



RADIO SERVICE NEWS

PUBLISHED · IN · THE · INTEREST · OF · RADIO · SERVICE · SALES · ENGINEERS

MARCH, 1936

CAMDEN, NEW JERSEY

Vol. 2, No. 5

RCA CHECK-UP ENDORSED AS BOON TO SERVICE PROFITS

Editors of Radio Publications Call Campaign Modern Merchandising Plan: Builds Profits and New Business

Editors of leading Radio trade journals are unanimous in endorsing the RCA Radiotron Check-Up Campaign. Writing personal letters to RCA, they sum up the campaign as a modern merchandising plan which gets extra profits into dealers' cash registers, plants the seeds for new customers and new business, and is a gold mine for dealers everywhere.

Ray V. Sutcliffe, editor of *Radio Retailing*, writes:

"First hand reports from our field editors, and my own conversations with jobbers and dealers, all point to the decided success of RCA's Campaign. Your latest 'Check-up' drive is a wise continuation of that idea.



Ray V. Sutcliffe

History shows that the retailer makes no mistake when he plays ball with propositions of this nature."

Glad Henderson, editor of *Radio Journal*, writes:

"As important as the product itself, a selling theme of such excellent value as the RCA Radiotron 'Check-up' idea enables aggressive dealers to do a splendid Spring tube business. Beyond the actual sales and profits from the intelligent operation of the 'Check-up' plan, is the wonderful by-product of new set prospects as well as customers for other merchandise. The RCA 'Check-up' plan actually enables dealers to 'sample' their territory—the ideal method of business seed planting."

Dr. Orestes H. Caldwell, editor of *Radio Today*, writes:

"This Check-up Campaign should be a local gold mine for radio dealers and radio service men everywhere."
(Continued on Page 2, Column 3)

RCA MEETINGS FEATURE NEW SERVICE FILM

Details of "Check-Up" Given In Unique Presentation

A special feature of the Series XI RCA Service Meetings now being held throughout the country is the showing of the new RCA Slide Film, "As a Matter of Fact." This film, which has been prepared with the help of radio dealers and service engineers, shows in detail how the RCA "Check-Up" plan operates to increase the income of the radio dealer and service engineer.

In a remarkably entertaining manner, the film demonstrates everything you need to know to put on a successful "Check-Up" campaign. The characters in the film make a call on a typical customer and show by actual example the best methods of cashing in on a "Check-Up" call.

"As a Matter of Fact" was produced by one of the country's leading slide-film organizations, and has been described by a number of authorities as "the finest sound

Magic Eye Model



Dealers using "readymade" ads (issued in mat form) to push the new RCA Victor Magic Brain Radio Model T8-18 will have a double measure of eye appeal in their ads. The above damsel graces a three-column ad, known as Mat No. A-41, which is sent free to dealers on request.

slide film ever produced." It's a progressive job—real entertainment—besides containing extremely valuable information for every service man.

The technical subject for this same series of meetings is "Commercial Sound Systems," a topic always of interest to service engineers, and especially so now because of the demand for sound systems that is always experienced in a Presidential election year.

Change of Schedules

The tentative schedule printed in the last issue of RCA Radio Service News has been supplemented by the following changes and additions:

- New York, N. Y.—Obtain date from RCA distributor.
- Newark, N. J.—Obtain date from RCA distributor.
- Erie, Pa.—New date, 3/2.
- Amarillo, Tex.—New date, 2/21.
- Oklahoma City, Okla.—New date, 2/26.

Manchester, N. H.—New date, 3/19.
Worcester, Mass.—New date, 3/24.

In addition to the previous schedules, a meeting will be held in Miami, Fla., 3/24.

For further details pertaining to schedules and subjects, service engineers should consult their local RCA Parts Distributor.

Special Oscillographs

To meet the demand from special territories and for special applications, the RCA Parts Division has added two special oscillographs to its line of test equipment. These are: a special 25-cycle model and a special sweep model. Both are identical with the standard RCA Oscillograph except that one operates on 25-cycle A.C. while the other has a special sweep oscillator which extends from 4 cycles to 18,000 cycles. The net price of either is \$110.00. They may be procured through all RCA Parts Distributors.

Case Histories

These tips are actual case histories of the more difficult service problems and are a great help to the practicing service engineer. They literally give him the benefit of the experience of hundreds of service engineers.

The promotional help, a booklet entitled "101 Service Sales Ideas," is exactly what the name implies, a collection of 101 ideas that have actually been tried in service and found to bring in additional business. Their application means more business and greater profits to the organization putting them into use. All RCA Parts Distributors are featuring this business building plan.

RIDER'S BOOK SOON TO BE DISTRIBUTED

"Business Methods" Book Goes to All Owners of RCA 3-Point System

The third feature of the famous RCA Three-Point Service System is about ready to be distributed to all owners of the System, said G. P. Allen, Assistant Manager of the RCA Parts Division, at a recent meeting of radio service engineers. This book, which is written by John F. Rider and J. Van Newenhizen, shows the service engineer how to operate his business profitably, how to find accurate costs of doing business and how to increase his income through better business methods.

The RCA Three-Point Service System, of which "Business Methods" is one point, covers the three essentials of the radio service business: technical help, promotional help and business methods help. The technical help is supplied by the RCA Radio Service Tip File, a handsome steel filing case containing 200 prize-winning service tips which are supplemented by Service Tip Packets, each containing additional service tips.

IF RADIO SETS HAD WHEELS—An Editorial By F. B. Ostman, Manager, RCA Service Division



F. B. Ostman

To drive your car, you must have gas in the tank, water in the radiator and oil in the engine. There is no compromise, you do these things or you don't go.

And if there's something wrong with your car, the fellows that do these things for you get a chance every day to tell you what's wrong. And they do tell you—with a vengeance.

* * * * *

If your customer's radio doesn't work just right, there's no one to tell him. The set wears out so gradually that he is not aware of the decline in tone quality and performance. Only when the radio stops altogether does he call you—or your competitor.

If auto service men had to wait until cars stopped running to get business, they'd all be broke. And that's one reason why most radio service engineers are broke too.

* * * * *

The moral of this story is that if you don't get to your customers, they'll never get to you. It's up to you to get to them—to see that their sets are at maximum efficiency at all times and to get paid for doing it. Just how well you bridge this gap is an exact measure of how much business you do—how many parts and tubes you sell—how prosperous you are. If radio sets had wheels, you wouldn't have to worry, but they don't.

RCA Equipped Safety Car



The Traffic Safety Car of the Automobile Club of Philadelphia, American Automobile Association, and Philadelphia Police, with some of the 375,000 school children to whom it brought a safety message. See story, page 4.

Window Device Makes Any Display Operate 'Like Magic'

RCA Engineer Designs Device to be Automatically Operated by Passer-by

By F. H. SHEPARD, JR., RCA Manufacturing Co., Inc.

A piece of electrical magic that will draw a crowd to a radio dealer's show window by enabling people on the street to turn on an array of lights or an electric fan, or to start a toy electric train in the show window, is shown in Figure 1. The instrument operates by merely placing a hand close to the window glass. It is easy to construct and the cost of the parts required is small.

The device, which has been called a capacity operated relay, operates on the increase in output of an oscillator caused by an increase in the oscillator's feed-back capacitance when a prospective customer puts his hand near an antenna in the window. The triode section of the 6Q7 is the oscillator. Feed-back depends on the capacitance, represented by C_1 in the diagram, between antenna and ground. If a hand is brought close to the antenna, this feed-back capacitance is increased and the output of the oscillator rises. The diode section of the 6Q7 rectifies the oscillator's output and applies to the grid of the 25A6 a D-C voltage whose magnitude depends on the strength of oscillations. When someone in front of the window places a hand close to the antenna, the negative bias on the grid of the 25A6 is increased by the increased output of the oscillator. This causes the plate current of the 25A6 to change sufficiently to operate the relay which controls the display.

This circuit is capable of per-

forming with extremely high sensitivity, and is easy to set up and adjust. It has been found that a person can hold a hand stationary at a distance of several feet from the antenna and turn the relay on and off by just pointing and then lowering one finger. The device does not create interference in radio receivers, because the power output of the oscillator is small and the wavelength of oscillations is above the broadcast band. The sensitivity of the circuit, that is, the distance between hand and antenna at which the relay operates, is controlled by adjustment of C_1 and R_2 . The maximum plate current of the 25A6 is adjusted to a value sufficient to close the relay by adjustment of R_3 .

Simple Antennas

The antenna can be a piece of tin-foil glued to the show window. The oscillator coil can be a commercial type of 8-millihenry center-tapped r-f choke. This coil should be mounted close to the 6Q7 socket so that leads can be short. It will

Micro-Wave Transmitter



O. B. Hanson, Chief Engineer of the National Broadcasting Company, holds in his hand the world's smallest micro-wave transmitter, capable of flinging the human voice a distance of four miles. The transmitter, developed by NBC and RCA engineers, operates on wave-lengths of one meter or less, at a power of .2 watt. Also shown are the special pocket-size batteries, and the tiny "acorn tube" used in the set.

TWO NEW RCA TRANSMITTING TUBES READY

RCA-834 and RCA-830-B Designed for High-Frequency Use

Announcement of two new amateur transmitting tubes suitable for medium-power amateur stations has just been made by E. C. Hughes, Jr., manager of the RCA Amateur Radio Section.

The RCA-834, according to Mr. Hughes, fills a need in the amateur field for an ultra-high frequency tube operating efficiently at frequencies as high as 100 megacycles giving 75 watts output at maximum rating. It may be operated up to 350 megacycles at reduced plate voltage with reduced output. The RCA-830-B is primarily a Class B modulator although it may be operated efficiently as an oscillator at full power up to 15 megacycles.



RCA-834

RCA-834 is a three-electrode transmitting tube for use as a radio-frequency amplifier and oscillator, particularly at the higher radio frequencies. The grid and plate are supported on the top of the glass bulb by individual leads which are brought out of the tube through separate seals. This construction insures low inter-electrode capacities and minimum lead inductance. RCA-834 may be operated at maximum ratings at frequencies as high as 100 megacycles; it may be operated at reduced plate voltage and input up to 350 megacycles. The maximum plate dissipation for Class C telegraph and Class B services is 50 watts.

