

Explanation of Christmas Set Troubles; Assembly of Het-Duo-Gen Filter; New Experimenter Senior Hook-Up; How to Use Resistances in Radio Sets

# Radio Digest

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

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

Vol. XII

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SATURDAY, JANUARY 10, 1925

No. 1

## MARCONI FOR BEAM WAVE

### NATION GREETS YEAR WITH LIBERTY BELL

WOO BROADCASTS INDEPENDENCE HALL FETE

Successor to Historic Bell of Revolutionary Days Peals Years of Nation's Freedom

PHILADELPHIA.—Once more Radio has bound together the people of the nation in a celebration based on the fondest memories and most cherished traditions in the history of the United States as a union sufficient unto itself.

For on New Year's Eve, through station WOO in this city, the whole country joined in the impressive ceremonies and joyous merrymaking at the historic old Independence hall, that has been traditional to the people of Philadelphia each year since the first great liberty bell proclaimed American independence 148 years ago.

This year marked the second broadcasting of this feature by Station WOO. At a quarter to twelve Mayor Eireland W. Kendrick opened proceedings, speaking into the microphone, by telling the history of the three bells that have occupied the noted old belfry.

The first bell, the beloved Liberty bell, was cracked while tolling for the death of Chief Justice John Marshall in 1835.

### RECEPTION IN DAY WILL BE PRACTICABLE

Needs Less Wave Bands

Famous Inventor, at Royal Society Dinner, Describes Advantages of "Searchlight Radio"

By A. C. Blackall

LONDON, England.—"Radio waves are far too valuable to be broadcast always in all directions," said Senator Guglielmo Marconi, inventor of Radiotelegraphy, recently on the occasion of his election here to chairman of the Royal Society of Arts.

"I do not see," continued the famous man, "why, for example, messages intended for Canada or South Africa should be scattered simultaneously over the rest of the world."

He went on describing the advantages of his "searchlight beam" system of transmitting Radio waves and how it was being applied to the Radio communication problem of the world. Faster handling of messages, more secrecy, additional wave bands opened up for use by other stations, and less costly transmitting were among the many desirable features claimed for the beam wave system.

(Continued on page 2)



Corilla Dare, singing comedienne who has been heard many times from stations in the Northwest. She was recently featured on the dinner hour concert at the Gold Medal Station, WCCO.

Above, Katherine Spencer, one of America's most noted beauties, who recently talked from WOR on "Art and Censorship." Right, Claire Dux, famous opera star, appearing on the Brunswick Hour at WJZ and other linked stations.



# GOLD AWARD SET STILL UNFOUND

## \$1000 WAITING FOR FAN WHO DEVELOPS ORIGINAL CIRCUIT

### Many Sets Already Entered in Contest—New Method of Using Old Hook-Ups to Give Better Results Stand Chance

Some encased in clear, polished glass cabinets—others in plain, unvarnished wood boxes, the sets entered in Radio Digest's gold award contest are filling up the shelves. And all stand an equal chance for premier honors. Some of them show months of thought, study and calculation behind the circuit involved. Others have plainly been the result of a lucky changing around of wires. One thing most of them have in common—they're new!

There are, of course, a few that embody circuits more or less well known to the Radio fraternity. There are ultra-audions, straight regeneratives, "supers" and reflexes sent in by their owners because of unusual layout or beauty of workmanship. While the Digest editors appreciate the interest of these readers and wish to thank them for the opportunity to look over this ingenuity, such sets are not what Radio Digest is seeking.

**New Methods Stand Good Chance**  
On the other hand it should be made clear that the ideas desired need not be anything as radically new as super-heterodyne or super-regeneration. This publication does not hope to find nine Armstrongs in five weeks.

Prize winning ideas embodied in receivers may be a new method of securing regeneration or super-regeneration that is either better or simpler—may be superior reflexing or double reflexing. Audio amplification through a different grouping of apparatus—by some means other than transformers, resistances or chokes as now used, would stand an excellent chance of winning some real gold dollars.

**Het-Duo-Gen Is Old Idea**  
A good example of what is wanted is het-duo-gen, the articles on which are now appearing in this paper. The individual

## PLUGGER MUST PAY WNAC FOR STATION

### MUSIC PUBLISHERS WILL RETURN PART OF FEE

Shepard Stores Broadcast Director to Put Radio Song Plugging on Commercial Basis

BOSTON, Mass.—Station WNAC, the Shepard stores here, is getting back hot and heavy at the music publishers for the compulsion they now are under of paying an annual royalty of \$500 for permission to broadcast copyrighted songs.

It is the custom of so-called "song pluggers" to sing new songs over the Radio for the purpose of popularizing them and so increase the sales of the sheet music. Major John J. Fanning, director of the station, announces that for every new song broadcast by his station by song pluggers employed by publishers in the copyright combine, the publishers must pay \$25. This goes at the rate of \$25 for every rendition of the song, and in this way WNAC expects to get back all it has paid on royalty charges and even make a profit.

"If we must pay for the use of the song," says Major Fanning, "we expect them to pay for the use of the broadcast station."

**WLW to Broadcast at Auto Show**  
CINCINNATI, Ohio.—"See and Hear Crosley WLW Artists," is the announcement being made by the Cincinnati Auto show which will be held this year in Music Hall, from Saturday, January 10, to the following Saturday, January 17. A special studio will be erected by the management and programs will be broadcast.

Building material and equipment used in KOA, the new General Electric broadcasting station at Denver, Colo., if loaded on freight cars, would require a train, forty cars long and heavily loaded, according to estimates of the constructing engineers.

ideas incorporated in het-duo-gen have all been known for some time—the patents on regeneration and heterodyne were taken out years ago—but it remained for some one to combine them and work out, either by cut-and-try or mathematics, the constants of the various units.

There are dozens of good ideas in Radiophan's heads, and possibly actually in sets, that should be given to the Radio world, but the originators either are too modest to tell of them or have been waiting for some one to make it worth their while to divulge these creations.

**Give Sets Rigid Test**  
Here's the opportunity to cash in on that "different" set. If you haven't such a brain child yourself, tell one of your friends who has, of this offer. Few of the circuits and sets coming in are patentable; practically all contain a feature, phenomena or device already covered by patents. Het-duo-gen cannot be patented, yet it certainly is original and an advance. On one point prospective contestants should be more or less certain. Be sure that phenomenal results as to range or selectivity are not due chiefly to location. Give your entry tryouts in other places, on other aerials. Would it perform so remarkably on practically any other antenna—on an apartment in Chicago or

## \$1,000 GOLD AWARD SET CONTEST RULES

1. This contest opens at once and will close on Saturday, January 17, 1925, at midnight. All sets received up to that time will be entered.
2. The thousand dollars in gold will be divided into the following prizes: First, \$500.00; Second, \$250.00; Third, \$100.00; Fourth to Ninth inclusive, \$25.00 each. In the event of a tie, the full amount of the prize fund for will be awarded to each tying contestant.
3. Contest is open to all Radiophans, whether or not subscribers to Radio Digest Illustrated.
4. A neatly drawn hook-up diagram and short description (200 words) of the salient features of the set should be enclosed in separate letter advising set is being shipped. Entrants do not need to be authors or writers.
5. Sets must be sent insured pre-paid express or insured parcel post. All sets, including winners, will be returned insured collect to entrants.
6. Radio Digest is not to be held responsible for breakage or loss in transit. Pack sets carefully. Mark boxes and contents plainly with name and address of sender. Tubes and batteries need not be sent unless matched tubes are essential to operation.
7. Freak or novelty sets are not desired. Sets enclosed in or

- built around dolls, finger rings, hats, etc., will not be considered.
8. Sets desired are those based on an original circuit or part of circuit that functions better than circuits commonly in use. Originality is one of the prime considerations.
9. Entrants who are not awarded prizes, but whose sets are considered worthy of constructional description in Radio Digest, will be paid at regular manuscript rates.
10. Entrants must guarantee to Radio Digest exclusive publication rights of all descriptions of their sets. The exclusive publication rights will be in force for all sets winning or being later described in Radio Digest.
11. Judges not interested in manufacturing will be selected by Radio Digest to make the awards. The award of prizes will be based on: Selectivity, range, volume, quality of reproduction, simplicity of operation, constructional feasibility, economy of construction, minimum re-radiation, universality, practicability.
12. Ship sets and address correspondence to the Gold Award Set Editor, Radio Digest Illustrated, 510 North Dearborn Street, Chicago, Ill. All controversies will be decided by the Gold Award Set Editor, whose decision will be final.

New York or 200 miles from a station when tried in the northern forests? Test it good, but do not feel that this contest is only for Pupins, De Forests and Armstrongs.

## MARCONI BEAM WAVES

(Continued from page 1)

"With regard to broadcasting, said Signor Marconi, "it may well be that the day is fast approaching when the practical range of this science will be enormously increased, and that American stations will be heard with clearness and regularity even during the day and afternoons. At present one is obliged to listen for them very late at night or early in the morning. It is also quite reasonable to expect that it will soon be possible for a speech to be broadcast to the most distant parts of the world irrespective of whether it is made during day or night."

**Tells History of "Beam" Invention**  
Continuing, Senator Marconi told of the history of his invention of beam wave transmission. He said:

"During my earliest English experiments carried out 23 years ago, I showed the late Sir William Preece, then chief engineer of the British post office, the transmission and reception of intelligible signals over a distance of one and three-quarter miles by means of an elementary beam system using very short waves and reflectors, while, curiously enough, by means of the antenna or elevated wire system, utilizing much longer waves, I could only at that time get results over half a mile.

**Points Out Advantages**

"I can understand the utility of non-directional stations for naval and marine purposes and for broadcasting, but for ordinary efficient communication between fixed places, or between one country and another, I think the right thing to do, if possible, both from the viewpoint of secrecy and economy, is to concentrate all the radiated energy into a beam directed towards the place with which it is desired to communicate.

"The number of available wave lengths is limited, and if a wave length utilized for communication between England and India should necessarily be allowed to spread to Africa and America, it would probably interfere with the free use of that wave in other countries."

**Beam Permits Greater Speed**

Having described many of the tests carried out in connection with the general short-wave beam system, Senator Marconi went on to say that the short-wave beam system would be capable of transmitting a far greater number of words in 24 hours between England and far distant countries, than would be possible by the comparatively powerful, cumbersome and expensive stations actually in use, or which were planned to be used for Imperial communications.

"I am now firmly convinced," he continued, "that the beam stations employing only a small fraction of this power, and much lower and fewer masts, will be able to communicate at practically any time with any part of the world, and I cannot refrain from expressing my strong personal opinion that powerful, long-wave stations will soon be found to be uneconomical and comparatively inefficient so far as long distance, commercial communications are concerned."

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## Looking Ahead

**The Receiver of Two Hundred Variations** will be taken up in next issue by J. E. Owen as Experimenter Junior, and will be a delight to every true enthusiast. While it looks like any other receiver it might be called by some, a test board.

**The Base Panel of Het-Duo-Gen** carries most of the apparatus of this selective outfit, and most of the wiring. Once completed, as described by C. E. Brush next week, only nine wires are needed to connect it to the front panel.

**Amplification of a Billion Times** has been obtained by two French scientists and seems perfectly practical. The experiments are the work of Messieurs L. Dumoyor and P. Toulon, and will be discussed next week by Frederick M. Delano.

**Operating and Trouble Shooting the Fada Neutrodyne Receivers.** The suggestions given cover four models, Neuroceiver, Neurocola, Neuroceiver Grand and Neurocola Grand. Fada owners will learn much from this article, to appear in next issue, as will operators of other forms of neutrodynes.

**Newsstands Don't Always Have One Left WHEN YOU WANT**

# Radio Digest

YOU WANT IT!  
BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW

SEND IN THE BLANK TODAY

Publisher Radio Digest,  
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Chicago, Illinois.

Please find enclosed check M. O. for Five Dollars (Six, Foreign) for One Year's Subscription to Radio Digest, Illustrated.

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## OFFERS SUGGESTION TO CLARIFY LETTERS

NEW ALPHABET STRESSES DIFFERENCES IN CALLS

Announcers and Receivers Would Benefit By Elimination of Present Confusion

By E. W. Donaldson

A NEW and serious question seems to have entered Radio broadcast reception; serious because it concerns the friendly relation between the sending station and the receiving set—a relation most desirable to be maintained and from the viewpoint of both parties concerned, it would seem to be logical. This question, which has been voiced with growing frequency in the Radio journals of late, is the enunciation of the call letters of the sending station. Something will surely be done about this soon and the following plan is submitted by one who has had just such experience and has seen the problem solved with great satisfaction to both sender and receiver.

### Call Letters Easily Mixed

WGY, spoken at the sending end, comes to the ears of the receiving set operator as "WGI," while WBAV is just as likely as not to come out as "WCAB." Aside from the factor of natural curiosity on the part of the set owner, there is the important item of logging, and the man who logs a station as "WBIV," after hearing the announcer speak just such letters, and then turns to his chart only to find that there is no such combination, becomes angry. He cherishes a grudge against the announcer who caused the mistake and when he finds the real call letters of "WBIV," and discovers that the station using them is advertising some nation-wide product, he is likely to continue that grudge against the product and to do some local broadcasting of his own among his friends that will work no good for the commodity. So much for the sending end; the Radiophan's side in the matter runs all the way from exasperation to a desire to go out and bomb a few broadcast stations.

Now for one solution of the matter and one that has been tested and found satisfactory: The British army, during the World war, ran into just such a situation. The signal corps, working under trench conditions—wet insulation, hastily made connections and service of the most trying, not to speak of transmitting messages under gunfire—discovered just such a situation as exists here in America at this time among the broadcasters. The letter "B," when spoken into a transmitter, was more than likely to come out the other end as, "C, D, E, G, P, T, V or Z." Imagine the trouble arising when coded messages were sent and every letter meant life or death or the winning or losing of an engagement!

The consequence was that quick action was taken and a new alphabet adopted

(Continued on page 4)

## ALYCE MILLS GIVES MAKEUP TIPS



Alyce Mills, fight film star, is an expert on makeup for the stage and recently told WJZ listeners how to put the powder on straight. She is also an ardent fight fan, and tunes in at every opportunity to listen to Radio descriptions of championship battles.

SHE wasn't the least bit afraid when she told an invisible audience of thousands, by means of Station WJZ, recently how to "make up" for the stage.

Why should she have been afraid? Didn't she face the facile dactyls of Benny Leonard, champion pugilist almost every day while rehearsing for the motion picture, "Flying Fists," in which she and Benny are stars?

She is Miss Alyce Mills, dainty, lovely, delectable.

"Not so much 'makeup,'" was her advice to girls. And of course they right away said that that advice was good for Alyce, but not for many of them. For Alyce, be it known far and wide, does not need cosmetics to make her beautiful.

"The best way in which to learn how to make up for the stage" (some of the boys who heard her afterward wrote that it wouldn't have been hard for them to make up with Alyce), "is by experience,"

she said. "Study your features and your complexion, then use good judgment as to the amount and kind and texture of the tints.

"The makeup of each person is different because each person is different. A little lipstick and a little rouge and a little powder and a little coloring around the eyes. Oh, girls, much good judgment will do the work. It is better to use too little makeup than too much. The whole effect should be natural."

Thus Miss Mills described to a palpitant femininity the chromatic and plastic details of a front elevation. And, by the way, any man who "gets fresh" with Alyce had better look out—she's learned from Benny how to box.

In Pittsburgh of the Big Smoke, where Miss Mills lives, is her cousin, Charles Mills, Jr., who, although blind, makes and sells fine Radio sets. And another of her claims to fame is that she has starred with Jackie Coogan.

## RAILWAY PRESIDENT DELIVERS MESSAGE

THREE STATIONS JOINED BY RECORD TIE-IN

First Anniversary of Radio Department of Canadian National Railways—First to Adopt New Science

MONTREAL — Sir Henry Thornton, chairman and president of the Canadian National railways, addressed a vast audience recently, when he broadcast a New Year's message through the medium of three Radio stations of the CNR system in what was the record for a tie-in effected in Canada.

Sir Henry spoke in the studio of CNRM, Montreal. CNRM was connected to CNRO, the Ottawa station, and through Ottawa to CNRT, the Toronto station. The amplifying equipment at the Ottawa and Toronto stations will complete the broadcast as though the president was speaking in person from either of these stations.

### Marks First Anniversary

The special broadcast is marked the first anniversary of the Radio department of the Canadian National railways, which during the past year has been most active in offering splendid Radio programs. The Canadian National was the first railway system in the world to adopt Radio as a definite part of its service, operating a chain of powerful broadcasting stations, and installing on all transcontinental trains special receiving sets for the purpose of keeping passengers in touch with the world.

## Round the City with the Merry Old Chief

Audience Transported via Ether to Various Amusement Places

KANSAS CITY, MO.—One of the most popular features ever to be broadcast by WDAF, the broadcasting station of the Kansas City Star, has been the flivver trips which the "Merry Old Chief" takes around the city.

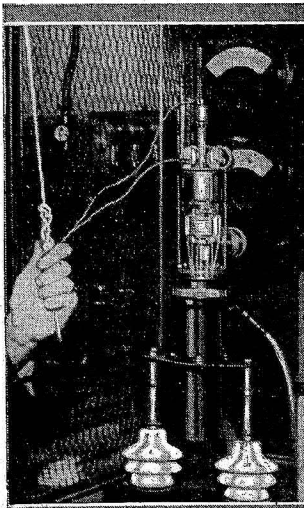
Transporting the Radio audience with him in a little old Ford he stops at various entertainment houses and allows the listeners to hear a portion of a great many programs.

The crank, the motor, the horn, the bumps, and the traffic cop's whistle may all be heard, making the scene almost realistic.

As many as eleven places may be visited during a single evening. Five operators are necessary when all these places are heard. Pipe organ numbers, vaudeville acts, orchestras, and soloists are included in the wide variety of entertainment.

So popular have these programs been that thousands of telegrams and requests are received to be followed by many more letters and applause cards.

## METHOD OF TESTING HIGH POWER TUBES



Giant Radio tubes, more powerful than any others at present in use. The photograph shows the testing of a "transatlantic" tube with a current of 15,000 volts. Owing to this high test current the operator holds a safety cord, by which it can be switched off immediately in case of an emergency.

## USING CRYSTAL SET WITH LOUD SPEAKER



Bernays Johnson, noted Radio engineer, who has apparently accomplished the impossible. He is successfully operating a loud speaker from an ordinary crystal set. The apparatus shown in the photograph is what does the trick. The volume of local broadcasting is equal to ordinary phonograph volume. This set recently won a silver loving cup at the New York Radio show.

## Atlanta Director Receives Radio Set from Trade Men

ATLANTA, Ga.—An eight tube super-heterodyne receiver was recently presented Lambdin Kay, Atlanta Journal director-announcer, as a joint gift from retailers, wholesalers and manufacturers of the Atlanta Trade association in recognition of WSB's broadcasting services. The outfit is valued at more than \$500.

KFAE Celebrates Second Birthday PULLMAN, Wash.—KFAE, State college of Washington here, celebrated its second birthday recently with a special anniversary program of musical numbers and talks.

## New Station Hails Atlantic City as World's Playground

ATLANTIC CITY—Hailing its home city as the "World's Playground" and drawing upon the entire facilities of the renowned resort city, station WPG, municipal broadcasting medium of Atlantic City, is now on the air with a wave length of 296 meters and a power of 500 watts.

Navy Set Creates Record WASHINGTON, D. C.—A new receiving set designed for the air cruiser Shenandoah is receiving messages from a distance of 6,000 miles, and is also having its signals received at great distances.



### LADY'S VANITY CASE HOLDS CRYSTAL SET



Interesting little crystal set built into a lady's vanity case by a Radiophan admirer. This set works exceedingly well.

### DISTINGUISHING CALLS

(Continued from page 3)

which became so general in use that not only the signal corps but other branches of the army adopted it, so easy was the system to catch on to. When the Americans arrived in France and were billeted with the British, they, too, took up the new alphabetical sounds and used them in their message and signal work.

The system consisted simply of taking an extra letter or two on to each alphabetical term needing distinction, and making a new sound out of the letter. The revised alphabet would run as follows:

Ac, Beer, Ced, Don, E, F, Get, Ash, I, J, Kur, L, Emma, N, O, Pip, Q, R, Esses, Tot, Up, Vic, W, X, Yaw, Zig.

Here we have a system of letters, the euphony of which is different in every instance. There is no combination of two or more in this alphabet similar in sound and the announcer, using such a system, would find himself easily understood even under adverse conditions when "mush" was in the air.

#### Code Easily Learned

For instance, take the baffling combination as exists in our everyday alphabet, B, C, D, E, G, P, V, Z, and recite these same letters in the new code: Beer, Ced, Don, E, Get, Pip, Vic and Zig.

Next take the Radio stations, WCBE, WCEZ, WDEZ and WEEP and others of the same conflicting sounds. Now, opposite each call letter, write the new code symbols, as follows:

WCBE.....W Ced Beer Esses  
WCEZ.....W Ced Beer Zig  
WDEZ.....W Don Beer Zig  
WEEP.....W E Beer Pip

In the confusing instance of WGI and WGY, we would have, instead, W-Get-I, and W-Get-Yaw; not much chance for error there. In a short time this new alphabet could be committed to memory by every receiving set owner and every announcer in the country, and when the announcer said, "Ac-Emma-Esses-Tot" into the microphone, every listener would know he was saying "AMST" and not KNFE—and what a relief that would be!

### BROADCASTING FOUND TO HELP OUT ARTISTS

Appear Before Microphone and Producers Pick Them

BUFFALO, N. Y.—Who says that Radio broadcasting is not good publicity for the artists that do the broadcasting? Anyhow, here's additional proof contrariwise.

George Albert Bouchard, well-known pipe organist of Buffalo, whose work has been broadcast from WGR's noon daily (except Sunday since the time the station was established in the new Hotel Statler, recently left the air, except for occasional appearances, because he has signed a contract to appear at Shea's Hippodrome, one of the best known motion picture houses in the country.

Mr. Bouchard will be heard by his WGR admirers every now and then on Sunday afternoon when he will play the Hotel Statler organ which he knows so well.

### Broadcasting Hockey Game Meets Approval

Northwest Tunes in on WCCO for First Game

MINNEAPOLIS, Minn.—Broadcasting of hockey games from Station WCCO is meeting with wonderful response from the Radiophans throughout the northwest. The first game broadcast was from the rink of the Minneapolis team on Friday evening, December 19, at 8:15 p. m.

This is the first time that broadcasting of hockey games has been attempted, and from the results of the first game, plans are under way to broadcast an equal number of games from the rink of the St. Paul team through the Gold Medal station.

Future games to be broadcast from this station are as follows: Pittsburgh, January 24; Cleveland, February 23; Duluth, March 9, and St. Paul, March 16. All these games will be at the Minneapolis rink.

WCCO listeners have responded to the hockey game broadcasts with enthusiasm.

### European Notes

Broadcasting is being carried on nightly from an unknown station located near Dublin, Ireland, much to the annoyance of the Irish post office authorities who have been unsuccessful in their attempts to locate the illegal station.

Suit has been brought against the British admiralty for using Perikon crystal detectors during the war without paying the usual license fee.

There is a large controversy raging in England like that in America, regarding the attitude of theatrical managers to broadcasting plays and operas.

Stations throughout Silesia are broadcasting special programs during workmen's dinner hour, from 12 to 1 p. m. This form of entertainment is making a favorable impression upon the "masses."

