shaft operating on ball bearings and



worm and spiral gears to prevent slipping. All parts are machined to close tolerances.—*Radio Industries*, June, 1930.

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SOLVES FARM RADIO PROBLEM

A radio set that is powered by dry cells instead of the storage battery and should offer a solution to the rural radio problem has been developed by the National Carbon Company, who are no longer in the set business and who therefore are not in a position to capitalize their achievement.

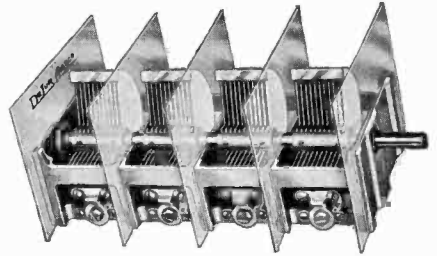
They started several years ago to develop a set which would compare favorably with the modern AC set for sensitivity, selectivity, and general operating characteristics, and which at the same time would give the farmer the service he demanded without the troublesome and unsatisfactory storage battery as a source of "A" current. Before this was possible, two things had to be developed—a tube which would conserve battery power, and a set which would operate satisfactorily with such a tube, and in which the storage battery would be eliminated.

Now, after two years of effort, a 2-volt tube and a set which will operate successfully with it, using eight six-inch dry cells, hooked up in a series—parallel arrangement as an "A" current source—is the result.

The new set will give three months service without replacing the dry cells, based on an estimated three-hour daily use of the set.—*Radio Industries*, June, 1930.

NEW SHIELDED CONDENSER

The DeJur-Amsco Corp., Fairbanks Building, New York City, are introducing their new variable condenser for the coming season. It is completely shielded and has been developed especially for screen-grid receivers. Following are some of the features of this new DeJur-Amsco unit: Aluminum cast frame. Aluminum cast shield plates. Ball bear-



ings at both ends. Steel bushings and raceway. Three-eighths inch steel shaft, centerless ground and highly polished. Individual spring phosphor bronze wipe contacts to each rotor assuring perfect electrical contact. Lugs attached for individual returns. All metal parts except castings, rotor and stator plates heavily cadmium plated. Mounting studs cast into bottom of frame. Provision also made for side mounting. Substantial compensating or trimming condensers. Available in 2, 3, 4 and 5 gang units.—*Radio Industries*, June, 1930.

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NEW R-S DRY CELL TESTER

The Roller-Smith Company, New York, announces a new instrument, the Type BME No. 6 Dry Cell Tester.

The Type BME Tester fills the need for a satisfactory instrument for testing No. 6 dry cells. Generally speaking, such dry cells are usually tested by taking the voltage reading, which is practically valueless as the voltage of a dry cell will hold up nearly at its maximum even when the cell is practically useless; another customary method of testing being to short-circuit the cell through an ammeter which imposes a severe drain on the cell.

With the type BME Tester the current flow is limited to about 6 amperes on a new cell and the instrument indicates whether the condition of the battery is good, medium or bad.—*Radio Industries*, June, 1930.

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PACENT ELECTRIC PICK-UP

After twelve months of research in its radio and talking picture laboratories, during which time hundreds of different models were made and tested, the Pacent Electric Company announces a new and improved electric pick-up to be known as the Master Phonovox.

The principal features of the new pick-up as listed by the engineers of the organization are:

Low center of gravity; lateral play of the armature exceeds lateral cut of record grooves; built-in volume control, combined with radio-record change-over switch, full swing-back head for easy needle changing; 36 percent English Cobalt Magnets; pole pieces specially milled, heat-treated and precision ground; all parts precision adjusted; correct needle pressure applied through scientific design of head; ball-bearing swivel tone-arm.

The new Phonovox is finished in a modernistic design, bronze finish. The tone arm is decorated with fluting which adds greatly to the appearance. A special adapter for A. C. sets is furnished with each unit. It is supplied in one model only which lists at \$15.00.—*Radio Industries*, June, 1930.

NEW DEVELOPMENTS

THREE NEW RADIOTRONS

Announcement is made of three new and improved R.C.A. Radiotrons, designed for two volt, low filament current operation. These include a general purpose tube, a screen-grid tube, and an output tube. All three are of the high vacuum type and employ a strong, metallic filament coated with alkaline earth compounds. The filament in each type has been carefully designed to take as little power as possible, consistent with satisfactory operating performance. These new Radiotrons, therefore, are particularly suited for use in radio receivers operating either from dry cells or from a storage battery where economy of filament current drain is important.

The model numbers are: General purpose tube, R.C.A. Radiotron 230; Power output tube, R.C.A. Radiotron 231; Screen-grid tube, R.C.A. Radiotron 232.

The new General Purpose Radiotron is useful as either detector or amplifier. It is similar in external appearance to Radiotron UX-199.

The new Power Output Radiotron (for use in the last audio-frequency stage) has been designed to give good output volume from battery operated receivers where economy of plate current is important.

The new Screen-Grid Radiotron is particularly recommended for operation as a radio-frequency amplifier in circuits designed especially for it.—*Radio Industries*, June, 1930.

ASSEMBLED DI-CO AMPLIFIER

Kelley-Wiegand, New York, announce the first completely assembled direct coupled amplifier. This unit is a phonograph amplifier and also can be used with a radio tuner. Various voltages necessary to operate tuner can be obtained from amplifier.—*Radio Industries*, June, 1930.

FOR LOW-SPEED RECORDS

For the faithful rendition of the large 16-inch disc records employed for theatre and broadcast purposes, at a minimum investment, the Stevens Manufacturing Corporation of Newark, N. J., has developed a giant electrical turntable and companion electromagnetic pick-up.

Briefly, the new Stevens product comprises an 18-inch turntable operating at 33 1/2 r.p.m. Instead of using an elaborate system of driving shafts and gears, the new turntable is driven by a silent and constant speed Stevens-Sibley motor, through a friction drive applied directly to the inner face of the turntable rim.



The motor is mounted with a pivotal spring tension, so that the friction drive makes positive contact at all times.

An automatic governor is included inside the motor's cast metal shell, thereby maintaining a constant motor speed despite line voltage fluctuations within 25% plus or minus of normal. The motor operates on low-voltage rectified current, supplied by means of a stepdown transformer and dry-disc rectifier. For emergencies, a throw-over switch is incorporated in the general assembly, together with a set of dry cells. In order to prevent a nautical roll or wobble, the 18-inch turntable is mounted on a ball thrust shaft which is sunk in a deep well.—*Radio Industries*, June, 1930.

PIERCE-AIRO D.C. CHASSIS

Pierce-Airo, Inc., announces a screen-grid direct current chassis designed to utilize A.C. tubes, to be known as model D.C. 273. The construction of the D.C. model is the same as the Pierce-Airo A.C. 724, but designated so that with the same A.C. tubes it will operate on Direct Current.

The chassis uses three screen-grid tubes and has specially designed selected control tuning with highly efficient double push pull amplification and humless filter circuit. The radio frequency assembly is completely shielded with a special bridge circuit compensated antenna. Provision is also made for automatic phonograph attachment.—*Radio Industries*, June, 1930.

SELF-CONTAINED OHMMETER

A self-contained ohmmeter in a case of molded bakelite has been announced by the Jewell Electrical Instrument Company, Chicago, Illinois.



The Pattern 89 Ohmmeter, as it is called, has a 1 1/2 volt flashlight cell inside the case, and is therefore independent of external voltage supply.

A convenient adjustment to correct for variation in the cell voltage is provided by a magnetic shunt. In operation the instrument can be adjusted to the cell each time a series of tests is made, and the result is a very high degree of accuracy.

The Pattern 89 Ohmmeter combines the convenience of a self-contained resistance meter with the stability of a bakelite case and a high degree of accuracy, at a popular price.—*Radio Industries*, June, 1930.

NEW TIPLESS STEM MACHINE

The Eisler Electric Corporation, Newark, N. J., offer to the market a new type tipless automatic stationary head stem machine equipped with a new feature of tilting die block stem head.

There are many additional novel features embodied in this machine such as automatic opening and closing of tipless arrangements; arranged for double press jaws; automatic blowout; speed of indexing is increased so that head reaches next position very rapidly; advantage of increased number of fires, greatly decreasing shrinkage; equipped with flexible gas and air connections. The machine occupies space 5x5 feet; employs one 1/2 HP motor.—*Radio Industries*, June, 1930.

SHALLCROSS RESISTANCES

The Shallcross Mfg. Co., Collingdale, Pa., will manufacture for the trade in general a new type of resistance known as their type "T" which is designed to provide a means of mounting without employment of clips by the employment of angle bracket terminals. Soldering terminals can be supplied instead of the angle brackets.

Their prices will change—some high resistance values they manufacture will increase in price and some of the lower values they manufacture will decrease in price. The price of their new type "T" will be the same as the new prices of their standard type "M".



They also announce a new type of wire wound resistor ranging in value up to 100,000 ohms. This unit will be popular in price. They will be about the size of a grid leak with flexible wire terminals and a tolerance of 5% plus or minus.

Their new Bulletin No. 100 will be available for distribution on or about June 1, 1930. This bulletin will supersede their Bulletin No. 62 and will be supplied in the future where requests for their Bulletin No. 62 are received. They are reproducing in this bulletin the first and original voltmeter multiplier chart providing the data for converting milliammeters into multi-range voltmeters and other useful information. The Service Department of *Radio Industries* will fill requests for these bulletins.—*Radio Industries*, June, 1930.

THREE JENSEN DYNAMICS

Three new Electro-Dynamic Speaker Units comprise the 1930 Jensen line which will be shown and demonstrated for the first time at the annual R.M.A. Trade Show to be staged at Atlantic City. One of the new units has a 12 inch cone while the other two have cones of 10 inch diameter.

The new 1930 Concert Unit, which has a 10 inch cone, is specifically designed for use with conventional amplifier systems in radio receiving sets.

The other two new Jensen Speaker Units are the Auditorium and Auditorium Junior, the former with a 12 inch cone while the latter has one of 10 inches.

All three of the new units will be available for operation with either 110 or 220 volt DC current, and either 25 or 60 cycle 110 volt or 220 volt AC current.

List prices for the units are as follows: Jensen Concert \$27.50 to \$37.50; Jensen Auditorium \$45.00 to \$65.00; and Jensen Auditorium Junior \$30.00 to \$42.50.—*Radio Industries*, June, 1930.

NEW POLYMET TRANSFORMERS

Polymet Manufacturing Corp. is exhibiting for the first time a complete line of audio transformers, power transformers for both 25 cycle and 60 cycle circuits and choke units.

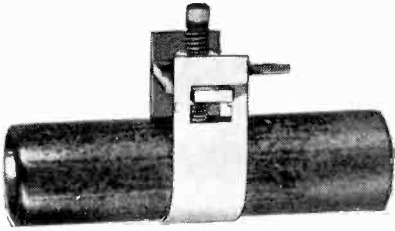
These transformers have been designed to correspond with standard practice and are available either in stock forms, or, for manufacturer's use. Slight variations in windings and corresponding voltage output can be promptly arranged without delaying production deliveries.

Inasmuch as Polymet, through ownership of the Strand & Sweet Mfg. Co., produces its own magnet wire, and has very large coil winding facilities at its Coilton Division of Easton, Pa., the company is fabricating transformers "from the ground up."—*Radio Industries*, June, 1930.

NEW DEVELOPMENTS

POTTER CLAMP AND AERIAL

The Potter Company, North Chicago, Ill., announces the Potter Ground Clamp. Vice grip construction makes positive contact because the hardened clamping screw of special construction forces its way through paint, rust or foreign matter on pipe or ground rod, insuring perfect contact to clean fresh metal. Each such clamp has a copper ground wire lug which gives the required method for attaching a ground wire. They are durable and rigid, and will not bend or lop over. Once they have been installed no further attention need be given as all parts are made of extra heavy material which will give service under all



conditions. List price, twenty cents. Standard package, twenty-five.

The Potter Company also announces the Potter Rug Aerial, of ribbon-like construction—so thin that its presence is not apparent. List price, \$1.70. Standard package, ten. A Potter Ground Clamp is furnished with each Rug Aerial to provide the best possible ground connection.—*Radio Industries*, June, 1930.

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S-M USE TWO-UNIT ASSEMBLY

Silver-Marshall complete console radio receivers are shown at the R.M.A. Trade Show at Atlantic City on June 2, in Section A, booths numbers 20 and 21, at the Convention Hall, and at the hotel display occupying the new section of the eighth floor annex of the Ambassador Hotel.

All models use screen-grid tubes in all radio-frequency stages, with screen-grid power detection. All are constructed on the two-unit assembly plan—power supply built in with speaker on lower shelf, separate from receiver chassis which is on the upper cabinet shelf. This construction is said to facilitate service and provide balanced weight in shipping, in addition to its principal object of eliminating all induction hum.

All models have two audio frequency stages, and use tuned transformers of a type developed by Kendall Clough, Silver-Marshall engineer, and marketed under the name of Clough-System Audio Transformers. The distinguishing feature is a fixed condenser which tunes each transformer so as to provide ample emphasis to bass notes for listeners who desire such tone. All models are equipped with variable tone control operated by a knob on the panel, so that in use the low tones are emphasized only to whatever extent the listener prefers. Automatic remote control is offered on any model at an additional cost of \$50.00 list.

The line includes four cabinets, fitted with two entirely new chassis. All four cabinets will be offered at the same list prices throughout continental United States.—*Radio Industries*, June, 1930.

« «

BRAIDED PUSH-BACK WIRE

Crescent Automotive Cables, Providence, announce a quick hook-up, push back wire they have recently developed for the radio trade. It is a double braided push-back wire, thoroughly impregnated with bees wax at a voltage of approximately 300 degrees, making impregnation most complete. It is made in many different colors and color combinations, in all sizes of both solid and stranded wire.—*Radio Industries*, June, 1930.

NEW ROLA UNITS—MODEL "K"

The Rola Company will introduce at the June R.M.A. Show what it considers the finest series of units in its history.

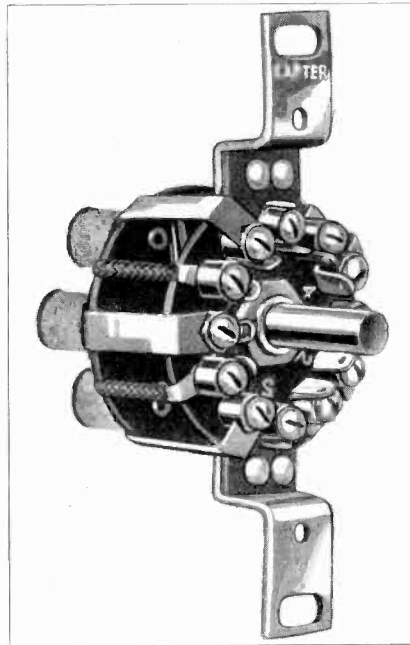
A remarkable moving coil structure, employing new patentable features, is one of the outstanding developments of this year's models.

Model "K" will be furnished in two sizes; the large standard measuring 1 1/2" in diameter, with a depth of 5 1/2", and the smaller size measuring 9 1/4" by 5 1/2". With a fine high frequency response, as well as a reinforced base response, it is a unit designed to meet the requirements of the most exacting critics of tone quality.—*Radio Industries*, June, 1930.

« «

FIVE CHANNEL SELECTOR

Carter Radio Company, Chicago, announces a Five Channel Selector Switch with impedance matching coils. For apartment hotel or similar installations this switch provides for five channels of entertainment with a matching impedance load always on the channels not in use. This impedance is of the same



general characteristics as the speaker. Switching from channel to channel does not change the volume level of either the channel picked up or the channel dropped.—*Radio Industries*, June, 1930.

« «

NEW AMPERITE UNITS

Amperite Corporation, New York City, announces a series of its line voltage control units. The new units are particularly designed for electric radio sets which are not already equipped for them, and may be quickly and conveniently installed either by the manufacturers' serviceman or the set user, himself. By means of these new units, perfect self-adjusting control is assured to a receiver over a line voltage fluctuation range which may run from 105 to 140 volts.—*Radio Industries*, June, 1930.

« «

NEW AMPLION PRODUCTS

The Amplion Corporation of America, New York City, has recently placed on the market a new Transverse Current Microphone; a Microphone Input Amplifier; a novel Double Unit Connector for attaching several dynamic units to the same horn; a special type Exciter and a new 12-ft. exponential Horn.—*Radio Industries*, June 1930.

ELECTROLYTIC CONDENSER

The Acracon Electrolytic Condenser recently announced by the Condenser Corporation of America of Jersey City, N. J., contains many new features. According to executives of the company, the requirements of many manufacturers have been met in the design and construction of this latest addition to the Acracon line.

