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AUG 26 '25

# Radio Digest

EVERY WEEK **Illustrated** PROGRAMS **TEN CENTS**

REG. U. S. PAT. OFF. & DOM. OF CANADA

Vol. XIV Copyright 1925 By Radio Digest Publishing Co. SATURDAY, AUGUST 15, 1925 No. 6

## VOTE POPULAR STATIONS



**THEY LEAD THE FIELD**

Station	Votes
1. KDKA, East Pittsburgh.....	12,986
2. WEA, New York.....	7,442
3. WGY, Schenectady .....	6,381
4. WLW, Cincinnati .....	5,008
5. WOC, Davenport, Iowa.....	4,973
6. KOA, Denver .....	4,557
7. WTAM, Cleveland .....	3,864
8. WLS, Chicago .....	3,779
9. WBZ, Springfield, Mass.....	3,421
10. WEBH, Chicago .....	2,590

### LISTENERS IN PICK KDKA AS FIRST CHOICE

#### WEAF in Second Place

Radio Digest Readers Select Fifty Leading Stations in Consensus of Opinion Balloting

"Most Popular Broadcaster in the World" may be added to the present slogan of KDKA, "Pioneer Broadcaster of the World," as the result of a survey of Radio fans just completed by Radio Digest. The East Pittsburgh station of the Westinghouse Electric and Manufacturing company more than proved itself the most popular, according to the country wide vote, the returns of which give KDKA almost twice as many ballots as its nearest competitor.

The vote shows larger stations by far most favored. Whether this is only because these stations have larger audiences because of their greater power and range, or because better programs are furnished by these broadcasters, is a question upon

(Continued on page 2)

### Jazz Falls Before Revival of Classic

#### KNX Checkup Shows Astounding Decrease in "Popular" Requests

HOLLYWOOD, Calif. — When KNX, "The Voice of Hollywood," went on the air in November, 1924, a check of the requests received revealed that over 90 per cent of them were for jazz or dance numbers.

But recently it was noted a decided change was evident in the character of the requests received. Another check was made. It developed the rather startling fact, in view of the previous figures, that less than one-half of 1 per cent of the requests received by KNX were for jazz selections. From a very small percentage the requests for the semi-classics and comic opera numbers had risen to the point where they amounted to more than all others put together.

### Song Restriction Off at KYW Hearst Studio

CHICAGO.—Hearst Square studio of KYW, Westinghouse station here, may now broadcast all musical compositions, copyrights for which are controlled by the American Society of Composers, Authors and Publishers. The Westinghouse interests did not succumb to the point of view of the organized music publishers, but the Chicago

American, a newspaper which broadcasts over KYW, paid the annual license fee. It is understood that the Westinghouse company will steadfastly continue to ignore the publishers' society.

### Stage Dancing from 2LO

LONDON.—An entirely new idea here is the broadcasting of the sound of stage dancing. The British Broadcasting company has made tests and found it can be done very well. Listeners heard it on several nights in July.



Left, Ruth Wack, soprano at WORD, Batavia, Illinois. Right, Adelaide de Luca, contralto, proud of the fact that WAHG, Richmond Hill, N. Y., carried songs to friends abroad.



# NEWS BRIEFS FROM THE BROADCASTERS

## EDWIN BORROFF TO HEAD NEW CHICAGO STUDIO

Edison Hour Pleases; "Americans Faster Than English"—Lopez; Hear WGY in Alps

One of KYW's oldest announcers, Edwin H. Borroff, will be the head of Westinghouse's latest Radio studio—the new KYW studio in the Congress Hotel, Chicago.

The New York Edison Hour which has graced WJZ's Wednesday evening program for several weeks in the past and promises to continue to do so for some time to come, bids fair to assuming the leading position among broadcast features for the Metropolitan district.

Another evidence that Americans live faster than any other nation on earth, both in their work and play, is contained in a statement by Vincent Lopez, at WEA. He relates that while in England he was obliged to retard the tempo of his dance music to a marked degree for the benefit of the staid Britishers, who could not keep up with the American rate.

A Radio program from Station WGY, Schenectady, broadcast on a 40-meter wave length in July, was plainly heard on one of the peaks of the Alps.

Dr. Frank H. Vizetelly, editor of the New Standard dictionary, continues his interesting historical series from WOR, every Wednesday evening. His talks are accurately described as one of the most interesting series ever broadcast, and one which has resulted from years of research work in many countries.

The one gang in New York city which is not a disturber of the public peace, but rather a distinct aid in the maintenance of law and order by keeping thousands in their homes on Sunday nights, is that of the Capitol theater artists, heard over the WEA link.

The pipe organ installed in the B. J. Palmer residence will be used during the Sunday afternoon and evening program of classical symphonic music broadcast by The Palmer Little Symphony from the Chiropractic Radio station, WOC, Davenport.

Maxine Brown, "The Sweetheart of the Air," will visit the principal broadcasting stations in the East during the month of August.

"Silver Threads Among the Gold," played by the orchestra with bell accompaniment, is the number that patients in ward C-2 U. S. Veterans Hospital 96 have requested of Westinghouse Station KDKA, Pittsburgh.

## COUNT RADIO CHIMES AMONG WORLD'S BEST

### WSAI Bells Are Largest in the United States

CINCINNATI.—There's the famous Liberty Bell, the Great Bell of Moscow, and the Great Bell of China. And then there is the WSAI Radio Chime. And speaking of bells, Station WSAI, here, boasts the largest set of chimes in the country, which countless thousands of Radio fans have had the opportunity to listen to. The chime consists of twelve bells, their total weight being over eleven tons. The set was cast in 1923, and the chime was broadcast through WSAI for the first time the following year. This is now a regular feature of WSAI programs.

WSAI's Radio chime is installed in a massive tower, 130 feet high, this Campanile being constructed only a few hundred feet from the WSAI studios. During programs, Radio listeners far and near may hear the clock striking the hour and quarter hours. This chime has often been referred to as "The bell heard around the world." It is remarkable the number of changes that may be played upon this set. It has been estimated that 479,931,600 changes may be played upon a chime of twelve bells.

### Denies WKAR Lost License

LANSING, Mich.—Reports published here that Station WKAR, located at the Michigan State college, East Lansing, had lost its class B license have been flatly denied by James B. Hasselman, director of the station. Mr. Hasselman exhibited letters from the department of commerce regarding permission which had been given the station to discontinue its programs during the summer months. Regular programs will be resumed in the fall.

## RELIGION NOT FREE OVER ENGLISH RADIO

LONDON.—A novel scheme is being employed in the diocese of Winchester to solicit contributions for the formation of new Bishoprics at Portsmouth and Guildford from Radio listeners who are not regular church attendants. Several parishes have appointed Radio scouts, whose duties are to locate aerials of non-church goers and leave collection boxes requesting them to contribute after listening to broadcast services.

## "HAMS" HASH CODE SO MYSTERY FLOPS

PHILADELPHIA.—A jumbled Radiogram and fear of a ship captain that some of his crew might desert, created a stir in Radio circles here a few days ago. The message sent from the Italian steamship, Maria Adele, read: "Send two policemen to meet Maria Adele." The ship's representatives, Radioed for details. "I didn't say to send policemen. I want watchmen." It was another mystery squashed for the "hams."

## THEY FILL THE AIR WITH HARMONY



Their songs blend for beauty just as their charming personalities blend for the same thing in this picture of Evelyn Simmons (left) and Florence Clifford, singers of popular songs from WLS, Chicago.

## British Radio Makers in Favor of Standardization

WASHINGTON.—Officials of the simplified practice division, department of commerce, are expressing much interest in the report received here that British Radio manufacturers have taken up the matter of simplification and standardization of Radio apparatus and equipment.

While no simplification work has been undertaken by the department of commerce along these lines, the subject has several times been broached to Radio manufacturers by officials of the department. The reports reaching here from Great Britain indicate that the general discussion at the meetings there showed that all the representatives present favored the adoption of a greater degree of standardization than at present exists. Officials of the simplified practice division seem to feel that it will not be long before a similar program will be requested by American Radio manufacturers.

## New Program Feature Is Announced for WKRC

CINCINNATI, O.—The Cincinnati Post and the Rudolph Wurlitzer company will broadcast two programs a week from Station WKRC, the Kodel Radio corporation, here, officials of both firms announced. The programs now being arranged will consist of one classical and one popular each week.

Freda Sinker, famous Cincinnati woman orchestra leader, and her Toadstool Inn orchestra, will be a regular feature of the popular program. Burnett C. Tuttle, manager of the Cincinnati Conservatory of Music, one of the largest music schools in the world, will have charge of the classical programs.

## Woman Philanthropist Uses Radio as Educational Means

NEW YORK.—Constance Towne, widow of the late Frederick Talmage Towne, of the firm of Yale and Towne, has decided to turn her philanthropic endeavors to the benefit of the Radio audience and to this end musical broadcasting under her auspices is being given from Station WJZ.

Always a great student and art and music lover, Mrs. Towne has devoted practically her entire life since the death of her husband, fifteen years ago, to the promotion of art in a New England city, helping especially the younger folks in the poorer classes. It became her dream, prior to her husband's death, to establish a school of art where any child might receive the best training at a cost within their reach.

Mrs. Towne is exceedingly interested in Radio and believes it to be one of the best mediums of education yet given to the world.

## Radio Nature League Talks Over WBZ Bi-Weekly Now

SPRINGFIELD, Mass.—For the entire month of August and part of September, the Radio nature talks broadcast by Thornton W. Burgess, noted author and naturalist and director of the WBZ Radio Nature League, will be heard over the Westinghouse station every other week instead of weekly. Membership in this league, which is recognized throughout the country as one of the great factors in the preservation of wild life in America, now exceeds 15,000 enrollments, but with the advent of the fall, when reception conditions will be greatly improved, it is expected that the membership will considerably exceed the present figure.

# BRITISH BROADCAST HEAD REVIEWS YEAR

## TEN MILLION PEOPLE HEAR PROGRAMS IN ISLANDS

Predicts Radio Will Establish Basis for Conscious World Citizenship and Good Will

LONDON.—"The British Broadcasting company has at last managed to live down the reputation of being a designing and avaricious monster intent upon the overthrow of the printed word," declared Lord Gainford, chairman of the company, in his speech here recently at its second annual meeting.

"The company's relations with the press have improved greatly during the year," he continued. "With the disappearance of the bogey there has ensued a period of growing friendliness and cooperation. We are grateful to our press friends and shall do our best to merit a continuance of their support."

### Ten Million Listeners

"Ten million of the inhabitants of the British Isles," continued Lord Gainford, "listened to B. B. C. programs either regularly or occasionally. In two years' time broadcasting may well reach 20,000,000."

"The international era is approaching. Through the development of Radio we look confidently for the growth of good will and understanding, in a measure supplementing and surpassing the efforts of diplomacy. Broadcasting should be able to do a great deal to bring the nations together and to establish a basis for a conscious world citizenship.

"Our task is immense enough nationally, but it has world responsibilities as well, and we will continue to do our best to ensure that wherever broadcasting is established it is turned to account as an instrument of education, social progress, and wholesome entertainment."

### Plan Big Development

Regarding the future, Lord Gainford stated the B. B. C. has in hand plans for rapid development. If and when the number of licenses increases to 2,000,000, the income will barely secure the standard of service at which the B. B. C. is aiming in its endeavor to provide the best available services for the country's entire population.

"All the reliable evidence at our disposal," the chairman concluded, "goes to prove that the public generally is satisfied with the manner in which we have sought to discharge our heavy responsibility. We fully realize, however, that much lies ahead in every line, and we are determined to prosecute the developments of the service in the best interests of the whole country.

"Our conception of broadcasting as a great public service, to be run as such, and the way we have initiated and developed it, are material factors we hope may stand to our credit in the estimation of the public we serve."

## OPERA STARS ASSIST AS NEW STUDIO OPENS

### WBBM to Transmit from Scientifically Built Room

CHICAGO.—The air was chucked full of good things around here recently when a galaxy of stars assisted in the opening of the new Stewart-Warner studio of Station WBBM. Fortunately several grand opera stars, who are on a national tour as the Chicago Concert company, were in the city and took part in the dedication program.

The Stewart-Warner studio has the most modern construction and assures every comfort for the artists. No effort is spared from the broadcasting angle to have a perfect studio, in order to make reception as nearly perfect as possible. This new type of construction does not deaden the tone of an instrument or the voice but retains it in all its naturalness, and at the same time prevents any reverberations that have a tendency to jumble up the music. This new scientific principle delivers to the transmitter music or voice in all its rich fullness and retains the personality of the artist.

Decorations of the studio have been chosen with artistic care and blend well to create an atmosphere of harmony. The announcer's desk is a most interesting piece of furniture. It is an exact replica of the desk used by George Washington while president.

### Marconi Perfects New Plane Set

LONDON, Eng.—Senator Marconi has just announced a new development in the application of Radio to fighting airplanes. Compactness is of vital importance to apparatus in these machines, and the new apparatus uses a rigid aether, thus doing away with the trailing wire. Thus the facility in maneuvering is in no way impaired.