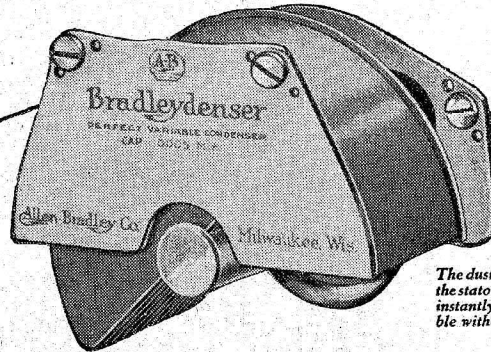
Various nervous disorders are being treated by Radio successfully, according to several prominent London specialists.

### PROGRAM RELAYED BY PHONE SUCCESSFULLY

Seven Mile Gap Yields to Wire and Transformers

COLUMBUS, Ohio.—What probably is a record for relayed Radio reception was accomplished here recently during a social gathering of Ohio Bell Telephone company employees. The meeting was held in the Virginia hotel, and those in charge of the program desired to include Radio as one of the features.

R. C. Bohannon, engineer at WBAV, was asked to help solve the problem and he did it in this way: Mr. Bohannon lives in Upper Arlington, some seven miles from the Virginia. A telephone line was established between his home and the hotel. He turned in the music on a super-heterodyne, passed it through a push pull amplifier, thence by telephone line to the Virginia, through another push pull amplifier and into a loud speaker. The arrangement worked perfectly and the telephone employees listened to programs from New York, Chicago, Buffalo, Dallas and many other distant points.



The dust cap over the stator plates is instantly removable without tools.

## A Low-Loss Condenser for Selective Receivers

THE New Bradleydenser embodies many new and important features that contribute to its high efficiency and low loss. One of the most significant innovations is the omission of the outer end-plate and the substitution of a unique bearing that maintains rigid alignment of the rotor plates without the use of unnecessary insulating or di-electric end-plates. There is almost no di-electric material in the Bradleydenser to absorb energy from the antenna oscillations.

The minimum capacity also is low, affording a wide range of control. This is an important advantage in sets to be operated from loops.

We shall be glad to send you complete information about the Bradleydenser. Drop us a line, to-day!

All plates are solid brass, carefully soldered at all joints. The Bradleydenser resistance does not increase, even after long use.

#### Standard Ratings and Prices

0.00025 M-F. \$4.50

0.0005 M-F. 5.00

0.001 M-F. 6.00

The Bradleydenser has no vernier plates. The shaft is 1/4 in. to fit any standard dial.

Allen-Bradley Co.

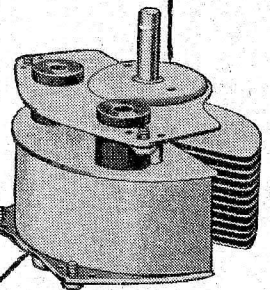
Electric Controlling Apparatus

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Milwaukee, Wisconsin

#### Sales Offices

Baltimore	Knoxville
Birmingham	Los Angeles
Boston	New York
Buffalo	Philadelphia
Chicago	Pittsburgh
Cincinnati	Saint Louis
Cleveland	Saint Paul
Denver	San Francisco
Detroit	Seattle



Notice the amazing reduction of insulating material to two small spacers. The di-electric loss is, therefore, very low.

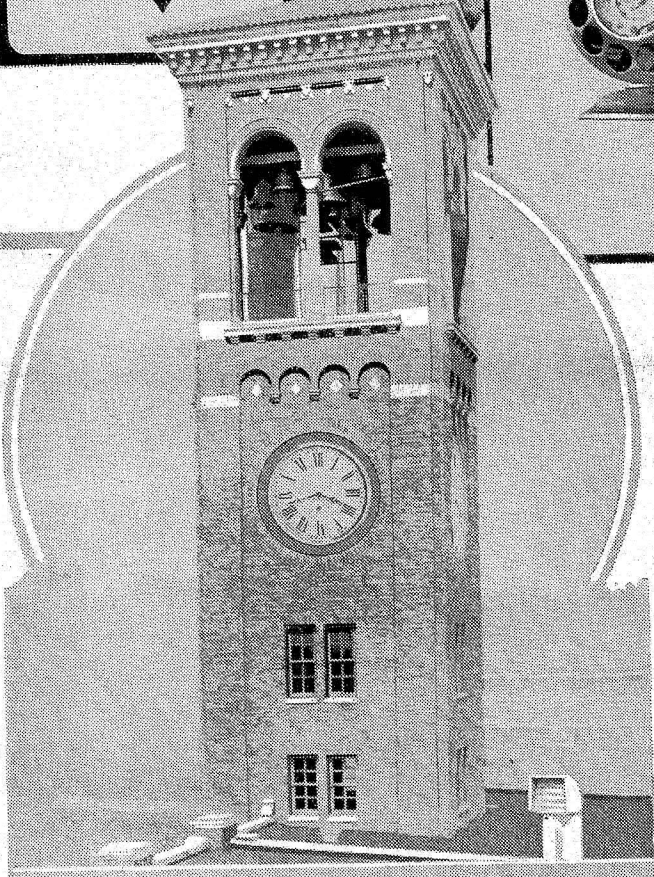
Another Allen-Bradley Radio Device of the same perfection and quality as the Universal Bradleystat



# A Hand That's Hard to Beat—WSAI



Left, this is the tower that John built. It is a monument to Radio ingenuity, enthusiasm and enterprise. A group of nine chime bells are used solely to broadcast chimes music, a pet hobby of John Omwake, president of the United States Playing Card company.



## The Playing Card Station

By Webb G. Welborne

"VOS you offer in Zinzinnati," where the fantastic and the romantic vie with the realistic in the progressive activities of commerce and industry, art and music and in educational, social, religious, civic and community movements?

A unique historical quaintness attaches to this city which gave to the world, not only its first bathtub, but its first thrill in Radiocast entertainment. Here, where "the North meets Dixieland," three states conjoin, not only geographically, but in common bonds of individual and community fellowship.

Without the use of a microphone the sound of the human voice will carry into these three states—Ohio, Indiana, and Kentucky—from a point in close proximity to any and all of Cincinnati's Radiocasting stations, but it remained for Radio to take the Queen City's message, and exploit her musical and entertainment talent, into the furthest reaches of the high seas and to foreign shores.

Literally correct announcements from the Playing Card station would be

"WSAI, Norwood, Ohio," because Norwood and not Cincinnati is the home of WSAI. Norwood, while an integral part of, wholly within and flanked on all sides by Cincinnati, is a separate and independent municipality, self-governed and boastfully self-supporting. It was from this unique city, with a population of approximately 40,000, that WSAI Radiocast its first entertainment on the evening of June 2, 1923, marking the dedication of Cincinnati's second station and the inauguration of year-round Radiocasting of programs.

Bob Visconti's orchestra concert, picked up from the Hotel Gibson during two periods each Tuesday evening, is the premier WSAI booking, having been accorded a more generous reception, supplemented with bounteous praise, than any other regular number on WSAI's programs. Men of conspicuous activity in business and politics in all parts of the country are known to reserve the Saturday night 9 o'clock period to hear the week's world news comprehensively digested (Continued on page 8)



Eugene Mittendorf dictating answers to his secretary to letters received from fans. At last reports he was well on the way to finishing the job.



Frances Corinne Jones, official accompanist and studio director of Station WSAI. She is one very busy person around the studio.



# When Winter Winds Blow Cold



## FRESHMAN MASTERPIECE

*The Greatest Value Ever Offered  
In A Radio Receiving Set!*

**A 5 TUBE TUNED RADIO FREQUENCY RECEIVER,**  
made of the finest low loss materials and in a beautiful genuine solid mahogany cabinet, that is attractive enough for the most pretentious room, and at sixty dollars, economical enough for the most modest.

Combines all points essential to the perfect receiver. Real distance reception without that squealing and howling. So selective that once a station is picked up—it can be brought in again on the same points on the dials, whenever you want it. And what's more,

*It Is Mighty Easy to Operate*

**\$60**

**Have Your Dealer Install One in Your Home!**

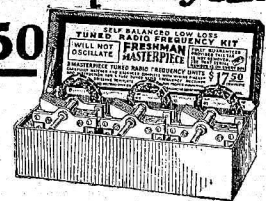
All genuine Freshman Masterpiece Sets have a serial number and trademark riveted on the sub-panel. The Receiver is not guaranteed if number has been removed or tampered with.

**Chas. Freshman Co. Inc.**  
*Radio & Condenser Products*

Write for interesting literature.  
Beware of Imitations and Counterfeits.

**Tuned  
Radio Frequency Kit**

**\$17.50**



**It's Easy to Build**

a five tube radio frequency receiver when you use the Freshman Masterpiece Kit. The result will be a receiver that will bring in even the most distant stations with the volume and clarity of locals. The equal of any 5 tube set in selectivity, simplicity of operation and all around efficiency. Write for interesting literature.

**No Neutralizing  
or Balancing  
Condensers Required**

Freshman Building, 240-248 W. 40th St., New York



## NEW WAVE LENGTHS FOR MANY STATIONS

CHANGES MADE SECRETLY AFTER OFFICIAL TESTS

Department of Commerce Creates Additional Lanes for Proposed Class B Stations

WASHINGTON.—Changing face in the view of millions and at the same time keeping it a secret would be branded by the greatest contortionist as a practically impossible feat. Yet it is comparable to a radical reorganization that has been accomplished by more than a score of the most popular Radio stations in the last few weeks.

For the Radio station the wave length is the chief, if not the identifying, feature of its relation to the uncountable Radio public. And this number of the well-known broadcasting group have been assigned new wave lengths by the department of commerce following secret tests that will result in the opening of new broadcasting channels among class B stations to make room for forty proposed new stations.

### Tests Early in December

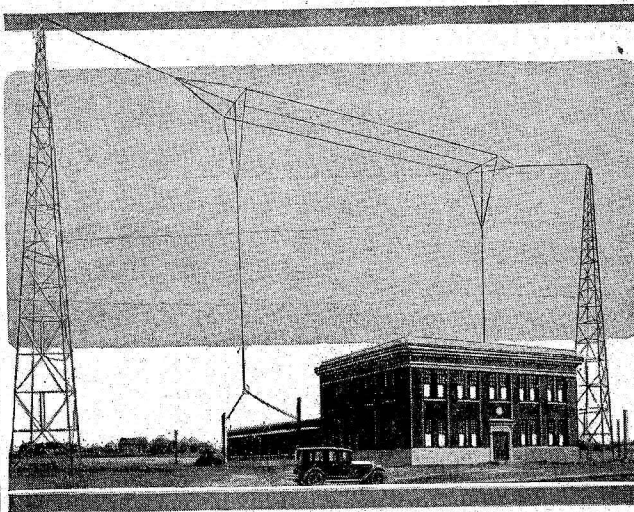
The tests were made through the early weeks of December. For rather than to create more interference in the opening of the new stations the department of commerce decided to reclassify the existing sixty-eight stations so as to create more lanes and maintain the minimum of disagreement.

The hitherto maintained separation of 10 kilocycles was found inadequate for the new additions. Starting on December 8 and running through December 8 several stations were assigned frequencies 5 kilocycles apart. Among those stations were KYW at Chicago, WNYC at New York, WOAW at Omaha, WWJ and WCX at Detroit, WOO and WIP at Philadelphia, and WMX at Memphis.

### Separated 7 Kilocycles Apart

Then, on December 8, these separations were changed to 7 kilocycles. Complaints were remarkably few during this period of experimentation. But experts comparing the two tests found the latter separation more satisfactory on the whole, the smaller separation producing some heterodyning. And the fact that many stations at the extremes of the continent can use

## ROCKY MOUNTAIN STATION—KOA



Located at Denver, Colorado, the third broadcast station to be erected by the General Electric company. The studios, offices and reception room are in the two-story structure. The power house and generator rooms are in the rear.

the same wave lengths with negligible clashing, further aided matters.

Changes in class B stations with a wave length over 484 meters as a result of the tests will go into effect immediately as follows:

Call	Location	New Wave Length	Old Wave Length
WHAA	Iowa City, Iowa.....	498	484
WOC	Davenport, Iowa.....	498	484
WMC	Memphis, Tenn.....	503.9	500
WOO	Philadelphia, Pa.....	509.9	509
WIP	Philadelphia, Pa.....	509.9	509
KLX	Oakland, Calif.....	509.9	509
WWJ	Detroit, Mich.....	516	517
WCX	Detroit, Mich.....	516	517

WOAW	Omaha, Nebr.....	522.3	526
WHO	Des Moines, Iowa.....	522.3	526
WNYC	New York, N. Y.....	528.8	526
KYW	Chicago, Ill.....	535.4	536
WCEE	Elgin, Ill.....	535.4	536
KSD	St. Louis, Mo.....	549.1	546
KFUO	St. Louis, Mo.....	549.1	546

The reason that the changes were not noted is the fact that they cause practically no revision in dialing except on the most selective sets, and then the changes are almost unnoticed. The changes for class B stations under 484 meters will be made in a short time, the distance expected to average around 8, 9 or 10 kilocycles.

## STATION KGO AGAIN PRODUCES DRAMAS

SPECIAL MUSIC SELECTED FOR BETWEEN ACTS

Plan to Broadcast Benjamin Franklin Program—Special Address by Speaker, G. E. Sleeper

OAKLAND, Calif.—As first of a series of Radio dramas given at KGO during the past year, which are to be repeated at the request of thousands of listeners, "The Green Goddess," a thrilling story of India, will be broadcast Thursday evening, January 15. Oriental music will be adapted to the waits between acts by the Arion trio.

Among the pieces selected are Caucasian sketches by Ippolitow-Iwanow, Cossack lullaby by White, Anitra's dance by Grieg, and Song of India by Rimsky-Korsakoff.

### Special Franklin Program

Commemorating the birthday of Benjamin Franklin, a special program of the East Bay Industrial exposition will be broadcast by KGO through remote control circuit direct from the municipal auditorium, Saturday evening, January 17.

G. E. Sleeper will deliver an address on the life of Franklin. KGO artists will appear in person on the platform before the audience in the auditorium.

## Award Contracts for Installing Big Sets

Veterans' Bureau Prepare Hospitals for New Receivers

WASHINGTON.—Award of contracts for installation of Radio equipment in thirty of the forty-nine hospitals operated by the Veterans' War bureau was announced recently by Director Hines. Equipment for four others has been donated, and will be completely installed within four months.

The plan calls for a master receiving set in each hospital, with individual head sets in tubercular and general wards, and loud speakers in assembly rooms. In some institutions, however, loud speakers will be the only equipment.

# Federal Factory Facts

THE plug is the key that unlocks the full possibilities of your receiver. No matter what you are getting off the air, you hear only what the plug lets through.

Buy a No. 15 Federal Plug for your radio phones or loud speaker if you want to know what your radio set can give you.

Buy a Federal Plug today—also take advantage of the other 130 standard radio parts sold under the same Federal iron-clad performance guarantee.

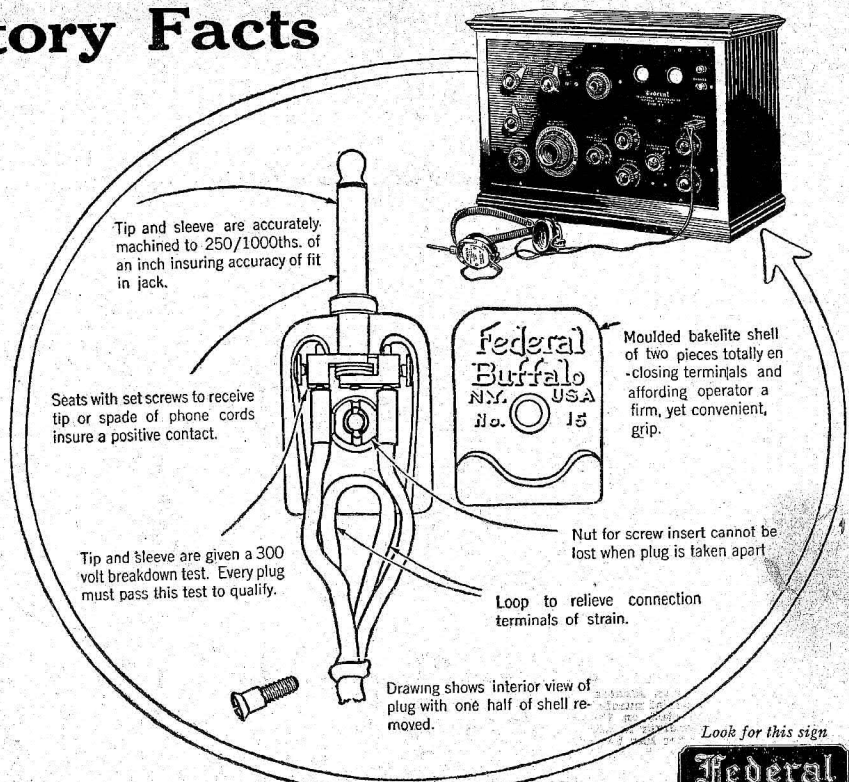
FEDERAL TELEPHONE MANUFACTURING CORPORATION  
BUFFALO, N. Y.

Boston New York Philadelphia Pittsburgh Chicago  
San Francisco Bridgeburg, Canada



# Federal

Standard RADIO Products





## CONFEDERATE VETERAN HIKER



**UNCLE** George Sheram, 85-year-old Confederate veteran of Cogginville, Ga., who has become a national figure through his habit of hiking to and from Confederate reunions every year since they were established always stops by the Atlanta Journal to say hello to his friends there and to speak to thousands of other friends through WSB, the Journal's broadcasting station.

In all the years Uncle George has footed it to all parts of the country to join the other unswerving sons who fought through the war between the states, he has ridden only once, and that was last year. It was his first experience on a train.

The beloved veteran has just returned from Hollywood, California, where he hiked from Memphis, Tenn. He left in June, after the Confederate Reunion, and hiked most of the way to the Pacific coast. His original idea was to sell newspapers in Los Angeles but when he ran up against a syndicate of news dealers who prevented him from getting established, he decided to try the movies. While awaiting his call a bad case of "homesickness" struck the aged hiker, and without waiting any longer he obeyed the urge and hit the high road for Georgia and home.

### Likes Hollywood Beauties

"By Joe," said Uncle George, in talking to his Radio audience, "I sure would have liked to be in the movies, and was waiting for a call when I got homesick. There just wasn't nothing else to do, so I started back to Georgia.

"The Fox people offered me a job to go to South America but I reckon that's too far from town. I was going to stay in California and play in the pictures but I guess I'd rather be here. And by Joe, you never saw such pretty wimmen in your life, as you'll run across out there in Hollywood.

"Everybody was mighty good to me going and coming from the West, and one man gave me a lift of 1500 miles, but I'd rather have been walking. I reckon this country's pretty much the same all over and in my travels I find good folks and bad everywhere. I just wanted to let all my Radio friends know how glad I am to be back home, and to thank everybody for their kindness to me on the longest hike I've ever taken."

### Thinks Bobbed Hair Mannish

Now at eighty-five after completing the transcontinental journey alone, Uncle George appears fit and his kindly blue eyes sparkle with a light which makes a recital of his age appear anomalous. There is a surety to his tread which would do credit to even a much younger man, and his sense of the humorous and his mental processes are still alert.

Uncle George wears his hair long, letting it fall in silver strands about his shoulders, and he sticks to the beard he has been wearing for many years. It thus is natural to agree with his antipathy for bobbed hair, which, he says, makes women "look too mannish."

Georgia, he says is good enough for him, and it doesn't matter if living is cheaper on the coast, the "red old hills" and all that goes with them is what he's used to and what he loves best.

If the distinguished Confederate veteran makes his annual hike to the next reunion, his Radio friends can expect to hear his voice again from WSB on his way back through Atlanta.

Scripps-McRae syndicate gave all its reporters.

Paul A. Green, world war flying veteran and managing director of Station WSAI, installed its equipment after putting into operation six other of the country's front-rank plants. This outfit, the operation of which is under the personal direction of Robert B. Cooper, who pioneered in Radio with the 8XP station back in 1920, soon is to be supplanted by the most modern super-power plant, work on the installation of which will be begun in the near future. The studios were equipped and furnished with a lavish hand, guided by an ingeniously artistic mind.

## WSAI—CINCINNATI

(Continued from page 5)

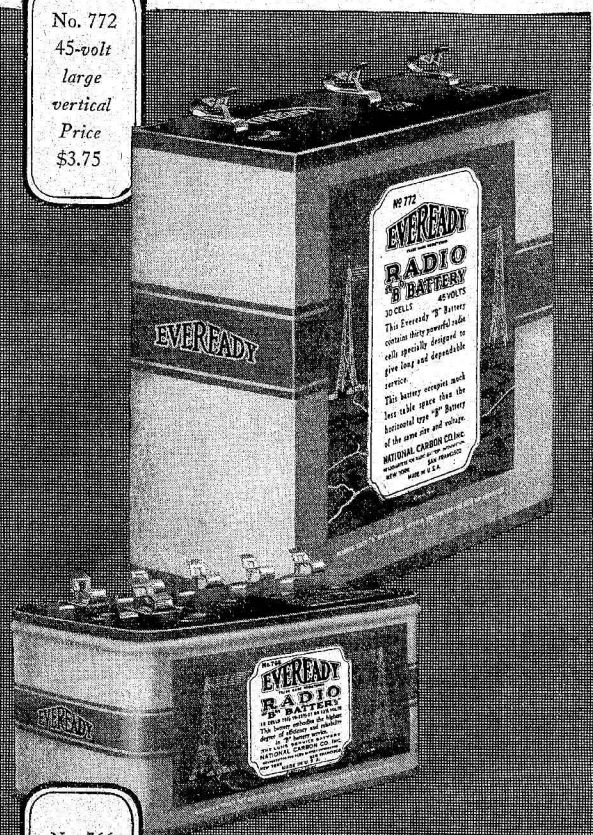
by Rutherford H. Cox, newspaperman and globe trotter. Doubtless some of the kiddies make the voyage to dreamland while Ethel Knapp Behrmann is telling them enchanting good-night stories on Tuesday evenings, but this is of minor concern since she has no way of knowing the size of her juvenile audience either when she begins or when she finishes her tales.

WSAI chimes, distinctively a nationally popular feature of present-day Radiocasting, peal forth their enchanting harmonies, in response to the manipulations of an ingenious and complex contraption vaguely akin to a keyboard, by an expert Swigg bell ringer, at 3 o'clock on Sunday afternoon and at 7:30 on Tuesday and 8 o'clock on Saturday evening each week. The twelve bells, built in Switzerland especially for broadcasting in the United States, the largest of which weighs two and one-half tons and the smallest 300 pounds, are mounted in the belfry of a nine-story tower, the chime music being picked up by a microphone suspended high in the air more than 300 feet from the chime.

Its extraordinary, such as multiple pleasures of Radiophans and the lion of members of the staff, have attained in the field of sport under the direction of Eugene Mittendorf, assistant director and sport announcer. Outstanding among these was the recent Radiocasting of the night football game between Cincinnati university and Kentucky Wesleyan college eleven, report cards on which completely swamped "Mitty" and his secretary.