The single 8 mcfd. 400 volt unit was decided upon because of its greater efficiency as compared to other types, there being no cross current leakage between the anodes or high resistance in the common lead. Laboratory tests have proved to be less than 2 milliamperes per mcfd.

To simplify chassis assembly, the mounting fixture is of the one-hole single nut type and all anode connections are made beneath the chassis, thus eliminating unsightly wiring which detracts from the appearance of the receiver. Mechanically the entire unit is rigidly constructed. A tapered anode terminal with two rubber gaskets tightened under pressure prevents any leakage of the electrolyte and since the level of the electrolyte is well above the electrode there can be no surface corrosion. The unit comes in an attractive sanded aluminum finish which also may be easily sprayed, if desired.

Plant facilities have been practically doubled and new automatic machinery has been installed to speed production.—*Radio Industries*, June, 1930.

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STORY AND CLARK RADIO

The technical description of the Story and Clark Radio—A.C. type—is as follows:

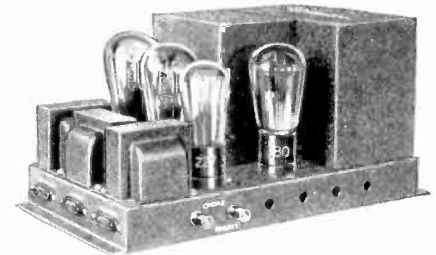
The chassis is designed to be sturdy, of high efficiency and with large margins of safety throughout. Its tube equipment consists of three 224s, one 227 detector, two 245s in push-pull and one 280 rectifier. In the two higher priced models, equipped with automatic volume control, an additional 227 tube is used.

Tuner and audio system are in one unit, and the power pack with built-in speaker comprises another unit. Through the use of heavy copper shielding, short leads, special circuit and coil design, this receiver is capable of greater sensitivity and selectivity than would be used in even extreme cases.—*Radio Industries*, June, 1930.

« «

THOMAS MAKE AMPLIFIERS

Mr. C. F. Rapp, Assistant Sales Manager of the Thomas Engineering & Manufacturing Company, located at St.



Charles, Ill., recently announced that his Company, in addition to supplying many of the large receiver manufacturers with condensers, coils, transformers, chokes, power packs, etc. have launched a complete line of two and three stage amplifiers, to be known as "Thomas Amplifiers".

The Thomas Engineering and Manufacturing Company, has made an unusual record in recent years, growing from a small firm to a highly organized group, handling a volume of business requiring more than 300,000 square feet of factory space for manufacturing facilities for its products, and a sales organization of international scope.—*Radio Industries*, June, 1930.

EXHIB

R.M.A. Fourth An

Atlantic City-

Name of Concern	Booth No.	Demonstration	Name of Concern
Acme Electric & Mfg. Co.	C-28		Fansteel Products Co.
Acme Wire Co.	A-38		John E. Fast & Co.
Adler Mfg. Co.	D38-39		Federal Wood Products Corp.
Aerial Insulator Co. Inc.	C47		French Battery Co.
Aerovox Wireless Corp.	C51		Herbert H. Frost, Inc.
Allan Mfg. & Elec. Co.	C25		Furnas Furniture Company
All American Mohawk Corp.	A33-34	CC-39	Jesse French Co.
Allen Bradley Co.	A30	BB-4	
Allen Hough Carryola Co.	C-48		
Aluminum Co. of America	C20-21		General Motors Radio Corp.
Amperite Corporation	D52		General Electric Co.
Amrad Corporation	C1		General Dry Batteries, Inc.
American Bosch Magneto Corp.	D31-32	AA10	The General Industries
Anaconda Wire & Cable Co.	C53-54		General Radio Co.
Arcturus Radio Tube Co.	A11-12		Gilby Wire Co.
F.A.D. Andrea, Inc.	A22-23-24-25		Gold Seal Electrical Co.
Atwater Kent Mfg. Co.	C13-14-15-16	BB9	A. H. Grebe & Co. Inc.
Audak Co.	A57	CC30	Gulbranson Co.
Audiola Radio Co.	B7	CC3	Grigsby Grunow Co.
Nathaniel Baldwin Co.	C31-32	BB8	Hammond Clock Co.
Belden Mfg. Co.	D28-29		Hygrade Lamp Co.
Birnback Radio Co.	D37		Howard Radio Co.
Bond Electric Co.	C2		Hoyt Electrical Instru. Works
L. S. Brach Mfg. Co.	A8		
Browning Drake Co.	D13		
Brunswick-Balke-Collender Co.	C17-18-19	CC34-35	
Burgess Battery Co.	A5		Insuline Corp. of America
Bush & Lane Piano Co.	C5		International Resistance Co.
Cable Radio Tube Corp.	C11-12	CC33	Jefferson Electric Co.
Capehart Corp.	B40-41-42-43	CC27	Jenkins Television Corp.
Cardonic	D61		Jensen Radio Mfg. Co.
Cardon Phonocraft Corp.	A28-29	BB6-7	Jewell Electric Instru. Co.
CeCo Mfg. Co.	B11-12	CC23	Howard B. Jones
Central Radio Labs	D15		
Champion Radio Works, Inc.	C58-59		Colin B. Kennedy Corp.
Clarostat Mfg. Co Inc.	C30		Ken-Rad Corp.
Columbia Phonograph Co. Inc.	D44-45	CC21-22	Kester Solder Co.
Commercial Credit & Trust Co.	D58		King Mfg. Co.
Continental Diamond Fibre Co.	A7		
Caswell Runyan Co.	D2		
Colonial Radio Corp.	B36-37	BB2-3	Magnavox Co.
Container Corporation of America	D27		Marvin Radio Tube Corp.
Cornish Wire Co.	C6		Micamold Radio Corp.
Crosley Radio Corp.	D41-42-43	CC14-15	Macanta Fabricators Co.
Crowe Name Plate & Mfg. Co.	C24		McMillan Radio Corp.
E. T. Cunningham, Inc.	B17-18-19		Leslie F. Muter Co.
Deca Disc. Co.	D60	CC44	National Carbon Co. Inc.
DeForest Radio Co.	B5		National Co. Inc.
DeJur Amsco Corp.	D14		National Radio Tube Corp.
Diamond Electric Corp.	A19		National Transformer & Radio Mfg. Co.
Dongan Electric Mfg. Co.	B35		National Union Radio Corp.
Dudlo Mfg. Co.	D53-54		
Easton Coil Co.	A55		Operadio Mfg. Co.
H. H. Eby Mfg. Co.	A9		Oxford Radio Corp.
Thomas A. Edison	B33-34	BB1	
Electrad, Inc.	A2	CC28	Pacent Electric Co. Inc.
Electrical Research Labs.	C22-23	CC8	Perryman Electric Co.

ITORS

Annual Trade Show

June 2-6, 1930

Booth No.	Demonstration	Name of Concern	Booth No.	Demonstration
D26		Philadelphia Storage Battery Co.	B13-14-15-16	AA6-7-8
A26		Philmore Mfg. Co.	A18	
D8		Polymet Mfg. Co.	D11-12	
C7		Potter Company	C9	
D3				
B8				
D59		Racon Electric Co. Inc.	A39	CC19
		Radio Industries	D56 B57	
		Radio Master Corporation	B44-45	CC25
		Radio Products Co.	C29	CC4
A40-41-42-43	CC7	Radiola Division	B52-53-54	AA2-3-4
D22-23-24-25	AA9	Radiotron Division	C44-45-46	
A50		R. C. A. - Victor Co. Inc.	A59-60-61	CC40-41-42
A58		Readrite Motor Works	D47	CC31
D5		Rochester Tool & Gauge Corp.	D30	
C40		The Rola Company	A6	CC11
C42-43	CC45	Runzel Lenz	C55	
D31-22	CC18			
D20-21	CC6			
D16-17-18-19	AA5			
		Sampson Industries	D46	
		Samson Electric Co.	B10	
		Scoville Mfg. Co.	C26-27	
C61		Silver-Marshall, Inc.	A20-21	
D48-49		Sparks-Withington Co.	A13-14-15-16	BB5
A31-32	CC32	Sprague Specialties Co.	D50	
B38		The Starr Piano Co.	B47	
		The Sterling Mfg. Co.	B30	CC12
		Stettner Phonograph Corp.	B29	
C8		Stevens Mfg. Co.	A47	CC13
D51		Stewart Warner Corp.	B1	CC20
		Stromberg Carlson Telephone Mfg. Co.	B22-23-24-25	AA1
		Super Ball Antenna Co.	A35	
		Superior Cabinet Corporation	A36	CC1
		Sylvania Products Co.	A52-53-54	
		Swan-Haverstick, Inc.	B39	
		Story & Clark Piano Co.	B27-28	CC26
		Supreme Instrument Corp.	B46	
B20-21	AA11-12	Transformer Corp. of America	B48-49	CC32a
A48-49		Triad Mfg. Co., Inc.	A46	
B50		Tung-Sol Condenser, Inc.	A37	
D38				
		United Air Cleaner Corp.	A1	
		United Scientific Labs. Inc.	C41	CC2
A10		Upco Products Co.	C60	CC46
C49-50		U. S. Radio & Television Corp.	A45-44	
C56		Utah Radio Products Co.	D1	
D9				
A27	CC5			
B2		Valley Appliances, Inc.	B26	CC16
		Victoreen Radio Co.	A51	CC29
C37-38-39		Ward Leonard Electric Co.	C57	CC10
D6		Webster Electric Co.	C10	
A56		Wells Gardner Co.	B6	
D40	CC47	Westinghouse Electric Mfg. Co.	C33-34-35-36	CC36-37-38
D33-34-35-36		Weston Electric Instrument Corp.	A3	
		Wright DeCoster, Inc.	B9	
A4	CC9			
C3		Yaxley Mfg. Co.	A17	
B3	CC24	Zaney Gill Corp.	C59	
D4				

RADIO SERVICING



Published as an Open Forum for the Discussion of Service Problems Affecting the Industry

Conducted by
H. G. BOYLE
Associate Editor

THE radio industry must look to its laurels in the matter of service for at present it is outranked by both the refrigerator and automobile organizations. At least it is in the ability to talk about service cost and dependability of the products.

The slogan "not a cent for service" is familiar to all who can read and many who cannot. The radio industry has nothing to offer that will approach it.

The famous advertisement "the penalty of leadership" is framed on a thousand office walls but it may not be honestly applied to any radio corporation or man.

Thousands of dollars are spent weekly to acquaint the public with the service attitude of the most famous of Detroit's automobile companies and everyone will agree that the money is well spent.

Service is not a hard or ugly word. It walks with honesty, truthfulness and square dealing yet the radio industry seems shy of it. Is the natural inference to be left to ferment in the minds of the customers upon which the industry depends for existence?

TELEVISION, the magic word, has so far failed to produce even a single rabbit from the silk hat although we were assured a year ago that an entire warren would be forthcoming immediately, or sooner. In casting about among technical difficulties and involved equations we have noted one thing which we believe of importance.

The radio industry owes its spectacular growth to small boys and young men who created electrical and mechanical marvels from oatmeal boxes and safety pins. After the advent of capitalists and factories these boys and men became engineers, service men, technical supervisors or ditch diggers according to their foresight and business acumen.

For some reason television has remained in the laboratory under the eyes of grim mathematicians. If it were transplanted to attics and basements and given to the care of small boys we believe it would thrive immediately.

With all reverence for the progress which has been made we must remember that the scientist says "Wait until I am certain." The small boy asks you to see what he has now and if there is even a shadow you are interested. And an interested man is more than half sold on any proposition.

EVERY manufacturer seems to include a list of "don'ts" in his instruction manual and we are wondering what the result would be if the customer would sometime retaliate with a list of his own. A few which we have heard at different times sounded somewhat as follows:

Don't make exorbitant claims for your set. Tell what it will do and what it contains and stop there.

Don't attack your competitors. If we like your set and you talk about someone else we'll buy the other product.

Don't forget that we are not radio engineers and 75 per cent of us cannot read a curve or diagram.

Don't forget to advise us where to go if trouble develops. We know you build a good set but something might happen.

Don't assume that we know anything about a radio set. Explain every detail necessary to insure a satisfactory installation.

Don't dress up a pile of junk with ginger bread cabinets. "Eye value" alone might sell us once but not twice.

Don't forget that the word of a neighbor, whether just or unjust, is more persuasive than \$1,000,000 worth of advertising.

THE census at present being conducted by Uncle Sam should prove of tremendous benefit to the radio industry. Whether it will depend entirely upon the industry itself and by "the industry" is meant the individual who has a part in any phase of radio work.

After the compilation is completed any executive will know how many engineers, service men, production supervisors, constructors or purchasing agents there are in the country and where they are situated.

However, if service men call themselves engineers, or doctors, or researchers obviously the completed tabulation will not show true conditions. If production men, purchasing agents and salesmen become managers and directors it again brings a false understanding.

At four cents a name a census taker can not afford to spend too much time in a perfect classification. From our own experience we believe that radio engineer after the name looks more imposing than service man. By the same token a man who washes dishes and fixes his neighbor's set in his spare time should be enumerated as a radio service man. Yet if the industry looks to his neighborhood when he is needed they find a dishwasher.

While considering the question it will be remembered that every family must state whether they own a radio set. By computation of electric receivers built in the past two years and subtraction of this aggregate from the number reported, executives may have a comprehensive view of their replacement market. Allowance should be made for the percentage which will never be replaced, those which will be rebuilt and those which will be traded in for the products of competitors.

Even with these deductions there should be a sufficient portion for everyone.

ASSOCIATION NEWS



Bond P. Geddes, Executive Vice-president of the R.M.A.

NAME NEW R.M.A. DIRECTORS

Radio industry personnel changes have resulted in changes among the R.M.A. directorate. Upon receipt by the R.M.A. Board of Directors at their meeting May 8th at French Lick Springs, Indiana, of the resignations of Messrs. B. J. Grigsby of the Grigsby-Grunow Company; A. G. Messick of the U. S. Radio and Television Corp.; and H. C. Cox of the Columbia Phonograph Company, the three vacancies on the R.M.A. Board were filled by the unanimous election of Mr. Herbert E. Young, Vice-president of the Grigsby-Grunow Co.; Mr. J. Clark Coit, President of the U. S. Radio and Television Corp.; and Mr. Roger J. Emmert, President of the General Motors Radio Corporation.

N. F. R. A. EXPANDS TO CANADA

The Radio Retailers Association of Canada represents the latest member of the N. F. R. A. The significance of this association's membership is increased when we consider that it is a national body in Canada and its affiliation makes an international body of the N. F. R. A. The prestige of the N. F. R. A. is thus extended throughout Canada as well as the United States,

MONTHLY SURVEY IMPORTANT

The services that the R.W.A. is performing for the entire industry on the monthly survey of radio sales and inventories is invaluable. Increased interest in this work is being evidenced by the radio manufacturers and wholesalers all over the United States and distributors everywhere are being urged to join the association if for no other reason than to contribute their figures on monthly sales and inventories. All replies are kept absolutely confidential and there are no identification marks enabling any one to trace the survey form to its original sender.

This service of the R.W.A. is of importance to the radio wholesaler in that it provides him with definite statistical information concerning the trend of the radio business and the forecast of sales for the coming quarter, as well as providing the manufacturer with similar information so as to better enable him to judge his potential market to gauge his production accordingly. The recapitulation issued each month by the Executive Offices shows some very interesting information concerning the trend of the radio business.



M. F. Flanagan, Executive Secretary of the R.M.A.

Executive Offices will draft a model set of standards as soon as the sample codes from various associations have been received. It is planned that this model set of advertising standards will be submitted to the N. F. R. A. for approval at the June Convention Meeting.

R.K.O. ENTERTAINS AT BANQUET

The entertainment program at the annual banquet of the Radio Manufacturers' Association will be provided by the Radio-Keith-Orpheum Corporation, it has been announced by B. G. Erskine, Chairman of the Convention Committee.

The annual R.M.A. banquet is being held Wednesday evening, June 4th, in the grand ballroom of the auditorium.

The announcement that R.K.O. is providing the program is in line with the R.M.A.'s previous promise that this year's entertainment will be the most elaborate and enjoyable the association has yet staged.

Outstanding stars of vaudeville, musical comedy and radio will headline a three-hour program of music, fun and girls that will be staged in the best R.K.O. professional manner. The cost of the production, which will be in the form of a musical revue, will exceed \$10,000, according to Mr. Erskine.



B. G. Erskine, Chairman of the 1930 Convention Committee of the R.M.A.

ADVERTISING CODE SURVEYED

The N. F. R. A. is making a survey among all local associations concerning the codes of advertising practice now in effect in the various localities. The

SALTZMAN AND BAKER SPEAK

General Charles McK. Saltzman, Chairman of the Federal Radio Commission, will be the principal speaker at the Sixth Annual Convention and Trade Show of the Radio Manufacturers Association at Atlantic City, New Jersey, the week of June 2nd. The only other speaker on the program will be Dr. Hugh P. Baker, Manager of the Trade Association Department of the Chamber of Commerce of the U. S. at Washington, D. C.