Has Separate Plate Lead

RCA-830-B is a three-electrode transmitting tube for use as a Class B modulator, radio-frequency amplifier, and oscillator. The plate lead is brought out through a separate seal at the top of the bulb. As a radio-frequency amplifier or oscillator, the 830-B can be operated at maximum rated conditions at frequencies as high as 15 megacycles. The plate dissipation for Class C telegraph and Class B services is 60 watts. In Class B audio service two tubes of this type are capable of delivering an output of 175 watts.

CHECK-UP IS ENDORSED BY ALL EDITORS

(Continued from Page 1, Column 1)

where. My congratulations to the farsighted manufacturing and broadcasting officials who have laid the groundwork of publicity to the public—done the costly promotion, both printed and on the air. For this has paved the way for dealer action.

"Now it is up to the radio man in each town or community to go after the uncounted opportunities for business within walking distance of his own shop or office."

Curtiss A. Wessel, editor of Radio Weekly, writes:

"The Check-up drive is among the very few major movements to give radio the HIGH USEFULNESS for the public and PROFIT for the trade. In automobile transportation the owner is taught to be dissatisfied with any but the newest car, and the dealer prospers accordingly. In the moving picture industry audiences seek the best theatres with the best acoustics and the best projecting and amplifying equipment, and both producers and exhibitors are on an increasingly PAYING BASIS. Radio will unfailingly follow these standards of increased usefulness."

NEW MANUAL ON CATHODE RAY ISSUED

Methods of Photographing Images and Interpreting Patterns Given

How to build a sweep circuit, how to take pictures of images, how to measure modulation and many other questions concerning Cathode-Ray Tubes and associated equipment are answered in the new RCA booklet TS-2, now available at all RCA Transmitting Tube Distributors. Or, if more convenient, a request may be addressed to the Commercial Engineering Section of the RCA Manufacturing Co., Harrison, N. J. The price is 25 cents per copy.

This new booklet, which contains more than 100 pages, includes a wealth of material, not available elsewhere, of vital interest to all users and prospective users of Cathode Ray Tubes and Oscilloscopes. It should be in the library of every radio service engineer who owns or contemplates owning an oscilloscope.

THREE METAL TUBES ADDED TO RCA LINE

RCA-25A6, 25Z6 and 6Q7 Added to Metal Tube Line

Three new RCA All-Metal Tubes, two designed primarily for AC-DC sets and one for compact, inexpensive AC models, have just been announced by E. N. Deacon, General Sales Manager of RCA Radiotron Division. These tubes fill the need for metal tubes in special applications where different characteristics are necessary.

The three new additions to the all-metal branch of the RCA Radiotron family are the 6Q7, the 25A6, and the 25Z6. The 6Q7 is a duplex-diode high-mu triode similar to the glass 75. The 6Q7 will be used in the familiar duplex-diode triode circuits to provide diode detection, a. v. c., and high-gain audio amplification.

The 25A6 is a power-amplifier pentode similar to the glass 43. The 25A6 has a power output of 2 watts at a plate voltage of only 135 volts and will, therefore, be used in D-C and AC-DC receivers where the plate supply voltage is limited. An interesting application of the 25A6 and the 6Q7 is the relay circuit, used to control a radio dealer's display, which is described on this page.

The 25Z6 is a rectifier-doubler similar to the glass 25Z5. The 25Z6 will be used in AC-DC sets as a half-wave rectifier or as a voltage doubler.

be seen that since the circuit operates directly from a 110-volt line, no power pack is necessary. However, because of the direct connection to the line, the whole circuit, except the antenna and antenna-lead, should be enclosed in a box so that there is no danger of shock or of shorting the power line to ground.

Since this device can be made to operate any display that is controlled by an electric switch, there are any number of ways to make an effective show-window installation. The most striking display will draw the biggest crowd.

Check-Up Gives Halle Bros. New Contact With Old Trade

By OSCAR NETSCHKE, RCA Salesman, Cleveland District

When Walter Myers took on the job of manager of the radio department of Halle Brothers department store, Cleveland, Ohio, he knew two rules were more important than any others.

First, Myers realized that to build sales he must promote sales, and second, that the promotion of service (and sales) to old customers was the quickest and most economical way to get results. Myers followed these rules and in two years' time built the Halle store radio department into one of the finest in the city.

One of Myers' first steps was to get out the department files on old customers—principally those who had bought new radios from the

store. Among other sales promotion plans which he worked out for these old customers, he used the RCA Radiotron Tune-up (now Check-up) campaign. Tune-up offered him the chance to get in touch with these customers again to check over their sets, make repairs when necessary and replace worn-out tubes.

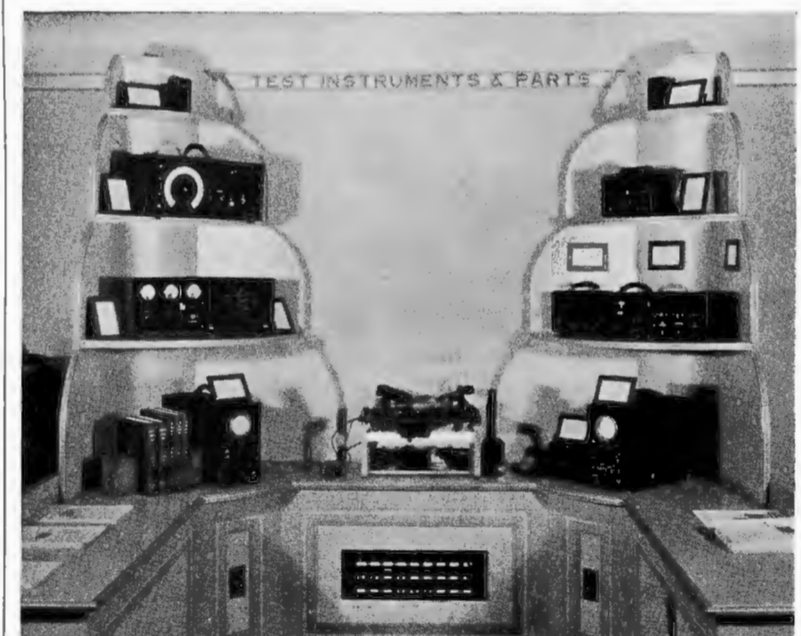
On the first RCA Radiotron Tune-up advertisement in the Cleveland newspapers, Myers tied in with his own ads and had 12 calls. The second ad netted him 19 calls and the third jumped to 26.

Then Myers decided he would use the Tune-up idea to sell new sets. Now Halle Brothers advertise that they will give a free Tune-up to every radio bought from them within a 90-day period from date of sale. Myers offered the same rate of commission to service engineers responsible for set sales as he gives his floor salesmen. As a result, many new set sales come from his service department.



Walter Myers

RCA Parts Display



A feature of the popular display room of the RCA Manufacturing Company at Camden, N. J., is the operating display of RCA Parts and Test Equipment.

DELUXE AMATEUR RECEIVER MEASURES SIGNAL STRENGTH

New RCA Receiver Has Crystal Filter, Magic Eye and Iron Core i-f Stages for Better Performance

Of interest to amateurs everywhere was the recent announcement of the new RCA Deluxe Amateur Communication Receiver, type ACR-175. This receiver, which has every possible refinement necessary for amateur operation, including RCA All-Metal Tubes, is priced at only \$119.50, a truly remarkable value. RCA Amateur Distributors are now showing the ACR-175 and early deliveries are expected.

The design of the ACR-175 has been made to meet the rigorous requirements of receiver performance necessary to maintain communication in the crowded popular amateur bands. A high degree of selectivity, sensitivity and ease of operation is made available at a popular price.

Uses T.R.F. Stage

A superheterodyne circuit is employed with one tuned r-f stage for ranges A, B and C (500 k.c. to 15,500 k.c.) thus assuring low image-frequency response and high signal-to-noise ratio. A separate rejection filter is placed in the antenna circuit to minimize interference from powerful commercial stations oper-

ation of headphones and speaker reception, or headphones only.

Easy To Tune

Ease of tuning and band spread with the ACR-175 is provided by two large diameter knobs mounted adjacent to each other on concentric shafting. The inner knob operates at a low ratio (20 to 1) and permits any range to be traversed rapidly. The outer knob functions at a high ratio (100 to 1) and permits fine tuning by requiring a liberal number of degrees rotation for the resultant frequency change. A unique dial permits the positive logging of stations of any frequency without resetting to a reference point. The main scales are calibrated in megacycles and in addition a coarse scale of 9 divisions is provided for logging in conjunction with the vernier index. A vernier index pointer is provided which traverses the entire circumference of the dial approximately eighteen times faster than the main pointer. The circumference of the dial is calibrated with 100 major divisions for accurately logging stations of small frequency difference.



The new RCA Amateur Receiver ACR-175 offers the advanced amateur every important feature at an extremely low price.

ating near the i-f frequency. Iron-core transformers are used in the i-f amplifier providing unusually high gain and added selectivity. Optional use of the crystal filter circuit is made possible by a combination band-width control and switch. A quartz crystal is used having special orientation and dimensions to provide unusual single-signal response heretofore unattainable. An electron-ray tube is employed to serve a dual function of tuning meter and indicator for measuring the strength of incoming signals. A separate eight-inch speaker is provided and when mounted on a baffle-board of suitable dimensions gives fine reproduction of signals.

All Controls On Front

All the controls on the ACR-175 have been located on the front panel to provide accessibility and ease of operation. No plug-in coils are required, the desired range being selected by a switch adjacent to the main tuning control. The use of the crystal filter, sensitivity, and audio gain controls permits exceptional flexibility in controlling background noise. The sensitivity control is calibrated logarithmically in terms of microvolts of signal input to the receiver. The value of signal input voltage is read when a deflection on the face of the electron-ray tube just begins to occur. This method of signal measurement in units of absolute value is more accurate and dependable than the arbitrary values now in vogue. The heterodyne oscillator control is calibrated in cycles offering advantages of pre-determining the desired pitch of the beat note and proper adjustment for single-signal c-w reception.