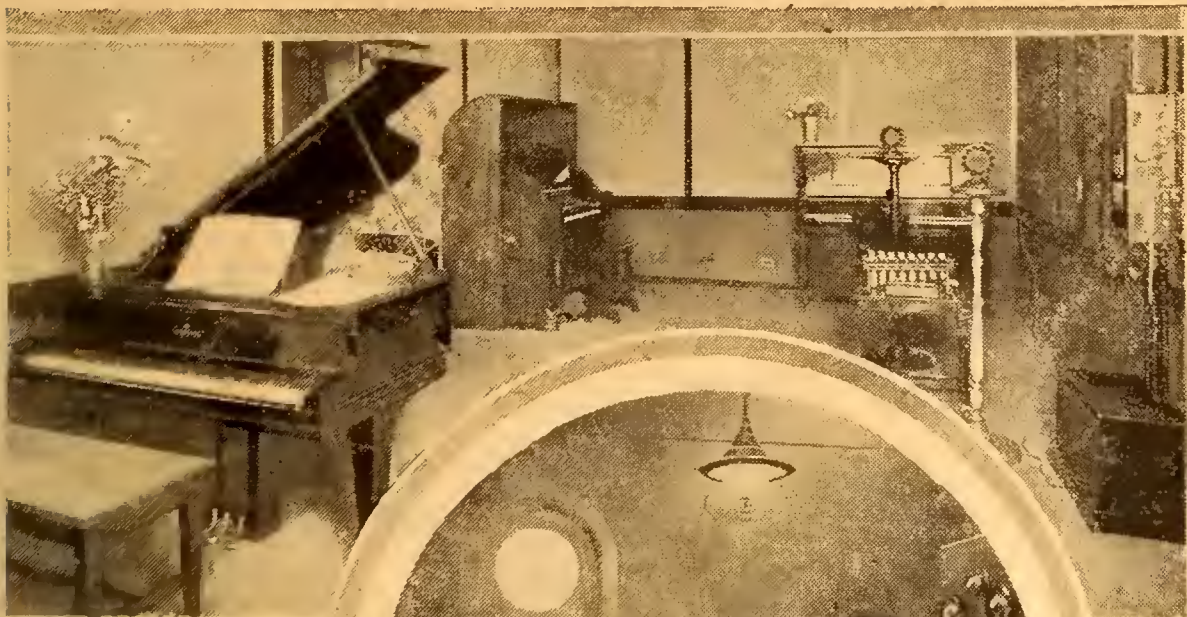


# Watch for the Crosley PUP!

“It’s a Sky Terrier”

THE CROSLEY RADIO CORPORATION  
CINCINNATI, OHIO  
POWEL CROSLEY, Jr., President

# WHAS, in "My Old Kentucky Home"



Above, studio, showing organ with tone deflector in left background.



Left, Chief Operator Graft, and Assistant Operator Harlow at controls in operating room. Above, reception room where visitors learn the true meaning of southern hospitality.



Above, Miss Dorothy Kirchnel, who is secretary of WHAS, the station that answers every communication with a personal note. Below, Miss Eleanor Hnber, who is Radio Editor of WHAS.



Right, this gentleman is Mr. D. H. Ives, senior announcer, who keeps the ball arolling at WHAS with such rapidity that the station has posted a standing offer of a special Foster song book to any fan catching them silent as long as eight seconds during their evening concerts.



Meet Credo Harris (right), the manager, a true southern gentleman, who is doing much with Radio to carry education to every corner of the "Blue Grass" state. Mr. Harris is working hard to carry out the plan of Judge Bingham, publisher, Courier-Journal, to put a Radio set in every Kentucky school. It will not be strange if the name of Harris becomes as famous in Radio as was that of "Marse Henry" Waterson in journalism.



**I**N PICTURESQUE and historic old Louisville, a little over three years ago, July 18, 1922, to be exact, the famous Courier-Journal, known internationally for its publisher, Judge Robert W. Bingham, and its late editor, "Marse Henry" Waterson, brought forth Station WHAS upon the air. Since that time this broadcaster has done a world of good—much more than the average station—for its listeners.

Why? To put it in the words of Credo Harris, southern gentleman and director of WHAS, "Radio has many, many purposes, but to us the first is human development, and we try to do some little constructive deed each day."

Picture a small country store on Sunday morning. Let us take, for example, one that stands at some "crossroads" in a remote region of Kentucky, or up some mountain creek. Not a church is near, but the people are kneeling on the floor of the store. At what? Why, there is a loud speaker on a board resting on two boxes, and a prayer is issuing forth. The store has a receiving set which is tuned to WHAS, and the station is broadcasting the morning studio service conducted by one of the Louisville church pastors.

Faith? Fundamentalism? Science? Progress? Radio, through WHAS, has become a minister and a teacher for the people in the far away hills of Kentucky, shut off otherwise from the great and swiftly

moving world outside. In an interview with Mr. Harris, one learns that it is the prime hope of Judge Bingham and WHAS to press forward, probing into remote places, until every Kentucky rural school is Radio equipped. A program will then be built for the exclusive benefit of these schools to fill a morning hour. For fifteen minutes one of the Courier-Journal or Louisville Times editorial staff will read a digest of the world's most important news, interpreting its meaning and possible consequences. Then an orchestra will play music—the kind that every school child should know. A few minutes of domestic science, perhaps, and kinks in fixing over dresses into late models will be followed by setting-up exercises, "to straighten out little shoulders," as Mr. Harris says. He continues:

"In Kentucky there are many roadless places and bridgeless streams that only Radio can travel the tree tops and get into. Our hope is to break down the mental barrier between the rural and the urban. Numberless country boys and girls, who leave homes to seek their fortunes in cities, carry a heavy mental handicap from the beginning. They are conscious of being less well equipped, less up-to-the-minute, than the city boys and girls, and this keeps them from getting off in step. But with Radio to help them prepare for the competition that must be met in larger centers, having kept them in touch each day with developments in politics, economics, fashions, sports and other activities, their self-confidence has been built up, their self-consciousness is gone. They know that their clothes are in as good taste as that of their city cousins, and that they are equally abreast in their knowledge of generalities."

Three years of service has shown Mr. Harris is right. Already the pupils of Radio-equipped rural schools are developing a broadness and an insight to the world outside. Automatically, also, these rural schools become community centers for the grown-ups who foregather to hear the evening musical concerts from WHAS, including

three-minute talks by leading citizens of Louisville, who give concentrated suggestions on health, success, happiness and other phases of human philosophy. Many hundreds of citizens have (Continued on Page 6)

AT THIS SPOT  
JULY 21, 1923  
WAS HEARD  
FOR THE FIRST TIME IN  
MAMMOTH CAVE A VOICE  
BY RADIO TRANSMISSION  
BROADCAST FROM  
**WHAS**  
The Courier-Journal  
AND  
THE LOUISVILLE TIMES  
LOUISVILLE



Upper photo is of Pete Johnson, who handles the 'milko' when special sporting events such as the Kentucky Derby are to be broadcast. Left, the man who is seldom heard on the air but the one who keeps things humming, J. Emmett Graft, chief engineer.



# NEW YORKERS TELL OF CITY'S VIRTUES

## USE RADIO TO INFORM ALL OF GOTHAM FEATURES

Series of Talks Over WMCA to Start with Account of Vacation Lures; More Each Week

NEW YORK—Leading business men here are going to take their city all over the United States by means of weekly talks from the McAlpin hotel Station WMCA. Each speaker will be a specialist in his line and will endeavor to give the listeners in distant points a clear idea of some particular phase of Manhattan life. This series is known as the Broadway Association series and will be given every Friday night at 8:15. Tune in on WMCA if you want the real facts about our largest city.

Frank E. Campbell, the first New Yorker to expound the glories of his city in this series, will talk on "Where New Yorkers Recreate" on August 21. Mr. Campbell says:

### About New York Speed

"New York is without question the world's greatest winter and summer resort. Americans are growing to learn more and more how to systematize their time very much like the European nations who make their recreational periods part of their life and profit by it.

"New York has a distinct reputation for speed," he continues. "Many believe that when a real New Yorker becomes tired of walking—he runs. This is literally true. New York has speed, lots of it, yet when the day is done, New York above all other cities in the world, loves its enjoyment, believes in relaxation, theaters, to refreshen its brain cells every time the opportunity affords.

"New York does not hesitate to subscribe only money for music," Mr. Campbell explains, "but extends its recreational period to marble tournaments for the boys and girls, from which a state champion is crowned each season. The city also supports a Harmonica league that almost assumes the proportions of a symphony organization, now in its third year of development. Public showers from the city hydrants are provided for young America in the congested district on the east side where no end of pleasure results from this on a hot summer's day.

### Seats for a Million

"It has come to pass in New York that one can select his own amusement, whatever it may be, and when you are in the midst of it, might wonder to yourself if anyone has been left at home to do the chores of the day. And yet, Broadway has its never ending throngs. New York in itself is a perpetual resort and inspiration. It is said that the theaters can supply seats all at one time for one million people seeking entertainment.

## "BLUE GRASS" STATION

(Continued from page 5)

already so served. Sunday morning services are conducted right in the studio. Thus a service adapted to Radio, without echoes and reverberations of the church auditorium, is broadcast. Seven Louisville divines take charge of services in weekly turns. Presbyterian, Christian, Episcopal, Methodist, Baptist and Jewish services are supplied.

Even more denominations are being accommodated on Sunday afternoons during the vespers service.

Always the service, regardless of its denomination, is builded chiefly for shut-ins and people in the roadless and churchless hills. Certificates of membership in the WHAS congregation are supplied to regular Sunday listeners who cannot, for some reason attend a church. These certificates, when applied for, give the applicant's name, location and preferred denomination. Duplicate cards bearing this information are then supplied to the ministers of the named denominations so that a visit can be made to the applicant, in case he or she desires. The tie-up is all that can be desired. Many tragic and tear-bringing stories have been brought back to the Radio congregation by the ministers making these visitations.

Of course, capable as he is, Mr. Harris could not carry on his good work without assistants. He is extremely fortunate in having a staff of very able young people to aid him. Dwight H. Ives is senior announcer and it is up to this young man to keep the programs going out on the air without delay. WHAS, at the time of their third birthday party, made a standing offer of a specially arranged Foster Old Kentucky Home song book to any fan who catches their station silent for as long as a full week during an evening program. This, of course, includes delays due to natural elements or mechanical difficulties.

However, the mechanical difficulties will not give the station much bother with J. Bennett Craft, the chief engineer, on the job. Mr. Craft is assisted in his im-

portant work by Fred G. Harlow. These two gentlemen keep WHAS going out on the 399.8 wave length. When WHAS covers some big sporting event, as they often do, Pete Johnson presides at the microphone.

Three young ladies have much to do with the smooth running of things in and around the studio. Miss Eleanor Huber is the Radio editor, Miss Dorothy Kirch-Tubel is the station secretary, and Miss Catherine Steele is head of the stenographic force.

On the regular week night concert programs the music of a reconstructed South predominates—the melodies we all love so well. Only the very best in music and musicians is broadcast to WHAS listeners.

All in all, WHAS has served for three years—going on four—and has a record of achievement that few more spectacular stations can begin to equal.

Incidentally, WHAS is one of the very few stations that actually gives a personal reply to every card and letter received from listeners. To do this entails a great amount of work—six stenographers are engaged in this work alone—but

## WWJ Hook-up with WEAF Brings Roxy to Detroiters

DETROIT.—In order to give the crystal and small set owners in Detroit the benefit of New York concerts, WWJ, the Detroit News station, has been linked up with WEAF five nights a week. On Sunday they have "Roxy and his Gang" and the Goldman band concert. Monday night is the Goldman band concert. Tuesday night gives the Gold Dust Twins, Eveready hour and WEAF grand opera. Wednesday night consists of local talent of Detroit. Thursday gives the Atwater-Kent artists and Silvertown Cord orchestra. To finish the perfect week, Friday night consists of another Goldman band concert.

no listener is disappointed in the true southern hospitality and courtesy of the Courier-Journal broadcaster.

And now, as a close to this tribute, let us sign off, as WHAS always signs on and off on its chimes, with the chorus of, "My Old Kentucky Home."