This will be one of General Saltzman's few speeches since his appointment to the Radio Commission last year and it will be the first time he has addressed the radio industry as a group. What he has to say, therefore, will be of extreme interest both to the radio industry and to the listening public as well.

General Saltzman is a graduate of West Point, class of 1896, and is a pioneer in the development of radio through his experience in the Signal Corps. It is not generally known that he is one of the few U. S. army officers to be cited for distinguished service in two American wars.

He received two citations for "gallantry in action" in the Spanish American War, and was awarded the Distinguished Service Medal for "meritorious and conspicuous services" in the World War. He has represented the U. S. in all International Radio Conferences and was appointed to the Federal Radio Commission by President Hoover in May, 1929. He was elected Chairman of the Commission last February.

The only other speaker, Dr. Hugh P. Baker, has been manager of the Trade Association Department of the Chamber of Commerce of the United States at Washington, D. C. for several years. He is also a member of the Board of Managers of the National Institute for Commercial & Trade Organization Executives at Northwestern University, Chicago.

Dr. Baker's activities are directed toward the promotion of self-regulation by business groups, which has as its aim the elimination of economic wastes, trade abuses and unfair competition.

I. R. E. PLANS FORGE AHEAD

Plans are going ahead rapidly on the program of the Fifth Annual I.R.E. Convention, First International Convention which is to be held in Toronto August 18-21 with Headquarters in the King Edward Hotel.

The convention meetings and papers committee is under the Chairmanship of K. S. Van Dyke and includes H. M. Turner, Dr. W. Wilson and H. O. Westman, Secretary of the I.R.E.

One of the features of the Convention will be the component parts exhibit, each exhibit being supervised by a technical representative.

A well balanced program has been arranged and the trips should prove most interesting.

ERLA ENTERS TENTH YEAR

The Electrical Research Laboratories, manufacturers of Erla radio receivers, are now entering upon their tenth successive year in the radio industry. Erla's complete new line will be on display at Booth No. C22-23, also Demonstration Room CC8 in the Atlantic City Auditorium.

HAWLEY FORMER GRID COACH

Jess B. Hawley, Chairman of the Show Committee of the Radio Manufacturers Association, has charge of all arrangements for the R.M.A. Trade Show this year. Mr. Hawley was formerly Vice-President of the Newcombe-Hawley Company and



the United Reproducers Corporation, and is now President of the newly-formed Hawley Fibre Company of St. Charles, Illinois. He is well known to the sports world as the former coach of the Dartmouth College Football Team.

AMBASSADOR HOUSES CECO

Officials of the CeCo Manufacturing Company, Providence, R. I., announce that their administrative headquarters at the R.M.A. Trade Show in Atlantic City in June will be at the Hotel Ambassador.

The CeCo delegation will include the following: Ernest Kauer, president, E. T. Maharin, vice-president in charge of sales, N. O. Williams, vice-president in charge of engineering, Max Mautner, secretary, J. C. Buckley, advertising manager, Larry Hardy, general sales manager, Henry Bobker, sales promotion manager.

Also the following representatives from various district sales offices of the CeCo organization: Jack Hedquist, Fred Kauer, G. V. Oden, E. Matchette, E. J. Tydings, Henry Grout, A. I. Witz, John Klein.

Supervising the technical staff as aid to Mr. Williams will be Franklin Snow Huddy, Assistant to Chief Engineer.

E. R. Fuller and L. S. Gillette, of the Walter Thompson Company, CeCo's advertising agency will accompany the CeCo delegation from New York as will Fred Baer, of Fred Baer & Associates, publicity representative for CeCo.

G-M AT RITZ-CARLTON HOTEL

Headquarters of General Motors Radio for the R.M.A. trade show at Atlantic City starting June 2 will be at the Ritz-Carlton Hotel, according to announcement at Dayton, Ohio, by R. J. Emmert, president and general Manager. Among those who will represent General Motors Radio, in addition to Mr. Emmert, will be John E. Grimm, Jr., vice-president in charge of sales; E. B. Newill, vice-president in charge of engineering; Charles T. Lawson, general Sales manager; R. H. White, director of advertising and sales promotion, D. M. Corson, office manager; as well as four regional managers, twelve zone managers and ten representatives. General Motors Radio has reserved space in the Atlantic City Auditorium, and will also have a large display at the General Motors permanent exhibit at the Steel Pier.

WILL REPRESENT COLONIAL

The following men will represent the Colonial Radio Corporation at the R.M.A. Show: W. S. Symington, President; F. G. Carson, Vice-president in Charge of Sales; I. G. Maloff, Vice-president in Charge of Engineering; Joseph Gerl, General Sales Manager; S. K. Dickstein, Advertising Manager; Ben Stevens; P. H. McCulloch; Wm. B. Ladd, Jr.; W. H. Allen; M. E. Bickford; Harry Rustin; G. P. Marron; Wm. Seckel; R. T. Knapp.

BRACH DISPLAYS ENTIRE LINE

The L. S. Brach Manufacturing Corp., Newark, N. J., pioneers in the manufacture of radio accessories since the inception of the Radio Industry, have on display at the Fourth R.M.A. Trade Show, Booth A-8, their entire line of products.

Those in attendance are Mr. L. S. Brach, Pres. & Sales Mgr., Mr. Joseph I. Liner, Chief Engineer, Mr. Wm. H. DeChant, Asst. Sales Manager, Mr. Frank T. Faeth, Sales Engineer, and Messrs. F. W. Kuehle, representative, N. J. Bigham, Brower Murphy, Kenneth Murphy, Jack L. Hursch, B. H. Smith, representatives. They also wish to announce that owing to the expansion of their business they were obliged to seek larger quarters, and have been located at 55-63 Dickerson St., Newark, N. J., since April 25, 1930.

CONCENTRATE ON THREE ITEMS

The Electro-Motive Engineering Corporation, New York City, have concentrated in the making up of just three items; namely, resistors, condensers, and volume controls. A great many set manufacturers have been among their customers during the past four years.

The organization is headed by Mr. Philip Lauter, who has been associated in the radio industry since the early days. He was one of the founders of Polymet. He is ably assisted by Mr. Harold Bretton who acts in the capacity of sales and advertising manager.



TURNING THE DIAL

By F. ROMER
Associate Editor

Tuning in on the Infinite, Getting the Wave-Lengths of a Few Ideas, and Cutting Out Some of the Attic Static.

When they went to view how much Leonardo had finished of a painting, the report came back: He is applying himself passionately to geometry, but he can't say a good word for the brush."

NEW FIGHTING SPIRIT

Applying yourself passionately to details in your plant is not the way to get the sales job done today. Close-up "shots" of trade conditions out "on location" are what you need. The stuff in you that made you head of the business needs to be roused by a few whiffs of burning powder. The times call for new fighting spirit.

« «

"A single technical expert is worth ten communists," wrote Lenin. The radio business doesn't need reforming—it needs re-energizing.

RE-ENERGIZING NEEDED

It needs stimulated study of what the public wants and will welcome with wide-open purse, not blind belief that what it wants the public to want is what is wanted. "To act is easy, to think is hard; to act according to our thoughts is troublesome."

« «

How will television be handled in the homes? When it's as far along as today's "talkies", will the apparatus be installed on lease by the year? Or will Mr. and Mrs. Consumer drop in a quarter, as some now do for gas, and get three hours entertainment of an evening? Will their quarter give them choice of as many visual-vocal programs as turning the dial gives to eager ears today?

What will happen to the movie palaces? Will the Federated Musicians get back in the pit to attract the crowds they now implore to ignore the "canned music"?

Or will the theatres become "broadcasting stations" supplemental to the present chain systems? Will the householder who takes a certain type of "lease" get "local television entertainment" only—giving him choice of programs on the boards at his local theatres, to whom part of his television tariff goes? In that way the theatre would continue its function doubly supported by those who wanted an evening out and by those who wanted an evening at home.

Will it turn our novelists into the rich and ruling class, adding to their book rights, serial rights, movie rights, talkie rights and radio rights, the television rights local and the television rights national?

Will television end or stimulate the nomadic impulses in us? Bringing to us the sights, sounds, and who can say but perhaps the scents, of foreign places and peoples, television will put the world in our sitting room. Will it

bait us to greater travel interest or abate our wanderlust?

Will the television programs be supplied by the country's advertisers, the nation's movie magnates, a single monopoly or a competitively active group of independent franchise holders with sectional leasing privileges to the consumer?

A new world of entertainment, a new day of education, a new era of industrial practice, and probably 10,000 new fortunes are awaiting on the answers to these questions.

« «

Cecil Rhodes so set his mind and heart on the development of Africa that he even built his house facing the interior, its back to the sea. Ford said: "Most business failures come from trying to do more than one

SUCCESS IS CONCENTRATION

thing in the same shop." The essence of success is concentration. The fewer precedents there are from which a course of action may be drawn, the more concentration is necessary to succeed in a business. Radio has had to say, like Napoleon: "Precedent? I make precedent!" The successes in radio are the great concentrators.

« «

Radio, right now, is "finding out." Those who come into the Radio Industry a quarter of a century from now will have facts, findings, formulas, and figures for guidance which were charged off as experience

THOSE PIONEERS

against today's pioneers. But, while some will leave bleaching bones behind, the real rewards are to the pioneers. Sudden discoveries, swift riches, quick growth, virgin markets—these compensate the valiant, venturesome and vigorous for running risks and enduring rigors. It's the day for the daring, the field for the forceful. Stanley fought thirty-two bitter battles with savage foes but penetrated Congo-land. As a sailor, he swam from his own ship to an enemy vessel under fierce fire and attached a rope to it so it was dragged along captive. That's the wade-in-and-wallopp spirit which will win in radio for the next decade.

I DON'T hear anything of golf club-houses turning their verandas into office space. Golf's a good game, but any man who says the golf club is the best place he knows to put over deals has his business just a short putt from being in the hole.

WEST OF THE ROCKIES

What the Industry and Its Leaders on the Coast Are Doing,

as Reported by—

RALPH POWER, Ph. D.

Pacific Coast Editor

RADIO INDUSTRIES



At tremendous expense, my under-cover agents have exposed the junket trip across the border (Mexico) of several radio distributors and factory representatives and manufacturers from California. Here are my operatives' pen shots of the escapade.

Act number one . . . Dave Marshank reviving the old and popular ballad, "My Wife's Gone to the Country."

Second act . . . Corpulent R. B. Yale valiantly endeavoring to climb tequila bush and work motion picture camera at one and the same time.

Act three . . . Fred Dean, ubiquitous interference hound, sleuths a foreign source of reception difficulty.

Intermission . . . George Marshall, huddled over glowing camp fire, narrates vivid story about how he shot fish with a 13 centimeter defense gun.

Fourth act, scene I . . . Charlie Kierulff, gone musical, rows the boat and sweetly warbles the Volga Boatman . . . profuse avalanche of pop bottles from the side lines rewards his efforts.

Fourth act, scene II . . . Cloyd Marshall fumbles his glasses, and cannot distinguish between 7 and 11 . . . recovers optic aids and nonchalantly resumes game of dominoes.

Finale . . . Charlie Walters, sartorially bedecked out like nobody's business, a la Beverly Hills cowboy (drug store species) . . .

Hat by Stetson

Balloon pants by Goodyear

Shirt by Heck

Boots by accident

Pipe by Meerscham

Hip pocket by Budweiser.

* *

The G-M radio activity on the coast, in its new set-up, includes three zone managers . . . J. W. Condon, Jr., in Seattle, formerly a distributor in Portland; Henry E. Gardiner, for San Francisco, formerly with Sonora and Columbia Phonograph; Don C. Wallace, Los Angeles, formerly a factory representative. As announced in this column two or three months ago, L. C. Warner, former wholesaler of radio in the northwest, is the new G-M radio Pacific coast regional manager. New quarters have been established in the recently opened Bendix Building, Los Angeles.

* *

Ben Price, of the DeJur-Amsco Corporation, N. Y., who has been in the southern part of the coast, finished his trip to various coast cities, and went back to New York in time for the Atlantic City conclave.

* *

Jackson-Bell, Los Angeles, has just shipped 100 mantle models north for Sherman City in San Francisco. The bay city firm will market under their trade name.

* *

The Electrical Research Products company has sold earphone sets to the Fox West Coast theaters, according to Harold B. R. Franklin, theater president. These are being installed in the circuit from Mexico to Canada and east to the Mississippi to aid the deaf to enjoy the talkies.

McMurdo Silver has been roaming around the coast showing his new receiver in a sort of pre-view before the R.M.A. show.

* *

James (Jimmy) De Pree, general sales manager for Colin B. Kennedy Corp., has been visiting the coast. Kennedy, by the way, used to be a telegraph operator at the old Washington station in Los Angeles before the war. De Pree also announced that the Columbia Stores Company is distributing Kennedy sets at Denver, Salt Lake, Spokane and Butte, Montana.

* *

William Dorival and Orville Gaspar have gone with the Plymouth Radio Corporation and discontinued their power-pack service and transformer winding business which operated as Dorival and Dorival, 207 East 15th street, Los Angeles. Dorival has been in radio circles for several years, while Gaspar flew to the coast in January from Minnesota.

* *

Dapper Howard D. Thomas buys railroad script by the yard these days. Up in the northwest he has a Seattle office at 2817 31st Avenue, south, and another at 1853 South Hope street, Los Angeles. He represents the Perryman Electric Co., Inc., and also distributes the Jackson-Bell midget line in the northwest . . . traveling south each month.

* *

Bill (William) R. Fremersdort, Pacific coast manager for Colonial Radio Corporation, hangs up his hat these days in Los Angeles at 487 Chamber of Commerce building.

* *

Emmett R. Patterson, Patterson Radio Corporation, stepped blithely aboard the train last month and went to New York ahead of the trade show dates.

* *

Vital statistics of the month . . . daughter born to Jack Perluth, Los Angeles manufacturers agents. Mother doing nice . . . the old man is up and around, too.

* *

Keller-Fuller Manufacturing Company (Radiette) last month loaded its technical force and accoutrements on a truck and rolled over to the Gilfillan factory. Their lines will be fashioned at Gilfillans under R.C.A., Hazeltine and Latour patents. Offices remain at the old stand . . . 1573 W. Jefferson, Los Angeles.

* *

"Scotty" Scott (Earl E.), formerly with the Meyberg organization, is doing special promotion work in Southern California and Arizona for the Arcturus Radio Tube Company, according to P. F. Wiley, California representative.

* *

M. J. Carls, who used to manufacture the Golden Bear speaker line . . . dormant the past year . . . has turned mill production over to moldings, grill and cabinet design especially for the mantle and portable sets . . . 1929 South Los Angeles street, Los Angeles.

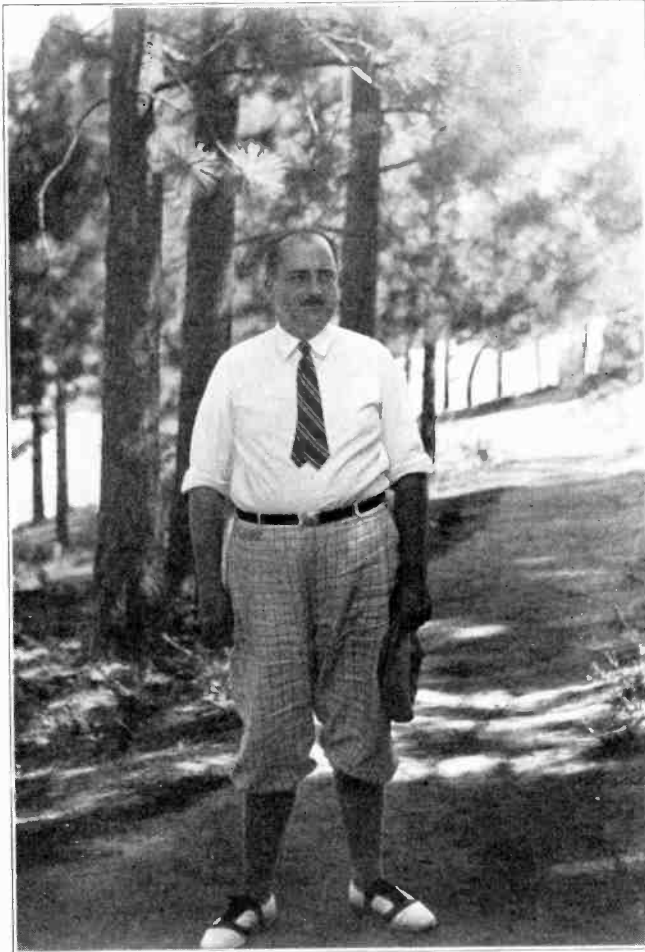
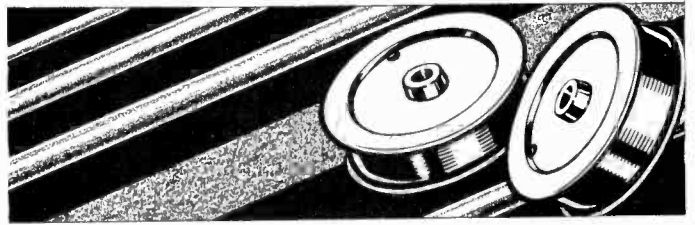
* *

G. C. Osborn, vice president in charge of sales, and Meade Brunet, sales manager, are two officials from the R.C.A. Radio-tron Company who have been doing a bit of visiting along the coast lately.