Heterodyne Oscillator Switch

A heterodyne oscillator "on-off" switch is provided. A combination selector-switch provides control for a-c power, three shades of audio response (speech - music - bass), and "stand-by." The latter position of this switch removes the plate voltage from the tubes and illuminates a green pilot light, but leaves the heaters lighted and ready for instant operation. A switch to cut out the A.V.C. permits the clarification of slow speed telegraph signals. A phone jack, located on the left side of the case, provides either a com-

Engineer Calls Business Book Service Bible

Believes It Will Help Financial Status of Service Profession

The RCA Three-Point Service System recently gained another enthusiastic supporter in the person of Robert A. Haines, Sales and Service Engineer for the Tri-State Electric Company, distributors of RCA products in the South Dakota territory.

"It seems to me," writes Mr. Haines, "that there has been for some time a need for a business-like plan to be readily available to the many thousands of radio service men all over the country, and I am more than pleased to find this gap so adequately bridged by the RCA Manufacturing Company in presenting the Three-Point Service System."

"One of the main reasons for the surprising scarcity of financially successful service enterprises over the past few years has been the lack of systematized business methods employed. Few would deny that the opportunities for radio service business have been generally good over the fiscal year, yet many men have discovered that a majority of their working hours have been bereft of profit."

"The book by Mr. Rider and Mr. Van Newenhizen, even if offered alone, would be a very worth while and useful service man's 'bible'."

"The addition of the neat and handy Service Tip File and the 101 Service Sales Ideas to the Business Methods book makes a compelling trio that cannot fail to appeal to the entire service trade."

Mr. Haines is State Chairman of the South Dakota Radio Service Association, affiliated with the N.R.S.A.

the cost of the check-up as \$1.50 is a great help to the service man, and most certainly a step in the right direction. It also backs us up on our service charges. This endorsement by RCA, a well-known and respected national manufacturer, not only educates the public to standard prices but also raises the level of integrity and prestige of service men and their work in general. Here are a few facts on the jobs obtained as a direct result of mailing out the No. 2 Check-Up Card at the time of the December Check-Up ad in the San Francisco papers:

Summary of Returns

| | |
|---|----------------------|
| No. of No. 2 Check-Up Cards mailed out | 63 |
| No. of returns | 12 |
| Percentage of returns | 18.7% |
| No of jobs obtained | 11 |
| No. of jobs in the home | 4 |
| Average charge on jobs in the home | \$5.00 |
| No. of tubes sold on jobs | 17 |
| No. of people who brought sets into shop | 7 |
| No. of people who brought sets into shop to have tubes checked and NEW TUBES were sold (sets O. K., no service work done) | 5 |
| No. of antenna jobs obtained | 2 |
| No. of sets sold directly on Check-Up Campaign | 1 |
| | (RCA Victor \$52.50) |

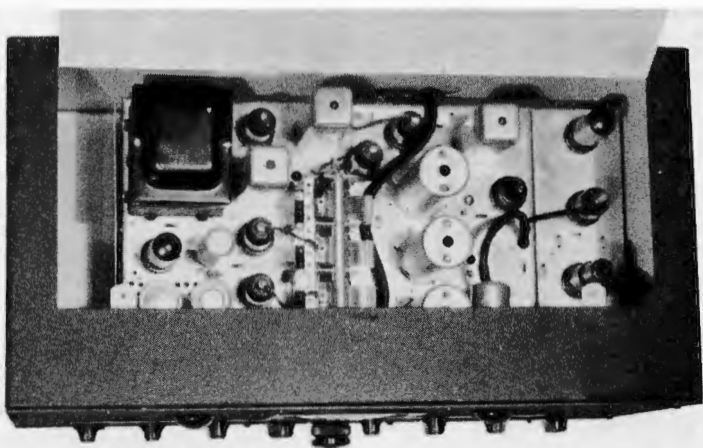
SAN FRANCISCO DEALER LIKES CHECK-UP PLAN

12 Check-Up Cards No. 2 Returned from 63 Mailed

An average of \$5.00 per call and one \$52.50 instrument sale was the direct result of mailing 63 RCA Check-Up No. 2 Cards, of which 12 were returned, reports Merwin and Holtzen of San Francisco, California. To quote Messrs. Marino and Porter, co-managers of the radio department:

"The fact that RCA advertises

Interior of ACR-175 Receiver



Clean-cut appearance and simplicity of design is at once evident upon inspecting the interior of the new RCA Amateur Receiver ACR-175. This receiver uses the sensational Magic Eye both as a tuning indicator and as a means for exact measurement of signal strength.

Adrienne Ames On the Air



Glamorous Adrienne Ames, who was co-starred with Ricardo Cortez over WABC and the nation-wide Columbia network. Miss Ames is another of the many movie stars that radio has brought into millions of homes. And another reason why millions of radios need the RCA Check-Up to insure getting many fine programs now on the air.

Service Men's Association to Offer Course

Philadelphia Group to Sponsor Technical Sessions for Members

The slogan of the Philadelphia Radio Service Men's Association "Better Radio Repairs; Improved Radio Reception," is rapidly becoming the byword among service men in Philadelphia.

This expression is not merely a slogan of words, but rather one of action. The officers and Advisory Board of this association realized the necessity for keeping P.R.S.M.A. members thoroughly efficient in the fundamentals and theory of Radio, and keeping their knowledge and information abreast with modern innovations in the industry. With this necessity in mind they devised a new schedule of procedure . . . a Servicing Course.

This course, together with the excellent educational lectures which are presented to P.R.S.M.A. members by representatives of the industry's leading manufacturers, will furnish Philadelphia servicemen with the finest technical information obtainable.

To Be Released In Sections

Presenting this course is the result of long formulated plans, ideas, and extensive preparation by a hard-working special committee. It will be released in pertinent sections, each section covering thoroughly one phase of radio service. The sections will follow in fine continuity and lay the groundwork for the following ones.

The course has been prepared with the paramount idea in mind to make it entirely interesting; not merely cold lectures, but thorough presentations anticipating questions and answering them. Thus when each section has been delivered, the service men will know the HOW, WHY, WHEN, and WHERE of what it was all about.

The officers of the association are proud to announce that this service course has been prepared, and will be presented entirely by authoritative MEMBERS of P.R.S.M.A. Recognized radio service men in the Philadelphia area who are interested

ENGINEER GIVES EXPLANATION OF TUBE BLUE GLOW

Fluorescent Effects Do Not Affect Operation

That the blue fluorescent glow present in many types of tubes, such as the 45, 2A5, 42, 80, etc., is not harmful and entirely separate from a gas condition is aptly explained in the following note from F. B. Stone, of the RCA Engineering Department.

"The glow that is present on the envelope," says Stone, "is caused by excessive electrons continuing beyond the plate and hitting the envelope, thereby fluorescing into a bluish glow. This glow is always on the envelope and is usually above or below the plate. It should not be confused with a blue glow that is confined to the tube elements, inside of the plate, as this indicates a gassy condition, something entirely removed from the fluorescent glow."

RCA Radio Tube dealers and service engineers should explain this condition to customers making such complaints. The explanation is so simple and understandable that it easily sets any unwarranted fears at rest.

PRICE LISTS

Accompanying this issue of RCA Radio Service News are new and up to date Radio Tube price lists. The larger one is for use at the Tube counter in the dealer's store. The others have been made purposely smaller to fit in the Service Engineer's kit or for a handy pocket reference. These lists have been brought up to date and include the prices of the new RCA All-Metal Tubes.

in securing the benefits of this timely instruction course, should contact the officers of the organization.

Oscillograph Tests Vibrators



One of the reasons for the long life of RCA Victor Auto Vibrator Units is the exact adjustments made with the aid of a Cathode Ray Oscillograph. Perfect mechanical as well as electrical alignment is insured on every unit.

CHECK-UP FILM GIVES SERVICE SALES FLAVOR

Pictures Actual Scene in Customer's Home

Just as a cabinetmaker lays out a pattern before he makes a table or chair, the radio service engineer should lay out a pattern upon which he builds confidence with a prospect or customer, and thus increase his business with that customer.

This is, in the opinion of E. N. Deacon, General Sales Manager of RCA Radiotron, as important as having the proper technical information with which to service a radio set. Mr. Deacon points out that the new sound slide-film titled "As a Matter of Fact," now available for showing through Radiotron distributors, lays out a working pattern which gives radio service a strong sales punch.

Increases Business

"Frequently," says Mr. Deacon, sales promotion campaigns will stress the fact that you should increase business, but rarely is it shown just how you can lay your pattern to go after increased business. In the 'As a Matter of Fact' film which is part of the Check-up Campaign, the service engineer can see an actual pattern of service with a sales punch that gets results. A service engineer can learn from this film what to do and how to do it, in less than a half hour.

Builds Confidence

"More than half of the film is devoted to a series of scenes which takes a service engineer from the beginning to the end of servicing a customer, not from the technical aspects of a receiver problem, but from the viewpoint of selling the customer on the service engineer himself. Having gotten the customer's confidence, the intelligent, honest service engineer has a minimum

of sales resistance for his recommendations of new tubes, necessary parts and etc.

Fifteen Points

"This pattern is brought out in a series of 15 points which may be outlined as follows:

1. Call up prospect for make and model of set.
2. Look up the right tubes in the RCA socket-layout guide.
3. Get the lowdown on the trouble from the RCA Tip File.
4. Get to prospect's house promptly.
5. Explain Check-up service.
6. Ask for dustpan and clean chassis.
7. Display testing equipment, etc.
8. Ease customer's mind that major repairs can readily be done in shop.
9. Tell of other sets serviced.
10. Compliment customer's set.
11. Let customer watch tube test.
12. Don't alter meter before comparison.
13. Show sealed RCA tube carton.
14. Show Check-up points done.
15. Call back later.