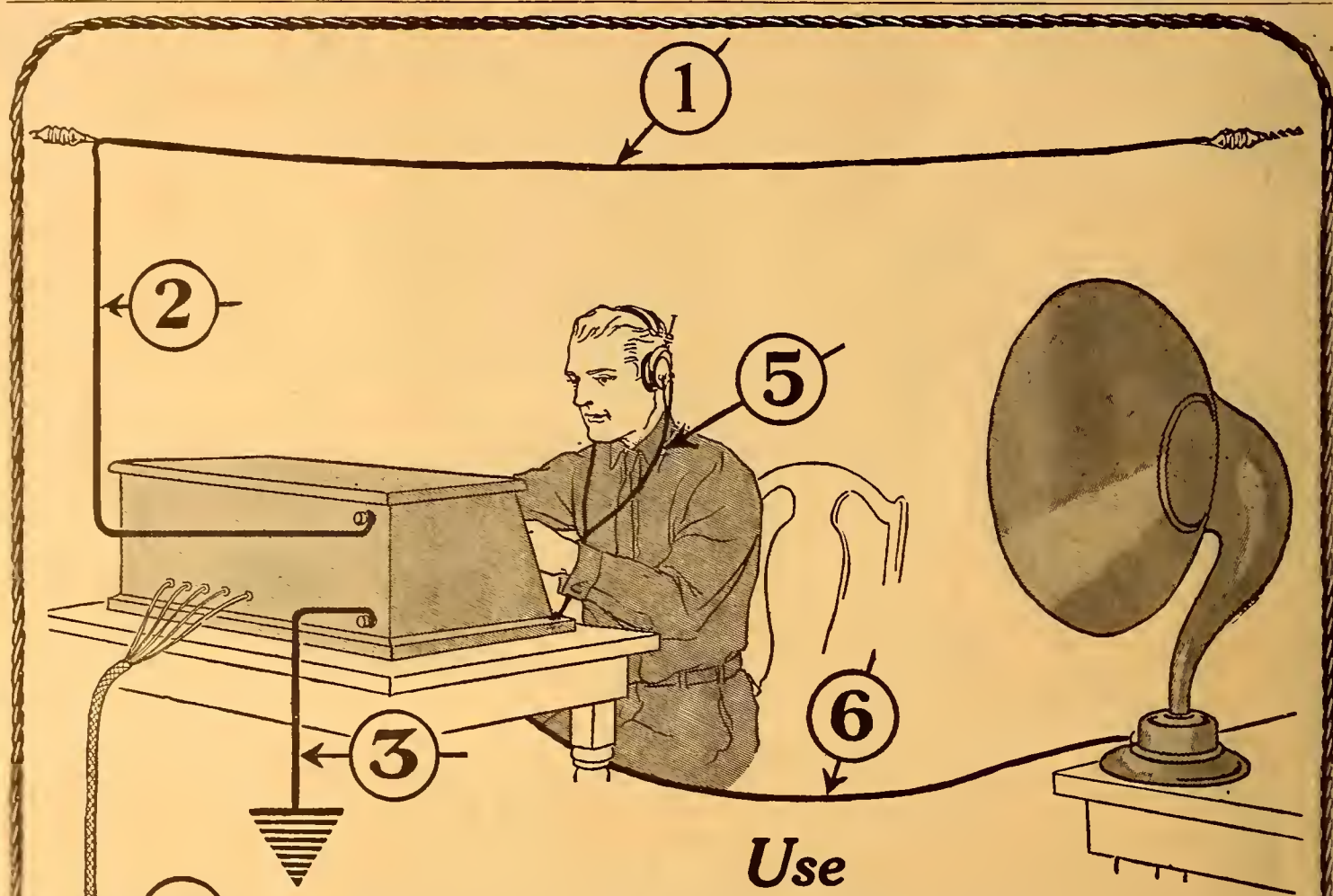
## Graustarkian Country Bans Receiving Sets

### Andorra Puts Radio on Taboo List With Newspapers

TOULOUSE.—The tiny republic of Andorra, hidden away in the Pyrenean hills between France and Spain, will have nothing to do with Radio. The council of state, composed of twenty-four elected members, which, since the days of Charlemagne has constituted the government of the microscopic republic, has decisively turned down the request of a Spanish summer visitor at the Spa of Las Escaldes to use his Radio receiving set.

No reason is ascribed for the action beyond the surprising one that, "No newspapers and no Radio sets can be allowed in Andorra."

The Czechoslovakian government has awarded a contract to an American firm for supplying the equipment for a new broadcasting station to be erected.



# Use Belden Radio Accessories

YOUR complete radio receiver is more than a cabinet containing coils, dials and tubes. It includes the aerial, ground wire, battery cord, loudspeaker cord, and other important elements.

Every radio fan knows that Belden Radio Accessories insure maximum efficiency and range, because each item is made especially for one particular job, and it does that job well.

For instance, the Beldenamel Aerial and Lead-In (Nos. 1 and 2) is the famous enameled copper aerial endorsed by leading radio authorities as the finest receiving aerial obtainable. The special Belden Ground Wire (No. 3) and Battery Cord (No. 4) make a neat, safe installation for every home.

Be sure to specify Belden Radio Accessories when you buy or build a receiving set. It pays!

Mail the Coupon for "Helpful Hints"

A Handy Booklet for Everyone.

Belden Manufacturing Co. 2310A S. Western Ave., Chicago Please send me your booklet entitled "Helpful Hints for Radio Fans." Name..... Address.....

# Belden

# GRIZZLIES, BOB-CATS, ARE NOT DANGEROUS

## IF YOU LISTEN TO ADVICE ABOUT THEM ON RADIO

### Western Tourists Hear Broadcast Instructions on How to Approach Wild Animals

DENVER.—“Wild animals—grizzlies and bob-cats included—are not dangerous. They are merely curious! Therefore, when courting these wild folk, let them make the advances, and if you are friendly, these advances will be rapid. Instead of going into the open, heavily armed and fearful of attack, take along your camera and some food—peanuts, salt, candy and bacon—because food, to an animal, is the medium of exchange.”

Thus, Joe Mills, owner of a leading mountain resort in Colorado, recently told KOA's tourist and camper listeners how to deal with big game—thereby establishing a new summer use for Radio.

More than 100 tourists congregated before a single loud speaker in Yellowstone National park during the unusual animal discussion, according to a recent communication to the Rocky Mountain broadcasting station of the General Electric company. From an Oregon summer resort comes word that 185 tourists likewise listened to the same program offering.

### No Excuse for Gun

“Because we have come to regard all wild animals with ignorant suspicion, we have been led to shoot to kill,” declared Mr. Mills in a recent interview. “We could as well shoot our neighbors as dangerous characters.”

“Wild animals have been gossiped about ruthlessly,” he charged, “when in reality, they are good neighbors, friendly and extremely curious. There is no excuse to carry a gun into the wilds. There are 1,000 persons injured by guns and not one by wild animals.”

“In twenty-five years I have investigated 100 reports of animals attacking people,” he continued. “In not a single case have I found truth in these stories. If for instance, a Wyoming school teacher catches a distant glimpse of a lobo wolf, the story is broadcast far and wide. After it has been retold a few times, the poor teacher has been maimed for life or is still barricaded in the school house praying fervently for help.”

### Wild Sheep Friendly

Mountain sheep, he pointed out, are the easiest of all western game to approach especially if one is successful in exciting curiosity in the animal.

“Wild sheep have such exceptional eyesight that it is folly to attempt taking them by surprise. If you will stick to the open, go slowly and perform a few unfamiliar stunts, you will soon have an interesting audience crowding forward for an unobstructed view of your entertainment.”

Mills' talk was one of a series for nature lovers which are being broadcast by KOA in cooperation with the Colorado Mountain club. These discussions are the opening event of Denver's Monday, Wednesday and Friday evening studio programs.

## Texas City Gets New Broadcasting Plant

### Rebuild WRR Station for Early Fall Use

Radio Station WRR, municipally owned, first in the state of Texas, and second in the United States, will go on the air again on or about October 11.

The funds for purchasing the equipment have been collected and the set ordered. The set is of 500 watts capacity and will be located in the new municipal auditorium, Fair park, where it can be viewed by thousands of people visiting Dallas during the fair beginning October 13 and ending October 20. The city has under way a one hundred thousand dollar pipe organ which will be operated from the auditorium and broadcast as daily features.

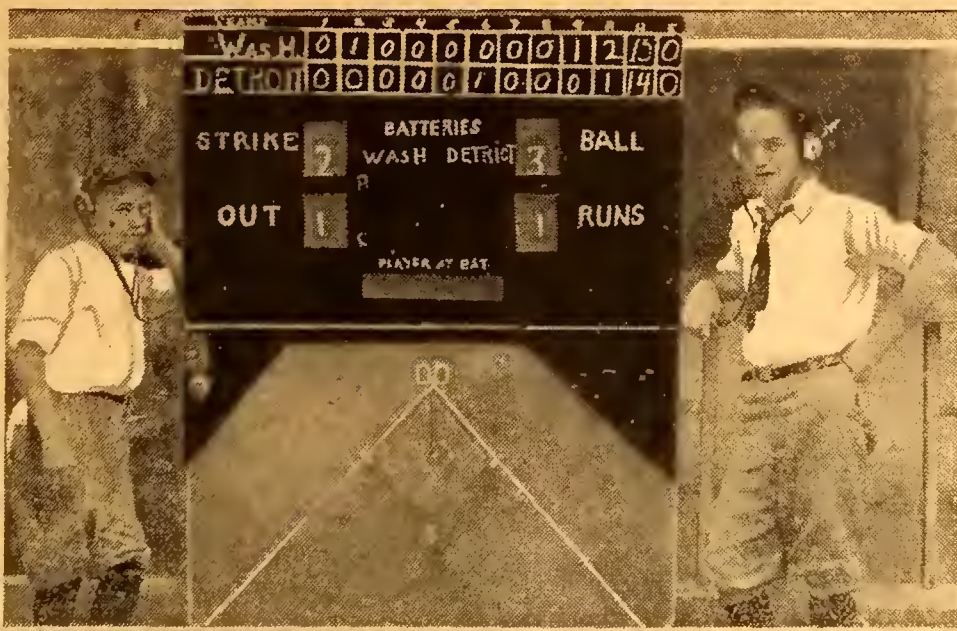
A studio will be located in the new Baker hotel, a new enterprise of Dallas, and will be opened on October 12. The Baker has contracted for one of the finest orchestras in the country and will feature majestic talent during the season.

Any suggestions for a slogan for WRR made by fans will be highly appreciated, says Mr. W. J. Reid, the supervisor.

### Jugoslavia Erects Plant

WASHINGTON.—The government of Jugoslavia is having a broadcasting station erected near Zagreb. For the present, according to reports received here, the station is to be used solely for the State but it is hoped that later it will be released for general use.

## YOU CAN'T BEAT KIDS FOR IDEAS



When the baseball fan age is reached the older people have to step to keep up with the boys. Eddie Nelson and Jack Horner, of Washington, made this electric scoreboard to record the Radio accounts of games. P. and A. Photo.

## RADIO'S POPULARITY INCREASES ON FARM

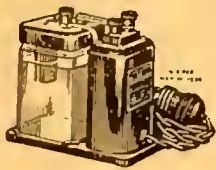
### INDIANA SURVEY SHOWS ONE SET TO TEN FARMS

### Purdue University Man Makes Careful Study: Ohio Ratio Is Higher by One Survey

INDIANAPOLIS.—A recent Radio survey made on Indiana farms through the office of Walter Q. Fitch, state leader of farmers' institutes of Purdue university, disclosed the fact that the Hoosier state can now show one Radio to every ten farms, and that this latter figure is gradually becoming smaller. The figure is based upon replies received from 51 county agricultural agents, fifteen farm bureau presidents, and thirty-three others, principally vocational agricultural teachers. According to the data submitted by the county agents, there are some 18,000 Radio sets, working on Indiana farms. The farm bureau presidents estimate the number at about 20,000, while the figure set by the vocational teachers was the most liberal of all, being about 26,000.

A report from an Ohio agricultural college disclosed the fact that there is about one Radio to every eight farms in the Buckeye state. This report was based upon replies from 3,500 questionnaires.

# Announcing the Balkite Trickle Charger at \$10 and the new Balkite "B" at \$35



### Balkite Trickle Charger

Charges both 4 and 6 volt radio "A" batteries at about 5 amperes. May be used in 3 ways: (1) With a low capacity storage battery for sets now using dry cells. (2) With sets of few storage battery tubes. (3) As a "trickle" or continuous charger for sets of as many as 8 storage battery tubes. Size 5 1/2 in. long, 2 1/4 in. wide, 5 in. high. May be put in usual dry battery compartment. Operates from 110-120 AC 60 cycle current.

Low capacity batteries especially adapted for use with this charger with dry cell sets are being offered by practically all leading battery manufacturers this fall.

Price \$10

West of Rockies, \$10.50 Slightly higher in Canada



### Balkite Battery Charger

The most popular battery charger on the market. It can be used while the radio set is in operation. Charging rate 2.5 amperes. Operates from 110-120 AC 60 cycle current. Special model for 50 cycles.

Price \$19.50

West of Rockies, \$20 Slightly higher in Canada

The Balkite Battery Charger is today the most popular charger on the market. It is the only charger commonly used while the set is in operation. Balkite "B" II is also well known. It replaces "B" batteries entirely and supplies plate current from the light socket.