The Royale mantle line has gone into production by Griffin-Smith Manufacturing Company, 1125 South Wall street, Los Angeles (A. M. Griffin and C. W. Smith). They are also acting as distributors and deal direct with the retail outlets.

* *

Specifications include a three screen-grid circuit, full dynamic speaker. Walnut cabinet is used for the regular mantle model while the other model is in a leatherette case. Frost volume controls, Yaxley parts, Eby sockets, Gardiner transformers, Sprague condensers, Electrad and Durham resistors. De Forest tubes.



In carefree mood, Radio Industries' Pacific coast editor, Dr. Power, saunters along the highways and byways of the rugged coastline, but more often he may be found maneuvering up and down Hollywood Boulevard in search of human interest copy. In this view the reportorial notebook is hid snugly in hip pocket, sometimes reserved for other purposes

"Ohiohm" has three Southern California distributors . . . Herbert H. Horn, Radio Manufacturers Supply Company and Radio Supply Company.

* *

Mission Bell Radio Manufacturing and Distributing Company, 2117 West Pico Street, Los Angeles (H. G. Schmieter and P. L. Fleming), makers of console and table models, now go into production for a mantle model, which they will sell to distributors rather than through retail outlets. The outfit weighs 23 pounds and stands 16 inches high, finished in portable model with carrying case or in regular finish, bending wood.

* *

Riggs-Palmer, Inc., a new organization, takes over the activity of the Stewart-Warner Sales Company of Portland, Ore., according to Norman H. Riggs, manager.

The Everyday Tubes of TOMORROW

will be made of
FANSTEEL
WIRE AND METALS

The Fansteel laboratory anticipates the demands of the industry for years to come. It is always developing better metals and alloys for use in tubes. The metals Caesium and Rubidium, for instance, hardly known today, are ready for tubes of the future. Tantalum, used only in large power tubes a few years ago, is being employed more and more in common receiving tubes—a notable improvement, at a saving.

Tube makers who use Fansteel metals for today's tubes not only are sure of dependable metals, uniform physically, chemically and electrically, but also are in close touch with a research service of proved practical value.

Manufacturers are invited to write for samples of Fansteel metals—better still, call in a Fansteel engineer.

**FANSTEEL PRODUCTS
 COMPANY, Inc.
 NORTH CHICAGO, ILLINOIS**

Leading Producer
of
Radio Frequency Chokes
ANNOUNCES

INCREASED CAPACITY

With present production facilities of thousands of RF choke and antenna coils daily in expectation of a big demand, Meissner will be in maximum production by early summer.

Immediate delivery is thus assured on any reasonable quantity of RF choke or antenna coils; also facilities for producing in quantity paper-section coils for radio transformers, speaker coils, X-ray, clock, and ignition coils.



COILS

—for practically every purpose
—stock and special—wound on
automatic machines to exact
number of turns you specify.
Precision inductances for quantity
production.

**TURN COUNTERS
DESIGNERS OF SPECIAL
COIL-WINDING MACHINERY**

And unusually prompt delivery on any special coils made to customers' specifications.

When you need first quality coils, a lot of coils or special types of coils in a hurry, depend on Meissner—a source of supply adequate to your needs where "quality" and "service" are something more than catch words.

**MEISSNER
MANUFACTURING CO.**

522 S. Clinton St., Chicago, Illinois

ENGINEERING PERSONALITIES



The program of the meetings of the Institute of Radio Engineers at the R.M.A. Show has been announced. The I.R.E. is meeting in conjunction with the R.M.A., as are many other radio organizations. The I.R.E. program follows:

Tuesday, June 3rd

10:00 A. M.

"Commercial Methods of Testing Loud Speakers," by C. H. G. Gray and P. B. Flanders.

"Overall Response Testing of Radio Receivers," by A. V. Loughren.

2:00 P. M.

"Problems Involved in the Design and Use of Apparatus for Testing Radio Receivers," by P. O. Farnham and A. W. Barber.

"Engineering Control of Radio Receiver Production," by V. M. Graham and Benjamin Olney.

"Essential Tests for Component Parts of Electric Radio Receivers," by H. E. Kranz.

All meetings will be held in the Civic Auditorium where the show itself will be staged.

* *

Acme Electric and Manufacturing Company, Cleveland, have recently acquired the services of Mr. J. A. Comstock, who was formerly Chief Engineer for Modern, and was later at the Riverbank Laboratory of the United Reproducers Corporation.

* *

John S. Arnold, one of a number of former engineers with Universal Wireless, Chicago, is now head of the Citizens Radio Service, Alexandria, Va.

* *

The great University of California has contributed its share of graduates to the radio engineering profession. Lieut.-Commander Ellery W. Stone, U.S.N.R., President of Kolster Radio, Haraden Pratt, Chief Engineer of Mackay Radio & Telegraph, and Lewis M. Clement, now with Westinghouse, are some recalled by Prof. D. D. Davis of the Berkeley school of engineering. D. K. Lippincott, '13, wrote the first radio thesis.

At famed Leland Stanford, Jr., University, Palo Alto, the banner of radio research is carried by Prof. Frederick E. Terman. Stanford grads who have blazed the trail of radio are many. Cyrill F. Elwell, '07, founder of Federal Telegraph (Kolster Radio), was a pioneer. In the present day is Herbert Hoover, Jr., '25, in charge of radio for Western Air Express, Los Angeles. Ralph Heintz, '20, and his chief engineer, Phil F. Scofield, '24, at Heintz & Kaufman, Ltd., San Francisco, both help to keep Stanford on the air.

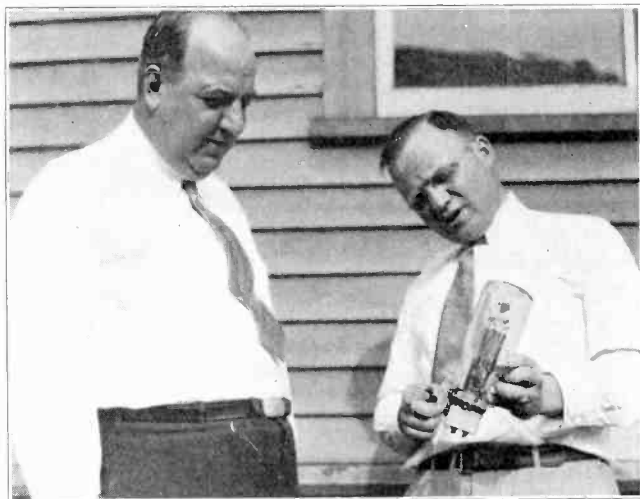
R. C. A.'s West Coast communications engineer is Ralph R. Beal, '12. At the same company's Victor plant in Camden, N. J., is H. F. Elliott, '16. And of course Federal Telegraph, right along side the campus in Palo Alto, is headed by Leonard F. Fuller, Ph.D., '19, aided by C. F. Suydam, '17, C. V. Litton, '24, W. M. Brower, '19, H. O. Storm, '20, and many another. S. W. Gilfillan, Los Angeles radio manufacturer, is Stanford, '12.

* *

Literature and engineering cross in the person of Hans Otto Storm, radio engineer with Federal Telegraph, Palo Alto, Calif. He is the author of a new, full-length novel, *Full Measure* (MacMillan, 1929), an excellent radio tale which will please radio engineers, finding themselves in fiction for the first time.

DE FOREST HEADS DISCUSS MILKOTRON

Having developed not only a complete line of De-Forest receiving and transmitting audions, but having inaugurated numerous refinements and improvements in the usual standard types of tubes, the De Forest organization has at last found time to introduce a startling innovation of its own—the Milkotron—the tube which justifies the slogan “Not a Bull in a Carload.”



Here we have big Bill Barkley, Vice-president, and Paul Staake (The Flying Dutchman), Advertising Manager, of the De Forest Radio Company, discussing the sales points of the Milkotron. Note the remarkable design of this new tube—in a standard milk bottle envelope; sturdy elements containing the grid leaks, capacities and what-have-you altogether; the special spigot feature which permits of draining the tube of its charge, and so on, and so on. Adjectives fail us in covering the wonderful features of this new tube.

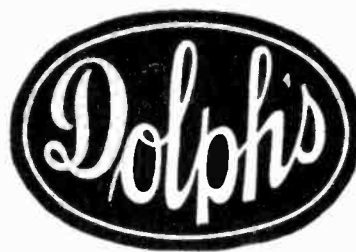
According to the De Forest engineers, the tube may be had in any capacity up to and including 500 qwatts (a new unit of something or other, chiefly the latter. See Borden and Sheffield, “Principles and Practice of MOO-Pa Transmitting Circuits,” page 356). It is intended for those troubled by fading signals, skip distance effects, low antenna current, static-itus, heartburn, weak ankles or humitosis.

See the Milkotron for yourself at the De Forest Booth. Once seen—never forgotten!

AIRCRAFT BEACON RECEIVERS

An order for R.C.A. aircraft beacon receivers to be installed on passenger planes flying the western division route of the T.A.T.-Maddux Company, has been placed with the Radiomarine Corporation of America, according to an announcement by W. G. Logue, Commercial Manager of the R.C.A. Company. Mr. Logue stated that this order brings the total number of radio safety units supplied by his company for T.A.T. and the T.A.T.-Maddux planes to twenty-five within the last year. These receiving equipments are all of the remote control type with provision for operation from the cockpit by either the pilot or the co-pilot.

The receivers are used for beacon, weather, and communications service in connection with the ground stations of the Transport Company and the Department of Commerce.



INSULATING



Compounds

An extensive line of Insulating Compounds covering the very wide range of radio coil and condenser requirements is maintained. Dolph's Compounds go into the products of the largest set builders and coil makers. Yet, since each manufacturer has a different problem, special materials are constantly called for.

At the present time in the Dolph Laboratory, there are scores of coils being put through the paces in order that thoroughly satisfactory insulation may be achieved. And, a trained laboratory staff handles each new demand with prompt efficiency.

High melting point compounds for power transformers are notable Dolph accomplishments. Also, a new wax compound developed especially for the impregnation of r.f. choke and other coils employed in radio circuits.

When sending coils, etc., for treatment, it is advisable to submit an outline of your problem so that the most suitable material may be more readily determined. Inquiries for information on improved impregnating methods as well as special data on the proper treatment of coils are invited.



John C. Dolph Company
Insulation Specialists
 Newark, N. J.



*"Talk it
over
with
Kingston"*

KINGSTON CAN
help you with your
production
problems!

The manufacturer who specifies Kingston products has a right to demand more than uniformly high quality. Kingston engineering service is a definite part of the obligation.

Kingston's resources and experience qualify them to solve your problems in the production of power transformers, filter condensers, filter reactors and other radio products.

Kingston will welcome an opportunity to talk it over with you.

**KINGSTON
PRODUCTS
CORPORATION**

KOKOMO, INDIANA
U. S. A.

KINGSTON
RADIO POWER EQUIPMENT
to manufacturers specifications



**WITH THOSE
WHO SELL**

—And What They Are Doing

Homer C. Davis, President of the Homer C. Davis Co., and President of the Associated Sparton Distributors, Inc., of the Philadelphia district, announces the appointment of his firm as exclusive Sparton distributors in that territory.

* *

Samuel Bialek, Eastern Sales Representative for Erla, writes in to state that he is now located in new and larger offices at 205 East 42nd Street, New York City. A new and complete line of Erla receiving sets, chassis and magnetic pick-ups will be on display and demonstration.

* *

The Esenbe Company, distributors of Atwater Kent Radio in Pittsburgh and adjoining territory in western Pennsylvania, recently announced the appointment of John K. Nichol as Sales Manager of the Company.

* *

Geo. C. Beckwith Company in the musical and radio jobbing business for the past fourteen years announce their appointment as Northwest Distributors for the Philadelphia Storage Battery Company of Philadelphia. They operate in a more or less wide territory, and now maintain complete distributing and service houses at Milwaukee, Wisconsin, Minneapolis, Minn., Sioux Falls, So. Dak., and are opening at Fargo, No. Dakota. Each of these establishments is an individual operating unit.

* *

The Peerless Electric Supply Company, Indianapolis, has assumed control of the distribution of Edison Radios in the Indianapolis area, according to a recent announcement from Thomas A. Edison, Inc. The section was formerly served by the Edison Distributing Corporation of Chicago.

* *

Ben Witlin has been appointed Sales Manager of the Cabinet Division of Federal Wood Products Corporation of New York. This is a promotion for Mr. Witlin as he was appointed Assistant Sales Manager the first of January, 1930. He was formerly with the Starr Piano Company where for ten years he intermingled with the trade in the East as General Sales Manager. Before that, he was with the Victor Talking Machine Company.

* *

H. A. Simmons has assumed the duties of Sales Manager for Carter Radio Co., Chicago, manufacturers of a complete line of radio parts. Until recently, Mr. Simmons was Sales Engineer in Chicago for International Resistance Co., Sprague Specialty Co. and Amperite Corporation.

* *

L. S. H. Baird, who was formerly Chicago sales representative for the Leslie L. Muter Co. division of Steinite, spent the winter in Los Angeles engaged in rest and literary pursuits. Perhaps the publishers' fall lists will include a radio novel.

* *

The appointment of Geo. L. Patterson, Inc. as New York distributors for R.C.A. Radiola products has been announced by Mr. V. W. Collamore, Manager, Radiola Division, R.C.A. Victor Company. Geo. L. Patterson, Inc., which superseded the well-known organization of Stanley & Patterson, Inc., in 1929, have been successful wholesale radio merchandisers for nearly ten years. Mr. George L. Patterson is Chairman of the Board and Mr. Irving Sarnoff is President of the new organization.

From A. A. Schneiderhahn, President of A. A. Schneiderhahn Co., Des Moines and Sioux City, Iowa, comes the information that besides himself, the following Iowa Atwater Kent Distributors will attend the convention at Atlantic City and will headquarter at the Ambassador Hotel: G. J. Timmerman, President of Midwest-Timmerman Co., Dubuque and Davenport; L. P. Courshon, Vice-President and General Manager of L. P. Courshon Co., Mason City; W. E. Parsons, General Manager of A. A. Schneiderhahn Co., Sioux City; and B. J. Kerper, Secretary and General Manager of Midwest-Timmerman Co., Davenport.

* *

Richard E. Smiley, Sales Manager of The Ken-Rad Corporation, recently returned from a two weeks' trip in the East, where he completed final plans for the Show at Atlantic City.

* *

Jack Hedquist, President of the Mid-West Distributing Company, Chicago, is finding little time to polish up that famous golf game of his. There are two possible reasons for his absence from the links—either business is so good that he's too busy to get away; or else business is so bad that he's out getting busy.

* *

Thomas A. Edison, Inc. recently announced the appointment of the Stoner Piano Company of Des Moines as Edison Radio distributors in the Iowa area. The negotiations were handled by Roy S. Dunn and A. E. Emrick, officials of the Edison organization. The general direction of the company's affairs is in the capable hands of T. I. Stoner, President of the Stoner establishment; F. T. Brand, Treasurer; and M. E. Wallace, Secretary.

* *

To attain the presidency of one of the largest distributing organizations in New York City at the age of 22, is the unusual accomplishment of Lawrence R. Fink. Mr. Fink now holds the position of president and general manager of the New York-Kennedy Company, New York City, distributors for the Colin B. Kennedy Corporation of South Bend, Indiana, manufacturers of Kennedy radios.

* *

Announcement has been made that the Kansas City, Mo., firm of Moser and Suor, Inc., has been appointed sole wholesale distributors of R.C.A. Radiolas in the territory of Western Missouri and practically all of Kansas. Arrangements to this effect were completed during the recent visit of Mr. Moser and Mr. Suor to New York City.

* *

Messrs. Lucker and Toepel, of the Lucker Sales Company, have recently returned to Minneapolis from New York where they concluded arrangements to distribute R.C.A. Radiolas over a wide territory. Mr. V. W. Collamore, Manager, Radiola Division of the R.C.A. Victor Company, has announced that Lucker Sales will be sole Radiola distributors in Minnesota, North Dakota, South Dakota and part of Wisconsin.