CHECK-UP AIDS

National advertising in the Saturday Evening Post, Collier's and other leading magazines . . . spot announcements three to six times a week over more than 30 stations. . . RCA Tube advertising in local papers . . . and local tie-in advertising by RCA distributors are but few of the many concrete helps being given to all RCA radio tube dealers and service engineers.

The RCA Check-Up advertising is designed to increase the business obtained by service engineers and dealers. It sells not only tubes, but parts, sets, etc. Likewise it sells the serviceman and the importance of the work he does.

The Check-Up ads are in themselves unique in that they promote the service man and dealer to the actual consumer. This is the first time this has ever been done on such a large scale by any tube manufacturer. Only RCA Radiotron can do this because RCA Radiotron is the only tube manufacturer today advertising to the consumer on a national basis.

Tells About Check-Up



"I was a push-over for Check-Up," says Goodwin while Rawson looks dubious. Eddy, working in the rear, is the service man. The picture is a scene from the new Check-Up sound slide film "As A Matter of Fact."

Philadelphia Safety Car Uses RCA P.A. and Radio Equipment

Excellent Results Obtained in Safety Drive, Reports Philadelphia Automobile Club; Used to Address Many School Children

A radio-equipped "Traffic Safety Car," to aid in the safety of driver and pedestrian on public highways, was demonstrated recently in Philadelphia and vicinity by the Automobile Club of Philadelphia (A.A.A.), the Philadelphia Police Department and the Pennsylvania State Highway Patrol.

Traveling along the streets of the city and the main traffic arteries, the Safety Car broadcast messages and warnings against traffic violations and bad driving practices, cautioned pedestrians against jaywalking, and explained how driver and pedestrian both can help make the highways safer for everybody.

Shown To Students

A demonstration of traffic safety was given by the crew of the Safety Car to more than 375,000 students in over 380 public, parochial, and private schools, assembled in their school yards in fire-drill formation.

The car was completely equipped with RCA products, the apparatus consisting of one RCA Universal Amplifier and Police Radio Receiver; two RCA Velocity Microphones—one a lapel model, the other a studio type, and two RCA Dynamic Loudspeakers, mounted on the roof. The power for installation was furnished by a 1/2 kw., 110-volt, a-c generator driven by a 1 h.p. gasoline engine, and the loud-speaker fields were energized by the car battery.

During the "Traffic Safety Car's" four months of daily duty, the ruggedness of RCA equipment and its ability to withstand adverse weather conditions and constant manhandling were given a severe test. The two amplifier units and the receiver were mounted on a wooden base and placed on the floor of the luggage compartment with no provision being made for protection against shock or vibration. Yet this apparatus, including the RCA Radiotrons utilized in the amplifier, remained intact—except for a shorted bypass condenser in the power amplifier. The microphones and loudspeakers also received severe treatment, being used in rain, snow and extremely cold weather, and pulled in and out of the car at least twenty times a day; but in spite of all this, little or no trouble with them was experienced.

Opportunity for Service Engineers

The success of this experiment suggests an excellent opportunity whereby service engineers, radio dealers and distributors can obtain some valuable publicity and create more business for themselves if they back such a movement as this or, by judicious publicity, create a demand for such a car in their cities.

The idea of the "Traffic Safety Car" was the brainchild of Frank E. Ballantyne, General Manager of the Philadelphia Auto Club, and the operation was in charge of W. L. Robinson, Director of Safety and Traffic Engineering, and his assistant, J. C. Cassel. The car was furnished by Bury and Holman, Inc., Philadelphia De Soto Distributors.

The Automobile Club of Philadelphia stands ready to give such help and advice pertaining to the equipment and operation of a Safety Car as their experience with one permits.

ULTRA VIOLET RAY NOW USED IN RECORDING

Filtered Light Gives Clearer Image on Film for Better Quality Reproduction

A new development in sound recording, which eliminates the lisping and hissing effects that have marred the voices of many screen celebrities, was recently described in a paper presented by Glenn L. Dimmick, RCA Photophone Engineer, before the Society of Motion Picture Engineers in New York City. Use of ultra-violet light, which is located in a narrow frequency band above white light, instead of ordinary light for recording, permits more accurate focusing of the recording light, thereby giving greatly improved voice and musical reproduction.

Like Improving Photograph

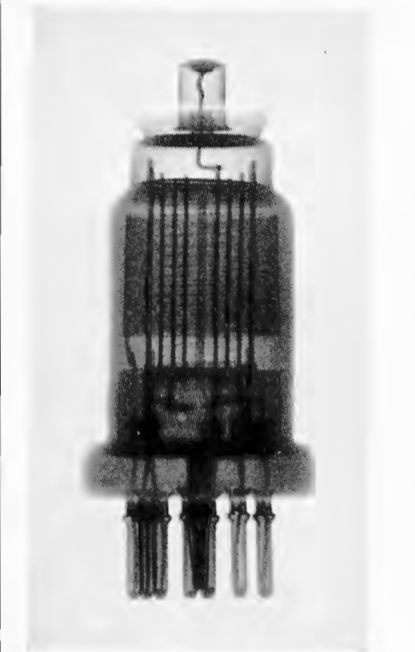
The advantages of the new ultra-violet system result from improvements in the photographic process. In this case the photograph is the picture of the sound on the film. Acknowledging some earlier research along similar lines by Carl Louis Oswald, the RCA Photophone engineers, working in the research laboratories of the Radio Corporation of America at Camden, N. J., discovered that by restricting the light focused on the film negative, during recording, to a narrow band in the ultra-violet range, sharper focusing of the lenses in the optical system and controlled penetration of the light on the negative emulsion made it possible to photograph the sound patterns with a sharpness and delineation which corresponds more closely to the characteristics of the original sound than ever before.

Impossible to Focus White Light

Ordinary white light, Dimmick explained, is composed of a great many different wave-lengths. Since it is impracticable to focus all of these wave-lengths exactly at one time, those of them that are even slightly out of focus blur the edges of the sound pattern on the negative and introduce distortion in the reproduction. Additional distortion of the sound results when the light penetrates too deeply into the film emulsion and scatters.

The new ultra-violet method involves only a few simple adjustments in existing High Fidelity sound recording systems, consisting in the main of an adjustment of the lenses in the optical system for sharper focusing, and in the use of a light filter over an ordinary incandescent lamp, which limits the radiant light energy focused on the film to a narrow band, invisible to the unaided eye. The same method permits a much wider latitude in the process of making accurate positive prints for the theatres.

X-RAY



How the inside of an RCA All-Metal Tube looks with an X-ray. Note the exact alignment of the elements.

AUTO RADIOS TO INCREASE DURING 1936

RCA Service Division Appointing Many New Stations

BUSINESS OPPORTUNITY

The RCA Victor Auto Radio Installation and Service Network offers a profitable connection to qualified service shops. The general requirements for appointment are as follows:

1. A good knowledge of radio principles, aligning and repairing.
2. An elementary knowledge of the automobile, especially of the ignition system.
3. The necessary electrical instruments, tools and other installation facilities.

The RCA Service Division invites all stations equipped with these facilities to apply for appointment in this network. Address all communications to Mr. P. H. Jeryan, Service Division, RCA Manufacturing Co., Inc., Camden, N. J.

All evidence indicates that the year 1936 will be a remarkable Auto Radio year, according to P. H. Jeryan, in charge of the appointment. (Continued on page 8, column 2)

'Just What We Need'



The Hostetter Radio Service Company of 4026 Main St., Kansas City, Mo., is another of the many progressive service organizations that are putting the RCA Three-Point Service System to work.

SERVICE TIPS

Now you can win your choice of a handsome pigskin wallet or an RCA Service Engineer's Pencil by sending tips to RCA Radio Service News, Camden, New Jersey. . . . Service Tips must be acceptable for either RCA Radio Service News or the RCA Radio Service Tip File. . . . All tips become the property of RCA to be used as they see fit. . . . Service Tips are our readers' ideas, not ours. While RCA Radio Service News believes they are worthwhile, we cannot be responsible for results obtained.

Phasing Loudspeakers

Phasing loudspeakers is a service operation that often stumps the P.A. and service engineer. Here are three easy ways to do it:

Dynamic Cones—Turn on fields. Break into voice-coil line with 22½-volt battery, touching one terminal lightly and instantly removing. All cones should move in same direction as you make and break connection. Remedy—reverse voice-coil leads on cone or cones that do not move in same direction as majority.

Air Columns—This is a little harder—some steady-frequency source is best, such as a pickup and an RCA Victor Standard Frequency Record. Try reversing voice-coil leads to see which connection makes loudest signal.

Tweeters—Crystal or Dynamic. Use double-pole, double-throw switch and stand about 30 feet from speakers. Leave on poles that give best response and volume. Also try shifting Tweeter forward and backward and sideways for best sound, particularly in theatre installation.

CAUTION: Remember reversing FIELD leads has the same effect as reversing V.C. leads!

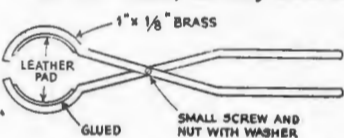
Lawrence L. Johnson,
Willcox, Ariz.

Metal Tube Puller

The illustration shows a little "gadget" for pulling out hot metal tubes. It is one of the handiest things in my kit.

Here is the "dope":

1. The overall dimensions—6 in.
2. The circular diameter is the diameter of a metal tube.
3. The leather is "roughened" on the inside, thereby enabling



you to get a good grip on the tube.

4. The handle may be made to suit the user.
5. The brass that I used came from the brackets of any old battery set.
6. The leather is a piece of old belt.

Edward C. Abounader,
639 Elizabeth Street,
Utica, N. Y.

RCA 6E5 Tubes

If the RCA 6E5 tube is operating but the screen is a very pale shade of green, check the 1 megohm resistor before condemning the tube. Very often this resistor will be found to have changed its value.