That was WSAI's red-letter night. The following week Mittendorf gave grid fans of the country a play by play description of the Cincinnati-Georgetown game, and now he almost wishes he hadn't for it will take him another long spell to catch up with his mail. Mitty knows the game of football better than the man who invented it and he sure knows how to tell about the plays. Mitty at one time was a news reporter and during his career in that field got some of that "brevity, accuracy, brevity" training that the old

No. 772  
45-volt  
large  
vertical  
Price  
\$3.75



No. 766  
22 1/2-volt  
large  
horizontal  
Price  
\$2.00

## Cut your operating cost

THIRTY years' experience in the manufacture of dry batteries has enabled us within the past two years to steadily and greatly improve "B" Battery quality. Eveready "B" Batteries are now from two to three times better than ever before.

Eveready "B" Batteries will long outlast any others, and are the most economical and dependable source of plate current. These are strong statements, but they have been proved by tests in our own and in independent laboratories. Check them for yourself on your own radio set. Get Eveready "B" Batteries.

There is an Eveready Radio Battery for every radio use.

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**EVEREADY**  
Radio Batteries  
-they last longer

*Dry's Batteries  
are more economical  
and more dependable  
than any other  
source of plate  
current!*



## PLAN OBSERVATIONS OF ECLIPSE AT WGR

EFFECT ON TRANSMISSION WILL BE STUDIED

Station Personnel Cooperating with Scientists on Latest Theory Regarding Broadcasting

By Lloyd S. Graham

BUFFALO, N. Y.—L. C. F. Horle, chief engineer of the Federal Telephone Manufacturing corporation, announces that WGR, at Hotel Statler, Buffalo, will take a prominent part in the scientific observation of the total eclipse of the sun on January 24.

WGR will be the only broadcasting station directly in the shadow path and the period of the total eclipse here is predicted to be 1.8 minutes, taking place at 9:06 o'clock in the morning. Associated with Mr. Horle in the study of this phenomena are several scientists who will record the effect of the total eclipse on Radio transmission. These include Dr. Alfred N. Goldsmith; Dr. M. E. Free, editor of the Scientific American; Greenleaf W. W. Pickard, and S. Kruse of the American Radio Relay League. Observations will be made in Boston, Ithaca and New York Stations.

### WGR to Play Active Part

This is the part which WGR will play in the observations: It will transmit on 319 meters between 7:30 and 11 o'clock in the morning on January 22, 23, 24, 25, and 26. Approximately 500 watts, modulated and unmodulated will be delivered to the antenna in fifteen minute periods. A thousand cycle modulating note giving constant modulation of not more than 20 per cent. modulation will be used. Periods of modulation will be divided into three five-minute intervals, at the beginning and end of which call letters will be repeated in code.

According to the statement from Chief Engineer Horle, it has long been recognized as a fact that the sun weakens Radio waves and this has given rise to the theory that daylight transmission is affected by waves close to the earth's surface. At night broadcasting waves move along a heaviside layer estimated to be about sixty miles above the earth. Night transmission is considered to be far more uniform than that of daylight.

### Astronomers Tell of Observations

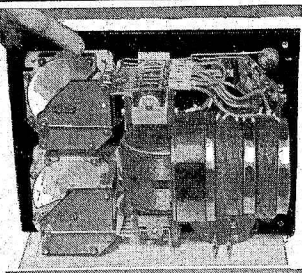
Observations of astronomers indicate that electrons which affect Radio waves are constantly encircling the earth. At the theoretical junction line of light and darkness, a permanently ionized region is believed to exist. This ionized region, being a good conductor, is impenetrable to Radio waves. Fading is attributed by some to this barrier condition.

As is well known, atmosphere, from an electric viewpoint, is not a perfect insulator because the gases constituting it are ionized partly by the cathodic rays. Elaborate preparations are being made by M. A. Rigg, Jr., manager of WGR, so that the observations made by Mr. Horle and the other scientists may be as complete as possible.

### Station KFJF Included in Link of Broadcast Stations

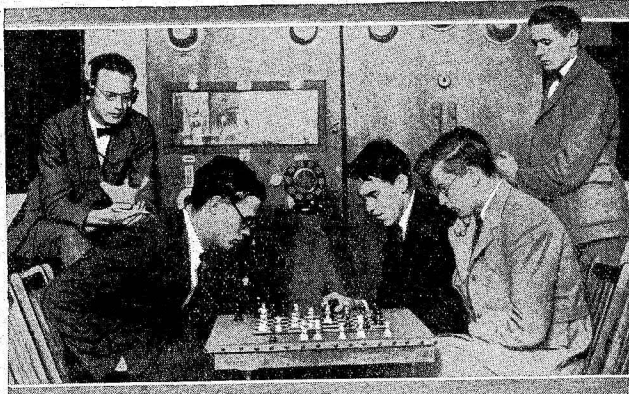
OKLAHOMA CITY, Okla.—It is reported that Station KFJF, located in this city, may become a link in the Radio chain of the American Telephone and Telegraph company, which is now extending westward. The proposed extension will be made to Kansas City some time the middle of this year, and shortly thereafter it will be run to Dallas or Fort Worth through here.

### GERMAN ARMY SET OF UNUSUAL DESIGN



That a crystal set can be made to work efficiently under almost any conditions is proved by this German army set, which was used extensively during the world war. One condenser is in the aerial circuit, as is also the rotor of the coupler; the second condenser being used across the secondary. Note the special type of tap switches used in this set.

## BROADCAST CHESS GAME "MOVES"



Broadcast chess game played by students of the City College of New York. Each move was reported by Radio. The game was one of the activities of the Intercollegiate Radio league, which held a Radio chess game with Oxford, in England, recently.

The leper colony on the Isle of Cullion isolated world by means of a sensitive in the Philippines, with a population of Radio receiver donated by an electrical 5,500, is soon to be connected with the concern.

## Broadcast Ford Hall Forum Every Sunday

Meetings Create Favorable Impression Upon Listeners

BOSTON.—Through the co-operation of the management of the famous Ford hall forum in Boston with Station WBZ, arrangements have been made for the broadcasting of a series of these Sunday evening meetings devoted to the popular discussion of vital public questions under the leadership of representative men and women throughout the country. The results of past experiences were so satisfying to the forum and WBZ management and to the Radio public that arrangements have now been made with WBZ to broadcast the Ford hall forum meetings on the following dates:

January 11.—Angelo Patri, "Character Training."

January 18.—Abraham Cahan, "Are We Taking Literature Seriously Enough?"

February 8.—Dr. James J. Walsh of New York, topic to be announced. The list of speakers and subjects will be enlarged as the Ford hall forum season continues, in accordance with the interest manifested by the Radiophans. The meetings continue at Ford hall up to and including the first Sunday in April.

The British Broadcasting company has decided to reserve a certain hour each day to broadcasting entirely devoted to English school children.



## Winner of Trans-Atlantic Tests with Her Freed-Eisemann

Mrs. Edna M. Smith of Springfield Gardens, Long Island, is the winner of the handsome silver cup, awarded for being the first contestant to report reception of European broadcasts on a Freed-Eisemann Receiver.

The winner was selected by "Radio Broadcast" Magazine, which was in charge of the international tests, and verified the reports of reception. Scores of other participants in the tests heard the following European stations on Freed-Eisemann Receivers:—

Paris, Petit Parisienne	Glasgow . . .	5 SC	
Madrid . . . PTT	Aberdeen . . .	2 BD	
London . . . 2 LO	Brussels . . .	8 BR	
Bournemouth	6 BM	Liverpool . . .	6 LV
Newcastle . . .	5 NO	Birmingham . . .	5 IT

For full sworn statement and fac-simile letters write—

*Freed-Eisemann Radio Corporation*  
MANHATTAN BRIDGE PLAZA, BROOKLYN, N. Y.

# FREED-EISEMANN

## RADIO RECEIVERS





## Playing His Way Into the Hearts of Millions, Snodgrass Attains Fame

"King of the Ivories," Inmate at Missouri State Prison, Receives Thousands of Letters After Giving Concert—Sentence Expires on January 16

ALTHOUGH it is generally conceded that a prison would be the last place to go in order to attain national fame and honor as an entertainer, Harry M. Snodgrass, an inmate of the Missouri State Prison, through his extraordinary skill as a pianist has played his way by means of Radio into the hearts of millions of Radiophans throughout the length and breadth of the country and has won several popularity contests as the most popular Radio entertainer appearing at any station.

Snodgrass, who is known to the Radiophans as "The King of the Ivories," was sentenced for a three year term for attempted robbery in St. Louis, while under the influence of intoxicating liquor which was the direct cause of his downfall.



Harry M. Snodgrass, known to thousands of Radiophans as "King of the Ivories." The public will have a chance to see and hear him on the vaudeville stage shortly.

nine years old, married and has a son nine years old, is of slight build, about five feet four inches tall and weighs about one hundred and ten pounds, plays entirely by note, adding his own transposition of the number as he plays. It might be said that his musical education was obtained by diligent study on his own part, and a wealth of experience obtained through playing as a music demonstrator in music in five and ten cent stores, where he was accustomed to playing from eight to ten hours a day for several years.

Several masters of the piano have declared that his expression and technique is inimitable and that his playing is especially well adapted for recording, predicting a great future for him if he is able to keep out of future trouble, and as Harry assured that he has learned his lesson, we are confident that he will profit by his experience.

### Discharged Next Week

Snodgrass will be discharged on the sixteenth of January, at which time he will fulfill a vaudeville engagement.

In addition to playing the piano in recitals, he also plays this instrument with the prison orchestra and the saxophone in the prison band. Both of these organizations appear regularly every Monday

Thousands of letters are received weekly by Station WOS from which he broadcasts regular programs while under the surveillance of the prison guards. These letters, often eight thousand on a single concert, request information of every conceivable nature about Snodgrass, so deeply is the Radio audience interested in the exceptional ability and technique of this pianist. Nearly all of the inquiries received want to know the length of the term for which he was convicted, whether he is white or black, what age, his appearance, whether he is married or single, does he play by note or by ear, where was his musical education obtained, when will he be discharged, and would it be to his advantage to circulate a petition to the governor for his immediate pardon.

### Receives Many Gifts

Through his many warm admirers in the Radio audience he is constantly supplied with cigars, cigarettes, candy, fruit and cakes, to say nothing of more unusual gifts such as gold pencils, neckties, hose, hats, shirts, new music, etc. Among these gifts, unusual requests received by the Radio audience regard to Snodgrass was a tall white request from a manufacturing concern in the State of Illinois to entertain their employees with his expenses, and the expenses of a guard to accompany him, together with an honorarium to be paid by their concern. Of course, this request could not be granted as the inmates of the prison are not allowed to leave the prison walls with the exception of the time when they appear on the Radio programs and then they are under the constant supervision of the guards.

### Displays Wonderful Technique

Owing to the national reputation he has acquired by Radio as the time for his discharge draws near, the theatrical managers and record piano roll manufacturers are all anxious to contract with him for his services, so great do they anticipate the public demand will be for his piano numbers.

Snodgrass, as you can see by the accompanying photograph, is white, twenty-

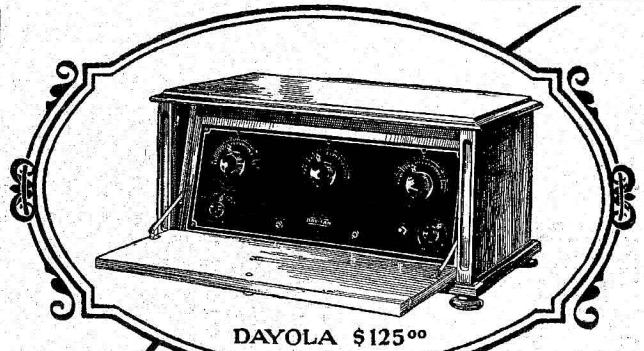
fortnight from the studio of Radio Station WOS, located in the dome of the State Capitol, Jefferson City, Missouri, and operated by the State Marketing Bureau. It is claimed that these are the only convict entertainers who regularly broadcast from any station.

He has made his musical reputation since he was imprisoned, a little over two years ago, in very much the same manner as O. Henry won a reputation as a story writer while he was serving a term in the Ohio Penitentiary at Columbus for forgery. Snodgrass, like O. Henry, has discovered his own powers only since his imprisonment and will have a profitable profession and presumably an honorable career when he has served his time. Truly, "Stone walls do not a prison make, nor iron bars a cage," to the man with a gift and a will to use it.

### Station KOB Establishes Broadcast Course in Code

STATE COLLEGE, N. M. — The New Mexico College of Agriculture and Mechanic Arts, Station KOB, has just begun a broadcast course in telegraphy. The regular Wednesday night period on KOB's schedule (7:30-8:30 P. M. Mountain time) is devoted to this new feature. Anyone may enroll as a student by simply writing the Radio Department, New Mexico College of Agriculture and Mechanic Arts, State College, New Mexico, and requesting an application blank. There is no expense connected with the course other than the cost of postage and the purchase of a set upon which the student may practice. This can be made or purchased at a very nominal cost from local electrical dealers.

WLW Noonday Programs Popular CINCINNATI.—Since the inauguration of the noon-day programs which begin at 12:15 and continue for forty-five minutes, appreciative reports have been received at the Crosley WLW studio from fans who heretofore had nothing to tune to in Cincinnati.



DAYOLA \$125.00

# The Set that is Already Logged!

EVERY DAY-FAN set comes to you with a complete list of broadcasting stations with their corresponding dial settings.

Select the station you want—turn the pointers to the positions furnished with the set—and listen in. That's all that is necessary when you use a DAY-FAN.

ALL DIAL SETTINGS ARE THE SAME FOR EVERY SET, EVERYWHERE, ON ANY ANTENNA

The entire DAY-FAN line, comprising models priced from \$90 to \$285 has this new and exclusive feature.

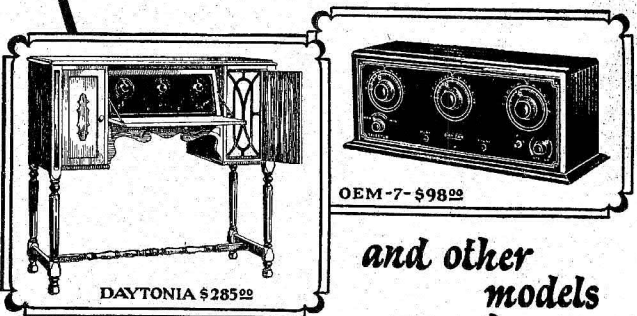
### EVERY MODEL A YEAR AHEAD

Although radio science has developed at an astounding rate in the past few years, the DAY-FAN has always kept well in the lead. The remarkable qualities of tone clarity, simplicity, beauty, and volume which distinguish all DAY-FAN sets entitle us to say that they are a year in advance of present radio standards.

## The DAYTON FAN & MOTOR CO.

Manufacturers of High-Grade Electrical Apparatus for more than 35 Years

DAYTON, OHIO.



and other models

# Day-Fan

RADIO

A YEAR AHEAD



## STATION KNX HELPS BOOST HOLLYWOOD

TO CORRECT ERRONEOUS IMPRESSION OF CITY

Movie Stars Head Program Since Opening of Station—Celebrities Talk to Fans

HOLLYWOOD, Cal.—KNX, "The Voice of Hollywood," is starting out in a way that makes one believe that it really is going to be the voice of that much maligned city, and help correct many of the impressions that people all over the world have of the capitol of filmdom.

Recently, appearing over the air in an appeal for funds for the Los Angeles Community Chest, KNX presented a number of motion picture people. The list included William "Bill" Desmond, little "Sir" Richard Headrick, Lew Cody, Lois Wilson, Robert Eastman, Walter Hiers and others equally well known to fans of the silver screen.

### Chance to Hear Movie Stars

Movie nights are going to be a regular thing with KNX in the future and distant fans, who otherwise could never hear the voices of their favorite actors and actresses, can tune in on KNX's 337-meter wave and get the thrill of actually hearing the voices of the big stars of movieland. Paradoxical as it may seem, those who live right in Hollywood rarely see or hear these same stars except through the same means that people in Chicago do—on the screen or over the Radio.

Making pictures is a highly concentrated, intensive and high speed art, and when the days work is done those concerned with its production are equally ready to rest with those who have spent the day in stores and offices, and many times probably more so.

Just as an instance, Lois Wilson dropped in at KNX to say a few words on her way to the "ranch" back of Universal City where she was to work all night, and it gets cold up in the hills back of Universal City during the night.

## Radio Courses Newest at University of Iowa

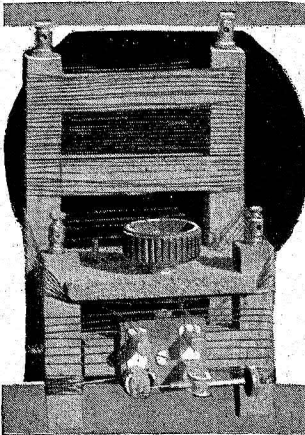
Plan to Reach Correspondents Directly by Air

IOWA CITY, Iowa.—The long arm of the University of Iowa classroom is going to become as long as the well-known reach of the law—maybe a little longer—February 4, 1925, when the university's broadcasting station, WHA, will become the means of reaching correspondence students from coast to coast.

Regular, accredited, Radio courses will begin at that time in economics, commerce, sociology, education, English and political science.

"All persons are invited to follow the Radio lectures, but all who desire credit must be regularly registered before the first lectures are given and should at once report to the extension division, indicating the courses selected," reads a bulletin which the university will issue shortly announcing the organization of the Iowa university of the air. "Registration materials will be sent promptly to all who so report."

## ELECTRIC CHAIR IS REALLY RADIO SET



The "last word" in novelty sets—this electric chair receiver was designed and built by Leonard Oswald of Chicago. It is capable of receiving programs from local stations with exceptional volume.

## LISTENS IN WHILE HUNTING



The modern nimrod while waiting for the ducks to ruffle the water, tunes in to one of the broadcast stations and enjoys the music. Photo shows Alfred Reilly, trying it out in New Jersey. Thus adds another episode to the endless epic of Radio.

Few nations today have not recognized of one sort or another. Most foreign the popular and growing interest in Radio countries maintain regular broadcasting by the enactment of laws and regulations schedules.

## Stevens Point Has Good Market Data

Broadcasts Farm News and Market Reports to Rural Districts—Leased Wire Service at Station

STEVENS POINT, Wis.—Station WLEB of the Wisconsin Department of Markets, located in Hotel Whiting, is recognized as the leading 500-watt station in the Northwest for the dissemination of market news.

WLEB is at present trying to determine the approximate number of listeners on its daytime market broadcast. It is interesting to note that many of the replies are from neighboring states. They all report hearing the station perfectly and consider the weather forecast and markets a real service.

### Broadcast Special Saturday Program

The office of WLEB is equipped with leased wire service, in co-operation with the United States Bureau of Agricultural Economics, and late markets are available for Radiocasting within a short time after they are released from the principal cities and shipping points on the leased wire circuit.

On Tuesday evening of each week a program is Radiocast from the station. This program is given under the auspices of the local chamber of commerce. On Saturday at 12 midnight, Central time, a musical frolic called the "Enemies of Sleep," is a feature that many enjoy.

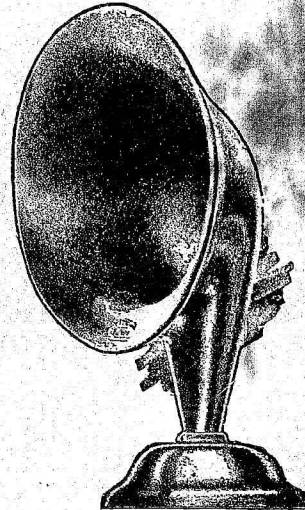
# Fultone

Trade Mark

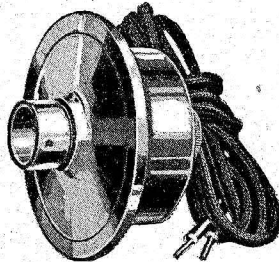
THE FORD of LOUD SPEAKERS

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This unit is the secret behind the unparalleled success of the Fultone Speaker. Its large diaphragm and bobbins wire are protected from injury by a heavy nickel-plated case through the back of adjustment is made by means of a special key. The pole pieces are not made from solid piece of iron but are assembled from 15 laminations of carefully chosen steel.

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- Edison Adapter.....25c
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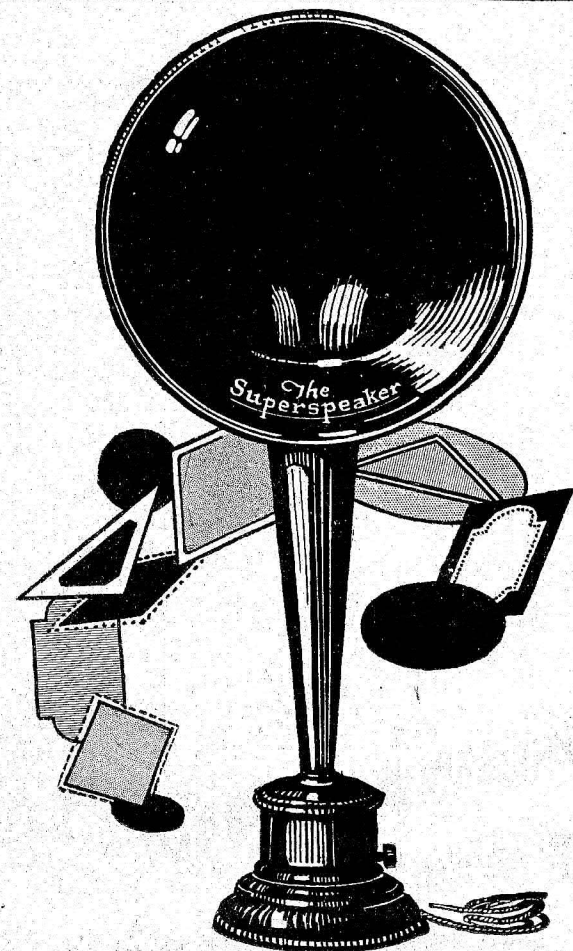
AN EVENING AT HOME WITH THE LISTENER IN (SEE INSTRUCTIONS FOR USE BELOW)

Table with columns: Station and City, Met., Saturday, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday. Lists radio stations and their broadcast times.

Instructions for Use.—All the hours above are given in Central Standard Time. If your city uses Eastern Time, add one hour to each of the periods stated; if your city uses Mountain Time, subtract one hour; if your city uses Pacific Time, subtract two hours. This table includes only the evening broadcasts, and, on week days, the afternoon program.

STATIONS IN ORDER OF WAVE LENGTHS USED

Table with columns: Station, Call, Meters, Call, Meters, Call, Meters, Call, Meters, Call, Meters, Call. Lists stations in order of wavelength.



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The Superspeaker, Jewett Radio & Phonograph Co. DETROIT 5670 Twelfth Street MICHIGAN











# KSD TO BROADCAST 18-HOUR PERIOD

## Monday, January 12

(Continued from page 14)

Harry Ash's Royal orchestra; 7:30-7:55, police alarm; 7:55-7:45, health talk; 7:45-8:30, Harry Ash's Royal orchestra; 8:30-9:45, Roosevelt program from Radio theater and studio program; 10:10-10:30, Board of Education.

WQAW, Omaha, Neb. (Central, 526), 6 p. m., dramatic hour, Davis Studio of expression; 6:45, Sammy Hamman's orchestra; 8:30, Brantley Store restaurant; 9, father and son program.