* *

In a recent interview, Mr. R. W. Cotton, Sales Manager of the Samson Electric Company, disclosed the fact that P.A.M. amplifiers are being used in over 50 different types of group address installations.

* *

The Frank M. Brown Company of Portland, Maine, one of the oldest and best known paint, varnish and electrical supply wholesale houses in New England, has been appointed by the Atwater Kent Manufacturing Company, Philadelphia, as distributors for Atwater Kent receiving sets and speakers throughout the entire state of Maine.

* *

Two of the Middle West's largest distributors, The W. S. Nott Co. of Minneapolis, Minn. and The Bennett Co. of Burlington, Iowa, were recently appointed Lyric distributors according to an announcement by Eugene R. Farny, President of The All American Mohawk Corp., manufacturers of Lyric Radios.

Gosh—I'm Tired!



"HALLOWELL" STEEL CHAIR

If chairs would come in handy around the plant, get the "HALLOWELL", made of steel, for they are not only comfortable to sit on and, therefore, rest you; but they are also so strong that they won't get askew in a short time—in fact, we guarantee them absolutely for 5 years—that's how strong they are.

If preferred, the back comes off, and then it becomes a stool—handy, isn't it?

The seat is either all steel or inserted wood as shown in picture. Just as you like it.

Write Us for Form 419

WE MANUFACTURE:

- "HALLOWELL" STEEL WORK-BENCHES
- "HALLOWELL" STEEL WORK-TABLES
- "HALLOWELL" STEEL WORK-BENCHES, SEMI-PORTABLE
- "HALLOWELL" STEEL-WOOD WORK-TABLES
- "HALLOWELL" STEEL BENCH-DRAWERS
- "HALLOWELL" STEEL CHAIRS AND STOOLS

STANDARD PRESSED STEEL CO.

BRANCHES
BOSTON
CHICAGO
DETROIT

JENKINTOWN, PENNA.
BOX 542

BRANCHES
NEW YORK
SAN FRANCISCO
ST. LOUIS

AUDIOLA MEN WELL-KNOWN

Mortimer Frankel, President and General Manager, who started the Audiola Radio Company in 1921, graduated from Cornell in 1911 in electrical engineering and was associated with the Roller Smith Company, large manufacturers of electrical measuring instruments, for 22 years. Mr. Frankel is also President of the Wilmort Mfg. Company, which firm he founded in 1917. Mr. Frankel is a full member of the following engineering societies: I.R.E.; A.I.E.E.; and S.A.E.

F. J. Marco, Chief Engineer, who has been associated with Audiola Radio Company for four years, formerly in charge of engineering for Bremer-Tully, is well known in radio engineering circles as a thorough student of radio receiving sets from both a theoretical and practical standpoint. His work under Prof. Wilcox while still a student at Armour Institute of Technology is known to many old timers in radio. His original work in the design of the Bremer-Tully counterphase set is also generally known.

E. J. Glennon, Vice-president and Production Manager, has been associated with the Audiola Radio Company for eight years and is thoroughly familiar with radio set production and its mechanical engineering. Prior to joining Audiola, Mr. Glennon was associated for six years with the Jefferson Electric Mfg. Co. in a production and mechanical engineering capacity.

H. E. Anderson, Secretary, has occupied that capacity with Audiola since it started in 1921. Mr. Anderson takes charge of purchasing and credits and is thoroughly familiar with the radio business from many viewpoints.

Charles W. Strawn, Sales Manager, is a new addition to the Audio family. He was formerly in charge of sales promotion for U. S. Radio & Television. Prior to that he was connected with prominent radio merchandising concerns. His early experience lasting over many years was in a kindred industry, the music industry, during which time he was connected with the Wurlitzer Company in the capacity of General Manager of Cleveland and Buffalo offices and as divisional manager of Lyon and Healy, Chicago.

VOLUME CONTROL INSURANCE

Sound advice to those interested in the control of radio circuits is afforded in a folder entitled "Volume Control Insurance," just issued by the Clarostat Mfg. Co., Brooklyn, N. Y. This piece of literature deals with the many problems of satisfactory volume control and how these have been solved through specialized engineering development. It also covers various types of volume controls in single and duo forms for every conceivable single and multiple circuit controls. Write for copies to the Service Dept., *Radio Industries*.

INTERVIEW RADIO LEADERS

Several hundred editors of radio business papers and the radio editors of newspapers will participate in public interviews of the leaders of the radio industry at the annual R.M.A. Convention at Atlantic City, in an effort to definitely determine the various trends of the radio industry.

It is the purpose of the Radio Press Association to gather the authentic views of the leaders of the industry so as to be a help in promoting the industry in every possible way.



H. H. CORY

Among those who have been invited to express their views are:—A. Atwater Kent, William G. Grunow, David Sarnoff, Powell Crosley, Paul Klugh, H. B. Richmond, Wm. S. Hedges, Wm. S. Paley, M. H. Ahlesworth, H. H. Frost, H. G. Erskine, J. N. Blackman, Capt. Sparks, Bond Geddes, Harry Alter, and Henry Steussy.

Many other individuals are also being invited and others will be invited after the Association meets at Atlantic City.

The meetings of the Radio Press Association will be held in the Auditorium on Wednesday and Thursday afternoons, June 4th and 5th, at 2:00 P. M.

The Executive Committee of the Association consists of: H. H. Cory, Chairman, Ray Sutcliffe, Lee Robinson, W. J. McLaughlin.

ERSKINE IN GOOD HEALTH

The many friends of Mr. B. G. Erskine, President of the Sylvania Products Company and Director of the R.M.A. will be glad to welcome him back to the convention again this year. They all remember during last year's convention how concerned everyone was when the doctors gravely shook their heads at his bedside. However, in true Erskine fashion, he fought his critical illness and came through with flying colors. After a winter in Florida, Mr. Erskine is entirely restored to health.

He will be seen all over the convention this year, commanding destinies of the Sylvania Booths as well as Sylvania Lodge at the Ambassador Hotel, and directing the R.M.A. dinner in his capacity as chairman of the Banquet Committee.

DISTRIBUTE RADIO AGAIN

It has long been known that the Westinghouse Electric and Manufacturing Company will again distribute radio sets over their own name. This, however, marks the first official statement as to policies, jobbing distribution arrangements, internal organization and dealer distribution plans.

For months Westinghouse has been quietly developing its organization plans. Now, as the time for beginning distribution draws closer, Mr. M. C. Rypinski, Manager of the Radio Department, announces the following organization: LEWIS M. CLEMENT, Assistant to Manager, responsible for commercial engineering, service, etc.; C. HART COLLINS, Merchandising Manager, responsible for jobbing relations; RALPH B. AUSTRIAN, Assistant to Merchandising Manager, responsible for dealer relations; JOHN A. DUNCAN, Assistant to Merchandising Manager, responsible for Westinghouse Radio Sales on the West Coast; FRANK E. ELDRIDGE, Assistant to Manager, responsible for business with the Government, associated interests and for internal organization activities; LEROY W. STAUNTON, Assistant to Manager, responsible for advertising and sales-promotion.

Mr. Rypinski will be remembered as Manager of the Radio Department of the Westinghouse Company in 1920, during the earliest pioneering days of Westinghouse in Radio. He is well-known as Vice-President of Brandes and Kolster Radio from early 1922 until 1928, when he resigned and retired from active business for a year. Prior to his connection with Brandes and Kolster, he had served Westinghouse for sixteen consecutive years.

C. Hart Collins announces that the distribution of Westinghouse Radio will flow through Westinghouse Agent-Jobbers. Jobbing territories have been established and, during the time of the Radio Trade Show at Atlantic City, jobbers will be given information on the initial advertising plans, general dealer policies and the Westinghouse Radio sets. "We at present, anticipate" said Mr. Collins, "holding Jobber-Dealer Meetings about the middle of June and arranging as quickly as possible thereafter for all prospective dealers to see and hear the new Westinghouse Radio." Mr. Collins was the founder of the Company of C. Hart Collins, Ltd., manufacturers of radio sets in Great Britain. He is one of the original group of founders of the British Broadcasting Company and a pioneer member of the British Radio Manufacturers Association and Executive Council. He joined the Westinghouse Company in April.

BORGHOFF RESIGNS POSITION

On May 1st, William, better known as Radio Bill, Borghoff to his many friends in the radio trade locally and nationally resigned his radio executive connection with the Geller Ward & Hasner Company, Crosley Distributors in St. Louis.

“ELECTRON PHYSICS”

Author: J. Barton Hoag, PH.D.

Publisher: D. Van Nostrand Co., Inc.

This splendid book is the outgrowth of a laboratory course in Radioactivity and Discharge Through Gases,” which Dr. J. B. Hoag has conducted at the University of Chicago for the past five years.

The underlying motive in *Electron Physics* is to present evidence for as many of the concepts of modern physics as fall within the scope of the subject chosen. The book has been arranged so that each chapter is a unit, containing a general treatment of the subject, the important discoveries, definitions and experiments. Many points of laboratory technique have been woven into these experiments while the procedure to be followed and the apparatus to be used have been greatly simplified over the original research methods.

Particularly interesting is the low voltage used in performing the famous oil-drop experiment of Millikan.

At the end of the book a list of sixty problems is presented; these are of great assistance in grasping the reading matter.

Dr. Hoag’s article, “The Double Heterodyne,” is featured in the current *Radio Industries*.

“THE FUNDAMENTALS OF RADIO”

Author: R. R. Ramsey, PH.D.

Here is a complete course in radio written so that the mathematical and the non-mathematical readers can understand the subject. Throughout, it contains a happy blending of theory and practical application which makes the theory vital and the application understandable. There is no phase of the subject which has not been treated, yet most of the dead wood usually found in texts has been omitted and replaced by up-to-date discoveries and inventions.

Dr. Ramsey’s article, “The Load of a Power Tube” is featured in the current *Radio Industries*.

“TOWARD CIVILIZATION”

Author: Charles A. Beard, Editor

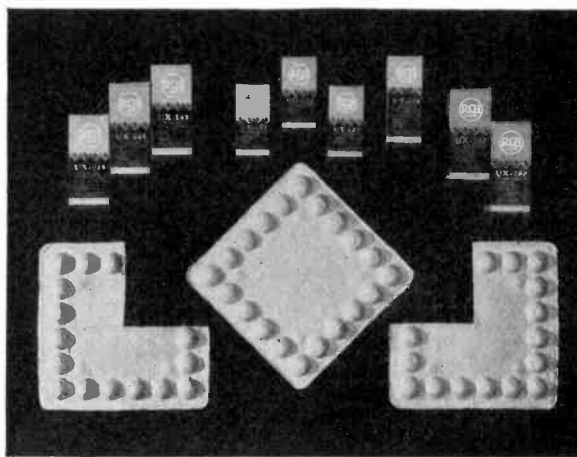
Publisher: Longmans, Green & Co.

Under the editorship of Charles A. Beard, formerly Professor of Politics at Columbia University, fifteen of the country’s leading engineers have written a comprehensive and philosophical survey of their individual fields—outlining present developments, and indicating the promise of the future.

After a brilliant introduction by Mr. Beard, the following chapters are included: “The New Age and The New Man,” by Ralph E. Flanders who is now Vice-President of the American Society of Mechanical Engineers. “Science Lights the Torch,” by Robert A. Millikan. Dr. Millikan was awarded the Nobel Prize in physics in 1923, and more recently he has been Director of the Norman Bridge Laboratory of Physics in Pasadena, California, and chairman of the executive council of the California Institute of Technology. “The Spirit of Invention in an Industrial Civilization,” by Elmer A. Sperry, President of the American Society of Mechanical Engineers. “Power,” by C. F. Hirshfeld, Chief of the Research Department of the Detroit Edison Company. “Transportation,” by Roy V. Wright, Managing Editor of *Railway Age, Railway Mechanical Engineering*, and Secretary of the Simmons-Boardman Company. “Communication,” by Dr. Lee De Forest, developer of the three-electrode vacuum tube. “Modern Industry and Management,” by Dr. Dexter S. Kimball, Dean of Engineering at Cornell University. “Agriculture,” by Thomas D. Campbell, member of the American Engineering Council in



HOLED-TITE INTERIOR PACKING FOR KITS OF 5 TO 12 TUBES



THIS IS EVERYTHING NEEDED TO PACK A 9 TUBE KIT ready to place into corrugated carton.

TUBE KITS Now Packed the Holed-Tite Way

Prevents breakage, costs less, requires smaller shipping carton, simplifies packing, *eliminates mussy excelsior.*

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TRADE MARK NEW YORK

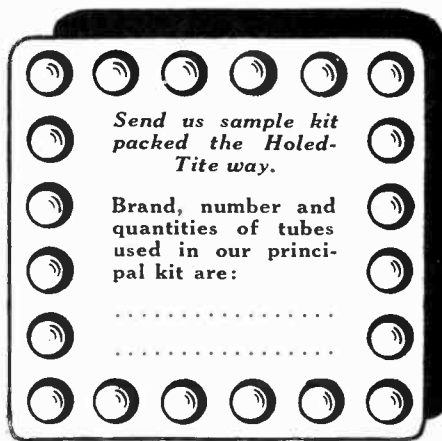
Radio Tube Pads

HOLED-TITE PACKING CORP.
100 E. 42nd St., New York, N. Y.
Affiliated with International Paper Co.

Simplify your kit packing problem. Pin coupon to letter-head and
MAIL AT ONCE

“PROTECT the HEART of the RADIO”

Holed - Tite moulded pulp pads are standard in use by most large tube manufacturers.



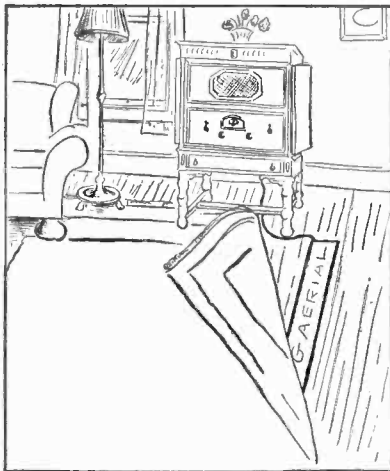
Potter

Quality Condensers

Improve Your Receiver

Potter Rug Aerial

Patent Applied For



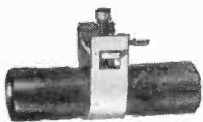
No longer is it NECESSARY to have an expert CLIMB to the ROOF. Old PROBLEMS of where and how to install the radio receiver aerial are SOLVED with the Potter Rug Aerial, designed by experts to fit the modern radio.

Roll back the living room RUG and place the Potter Rug Aerial in any DIRECTION on the floor, connect the lead wire to the AERIAL terminal of the radio receiver and REPLACE the rug.

To fit the rug, FOLD the Potter Rug Aerial where necessary at an angle so as to use all of the SURFACE.

POTTER GROUND CLAMP

WISE GRIP CONTACT—EASY TO INSTALL
—RUST PROOF PERMANENT—MODERN



Electrical devices such as the radio, electric ice machine and oil burner require grounding. Every telephone and electric service installation also requires a ground. The ground wire for each should be attached to a water pipe or ground rod with a Potter Ground Clamp for best results. The standard clamp fits $\frac{1}{2}$ inch and $\frac{3}{4}$ inch pipe. Installation is as easy on pipe close to wall as in open space.

The Potter Co.

North Chicago, Illinois

A National Organization at Your Service

Washington, D. C. "Engineering in Government," by L. W. Wallace, today Executive Secretary of the American Engineering Council. "Art in the Market Place," by Richard F. Bach, Director of Industrial Relations at the Metropolitan Museum of Art. "The Machine and Architecture," by Stephen F. Vorrhees and Ralph T. Walker, who are among the foremost modern American architects, and members of the well-known firm of Voorhees, Gmelin, and Walker. "Work and Leisure," by Lillian M. Gilbreth, Director of Gilbreth, Inc., Consulting Engineers in Management. "Education and the New Age," by William E. Wickenden, President of Case School of Applied Science in Cleveland. "Machine Industry and Idealism," by Dr. Michael Pupin, Professor of Electro-Mechanics at Columbia University. "Spirit and Culture Under the Machine," by Dr. Harvey N. Davis, President of the Stevens Institute of Technology. "Toward Civilization" concludes with a summary by Mr. Beard.

"The result is a significant volume—significant as a disclosure of technical tendencies, as a sign of deep stirrings among the members of the engineering fraternity, as the promise of a wider co-operation among the makers of our machine civilization, as a revelation of the engineering mind to the lay public."

