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RADIO WORLD

Title Reg. U. S. Pat. Off.

ILLUSTRATED

EVERY WEEK

THESE MEN WILL COMBAT RADIATION INTERFERENCE



(C. Foto Topics)

This group of representative radio men attended the Radiation Interference Conference, called by RADIO WORLD at The Engineers' Club, New York City, on January 16. Seated, left to right: J. A. Harkness, Dr. A. N. Goldsmith, J. V. L. Hogan, W. D. Terrell, Laurence Nixon, Roland Burke Hennessy, A. E. Sonn, Paul B. Klugh, Wm. Henderson. Standing, left to right: C. C. Kolster, E. Miller, J. A. Holman, Major E. H. Armstrong, S. A. Sollie, F. H. Canfield, Lloyd Espenschied, R. Lacault, Arthur Batcheller, Capt. Stephen L. Coles, Robert L. Dougherty, Harry R. Rose, S. L. Cahn, L. G. Ingram, Jack Binns. (See article on Page 3, this issue.)

Federal Standard Head Sets

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VOLUME FOUR OF

RADIO WORLD

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January 26, 1924

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Radiation Interference Conference Sponsored by RADIO WORLD Gets Into Action Promptly

Educational Campaign Inaugurated to Curb This Widespread Evil—Two Competent Committees to Cooperate in Movement—Representative Attendance at Meeting

IN response to an invitation from RADIO WORLD a gathering of distinguished radio men met in the Board of Governor's Room at The Engineers' Club, New York City, on the evening of January 16 to discuss ways and means of curbing the radiation interference evil. Among those present were: W. D. Terrell, Chief Radio Inspector, Department of Commerce, Washington, D. C.; Major E. H. Armstrong, Marcellus Hartley Laboratories, Columbia University, New York; Arthur Batcheller, Radio Supervisor, New York City; C. C. Kolster, Radio Supervisor, Boston, Mass.; Dr. A. N. Goldsmith, Chief Broadcast Engineer, Radio Corporation of America; J. V. L. Hogan, Radio Engineer, New York City; Wm. Henderson, Technical Editor, New York "Evening World"; L. G. Ingraham, Assistant Technical Editor, New York "Evening World"; Lawrence Nixon, Editor "The Radio Dealer," 1133 Broadway, New York City; Jack Binns, Radio Editor, "New York Tribune"; Paul B. Klugh, Executive Chairman, National Association of Broadcasters; E. Miller, Engineer, American Telephone & Telegraph Co.; J. A. Harkness, Assistant Vice President, American Telephone & Telegraph Co.; L. Espenschied, Engineer, American Telephone & Telegraph Co.; Robert Lacault, Associate Editor, "Radio News," New York City; Fred H. Canfield, Radio Editor, Newark Sunday "Call"; A. E. Sonn, Radio Editor, Newark Sunday "Call"; S. A. Sollie, Chief Operator, Station WOR, Newark, N. J.; S. L. Cahn, "The Radio Dealer," New York City; Harry D. Rose, Managing Editor, New York "Star"; Roland Burke Hennessy, Editor RADIO WORLD; Capt. Stephen L. Coles, Managing Editor, RADIO WORLD; Robert L. Dougherty, Technical Editor, RADIO WORLD.

Captain Coles opened the conference with a short statement outlining the purpose of the meeting. He introduced Roland Burke Hennessy, Editor of RADIO WORLD, who explained his position in calling the conference, asking that everyone present assist in diagnosing the situation and work in harmony for its solution. It was then moved by Capt. Coles that W. D. Terrell assume the chair, which he did.

Mr. Terrell spoke on the efforts of the government to control spark interference. Mr. Terrell explained that while some of the interference came from ships at sea, the greater portion was due to interfering radiation from nearby receiving sets. He stated that the United States government practically controlled ship interference so that it would not cause any upset to radio. "The most serious problem," said Mr. Terrell, "is the radiating receiving set. I mention no particular make. There is only way to eradicate this trouble and that is through an extensive and intensive educational campaign against builders of radiating sets. Tell them what effect their sets are having on the broadcasting conditions and inform them what to do and how to do it. We cannot accomplish anything by legislation. This was attempted in Great Britain and it proved an absolute failure. By the combined action of newspapermen and engineers, carrying on an educational campaign, by the use of printed propaganda whereby we can be in direct touch with the users of improperly constructed home-made regenerative sets, we can quickly educate them so that their sets will not interfere with their neighbors or themselves. We can get a plan working whereby everyone that has a set can notify us immediately of an interference, how the interference acted, etc. This can all be explained on a regulation blank that will be sent upon request. It is utterly impossible to investigate the direct sources of radiation interference." He explained that the government's force was too small to investigate every complaint that was filed with it and admitted that the government would gladly welcome any suggestion that would help it clear up the situation. Mr. Terrell, as chairman, called for suggestions from the various persons in attendance.