G. H. Minnerly,
440 East 182nd Street,
New York City.

RCA Victor Model D 22-1

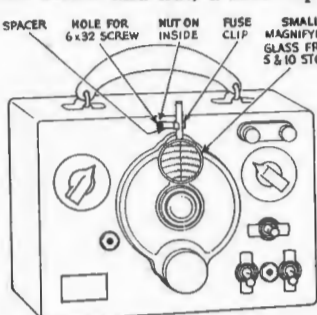
Several instances have been reported recently where trouble in the D 22-1 radio chassis resulted from intermittency, low sensitivity, lack of Magic Eye deflection, and distorted tone quality. The seat of such trouble can usually be traced to the third I-F transformer. The alignment of this transformer varies during operation (also between ON and OFF) from heat generated by resistor R-44-45 which, on some instruments of early production, is mounted directly below the transformer-trimmer base on the rear apron of the chassis.

To correct the above condition, remove the resistor (R-44-45) from its mounting on the rear of the chassis and remount it on the front apron of the chassis adjacent to the power transformer. This relocation will remove possibility of heat affecting the I-F alignment. The chassis should be allowed to assume normal temperature after changing the resistor and the alignment, corrected in the usual manner.

Editor.

RCA Test Oscillator

The illustration shows a magnifying glass which I have found very useful for use with the RCA Test Oscillator. I use a spacer, a long 6-32 screw and nut, a fuse clip, and



a cheap magnifying glass which I purchased in the 5- and 10-cent store. This greatly facilitates the reading of the dial, which often is difficult to read because of the small figures and poor lighting.

H. B. Duncan,
Duncan Radio Lab.,
1101 West Street,
Wilmington, Del.

Color Code

Radio service men are often unable to determine the value of a coded resistor, because they do not know the color code and have lost or misplaced their trick color code cards. (And so far have not been able to secure an RCA Color Code Pencil.) All of them, of course, can tell how many days are in each month by the old ditty, "Thirty days has, etc." The following catch phrase is almost as simple. It is only necessary to remember the code begins with black—0, and ends with white—9, and that "Mr. BROYG wears BVG's." The letters BROYGBVG can then be counted on the fingers of one hand, and presto—there is the value of the unknown.

L. W. Leidy,
637 Chestershire Road,
Columbus, Ohio.

RCA Victor Models R-74, 76 (G.E. Models J-100, 105)

Interference set up by mercury vapor rectifier (82) in Radiolas R-74, R-76 and G.E. Models J-100 and J-105 is troublesome when receiving weak signals in the daytime. This interference may be mitigated by installing a short lead to a good ground, but the use of a 5Z3 rectifier will overcome it entirely. The necessary filament voltage may be obtained by connecting the 2.5-volt rectifier filament in series with the 2.5-volt filament winding which "lights" the avc tube. The avc tube is then connected on the filament winding which supplies all other tubes. The jumper wire which connects the avc heater terminal to the cathode terminal is removed. If the old avc tube shows any cathode-heater leakage it should be replaced with a new Radiotron. The receiver thus altered retains its original performance minus "hash" from the rectifier.

J. D. Blitch,
Blitch Radio Service,
Statesboro, Ga.

Freshman Model Q-15

The hum may be removed from the Model Q-15 Freshman radio, the reception will be greatly improved, and the screen grid tube life will be increased by replacing the type 22 with an RCA type 35. To remodel this set, simply replace the four-prong socket with a five-prong socket, connect the filament to the type 27 detector, and remove the three-volt wires running to the transformer. Bias the cathode with a 1500-ohm resistor and by-pass this resistor with a .5 mfd. condenser. The results will be astounding and the cost should not be over \$1.25.

D. M. Raw,
Raw & Boddy,
Clearwater, Minn.

Checking AC Line

For several years I have carried in my tool box a small plug-in type night lamp which is about 2 inches long and 1 inch in diameter. When a radio does not light up I immediately plug in the night lamp before pulling out the chassis. Many times the fault will lie in the outlet receptacle. These lamps may be purchased for 20 cents at most 5- and 10-cent stores.

R. R. Taylor,
175 E. South Street,
Kalamazoo, Mich.

Battery Receivers

In many old battery receivers, tinny and thin tone quality and background noise may be effectively eliminated by by-passing the C battery and all B battery taps with .25 mfd. capacitors.

E. W. Caldwell,
954 Scotland Avenue,
Chambersburg, Pa.

Temperature Affects Condensers

When servicing new receivers for hum in cold weather, watch out for sets that have been in freezing rooms. The electrolytics lose their capacity and must be placed in a warm room before it returns.

Ellis F. Brubaker,
357 Main Street,
Denver, Pa.

RCA Radiolas 44, 46 and 47

To make these receivers practically humless, remove the detector-cathode wire running to the power pack, and ground the cathode with a 10,000-ohm resistor. This should be bypassed with a 4 mfd. capacitor.

D. M. Raw,
Clearwater, Minn.

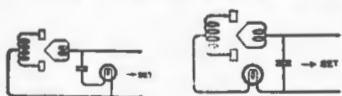
Defective Vibrator

A week after replacing a vibrator unit in a Motorola, the set was again returned to me for repair. On inspection I discovered the new vibrator had burned out. Using a voltmeter and an ammeter to test the ignition system of the car in which the radio was used, I found that the ground connection to negative side of the battery was loose at the chassis end, resulting in a momentary open circuit. This loose connection was enough to cause a surge of about 12 volts from the generator to the set, thus burning out vibrator and filter condenser. A new ground connection on the chassis and a new cable eliminated the trouble.

L. C. Brown,
241-33 87th Avenue,
Bellerose Manor, L. I., N. Y.

Pilot Lamp Fuse

A pilot light placed in the rectifier circuit will act as a fuse and prevent rectifier tubes from burning out due to shorts in the set. This is especially true of the 25Z5 and



mercury-vapor tubes. At the same time, if a bulb of proper size is used, it will also act as a pilot light. It may be connected as shown in either of the following figures:

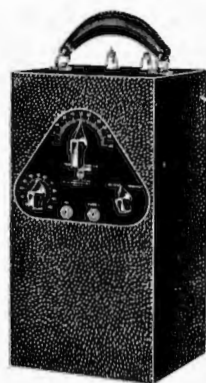
J. Kelly,
25 Vermilyea Ave.,
New York City.

Atwater Kent Models 37 and 40

By connecting a 1 mfd., 600-volt capacitor between the filament of the "80" tube and the chassis, all "B" voltages will be increased together with a decrease in hum. This results in greater sensitivity and better all-around performance.

C. W. Bourne,
Box 32,
Council Grove, Kan.

Transceiver



The new RCA Transceiver, now available at the low net price of \$19.95, provides amateurs with a reliable means of communicating over short distances.

TRANSCEIVER OPERATES IN 5 METER BAND

Has Unity-Coupled Oscillator and Self-Quenched Detector

The licensed amateur operator seeking a compact, battery-operated transceiver for use in the amateur 56-to-60 megacycle band will find the new RCA ATR-219 Transceiver particularly desirable for portable and mobile voice-communication service.

Simplicity of installation and ease of operation are attractive features of this popular priced transceiver for the amateur who wishes to engage in short-range point-to-point communication either out-of-doors or at a temporary location indoors. RCA Amateur Distributors are now featuring this new instrument at the reasonable amateur's net price of \$19.95.

Reliable equipment for mobile purposes adds greatly to the enjoyment of amateur communication. The RCA Transceiver ATR-219 will be found useful not only for mobile purposes, such as amateur field days, but also as an auxiliary transmitter and receiver for communication between the home station and nearby stations, thereby keeping other amateur channels free for communication over longer distances.

Circuit

This transceiver uses an RCA-19 Twin Triode in the popular, unity-coupled, push-pull oscillator circuit. In the transmitting position this oscillator will deliver 1 watt, or more, of energy to the antenna. The modulator is an RCA-19 in a class B circuit delivering the power required to modulate the carrier 100 per cent. An RCA-30 acts as a

NEW DEAL IS OFFERED ON SERVICE TIPS

Awards For Acceptable Tips To Be Made At Once

Those who submit service tips acceptable for publication in RCA Radio Service News or the RCA Radio Service Tip File will henceforward be rewarded at once. Under the new plan, the contributor is informed immediately whether his tip is acceptable, and if so, his award is mailed with the letter. The award may be either the famous RCA Service Engineer's Pencil or the RCA Pigskin Wallet, both highly desirable items for all service engineers. A tip contributor who has won both of these items may choose any bound volume of the RCA Victor Service Notes instead.

Any subject concerning radio service may be submitted for these awards, but to win, the service tip must be on the more difficult phases of service work—a tip that is a real time and money saver. Money-making ideas, for use in RCA Radio Service News "Selling Tips" column, are acceptable too, ideas that make two dollars grow where only one grew before, ideas that promote service business and reduce service costs.

All tips previously submitted have been reviewed; all winning contributors rewarded. A large number of these awards are being mailed along with this issue of RCA Radio Service News.

speech amplifier preceding the modulator.

A simplified switching system transposes the above circuits for reception. The RCA-19 oscillator becomes a super-regenerative detector with correct circuit values for maximum sensitivity and minimum radiation. The RCA-30 is used as an audio amplifier to drive the RCA-19 as a class B output tube. An output transformer provides a proper impedance match for either headphones or magnetic type loudspeaker.

Controls

All controls are conveniently mounted on the front panel. These are: (a) Main tuning; (b) Combined volume control and power switch; (c) Jacks for microphone and for headphones or speaker; (d) Send-Receive switch. Terminals, for attaching the antenna or feeders, are mounted on the top of the case. At the rear a convenient terminal strip makes battery connections easy.

Suggested Antennas

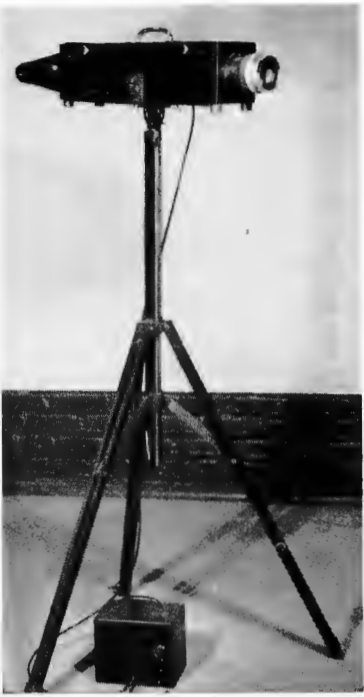
A three-quarter wave-length antenna attached to either terminal, with case grounded, a half-wave current-fed antenna, or other antennae with suitable transmission line are recommended with this instrument.