* *

POLO MATCH TO BE HARD-FOUGHT

A sensational battle between two star teams is promised when the Silver-Marshall Polo Squad clashes with a team representing Radio Industries at Atlantic City on Wednesday afternoon, June 4th, at 4:00 P.M. The match is to be played in the Atlantic City Auditorium, located at the corner of Apsecon Blvd., and New York Avenue, and will be broadcast over the 5,000 Watt Columbia Chain Station, WPG. Max Coleman, famous sports announcer, will be at the microphone.

Here we have depicted the members of the Silver-Marshall



Team, reading from left to right (across the top) McMurdo Silver, President; William Halligan, Chicago Representative; Laurence Chambers, Chicago Representative; and Burton Browne, Sales Promotion Manager.

Admission is free to the trade, and tickets can be secured gratis at either the Silver-Marshall or the Radio Industries' booths, in the Auditorium.

As an indication of the furious spectacle in store for the audience, we report a statement made by the Masked Marvel of the Radio Industries team, who was overheard remarking, "Those Silver-Marshall fellows had better get off their high-horse, or we'll knock 'em off."

USES OF THE RADIO TUBE

(Continued from page 85)

for the detection of flaws in steel rails, and for the analysis of the actual structure of metal produced by heat-treatment, rolling, etc.

The audion tube is useful, also, in determining the genuineness of precious gems; for alarm systems against bank hold-ups, for bank-vault alarms, etc.

Amazing as has been the penetration of the vacuum tube throughout industry, the arts, and sciences, the achievements of the tube to date are but the beginnings of greater and more wide-spread uses.

The Editor of a magazine devoted entirely to the practical applications of the electron tube has recently said: "Looked at broadly the electron tube may perhaps be compared with Archimedes' classical discovery of the power of the lever, and his proud boast that, given an adequate fulcrum 'he could move the world.' For the vacuum tube is, in effect, an *electrical lever*. Its grid-input represents the short arm, and its anode-output the long arm. And just as the principle of the lever is used again and again in every element of every machine built in this Mechanical Age—so the introduction of the vacuum tube and its associated circuits presents almost inconceivable potentialities for the electrical future.

"So rapidly are new applications of this new principle coming that within a few years one may safely predict that—There will be nothing which the average man sees, hears, or buys but what will be controlled, regulated, or affected, in some important respect by an electronic tube."

So when next you open your Radio set and look at the little tubes glowing therein—think of the usefulness, the real beauty, of that simple device.

Of late I have been devoting my personal attention almost exclusively to the problems of Phonofilm or talking pictures on 16 m.m. film. The difficulties evolved here are very much greater than for the 35 m.m. film. In the first place, the speed is very much less, being forty per cent of that of the standard 35 m.m. film, which is 90 feet per minute. In other words, the 16 m.m. film is limited to a speed of 36 feet per minute. To obtain the necessary fine transverse lines of the sound image, representing frequencies of 5,000 per second, at this speed of film movement, means that these high frequency lines, which are exceedingly fine even at a film speed of 90 feet per minute, are positively microscopic in their dimensions. A very fine slit in the optical system, a very sharp focusing of the sound track on the film are necessary both in the recording and in the reproduction.

Inasmuch as the chief demand for 16 m.m. talking film will be to enjoy in the home reproduction of standard talking pictures made on 35 m.m. film, it has been necessary to develop methods for reducing the sound track from 35 m.m. to 16 m.m. film. Optical and electrical methods to accomplish this require the utmost nicety of detail in design and construction.

In addition to the short length of sound record available for the 16 m.m. film, the width of the sound track must necessarily be smaller than that on the 35 m.m. On the other hand, the light available, on account of the fine slit required, is less than half that in a theatre sound-

ANNOUNCING

AN ERCH IN HIGH FREQUENCY RESPONSE
 GREATER SIMPLICITY - SAFETY - STRENGTH
 REINFORCED BASS RESPONSE

The New
ROLA

Series K

**Electro-Dynamic
 Reproducing Units**

A frequency range believed unattainable has been realized in this new Rola series.

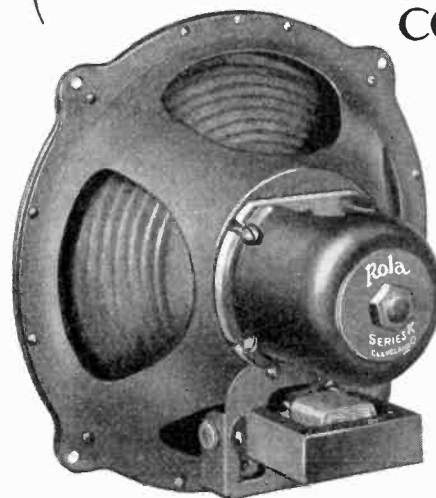
The significance of this development in tone reproduction is further amplified by a higher mechanical safety factor, by greater compactness and increased structural stamina.

See these new Rola models and hear them demonstrated both at the Ritz-Carlton Hotel and the Auditorium, June 2nd., R.M.A. Show. Auditorium, Booth No. A-6. Demonstration Booth CC-11.

The
ROLA
 COMPANY

2570 E. Superior Ave.,
 CLEVELAND, OHIO.

45th and Hollis St.,
 OAKLAND, CALIF.



SEE THE ACRACON EXHIBIT—BOOTH C-2
RMA SHOW AT ATLANTIC CITY

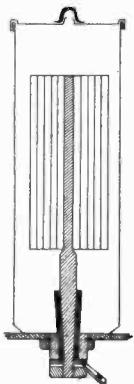


This Is The New



ELECTROLYTIC CONDENSER

DESIGNED especially to meet requirements specified by several leading manufacturers, this new Acracón Electrolytic Condenser possesses many new features which simplify chassis assembly, speed production, and lower manufacturing costs. Mechanically and electrically perfect, it is a worthy addition to the Acracón line. Here are 15 noteworthy characteristics:



1. Capacity 8 mcfd.
2. Peak voltage 440 volts
3. One hole mounting
4. Anode connection under chassis
5. Compactly built
6. Neat appearance
7. Rigid internal construction
8. Self healing
9. Long life
10. Leakproof construction
11. No surface corrosion
12. Electrode free from gas accumulation
13. Leakage less than .2 milliamperes per microfarad
14. Low power factor
15. Size $1\frac{1}{2} \times 4\frac{3}{8}$ " high

CONDENSER CORPORATION OF AMERICA

259 Cornelison Ave., Jersey City, N. J.

Factory Branches in

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Wax Impregnated Condensers—Oil Impregnated Condensers—By Pass Condensers—Electrolytic Condensers—Power Condensers—Transmitting Condensers

projector, with corresponding diminished volume of reproduction from the 16 m.m. projector. This, however, is not serious because with the ordinary 16 m.m. projector used in the home the small audience is located fairly close to the screen.

It has been necessary to develop a different type of photo-electric cell, much smaller than that used in the theatre projectors, and a very efficient little amplifier which is small, compact, requiring practically no attention or adjustment, and at the same time cheap to manufacture.

It appeared obvious that to make the 16 m.m. Phono-film commercially practical it was necessary to keep the cost factor down in every possible manner. Consequently I have worked along the line of a separate attachment which could be placed on any one of the three most popular "home-movie" projectors, so that the owner of such a projector would not have to scrap his projector and buy an entirely new outfit at a large expense.

It was at first considered desirable to utilize the existing radio audio-amplifier which can be found in almost every home having a motion picture projector, but careful consideration of the problem finally persuaded me that the most suitable method would be to work entirely independent of the radio outfit in the home, to use my own amplifier especially designed for the purpose, a special loud-speaker which could be located directly behind the projection screen on the wall, or in whatever part of the room it might be most desirable to erect the screen. Recent developments have convinced me that these are the lines which will lead to commercial success. My development work along these lines, while for a long time discouraging, has at length begun to bear fruit and from present indications I believe we will see on the market during this year a 16 m.m. sound-on-film attachment which can be readily installed on modern types of Bell & Howell, De Vry and Ampro home projectors. The cost of such attachments, including the special amplifier, loud-speakers, and sound-porous screen, will not be excessive.

What this new development in talking pictures will mean to home entertainment, work in the smaller school-rooms, etc., requires an active and far-reaching imagination to envision. I predict for the 16 m.m. talking film a practically unlimited field for entertainment, educational, and commercial utility.



THE LOAD OF A POWER TUBE

(Continued from page 89)

IR. Then $R = (E \cdot Pd) / I$. This equals the cotangent of the angle BDO.

The plate potential and the grid bias is so adjusted that the normal potential on the plate when the tube is inactive is represented by the position, O. Or a plate potential of 275 volts, a grid bias of -18 volts and a B battery potential of 475 Volts.

When the grid potential is actuated by an alternating E. M. F. such that the plate potential fluctuates from the minimum value, E_{min} , at A, to a maximum value, E_{max} , at B, the current fluctuates from the maximum value, I_{max} , at A, to the minimum value, I_{min} , at B, in the dia-

gram, Figure 5. If the grid swing is a sine curve the maximum value of the alternating plate potential is $E_{\max} - E_{\min}$ divided by two. The virtual value of the potential will be this divided by $\sqrt{2}$. In like manner the virtual alternating current will be $I_{\max} - I_{\min}$ divided by $2\sqrt{2}$. The power output will be the virtual current times the virtual E.M.F. or $\frac{1}{8} [(I_{\max} - I_{\min}) (E_{\max} - E_{\min})]$. This value is proportional to AQ times QB. Or the power is proportional to twice the area of the rectangle, AQDN. The rectangle, AQDN, is inscribed in the right triangle $I_{\min}DM$. The power will be a maximum when the area of the rectangle AQDN is a maximum. It can be shown by geometry that the largest triangle which can be inscribed in a right triangle is when the corners bisect the sides and hypotenuse. Then the line MN is equal to the line ND. The resistance of the tube is the cotangent of the angle MAN or AN/MN. The value of the load resistance is the cotangent of the angle QBA or QB/AQ. But QB is twice AN and MN is equal to AQ. Therefore the load resistance is twice the resistance of the tube for maximum output without distortion due to curvature and grid current. The term "distortion" here does not refer to reflections.

If the load resistance is made equal to the tube resistance, the load characteristic is represented by the dotted line which makes an isosceles triangle with the line $E_c = 0$, Figure 5. If the B battery and the grid bias are adjusted so that the normal average potential of the plate is 220 volts with a plate current of 5.2 milliamperes, the maximum power delivered by the tube with no distortion will be about 20 per cent less than when the load is $2R_p$. But the output will be obtained with a less B battery potential, about 335 volts.

From a casual examination of the curve it is apparent that if one wishes to increase the output of the tube all that is necessary is to increase the B battery potential and to use more negative grid bias voltage on the grid. However, there is a limit to the power that can be obtained. There will be times when the tube is inactive and the plate of the tube must dissipate the energy of the B battery. In Figure 5 it is assumed that the maximum safe dissipation is represented by the point, O. The load characteristics are drawn so that the plate dissipation is the same whether the load resistance is equal to or is twice the resistance of the tube. The product of the plate current and the plate potential is made the same in each case.

The curves, Figure 6, taken from Brown's paper, gives a comparison of the two loads. This figure is drawn for a tube whose resistance is 5,000 ohms. If with a load of 10,000 ohms the output is 100 per cent, the maximum undistorted output for a load resistance of 5,000 ohms is about 80 per cent. But it will be seen that the output per volt squared is 8 per cent to 10 per cent greater with the smaller load. With a load resistance equal to the resistance of the tube the distortion due to curvature and grid current is zero or is no larger than that with the larger load resistance unless the tube is overloaded. This is true since the curves are assumed to be parallel straight lines. Distortion due to reflection can be made equal to zero only when the load resistance is equal to the tube resistance. As long as the tube is not overloaded the power output of the tube is perhaps 10 per cent greater with

Announcing NEW DESIGNS IN RADIO TUBE PARTS

TUBE manufacturers will welcome this announcement of our newly designed parts which meet the requirements made necessary by improved vacuum tube design.

Our engineers being thoroughly familiar with tube design and manufacture and knowing the problems of the manufacturer in making tubes of consistently high quality, anticipated the changes in part specifications. Thus we are able to offer at this time an improved line of plates, getter cups, collars, oxide coated filament and cathodes of the same quality and accuracy that has won such an enviable reputation for our products.

Our engineering staff will be pleased to help manufacturers in developing or adapting standard or special radio tube parts to meet individual requirements.

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CONDENSER TISSUE

Linen—Kraft—Cellulose

Condenser Tissues of Linen and Cellulose manufacture that have been used for years with best results, carried in New York City stock—In standard sized rolls and in all calipers. We cut special sizes from large rolls in all calipers.

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FRED C. STRYPE

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NEW YORK CITY

the smaller load resistance. Summing up, the only time when there is any advantage of making the load resistance $2R_p$ is when the tube is nearly overloaded. When working with average loads all advantages of no distortion due to any cause, and the output per volt squared is in favor with the smaller load resistance.

In the theory as given, the assumption is made that the curves are parallel straight lines. In practice, this is not absolutely true. Figure 7, taken from Cunningham Data Book gives the plate characteristic for a 371 tube. It will be seen that the amount of distortion depends on the position of the limit I_{min} . The higher this limit the less the distortion. If the curves are not parallel straight lines, distortion will be introduced with both load resistances.

The assumption in this theory is that the load is an actual resistance in the plate circuit of the tube. This simplifies the theory, since the impedance of the circuit is the same for the direct current and for the alternating current components of the plate current. If a transformer is placed in the plate circuit, assuming the transformer to be a perfect transformer, one in which there are no copper or iron losses, the impedance to the direct current will be the tube resistance alone. The load being in the secondary coil, the impedance to alternating current in the plate circuit of the tube will be the tube resistance plus the equivalent primary impedance of the load impedance in the secondary circuit. The equivalent primary impedance should be made equal to R_p by selecting a transformer with the proper coil ratio. Under these conditions, the normal average potential of the plate is the B battery potential.

As applied to the average modern receiving set the only advantage of a load of $2R_p$ is when the set is turned to full volume. With the average set this is when the loud speaker is so loud that the room is filled with various sounds from the loud speaker together with reflections from the walls of the room so that no one can tell whether there is distortion or not. Presumably there is none while with a load of R_p there might be distortion due to overload. Too often the criterion for a good set is one which will amplify the sound to such a point that the hearer is blown out of the room with the sound pressure. If noise is what is wanted the advantage is still with the smaller load. The output is still 10 per cent per volt squared ahead of that with a load of $2R_p$. As to distortion, the auditors are so deafened that they can not tell if there is distortion or not.

* *

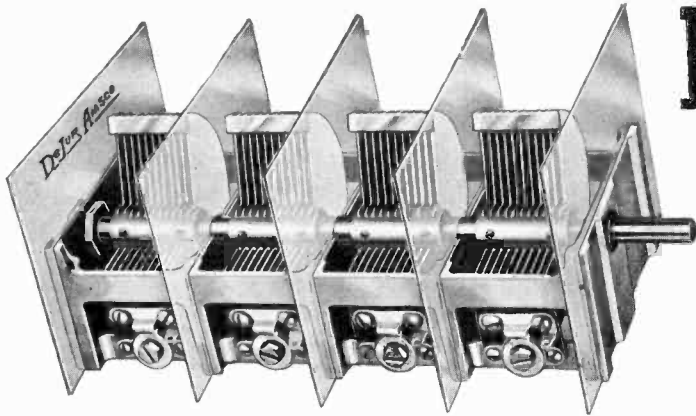
COST OF OPERATING RECEIVERS

Studies on the cost of operating radio receivers have recently been made by the Stromberg-Carlson Company of Rochester. They find that a typical one of their receivers consumes a maximum of 90 watts (as much power as is used by two 45-watt electric light bulbs). This is a cost of about nine-tenths of a cent per hour, figured at the rate of 10 cents per k.w. hour.

* *

In addition to the booths A-52-53-54 at the Auditorium, during the Atlantic City Convention, Sylvania Radio Tubes will have a private home of their own. The entire eleventh floor of the Ambassador Hotel is to be "Sylvania Lodge," with flashing oak leaves everywhere and a reception room exactly in spirit with the interior of the hunting lodge of the Sylvania Foresters.

A PRODUCT OF EXPERIENCE



DeJur-Amsco

COMPLETELY SHIELDED CONDENSERS

Developed Especially For Screen Grid Receivers

The development of DeJur-Amsco Condensers parallels the development of the radio receiver. It is the constant aim of this organization to produce the most perfect tuning unit consistent with the production costs

of commercial receivers. That we have been successful is evidenced by the fact that DeJur-Amsco Condensers are now used by many of the leading commercial set manufacturers.

Write us for engineering data and complete specifications of our new condenser. Samples on request.

Available in Double, Triple, Quadruple and Five Gangs.

We are also making special condensers for automobile radio and portable receivers.

See the DeJur-Amsco Display at the R.M.A. Trade Show, Atlantic City. Booth No. D-14.