WOC, Davenport, Ia. (Central, 484), 10:05 a. m., household hints; 12 m., chimes concert; 7 p. m., Sunday's visit, Val McLaughlin; 7:50, "Drops," L. V. Willes; 8, formal opening of WOC's new Radiothon transmitter; Tri-city symphony orchestra, Ludwig Becker, conductor; Franz Wagner, cellist; Jeanette Brewehaker, soprano; Robert Lynch, baritone; 10, program, Chanticleer club.

Bilmore hotel concert orchestra, Edward Fitzpatrick, director; 6:30-7:20, Professor Walter Sylvester Herzog, little stories American history, weekly visit of Queen Titania and the Sandman of Fairyland, Uncle John; 8-11, program, Rosamond Motor company, presented by J. Howard Johnson; 11-12, Earl Burnett's Bilmore hotel dance orchestra.

KIS, Los Angeles, Calif. (Pacific, 360), 8-9:30 p. m., musical program of classical nature; soprano solos, organ recital.

KXK, Hollywood, Calif. (Pacific, 337), 8 a. m., morning prayer; 9, program, State Board of Education; 10:30, home economics, Mrs. Kate Drew Vaughn; 5:30-6, Town Crier and Village Urubins; 6:30-7, dinner hour music, R. C. "Cliff" Durant; 8-10, program, Debeque Sales Land company; 10-11, dance orchestra; 11-12, Abe Lyman's Coconut Grove dance orchestra from Ambassador hotel.

KPO, San Francisco, Calif. (Pacific, 423), 1-2 p. m., Rudy Selger's Fairmont hotel orchestra; 4:30-5:30, Rudy Selger's Fairmont hotel orchestra; 5:30-6:30, children's hour stories; 10, recital of KPO; 7-7:30, Rudy Selger's Fairmont hotel orchestra; 8-9, California Composer's night; 10-11, E. Max Braddock's Versaille band.

KSAC, Manhattan, Kan. (Central, 341), 12:30 p. m.,

8:30, Irene Klempeter, soprano; 8:30, Bible lecture; "God's Remedy for World's Distress," Harry Pincock; 8:30, Irene Klempeter, soprano; 8:35, Syrian Oriental music.

WZ, Springfield, Mass. (Eastern, 337), 6-7 p. m., dinner concert; 7:10, kiddies' bedtime stories; 7:15, lecture, address; 8:50, concert; 11:30-12, organ concert.

WCAL, Northfield, Minn. (Central, 369), 9-9:55 a. m., St. Olaf college chapel services.

WCCO, Minneapolis-St. Paul, Minn. (Central, 417), 10:35 a. m., "Venetian Dinner," Betty Crocker; 2 p. m., women's talk, League of Women Voters; 4, "Our Wanted-a-Male," Ellis Parker Butler; 5:30, children's hour; music, Hotel Woodlodge; 6:30, Gold Medal Lady; 6, talk, C. G. Rubinow; 6:30, dinner concert, Riley's concert orchestra.

WCX, Detroit, Mich. (Eastern, 513), 4:15 p. m., music; 6, dinner concert, Book-Cadillac hotel; 7, musical program; 10, The Red Apple club.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Star's Radio trio; 5-5:30, weekly children's program; 6:30, school of the air, piano tuning-in number on the Duo-Art; fourteenth of a series of Radio piano lessons, Mandelien Littlefield; the Tell-Me-a-Story lady; music, Hotel Woodlodge; 7:10, piano ensemble; 11:30-1 a. m., nighthawk frolic, the "Merry Old Chief" and the Phinixing players.

WDAF, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., daily almanac; 12:02 p. m., Stanley theater organ recital; 2, Aradisa cafe concert orchestra; 2, Aradisa cafe

concert orchestra; 7, Sunny Jim, the kiddies' pal; 7, Eveready hour (on WBAE); 9, Goodrich Silver-ton orchestra from WBAE.

WGN, Chicago, Ill. (Central, 370), 1:40 p. m., luncheon concert; 2:30, Lyon and Healy artist cafes; 3, rocking chair time; 5:30, Skeewis time; 6, organ recital, Lyon and Healy; 6:50, dinner concert; 8, program, Chicago Association of Credit Men; 10, dance numbers, Don Bestor Drake orchestra.

WGB, Buffalo, N. Y. (Eastern, 319), 12:30-1 p. m., Hotel Statler concert ensemble; 2:30-4:30, Buffalo Courier and Enquirer musical program; 6-7:30, dinner music; 8:30, Halcyon orchestra; 9:10, "Eveready Hour," jointly with WBAE; 10-11, Goodrich Silver-ton orchestra.

WGV, Schenectady, N. Y. (Eastern, 380), 2 p. m., "Women in Industry," Mrs. A. Dingman; 6:30, dinner music, Hotel Tenbyck trio; 7:45, "Tic-tac-Toe," J. F. Zoller; 8, program of dance music, Bon Ton orchestra; 11:20, Stephen E. Boelscher, organist.

WHS, Louisville, Ky. (Central, 400), 4-5 p. m., selections, Alamo theater organ; 7:30-9, Rossos's entertainments; chapters XIII and XIV of the "Billy and Jane" stories, James Speed.

WHK, Cleveland, Ohio (Eastern, 283), 6 p. m., English Room trio, Hotel Union.

WHN, New York, N. Y. (Eastern, 360), 12:30-1 p. m., Chas. Strickland and his Palms D'Or orchestra; 2:15-2:45, Eveready and vaudeville from State theater; 5:30-7, Strand Rock entertainers; 7-10, "Personal Chats of the Stage and Screen," E. S. Collins, movie critic; 7:10-7:30, "The Madras Period," radio casting; 9:30-10, Bertism J. Goodman's orchestra; 10-10:30, "The Madras Period," music and entertainment; 10:30-12, New Rockwell Terrace revue; 11-11:30, Club Rose revue; 11:30-12, Sam Wooding and Club Alhambra orchestra.

WIP, Philadelphia, Pa. (Eastern, 569), 1 p. m., organ recital, Karl Bonawitz; 3, John McGreevy, baritone; 6:30, songs, Mark Fisher and Joe Burke; 6:45, Harry Marburger and his vaudeville orchestra; 7, Uncle Wip's bedtime stories; talk, Jules E. Masbaum; dramatic recital, Elliott Lester; 8:15, Philadelphia police band, Director Lieutenant Joseph Kiefer; 10:35, "Tom's Weekly Movie Broadcast," Eli M. Grawitz; 10:50, Harvey Marburger and his vaudeville orchestra.

WJAX, Cleveland, Ohio (Eastern, 390), 7:30 p. m., program arranged by Cleveland News-Leader; bedtime story, E. C. Bacon; radio cartoon talk, Don C. Palmer; Musical Mappies jazz orchestra; vocal, instrumental solos.

WJD, Mesquite, Ill. (Central, 278), 3:30-4:30 p. m., Moessner children; 6:30-7:15, Albert F. Brown, organist; 7:15-8:15, Moessner concert band; "Child Care," M. P. Adams.

WJY, New York, N. Y. (Eastern, 405), 8:30-9:30 p. m., Goddard National bank quartet.

WKAG, San Juan, P. R. (Intercontinental, 360), 9-10:30

WKBF, Providence, R. I. (Eastern, 286), 8:30 p. m., Vincent Lopez band orchestra.

WLBL, Stevens Point, Wis. (Central, 278), 8 p. m., Musicale.

WLS, Chicago, Ill. (Central, 345), 12-1 p. m., "The Farmer and His Local Newspaper," H. C. Butcher; "Milk as a Food," Val McLaughlin; 3:15-4:45, "What Book Do You Read," Mrs. M. H. Foster; "Home Lighting," William A. Durkin; "Feeding the Family Properly on a Proper Budget," Mrs. Wilbur B. Frigley; 6:30, Ralph Emerson, organist; 8:30, recital, Senate theater studio; 7, lobby time, Ford RWLW and Glenn Howell; 8:30, Alvin Karpis, mezzo soprano; Charles L. Hutzler, bass; 7, "Treasure Island Inn orchestra; 8:15, Ishana Jones and his College Inn orchestra; 8:15, "Milk as a Food," M. O. Maughlin; 9, "Taming of the Shrew," Anthony Wens; 9:20, Grace Wilson, contralto; 9:30, Robinson and Bernard; 9:40, Art Kahn's Senate theater orchestra; 10, Chicago cable glee club; 10:40, Ford and Glenn How; 11, Ishana Jones and his College Inn orchestra; 11:10, Carroll vaudeville revue; 12:10, Ralph Emerson, organist; 12:30, Ishana Jones and his College Inn orchestra; Ford and Glenn.

Natalie Brigham was the first artist to appear before the microphone of KTHS, Hot Springs. She will sponsor another concert at this same station, January 13, from 8:30-10 p. m., which, judging from her last reception, will be very popular.



Madame Margarita Selinsky is the violin soloist with the Selinsky quintet on the Cincinnati Post-Crosley dinner hour program at WJW.

WOL, Ames, Ia. (Central, 360), 12:30 p. m., college clinics; "Community Control," Paul H. Miller; 10, program.

WOP, Philadelphia, Pa. (Eastern, 509.9), 11 a. m., organ recital, Mary E. Vogt; 12:30 p. m., Wagon-maker crystal ten room orchestra, Robert E. Golden, director; 4:45, concert, Mary E. Vogt; 5, sports results and police reports; 7:30, A. Candelori and his Hotel Adelphi concert orchestra; 8:30, Harriette G. Hideo, pianist; WOO orchestra; 10:05, organ recital, Mary E. Vogt; 10:30, Vincent Hizzo and his Hotel Sylvia dance orchestra.

WOS, Jefferson City, Mo. (Central, 440.9), 8 p. m., Harry M. Shodgers, pianist.

WOS, Atlanta, Ga. (Central, 429), 5-6 p. m., songs, bedtime story, Bonnie Barnhardt; 8-9, Vick Meyers Melody orchestra; 8:30, Harriette G. Hideo, G.

WTAM, Cleveland, Ohio (Eastern, 360), 6 p. m., Philip Spitalny's Music Box orchestra; 8, concert program.

WVI, Detroit, Mich. (Eastern, 513), 8:30 p. m., The Detroit News orchestra.

## Tuesday, January 13

Tuesday, silent night for CHCO, KFEE, KFAU, KFNF, WDAW, WBBW, WCAU, WCBW, WCCO, WCG, WHAZ, WHK, WRG, WWD, WOI, WOO, WOS, WTAM.

CKAC, Montreal, Can. (Eastern, 437), 7 p. m., Kiddies' stories in French and English; 7:30, Windsor hotel dinner concert ensemble; 8:30, concert, Frontenac Brewery; 10:30, Windsor hotel dance program.

GNRA, Regina, Can. (Central, 420), 8:10 p. m., bedtime travel tale; B. A. O. B. orchestra and band.

KDKA, East Pittsburgh, Pa. (Eastern, 326), 9:45 a. m., stock reports; 12:10, Seattle Post-Intelligencer musical program; 10:05-11, Eddie Harshen's Jazz orchestra.

KFSG, Los Angeles, Calif. (Pacific, 278), 10:30-11:30 p. m., sunshine hour for shut-ins; 3:30-4:30, organ recital, Esther Felice Green, organist; 4:30-4:50, children's hour in Gray; 8:30-9:30, concert.

KGO, Oakland, Calif. (Pacific, 312), 11:30-1 p. m., luncheon concert, Pacific State Electric company; 4-5:30, concert orchestra, Hotel St. Francis; 8, program, Young Men's Christian Association; Missions Liveable, pianist; vocal duets, Margaret and Kathryn Jones; George H. DeKay, Jr.; H. Victor Vogel, bass; Elsa Bohlow Trentner, soprano; "Character Building on the Four Fold Basis," Richard R. Perkins; 10-11 a. m., dance music, Hoary Halstead's orchestra.

KGW, Portland, Ore. (Pacific, 402), 12:30 p. m., concert; 5, story, Uncle Dave; 3, agricultural lecture; 8:30, concert, Civic Music club; 10, Multnomah Hotel Strainers' orchestra.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30 p. m., program of news and music; 6-6:30, Art Hickman's

Oonaha Hall Burr, reader; "Constalk Delmonico in Cattle and Horses," Dr. H. R. Dykstra; 7:20, colliers bell and opening exercises; 7:30, "Preparation of Foodstuffs," Armas Abbott; 8:30, Radio college trio; 7:45, "The Selection and Care of Hatching Eggs," L. F. Payne.

KSD, St. Louis, Mo. (Central, 549.1), 4:10 p. m., home economics; 5, special round-the-world test, concert, Benjamin Rader's orchestra; R. R. Y. M. C. A. mandolin orchestra; Dr. A. G. Polman, speaker; John W. Wynn, baritone; Emma O. Waller, accompanist; C. G. Cady, baritone; Exchange club program; Vin James, pianist; Ruth Kelo-Benford, reader and other.

KTHS, Hot Springs, National Park, Ark. (Central 375), 3:30-6:30, Meyer Davis orchestra, Jack Renard, director; 8:50-10, concert, Natalie Brigham, violinist.

KYW, Chicago, Ill. (Central, 330), 11:35 a. m., table talk, Mrs. Anna J. Peterson; 2:30-4 p. m., afternoon frolic; 6:35-7, children's bedtime story, Uncle Bob; 7-7:30, dinner concert, Congress hotel; 7:30-7:45, around the town with KYW; 8-8:30, Edith Wimmer, contralto; Edna DeLoe, soprano; Florence Roy, pianist; Lewis Mehan, tenor; 8:30-8:45, program, auspices American Farm Bureau federation; "Live Stock Market Conditions," J. D. Harper; "The Shippers' Responsibility," O. W. Sandberg; 8:45-9:30, music; 10-11:30, evening at home.

WBAF, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., musical program, artists Baptist Seminary, Frank Clegg, director; 9:30-10:45, dance music, Coca-Cola company orchestra.

WBVA, Columbus, Ohio (Eastern, 423), 8 p. m., WBVA orchestra Frances Hanthelbe director in program of vocal and semi-classical selections.

WBBR, New York, N. Y. (Eastern, 273), 8 p. m., Syrian Oriental music, Toule Moubaid, Elizabeth Awad;

concert orchestra; Marcelle North, pianist; 4:30, Andrew M. Strawn; Chas. V. Cook, soprano; 7:30, Dream Daddy's bedtime stories; 7:50, "Behind the Footlights," Armas Abbott; 8:30-9, Gold Dust Twins; 9-10, Eveready hour; 10-11, Goodrich Rubber company.

WEBH, Chicago, Ill. (Central, 370), 7 p. m., Orleole orchestra; P. E. Hathaway, tenor; Anna May Hathaway, violinist; musical hits, Riviera theater; 9, orleole orchestra; Dennis sisters; Chicago Association of Credit Men; 11, Orleole orchestra; Low brothers.

WEBJ, New York, N. Y. (Eastern, 234), 7-7:15 p. m., Bibbryn's review of new photography; 7:15-8, Walter Wislak's orchestra; 8-8:30, Jimmie Clark and his White Way entertainers; 8:15-9, Jean Morson, tenor; Norman Homefeld, accompanist.

WEI, Boston, Mass. (Eastern, 363), 6:30 p. m., Boston Edison Big Brother club; 7, Duk-Disenburg and his Sunlons; 8, program, Mr. Frothingham, director; 9, program, New York studio, Eveready hour; 10, program, New York studio, Goodrich Silver-ton orchestra.

WFAP, Dallas, Texas (Central, 476), 12:30-1 p. m., address, Charles E. Osborne; 8:30-9:30, Elizabeth Gay Cole company orchestra; 11-12, Falco theater organ, Dwight Brown, organist.

WFI, Philadelphia, Pa. (Eastern, 395), 1 p. m., Meyer Davis' Bellevue Stratford concert orchestra; 3, report, closing prices, Chicago grain market, concert, Philadelphia Music club; 6:30, Meyer Davis' Bellevue Strat-

Dr. Henry T. Fleck lectures on music each Wednesday evening at 8:30 from WYNO, New York's municipal station.

WLV, Cincinnati, Ohio (Central, 423), 8 a. m., physical exercises; William Bradman; 12:10 p. m., program, Delta Omicron sorority; dance selections, Woody Schick; 2:30, "The Automobiles," Henry Schick; 3:30, "The Automobiles," Henry Schick; 4:30, "The Automobiles," Henry Schick; 5:30, "The Automobiles," Henry Schick; 6:30, "The Automobiles," Henry Schick; 7:30, "The Automobiles," Henry Schick; 8:30, "The Automobiles," Henry Schick; 9:30, "The Automobiles," Henry Schick; 10:30, "The Automobiles," Henry Schick; 11:30, "The Automobiles," Henry Schick.

WMAQ, Chicago, Ill. (Central, 447.5), 4 p. m., American Red Cross talk, Estelle Weltman; 4:30, Gunn School of music; 5, "The Lobby lady," Mrs. Gene Davenport; 6, Chicago theater organ; 6:30, Hotel LaSalle orchestra; 8, piano review, Harry Hanson; 8:20, travel talk, Clara B. Laughlin; 8:40, Association of Commerce weekly talk; 9:30, University of Chicago lecture; 9:45, Mrs. Annie Montgomery, contralto; Mrs. Alma S. Matthews, pianist.

WMC, Memphis, Tenn. (Central, 593.9), 12 m., musical program, Hank P. company; 8 p. m., bedtime time story, Uncle Percy; 8:30, classical program, Harry Brun; 11, midnight frolic, Rhinehardt's orchestra.

WNJ, Newark, N. J. (Eastern, 233), 10:30-11 p. m., dance music, Frank Daily and his famous "Meadow-

(Continued on page 16)











Friday, January 16

(Continued from page 17)

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., dinner music, Jim Riley's Texas hotel orchestra 9:30-10:35, Mexican Gaiter orchestra of Burleson.

WBAV, Columbus, Ohio (Eastern, 423), 8 p. m., miscellaneous program, talent from Denison university, Granville, Ohio, under direction of Karl Eschman, director, school of music.

WBZ, Springfield, Mass. (Eastern, 327), 6-7 p. m., dinner concert; 7:10, kiddies' hotel orchestra; 7:15, lecture, address: 7:30-8, University Extension course; 10-11:30, concert; 11:30-12, dance program, McEnelly's string orchestra.

WBAL, Northfield, Minn. (Central, 360), 9:45 a. m., St. Olaf College choir; 10:30, book talk, "Life of Robert Louis Stevenson," Dr. George Wetzel speaks.

WCAU, Philadelphia, Pa. (Eastern, 278), 6 p. m., dance music, Meyer Davis Hotel Pennsylvania orchestra; 7:30, series of talks on household appliances; 8, recital.

WCCO, Minneapolis-St. Paul, Minn. (Central, 417), 10:45 a. m., "Nutritious Beverages," Betty Crocker; 2 p. m., Community Fund talk; 9:30, ma. Paul Narkin cafe orchestra, Howard Keller; 4, "Denleigh Follows the Doctor's Advice," Eleanor Holloway Abbott; 5:30, children's hour; 6:30, concert, Minneapolis Athletic Club orchestra; 7:30, "Red River Valley Winter show; 8:30, Albert Lee, Heist, American Gas Machinery company.

WCK, Detroit, Mich. (Eastern, 315), 4:15 p. m., music; 6, dinner, music, Pinzel's orchestra; 7:30, musical program; 10, dance music, Pinzel's orchestra.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Star's singing trio; 6:7, address, piano "Using-in number on the Duo-Art," address, speaker, audience, Kansas City College; 7:30, "Tell-me-a-Story lady; music, Hotel Metropole Trio on ensemble; 8-9:15, popular program; 11:45-1 a. m., nightclub follies, the "Merry Old Chelsea" and the "Plantation players."

WDAK, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., "Shilly almanac; 12:05 p. m., Staney theater organ recital; Arcadia cafe concert orchestra; 2, playlet, student's National Student League; 3:30, "The Girl in the Marcella North; 7:30, Dream Daddy's bedtime stories; 8, humor talk, Sam Wingfield; playlet, WDAK-Walter Coleman City College; 9:30, "Morand Glory club concert, Arcadia cafe dance orchestra.

WEAF, New York, N. Y. (Eastern, 492), 4:30-4:50 p. m., French lesson, Columbia university; 6-7, dinner music, Waldorf-Astoria hotel; 7-7:30, Jack Albins hotel escort orchestra; 7:30-7:45, "Old Chelsea"; 8, R. Kinsey company; 7:45-8, Nancy McCord, soprano; 8-8:30, Happiness Candy Boys; 8:30-10, U. S. Navy band from Washington.

WEH, Chicago, Ill. (Central, 370), 7 p. m., Orlole orchestra; Dean Runkle, pianist; 9, Orlole orchestra; Frederick Agard, tenor; Rita McFawn, soprano; 11, Orlole orchestra; Three Musketiers.

WEI, New York, N. Y. (Eastern, 233), 7-7:15 p. m., Ribbun's reviews of new plays; 7:15-7:45, Circle quartet, directed by Jerry Antonow; 7:45-8, "The Harris, blind singer, accompanied by Viola Milber; 8:15-9, Feinstein ensemble, directed by David Feinstein.

WEEI, Boston, Mass. (Eastern, 303), 8:30 p. m., Big Brother club; 7-9 program, New York studio; 10, Don-Bisanzione and his Simphonians.

WEMC, Berrien Springs, Mich. (Central, 286), 9-9:59 p. m., Radio Orchestra; 10, Opal Hoover, saxophonist; 9:40-10, "The Christian's Privilege," Prof. C. M. Sorenson; 10-10:15, the Thelma O. New's Mundt.

WFAX, Dallas, Tex. (Central, 476), 12:30-1 p. m., address, Dr. Robert Stewart Hyer; 4:30-5, woman's hour, Mrs. Bessie M. Tribble, director; 8:30-9:30, Eolemie Mito quartet.

WFI, Philadelphia, Pa. (Eastern, 395), 1 p. m., Meyer Davis Hotel Pennsylvania concert orchestra; 3, "Caroline Hoffman piano; 6:30, Meyer Davis Hotel Pennsylvania concert orchestra; 7, Sunny Jim, the kiddies' night.

WGN, Chicago, Ill. (Central, 370), 1:40 p. m., luncheon concert; 2:30, Lyon & Healy artists series; 3, roosting chair time; 3:30, Sessiz time; 4, organ recital, Lyon & Healy; 6:30, dinner program; 8, classical concert, William Hanson, tenor; 10, jazz hour, dance numbers, Don Bestor Drake orchestra.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1 p. m., Hotel Statler concert orchestra; 2:30-3:30, Buffalo Courier and Enquirer musical program; 6:30-7:30, dinner music, Vincent Lones Hotel Statler dance orchestra; 8-10, Acme Jubilo singers (colored); 10-10:30, zither duet, Albert Schreier and Joe Hochmuth; 10:30-11:30, soprano solo, Madamanchelle Chausseux; 11-11:15, popular piano recital, Fred Bryan; 11:30, supper-dance music, Vincent Lones Hotel Statler dance orchestra, Harold Greer, director.

WGY, Schenectady, N. Y. (Eastern, 380), 3 p. m., health hints, Dr. C. W. Woodall; 6:30, stories for children; 7, International Sunday school lesson; 7:45, "Air," WGY orchestra; 8, "Facts Concerning the Evolution of Man," Dr. James N. Wood; 8:15, "The Times," WGY orchestra; 8:15, "The Outsider," WGY orchestra; 10:30, program, WGY orchestra; "Ezrae D'Amore," orchestra; cello solo, "Gaudete" from "Sonata Op. 53," Giovanni Trombini; trio selection, "Frosperine," American trio; "Valse," orchestra; "Frelude," orchestra; violin and viola duet, "Melody," Edward A. Rice, Leo Klivner; "March-Ambrosiano," orchestra.

WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., selections, Alamo theater organist; 7:30-9, concert, auspices of the Louisville and Jefferson County Children's home, Grace Deppe, director; four-minute talk, George Colvin.

WHK, Cleveland, Ohio (Eastern, 283), 6 p. m., English Room into Hotel Winton; 8 p. m., Banquet club entertainers, Billie Bugbee, Alice Crandall, Betty Booth, "Fascist Queens, Lucille Phillips, June Farley, Ethel Rohde, Bobbie and Dede Fitzpatrick, O'Mara and George Seegitz, John Peattie, Art Cooke, Phil Fasson, Bert Leard, Worley Alton, Audrey Jones, Norman Walman, WHK-Bellboys orchestra, Dean Smith, director; 10 p. m., Ray Silwell's New York orchestra.

WHN, New York, N. Y. (Eastern, 300), 6:30 p. m., Vincent Canane and his Hotel Alamae orchestra; 7-7:30, Harry Richman and his entertainers from Club Richman; 9:35-10, Dan Gregory and his Crystal Palace orchestra; 10-10:10, fashion chats, Mino Belle; 10:10-10:20, Bob Miller, songs; 10:20-10:30, "Storage Batteries," H. B. Shontz; 10:30-11, Roseland dance orchestra; 11-11:30, Vanity club revue; 11:30-12, Sam Wooding and his Club Alamae orchestra; 12-12:30, p. m., Ted Lewis and his orchestra from Parody club.

WHO, Des Moines, Iowa (Central, 522-3), 7:30-9 p. m., Julia Nelson, pianist; Hubbard Cleveland, 4:30-5:20 p. m., pianist; talent from Carroll.

WIP, Philadelphia, Pa. (Eastern, 509), 1 p. m., Gimbel tea room orchestra; 3, concert, Homes Junior High school students; 6:05, Art Coogan and his Club Madrid orchestra; 7, Uncle Wip's bedtime stories.

WIAX, Cleveland, Ohio (Eastern, 300), 7 p. m., organ recital, Cleveland Public Auditorium.

WJJD, Mooseheart, Ill. (Central, 278), 3:30-4:50 p. m., Mooseheart children; 6:30-7:15, Albert P. Brown, organist; 7:15-8:15, solos, Mooseheart children, Mooseheart Novelty orchestra; talk, M. P. Adams; 11:30-12:30, request program, Albert P. Brown, organist.

WJY, New York, N. Y. (Eastern, 403), 6:30-7:30 p. m., Delish music from Curnard Linn, "Franciaona."

WLS, Chicago, Ill. (Central, 345), 12-1 p. m., music, Nubs Allan; 3:45-4:15, "How to Know Your Owns," Alma Thompson Leaverton; talk, Helen Bennett; 6:30, Ralph Emerson; 8:30, specialties, Senate theater studio; 9, lullaby time, Ford Hays; 10:30, Howell; 11:15, Walker League musical program; 8-9, Kenneth Clark, pianist; Jackson Jones and his Gallens Inn orchestra; "The Farmer in Motion Pictures," D. O. Thompson; 9, drama, "Mother," WLS theater; 9:30, Robinson and Bernard; 9:40, Art Kahn's Senate theater orchestra; 10, Tom Brown's saxophone sextet; 10:30, Estam Jones and his orchestra; 10:40, Ford and Glenn time.

WLW, Cincinnati, Ohio (Central, 423), 8 a. m., physical exercises, William Strudman; 12:15 p. m., Alons Demusvick orchestra; program, College of music; 4, recital, pupils of Leo Strougner; 7:30, 10:25 p. m., Y. M. C. A. forum; 4, English talk, Mrs. J. Elliott; 6:30, 7:30, 8:30, 9:30, 10:30, "The Chicago Lady," Mrs. Gene Davenport; 6, organ recital, Chicago theater; 6:30, Hotel LaSalle orchestra; 8, weekly Wide-Awake club program, M. P. Adams; 8:30, musical geography, Mr. and Mrs. Marx E. Oberdorfer; 9:15, musical program, Mrs. Elizabeth Jenks, soprano.

WMC, Memphis, Tenn. (Central, 503.9), 12 m., musical program, O. K. Honeck Piano company; 3 p. m., bedtime

TABLE FOR MAKING USE TIME TRANSITIONS

Eastern Standard Time	1	2	3	4	5	6	7	8	9	10	11	12
Central Standard Time	12	1	2	3	4	5	6	7	8	9	10	11
Mountain Standard Time	11	12	1	2	3	4	5	6	7	8	9	10
Pacific Standard Time	10	11	12	1	2	3	4	5	6	7	8	9

**HOW TO USE.** If a station is giving a program at 8 o'clock Mountain time and you wish to find what this is equivalent to in Central time, find 8 o'clock in the third of Mountain time row. Then immediately above it in the same vertical column will be found the figure 9 in the Central time row. This indicates that the program would be heard at 9 o'clock Central time.

story, Uncle Joe; 8:30, concert, Brillings's Novelty orchestra, Frank Braccante, director; 11, midnight frolic.

WJ, Newark, N. J. (Eastern, 233), 10:30-11 p. m., dance music, Frank Daily and his Meadowbrook orchestra; 11-11:30, Wolfe Gilbert and company; 11:30-12, Original Didieland jazz band; 12-12:30 a. m., dance music, Frank Daily and his Meadowbrook orchestra.

WYC, New York, N. Y. (Eastern, 526), 7:30-7:35 p. m., police alarm; 7:35-8, resume of meeting of board of estimate, Peter J. McGowan; 8:30-9:30, song recital, favorite artists; 9:30-9:45, timely topics, Francis P. Bent, director of investigations; 10:30-11:30, Ben Bernie's Hotel Roosevelt orchestra.

WOAW, Omaha, Neb. (Central, 526), 6 p. m., story hour, Doris Claire Secord, daughter of "Uncle Rem's" of the World-Herald; 6:45, dinner program; 9, Peru State Normal college.

WOC, Davenport, Ia. (Central, 484), 7:20 p. m., "Educational Opportunities for the Farm Boy," M. H. Hoffman; 8, Ambrose Besenham, pedler; Hugh Mortlay, William Judge, entertainers; Emil Hass, reader.

WOI, Ames Ia. (Central, 360), 12:30 p. m., college children.

WOO, Philadelphia, Pa. (Eastern, 509), 11 a. m., organ recital, Mary E. Vogt; 12:32 p. m., Wanamaker crystal tea room orchestra, Robert E. Golden, director; 4:45, organ recital, Mary E. Vogt; 9, sports results and police reports; 7:30, A. Candelari and his Hotel Adelphi concert orchestra; 8:35, Ermo Rapese's intimate concert from Fox theater; 9:30, WOO orchestra, Robert E. Golden, director; 10:45, organ recital, Mary E. Vogt; 10:50, Vincent Rizzo and his Hotel Sylvania dance orchestra.

WOR, Newark, N. J. (Eastern, 405), 7-7:30 a. m., WOP gym class; 8:15-8:30 p. m., Allan R. Culliners, director Newark Technical school; 8:45-1, talk, Adolph Lewinstein; 6:15-8:30, "Music While You Dine," Wallie Osborn's orchestra; 8:30-7, "Man-in-the-Moon stories, Josephine Lawrence and Wm. F. B. McNeary; 7-7:15, Wallie Osborn's orchestra; 7:15-7:30, resume of the day's sports, Jolly Bill Steinke.

WOS, Jefferson City, Mo. (Central, 440.9), 8 p. m., musical program, students and members of the Faculty of Westminster college.

WSB, Atlanta, Ga. (Central, 429), 12 m., entertainment; 5-9 p. m., songs and bedtime story, Bonnie Barnhart; 8-9, Harmony boys; 10:45, Radiowit entertainment.

WTAM, Cleveland, Ohio (Eastern, 390), 6 p. m.,

Guy Lombardo's Royal Canadiana orchestra  
WTAY, Oak Park, Ill. (Central, 283), 6:35-7:45 p. m., Sandy Meek, baritone; The Melody boys; Black Cat orchestra.  
WWJ, Detroit, Mich. (Eastern, 513), 3 p. m., The Detroit News orchestra; 8:30, The Detroit News orchestra, Anne Campbell, The Detroit News poet.

Station KFNF Installs Remote Control Lines

Now Operating on Monday Nights, Heretofore Silent

SHEWANDOAH, Iowa.—Station KFNF, located in this city, has recently installed microphones in the new Armory and Methodist church located here. This installation was put in at the expense of Henry Field, owner of Station KFNF. This is a part of the original plan of this station, but had never been put into effect till now, awaiting the working out of special plans of transmission which Mr. Field has been investigating, and also awaiting the development of the full power of the station, which has now been practically completed. This station is now broadcasting every Monday night on a wave length of 266 meters, as well as every other night in the week.

California Hears Chicago Easily

CHICAGO.—Underground reception of a Chicago station by a California Radio-phan was revealed in a letter recently received by Edgar L. Bill, director of WLS, the Sears-Roebuck station here.

# The New Radio Book

## HOW TO

### Operate Sets Construct Parts Improve Reception Understand Radio Assemble Circuits

## FREE With One Year's Subscription to Radio Digest

THE greatest assemblage of facts and hints, from actual everyday practice, ever gotten together. Edited by the technical staff of Radio Digest it supplies the demand for a book covering every phase of Radio from a simple explanation of Radio reception to a technical explanation of the different parts of a set which leads to the best reception possible. The sections on selecting and making sets develops the different types of sets and circuits with blue-prints and diagrams to explain same. "How to Operate" gives detailed information on the operation of all the well-known sets. The section of general information contains a complete Radio map and schedule and a section of workshop kinks which save time and money. Now is the time to take advantage of the exceptional offer as listed in the coupon for your convenience.

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# CARING FOR YOUR NEW CHRISTMAS SET

## Part II—Within the Receiver Itself

By Harold O. Totten

ONE of the first things to understand when you get a receiving set is, that the set will not work the same in all kinds of weather and in all localities. This is the factor that causes more "grief" to new fans than all the other troubles put together.

In a city where the surrounding buildings are of the modern steel construction, a receiver will not work as well as it would if located on the outskirts of the city. Another thing to watch for is high power electric wires. Keep the aerial away from them as much as possible, and the set will work better.

Two sets of the same design and with same batteries, placed one in a city and the other in the country, will differ greatly in the results obtained. Therefore, do not expect too much from a set which has a number of detrimental objects in the immediate vicinity, for sometimes they cannot be removed.

### Deciding on Tone Value

One person alone should not judge the quality of tone emitted from a receiving set as hearing depends on the individual. Some people have a range of frequencies within audibility to which others are deaf. Many people hear better with one ear than with the other.

The pair of ears was intended for the so-called binaural or directional effect. A sound coming from your right reaches your right ear before it comes to the left

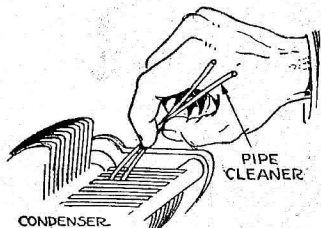


Figure 1

ear and you recognize this difference in time value or phase and can thus judge direction.

Constant prolonged use of ear phones is tiring. Do not wear a tight headband nor keep the earphones tightly pressed against your head for long periods.

When a crackling or frying noise is heard in the receivers, do not always blame it on "static." This word covers a multitude of faults which may be traced directly to several things. Last week you were told to check your B battery voltage when these sounds were heard. If the batteries are all right, then try the following and see how the set works.

### Keep Filament Current Down

As a general rule most people who have sets are tempted to have the filaments of the vacuum tubes burn too brightly. The proper brilliancy is the lowest one at which the signals are good. Increasing the filament current beyond this point does not increase the signal strength, but does lessen the life of the tubes considerably. A good rule to follow is that of keeping the filament as low as possible, consistent with good reception.

Moreover, certain types of vacuum tubes operate at very low filament temperatures. It is therefore best for the novice to follow closely the directions furnished with each vacuum tube.

Before inserting a tube in its socket,

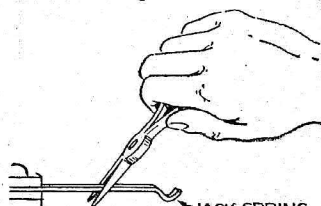


Figure 2

be sure that the rheostat is turned off or at the proper setting for normal operation. Don't forget that vacuum tubes cost from five to ten times as much as ordinary incandescent lamps and therefore deserve a little more respect.

### Tubes Give Plenty of Trouble

It is advisable to have a couple of extra vacuum tubes on hand as "spares." Quite often the Radiophon will find that his tubes light, but there is no power from them. This is caused by burning the filaments too high and destroying the

sensitive thoriated coating of the filament from which the electrons flow. When this occurs try changing your tubes to see if this may be what is causing the set to refuse to "perce."

Even though a set is in a cabinet, it

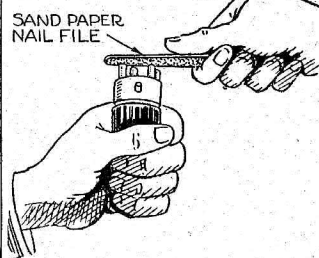


Figure 3

has a habit of collecting dust on the condenser plates. Frequently, the set should be taken out of the cabinet and with a pipe cleaner bent in the form of a horse-

shoe, the plates of the condenser may be cleaned. See figure 1.

Be sure while doing this that you do not bend the plates. If the plates are bent, bend them slightly either one way or the other so that they do not touch when the rotor is turned.

Jack springs, when used constantly, have a habit of springing out, thereby making poor contact when the plug is inserted. When this trouble arises, take a pair of pliers and bend the upper spring down and the lower spring up so that they will be closer together without touching each other. See figure 2.

### Keep Tube Prongs Clean

Dust has a habit of collecting on the springs of the tube sockets and is picked up by the prongs of the tube. This can be remedied by taking the tube out of the socket and with a piece of sandpaper, or nail file, lightly rubbing tips of the tube prongs to make them clean (see figure 3). Do likewise to the springs by taking the sandpaper on the end of the finger and rubbing it over the springs.

In doing this, the springs may be slightly bent downwards so that there is imperfect contact between the tube and spring. To eliminate this take a button hook and slip it beneath the spring and

pull it up just a little. Be sure when doing this that all the tubes are removed. If you do not care to remove the other tubes from their sockets, instead of using a button-hook take a piece of fiber or bakelite rod and file a notch in the end. The spring will then fit in this notch and

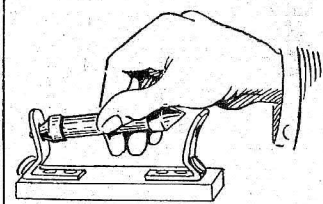
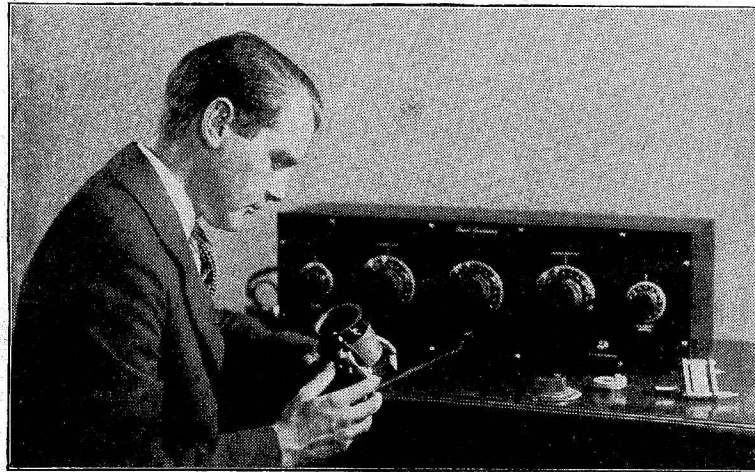


Figure 4

may be lifted up to its proper height. Quite often sets are sold without the grid leak, as this conflicts with existing patents, other than the one covering the set sold. To remedy this trouble, procure a number of grid leaks, inserting them into the place provided for them on the (Continued on page 26)



# How I Earn \$10000 a Week as a Radio Expert

A year ago I was mighty blue and discouraged. It seemed to me that I would never be more than a low-paid bank clerk. Of course I had a small increase in salary every now and then but I knew that pretty soon I would reach my limit and there would be no further advancement for me. What future had I to look forward to? Where would I be in five years? I became restless and discouraged and began to look around for some other opportunities.

It was then that I discovered that the demand is for trained men, that the opportunities are all for men who can do some one thing better than anything else. There were wonderful opportunities for men who were experts or specialists—but I was ..... a clerk. How I regretted then that I hadn't prepared myself for some definite career!

### I Wanted to Marry

The thing that made me more restless at that time than anything else was the fact that Marian and I were—that is we wanted to be married. But we both knew that we couldn't possibly get along on my salary. If only there was something I could do that would bring me a larger salary!

It was just about the time that every one became so interested in radio. Our whole town became radio-mad, and of course what was happening in our town was happening all over the country—all over the world. I managed to save up enough to buy a receiving set and I was never quite so happy as when I was trying to tune in on stations.

The thing fascinated me. Playing with air waves! Bringing melodies and messages out of the sky! I was never so interested in anything before.

Marian was the first to sense the great opportunity: "Why don't you become a

radio expert?" she said. "You like it, and I am sure there must be a big demand for men who understand it. It's a new field and there's plenty of room for wide-awake men."

"But—I'm not trained!" The thought excited me. To be a radio expert! To find my future in this fascinating new field! "I don't know anything about it, Marian," I said. "I wish I did, though."

"Well, why don't you find out about it," she retorted. "You can't learn about radio just by listening in to the concerts. Why don't you take a course?"

But we found out that most courses were expensive or that they would interfere with my other work. We were about discouraged when I discovered that through the National Radio Institute it is possible to become a radio expert by studying right at home in spare time. I told Marian about it and she was elated. "Send off for information, at once—today!" she exclaimed.

### Advances Quickly to \$100 a Week

I did and the following day received an attractive booklet, "Rich Rewards in Radio," telling all about radio opportunities and how to become an expert in any particular phase of the work.

Here was my opportunity at last!

I began to study in all my spare time. It was the most interesting and absorbing study I had ever made. The secret of the radio revealed to me! Day by day I became more skilled and deft until I was able to take apart receiving sets and put them together again as though I were playing with a toy. It was fun! In a month I was able to take a position as lineman at a bigger salary than I was getting at the bank. This was wonderful experience for me, and I kept right on with my studies. It wasn't long before I qualified for a position as radio engineer at a salary of \$100.00 a week! That is what I

an earning now, though I expect to make more soon. It seems to me almost too good to be true, after all those years as a low-paid clerk in a bank. And Marian, who will soon be my bride, keeps saying, "I told you so!"

As a radio expert I can tell you that there is a tremendous demand for men who can build, sell and install radio sets, who can design, test, repair. Men are needed as operators, engineers and executives, all over the world. The opportunities are limitless, and if you like radio there is no reason why you cannot qualify for one of these positions by studying in your spare time at home as I did.

The National Radio Institute offers an absolutely complete course which prepares you for the Government First Class Commercial License and for the bigger-paying jobs in Radio. The Director, E. R. Hans, will be glad to send you all details of this marvelous new method of practical instruction, including information concerning the Free Employment Service which secures positions for National Radio Institute graduates. Everyone interested should have this information. It's free, and this coupon will bring it to you. I advise you to send it off today. Radio is a new and interesting field, and it offers you more money than you probably ever dreamed possible.

### Important

Those who mail this coupon at once will also receive details of Special Short Time Reduced Rate. Do it now!

National Radio Institute, Dept. 55-CB, Washington, D. C.

I am interested in radio and would like to find out whether or not I am suited for a radio career. Please send me, without the slightest obligation, your interesting free book called "Rich Rewards in Radio." I will send you full details concerning your special Short Time offer.

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# Radio Digest

PROGRAMS  
Illustrated

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## Beam Ray Reaches Distance

Successful Attempts with Pointed Waves

SOME of our noted scientists are working desperately on beam Radio. When this scheme is perfected we will be getting somewhere near privacy in Radio communication. It is claimed that signals have been sent directionally between England and Australia. Heretofore the Radio wave is supposed to have travelled outward in all directions from the sending point in spherical form. Mr. Marconi, who made the beam tests, has used a device corresponding to a searchlight to send the waves in the shape of a light beam.

Perhaps the beam method will be used for all Radiophone transmission where secrecy is desired.

## Magnetism Not Silent

Atoms in Iron Roar When Amplified

IN THE research laboratories of one of our large manufacturers of electric apparatus tests have been made with the use of Radio to determine the action and sound in the smallest part of iron composition—the atom. When a magnet was brought near a piece of iron a rattle was heard. If the approach was sudden the noise became loud and abrupt; if slow the sound was soft and more permanent. Removing the magnet caused the disturbed atoms to scurry back in place and sound resulted. If the poles were reversed; extremely loud and abrupt noises were heard.

Naturally these sounds are not heard with the human ear, they must be amplified and the application of Radio brought about the sound of the moving minute parts. Listening to the atoms roar may appear to be a silly pastime, but this new finding may aid in the study of the atom on which so much modern science rests.

## Visions of the Future

Just a Little Box to Travel the Earth Around

ALMOST with the coming and going of the days there are new developments in Radio. Its potentialities appear to be limitless. Only recently have we encircled the earth with a flash of five seconds. We now can listen to programs broadcast in Europe. Photographs have been sent across the continent as well as across the ocean which are quite accurate. Complete audible as well as visual communication with the rest of the world is a possibility.

Some predict that we are to have the pocket set which will be within the reach of all. From another source comes the remark that along with the pocket set there will be the addition of a hole instead of the phones into which a person may look into and see objects thousands of miles away. Well, now, what is to become of the railroads and automobiles? If we can just take a look and listen into one of these contraptions and see the jungles of Africa, the crowded streets of a metropolitan city or the woods and snow of the far north, then why travel?

## Radio vs. Newspapers

All News Matter Cannot Be Broadcast

THIS year the metropolitan newspapers made little out of their "extras" on election night. There was no demand for them—and all on account of Radio. The voting public had heard all about the election just as it happened. Such a large number of people had already been apprised of the results in detail that to the average reader the news contained in the "extras" was ancient history. This does not signify that Radio will supplant the newspaper. Radio is a new agency which is being wonderfully developed and its exact use may not be as it is today.

The big town press cannot supply local news, and it is local news that keeps the small newspaper going. For the same reason Radio cannot supply this news. It is quite evident that the newspaper must drop some of its items of news matter, such as weather reports, market quotations and standard types of news matter. Radio will never be able to broadcast local events, which, after all is said and done, are the backbone of newspaperdom.

## RADIO INDI-EST

### Life Cycle of a Radiophan

I started with a crystal set;  
I made it buzz and hum;  
I scraped, I turned, I twisted things  
To make the music come—  
At length I found that set, by jings!  
Was reticent and dumb.

I gave the crystal set away  
And bought a single tube;  
I wired it up and thus became  
A regular tinker-boob,  
A super-man of local fame,  
A Radioing rube.