We now announce the Balkite Trickle Charger at \$10. This low-rate charger is especially adapted to use with sets of relatively low "A" current requirements—any dry cell set and storage battery sets with few tubes. Owners of dry cell sets can now make a very compact and economical installation with a Balkite Trickle Charger and a low capacity storage battery of the type offered by battery manufacturers this fall.

We also announce the new Balkite "B" at \$35. This new model will serve sets of five tubes and less. It fits in your present "B" battery compartment.

### Noiseless—No bulbs—Permanent

All Balkite Radio Power Units are entirely noiseless in operation. They have no moving parts, no bulbs, and nothing to adjust, break or get out of order. Each is a permanent piece of equipment with nothing to replace. They require no other attention than the infrequent addition of water. They require no changes or additions to your set.

Manufactured by  
FANSTEEL PRODUCTS COMPANY, Inc.  
North Chicago, Illinois

# FANSTEEL Balkite Radio Power Units



### Balkite "B"

Eliminates "B" batteries. Supplies plate current from the light socket. Operates with either storage battery or dry cell tubes. Keeps "B" circuit always operating at maximum efficiency. Requires no attention other than adding water about once a year.

Will serve any set of 5 tubes or less. Occupies about same space as 45 volt dry "B" battery. Operates from 110-120 AC 60 cycle current.

Price \$35

Slightly higher in Canada



### Balkite "B" II

Same as the new Balkite "B" but will fit any set including those of 10 tubes or more. Operates from 110-120 AC 60 cycle current. Special model for 50 cycles.

Price \$55

Slightly higher in Canada

The Gould Unipower is equipped with a special Balkite Radio Power Unit

BALKITE BATTERY CHARGER • BALKITE TRICKLE CHARGER • BALKITE "B" • BALKITE "B" II

ALL BALKITE RADIO POWER UNITS ARE TESTED AND LISTED AS STANDARD BY THE UNDERWRITERS LABORATORIES





# KOA PLAYERS GIVE GAY COMEDIES

## Sunday, August 16

(Continued from page 8)

### Pacific Standard Time Stations

**KFWB**, Hollywood, Calif. (252), 9-11 p. m., late spot news and Warner Brothers' movie feature.

**KGO**, Oakland, Calif. (361.2), 11 a. m., Calvary Presbyterian church; 3:30 p. m., KGO Little Symphony orchestra; 7:30, Calvary Presbyterian church.

**KGW**, Portland, Ore. (491.5), 7:55-9 p. m., First Church of Christ Scientist.

**KHJ**, Los Angeles, Calif. (405.2), 8-6:30 p. m., Leigh-ton's Arcade cafeteria orchestra, Jack Cronshaw leader; 6:30-7, Art Hickman's Biltmore hotel concert orchestra, Edward Fitzpatrick, director; 7-7:30, organ recital, Arthur Blakely; 8-10:30, program, Martin Music company, arranged by J. Howard Johnson, Ruth Pitts, soprano, John Martin, pianist.

**KNX**, Hollywood, Calif. (336.9), 7-8 p. m., First Presbyterian Church of Hollywood, Stewart P. MacLennan, pastor; 8-9, Ambassador hotel concert orchestra, Josef Rosenfeld, director; 9-10:30, program, Beverly Hills Nurseries, Lubovskil concert trio.

**KPO**, San Francisco, Calif. (428.3), 6 p. m., Waldemar Lind and the States Restaurant orchestra; 6:35-7:30, concert, Palace hotel; 8:30-10, Rudy Selger's Fairmont hotel orchestra.

**KTCL**, Seattle, Wash. (305.9), 7:50-9:10 p. m., First Church of Christ; 9:10-10:10, Bible Students association.

## Monday, August 17

Monday, silent night for: **CKAC**, **CRRT**, **KFAE**, **KFDM**, **KFMQ**, **KGW**, **KHJ**, **KLDS**, **KYW**, **PWX**, **WBAV**, **WBBM**, **WBCN**, **WCAU**, **WDWF**, **WEAO**, **WEBH**, **WEBJ**, **WFI**, **WGN**, **WGBS**, **WGES**, **WHAS**, **WIBO**, **WIP**, **WJY**, **WKAQ**, **WLS**, **WMAQ**, **WMBB**, **WOC**, **WOAI**, **WQJ**, **WRC**, **WRO**.

### Atlantic or Eastern Daylight Saving Time Stations

**CHNC**, Toronto, Can. (356.7), 8:30 p. m., CHNC orchestra; Dwight Wilson, baritone.



Alice Guthrie Poyner, violinist, will be on the air from KGO Saturday, August 15. W. Irving Oppenheim is the director of the Benjamin Franklin hotel orchestra, which broadcasts from WIP every evening. An agricultural musician leads the Cornhuskers' orchestra at WLS. He is Rex A. Maupin, a graduate of the Kansas State Agricultural college and a Radio artist well known at WOAI and WBAP.



hour, Big Brother of KFWB; 7-7:15, Radio Dings Question and Answer period, conducted by K. G. Ormlston, technical editor; Van Sisters stringed trio, J. Stanley Fulbright, tenor; 8-9, program, Star Motor Company of California; Peggy Mathews, blues singer; Dan Gridley, tenor; Ron Wilson's dance orchestra; 9-10, Harold's Collegians, Corinne Cleveland, blues singer; Rosa Gavilo and Gertrude Thompson, piano duets; 10-11, Warner Brother's frolic.

**KGO**, Oakland, Calif. (361.2), 6-7 p. m., dinner concert, Sherman, Clay & company; 8, "New Praise for Soap and Water," Hugh Barrett Dobbs; "The Apprenticeship Problem," Senator Albert E. Boynton; "An Evening in Italy," Helene Phillips; chats about new books, Joseph Henry Jackson; "From a Composer's Workshop—Violin," Arthur S. Garbett; "Inside Done on Coring Automobiles," Louis P. Sinner; Arlino trio.

**KGW**, Portland, Ore. (491.5), 6-7 p. m., Claude Johnson and his Baker theater orchestra.

**KNX**, Hollywood, Calif. (336.9), 5:30-6:15 p. m., Wur-tlizer pipe organ studio; 6:15, travel talk, W. F. Alder; 6:30-7, Atwater-Kent Radio orchestra, Paul Finstein, leader; 7-7:30, Mutual Motors mirth program; 7:30-8, program, Columbia Outfitting company; 8-9, program, L. W. Steckler company; 9-10, program, Globe Ice Cream company; 10-11, Goodrich Silvertown Cord dance orchestra; 11-12, Abo Lyman's Coconut Grete dance orchestra.

**KPO**, San Francisco, Calif. (428.3), 7-7:30 p. m., Rudy Selger's Fairmont hotel orchestra; 8-9, program, Wur-tlizer company; 9-10, Pacific trio; 10-11, Waldemar Lind and the States Restaurant orchestra.

**KTCL**, Seattle, Wash. (305.9), 9-10 p. m., National Machine Sales company.



**WIP**, Philadelphia, Pa. (508.2), 3:30 p. m., Comfort's philharmonic orchestra; 6:05, Benjamin Franklin concert orchestra; 7, Uncle Wip's bedtime stories.

**WJAR**, Providence, R. I. (305.9), 7:45 p. m., Berry Spring dance hour.

**WJZ**, New York, N. Y. (454.3), 4:30-5:30 p. m., Fred Hall's Royal Terrace orchestra; 7:25-8:30, program, Landay Hall; 10-10:30, Jon Weber, cellist; 10:45-11:45, Jacques Green and his Club Beauville orchestra.

**WLIT**, Philadelphia, Pa. (394.5), 1:30 p. m., Marcela North, pianist; 7:30, Dream Daddy's bedtime stories; talk, Short Ago-Wares, Charles E. Shoffner; 9, Stanley theater hour of music; 10, Arcadio cafe dance orchestra.

**WMCA**, New York, N. Y. (340.7), 9:30-7:30 p. m., Ernie Gohben and his Hotel McAlpin orchestra; 7:30-8, songs, Coakley Sisters; 8:0, before, Church of Christ Scientist; 9:15-9:30, Fred A. Sommens, baritone; 9:45-10, Fred A. Sommens.

**WOO**, Philadelphia, Pa. (508.2), 4:45 p. m., organ recital, Mary E. Vort; 7:30, A. Candelori's orchestra; 8, special musical program; 8:45, Goldman Band concert; 10:15, Giuseppe di Benedetto; 10:30, Hotel Bussert Marino Roof orchestra; 11, A. Candelori's Roof Garden dance orchestra.

**WOR**, Newark, N. J. (405.2), 6:15-7:15 p. m., Ernie Krefkett's orchestra; 7:17-7:30, sports talk, Bill Wathey; 9-10, "Al Red's hour."

**WASA**, Cincinnati, Ohio (326), 10 p. m., Margaret Moran, contralto; Cello Kaufman, violinist; Ruth Don-nerberg, cellist; Herbert Schotz, baritone.

**WTAM**, Cleveland, Ohio (389.4), 6-7 p. m., Golden Phasant studio orchestra; 8-9, Willard symphony, Walter Logan, director; 9-10, artists program; 10-11, symphony program; 11-12, Frank R. Wilson's Euclid High Park orchestra.

**WTAS**, Elgin, Ill. (302.8), Purple Grackle orchestra; Heride Mintz, Tommy Dunham, Tommy Garon, Maurice Marselles, Art Siller, Roger Welberg.

**WTIC**, Hartford, Conn. (348.6), 6 p. m., Knoll Helm-burger's Hotel Band trio.

**WVJ**, Detroit, Mich. (352.7), 6 p. m., dinner concert; 7:20, Goldman band concert.

**WIP**, Philadelphia, Pa. (508.2), 3:30 p. m., Comfort's philharmonic orchestra; 6:05, Benjamin Franklin concert orchestra; 7, Uncle Wip's bedtime stories.

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**WTIC**, Hartford, Conn. (348.6), 6 p. m., Knoll Helm-burger's Hotel Band trio.

**WVJ**, Detroit, Mich. (352.7), 6 p. m., dinner concert; 7:20, Goldman band concert.

## Tuesday, August 18

Tuesday, silent night for: **CHNC**, **CRRT**, **KFAE**, **KFDM**, **KFMQ**, **KGW**, **KHJ**, **KLDS**, **KYW**, **PWX**, **WBAV**, **WBBM**, **WBCN**, **WCAU**, **WDWF**, **WEAO**, **WEBH**, **WEBJ**, **WFI**, **WGN**, **WGBS**, **WGES**, **WHAS**, **WIBO**, **WIP**, **WJY**, **WKAQ**, **WLS**, **WMAQ**, **WMBB**, **WOC**, **WOAI**, **WQJ**, **WRC**, **WRO**.

### Atlantic or Eastern Daylight Saving Time Stations

**WIP**, Philadelphia, Pa. (508.2), 3:30 p. m., Comfort's philharmonic orchestra; 6:05, Benjamin Franklin concert orchestra; 7, Uncle Wip's bedtime stories.

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**WTIC**, Hartford, Conn. (348.6), 6 p. m., Knoll Helm-burger's Hotel Band trio.

**WVJ**, Detroit, Mich. (352.7), 6 p. m., dinner concert; 7:20, Goldman band concert.

### Pacific Standard Time Stations

**KFOA**, Seattle, Wash. (454.3), 6-6:45 p. m., Pacific States Electric company; 8:15-8:45, Sherman, Clay and company; 8:30-10, Times studio program.

**KFWB**, Hollywood, Calif. (252), 6-7 p. m., children's

(Continued on page 10)













An Evening at Home with the Listener In

(FOR CENTRAL TIME)

(Tabular form and listings copyrighted. Reproduction is forbidden.)

(FOR PACIFIC TIME)

Main schedule table with columns for Call, Saturday, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Call, Location, Met., Saturday, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Call. Includes call letters like AT9, CFCA, CHNC, CJKC, etc.



# Radio Digest Illustrated

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Vol. XIV Saturday, August 15, 1925 No. 6

## Room For Good Critics

ART, music and the drama have long been reviewed in the daily press by journalists trained especially as critics. The good accomplished by constructive criticism in these three arts is well recognized. The public has come to depend upon the views of their favorite critics to guide them in their search for beauty and entertainment. Those writing these special articles are listed among the highest paid workers in the newspaper business.

But until recently Radio has been without regular press critics. Of late there have sprung up from the reporters' ranks certain fans who have penned a few notes about current broadcast programs to fill up space between the advertisements on the Radio pages. These stories for the most part have been haphazard mixtures of praise, criticism and "razzing." Very few of the so-called critics have taken either the Radio or themselves seriously. In a few cases certain newspapers have made room for regular departments of Radio reviews and have assigned writers to this task alone. Unfortunately in nearly every case the newspaper inaugurating the service has been owner or lessee of a local station and the critic automatically became a glorified press agent for the station.

There is room in the newspaper field for several real broadcast critics. To qualify as such the writer must have a good knowledge of broadcasting methods, he must at least know how to get the most out of a good receiving set, he must understand how to distinguish between the good and the bad in music of all kinds, and now with the drama playing an important part in broadcast entertainment, he must know a great deal about that form of entertainment.