DeJur-Amsco CORPORATION

Fairbanks Building

BROOME & LAFAYETTE STS., NEW YORK CITY

SACRIFICE SALE

LATEST TYPE, BRAND-NEW TWO REDDINGTON CARTON FORMING, FILLING AND ENCLOSING MACHINES

You get a rare bargain; a leading tube maker takes the loss. These machines have never been in operation!

One Reddington for packing all types of tubes manufactured in S14 bulbs was delivered to us on Dec. 9, 1929. It is a new machine.

The other packs all types of tubes manufactured in S17 tubes. It was received

Feb. 10, 1930. It too is the Reddington Company's latest type machine.

Only because we are changing to a special type of box do we dispose of these wonderfully fine, efficient machines. For sale at a great sacrifice. If you need them, here is a cut-price opportunity you seldom run across.

—Write or wire at once to address below.

BOX 101, RADIO INDUSTRIES



ENJOY THE BEST

Modern scientific equipment and management make it possible for you to enjoy the best in New York at the Lincoln. Bath, shower, servidor and the "sleepingest" beds imaginable in every room.

1400 Rooms—1400 Baths

NEW YORK'S NEW

\$3-5 For One \$4-7 For Two

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HOTEL LINCOLN

Eighth Avenue, 44th to 45th Sts., Times Square

A NEW TYPE OF BY-PASS CONDENSER

By JOHN W. MILLION, JR.
Research Engineer, Utah Radio Products Co.

Necessity is the Mother of Inventions is an old saying. We can all remember not so long ago when Radio Engineers first began to specify non-inductive condensers for radio frequency by-pass units. Since that time the march of progress has brought sets of higher gain each year with, at the same time, a demand for greater stability. This has resulted in all by-pass condensers for radio frequency work being made with the so-called non-inductive winding. This process, as everyone knows, consists of extending one foil at one side and the other foil at the other side. After winding these foils, extensions are swaged and soldered. In theory this makes a very good non-inductive condenser. In practice, however, particularly under quality production pressure, this is only relatively true. Only a portion of the turns is soldered and the balance of the capacity is inductive. A further disadvantage lies in the difficulty in maintaining capacity tolerances. If sufficient heat is applied to do a perfect solder job on the foil extensions the wax softens and the dielectric distance between the foils near the end of the section changes with resultant change in capacity. In production, this leads to the use of as little heat as possible and sections having an appreciable inductive reactance are well represented in any given number produced.

In considering this problem one immediately appreciates that mica condensers meet the requirements but are too costly in any but very small capacities. To overcome this Mr. H. A. Simmons of the Carter Radio Co. has invented the "Carter Layerbuilt Condenser," which is a flat plate paper-wax condenser and by virtue of its layerbuilt construction it is absolutely non-inductive.

The following brief description covers the facts available for release at the present time regarding the construction of this new condenser: The dielectric consists of the desired number of papers of the highest quality impregnated with high melting point paraffine compound and sized to a definite specified thickness before the foil is placed in contact. After the foil is placed in contact, the sizing process is repeated. This produces a practically perfect wax, dielectric, as accurate as it is possible to make paper. In the finished condenser all plates of each side are in contact at the terminal. No variations in impregnation exist, removing any possibility of sub-normal breakdowns occurring. In multi-section units this special construction makes possible a very compact unit with one common and complete shielding between the different sections. This condition, unlike grounding the outside foil, is not subject to operators' errors.

The methods specially developed for the production of these units not only makes it easy to hold closer tolerances but to produce more rapidly and economically than on old style units.

* *

Pipe-Major Donald MacPherson, Champion Bag-Piper of North America, accompanied the Canadian Delegation of Philco Jobbers Attending the Sea-Going Convention of Philco to Bermuda May 27-June 3. The Skirl of His Pipes was a Rallying-Cry for the 500 Radio men Aboard the S. S. Arcadian, 19,000 Ton Liner Chartered for the Trip, and During Their Stay on the Island.

The Monterey

APARTMENT HOTEL
Facing Lake Michigan

Charming kitchenette apartments furnished in your choice of Early American, Directoire, Chinese or Moderne Period Styles ~ or hotel rooms for permanent or brief residence.

**4300 Clarendon Avenue
CHICAGO**

TRANSIENT RATES
KNOWN FOR GOOD FOOD
Dollar Dinner Served Daily

*Write for Illustrated
Descriptive Booklet*

**STILES
MANAGEMENT**



RADIO IN FOREIGN LANDS

(Continued from page 92)

country itself being small in area, a three tube set is usually sufficient to bring in the local stations and they haven't very much need for larger and more powerful sets. Reverting to India, the Broadcasting Company has recently gone up the spout, as they could not seem to make a go of it, and now the Government has taken it over and there is a bright ray of hope.

Russia is a sort of "terra incognita" to the American industry. There are conflicting reports as to business done there. On account of the fact that Russia and the United States have no official relations, it is difficult to secure information as to the radio exports to that country. There are, as is well known, several Soviet organizations, the principal of which is "Amtorg" which is an unofficial Soviet organization established in the United States, charged with the purchase of American products for the Soviet Government. It is undoubtedly true that large quantities of radio material of sorts are purchased by "Amtorg" and others in the United States.

I recently saw what purported to be an indorsement on a Letter of Credit covering the purchase of 3,000 well-known American sets at a net price of \$5.00 each. Even in face of the large lots of "distress merchandise" left on hand as a result of the recent slump in the radio business, it seemed impossible that such a set as the one in question could have been sold at as low a price as \$5.00, but in view of the well-known fact that a number of American manufacturers have been approached by Russian purchasing agents with what might be called ridiculously low offers for radio sets, it may well be that some manufacturers have succumbed to the opportunity of "dumping" fairly large quantities where they could do little harm to their general business. On the other hand, even if American sets are bought for use in Russia, they would have to be modified at a considerable expense to work on the high wave band, as the majority of Russian stations broadcast between a wave length of 700 meters (which is above the American limit) up to practically 2,000 meters. Therefore, any American sets to be truly useful in Russia would have to be fitted with extra coils. There is, however, little doubt that large quantities of parts and components, and perhaps loudspeakers as well as some sets, are sold to Russia but the business could be classed as more or less bootleg transactions.

Nothing has been said of Canada, but this is hardly a foreign land as far as radio is concerned. Conditions there are practically the same as in the United States and with the establishment of the powerful stations in this country, the Canadians are enjoying the same programs as the Americans, in addition to their own broadcasts. American radio material in large quantities is exported to Canada.

Although, as pointed out, the export of American receiving sets is handicapped in many countries on account of the differences encountered regarding wave lengths, tubes, etc., this very fortunately does not apply to loudspeakers, components, and accessories. The exports of loudspeakers to some countries is so great that the business assumes large proportions. When one considers the

Super Akra-Ohm Wire Wound Resistors



TYPE "M"



TYPE "T"

are vital for Radio, Audio, Visio and Industrial applications of the Electronic Tube.

Super Akra-Ohm Resistors are made in any value from 1.01 ohms to 10 meg-ohms. They are carefully designed to insure an accuracy of one per cent and a constant permanency of calibration. They are especially adapted and highly recommended for Laboratory Standards, High Voltage Regulators, Telephone Equipment, Television Amplifiers, Grid and Plate Resistors, etc.

TYPE "T" is manufactured with soldering terminals or angle brackets. This type is designed to meet an increasing demand for a unit that can be readily mounted in precision electrical instruments, high-grade testing apparatus and high-grade radio sets.

These can be produced in quantities for a low price without sacrificing the accuracy and durability that characterize Super Akra-Ohm Resistors.

Let us know your Resistor requirements. We manufacture a type for every purpose. Samples and prices sent on request.



KESTER
FLUX-CORE
SOLDER

FLUX IN POCKETS
SOLDER WALL

EXACT

No more soldering failures—Kester eliminates the guesswork of separate fluxes. Its simple, sure operation will speed your work and increase your soldering efficiency. Profit by using Kester Flux-Core Solders in your industrial soldering processes.

A special solder, designed for your particular purposes, will effect a great improvement in your present methods of construction, installation and repairs. Let our experts analyze your specific needs and recommend the exact solder for your use. Consultation imposes no obligation; write our research department today.

KESTER SOLDER COMPANY
 4216 Wrightwood Ave. Chicago, Illinois
 Incorporated 1899 — Formerly Chicago Solder Co.

AT ATLANTIC CITY
 See our Research Engineer, P. C. Ripley, at the Civic Auditorium, Booth No. 50, Section B, June 2nd-6th, inclusive.

KESTER FLUX-CORE SOLDER

ACID-CORE
ROSIN-CORE
PASTE-CORE

METAL MENDER
RADIO SOLDER



CAROLINA CREST HOTEL

No Charge!

This charming hotel surrounded by green lawns and sun porches is the only Hotel in Atlantic City serving breakfast in your room without charge.

The bedrooms are built for comfort; each with its own private bath, large closets, modern furnishings, bridge and reading lamps and three or more windows to the room. Everything is cozy and homelike.

Chas. A. Berry H. L. Fairbairn
Owner Manager

CONTINENTAL PLAN

NORTH CAROLINA AVENUE BOARDWALK
Atlantic City

PUBLICITY

The right sort of publicity, cleverly handled, builds prestige and is a necessary adjunct to your general advertising and sales plans.

The handling of publicity is a specialized business. Why not engage an expert to do the job for you. The cost is moderate. We give as much care and attention to small accounts as the larger ones. Our present clients are located in all parts of the country.

A letter will bring full details.

AUSTIN C. LESCARBOURA & STAFF
Croton-on-Hudson, New York

volume of parts, components and accessories, it would seem almost as if the majority of foreign made sets use American material.

The practice of most American radio set manufacturers in making their sets to operate only on the loudspeakers constructed specifically for them is leading to the importation of large quantities of other speakers even in competition with local manufacture. There is no doubt that the heavy cost of machinery for stamping, pressing and screw work leads to the import of perhaps the majority of components used in foreign made sets.

It might seem strange to an American who has only to buy a set and immediately have opened up to him a world of music and entertainment if he were told that he had to pay the Government a fee (usually small, but sometimes rather stiff) for the privilege of using it. Yet this is what happens in almost all foreign countries. The American has to pay a license for the use of a motor car, and the time is perhaps coming when he may have to secure a license to run a motor boat (perhaps in some cities he has now); but radio is as free as the ether through which its impulses travel, and while many people in this country object to the "advertising" let them think for a moment and consider how they would get their programs if it were not for the advertising the sponsors of these programs get out of it. In other countries, the broadcasting is done either by the Government or by a Broadcasting Company that must pay the Government a heavy toll. The only way the expense can be met is to tax the "user," and a license is required. Therefore, radio piracy (operation of a set without payment of the license) is one of the evils of this system, but people are rapidly coming to the conclusion that the game is not worth the candle, and are coming into line with their license payments to a greater degree all the time.

To say that radio is on the increase in foreign countries is putting it mildly. The exports of American radio material in 1929 were more than double the value in 1928, and they are growing and growing. In the first three months of this year, the figures are practically double the volume in the first three months of last year, which, in view of what happened in this country a few months ago, is not altogether displeasing. Export Departments are increasing their staffs and where an order for a \$1,000 worth of radio sets was a few years ago sufficient excuse for opening a bottle of champagne (if the champagne were available) it is a small order today. Carloads are taking the place of l.c.l. (less than carload) shipments, and to the old question of "Are we downhearted," the answer, as Winston Churchill once neatly put it, is in the negative.



ADVANCE OF MARINE RADIO EQUIPMENT

The last six years have brought a remarkable advance in marine radio equipment and operation. The continuous-wave vacuum tube transmitter, with its silent, positive operation, has been steadily replacing the dramatic, but relatively inefficient spark transmitter. All of the transmitters supplied by the Radiomarine Corporation of America under rental contract are of the tube type but a considerable number of ships still retain spark transmitters. International regulation prohibited installation of spark transmitters on ships after January 1, 1930.

THE VALUE OF POLO TO RADIO

(Continued from page 107)

tem goes into effect. Since his vocabulary will be non-technical, he will no longer be forced to spend hours trying to explain to a customer why one make of set is better than another.

"I'm undecided as to which radio is the best," the customer will say. "I was going to buy one of your Spartons, but I've been watching Basketball results closely these last few weeks, and I notice that the Colonial team has had the edge on you in the number of games won."

"Huh!" the Sparton dealer will answer, opening his record-book. "Look at the results of this Track Meet we had with that Colonial outfit last week. We took first in every event. And not only that, but we've taken the Ping-Pong championship from them for three years in succession now."

"Well, I should say!" the customer will explain, thoroughly sold. "You do have a superior set, don't you?" And he'll pass his check for the first installment across the counter.

It is proposed, if this athletic program becomes a reality, that all patent rights and royalties will extend onto the playing-field. For example, when Captain David Sarnoff of the R.C.A. Football Team leads his warriors across the gridiron to battle against the eleven of an independent manufacturing organization, he will be entitled—on his regular 7½ per cent royalty basis—to use 7½ per cent *extra* men in the lineup. Due to the difficulty of computing 7½ per cent of 11, he will probably be allowed to keep 7½ *more men* in the game than are playing on his opponent's team. He might feel it puzzling to find the half-of-a-man necessary to fill his quota, but we strongly recommend for the position our office-boy, who only works about half of the time, even when feeling ambitious.

If, in the future, the plan of athletics outlined above is not put into practical use, we can say in all sincerity that Polo will have absolutely no value whatsoever to the Radio Industry.—GEORGE GRUSKIN.

* *


A dinner-dance was given for employees of the Cable Radio Tube Corporation, on April 25th. Jack Steinharter, President of Cable; Jack Grossman; Don Strathy, Sales Manager; Paul Weil; and Robert Herts acted as hosts.

* *

According to an announcement by Alfred H. Grebe, President of A. H. Grebe and Co., Inc., a new Grebe receiver will make its appearance this year to meet the demand for a moderate-priced set. Also, the famous SK4 line, with many refinements and developments, will be continued.

* *

"Contary to general opinion," states R. L. Duncan, President of R.C.A. Institutes, "our schools are not devoting their entire servicing courses to R.C.A. and allied broadcast receivers. Indeed, our schools purchase and acquire every standard radio set and component possible, and our students are thoroughly trained in all sorts of equipment with which they are apt to come in contact during their subsequent careers. It is surprising, however, to note the small amount of co-operation we have received from radio set manufacturers."



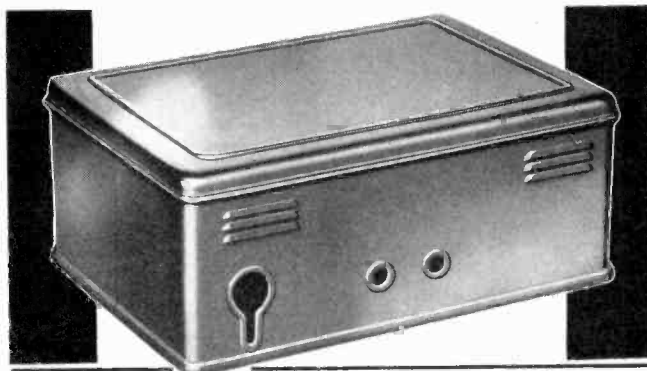
COILS

Manufactured by
COILS, INCORPORATED

*are Accurately Wound
and Tested to Individual
Specifications*

CROSS WOUND INDUCTANCE COILS,
DYNAMIC SPEAKER COILS, AND COILS OF
OTHER TYPES.

COILS, INCORPORATED
1183 Eddy Street, Providence, R. I.




ADDING TO YOUR PROFITS

Stamped, formed and pressed metal parts offer many economies. Each piece or part is exactly alike—even in small, intricate shapes and designs—is lighter and stronger—machining and assembly costs are radically reduced. G. P. & F. plant facilities are large enough to fill hair trigger orders on short notice and G. P. & F. engineers have a background of fifty years' experience to assist you in design or redesign. You will find new ideas for improving your product in our 1930 booklet, "In Harmony with Modern Progress". Shall we send you a copy?

GEUDER, PAESCHKE & FREY CO.
Sales Representatives in Principal Cities in All Parts of the Country
1393 St. Paul Avenue, Milwaukee, Wis.
374 W. Ohio Street, Chicago, Ill.

G. P. & F.

STAMPINGS



19 ACRES OF
FLOOR SPACE



FAITHORN Typographers continually are adding new fonts of modernistic type faces. Faithorn Engravers delight in complex problems of "Art Moderne" reproduction. Faithorn automatic presses click to the modern tempo. A large number of prominent advertisers and advertising agencies swear by Faithorn Progressiveness.

Only ONE contact and ONE set of orders will cover your every requirement

THE FAITHORN CORPORATION

Ad-Setting ▾ Printing ▾ Engraving
504 Sherman Street
CHICAGO

A NEW DEAL FOR THE DEALER

(Continued from page 96)

is just as well to drop the order-taker variety of distributors, which will no doubt be done in many instances.