J. V. L. Hogan, radio engineer, thought that the publicity plan was the only way to remedy the situation. He believed that every paper, daily and weekly, should refrain from instructing amateurs how to build any type of set that causes radiation interference and also

(Concluded on page 6)

KGO, the Sunset Station at Oakland, Cal., Presents Interesting Features

By W. T. Meenam

KGO, THE "Sunset Station," has come on the air with the new year. On the western edge of the United States, at Oakland, California, two steel towers have arisen and from the antenna, on January 8, the new voice vibrated on the air. KGO is the second link in a chain of three super-broadcasting stations planned by the General Electric Company. The first is WGY, at Schenectady, N. Y., now completing two years of popular broadcasting, and the third will be erected at Denver, Colorado.

For the first time in the brief history of radio broadcasting an entire building has been constructed to house a great station and its equipment to be used exclusively for popular broadcasting. This not only demonstrated an advancement in the art but also indicates that the General Electric Company has faith in the permanence of broadcasting.

The Oakland station in its studio, control room and power plant embodies the latest developments in the art. Its power and antenna systems, a thousand feet away from the studio building, include all the mechanical and technical refinements that have marked the new achievements in broadcasting. The engineering resources of a great electrical organization have been brought into the problem of making this station one of which Californians may be proud and which every listening radio fan may enjoy. By means of KGO, the listener in Maine becomes an air neighbor of the folks in California. (See illustrations on page 17, this issue.)

The Pacific Coast station is located on East 14th Street, Oakland. The site was selected because of its technical advantages, the availability of musical talent and its proximity to San Francisco, the great commercial center of the Pacific Coast. It is a two-story brick building. On the first floor, near the entrance, is the office of the studio manager who plans programs, selects artists, and co-ordinates the duties of the office and broadcasting staff. It is his province to see that real merit receives the recognition of a public hearing; that the inexperienced are tactfully saved the embarrassment of a failure to reach the high standard demanded by the listeners.

Close at hand is the correspondence room where the business of the station is carried on. Here a staff of assistants attends to the details of program-making, interviews callers, keeps logs of every performance and answers and files the letters received from the listeners.

On this floor there is an attractive reception room covered, as is the entrance hall and stairway, with a rich, heavy piled carpet of a beaver taupe color. The woodwork is painted a soft antique ivory and is glazed a Van Dyke brown. The walls are covered with a two-tone gray and blue figured tapestry. Draperies of blue and taupe damask enrich the appearance of the room which is furnished with carved walnut furniture of the eighteenth century period. Adjoining the reception room is the ladies' rest room. On the first floor is also a large room for motor-generator sets and storage batteries.

On the second floor are two studios similarly appointed—one large enough to accommodate a chorus or symphony orchestra, the other, a smaller room, for the broadcasting of solos and addresses. The use of

the two studios also makes continuous broadcasting possible. The announcer has but to step from one room to the other at the conclusion of a number and find the next performer waiting for the word to begin.

It is in the main studio that the art of the decorator reaches its fullest expression, but before the artist began his picture, working with tapestry, carpets and draperies, the engineer had veritably lined the walls with a mesh of insulated wires connecting microphones with control apparatus in an adjoining room. After the wiring was completed exhaustive experiments were made to determine the reverberating qualities of the ideal studio that the proper amount of "damping" might be secured to assure maximum musical quality. Walls and ceiling were covered with special sound-proofing material and then the studio was turned over to the artist. The decorator has hidden all evidences of the true purpose of the room. The visitor or performer feels that he has entered the studio of a master musician. Even the microphone from which the electrical vibrations are set up, is concealed in a silk-shaded lamp. The effect of the whole is repose, beauty and refinement. The furniture is all of the eighteenth century period; comfortable, inviting chairs are covered with gray velvet; the walls are covered with two-toned blue figured tapestry which harmonizes with beaver taupe carpets and the dull blue velvet draperies with fringe of silver and blue. The smaller or auxiliary studio is similarly furnished.