I got a station several miles  
Away, and oh, gee whiz!  
My gizzard seemed to oscillate  
And leap about, which is  
A gizzard's customary fate  
When "tune-bugs" give him his.

And thus I caught the great disease;  
It cancered through my purse;  
I added leaks and tubes and wire;  
I tried out schemes diverse;  
I still was gnawed by more desire  
To hear more universe.

And now I sport a super-het;  
I hear across the wave;  
I listen oft to Frenchie's gab,  
And hear the Spaniards rave—  
But still The Bug puts in his stab  
And prods my "distance crave"!  
HORACE GRADY MOORE.

### Some Station Characteristics

The national station—WCAPital.  
The religious station—WBAPapist.  
The Scottish station—WCALedonia.  
The German station—WBAVaria.  
The Roman station—WCAEsar.  
The martial station—WORdnance.  
The marital station—WOOing.  
The Senegambian station—WBEAFrica.  
The dangerous station—WHAZardous.  
The tired station—WEARiness.  
The pious station—WSAIntly.  
The appreciative station—WGRateful.  
The humorous station—CFAcetious.

J. E. D.

### And What About Me?

Sitting at the Radio,  
Wondering about  
What the deuce they look like,  
Who call the stations out.

When I hear old WOS,  
That silas of the air,  
Think he wears suspenders  
And attends the county fair.

After getting WSE  
I conjure up a fellow  
Who likes coln pone and buttah beans,  
And wears a mustache yellow.  
RADIO FANNY.

### Mrs. Partington Speaks Out



Dear Indi—Miss Partington says she spent a very pleasant Christmas eve and heard some nice instructive entertainments with the music about balanced between "Holy Night" and "My Blue-eyed Sally." WTAM broadcasted a few band numbers from the bandstand in the park and the music was good, even if the musicians did have to play with their mittens on. WCY and WJZ combined and put on a fine concert.

WBZ sent out some more New England music of the Boston brand which is always grade A. WCX from the top of the new Look-Cadillac hotel over-rides static and always makes you glad to listen. WEBB and WQJ came in a romping with much variety of good stuff. WSB and Lambdin "Likewise" Kay Radiowis was enjoying themselves and pleasing their listeners. The Hired Hand had Jim Reilly's orchestra working for him and they was earning their pay. Bob Lawrence was running the show at WCAP and had some good performances.

WOC had the Chiropractor's orchestra with an extra program that they must have practiced up on ever since last Christmas, for they knowed every note and crossword. Joliet and Mooseheart was both out strong and going good.

WCAZ, down to Carthage, was a big station tonight, too, and their pronouncer was backing up the president of the college who was reciting a new "Epic to the Carthaginians." KDKA and other big stations was also out with extra editions making the evening very pleasant and profitable.

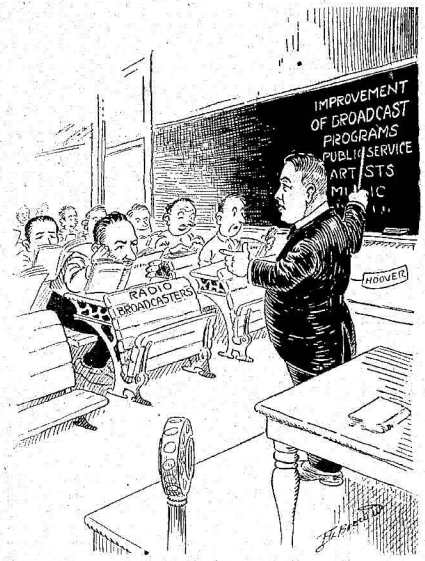
SIGNING OFF.

### I Remember

I remember, I remember  
The first set that I had;  
No loud speaker was on it—  
Its batteries were bad.  
Sometimes its poor behavior  
Would make me fuss and fret.  
I remember, I remember  
Because I have it yet.

SPIDER WEBB.

## Broadcaster School



## Condensed

"Way out West in Kansas" is one place to go for programs of variety and merit. On my last trip to KFKB there was an excellent group of musical numbers on the air, so that my stay was longer than intended, though they didn't invite me to leave earlier.

It is hard to believe there are any Welsh singers with poor musical understanding or unpleasant voices. Certainly those entertaining through Station WJAX were of the characteristic type. Male choruses are generally appealing anyway, so it would be no wonder if the station received a great many applause cards following the artistic work of the Cleveland Welsh male chorus. There should be return engagements.

Brunswick artist concerts have been quite successful from the viewpoint of the listener in, and with several Radiocast stations transmitting them, a large part of the Radio public has enjoyed the concerts. Ray Miller's orchestra came through WGY in fine style so as to display to advantage the training of the musicians. It is possible other recording companies will try this means of reaching immense audiences.

"The Voice of New England," which as you know is WBZ, had for one of its features a whistling duet engaged in by two ladies. There have been a number of whistling artists to entertain over the Radio having more or less to their credit, but these two certainly equal the best of them. If whistling for wants brings them, they should not need.

Take a trip to Norfolk, Va., and let the "Voice of Hampton Roads"—there are so many "voices" in the air nowadays—fill your loud speaker with melody. As I listened to what seemed to be a ukelele in front of the Mike at WTAR I was treated to a whole flock of cold chills, all caused by fear that the musician would fail to reach the note he was sliding toward. But that's past. He always arrived on key.

Is Shakespeare popular in Radio-doses? WLS has tried it out with seeming favor from the listeners, which is a pretty good answer. I happened in one evening when one of "Bill's" dramas was coming to a climax and found the characters portrayed in true Southern-Marlowe style. If these dramas are heavy, Radio carries them all right.

Syncopation comes nearer to pleasing a great many folks than any other brand of musical composition. If that is true, then everyone falling within that class had a treat in listening to the prize syncopators provided by Station WBCN, which is not one of the most elderly of our Radiocast stations. We shall see how they average.

WEAF presented a very effective arrangement, with instrumental trio and a quartet, of "Songs of the Sea." So realistic was it in parts that when the waves were represented as breaking over the decks of the vessel, with the wind tearing through the rigging overhead, one felt like seeking shelter from the storm. That was much more impressive than the sounds accompanying a bedtime story describing the fall of pots and pans, from another station.

Another of our younger Radiocast stations is located at Denver, KOA. I listened to their transmission of an orchestra to see what flaws could be found in the control room (or studio). They were so obscure as to decide me to try it again. You know some stations give you the sound of an orchestra, while others give the orchestra.



# Construction of the Six Tube Het-Duo-Gen

## Part III—Assembling the Filter

By C. E. Brush

**W** E NEXT take up the construction of the filter coil and the special condenser. This will be perhaps the hardest of the three units to make, but careful following of the instructions will assure success.

Materials required for the special filter

one small piece of tinfoil, one small piece of thin copper 3 inches by 3 inches, one piece of 1/2-inch by 7/8-inch flat brass 3 inches long, 1/4 pound of number 26 dsc. wire.

In this we have three distinct parts to make to form the unit, namely, the primary winding, the secondary winding, and the special condenser (see figure 9). These will be taken up separately.

The form for the primary winding is made as follows: Two of the 2 3/4-inch discs and two of the 1-inch discs are to be drilled with a hole in the center large enough to be a slide-over fit over the 8-32 threaded rod. Now take an 8-32 bolt about 1 inch long and assemble these four discs as follows: slide one of the 2 3/4-inch discs onto the bolt, then the two 1-inch discs, then the other 2 3/4-inch disc. Then screw on the nut and draw up tight. You now have a form in which to wind the primary winding. The bolt must be removed later, though, so it is necessary then to place this unit in a vise and drill two holes, to accommodate 6-32 round head bolts, one on each side of the bolt now holding the form together and in such a position that the holes extend through all four of the discs. Two 6-32 bolts are to be secured through these holes and cut, or filed off, flush with the face of the nuts. The center bolt, extending through discs is

used to hold form in the winding chuck.

### Winding Done with Drill

The winding of the wire is to be done on a hand drill press. The drill may be fastened to the flat surface of a bench or table with a clamp of some sort, with the chuck extending over the edge of the bench. The spool of wire should be hung in some manner as to allow free unrolling as it is wound up in the form. Now place the form in position for winding with the 8-32 bolt securely fastened into the chuck of the drill. If the drill is a geared one you will have the advantage of putting on many turns of wire with each

turn of the drill handle. In this case you must determine what the gear ratio is, and figure out how many turns of the handle it takes to give the correct number of turns of wire.

Having set up the apparatus, we are now ready to wind. The method of anchoring the beginning of the winding at the bottom of the form is to make one turn around the slot, cross the wire and take it back in the opposite direction, forming a loop at the bottom. Take the free end of the wire and pass it over the edge of the disc and then take a few

(Continued on page 22)

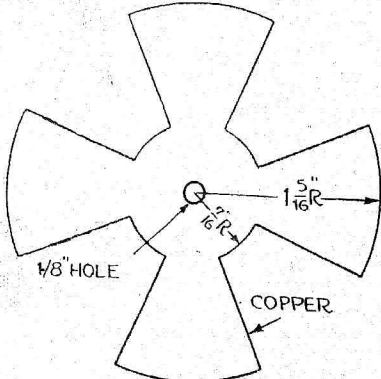
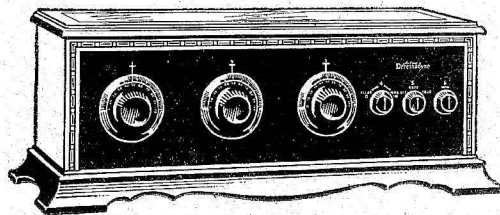


Figure 8—Actual Size

are five 2 3/4-inch discs of fiber about 3/32 inch thick, six 1-inch discs of fiber 1/4-inch thick, one 5-inch length of 8-32 threaded brass rod, four 8-32 hexagon brass nuts, one sheet of mica 3 inches by 3 inches,



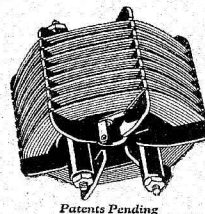
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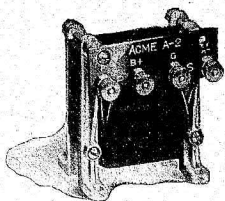
# Andrews Deresnadyne

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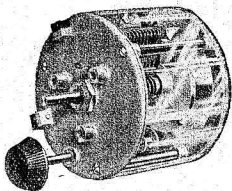
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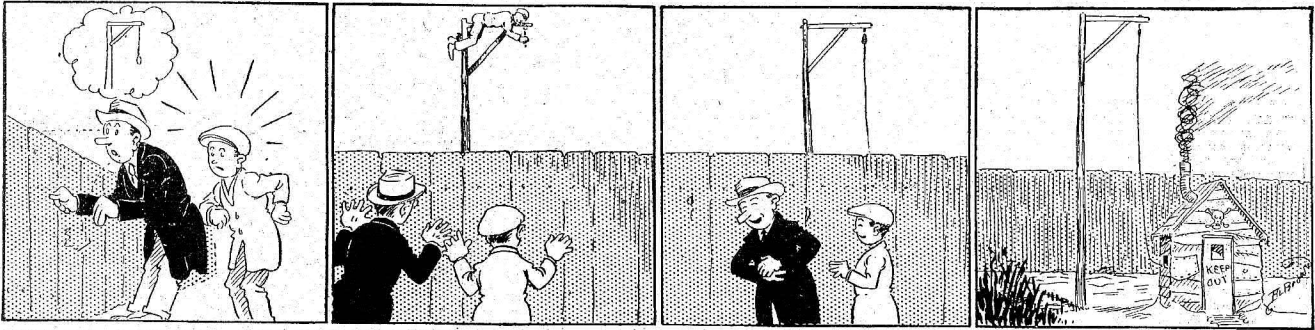
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**THE ANTENNA BROTHERS**

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**SIX TUBE HET-DUO-GEN**

(Continued from page 21)

turns around the chuck to keep the free end from becoming entangled. Arrange this so that by turning the handle of the drill, the wire will wind on in a clock wise direction when looking at it from the side opposite from the drill.

Now turn on 350 turns of the number 26 disc. wire and secure the free end in the same manner as above, by taking a reverse turn and forming a loop. Take the wound form from the drill, and remove the center 8-32 bolt from the form, leaving the hole through the unit clear.

**The Filter Secondary**

The form for the secondary winding is made up from the rest of the discs, using a 5-inch piece of 8-32 threaded rod on which to set up the discs.

First take an 8-32 hexagon brass nut and screw it on to the threaded rod to a distance of 1/2 inch from the end. Then pass on the mounting standard to be made from the 1/2 inch by 1/2 inch flat brass, the same as the one made for the oscillator coil. Now assemble the discs on the rod as follows: First, one 2 3/4 inch disc; this to be flush against the flat brass forming the standard and foot, then two of the 1-inch discs, then another 2 3/4-inch disc, then two more of the 1-inch discs,

and last the remaining 2 3/4-inch disc. Now pass on an 8-32 hexagon nut and screw up tightly. You now have a two-slotted form for the secondary winding, and, if correct, the brass threaded rod is extending through at one end for a distance of about 1/2 inch, and at the other end approximately 3 1/2 inches.

In winding this form the same method as used on the primary is used. Place the short protruding end of brass threaded rod into the chuck of the drill, secure the end of the wire in the same manner as before and turn on the wire in the same direction as on the primary. Start with the slot nearest to the drill and wind on 350 turns of wire in each of the slots. When beginning the second slot the free end is to be passed over the first slot and wound around the chuck to prevent interfering the same as with the first. This you will see brings both of the starting ends up and over on the same (right) side of each slot, with the finishing ends on the surface of the windings. All four ends should be grouped at about the same position on the circumference of the form, and if not already so, the standard should be forced into a position in line with the ends of the wire. Thus, when the unit is mounted the ends of the wire will be at the bottom of this unit (see figure 9).

**Regeneration Condenser**

The special condenser is made up from segmented discs, one of tin foil and one of thin copper (see template, figure 8, for

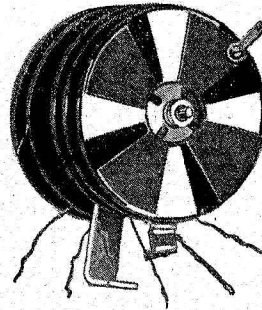


Figure 9

cutting these discs). In cutting the segmented discs, a good way is to cut out the one of copper first, using a pair of scissors and, after smoothing this one up



with a file, use it as the form for the one of tin foil. Place the copper form on the sheet of tin foil and cut around with a razor blade. Figure 8 may be traced onto the copper with carbon paper.

The hole in the center of the tin foil form must be more than large enough to clear the hexagon nut, so there can be no possibility of connection between the tin foil form and the brass parts of the form. After forming the tin foil sheet, this should be glued onto the fiber disc which forms the outside of the secondary unit. Place the tin foil so that one of the cut-out sections is at the top of the disc.

Now cut a disc of mica 2 3/4 inches in diameter, with a hole in the center just large enough to pass over the hexagon nut, and place this in position over the tin foil. This forms the dielectric between the two plates of the condenser.

A hole must be cut in the copper segmented disc just large enough also to pass over the hexagon nut and should be placed in position over the mica disc. You now have a condenser which is variable from minimum capacity to maximum, by moving the copper section on its hub over the tin foil plate. In order to fix this action we must have some sort of a spring washer which will bear upon the movable (Continued on page 28)

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# Demonstrating Radio Principles at Home

## Chapter V—Presenting the Experimenter Senior

By J. E. Owen

**RADIOPHANS** inclined to experiment will find in this series of articles, directions for illustrating to their own satisfaction the underlying principles of Radio. They will be told how to set up the experimental apparatus, which will be simple and not so complicated as to require the equipment of a large laboratory, using odds and ends probably already at hand. Few new parts will be needed. The chapters to follow will be:

- Chapter VI—Presenting the Experimenter Junior.
- Chapter VII—Presenting the Experimenter Supreme.
- Chapter VIII—Experimenting with Push Pull Amplifiers.

**T**HE first and most easily constructed of the experimenter circuits is the Experimenter Senior. Following the general specifications developed in the last article, this circuit has been planned and so thoroughly worked out that success is certain for all who build it, provided the general things and precautions are carefully observed.

The original from which this set is patterned is the oscillating circuit of a broadcasting set, a set that has obtained excellent results with this modified form of the Colpitts oscillator. Inasmuch as the original circuit used by this station for transmission proved to be difficult to control when it was tried for reception, the development followed the course of determining just what sort of control to use over regeneration and what constants and particular types of apparatus to use in the circuit. The utility of special controls over regeneration has already been demonstrated in certain modifications of the ultra audio (the ultra audio being the Colpitts utilized for purposes of reception), but in the Experimenter Senior there are incorporated features that are new to the art of reception. One of the most outstanding of these is the employment of a counterpoise, together with an aerial and ground. In the usual type of

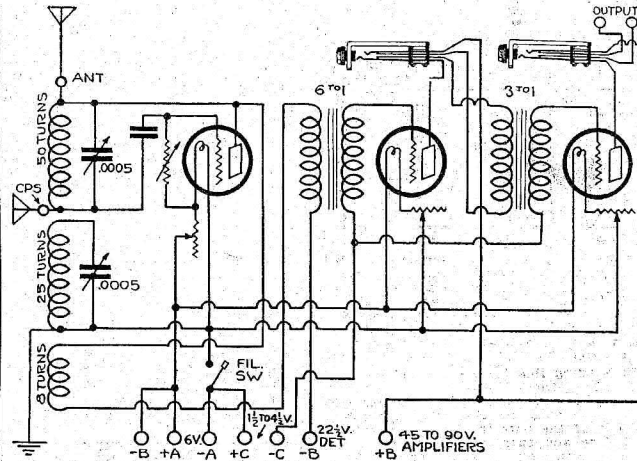


Figure 1

ultra audio, there is a condenser in the aerial circuit which in the Experimenter Senior is replaced by the counterpoise and ground. This, in addition to providing a suitable capacity, brings out a feature, the use of which was not feasible in the original types of ultra audions. To those who have made a study of counterpoise advantages, it is at once apparent that this has to do with its action as an aerial as well as a plate of a condenser.

**Do Not Crowd Apparatus**

In the list of parts is given all the necessary apparatus for the construction of the Experimenter Senior with a two stage amplifier, this being sufficiently sensitive and powerful to bring in distant

stations with excellent volume. The circuit diagram is given in Figure 1. This set may be satisfactorily housed in a cabinet that uses a panel, size 7 inches by 21 inches, although a smaller one will accommodate it. It is always advisable, especially for the less advanced experimenter, to use the larger sizes when more than one cabinet, baseboard, or panel layout is given. The writer once put a six tube neodyne in a cabinet that was slightly small and consequently it was rather difficult to neutralize the Radio frequency stages. Somewhat similar difficulties may often be encountered in the regenerative set. Regeneration may be difficult to hold stable and there may be losses similar to

those for the prevention of which "low loss" devices have been designed. These losses cannot be prevented regardless of the types of apparatus used in the set.

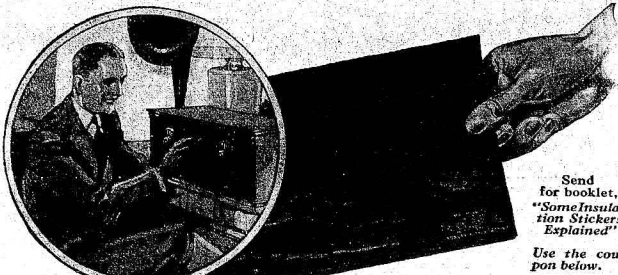
The panel layout for the three tube set is given in figure 3. The dimensions for the mounting of the different pieces of apparatus will vary with the different brands used, but the general plan should be followed for best results. Figure 2 is a recommended baseboard layout that is adapted to the panel layout of figure 3. A regenerative set of this type is fairly flexible in its construction. There may be considerable shifting of the different pieces of apparatus before any difficulty from losses and unstable regeneration will result. The back panel, on which the binding posts are placed, is shown above the layout.

A "soft" or standard detector tube is recommended for use in the detector circuit, although there may be a considerable gain in A battery economy if a "hard" or amplifier tube is used. The rheostat should be of a type that will handle either type of tube. Dry cell tubes will give superior "dry cell tube results" in this circuit, but the output will be considerably less than the output from storage battery tubes. Various plate voltages should be tried until the most satisfactory is determined. If a C battery is not used a wire should connect the posts marked +C and -C.

**Coils May Be Homemade**

The list of parts includes a three coil set of 50 turns, 25 turns and 8 turns, the 50-turn coil being placed on a stationary mounting, the 25- and 8-turn coils being placed on a double mounting, the 8-turn coil being on the movable portion. The 25-turn coil is placed in the middle and approximately 1 inch away from the 50-turn coil (center to center). These coils may be wound in the experimenter's workshop or they may be secured from any of the leading manufacturing establishments.

The cost of the set may be reduced somewhat if the experimenter winds his own coils. Regardless of all that has been (Continued on page 24)



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# EISEMANN

ELECTRICAL EQUIPMENT



**DEMONSTRATING RADIO**

(Continued from page 23)

said and written about winding "low loss" coils, the beginner will find standard coils much easier to make and more rugged, and more likely to give satisfactory service. Coils for this circuit may be wound on a 3-inch tube approximately 6 inches in length, using number 18 dec. wire. Beginning at one end, wind 25 turns and make a loop from which a tap may later

one or two turns. If, after making sure that the coil has the proper polarity, it is found that regeneration is not sufficiently strong, wind on more turns until the desired results are obtained. This should never be more than 8 turns, however. Adjustment with the standard coil mounting set amounts merely to the determining of the correct polarity of the 8-turn coil and adjusting the strength of regeneration by moving it toward or away from the absorption coil.

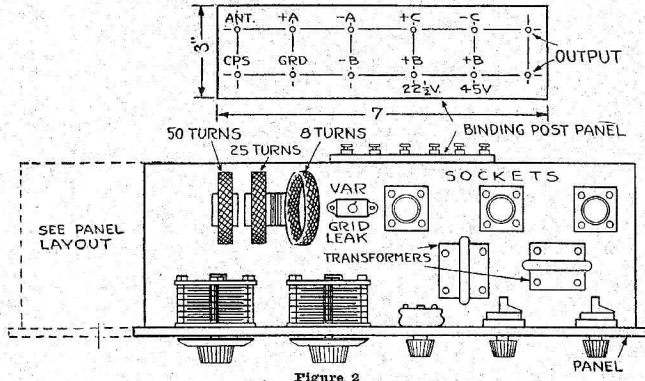


Figure 2

be taken. Wind 25 turns more and fasten. This completes the 50-turn coil. Leave a space of approximately 3/8 inch and wind the 25-turn coil.