## Bryan and the Radio

FROM the time of the famous "Cross of Gold" speech down to the opening of the Scopes trial many people had heard William Jennings Bryan speak. However, the use of the Radio during the evolution hearing in Tennessee brought the voice of the silver-tongued orator to hundreds of thousands more people who would never have had the opportunity to listen to him if it were not for this medium. When the news of the Commoner's death was broadcast across the country from many stations and was blazed on the front pages of every newspaper, many Radio fans felt that they had lost a new friend. With the trial taking place in the summer with all the children home from school, many of them were enabled to listen in on the broadcasting and hear the voice of the man they are to read about in history. Bryan represents an important period in American history. High school history teachers will find more interest displayed by the children who heard him over WGN when they come to teaching this period in all classes for years to come.

WGN deserves much credit for their work in putting this phase of history on the air. Quin Ryan, announcer, and Paul Neal, engineer, of that station should be proud to have suffered the unpleasant heat of summertime Tennessee to make this work possible.

## How England Does It

THE reason for the growth of public good will towards the British Broadcasting company in Great Britain is perhaps best explained by a glance at the financial report of that corporation recently made public. After paying all expenses and deducting a 7½ per cent dividend, the company had a surplus of \$395,000. They immediately spend this, and more too—\$295,000 going for extension and improvements and \$250,000 being required to complete the construction of the new 5XX and to complete paying for the new 2LO. This has again placed them on the red side of the ledger, but they expect by continuing the good programs to have enough new listeners paying taxes to more than balance this.

That the English company is endeavoring to give those who pay the government tax to own receiving sets their money's worth is evidenced by the report of their expenditures. As is well and fitting, the biggest item on the debit side was for programs, 85.37 per cent of all outgoing money being for this item. Other expenditures were listed as 6.38 per cent for administration and 8.25 per cent for depreciation.

## RADIO INDI-GEST

### Mizz Partington Speaks Out

Dear Indi: Mizz Partington says she's been migratin' and emigratin' around for past few months without no portable set, so far for amusement has been forced



to depend on newspapers and gossip such as reports from the Monkey Show at the Dayton Asylum, but adds that she has reformed permanent, and is now building a 8-tube super which is an evolution of 5 tubes in 3 years, and says, she knowed that if she didn't have a Radio pretty soon, she would sure be evolving back into a monkey again, like they done in Tennessee. She suggests that the "Home Missionaries" should ought to donate a lot of sets over these so them people would come down out of their trees to listen in awhile and sort of ketch up with the other part of the world. SIGNING OFF.

### Talk About Nerve!

An enthusiastic listener to the Goldman band concerts broadcast from WEAF and a chain of stations has cited the "Hallelujah Chorus" from Handel's "Messiah," which was played recently by the band, as the plainest case of plagiarism he had ever heard. "Why it's a direct steal from 'Yes, We Have No Bananas,'" he protested.

### And the Expert Laughed

It must be embarrassing after having called an electrician to shoot the trouble in your set to have him reach up on the mantle above the outfit and find the five tubes you neglected to replace in their sockets after you cleaned the contacts. An acquaintance of ours recently pulled this bright one and then kicked when the man sent him a bill, itemized like this: "To correcting absent mindedness trouble—\$5.00."

I bought me a Radio up the street—  
Costly but oh so fair—  
I placed it in the parlor  
And tried to tune it there.

I twirled the dials way up high  
And then I tuned them low;  
I twisted them left and right,  
But the speaker wouldn't go.

I called an expert in to see  
If I had been a Rube,  
He took one look and then said,  
"You forgot to insert the tube."

### Another Fall in Tubes!

"I'm sorry, sir," stammered the errand boy, "but tubes are down again."  
"Eh! What do you mean?" shouted the Radio dealer.  
"Only this, sir," gasped the lad. "I've just d-dropped another b-boxful."  
LONDON BOBBY.

### Back to Eden

Dear Indi: "About two years ago," a lady wrote to me, "I erected a scaffold pole in my garden to serve as an aerial mast. Three months ago it sprouted, and I recognized the leaves as those of an apple tree. This month the mast has borne fruit. What will happen to my Radio set?"  
"Unless it receives very careful attention," I warned her, "it will get the pip."  
ADAM SAPPLE.

"In the Shade of the Old Apple Tree" and "Sweet Cider Time" probably came over without interference on her set.

### Sneezing Is Static

Dear Indi: Suggest that stations in the Ragweed belt post the following notice on the bulletin board during the hay fever season, which opens on August 15.  
"Artists suffering from hay fever will please do their sneezing and sniffing before approaching the open microphone. Summer static has been blamed for too many studio faults as is."  
GOLDEN ROD.

Go ahead with your hay fever jokes old dear, we don't mind them at all any more since we have been immunizing ourselves with the tobacco belonging to the gentleman at the adjacent desk? It smells like sweet clover and tastes like a stockyards zephyr.

Evidently the muskies are biting good in the lakes of Northern Wisconsin because the Third Trombone Player seems to be on an extended vacation in those parts. In the meantime the Milwaukee Daily Beverage is like unto its namesake—hard to get.

Radio Station NSF is located near Amsterdam, Holland, according to a news letter from Fred Smith, America's First Radio Ambassador. Judging from the checks that Uncle Sam has been getting back from the banks that handle the French funds for repayment of war debts we are of the opinion that the Dutch government ought to donate the NSF call letters to the boys in no-pay Poree.

### Or "Where the Orioles Sing!"

Dear Indi: Now that BWS has left WOC where he used to pull that "Out Where the Tall Corn Grows" phrase and is planning on announcing from a Baltimore station, do you suppose we can expect to hear something like this on the air—"Baltimore, On Chesapeake Bay Where the Oysters Bark?"  
CAP.

## News Review of the Week



## Condensed

BY DIELECTRIC

Possibly the only attraction to a summer broadcast feature is that which takes one's mind from the discomfort of heat. There are a few things to be heard over the ether ways capable of transporting you to a cool open air cafe, park concerts, etc., and one such program came through WEEL, Boston. Of course the music heard was of the popular character, but well played by the Nautical Garden orchestra. Simply thinking of a "garden" is an aid to forgetting humidity to some degree.

WLW, Cincinnati, is the station from which the Formica orchestra broadcasts. This surely deserves to be classed among the better stations, both for programs presented and the transmission itself. I have both praise and blame for the Formica orchestra. The manner in which they rendered Victor Herbert's charming music from the Red Mill is most commendable; on the other hand, their insistence on changing perfectly innocent melodies into corrupted jazzettes is hardly to be wished for. Let jazz be bold and unafraid—not sneaking by on the strength of good music.

Programs of the continuity variety have their appeal—to how many we cannot state—as do those of a detached nature. The latter were first on the boards and bid fair to remain there in spite of any assault. It has always been true of WEBH, Chicago, that a thoroughly mixed program interests large Radio audiences. They know from letters received. The prosaic becomes tiresome in any medium and WEBH realizes that. There is always a guarantee of entertainment from this station. Tunc in.

Then there is the reliable United States Marine band, which may be tuned in from WRC, Washington, or one or two other stations in addition, if nearer. As previously remarked, this is a distinct institution with a reputation envied by many less capable organizations and has a wide hearing every time "Mike" poses in front of the players. Their efficiency must be divided between the ability of each member of the band and the leader, for credit to one without due regard for the other would be unjust. Then, of course, it is a national institution, which attribute also has its appeal. To anyone never hearing them, I urge a Radio audition.

Prize fights have not held the ether to the extent they formerly enjoyed. Much discussion has followed their discontinuance as well as preceded it. Certain fans are annoyed by the absence of ringside accounts of important fights while many parents rejoice thereat. WAHG, Long Island, heeded the request of the former and put on the air a series of scraps recently, the feature of which was that between Shea and Goldberg for the bantamweight crown. Those at the ringside were uproaring most of the time.

With these rumors going around about next year's transatlantic broadcasting, or rather the rebroadcasting by American stations of foreign programs, some of us are expecting to listen to a variety of languages. We may be disappointed! They may all play jazz for our benefit. However, anything we send across the pond seems to arrive all right. The Prince of Wales is always flitting about from country to country and KDKA decided to nail him before he got away from South Africa. They had the Governor, General of Canada step up to their Mike and address the Prince as a gentle reminder of his ranch in the northern dominion.

# A. B. C. Course in Radio Fundamentals

## Chapter XXI—Characteristics of the Three Electrode Vacuum Tube

By David Penn Moreton

**I**N THE operation of the vacuum tube, in order to produce a current through the tube between the plate and the filament, it is necessary to establish and maintain a difference of potential between the plate and the heated filament, making the plate positive with respect to the filament. In order to meet these conditions a battery or generator must be

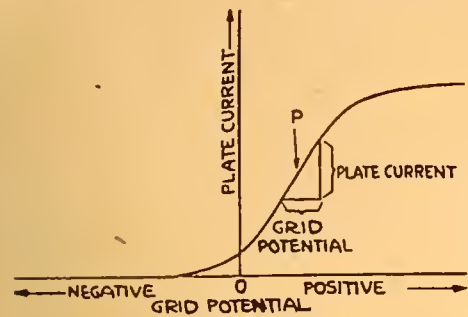


Figure 90

connected between the plate and the filament whose function is to furnish the energy required to accelerate the electrons emitted by the filament and attract them to the plate. If no battery or generator were used, the positive charge of the plate would very soon become neutralized by the electrons collected by it and then the electron flow would cease.

### Following an Electron

Let us now follow one of the electrons in its travel around the plate circuit, which will give an idea of the function of the battery or generator in maintaining the current in this circuit. When the electron is emitted by the heated filament, it escapes from the metal of the filament into the evacuated space of the tube where it is subject to the influence of the electrostatic field set up between the plate and the filament due to the potential of the plate. Under normal conditions the plate is positive and the electron is set in motion under the influence of the field of the plate, in a direction from the filament to the plate. As a result of the electron being set into motion, there is a distortion of its electrostatic field and a transformation of part of its electrostatic energy into electromagnetic energy. This transformation is made at the expense of the electrostatic field producing the motion, which in this particular case is the electrostatic field of the plate, so that some of the electrostatic energy of the field of the plate is actually transformed into electromagnetic energy and stored in the electromagnetic

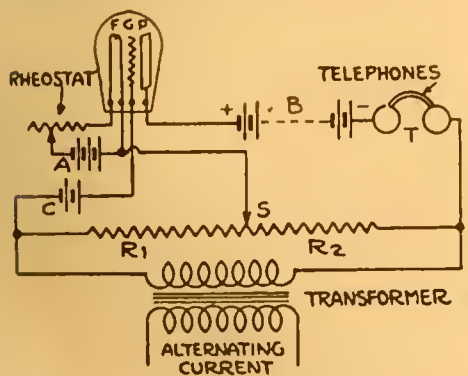


Figure 91

field of the electron. The velocity of the electron increases as it nears the plate and its energy is stored in its magnetic field in an increasing amount and, at the same time there is a corresponding decrease of its electrostatic energy.

When the electron collides with the plate, the energy stored in the magnetic field of the moving electron by the battery or generator connected between the plate and filament is surrendered to the plate of the tube as heat. The energy supplied by the battery or the generator serves the useful purpose of attracting the electrons to the plate so that they may deliver their negative charges and thereby produce a current in the external plate circuit, but the energy of the battery or generator which is represented by the motion of the electrons is permanently lost in heat produced at the plate by the collision of the electrons with the plate. There is thus an expenditure of energy on the part of the battery or the generator similar to that due to the ohmic resistance of a conductor, that is, of the nature of a frictional energy loss due to the collisions of the moving electrons with the atoms of the metal.

The energy lost in heat is directly proportional to the electromagnetic energy of the electron moving in the empty space of the tube. For the total electron cur-

rent, this loss is proportional to the square of the current; then the total energy  $W$  expended by the battery or generator, in a unit of time, in maintaining the plate current  $I$ , may be expressed by the following relation:

$$W = R \times I^2$$

In the above expression,  $R$  is a constant and, if the external resistance of the plate circuit be neglected, this constant is then the internal plate resistance of the vacuum tube.

When the plate is held at a fairly high potential with respect to the filament, the electrons attain high velocities and the plate becomes red or white hot in a few seconds after the tube is put into operation.