"Lots of Valuable Information"



T. M. Duffield, Past President of the Lincoln, Nebr., Radio Service Association, thinks the RCA Tip File is by far one of the most convenient forms of case histories he has seen.

Telescope



The new "electron telescope," which opens the possibility of seeing through atmospheric haze by infra-red light waves.

"black light" directly into visible pictures on its fluorescent screen.

Used For Microscopy

The experiment has already captured the interest of experts in microscopy, who see in the device a tool to extend their research in minute living organisms, which are now observable by means of intense light or stains, that often kill the germs they seek to study. By means of the new device, sensitive to infra-red rays, whose illumination reveals details of tissue and cell structure not readily viewed by visible light, it is foreseen by some that the use of stains may be obviated, and the development of heretofore baffling cells brought within vision.

"Sees" Through Fog

In converse use, the electron image tube opens the possibility of seeing through atmospheric haze, which seriously handicaps visible light by reflection from water particles but does not impose limitations in the same degree on infra-red light waves. For such use, the RCA scientists demonstrated an "electron telescope" which makes use of the light gathering properties of optical systems, plus the infra-red and ultra-violet favoring characteristics of the electron tube.

Electron optics is a comparatively recent branch of the science of electronics, based on the similarity of electron paths through certain types of electric fields and those of light rays through ordinary lenses. This field of study shows that it is possible to shape electrodes in such a way that the electric field between them will act as an "electron lens," capable of focusing the electrons leaving a cathode into an image of that cathode.

RCA FIELD FORCE REORGANIZATION NOW COMPLETED

Two Divisions and Eighteen Districts Formed To Improve Service

Reorganization of the RCA Manufacturing Company field forces in order to unify the selling activities of its varied products and promote more efficient operation was recently announced by G. K. Throckmorton, Executive Vice-President.

The country has been divided into two major selling divisions, within which a number of district offices will administer the sales and merchandising efforts for all of the Company's diversified products. M. F. Burns, formerly RCA Victor Merchandise Manager, will head this activity at the Camden, N. J., headquarters. John W. Griffin, who has had many years of radio selling and merchandising experience in the retail, wholesale and manufacturing phases of the business, has been appointed Manager of the Eastern Division. Henry C. Bonfig, former Sales Manager of the Grunow Corporation, and for many years a prominent radio wholesaler, has been appointed Manager of the Western Division.

Combines Seven Forces

Under the new arrangement, seven separate field forces which

have been devoting themselves independently to the promotion of as many kinds of merchandise, most of which overlapped into the same fields, are consolidated under the direction of the district manager in each territory.

The various district offices are in a position to offer information on any RCA activities in their particular districts. Their locations are as follows:

Eastern District Managers

- District No. 1—Boston, J. B. Elliott, 537 Statler Bldg., Boston, Mass.
- District No. 2—Syracuse, H. C. Edgar, 401 Loew State Bldg., Jefferson and S. Salina Sts., Syracuse, N. Y.
- District No. 3—New York City, L. W. Teegarden, 411 Fifth Ave., New York, N. Y.
- District No. 4—Philadelphia, J. K. West, 12 S. 12th St., Phila., Pa.
- District No. 5—Pittsburgh, E. W. Butler, 1205 Plaza Bldg., Pittsburgh, Pa.
- District No. 6—Baltimore, R. A. Forbes, 1004 Court Square Bldg., Calvert and Lexington Sts., Baltimore, Md.
- District No. 7—Atlanta, M. F. Blakeslee, 144 Walton St., N. W., Atlanta, Ga.

Western District Managers

- District No. 8—Cincinnati, Norman Bass, 1339 Union Trust Bldg., 4th and Walnut Sts., Cincinnati, Ohio.
- District No. 9—Cleveland, H. A. Edwards, 830 Keith Bldg., Cleveland, Ohio.
- District No. 10—Detroit, R. E. Kane, Book Bldg., 1249 Washington Blvd., Detroit, Mich.
- District No. 11—Chicago, F. H. Larabee, 520 N. Michigan Ave., Chicago, Ill.

- District No. 12—Minneapolis, F. D. Wilson, Hotel Dyckman, Minneapolis, Minn.
- District No. 13—St. Louis, H. T. Stockholm, 3527 Lindell Blvd., St. Louis, Mo.
- District No. 14—New Orleans, F. M. Bewsher, 517 Masonic Temple Bldg., 333 St. Charles St., New Orleans, La.
- District No. 15—Dallas, J. W. Cocke, 2211-13 Commerce St., Dallas, Tex.
- District No. 16—Denver, D. A. Lewis, Midland Savings Bldg., 444 Seventeenth St., Denver, Colo.
- District No. 17—Seattle, N. A. Woodford, 1411 Fourth Ave., Seattle, Wash.
- District No. 18—Los Angeles, J. E. Francis, 1016 N. Sycamore Ave., Hollywood, Calif.

Black Light



A scene projected in infra-red (or "black light") on the fluorescent screen of the image tube.

ELECTRON TUBE "SEES" THROUGH DARK AND HAZE

Scientists Demonstrate Equipment Which Solves Many Problems

A new electron tube which for the first time enables man to see through the dark was described and demonstrated recently at St. Louis, Mo., before the American Association for the Advancement of Science by Dr. V. K. Zworykin and Dr. George A. Morton, of the RCA Laboratories in Camden.

The assembled scientists at this memorable meeting witnessed the projection of motion pictures focused on the tube, which converted light rays into electrons. The electrons sped through the tube and reproduced the pictures in enlarged form on a screen in its further end. Continuing the demonstration, a dark glass filter was placed in the beam of the motion picture projector. All visible light rays were stopped dead, yet, with what to the average person would appear sheer magic, the electron image tube continued to reproduce the enlarged pictures with hardly noticeable loss in clarity. Dr. Zworykin explained that the tube was then functioning entirely on "black light" or infra-red rays, which were all that could reach the tube through the filter.

Electrons Behave As Light Rays

The new device, which is sensitive to ultra-violet as well as infra-red rays, known as "black light," makes electrons behave exactly as light rays and marks a great advance in the use of electron lenses. Its large photoelectric cathode allows the efficient employment of large diameter, high power optical lenses.

The amazing similarity of the new system to optical systems was shown. The images were focused by electrostatic instead of optical means, and the produced images possessed a degree of definition quite comparable to that obtained by photography. This new electron optical system inverts the image, as in the case of a glass lens optical system. In the electron image tube electrostatic lenses play the part of glass lenses. Focusing of the image is accomplished by varying the electrostatic lenses by means of a potentiometer, and, to carry the analogy one step further, the scientists have corrected the tube for various distortions, just as a camera lens.

For some time it has been possible to capture on photographic negatives images carried by "black light," but investigators have been limited to the use of "still" pictures, which could be observed only after the process of developing and printing. The new electron image tube converts the scenes it receives in

Newspaper and Magazine Ads Help Sell CHECK-UP

"DOCTOR" for sick radio

When your radio is sick, call radio doctor just as you would your family physician for a check-up. Let an expert do it. Complete Radio "Check-Up" from bottom, A to Z, costs only \$1.50 plus any tubes or parts needed to put your radio in perfect health. Send for DOCTOR TODAY!

Mat 259

IS YOUR RADIO FLAT ON ITS BACK?

By that we mean, does it sound terrible? If so, try new RCA Radio Tubes. Likely they will put your radio back on its feet again. At the same time, better have a complete Radio "Check-Up." That means going over set from A to Z, finding out what else needs to be done (if anything) to "bring it back alive." Cost, only \$1.50. Get a "Check-Up" today!

Mat 253

HAVE IT OUT NOW!

That tooth? No... howl in your radio! Radio "Check-Up" will cure the trouble and free you at the same time. The cost is only \$1.50. Better reception, check!

Mat 254

HAS YOUR RADIO A HANGOVER?

Too many hours of playing far into the night? Sore tubes? Hoarse voice? Then do what the doctors do—give your radio a complete "Check-Up"! Includes adjusting the little things that get out of whack, cleaning the parts, and recommending other repairs if needed.

Mat 261

When the music says

"Let's dance"

don't let your radio cut in with noise and static!

SHALL WE DANCE?

IT'D LOVE TO.

OH, WHAT'S THE MATTER?

I'LL CALL MY RADIO SERVICE MAN FOR HIS CHECK-UP...

YOU'RE A MAGICIAN! THE OLD SET SOUNDS LIKE NEW AGAIN...

IT'S ALL IN KNOWING HOW—EVERY SET NEEDS A CHECK-UP ONCE A YEAR.

NOW WE CAN REALLY ENJOY OUR RADIO

YES, AND THE BILL WAS ONLY A DOLLAR AND A HALF....

Put an end to poor reception... call your radio service man

When your radio spoils the marvelous programs that are on the air, your radio service man is the one to consult. He knows how to find the causes of noise, hum, distortion, erratic operation such as loose connections, worn parts, weak or dead tubes. Ask him for a Check-Up, which usually costs less than 3¢ per day per year. This may be all you need. Or if weak tubes or worn parts have to be replaced in order to restore the original pep, tone and volume, the total cost usually does not exceed 3¢ per day per year. So, for perfect reception, call any radio service man.

Most reliable dealers recommend RCA Radio Tubes, because they know they pay them to sell as good tubes as can be found. RCA Radio Tubes are used by over 20 of the leading set manufacturers as standard equipment. RCA makes not only receiving tubes, but also transmitting tubes used by broadcast stations, aircraft, police, marine and trans-oceanic stations, and many special-purpose tubes such as Cathode Ray, Photo-Cell and others used in the most exacting services.

Leading makes of new radios are designed for RCA Metal Tubes. Make your next set a Metal Tube radio.

RCA RADIO TUBES

One of the series of RCA Radiotron consumer ads appearing in Saturday Evening Post, Collier's and other leading national magazines. The next one appears in the Saturday Evening Post on March 14.