With this form of coil construction, the feedback turns are wound directly on the absorption coil. Wind on 5 turns. The general form of the coil will then be like that of figure 4. When the set is completed (or apparently so) reverse the connections to the feedback coil. It will be observed that there is a negative feedback with one connection and a positive feedback with the other. Ordinarily, the positive feedback is desired. This will, of course, be the connection that gives the stronger regeneration. The strength of this regeneration is next to be adjusted. If it seems too strong, i. e., if oscillation takes place before proper control can be had over the regenerative state, remove

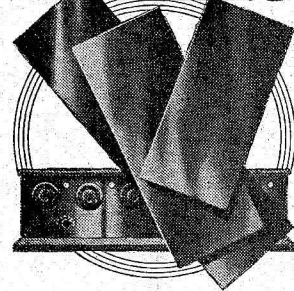
**Cutting Radiation**

The purpose of the middle tap on the 50-turn coil has to do with a recent discovery which deals with the reduction of radiation from a regenerative receiver. With the aerial connected to the middle point on this tuning coil, the effect is to reduce radiation considerably. The idea that a three circuit receiver is free from radiation is prevalent, but tests show that it is nearly as great an offender as a

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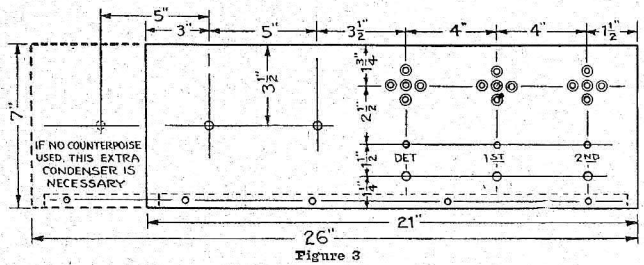


Figure 3

single circuit set. Binding posts should go to the regular antenna connection and to this middle point on the 50-turn coil. Since it is rather difficult at present to obtain from stores and supply houses a coil with the middle tap, this feature is not included in the regular circuit diagram.

The counterpoise is simple to install, but care must be taken to see that it is not grounded in any way. It may be arranged fan-shaped or the wires may be parallel, one wire at the lead-in end connecting them all. The list of accessories as given in the material list includes wire and insulators for its construction. The set may be used with the regular type of aerial installation if a 23-plate condenser is connected across the counterpoise and ground binding posts. If desired, this feature may be included in the set as originally designed. The counterpoise should lie directly under and be as

long as the horizontal portion of the aerial. It may spread out 30 or 40 feet if desired.

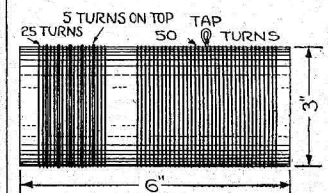


Figure 4

With the counterpoise the set is fundamentally a permanent installation, but (Continued on page 30)

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# Various Uses of Resistances in Radio Circuits

## Units Are Control Gates of Energy

By Ernest W. Sawyer

THE exact theories of the phenomena of resistance in Radio circuits as mentioned below, have not been completely worked out and this is now one of the most fertile fields for research, investigation and experimentation. Luckily, the devices available are so designed that even those with little Radio knowledge can experiment and obtain excellent results. At the same time, the greatest experts are entirely at variance as to the actual technical explanation of many of the results secured. Suffice it to say, anyone can get remarkable results from trying the following suggestions. Try them and be convinced. Study the reasons for your results and you have a man-sized problem on your hands.

### Grid Leak is Familiar

1. Ordinary use of variable grid leak in the lead from the coil to the grid of the detector tube. This might be considered as a dam to hold back and govern the flow of electrons to the grid. It was this use of a variable resistance  $1\frac{1}{2}$  to 50 megohms by Mr. F. A. Hodge of Brooklyn in his \$15.00 set that permitted him to get London in the famous Waxman test of April, 1924. This use is specially adapted to regenerative and ultra audio circuits and can be used very successfully in such super-heterodyne circuits as those used by Paul Godley in the famous receiver which he used in the first Transatlantic tests held in England. The explanation of the action of the variable resistance here is about as follows:

When waves enter the tuner from the aerial, the grid is affected with an alternation of positive and negative waves. The flow of electrons from the filament is hindered or prevented when the grid is negative. For our purposes, it can be considered that when the grid is positive, the little charges of electricity exchange places with the negative charges flying from the filament in the form of electrons. But when the grid is harboring only negative electricity, it is held a prisoner. There is no place for these charges to go.

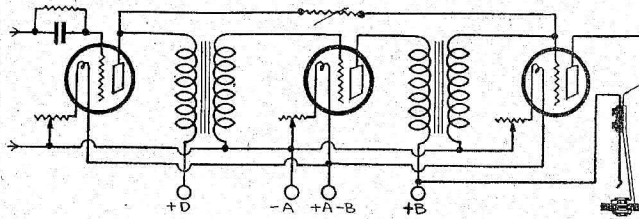


Figure 1

The little ups and downs of the Radio waves, however, come in thick and fast, and the grid endeavors to take care of them. It has no trouble in getting rid of the positive halves because they flow over to the filament; but the negative halves remain where they are. Soon these negative charges are crowding the grid. As soon as the wave train ceases—and before the next wave train appears—the grid gets rid of these negative charges by making them leak through the most convenient hole. The grid leak is for this purpose. It takes care of the negative charges on the grid. Unless this is done, the action of the tube as a detector would be unsatisfactory if not impossible.

2. Common use of variable grid leak is from grid of your detector tube to ground or the negative A battery or to the filament. Variable resistances are built especially for this purpose, and best results are obtained when they are somewhere between 500,000 ohms and 6,000,000 ohms, as is shown in the Cockaday and other four circuit regenerative circuits; also in many types of ultra audio circuits. This use usually stabilizes the circuit and could be considered as a by-pass or overflow to carry off the surplus grid electrons. You can easily test for yourself and find the best place to connect this in your individual set.

In receiving weak signals, the resistance should be high so that very little energy is lost. For a strong local signal, the

resistance should be lowered to avoid distortion and blasting. If, however, your set is already equipped with fixed leaks, then by all means investigate the improvements available by using a 4 to 5 megohm cartridge for distant stations, and a  $\frac{1}{2}$  to 1 megohm for local stations.

### As a Neutralizer

3. Possibilities of using  $\frac{1}{2}$  to 30 meg-

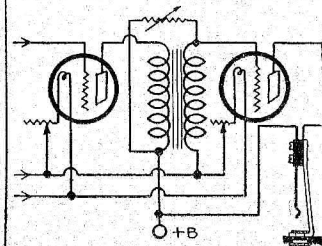


Figure 2

ohms variable resistances in neutrodyne circuits so as to combine capacity and resistance neutralization. The merits of this are still subject to considerable discussion as are also the comparison with ordinary capacity neutralization.

4. Frequency bucking controller. Connect a variable resistance from the detector plate to the grid of the last tube. See Figure 1. This should be operated in the vicinity of 10,000,000 ohms. Here is something very interesting and the action may be explained roughly as follows:

A portion of the plate current from the detector is shunted into the secondary of the last transformer and produces the following results. When the audio frequency current in the primary of the first transformer is communicated across the transformers, by reason of distributed capacity of the transformers, it is communicated to the receiver or loud speaker in the form of distortion, for when the first transformer primary is plus, the secondary minus, the primary of the second stage is plus, the secondary minus. Now by feeding through the shunt circuit a very small portion of the plate current to the secondary of the second stage transformer, it is then 180 degrees out of phase with the distorted impulses communicated through the transformers, which therefore nullifies the distortion. By use of this variable distortion eliminator, the amount of current by-passed by this shunt, is under full control of the operator. Should a greater amount of current be by-passed than is necessary to eliminate the distortion, the lower frequency impulses will be connected across the shunt path and reduce the volume of amplified impulses that come through the transformers normally.

5. There are other places where variable resistances may be successfully used, such as in series with the loop or from the antenna to ground, etc.

6. If used from antenna to ground, it may be considered as a static discharger relieving the antenna of the surplus tension, which would otherwise cause disturbing clicks, in other words, a partial static eliminator.

7. Another place to try such a unit is from the grid of the detector tube to the plate of the last tube, or the plate side of the secondary of the last audio transformer.

(Continued on page 26)

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**USES OF RESISTANCES**

(Continued from page 25)

8. Still another very important place is from the grid to the plate, as in the Kaufman circuit. Mr. Kaufman says he cannot explain how the grid leak functions, but he knows the set will not operate properly without it.

**Excellent Distortion Eliminator**

9. As a distortion remover, there is nothing comparable with a variable resistance from 10,000 to 120,000 ohms placed across the secondary of your audio transformer. Several have been especially adapted for this purpose. This phenomena may be described as follows:

"As the audio frequency in the transformers is also combined with very high frequencies, the length of which is sometimes shorter than the length of wire in the transformer itself, there will be one or more nodal points in the transformer. Therefore, by shunting the secondary of the transformer by resistance, one limits the amount of current taken up in the short circuit secondary to the required amount necessary to produce a partial flux out of phase with the flux resulting from the current supplied to the primary of the transformer. This acts as a dampening ring similar to that used on alternators to prevent what is known as "hunting." Also used at the one end of a plunger in an alternating current solenoid to prevent humming. As the original impulse generates a current in the short circuit ring, it again loses its energy between frequencies of the primary current and therefore sets up a counter emf. Then there is no voltage in the primary and therefore distortion due to harmonic or other causes that are impressed at the primary of the shunted transformer out of time with the primary of principal frequency is prevented. This is the most important use of all and in ordinary language, I explain the phenomena simply this way. Audio transformers should give an equal voltage amplification over the entire range of 200 cycles to 2,000. Practically, this is impossible because of costs, etc. Some of the best audio transformers on the market give poor results if used below 300 or above 1,200 cycles. If the best ones distort, then the poor ones certainly accentuate it. (Whatever you do, buy good transformers.) High ratio transformers have sharper peaks than low and distort more. To stabilize these and level up the curve of amplification, it is necessary to put a resistance or load across the output or secondary side of the transformer.

The improvement in tone quality when

it is used is very noticeable and ordinary homemade neutrodyne sets, for instance, will give their owners 100 per cent better "quality results." When the resistance is adjusted to the proper value for elimination of distortion, your transformer is then working at its maximum "quality efficiency" and all surplus energy is being by-passed.

10. The variable resistor can also be used advantageously across the phones or loud speaker terminals to control the volume without upsetting the tuning. The resistance in this case should be variable from 10,000 to 120,000 ohms also.

11. A variable unit covering the range 5,000 to 100,000 ohms can be used to obtain a negative bias (see figure 2) by connecting it across your audio transformer from the primary B to the secondary G and adjusting somewhere between 5,000 and 10,000 ohms.

12. There are several other interesting places to use variable resistances, such as across the secondary of Radio frequency transformers to broaden the tuning range.

13. Also that one tremendous big field resistance amplification. This last field is so large that a discussion of it will not be attempted in this article.

In all resistance coupling, type 216-A or other large tube may be used to obtain extra volume on the last stage of amplification. Tubes of high mu values will no doubt soon become plentiful to take further advantage of the possibilities of the clear quality reproduction of resistance coupled sets.

The real secret of success in the above experiments lies in the fact that resistance coupling, and resistances used anywhere, do not distort or alter the energy or waves that pass through. When you deal with inductances and capacities, you are playing with the dangers of distortion, but with resistances you are simply controlling the gates of the energy.

**CARING FOR XMAS SET**

(Continued from page 19)

set. This can be accomplished as shown in figure 4 by simply inserting one end in one side of the clip and springing the grid leak into position.

When a grid leak of the proper capacity is put into the regenerative circuit, the dial controlling the regeneration should be advanced until the set squeals. If the set does not squeal when this dial is turned, the grid leak must be changed until one of sufficient value is found.

Another place to look for trouble on a receiver is at the bolts and screws used

throughout the set. At times the locking nuts on the transformers or vacuum tube sockets have a tendency of coming loose "for no reason at all." A set of socket wrenches are of great help in taking care of this trouble, and may be purchased in any hardware store quite cheaply.

**Miscellaneous Troubles**

If replacement of fresh B batteries and cleaning of tube socket contacts does not stop the noise, a fixed condenser may be the trouble. If solder flux is left around a fixed condenser joint, there may be a resistance leak formed. Replacement is the best procedure in case this happens.

Heat changes will sometimes loosen the windings of coils, variometers and other apparatus. A varnish made by dissolving celluloid strip in acetone can be used to refasten the loose windings.

Another trouble found in some sets is caused by one or more bus wires loosely touching others or coming loose during use, to form open or short circuits. Loose wires can be found by carefully moving each bus wire gently with the fingers. A

wire just resting on a contact instead of being soldered fast will then come loose, and can be resoldered.

Battery connections, or wires to the binding posts of the set, may work loose and cause trouble, so it is advisable to look these over when the set does not give the proper tone and reception is spoiled by intermittent grinding noises.

**Do Not Use Paint**

Painting parts of Radio receiving sets is a certain cause of leakage. It has been found by careful experiments. If wooden panels are used, the wood should be left dry, and no liquid substances should be used on the coils or condensers at any time. However, it is very important to keep the metallic parts of Radio equipment bright and free from dust, and Radio receiving sets with shingling well-groomed parts give the best results.

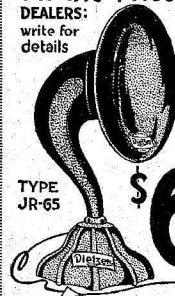
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# Homemade Winder Makes Coils Even

## Handy Bench Tool for Builders of Receivers

There are no special measurements that can be applied to the homemade winder illustrated. Enough details are given so that any fan can construct one for his

### WORKSHOP KINKS EARN A DOLLAR—

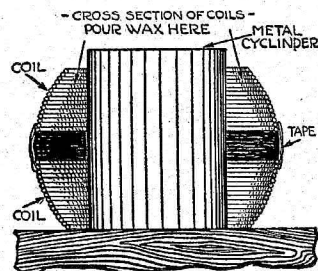
**T**HERE are many little kinks worked out at home that would aid your fellow Radio worker if only he knew about them. There are new hook-ups, new ways of making parts and various unique ways of operating sets that are discovered every day. Radio Digest is very much interested in obtaining such material. 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

**Workshop.** Two uprights at one end of the base support the coil of wire while at the opposite end two more supports hold the coil core on which the wire is wound. The cross piece on top of these supports holds the arm for distributing the wire evenly as the core is turned. To operate, simply turn the crank and gradually work the distributing lever over as the wire is wound on the coil.—Kenneth J. Yost, Eaton, Ohio.

### Simple Method to Make Rotors

When making tuning coils and couplers the amateur either must use a section of cardboard tubing, or else buy a rotor and wind it. By employing the method here-with described a very serviceable and inexpensive rotor may be made.

The wire is first wound on a form, which is usually employed in winding the stators of variometers. The wire is wound on the form with a few more turns than is needed on half the rotor. After the wire is wound on the form it is given a coat of good insulating varnish, such as water glass, or a cement made especially for such work and this is allowed to dry. After the drying process the wire is carefully removed from the form. This forms one half the wind-



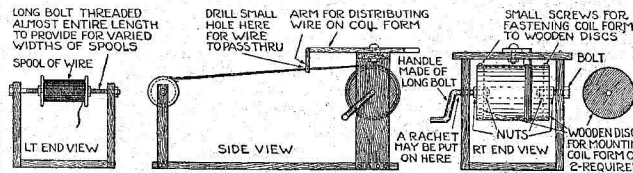
ing of the rotor, therefore another coil is wound in the same manner. This should be wound so that when it is complete the wire runs in the same direction. A piece of tape is wrapped around the two coils and they are then laced on a flat surface. A metal cylinder is placed inside the coils as shown in the illustration. This should have oil rubbed on it for good results.

Some sealing wax is next procured (this may be obtained from old B batteries that have become discharged) and melted then poured around the coils between the coils and the metal cylinder. When this cools the cylinder is heated enough to be removed, also the tape is removed. Two holes are drilled for the shaft and two others for the wires leading to the coils. The two inside leads are soldered together. A rotor of this type should give as good results as those found on manufactured rotors.—Evermont Fisel, Lebanon Junction, Ky.

### Bending Bus-Wire

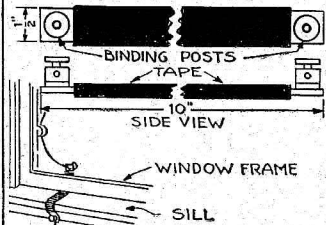
Bus wire can be easily bent with the aid of two 10-penny nails and a small piece of wood 1/2-inch thick. Drive the nails into the wood, leaving about 1/4-inch protruding. The nails should be placed close enough together to just allow a piece of bus-wire to slip between them. To bend the wire at right angles or into loops at the ends, simply insert the bus-wire between the nails and bend it in the desired direction

## SIMPLIFIES WINDING OF TUBES



### Homemade Window Lead-in

To save the trouble of boring a hole and the resultant bad looks to the window sash I use a lead-in in strip form



placed under the sash. The strip may be bent into any shape to fit the ledge. The lead-in is made from a small strip of copper 10 inches long and 1/8-inch wide. Two small holes are drilled at the ends of the strip for binding posts. Ordinary tire tape is wrapped around the strip for insulation.—Calude Lisman, Hooker, Oklahoma.

### The Best Type Aerial

The aerial is preferably one of a single wire, which runs directly away from the receiving set. However, when the aerial must be less than 100 feet in length, a small increase in the received signal may be obtained by using two parallel wires instead of one. The usual type of single wire aerial is from 100 to 200 feet in length and as high above the ground as possible.

The longer aerial may have such a high natural wave length that it will be found impossible to receive the shorter wave length broadcasting stations, since it is impossible to forecast the fundamental wave length of an aerial before it has been erected. This particular limitation should be looked for in aerials which are greater in length than 125 feet.

Splices and joints in the aerial span are to be avoided. Make the aerial and wires in one continuous conductor, if possible. This makes splices unnecessary. Any splices and joints in the aerial span must be soldered and wrapped with electrician's tape to prevent corrosion.

The aerial wire is copper, copper clad steel, or other metal which will not corrode excessively, and in no case should be smaller than number 14 gauge.

All parts of the aerial should be kept as far away from other electrical wires as possible, and particularly away from the power circuits and wires of the street car lines, high tension power distribution lines and power transformers. Do not build the aerial where it can come in contact with any part of a power or elec-

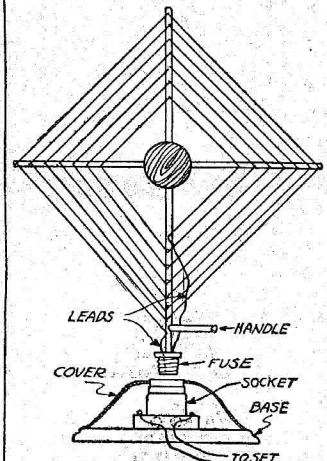
trical line through the accidental breaking of the aerial or lead-in.

The two binding posts or terminals which are marked "Antenna" in many receivers are provided to make possible the most efficient use of the antenna which has been installed. To decide upon which terminal best for your purpose, attach the antenna first to one binding post, then carefully note the reception from both long wave and short wave broadcasting stations. Then attach it to the other binding post and note the reception from the same stations. Connect the antenna permanently to that binding post which gives the best results.

The restricted aerial often greatly decreases trouble due to power line induction and static. If you are located near noisy lines try a small indoor aerial.

### Rotating a Loop

A fuse plug and a light socket provides a means for rotating a loop aerial. This arrangement does away with the flexible cords used on ordinary loops. The mica end of the plug is removed and the stem of the loop is inserted in its place. The



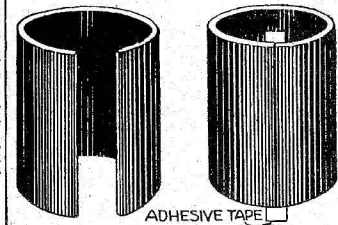
connections are made from the ends of the loop to the brass button in the center and to the threaded sleeve. The wire connecting with the set is attached to the screws on the socket.—C. E. Mock, Le Mars, Iowa.

Sound waves travel faster in summer than winter, and travel is slower above the earth and on its surface.

## Cutting Tubes to Make Any Diameter Needed

Many times the Radio experimenter finds that he needs a tube of a special diameter which he cannot obtain at any Radio store. For instance, in making neodyne transformers, he may not be able to procure a tube of exactly the right diameter to fit snugly inside the secondary coil.

A simple method of making tubes of exactly the size needed is shown in the accompanying illustration. A cardboard tube a little larger than the size needed is obtained and a strip is cut out lengthwise. This strip should be of such width that when the edges of the slit are pressed together the diameter of the tube will be just the size needed.



If a hard rubber tube is desired instead of a cardboard tube, the strip is cut out of a hard rubber tube and the tube is then placed in very hot water. When the tube has become soft and easily bent, the edges of the slit are pressed together and some wire is wound tightly around the tube to keep the slit closed. The tube is then set aside to cool and harden. After the tube has hardened again, the binding wire is taken off and the regular winding put on. Usually, if the wire is wound tightly, the winding alone is sufficient to keep the slit closed, but if the experimenter desires he may fasten a strip of adhesive plaster under the slit, as in the illustration.—J. L. Rifkin, New York City.

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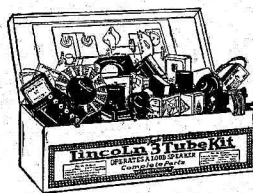
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**SIX TUBE HET-DUO-GEN**

(Continued from page 23)

copper section and still be held firmly onto the rod in itself. The slotted spring washer found in certain types of rheostats is just the thing for this purpose and after bending into suitable shape should be slid into the rod, and held in place against the copper by another nut screwed up tight against the whole.

Now that we have all of the parts made, we have only to assemble them permanently. The primary unit has simply to be slid onto the long end of the protruding brass threaded rod, but a hexagon nut should go on first, then the primary unit, and then another nut, the idea being to screw up both of these nuts tightly to hold the primary unit in position after it has been tried out for best results in various positions in the finished set. This of course will all be explained fully later.

**Connecting the Condenser**

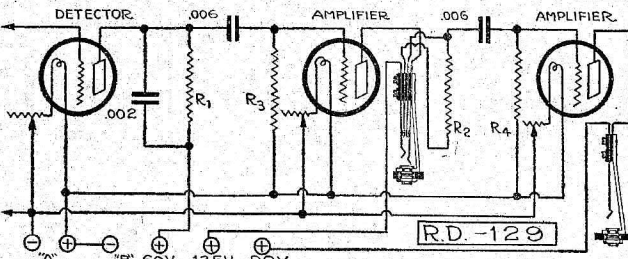
Perhaps the most ticklish operation is now to come, that is the soldering of one of the leads from the secondary winding to the tinfoil plate of the condenser. In this operation the soldering iron must not be too hot, nor left for more than an instant against the tinfoil, or the result will simply be to melt the tinfoil.

The end to be soldered is that end of the wire which comes up from the bottom or beginning of the coil wound in the slot immediately beside the condenser set-up disc. This lead is to be soldered to the tinfoil plate, and extreme care must be used to prevent spilling it. To do this it is necessary to remove the copper plate and the mica disc.

We still have one more small operation to complete this unit, and that is to join the two sections of the secondary windings. The outside, top, or ending terminal of the winding in the slot next to the condenser, is to be joined with the bottom, inside, or beginning terminal of the winding in the other slot. Twist these two wires together for the full length of the terminals and leave as one for connecting to the other apparatus.

In the next issue Mr. Brush will take up the assembly and wiring of the base panel and show top and bottom views of it. (Editor's Note.)

**RESISTANCE COUPLED AMPLIFIER**



WHILE it has been the general practice to couple tubes amplifying at audio frequencies by means of transformers, this has been largely because few listeners were aware that any

so be distortionless. While resistance coupling gives less amplification per stage the output is a perfect reproduction of what is put into the device and the cost of a three-stage resistance-coupled amplifier is no greater than that of a transformer-coupled unit of two stages.