### Plate Resistance

The internal plate resistance of a three electrode vacuum tube may be defined as the ratio between a given change in plate voltage and the change in the value of the plate current resulting from the change in plate voltage. Representing a certain change in plate potential by  $dE_p$  and the corresponding change in plate current by  $dI_p$  then the internal plate

resistance  $R$  will be given by the following expression.

$$R = dE_p \div dI_p$$

The plate current may be changed by the same amount  $dI_p$  by changing the

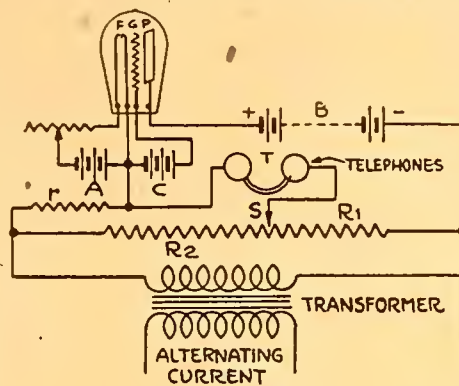


Figure 92

grid potential, keeping the filament temperature and plate potential constant. The amount the grid potential  $dE_g$  must

be changed to produce the same change in plate current as the change in plate potential  $dE_p$  produces, is equal to the change in plate potential  $dE_p$  divided by the voltage amplification factor of the tube which is represented by the letter  $k$ . Thus:

$$dE_g = dE_p \div k$$

or

$$dE_p = dE_g \times k$$

Substituting this value of  $dE_p$  in the above expression for  $R$  gives

$$R = (dE_g \times k) \div dI_p$$

which may be rewritten as follows:

$$R = k \times \frac{dE_g}{dI_p}$$

The expression  $dE_g \div dI_p$  is the reciprocal of the slope of the plate-current grid-voltage static characteristic of the vacuum tube, which may be explained as follows: The variation in plate current due to a variation in grid voltage with constant filament temperature and constant plate potential is shown in figure 90. Now the slope of this curve at any point may be determined by drawing a

(Continued on page 22)

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**D**AY-FAN is like a great railroad station into which run a hundred tracks.

The train from San Francisco comes in on track 17. Pittsburgh's train rolls in on track 17. A long distance express from Nebraska comes in on track 13. A big New York special comes in at 65.

These tracks belong to these trains. They always come in on them. You know where to meet them. So for a hundred other trains from all over the United States.

Yes, you have guessed it. The trains are the music, the speeches, the songs, that travel through space to your radio. The hundred tracks are the hundred lines on your Day-Fan dial.

Instead of rushing from track to track, know in advance where your train comes in. The Day-Fan Air Telephone Directory will tell you. And no other set can do this. You need never again miss the "music train" you had planned to meet and enjoy.

Day-Fan owners take distance for granted, just as they speak across

the continent by telephone. They take selectivity for granted, and as a matter of course expect to cut out one station and get another. The thing that they are never able to take for granted is Day-Fan's sound beauty, for in this radio sets differ as a fifteen dollar violin differs from a fifteen thousand dollar Stradivarius. Magnificent as Day-Fan is in volume, exact as it is in its arrow-like flight to the music you seek, marvelous as it may be in simplicity and sureness, its outstanding feature must always be its beauty of tone. The more sensitive your ear may be, the more you will enjoy Day-Fan. The more you have said, "I can never enjoy radio," the more surely you will enjoy Day-Fan. When some one told Ole Bull that he didn't like music, the master nodded and said, "Good. I will play to you."

Go hear a Day-Fan today and prove these things to yourself right away. If you do not know who is your nearest Day-Fan dealer drop us a line and we will tell you.

and what it brings to you



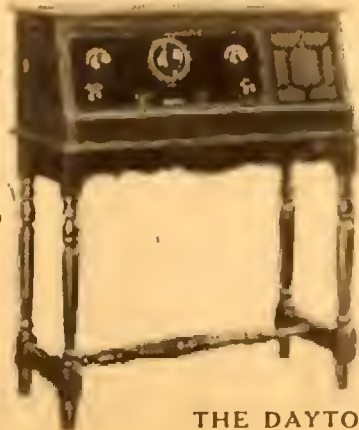
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# A Non-Radiating Tuned Radio Frequency Unit

## For Single Circuit Regenerative Receivers

By J. A. Thatcher

**R**EGENERATIVE circuits which are coupled to the aerial either directly or loosely cause interference to nearby receiving sets by heterodyning the various broadcast waves as the regenerative set is tuned. One cure is using a stage of neutralized radio frequency between the aerial and the regenerative set. Such a stage of radio frequency may be made as shown by the circuit diagram and photos.

cell and head phones. From 1" to 1 1/4" from the double turn coil wind the output coil of 10 turns.

The various parts should now be mounted on the standard 7"x9" panel. The tube socket may be mounted on a bracket attached to the panel or fastened to the baseboard. The condenser, rheostat and binding posts are mounted on the panel.

The 65 turn coil is mounted horizontally and the double turn coil is mounted verti-

These coils are fastened by means of small brackets to the baseboard.

The small neutralizing condenser is mounted on the baseboard unless it is of the rotary type in which case it is mounted on the panel. Use No. 14 round tinned bus bar wire for connections.

The output coil should be connected to the output binding posts. The rheostat is in the A negative lead and the 15 turn tap is connected to the rotor plates of the .0005 variable tuning condenser and to the

stator condenser plates and to grid.

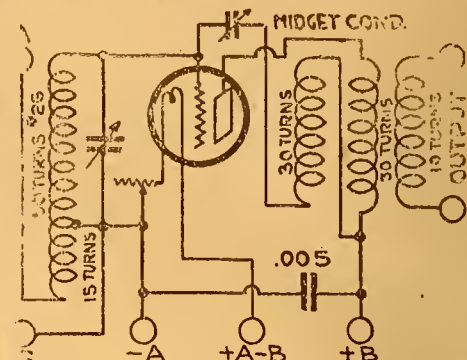
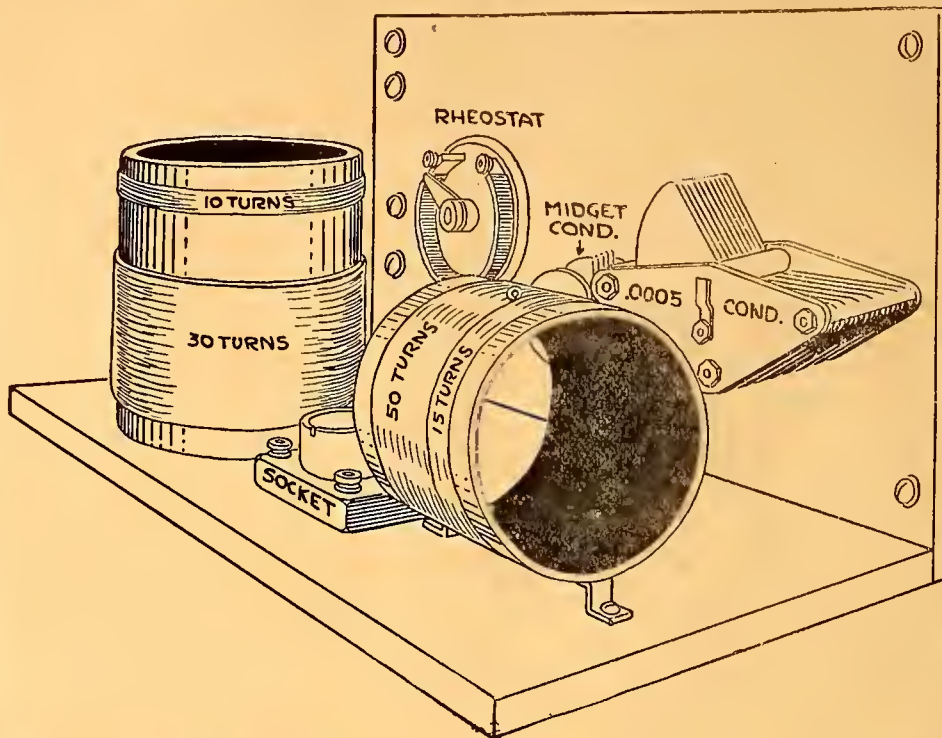
A .005 mfd. bypass condenser is connected from the B positive terminal to A negative terminal. In attaching the radio frequency unit to a receiving set, bring leads from A negative and A positive terminals on the receiving set to the corresponding terminals on the radio frequency unit. Augment the B battery of the receiving set until it totals 45 to 90 volts and bring this to the B positive connection on the radio frequency unit, leaving the B positive connection from the

LIST OF PARTS	
1 Variable condenser .0005 mfd.	\$ 5.00
1 Midget variable condenser .000010 mfd.	1.50
1 Rheostat 30 ohm	1.00
1 Socket	1.00
7 Binding posts	1.05
1 Panel 7"x12"	1.20
1 Piece of 3" tubing 2 3/4" long	.50
1 Piece of 3" tubing 4" long	.70
1 Fixed mica condenser .005 mfd.	.60
1 Spool 1/4-lb. No. 26 dsc. wire	.85
Miscellaneous, bus bar, screws, etc.	1.00
<b>Total cost</b>	<b>\$14.40</b>

### Construction

Use no. 26 dsc. wire for winding the coils. On the 3" tube 2 3/4" long wind 65 turns with a tap at the 15th turn, starting the winding 1/2" from the end. On the 3" tube 4" long, starting 1/2" from the end, wind 30 double turns by using two lengths of wire and winding both at the same time as a single wire. 30 turns of this double wire will make a coil of 60 turns with 4 ends and is really composed of two coils of 30 turns each tightly coupled together. The beginning of one coil is connected to the end of the other coil, forming the B positive connection, while the two remaining terminals go to the plate and balancing condenser. It does not make any difference which terminal is connected to plate or condenser. In order to check the double coil to determine the proper terminals, use a dry

cally, both the same distance from the panel, and as far apart as possible. It is also important that the 65 turn coil is centered on the 30 double turn coil.



receiving set at its original value on the B battery. Connect the output terminals to the aerial and ground connections of the receiving set and connect the aerial and ground to the proper binding posts on the radio frequency unit.

### Balancing

After these connections are made, light the tubes of the receiving set and radio frequency unit and turn the tuning condenser of the radio frequency unit to about 40. Increase the feedback of the receiving set until it oscillates and tune the receiving set for a signal by means of its tuning condenser. The signal will be the customary whistle, and then turn the tuning condenser of the radio frequency unit for maximum intensity. Vary the setting of the small balancing con-

(Continued on page 22)

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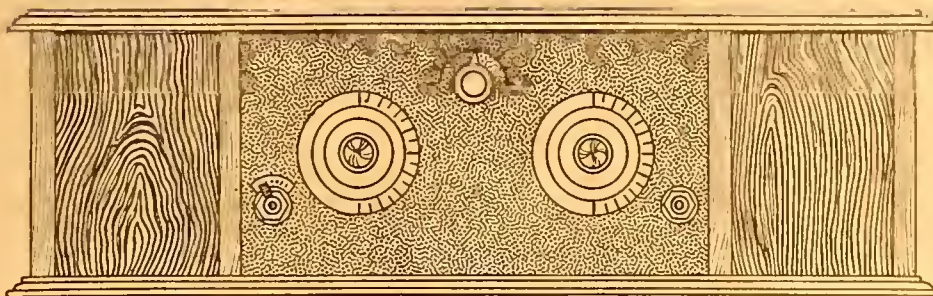
**Radio Digest Publishing Co.**  
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Chicago, Ill.

# A Balanced Bridge Tuned Impedance Receiver

## Set From Nicaragua Both Novel and Efficient

By R. N. Skeeters

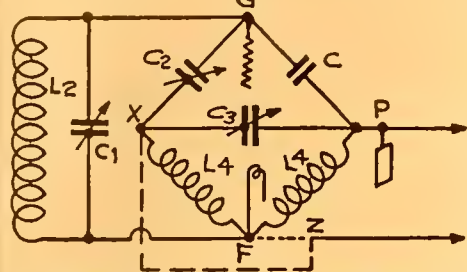
PERHAPS one of the first circuits used for radio frequency amplification was the tuned impedance hook-up. However, because of certain drawbacks which seemed impossible to overcome, it has not as yet become a popular circuit with the Radio public at large. The most important of its defects has been its tendency to oscillation and the consequent necessity of a tight antenna coupling, grid biasing or resistance in the tuned circuits to provide some degree of control over this oscillation. Also, because of the tendency to oscillation, it was not possible to tune the impedance circuit to



The front of this four tube set is symmetrical and attractive.

set selective and eliminate radiation; it must be possible to use the tubes available on the market; and, most important of all, it must be made so that the impedance circuit could be exactly tuned to the signal frequency.

These results have been admirably ac-



Bridge diagram of this set. Note that input is on two corners and output on remaining two. While negative B (point Z) actually connects to F, the output variations are in reality across X and P.

complished in an experimental set which the author has built. This model uses a neutralization condenser to control the tendency to oscillation and has an aperiodic antenna circuit loosely coupled to the secondary allowing any desired degree of selectivity.

### Results Obtained

Before entering into any detailed de-

scription of the construction it is well to tell something of the results that have been obtained in testing this set in Managua, Nicaragua, which locality is about eight hundred miles south of Havana and one thousand miles southeast of Mexico City. Up to date we have heard from fifty-five broadcasting stations in the United States, Mexico, Cuba and Porto Rico. We get consistent loud speaker operation with good volume from stations as far distant as two thousand miles.

Recently the second stage audio frequency transformer burned out but we are still able to hear, with loud speaker volume sufficient to enable everyone in a large room to hear comfortably, such stations as KDKA, WBZ, WMBF, WQAM, WLW, KFKX, WTAS, WTAY, and WOC.