Ads like this are appearing weekly in over 124 leading newspapers. Radiotron dealers and service engineers can secure these Check-Up mats by writing their Tube distributor or RCA Radiotron, Camden, N. J. Order by mat number shown.

Engineer Stresses Advantages Of Metal Tube Receiver Design

Better Conversion Efficiency, Higher Gain and Simplified Construction Achieved With New Type Tube

By W. L. CARLSON, Development Engineer, RCA Manufacturing Co., Inc.

Perhaps no one is better equipped to appreciate the relative merits of different types of tubes than the engineer actually concerned with receiver development. W. L. Carlson, who has for many years been actively concerned with the development of RCA Victor receivers, explains why metal tubes make better and more efficient receivers possible, and why they greatly simplify the problems of the development engineer.

The history of scientific progress in any field of activity is invariably accompanied by traditional resistance. The radio art, and particularly vacuum tube development, are no exceptions to this rule. Each milestone of progress — the Fleming Valve, the De Forest Audion, the Unipotential Cathode Tube, and the Screen Grid Four-Element Tube, won their places in the radio art only after a hard fought battle.

W. L. Carlson

Today the smoke of battle obscures from view the issues of Glass vs. Metal Tubes. History is repeating.

We see a radically new mechanical construction, housing and terminating the electron elements of a thermionic vacuum tube. Whatever lasting merits will justify the future existence of metal tubes must be due directly or indirectly to this construction.

Smaller Size

The most obvious result of this new construction is reduction in overall tube component size, brought about by the new "header" and base design, smaller required heat dissipating surface, and elimination of the necessity for external shields. As a general rule smaller equivalent component parts, whether they be transformers, condensers or vacuum tubes, contribute directly to more compact chassis designs, and indirectly to lower cost and improved performance. The new metal tubes will start a new trend in smaller component part design, resulting in reduced size, neater appearing and lower cost radio receivers, and allied amplifier equipment.

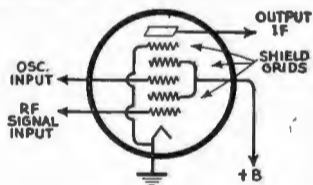
Consider now the new tube design from the standpoint of sturdy construction, which plays a large part in holding tube constants uniform. The bead terminal supports in the "header" provide a large area for supporting the various tube elements rigidly at the base. The top end of the tube elements are held rigid by an insulated metal disc fitting snugly to the inside wall of the outside metal case. This construction replaces the familiar mica disc in old glass tube designs, where

larger tolerances are required between mica and glass to allow for comparatively large variations in diameter of glass bulbs. Another important consideration is bulb breakage, which obviously is not likely to occur when metal tubes are subjected to severe usage or careless handling.

Other features of metal tubes are those that have to do with circuit design, features that make better performance possible, features that permit basically superior receiver design. The following discussion of various tube types shows to a small degree how a few of these important advances are realized.

Heterodyne Conversion Efficiency

One of the most important functions in a superheterodyne receiver is heterodyne conversion of the received radio frequency waves to a new intermediate frequency. This conversion process requires combining a locally generated radio frequency oscillation with the signal frequency in a mixer tube usually known as the heterodyne detector. There are two input circuits and one output circuit associated with the heterodyne detector. In a modern all-wave receiver, it is important that there be no common coupling between the two input circuits to react on each other, just as it is



Elements of RCA-6L7

important that there be no common feedback coupling between the output circuit and input circuit of an ordinary r-f amplifier. This is particularly true for reception on signal frequencies above 10 Mc., in which case the percentage frequency difference between the signal and local oscillator is small when heterodyning to the conventional 460 k.c. intermediate frequency.

The RCA-6A7 glass tube was a step in the right direction over prior art, in that the received signal and the local oscillator voltages were connected to separate tube elements. However, the signal and oscillator circuits were not entirely free to function independently of each

other. A hitherto unrecognized reaction, causing in some cases degeneration and in other cases regeneration, was soon discovered. This observed phenomena was due to large alternating electron space charges in the vicinity of the signal grid which were controlled by the local oscillator grid voltage. It was found that this objectionable reaction could be overcome by changing the design so that the oscillator grid of the tube acts on the electron stream from the cathode after, instead of before, the electrons pass by the signal control grid.

Oscillator Stability Required

Another important consideration is the stability of the local oscillator. It is not uncommon for oscillator circuits employing the 6A7 type tube to drift in frequency 10 to 50 k.c. at 18 Mc. within a short period of time, and therefore require continual retuning of the receiver, particularly during the first half hour of operation.

A new circuit was devised, incorporating the all-metal pentode RCA-6J7 tube as an oscillator, which reduced the frequency drift during the warming-up period of the set and the drift due to power line voltage fluctuations.

The new 6L7 all-metal tube incorporates the new design feature which allows the signal input, local oscillator input and intermediate frequency output circuits to function independently of each other. By employing the RCA-6L7 all-metal pentagrid mixer and separate oscillator all metal RCA-6J7 in place of the old glass RCA-6A7, we are able to increase the sensitivity of receivers about four times at 18 Mc. and about ten times at 40 Mc. and reduce local oscillator drift (causing detuning) about 10 times at 18 Mc. and 40 Mc.

High Plate Impedance

Another important feature of the all-metal RCA-6L7 is its high plate impedance of 1,000,000 ohms, due to employing a suppressor grid between screen grid and plate, which offers less load on the output i-f transformer and thereby improves the selectivity and gain of the first i-f stage. The RCA-6A7 glass tube has a plate impedance of 350,000 ohms; it having no suppressor grid.

Havana Meeting

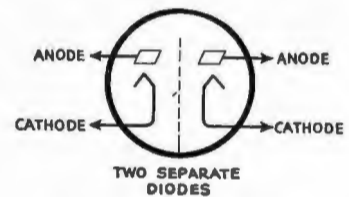


A group of enthusiastic service engineers and radio dealers in Havana, Cuba, at the RCA Service Meeting conducted by G. Warren Kimball, RCA service engineer, under the auspices of Humara y Lastra, RCA Distributor. The display in the background was one of the most striking displays at the Cuban National Fair, held during the month of February.

This new improvement in heterodyne conversion performance for all-wave receivers cannot be obtained with a double purpose single tube, functioning both as oscillator and heterodyne detector. The superiority of single function metal tubes designed without compromises compared to double function tubes is clearly demonstrated in the heterodyne conversion systems of 1936 RCA Magic Brain Receivers.

As An Audio Volume Control

The independent action of the two control grids of the all-metal RCA-6L7 makes this new tube adaptable to audio frequency ampli-



Elements of RCA-6H6

fiers where it is desired to automatically control the amplification gain. The automatic audio volume expander circuit, a new feature in the RCA-D22 Radio Phonograph Combination, employs an all-metal RCA-6L7 as an audio amplifier tube. The audio signal voltage is impressed on the first control grid and the automatic gain control bias voltage is impressed on the second control grid. Using the all-metal RCA-6L7 in this manner, higher audio voltages can be handled without serious distortion than could be handled if both signal input and automatic bias voltages were impressed on the same control grid.

As A Detector and Rectifier

The RCA-6H6 is known as the twin diode and is used as a single and double detector or low power single and double wave rectifier. Each diode has its own separate cathode and anode and the two diodes are shielded from each other. These two features, together with its miniature size, make the new tube far more flexible in application to circuit designs than its predecessors. This is particularly true in combined audio diode detectors and automatic volume control circuits, as for example, the circuits employed in RCA Model C13 and C8 receivers where separate cathodes were required for each diode.

Divorcing the twin diode from triode and pentode in multi-purpose tubes allows the triode and pentode as well as the diodes to be designed without compromises on cathode emission area, base pins and eliminates objectionable inter-element capacities.

RCA 6K7 and 6J7 All-Metal Tubes As Amplifiers

When pentode tubes of metal construction, such as type RCA-6K7 and RCA-6J7 are used in an amplifier of a superheterodyne receiver, the regenerative feedback coupling per stage is substantially less than when using pentode glass tubes such as the type RCA-6D6. This feedback is due to inter-electrode capacity coupling between the output plate element and the input grid element of the pentode tube. This is the same inter-electrode capacity coupling which was present to a large degree and caused distortion and unstable operation in amplifiers using triode

ACR136 HELPS HAM WIN WAC CERTIFICATE

Improved Results Obtained With Same Transmitter Says W4SV

Paul L. McGinty, operator of Amateur Radio Station W4SV, at Boynton, Fla., has proved to himself that the ability of a station to work DX is largely dependent on the calibre of the receiver used. Mr. McGinty writes:

"Have been in the ham game for about ten years, struggling along with the well-known 210, and, outside of a few Europeans, my DX was very limited, to say the least. To work WAC seemed to be something superhuman and only for the other fellow to do. I had made up my mind some time before that the receiver was more important than the transmitter when it came to working DX, so when I read your ad in QST I was induced to order an ACR-136. Now I am quite convinced that a good receiver is a lot more than half of the station when it comes to DX QSO's.

WAC Twice

"May it not seem like bragging if I mention that my station has made WAC twice in the short time since the ACR-136 has been used. Of course, it's nothing compared to what many other fellows have done, but then, it seems mighty fine to me.

"The point is that my transmitter is of the same power as before. The change is in the receiver, so I'm taking off my hat to the ACR-136 and thanking you fellows for turning out such a darned sweet job of a ham receiver."

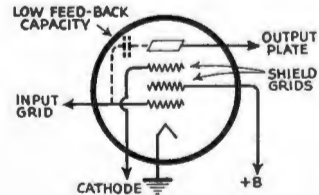
The results obtained by W4SV are typical of those obtained by other owners of the ACR-136, a top-notch value in amateur receivers. With a net price to amateurs of only \$69.50, complete with all tubes, power supply and speaker, the ACR-136 has every necessary feature for the progressive amateur station. RCA Amateur Radio Distributors everywhere are featuring this receiver.

tubes in the old days up to about 1930.

The radio art was greatly advanced by the introduction of the four-element tube and later the pentode tube with their screen grids which greatly reduced this objectionable plate to grid capacity coupling and allowed far greater amplification per stage without distortion and unstable operation than was possible with triode tubes.