To build a resistance-coupled amplifier requires no new knowledge on the part of the Radio builder, nor is it difficult to alter the transformer outfit into one of this type. The resistance units and coupling condenser are all mounted on a small base with terminals P, B, G and F, with which everyone is familiar. The diagram shows two stages added to a non-regenerative detector which may well be part of a neutrodyne, tuned Radio frequency, superdyne or super-heterodyne receiver. While it is perfectly feasible to arrange a jack after the detector for

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2 Resistance units, 100,000 ohms @ .50 .....	1.00
1 Grid leak, 1 megohm.....	.50
1 Grid leak, 1/4 megohm.....	.50
2 Sockets @ 1.00.....	2.00
2 Mica fixed condensers, .006 @ .45 .....	.90
1 Open circuit jack.....	.75
1 Double Circuit jack.....	1.00
1 Panel 7x10.....	1.25
Miscellaneous small parts.....	1.00
<b>Total cost .....</b>	<b>\$11.90</b>

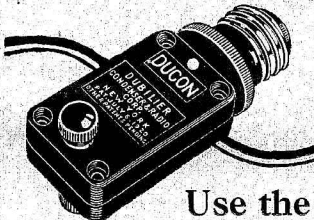
other method existed. As a result, resistance-coupled amplifiers only came into their own recently. The transformer has much in its favor, but it is inherently impossible for this device to give equal amplification of all audio frequencies and

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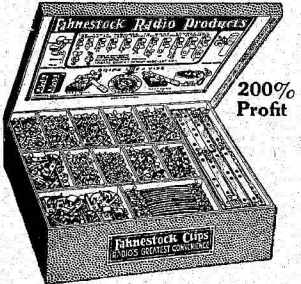
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**TELEGRAM**

Garden City, N. Y. Nov. 29th, 1924.

Program you heard Nov. 25th was broadcast by 6NO, Newcastle, England. Radio Broadcast Magazine.

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**PREMIER Quality Radio Parts**

plugging in, it slightly complicates without being particularly desirable.

The capacities used are all indicated in the diagram; the resistances R<sub>1</sub> and R<sub>2</sub> are 100,000 ohms each, R<sub>3</sub> and R<sub>4</sub> being 1 megohm and 1/4-megohm respectively. There is nothing critical to adjust and readjust, it being only necessary to turn on the battery switch when the use of this apparatus is desired. This type of amplifier is particularly desirable in a super-heterodyne as there is a minimum of possibility of undesirable noises from coupling between parts of the set.

**Care of Storage A Battery**

If a receiver has been set aside and not used for a time the first thing that requires attention is the batteries. Most fans who do not thoroughly understand the working of a set will put on the battery charger for a short time and expect it to do its best. A battery will always form some corrosion and it should be taken outdoors and the corrosion removed with water and an old broom. When a battery is clean it presents a better appearance, the charge will hold longer and the battery will have a longer life.

Many owners will lay the slight popping noise on static or hunt all over the receiver for it. The difficulty will usually be found in a loose or corroded connection on the A battery.

One of the best agents for cleaning a storage battery is a tablespoonful of common baking soda dissolved in a pint of water. After the battery and clips have been cleaned with this solution scrape the binding posts clean and cover them and the clips well with a coat of vasoline, as this substance will keep the parts from corroding.

**STAR-ITE THE STAR-ITE CRYSTAL**

Because many people have had good results with the STAR-ITE CRYSTAL used as a detector with non-regenerative tube sets, we have had a great many letters from radio folks who seem to be of the impression that this is the—as yet unperfected—OSCILLATING CRYSTAL of which so much has been said in the radio press.

We have secured oscillation with crystals in a laboratory fashion, but could not attempt to sell the STAR-ITE to take the place of amplifying tubes.

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# Questions and Answers

## Soldering Trouble

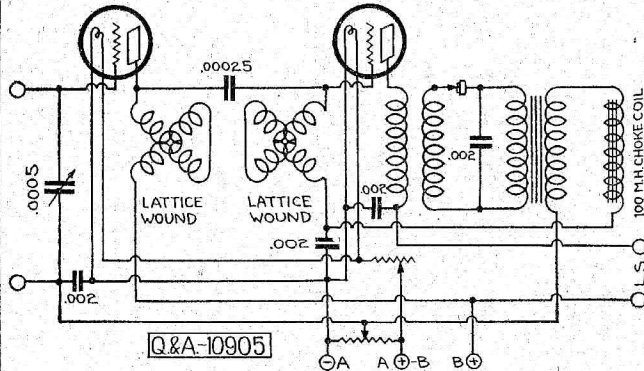
(10703) HM, Montreal, Canada.  
I take pleasure in telling you that I constructed a Reinartz receiver last fall according to your booklet. I bought all good parts and kept strictly to your plan even to the cabinet, which is polished mahogany, and it has been a wonderful success, having heard stations as far away as Omaha and St. Louis. The reception is beautifully clear and I might say that I believe I have had far greater success with it than any of my friends have had with their various hook-ups. I went a step farther this summer and built the two stage amplifier and, as before, using all good quality parts on the first stage I have a 5 to 1 Supertran transformer and on the second stage a 3 to 1 general Radio type 231A. All tubes are WD-11, and I might state that it seems to work better using separate batteries (these are on a shelf under Radio table, with holes drilled through table for connections), 22½ volts on detector and 45 volts on amplifier.

My trouble is this: When I pick up a station on the detector (leaving amplifier rheostats on one-quarter way) and then plug in on the first stage the station has gone. This means that I have to find my station on the first stage, which comes in considerably amplified, and when I plug in on the third stage it again amplifies splendidly in fact, I think St. Louis and Chicago would work the loud speaker. This is perfectly satisfactory, but would you be kind enough to advise me why the detector and first stage won't work together.

My choke coil has thirty turns of cotton covered wire, and also I should tell you that my detector works better without any phone condenser. Do you think it necessary to put one on now that I have the amplifier unit?

A.—We have noted carefully the action encountered in operation of your Reinartz circuit and we are suggesting either a partially shorted transformer or a defective phone jack as the probable source. When soldering to the lug on the jacks, the soldering flux may have run into the fiber spacers and causes trouble. Note the action of jack by inserting and withdrawing the plug and if spring tension seems weak it should be bent into shape to correct the fault. Test your transformer, primary and secondary separately, by connecting a 22½-volt B battery in series with a voltmeter to the primary and secondary in turn. If shorted the reading will be over 20 volts.

A dead battery connected in series to others will shorten the life of good batteries. It should be taken out of the circuit immediately.



Q&A-10905

## Two Tube Reflex

(10905) WLD, Scranton, Pa.  
Will you show again the circuit diagram of the two tube reflex circuit published about eighteen months ago in Radio Digest? The circuit contained two tubes, one fixed crystal, two variometers, one Radio frequency transformer, one audio frequency transformer, one variable condenser and with miscellaneous condensers.

The circuit you mention was published in the June 30, 1923, issue of Radio Digest and it is again shown in the accompanying illustration.

## General Difficulties

(10732) JRW, Avlmer West, Ont., Can.  
I am writing to see if you can proffer some of your expert assistance on a problem that has arisen in connection with a set I have.

This set, I understand, is known as a single circuit regenerative set having two stages of audio amplification. The difficulty is I can get no volume from it. Other sets having only one stage of amplification being louder than this set.

The variocoupler is a Shamrock, having approximately 65 turns on the stator, 7 taps of 8 turns and 7 taps of 1 turn each. The condenser is a 3-plate vernier; first transformer is a 4 to 1, the second 2 to 1. I have 150 feet of aerial, 60 feet at one end and 25 at the other, this includes lead-in; Ground, about 15 feet soldered to a water pipe.

A.—Varying factors are responsible for lack of volume and we are suggesting that you check all external equipment to perfect efficiency. This will involve a careful survey of antenna, lead-in and ground installation, providing against any possible leakage losses through poor insulation, shorted lightning arrestor or inefficient ground. Before attempting to use your amplifier it is advisable to be sure that your tuner stage is doing its

full share in satisfactory reception. Common factors for weak signals in this circuit are poor wiring, failure of tubes to make a proper contact in socket and often an improper adjustment of the grid leak. Defective tube could be a source of weak signals and it is well to try the several tubes in the different positions and note audibility. Having determined that this part of your receiver is functioning normally turn your attention to the amplifier circuit, having proven the condition of tubes. The most common difficulty here is in poor transformers which are either shorted or burned out or generally inferior. Try reversing terminals. Defective phone jacks would effect volume unfavorably. Great care in soldering is essential as stray soldering flux is exceedingly detrimental to normal functioning.

All of the factors cited are suggested as worthy of attention and a review along the line suggested will doubtless isolate the particular one which is imposing limitations.

Never draw excessive current from a battery or charge at too high a rate, as this will cause the plates to become distorted and will ruin the battery.

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CUT your tube expenses in HALF. Here's "Roice," an efficient and durable tube that gives longer service and greater satisfaction. Powerful! Increases range and volume with maximum clearness. We sell direct only. You save by this plan; it enables us to sell "Roice" at this low price.

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### The Reader's View

#### Jumble and Confusion

We sit down each evening to our Radio, and each time with a feeling that springs eternal in the human breast, and wells that it does, and as often we get up dissatisfied, but a better term would be disgusted. We tune in to our nearest major station, WDAF, and try to get a good center focus on it, and failing to find a stable one we wonder what sort of moonshine the station has been imbibing, anyway, that makes it so wavering and staggering, and then we hear the edge of a different sort of music than WDAF is trying to send out, an know that WCCO is, too, crowding for a place in the sun. We quit this duel and move over to KFXX, and after hearing a few words in a clear and distinct way, another station marches hastily to a flank attack and the fight is on, and so we leave that vicinity. Then we move over to station stall 360 and at once we realize that there is the real seat of war sure enough, and the punishment and casualties must be heavy indeed, judging from the pandemonium of the noises, and squeals, and howlings that are issuing from that quarter. We go over, then, to the opposite side of the dial and get enough to know, that there is something fine on at WFFA if it wasn't for WOC traying one side of it and WCAP bumping it from underneath.

Then we move back to WOS, and no doubt it is a dandy old-time fiddlers' program that is going on, except that WSB is doing something at the same sort of stunt, and the WSB's fiddle bows get to raking WOS's fiddle strings, and, listening a few second at this asylum-like concert, we move on, and with a fair first promise we step over WLS, but this promise soon proves deceiving, for this stall soon gets into a family fuss with a couple of close each side neighbors and the innocent on-looker has no business there any more. We next go over to WGY's concession, and finding that it did not have elbow room, and was whistling disgustingly over it, we moved to WJZ, not so very far away—and here it was, station to right of it, station to left of it, station right under it, volleying and thundering—sure some one must have been blundering. We hopped, skipped and jumped a few times over and around the dial after this trying to find a transient lodging for a small part of the night, and absolutely failing, hung up our headsets and quit for the night. And this we do each night, hoping and hoping to get a station isolated some time where we can get a good square shot at it. An entire stranger to the whole proposition, and listening in at it for the first time, would think it was a crazy patch work got up by a committee of the insane to entertain disordered minds with disordered jumbles of sounds. Of course, our local electric plant is broadcasting all over the dial as well.—Taylor South, Chanute, Kansas.

#### Re-Radiating Receivers

The Radio Digest bearing date of December 13, 1924, is commenting on the lessons emphasized by the transatlantic

**RADIO SALESMEN and SET BUILDERS**—We need you and you need us. If you are reliable and well known in your community, we will appoint you our representative and furnish you with standard well advertised sets and parts at prices that will enable you to sell at a handsome profit. Write at once for catalogue and sales plan. Waveland Radio Co., Div. 42, 1027 N. State St., Chicago, Ill.

Send me your burned-out or broken Power tubes—50 watts or over. Will pay liberally. W. Baker, 36 West 20th Street, New York City.

Write for Our Free Book on Patents—Munn & Co., 843 Woolworth Building, New York City; 338 Scientific American Bldg., Washington, D. C.; 407 Tower Bldg., Chicago, Ill.; 360 Hobart Bldg., San Francisco, Calif.; 215 Van Nuys Bldg., Los Angeles, Calif.

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**THE INDOOR AERIAL**  
IDEAL FOR APARTMENTS. Just stretch it and you have the best reception across a Room.  
Perfection Radio Mfg. Co.  
24th and Race Streets Philadelphia

Radio tests of International Radio week, says lesson number 2 is:

"Improperly operated regenerative sets are an abomination and must be ruled out of the game if international reception is to be a regular program."

Why limit ruling them out of the game in international reception only? Why not rule them out in intranational reception? And why not include with them the super-heterodyne closely coupled to an antenna?

About the only difference I note is that the operator of the super-heterodyne does not know when he is making a nuisance of himself. To the listener in interference by radiation is from the same effect whether it comes from a "super-het" or regenerative set.

Can't you all go co-partners and run feature articles against radiating sets—super-heterodyne as well as regenerative each issue?—P. R. Van F., Memphis, Tenn.

#### Interference on International Broadcasting

The international broadcasting test, November 24 to 30, in the writer's estimation, was one of the most interesting Radio tests ever made in America, seeing through the eyes of the user as well as the dealer. I think this test was badly hampered because of lack of good judgment on the part of a number of sending stations such as WQAL, San Antonio, Tex., KTLZ, Times Mirror company of Los Angeles, one of the Hollywood stations, and a station not controlled by the United States and located in Mexico.

It is bad enough for some of these stations to "cut in" during the silent period with American programs, but when stations like the Times Mirror company resort to giving Scotch programs during the silent period, giving the impression to the listener in that they have actually heard Scotland, and later find out that it was not Scotland, but an American station, leaves a "bad taste" in the amateur's mouth.

As the writer understands it, these tests are to be undertaken from time to time, and the Radio Digest is expected to do more towards keeping up this interest than any other instrument known. These stations should be taken in hand and should be shown the way to "play fair" with all concerned. The stations in Chicago, New York and other large cities, are more important than the "interferers," and they were kind enough to "lay off."

Why can't influence be brought to bear so that in the future the amateurs will have an absolute "silent" period in which

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All steel construction. Complete with galvanized steel guy wires and pulley. Slings diam. Mast shows how to erect mast. 20 ft., \$19; 40 ft., \$29; 60 ft., \$45. We pay freight. Incomplete mast for same price and better results. Write now for literature and **FREE BLUEPRINT**  
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**DX mushy?**  
**FREE TUBE CONTROL BOOKLET**  
On "Tube Control" tells how to bring in distant stations clear and loud. Just drop a post card to **UNITY MFG. CO.**  
232 North Halsted Street CHICAGO, U. S. A.

they may be able to pick up the European station?

In Chicago on Monday nights we have "silent night" and all the leading stations are silent, unless some special event occurs and they are justified in "cutting in" for a few moments. However, there are two stations that while not exactly in Chicago, they belong to the Chicago territory. The Elgin station, for instance, carries a wire from one of Chicago's leading hotels to Elgin and broadcast from there. The Zion City station gives its customary Monday night program. Both of these stations are so strong and interfere so much along the North Shore that it is next to impossible for an amateur with an ordinary set to get anything else on Monday night except these two stations.

Of course, this stimulates the purchase of higher priced sets, but it also discourages the masses who cannot afford a neutrodyne or super-heterodyne.

This is "food for thought" for the editor of Radio's leading publication.—O. R. Henkel, Chicago, Ill.

#### Violet Ray Interference

Here in a small prairie town Radio bugs are up against such interference as an old light plant, Delco light plant and a violet ray electric machine. I have two mfd. condensers that give me some relief against the electric light plant and the Delco, but the violet ray machine puts me out of business—and several others—excepting in the low wave lengths, say below 360. A letter from the General Radio company of Cambridge, Mass., says no way is known whereby one may tune out the violet ray machine.

Radio is past the novelty stage, and has become a modern necessity, almost as much so as telegraph or telephone, has it not? Receivers are entitled to protection, are they not? What can be done, or is being done to that end? Can we in some way get or require our chiropractor to limit his hours? In the small town the barber shops, confectioneries, lunch rooms, chiropractors, and what not, do the larger part of their business after working hours. And so people who want the kinks taken out of their backbones—a belly rub, call on the chiropractor at the time—the only time we can use our Radio receiving sets.

Let us have an invention that will give us protection—or a law that will do so!—E. L. Penn, Sherwood, N. Dak.

**Radio Shop for Sale—Ground floor in 1000.** Established 3 years. Straight lease, 5 year additional option. \$3,000 net cash takes all, less than inventory. Address Box 798, Radio Digest.

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**DEALERS**—We make a specialty of stocking new dealers and radio departments. Our large price list will be mailed free to you on request. Good discounts and prompt deliveries.  
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Distributors of High Grade Radio Sets and Supplies  
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Guaranteed to function efficiently in the most exacting circuits. Try them 30 days. Money refunded if you are not delighted.  
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Our guarantee includes safe delivery  
**SPECIAL OFFER**  
At no extra charge, we will furnish selected Atlas Instrument-Tested Tubes in matched sets for Reflex, Neutrodyne, Radio Frequency, or super-heterodyne or other sets. They will improve the performance of any set.  
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310 Caxton Buildings CLEVELAND, O.  
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609 Chamber of Commerce PITTSBURGH, PA.

### DEMONSTRATING RADIO

(Continued from page 24)

with this extra condenser it lends itself well to portable work. The control over regeneration is excellent, the set covers the entire wave length range on which broadcast material is now transmitted, and because of the peculiar aerial installa-

#### LIST OF PARTS

1 Panel 7"x21".....	\$ 3.70
1 Back panel 3"x7".....	.60
1 Baseboard 7"x20".....	.90
1 Cabinet, panel size 7"x21".....	5.00
2 Variable cond., low loss vernier, .0005 mfd.....	11.00
1 Coil low loss 50 turns.....	1.00
1 Coil low loss 2 turns.....	1.00
1 Single coil mounting.....	.75
1 Double coil mounting.....	2.00
1 Grid cond., .00025 mfd.....	.35
1 Variable grid leak.....	.75
1 Universal rheostat.....	1.85
2 20 ohm rheostats.....	2.00
3 Sockets.....	3.00
3 Two-circuit jacks.....	2.00
1 Audio transformer, 5 or 6 to 1.....	5.00
1 Audio transformer, 3 or 4 to 1.....	5.00
2 Dials 4".....	1.50
1 Filament switch.....	.90
1 Doz. binding posts.....	1.20
Bus bar, spaghetti, screws, etc.....	1.00
<b>Total.....</b>	<b>\$51.00</b>

#### List of Accessories

600 ft. aerial wire stranded.....	\$ 4.00
1 doz. insulators.....	1.66
1 Storage battery, 6 volts.....	20.00
2 B batteries, 45 volts.....	8.00
1 C battery, 4 1/2 volts.....	.40
1 Vacuum tube, "soft" type.....	4.00
2 Vacuum tubes, "hard" type.....	6.00
<b>Total.....</b>	<b>\$46.00</b>

Any type loud speaker or phones.

tion, it is very sensitive to weak signals, building them up so that the amplifier can give wonderful tonal qualities and remarkable volumes in a standard loud speaker or pair of headphones.

(Following the Experimenter Sr. is the Experimenter Jr., which is the combination of nearly all standard regenerative sets, with a combination of switches. Over 50 different actions can be obtained.—Editor's Note.)

**Men to build radio sets in spare time.** Leon Lambert, 501-H Kaufman Bldg., Wichita, Kansas.

**For Sure Results, Solder Up Your Set with SOLOX**  
The scientific soldering solution that makes sound metallic joints a certainty, with freedom from acid, messy grease or resin. Easy and clean in use and cannot corrode. Most effective and economical of all preparations. Get your dealer or mail order by the inventors and manufacturers, The D. X. Radio Research Laboratories, Cruger, N. Y. Money back guarantee. Dealers: Write for attractive proposition to our national distributors.  
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### PATENTS

Write for my free Guide Books "How to Obtain a Patent" and "Invention and Industry" and "Record of Invention" blank before disclosing inventions. Send model or sketch of your invention for instructions. From patent assured. No charge for the above information. Clarence A. O'Brien, Registered Patent Lawyer, 2906 Security Bank Building, directly across street from Patent Office, Washington, D. C.

### PATENTS SECURED

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National Confectioners' Association, Chicago; National Canners' Association, Washington, D. C.; Life Savers Inc., Port Chester, N. Y.; Bon Ami Co., New York City; New York City; Hershey Chocolate Co., Hershey, Pa.; Stephen F. Whitman & Son, Philadelphia, Pa., and many others.

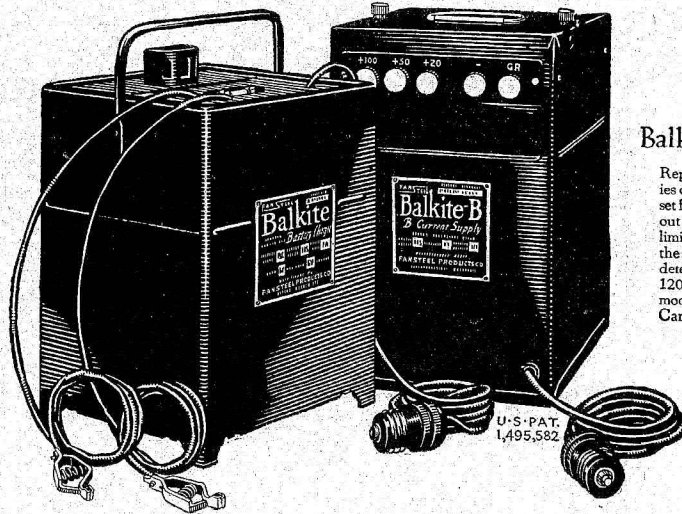
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### Balkite Battery Charger

For charging 6 volt radio "A" storage batteries. Entirely noiseless in operation. Can be used while the set is in use. Prolongs battery life. Operates from 110-120 AC 60 cycle current. Special model for 50 cycles. Price \$19.50, \$20 West of Rockies, \$27.50 in Canada. Special adapter for charging 2 and 4 volt batteries, \$1.50.



### Balkite "B" Plate Current Supply

Replaces either storage "B" batteries or dry "B" cells. Fits any radio set from 1 to 10 or more tubes without additions or changes. Gives unlimited constant current supply to the "B" circuit, both amplifier and detector tubes. Operates from 110-120 AC 60 cycle current. Special model for 50 cycles. Price \$55. In Canada, \$75.

# Balkite Radio Power Units

*Solve the power problem  
for both "A" and "B" circuits*

Balkite Radio Power Units—the Balkite Battery Charger and Balkite "B"—bring a convenient and unfailing power supply to both the "A" and "B" circuits. They bring to your set a constant uniform voltage, clearer tone, greater distance and greater volume. The Balkite Battery Charger keeps your "A" storage battery charged and working at maximum efficiency. Balkite "B"—one of the most important recent developments in radio—replaces "B" batteries entirely and supplies unlimited plate current from the electric lighting circuit.

Both the Balkite Battery Charger

and Balkite "B" are entirely noiseless in operation. They do not create disturbances in either your set or your neighbor's. They have no moving parts, vibrators or bulbs, and nothing to adjust, break or get out of order. They cannot deteriorate through use or disuse. They require no attention other than the infrequent addition of distilled water. They are simple and unfailing in operation. Both can be put to use at any time by merely connecting to a light socket. Their current consumption is remarkably low. Both are guaranteed to give you satisfaction. *Both are sold by leading radio dealers everywhere.*

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

**FANSTEEL**  
**Balkite** *Radio Power Units*

BALKITE BATTERY CHARGER.—BALKITE "B" PLATE CURRENT SUPPLY