Although we use only the one stage of audio frequency. On one occasion, on a special test, we plugged the loud speaker into the detector jack and tuned in WMBF so that we heard the music distinctly, and understood clearly the announcement, fifty feet from the speaker. The bulbs used at that time were two 199s, one as a radio frequency amplifier and the other as detector. This station, although it is a thousand miles from here, is our "local" station.

We attribute these excellent results, first, to the efficiency of the circuit which, besides giving a high amplification in the radio frequency tube, allows for regeneration in both the radio frequency tube and the detector and, secondly, to the fact that highly efficient tuning inductances are employed with the best of low loss condensers.

There are so many complicated sets sold now with five to eight tubes which cost a small fortune to build and, besides, require a technical education to construct, that the writer believes the average experimenter will welcome a design for a simple, efficient, four tube receiver using dry battery tubes, requiring no special parts which the experimenter cannot build for himself and which will almost, if not quite, equal the most elaborate and expensive circuits. Besides being extremely cheap to construct, it is very

(Continued on page 20)

2 Variable condensers .00025 mfd. ....	\$ 9.00
2 Vernier dials .....	7.00
1 Midget variable condenser .000045 mfd. ....	1.50
1 Spool 1/2 lb. No. 20 disc. wire..	.90
1 Fixed mica condenser .00025 mfd. ....	.35
1 Fixed mica condenser .002 mfd. ....	.40
4 Fixed filament resistors.....	4.40
1 Grid leak clip .....	.35
1 Grid leak cartridge 5 meg.....	.40
4 Sockets 199 or 201A .....	2.40
2 Audio frequency transformers	12.00
1 Double circuit jack.....	.90
1 Filament switch .....	.75
12 Binding posts.....	1.80
1 Panel 7" x 12" .....	1.20
1 Cabinet 7" x 24" x 7" .....	7.50
Miscellaneous, approx. ....	2.15
<b>Total Cost .....</b>	<b>\$53.00</b>

the exact frequency of the incoming wave which meant that the full amplifying power of the radio frequency tube could not be utilized.

The author realized that if this circuit was to become popular and practical, many improvements would have to be made. Provision must be made for loose antenna coupling in order to make the

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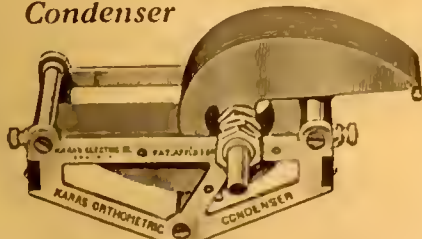
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### BALANCED BRIDGE SET

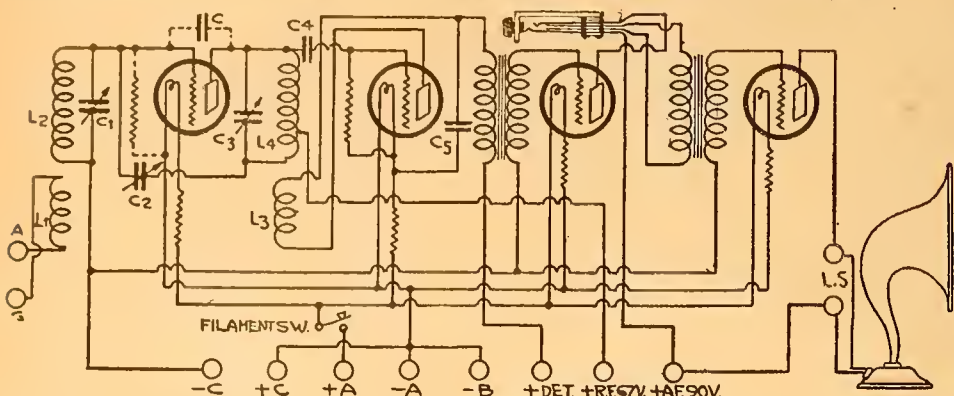
(Continued from page 19)

simple to operate, being tuned like a neu-trodyne but having only two tuning con-trols.

#### Coil Construction

The thing of first importance in this set is that you construct efficient tuning inductances. The author has found the

tape, or adhesive tape, about 5" long and lay six of them along the length of the bottle at equal intervals around the cir-cumference. These are to form a non-slip-ping surface on which to wind the wire and are discarded after the coil is wound. Fasten the end of the wire under one of the strips and wind the coil to the proper number of turns, fastening the finishing end in the same way as the first.

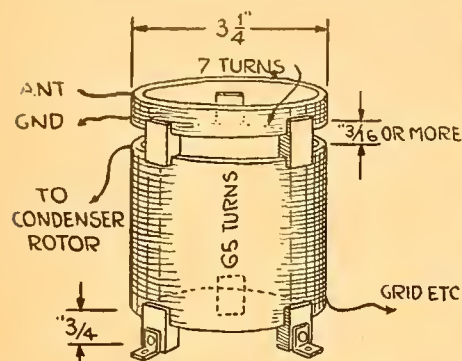


- L-1 consists of 7 turns.
- L-2 consists of 65 turns.
- L-3 consists of 20 turns.
- L-4 same as L-2 and tapped at 15th turn.

- C-1 capacity is .00025 mfd. max.
- C-2 midget condenser of .000045 mfd.
- C-3 capacity is .00025 mfd. max.
- C-4 capacity is .00025 mfd.
- C-5 capacity is .002 mfd.

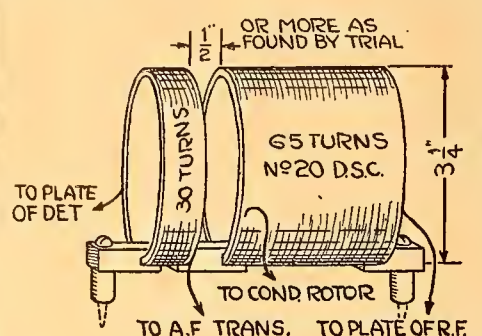
bottle wound inductances to be the best low loss units, and the easiest to con-struct. An easy method to wind them is

Now make a celluloid "glue" by dissolv-ing scraps of celluloid in acetone or get some celluloid varnish and allow it to



The method shown is an excellent one for mounting the low loss coils described.

as follows. Secure some large round smooth bottles of uniform diameter of 3 1/4". Cut some strips of electrician's insulating



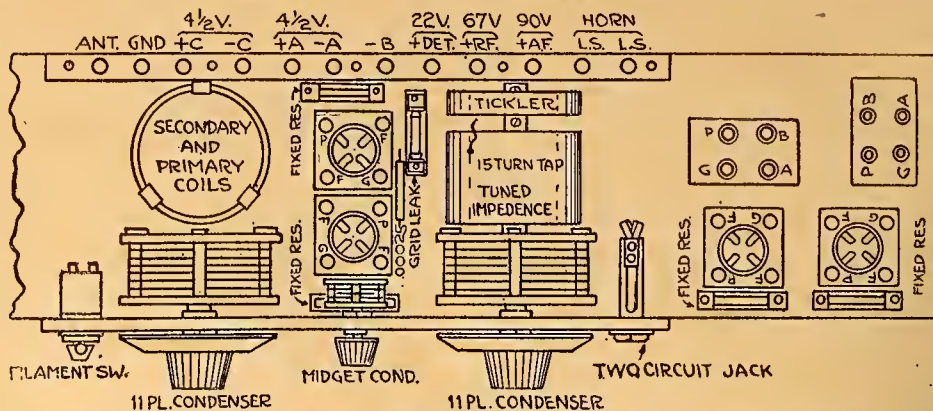
Coils can be temporarily set on match boxes until proper coupling is determined, then the mounting shown can be used.

evaporate to the consistency of thick glue (Radio cements can be had at most Ra-dio dealers—Editor's Note). Do not paint

the entire coil with this glue; it is only necessary to paint four narrow strips along the length of the coil at equal in-tervals around the circumference. It is not desirable to use much of the glue but be sure that all of the wires are touched, and bound by it. After the glue has dried, break out the bottle by means of a small hammer and remove the strips

baseboard were 7" from panel to rear edge to allow for wider spacing of the various units.

To avoid the introduction of body ca-pacity effects it is necessary that the grid of the radio frequency tube should be con-nected to the stator of the condenser and not to the rotor; the plate of the same tube should go to the stator of the second or



If baseboard depth is increased to 5" the tuned impedance coil can be moved back from the variable condenser.

of tape. The coil will be very strong and firm and is then ready for mounting. One-half pound of No. 20 dsc. wire is needed for the coils of this receiver.

#### Mounting Apparatus

In mounting the parts on the panel it will probably be found convenient to mount the tuning condensers 6" apart and the midget condenser near the top of the panel and midway between them. The secondary coil should be mounted verti-cally behind its tuning condenser. The bottom end of this coil goes to the grid. At the top of this coil is suspended the antenna or primary coil. The impedance or plate coil should be mounted hori-zontally behind its tuning condenser and with its axis perpendicular to the panel. The end of this coil, near which the B battery tap is located, should be placed toward the back of the baseboard.

impedance tuning condenser. The midget should have its rotor element connected to the rotor of the impedance tuning con-denser and its stator connected to the stator element of the first tuning con-denser.

The sockets of the radio frequency and detector tubes can conveniently be placed between the two tuning coils. The ampli-fier can be arranged in any way to suit the convenience of the constructor, al-though the writer's layout is clearly shown in the drawings. While the base-board has been shown as 5" deep, since the parts can be gotten into this depth, it would be better for efficiency if the

All of the details of wiring, as well as the specifications of the coils are shown in the diagrams accompanying. The an-tenna coil and the tickler coil should not be fastened in place when the set is first built; test the set to find out what degree of coupling gives the best results in your case. After the right amount of coupling is found for both coils clamp or fasten them in that position as it is not neces-sary to change them afterward. Be sure that the plate of the detector tube is con-nected to the end of the tickler coil farthest from the impedance coil. If the coupling between the tickler and the im-pedance coil is too close it will be im-possible to neutralize the set. This cou-pling should be adjusted as closely as pos-sible without the set oscillating at any wave length, after it has been neutralized by adjusting the midget condenser. In mounting the coils, keep them clear from the baseboard by at least half an inch and do not place any metal object such as

(Continued on page 21)

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# Pittsburgh to Halifax on One Tube

## Says Simple Circuit Gives Plenty Volume

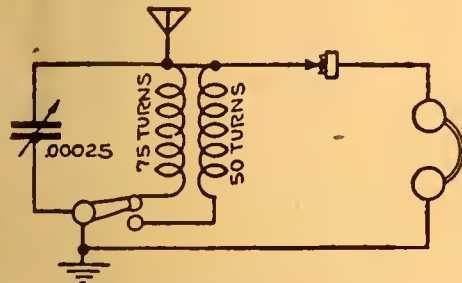
The first illustration shows my pet circuit for a tube set. It gives good selectivity with plenty of volume. I use the

### WORKSHOP KINKS EARN A DOLLAR—

There are many little kinks worked out at home that would aid your fellow Radio worker if only he knew about them. There are new hook-ups, new ways of making parts and various unique ways of operating sets that are discovered every day. Radio Digest is very much interested in obtaining such material. Send them in with full details, including stamped envelope, so rejected copy may be returned. The work must be entirely original, not copied.

RADIO KINKS DEPARTMENT  
Radio Digest,  
510 North Dearborn St., Chicago

201 tubes. The second circuit is one for a crystal. I have heard stations as far as Pittsburgh, Pennsylvania. The coils used in this circuit are not movable. The 50-



turn coil is at right angles to the 75-turn coil. These coils are of the honeycomb type which may be purchased at any retail Radio store.—E. H. Taylor, Halifax, N. S.

### Low Loss Tuner

Are you using a standard circuit set with a low loss tuner? If so, look at your secondary tuning condenser. Is it of the low loss type also? If not, it should be. Nothing is gained in the installation of a low loss tuner if all the energy is chased to the condenser where it finds an easy path for escape.