Have One-Half Internal Capacity

The type RCA-6K7 and RCA-6J7 pentodes with their natural shielding metal case have approximately one-half the control grid to

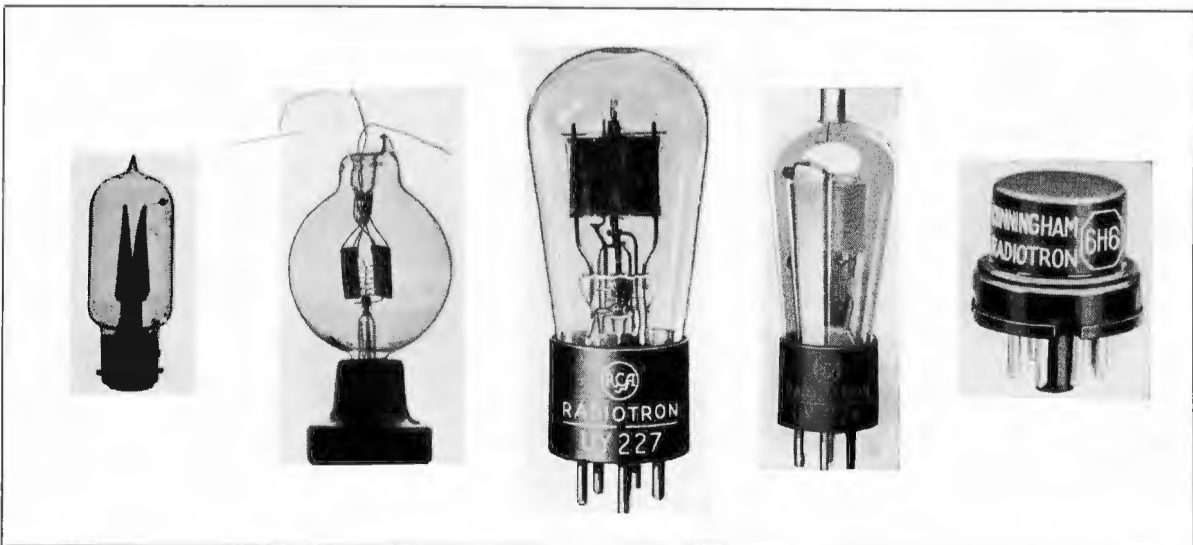


Elements of RCA-6K7

plate capacity compared to the RCA-6D6 glass tube with shield can. They are one step closer to the ideal non-regenerative tube and thereby allow greater amplification gain per stage without distortion and unstable operation than with the same or equivalent circuits using their predecessor type 6D6 glass tube.

The foregoing applications are but few of the many associated with RCA All-Metal Tubes. However, the basic superiority of All-Metal Tube types over similar glass types is present in practically all applications. That this is true is well demonstrated by the superior performance of the 1936 receivers employing All-Metal Tubes as compared with those using the old style glass envelopes—a superiority easily demonstrated by anyone.

Evolution Of RCA All-Metal Tubes



Fleming Valve

De Forest Audion

Unipotential Cathode

A.C. Screen Grid Tube

RCA All-Metal Tube

RADIO STARS OF THE MONTH

HEAR THEM AT THEIR BEST



**MAKE YOUR
RADIO PLAY
LIKE NEW
WITH A
CHECK-UP**

Get details inside



This lady is "Honey Chile" (Miss Margaret Johnson) heard over CBS.



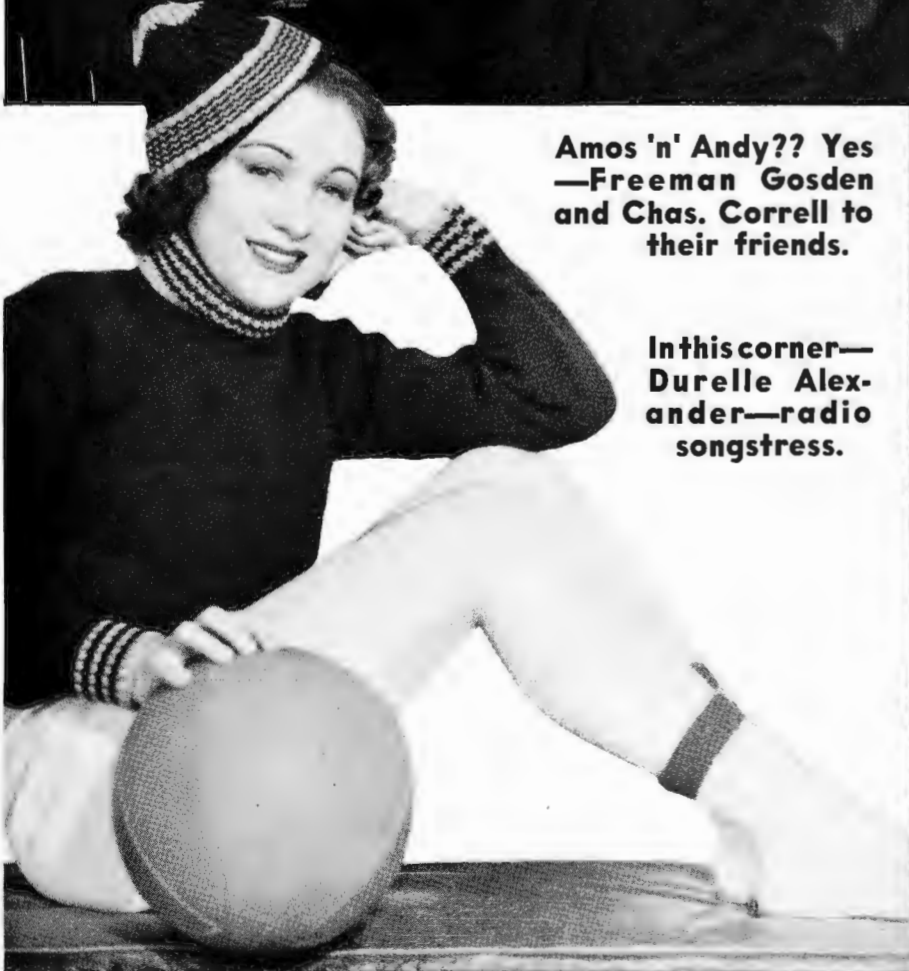
Major Bowes in his private office.
(Circle) Walter Winchell, air waves gossip.
**HEAR THEM AT THEIR BEST
—PUT YOUR RADIO IN
ORDER WITH A CHECK-UP**



Here's the Queen herself—Miss Jessica Dragonette.
(Below) Jack Benny, radio comedian, with Mary Livingstone.
**A CHECK-UP ON YOUR RADIO
WILL PUT IT IN TOP SHAPE TO
GET THESE STARS AT THEIR BEST**



"What's that—a sour note!"—come, now, Rudy Vallee, don't fire that musician.
(Circle) Al Jolson in a typical radio studio pose.
**GET THAT RADIO CHECK-UP
NOW**

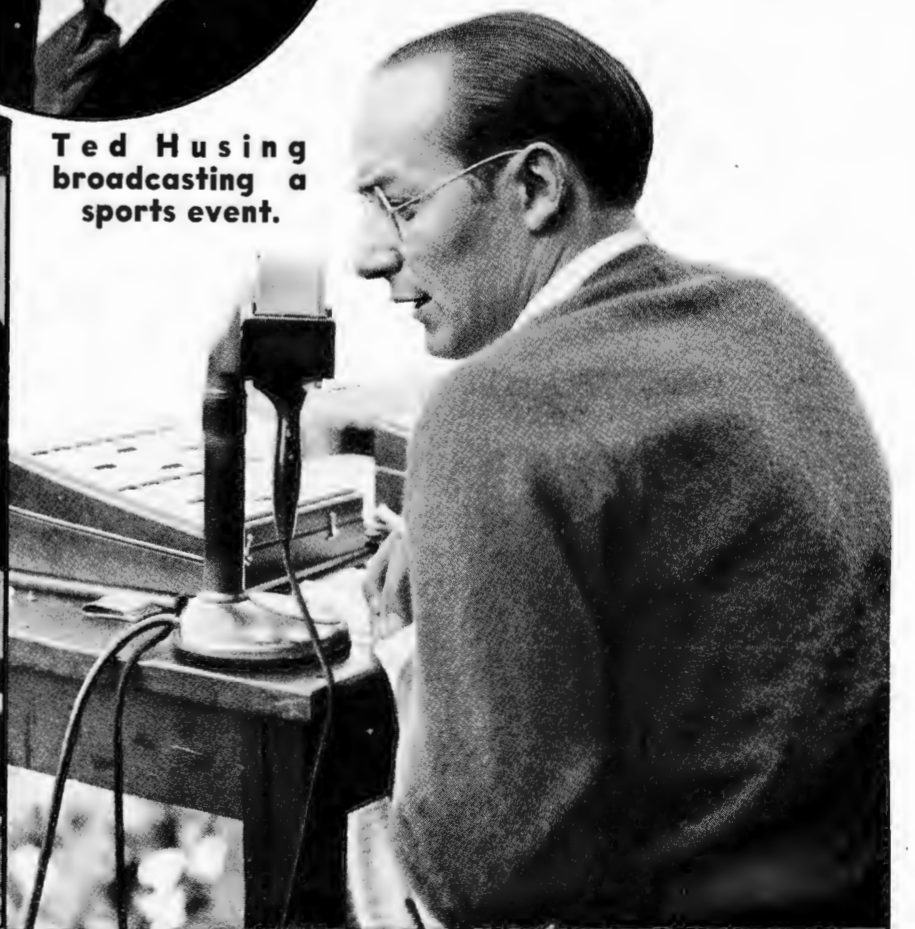


Amos 'n' Andy?? Yes—Freeman Gosden and Chas. Correll to their friends.

In this corner—Durrelle Alexander—radio songstress.



Ted Husing broadcasting a sports event.



**WE CLEAN, CHECK, INSPECT AND TEST
YOUR SET—at a new special rate**