Financing: Until now, the manufacturer has given very little attention to the financial end of the dealer's business. The manufacturer, through his distributor, has been prepared to sell to any and all dealers who could raise the wholesale price of a set. As a consequence, many dealers have been in poor financial shape. A recent analysis shows that more than 50% of the so-called radio dealers cannot show \$5,000 assets. This is a serious state of affairs.

One radio manufacturer is going into the financial status of the dealer. It will not appoint an exclusive dealer who cannot show \$20,000 assets. The company appreciates that no dealer can do an exclusive job unless he has that much with which to function. However, the company in turn, through its affiliated financing branch, is ready to advance that dealer \$5.00 credit to the dealer's \$1.00 in capital. Thus a \$20,000 dealer can borrow up to \$100,000, at 6%. He must pay the manufacturer immediately for all goods shipped direct to him. On the other hand, he has a 5 to 1 borrowing capacity, at a straight 6%, which is exceptional financial backing.

Sales Co-operation: The dealer, in his hard job of selling sets this year, is securing co-operation from some manufacturers. Some are providing the services of sales experts, who look over the dealer's store, plan the layout, analyze the location, audit the dealer's books, and in every way teach that dealer how to make money. This is an important consideration, for there is nothing more valuable in business than securing the benefit of the other fellow's experience. A large radio manufacturer, having intimate contact with many dealers, can readily analyze how profits and losses take place, making such information available to its non-competing exclusive dealers.

And Good Products: Lastly, the dealers want good products. They are not seeking experiments. They want goods which will function well and stay sold, with a reasonable amount of servicing. Fortunately, the industry this year is introducing nothing radically new, so that the engineering end is pretty much refined and based on established practice. Such innovations as the tone control are excellent merchandising features, but present no technical problems for the dealer. The tubes are pretty much refined today, and should cause no trouble.

Briefly, that's the dealer picture today. Don't be impatient with your distributors if they fail to line up dealers as rapidly as you'd like them to. Remember, other distributors and manufacturers are out with highly attractive propositions. They are signing up the best dealers exclusively. And not so much on bigger discounts as on sound, conservative, profitable plans for the dealer.

The dealer is going to make money this year. Unless you can help him make money, he will have no use for you or your wares.

* *

Roy Burlew of Ken-Rad gave a farewell dinner, last month, to William E. Erskine, son of Sylvania's B. G. Erskine. The young man was leaving Ken-Rad after having been with them since a year ago last February, to take over a share of the management of the Sylvania Company.

Send Us Your Specifications for Estimate



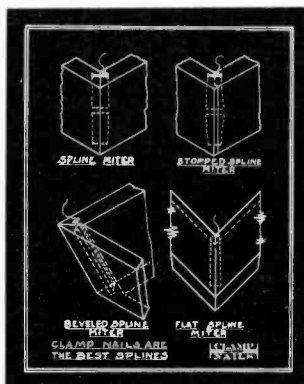
TRANSFORMERS AUDIOS --- CHOKES COIL WINDERS

Acme Electric & Mfg. Co.

1445 Hamilton Ave.
Cleveland, Ohio

USE CLAMP NAILS IN MASS PRODUCTION Of Fine Radio Cabinets

Samples On Request



USED FOR 30 YEARS In Fine Cabinet Construction

Durable
Dependable
Economical

CLAMP NAIL CO. 4540 PALMER ST. (Cragin) CHICAGO, ILL.

A NEW SALES APPEAL

(Continued from page 102)

regard to novel "sales appeal," these cabinets are, to say the least, extremely promising. During the past, hand-painted cabinets have been expensive, but this new process far surpasses the color and pattern effects attainable on wood, and at the same time places the decorative cabinet in the popular price-range. Public favor, therefore, should be attracted immediately.

By virtue of all these points, it seems plausible to believe that the cabinets described may play a big part in satisfying the three requisites necessary to future prosperity within the industry.



WHO IS THIS HUDDY FELLOW?

(Continued from page 97)

on vacuum tubes or when engaged in highly mathematical computations.

His mind works quickly and logically. This has been amply illustrated during the last few months when he has been on the constant defensive. Bombarded daily with any number of inquiries, arguments and taunts relative to the pentode, his answers have been immediate, decisive and to the point.

That's the kind of a fellow Frank Huddy is.



SPECIALIZATION

(Continued from page 103)

Eighth: Advertising Is More Productive. There is splendid advertising copy possible with the dealer who operates exclusively. Such advertising is more productive and cost of specialization more economical.

Ninth: A Big Time Saver. When it becomes known that a retailer is concentrating on one line and handling nothing else, considerable "selling time" is saved as well as "buying time." Other wholesale salesmen leave him alone so that he has more hours to spend in sales work. The dealer who handles ten or fifteen lines must interview ten or fifteen salesmen representatives each week, and generally speaking, must have a pretty good alibi ready for each one as to why he has not done a better job.

Tenth: Makes Outside Selling Possible. No canvassing or outside selling campaign is practical without specialized efforts on one line. A canvasser or outside salesman must concentrate on one make of radio, and if that is the case, the store that he represents must do likewise.

The disadvantages of specializing are few and comparatively unimportant. The advantages enumerated above far outweigh any disadvantages.

Of course, a retailer in order to be at all successful, must first select a strong popular priced, well advertised, radio to concentrate on. If he loses a sale once in a while, which is to be expected, for a set that he does not handle, it should not worry him in the least. The dealer should remember that his goal is net profits and if he arrives at his goal by selling a few less radio sets, he is much better off, and is building a more permanent and more solid and substantial business.

HALLDORSON TRANSFORMERS

At Your Service—

The Halldorson Company offers you a dependable source of supply for:

- Audio Transformers
- Power Transformers
- Speaker Transformers
- Filter and Output Chokes

The name Halldorson is widely known for the quality of the products with which it has been identified and the service for which it stands.



Send us your specifications for quotations and samples.

THE HALLDORSON CO. 4500 RAVENSWOOD CHICAGO, ILLINOIS

METAL STAMPINGS
DIES

TOOLS

JIGS

PERMANENT MAGNETS
HEAT TREATING

LARGE CAPACITY

MODERN EQUIPMENT

Thirty years experience guarantees dependability

WE SPECIALIZE IN LAMINATION STAMPINGS

Dimension and price sheets of stock laminations sent on request.

THOMAS & SKINNER STEEL PRODUCTS CO.

1100-1120 E. TWENTY-THIRD ST.

INDIANAPOLIS, IND.

ALUMINUM — — SOLDER

SUPER ALUMINUM WIRE SOLDER
has proven its efficiency for condenser work
and wherever soldering is done on aluminum.

LOW MELTING POINT

WE WILL CHEERFULLY SEND SAMPLE

THE LENK MFG. COMPANY

NEWTON LOWER FALLS, MASS.
CHICAGO OFFICE 506 S. CANAL ST.

Radio Compounds

Filling, sealing, topping,
Impregnating, to specifications
for condensers and transformers

WRITE FOR OUR LATEST DEVELOPMENT

COCHRANE CHEMICAL CO.

452 Danforth Ave.

Jersey City, N. J.

Indispensable to MODERN RADIO

The new AMPERITE automatically equalizes line-voltage fluctuations. Helps radio sales and satisfaction, because it improves tone, lengthens tube-life and insures uniformly perfect operation. No electric radio is modern without AMPERITE. Does not add to chassis cost.



AMPERITE Corporation
561 BROADWAY, NEW YORK
AMPERITE
Self-Adjusting
LINE VOLTAGE CONTROL

FREE—Technical Bulletin and list of AMPERITE-equipped radios. Address Dept. R 16

THE EASTERN MANUFACTURERS

(Continued from page 105)

company grows. The executives of Triad were formerly connected with the lamp industry.

Over at the CeCo plant in Providence a laboratory for development of new tubes and for investigation of production is being constructed and equipped. An entire floor of the four story addition to the factory is to be used for research purposes.

Acme Wire company at New Haven report a fair business for the spring months. Specifications from the manufacturers had not showed anything definite as to the wire sizes to be demanded during the coming season at the time of the visit.

It is gratifying to note the condition of the industry so far as it has been possible to observe it prior to this article's going to press. The coming year is to all appearances to be marked by an increase in the quality of products, by an individuality never attained in the past, and by an increase in the average price of the radio set. Box car numbers do not loom as production figures as was the case last year. Sets will undoubtedly be sold on the merits of the apparatus and the special features which each contains rather than upon adaptations that might be used for sales promotional purposes.

In the July *Radio Industries*, this correspondent will report the observations gleaned from the latter part of his trip, including comments on plants visited but not mentioned above.

* *

RADIO DIRECTION FINDER

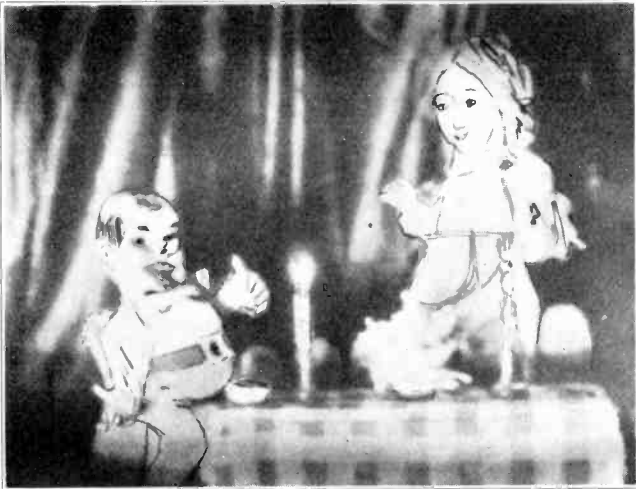
The picturesque lighthouses, fog guns, bells, and sirens which have aided navigators for several centuries are being put out of date by the radio direction finder, C. J. Pannill, Vice President and General Manager of the Radiomarine Corporation of America, points out. The direction finder, in conjunction with radio beacons along seashores and waterways gives exact bearings up to 200 miles under ordinary conditions. It has figured in several sea rescues because of its ability to find the ship in distress, even when the ship's navigators do not know their exact position.

* *

S. A. Blank is the new district manager for Radio-Marine Corp. of America at Los Angeles. He succeeds T. H. Mitchell who went to Honolulu, as general superintendent for the same company. Mr. Blank was formerly in charge of a branch office in San Francisco for R.C.A. Communications, Inc.

MEN WARNED OF BOARDWALK DANGERS

Men of the radio industry who are in Atlantic City at this time—away from the protecting influence of their homes—are warned



by this picture of the dangers facing them in every little tea shop and restaurant on the Boardwalk.

The above scene was posed by Mobet's Puppets of Chicago, at the request of the Radio Industries Service Department, and with the welfare of the industry's virile men at heart.

The gentleman in this illustration is shamelessly flirting with the waitress who, to all appearances, is a nice, refined girl. Our research department, however, has gathered statistics on the subject and tells us that 97.4 percent of all such "nice, refined girls" are like obsolete radio sets—once you have one, they're hard to get rid of, and they require lots of servicing.

* *

RADIO FOR ACCURATE TIMING OF RACES

A special arrangement of radio and photo-electric apparatus has been designed by George Lewis, vacuum tube engineer and Vice President of the Arcturus Radio Tube Company, Newark, N. J., for use in all timed sporting events that, according to the claims of the inventor, provides an automatic and accurate photograph of the finish, an imperishable record of the time, and indisputable evidence as to place in close events.

A light ray is focused across the track at the finish point on a special photo-electric device that acts as a relay the moment a figure—runner, horse or cyclist—passes across the line. The impulse caused by the fleeting shadow is amplified and within one thousandth of a second actuates a camera which takes a picture of the scene, including the dial of a stop watch set in motion at the beginning of the race. In the case of races where fast contestants lap the slower ones, the device acts as an "electronic gate" or "tape", and can be held open by means of a switch, until the probable winner approaches the "line."

The apparatus functions unflinchingly under all light conditions. It is light and portable, and is readily set up on any track.

* *

A. Atwater Kent, president of the Atwater Kent Manufacturing Company, entertained more than a score of his company executives at a luncheon aboard his private yacht, "The Alondra," on Saturday May 3. The luncheon was followed by a short informal business conference, at which plans for the coming selling season were discussed. Everyone aboard was in high spirits and the prevailing note was one of optimism over the 1930-31 outlook.

CLAROSTAT

Once more an old friend greets you at the R. M. A. Trade Show—CLAROSTAT—a friend that has served you from the time of the first B-eliminators struggling for public acceptance, until today when the line voltage problems threatens the successful operation of even the best of radio sets.

And now, CLAROSTAT is better prepared to serve you than ever before—in diversity of products, in engineering personnel, in experience, in production capacity.

When you specify CLAROSTAT, you specify the correct resistance for your specific requirements.

"There's a CLAROSTAT for every radio purpose."

WRITE for data on complete CLAROSTAT line. Don't hesitate to place your resistance problems before our engineering staff and if you visit the show, don't fail to look us up. (Booth C 30).

CLAROSTAT MANUFACTURING CO., Inc.

Specialists in Aids to Better Radio
292 North 6th St. Brooklyn, N. Y.

Just Opened
in New York
The HOTEL
GOVERNOR
CLINTON

OPPOSITE PENNSYLVANIA R. R. STATION

New York's new hotel truly expressive of the greatest city. 1200 pleasant rooms each with Servidor, bath, circulating ice water and radio provisions.

Rooms from \$3.00

General Manager
E. G. KILL

31ST STREET **7TH AVENUE**

SPEAKER

OXFORD



The Oxford Chromatrope will be merchandised through the regular jobber-dealer channels. Franchises are being signed up during the R. M. A. Trade Show.

Built by Speaker Engineers, with every possible engineering aid to improve tone quality, housed in elaborate period cabinets, with great eye appeal, priced moderately for the highest class of merchandise, the Oxford Chromatrope offers an outstanding merchandising opportunity.

Built in Oxford's large new factory on large production schedules, deliveries and fine workmanship are assured.

Model 150—is a complete electric phonograph, having built-in speakers, amplifier, electric pick-up and phonograph turntable. Price \$260.00

Model 151—has built-in speakers and amplifier, but is without electric pick-up or phonograph turntable. It, however, has pick-up jacks for this connection. Price \$200.00

For Radio Reception both Model 150 and 151 have jacks for connection to your present radio set. Also the cabinet of each provides ample space so that standard table model radio sets, or standard tuners, may be inserted, making a regular built-in radio-phonograph combination of Model 150 and a complete Radio Receiver of Model 150.

See our Exhibit R. M. A. Trade Show, Booth C-3, Demonstrating Room CC- 25.

NOW

The New Oxford

Manufactured by
OXFORD RADIO CORPORATION
 2035 W. Pershing Place Chicago, U. S. A.

Manufactured under the designs and patents of Frank Reichmann,
 the oldest loud speaker manufacturer in the United States,

Licensed under Lektophone patents.

by OXFORD

The Oxford Chromatrobe For Jobbers and Dealers

Oxford Engineers, in the Chromatrobe, have developed the finest possible sound reproducer. To do this it was necessary to furnish speaker, amplifier and cabinet, all engineered with the one idea of the height of perfection in sound reproduction.

The Oxford Chromatrobe has two speakers in an elaborate double baffle sound chamber, with a chromatic amplifier.

Bass drums, bass instruments of all kinds are reproduced with true fidelity, intermediate ranges are all present, and clear crystal high notes, with their higher harmonics.

When you hear the Oxford Chromatrobe you will appreciate all this. Bass drums, that are real, voice that is natural, the highest violin and piccolo notes and their high overtones. In addition there is a tone balance control to match room acoustics. This gives perfect tone balance in home, auditorium, or outdoors, and also at all volumes. The Oxford Chromatrobe gives gorgeous, tremendous music at full volume and also perfect lows and tone balance at the lowest volume.

The Oxford Chromatrobe has been developed through the work of Oxford Engineers on elaborate Theatre installations where price is no object and every aid is commandeered for better performance. These same principles, we believe extended and improved, are incorporated in this great musical instrument for the home.

Now Available for Radio Set Manufacturers
Oxford's New 14-Inch Speaker
An outstanding achievement in the speaker art



Chromatrobe

Precision UNITS

T. C. A.'s laboratory control of all production activities is establishing new standards of uniformity for set manufacturers.

Due to T. C. A.'s tremendous output, this uniformity and precision is gained at no sacrifice of economy.

The desirability of these units from every standpoint » authentic design, quality of materials, and character of workmanship » is unquestioned.

TRANSFORMER CORPORATION OF AMERICA

2301-2319 South Keeler Avenue, Chicago, Illinois

Transformers
Chokes
Dynamic Speakers
Power Packs
Condensers