**Oh boy!**

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Rosin Core  
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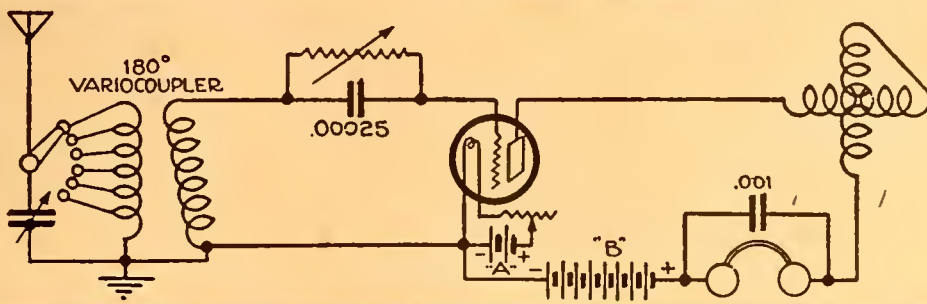
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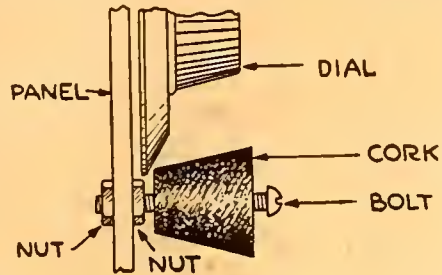
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## HOOK-UP FOR GOOD CIRCUIT



### Cork Provides Dial Vernier

The illustration I have enclosed is a vernier which is made from a cork and a bolt with two nuts. It is very simple



to make and efficient. A hole the same size or larger than the bolt must be bored lengthwise through the cork. Also drill a hole the same size as the bolt through the panel close enough to the dial to allow the cork to touch the edge of the dial as shown. Mount it on the panel as pictured. The bolt should be long enough to allow the cork to slide back and forth on it. Then, when rough tuning is desired the cork may be slipped back, and when fine tuning is needed, it can be pressed in against the dial.—William Briggs, Fulton, Ill.

A cheap battery may last less than a month, while a good one may last six or nine months.

## What becomes of the bass notes in your set?

While the better transformers amplify quite evenly over the entire upper and middle registers of the musical scale, from about 60 cycles downward there is a pronounced loss of amplification, as indicated above. Poorer transformers begin to drop off in amplification even higher on the scale with the result that lowest notes disappear entirely.

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## BALANCED BRIDGE SET

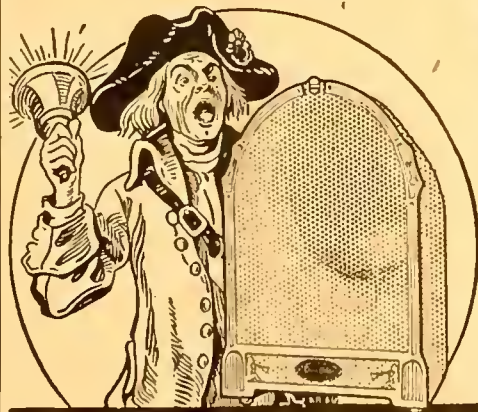
(Continued from page 20)

condensers or transformers so near them as to be in the magnetic field.

### Operation

When tuning, it will be found easier to adjust the midjet condenser to one side or the other of the neutralizing point so as to allow the set to oscillate while picking up a station. When the carrier is located, adjust the midjet for neutralization and readjust the tuning condensers. However, this should be resorted to only when looking for distance late at night and new stations because of possible interference with neighbors. Best results will be obtained when the set is on the verge of oscillation which state is controlled by the adjustment of the midjet. After a little practice you will find that it is easy to tune this set and to get the most out of it of which it is capable. Vernier dials will aid greatly in tuning.

The set as described here and as built by the author used four 199 tubes. This will furnish all the volume that one could reasonably want for a loud speaker;



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## Causes for Broad Tuning

Broad tuning in a set may be caused by: Too long an antenna; too large a primary on the tuner; poorly designed condensers—that is, too high resistance and leakage; poor insulation throughout the set; wires in the circuit too long; poor connections or an inefficient ground.

## Homemade Reamer

An old three-cornered file with the abrasion lines removed on an emery wheel or grindstone makes a fine tool for the home builder of Radio sets. With this instrument it is easy to ream out panel holes and to dress up the rough edges of a panel.

It is announced that the French Ministry of Marine has opened a new station at Papeete, on the Pacific island of Tahiti.

Because rust and corrosion interfere with reception, it is wise to renew aerials each year.

Should anyone want to get more out of the set, 201-As may be used for the detector and the audio frequency amplifiers. This arrangement will necessitate purchasing larger sockets for the tubes mentioned and some changes in the filament resistors. It is not advisable to use the larger tube in the radio frequency as the small tube is more efficient, besides being more economical.

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### A. B. C. RADIO COURSE

(Continued from page 17)

small triangle, as shown in the figure, and determining the value of the vertical side in plate current and the horizontal side in grid voltage, then dividing the vertical side in current by the horizontal side in voltage gives the slope of the curve. An inspection of the curve shown in figure 90 will disclose the fact that the slope is not a constant, hence the internal resistance of a vacuum tube operating at a constant filament temperature and plate voltage may be changed by changing the grid potential. When the slope is a maximum, the reciprocal of the slope is a minimum and the internal plate resistance will be a minimum.

In the above discussion it was assumed that a direct current voltage was applied to the grid and in such a case there would be a steady direct current produced in the plate circuit. When an alternating potential is impressed upon the grid, as is done in Radio work, a pulsating current flows through the tube between the plate and the filament. Under these conditions the electrostatic capacity between the filament and the plate cannot be neglected, especially for the higher frequencies. The circuit between the filament and the plate is then equivalent, for the alternating current component of the plate current, to a condenser having an electrostatic capacity equal to that between the filament and the plate, shunted by a resistance equal to the effective internal plate resistance of the tube. This combination of capacity and resistance constitutes the internal plate impedance of the tube.

#### Mutual Conductance

The conductance of a conductor is defined as the reciprocal of its resistance. The reciprocal of the internal plate resistance of a vacuum tube is equal to

$$\frac{1}{R} = \frac{1}{k} \times \frac{dI_p}{dE_g}$$

The quantity  $dI_p / dE_g$ , which is the slope of the grid-voltage plate current static characteristic curve, is called the mutual conductance of the tube. An inspection of figure 90, discloses the fact that the mutual conductance is zero at the points of zero plate current and maximum saturation current, and a maximum at the point of inflexion of the curve which is at approximately the point.

The static method of measuring the voltage amplification factor of a tube is to impress upon the plate a certain positive potential and then impress upon the grid sufficient potential to bring the plate current down to zero value as determined by an ammeter or galvanometer connected in the plate circuit. The amplification factor is equal to the plate potential divided by the grid potential when the plate current is zero.

A dynamic method of determining the voltage amplification factor is shown in figure 91. The filament of the tube is

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heated by the battery A and the plate and grid potentials are obtained from the batteries B and C respectively. The relation of the non-inductive, non-capacity resistances  $R_1$  and  $R_2$  can be varied by moving the sliding contact S. A telephone headset T is connected in the plate circuit. When an alternating electrical pressure is applied to the outside terminals of the resistance  $R_1$   $R_2$ , there is a simultaneous application of grid and plate potential. These two potentials, when measured with respect to the filament terminal connected to the sliding contact S, are practically 180 degrees out of phase. If the sliding contact S is adjusted until there is no sound in the receivers, then the amplification factor is equal to  $R_2$  divided by  $R_1$ .

The internal plate resistance of a tube may be determined for any value of grid and plate potential by determining the slope of the plate-voltage, plate-current static characteristics curve corresponding to the specified grid potential. The resistance is equal to the amplification factor times the slope.

A dynamic method of determining the resistance is shown in figure 92. The plate to filament path of the tube is connected as one branch of a Wheatstone bridge, a known resistance  $r$  forms another arm of the bridge, and the two remaining arms are the two sections of resistance  $R_2$  and  $R_1$  to the left and right of the sliding contact S. Alternating current is supplied to this bridge, and a balance (no sound in the telephone receivers) is brought about by moving the sliding contact S. When a balance is obtained the internal plate resistance is given by the following expression.

$$R = \frac{R_1}{R_2} r$$

(Now that the construction of Radio tubes has been shown, and the terms used to describe the constants made clear, Professor Moreton will discuss, in the next chapter, the uses of these tubes in receiving circuits.—Editor's Note).

#### Switch for A Battery

There are few Radio set attachments which will yield bigger dividends than a switch in the A battery lead. Amplifier tubes ought not to require any adjustment and use of a switch in the circuit obviates turning off tubes at the rheostat.

#### Range of Receiving Set

The receiving range of a set is determined by testing for signals between 11 o'clock in the morning and 4 o'clock in the afternoon. Stations that can be picked up regularly between these hours are the ones upon which the receiving range should be based.

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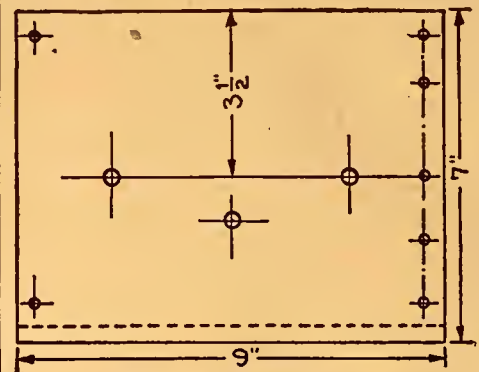
### NON-RADIATING UNIT

(Continued from page 18)

denser until when turning the tuning condenser of the radio frequency unit through the maximum intensity of the signal, the whistle varies only in intensity and not in pitch. The set is now balanced and the balancing condenser should be set at that point.

Local stations may be used for the initial adjustment but stations 50 to 100 miles away should be used for the final setting as local stations have so powerful a signal as to make it difficult to tell when the pitch varies.

This radio frequency unit will work wonders with a single circuit receiver and the selectivity is such that vernier



controls may be necessary. In connecting to any other regenerative set than a single circuit, the same general scheme may be followed until the selectivity becomes too great. For instance, with a honeycomb coil receiver connecting the output coil to the tuned primary will make an extremely selective set having three controls which will make the set difficult to tune. This may be corrected by disconnecting the primary con-

denser and using a 25-turn primary coil, winding 25 turns on the output coil. These two coils will constitute a link and reduces the number of controls to two. Another way is to connect the output coil in series with the secondary coil disregarding the primary circuit giving the effect of a single circuit tuner. It is best where possible to connect the output coil in the tuned secondary circuit.

#### Trouble Shooting

Any standard receiving tube may be used but 5-volt tubes are recommended. If signals can be received with the radio frequency tube turned off that tube is not properly neutralized or the aerial wire is running too close to the receiving set and is passing the signals direct without going through the radio frequency unit.

If the receiver tunes too sharply, wind the output coil closer to the 30 double turn coil and if the proper wave lengths cannot be received, wind more turns on the output coil.

Another method of neutralizing the set is to follow the standard practice used with neutrodynes. Darken the radio frequency tube with a piece of paper over one prong of the filament contacts. Tune in a signal and adjust the neutralizing condenser until the signal disappears or becomes a minimum.

It is necessary to be able to control oscillations on the receiving set over the entire broadcast wave band and it may be found that certain taps on the primary will not oscillate, while on other taps the oscillations cannot be controlled. This condition is corrected by changing the number of turns on the output coil and also moving the output coil closer to the 30 double turn coil.

This radio frequency unit will make a regenerative set non-radiating, extremely selective and reach out further.

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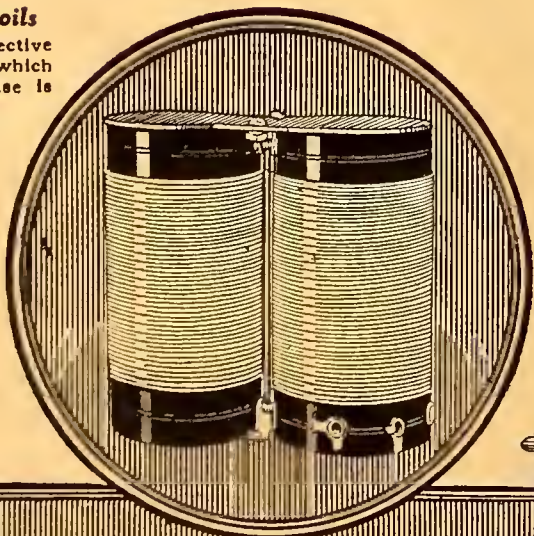
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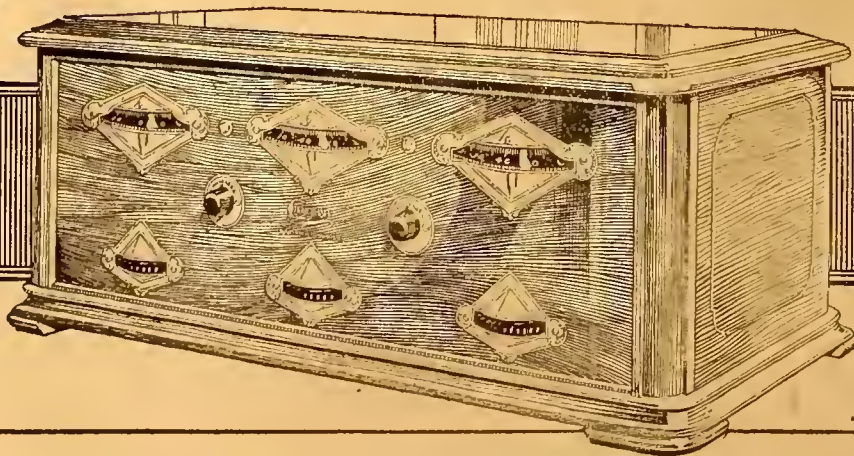
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