Adjoining the studios is a "silent" room in which the performer is ushered to remain until summoned to the studio. The furnishings and decorations of this room are restful and pleasing.

On the second floor, but unseen by the performers, is the control room. Here with headphones at ear, operators listen critically to every word and note, compensating for differences in tone and volume among the artists and flashing warning through silent electric signals to the studio manager, when it is necessary to alter the position of the singer or instrumentalist in respect to the microphone. The control room has three stages of speech amplification consisting of two five-watt tubes and four 50-watt tubes. A fourth stage of speech amplification is installed in the power house.

KGO is operated at 1,000 watts, but the equipment is designed in excess of that power for purposes of conducting tests. In operating high-powered equipment below normal rating in broadcasting, tubes and rectifiers are not subject to occasional overloads and, as a result, superior quality and greater reliability of transmission is obtained.

The power house and antenna system are 1,000 feet from the studio building. Nine motor-generator sets in the power house supply filament and plate current for the oscillator, modulator and kenetron rectifier tubes.

There are six tubes in the kenetron rectifier assembly, one metal plate oscillator tube, and one metal plate modulator. Every part of the equipment in the power house and in the control room is in duplicate, assuring uninterrupted service. If one outfit or part of an outfit breaks down during the operation period another outfit will be ready to be brought into the circuit.

The antenna is of the multiple-tuned type and is

strung between two steel towers, each 150' high and 250' apart. Beneath the antenna is the counterpoise consisting of a network of wires, 14' above the ground, covering an area of 150' by 300'. In addition to the power house which is one story high, 71'x32', there is a small building for the tuning apparatus and the end of the multiple-tuned antenna.

KGO, the Pacific Coast station of the General Electric, will not be dependent upon its own studio alone for programs. Located as it is near the great cities of the Pacific Coast, it has a rich field from which to select music and eloquence. By means of broadcasting pick-up circuits, the Sunset Station will be equipped to broadcast the speeches of important public gatherings, the addresses of prominent citizens, sermons by

pastors of leading churches, concerts, theatre productions and, occasionally, important athletic events like baseball or football games.

The Oakland station will be on the air every Tuesday, Thursday and Saturday night, carrying instruction and entertainment to the great audience of the Pacific Coast and, when atmospheric conditions are favorable, to the fans throughout the country. The wave length of KGO is 312 meters.

Martin P. Rice, director of broadcasting for the General Electric Company, has charge of KGO, the new Oakland station, WGY at Schenectady and the proposed Denver station. J. A. Cranston, Pacific Coast manager for the G-E, has direct supervision of Station KGO.

Mayor Urges Radio in Schools and Churches for Community Benefit

By James B. Furber

THE following is a communication recently sent to the Board of Education of Rahway, N. J., by James B. Furber, mayor of that city:

While listening to the wonderful radio concerts the past few days, I have been impressed with the fact that it would mean but a trifling expense for these concerts and splendid addresses frequently delivered by radio to be made available for all our citizens.

Amplifying sets are comparatively inexpensive and when President Coolidge can be heard delivering his message as clearly as though he were standing immediately before us, and various orchestral and pipe organ concerts are as clearly broadcast and enjoyable as if one were sitting in the orchestra circle, it becomes at once apparent that some effort should be made to bring these concerts and other entertaining features home to everybody.

I am of the opinion that the manufacturers of radio outfits would look upon the equipment of our schools with their devices as such an advertising opportunity as to justify a very low initial charge for installation.

Our schools and churches are standing idle a very large part of the time and the investment proportionately wasted. They belong to the people—why shouldn't the people have the use of them?

If mothers, after a hard day's work, could step into the nearest school or church of an evening with sewing and mending and enjoy an hour or two of the choicest music obtainable it would make the day's drudgery seem less offensive and add to the joy of living. Entire families would soon acquire the habit and become music lovers instead maybe of "card fiends." There's nothing, however, in radio concerts to prevent playing cards or reading at the same time.

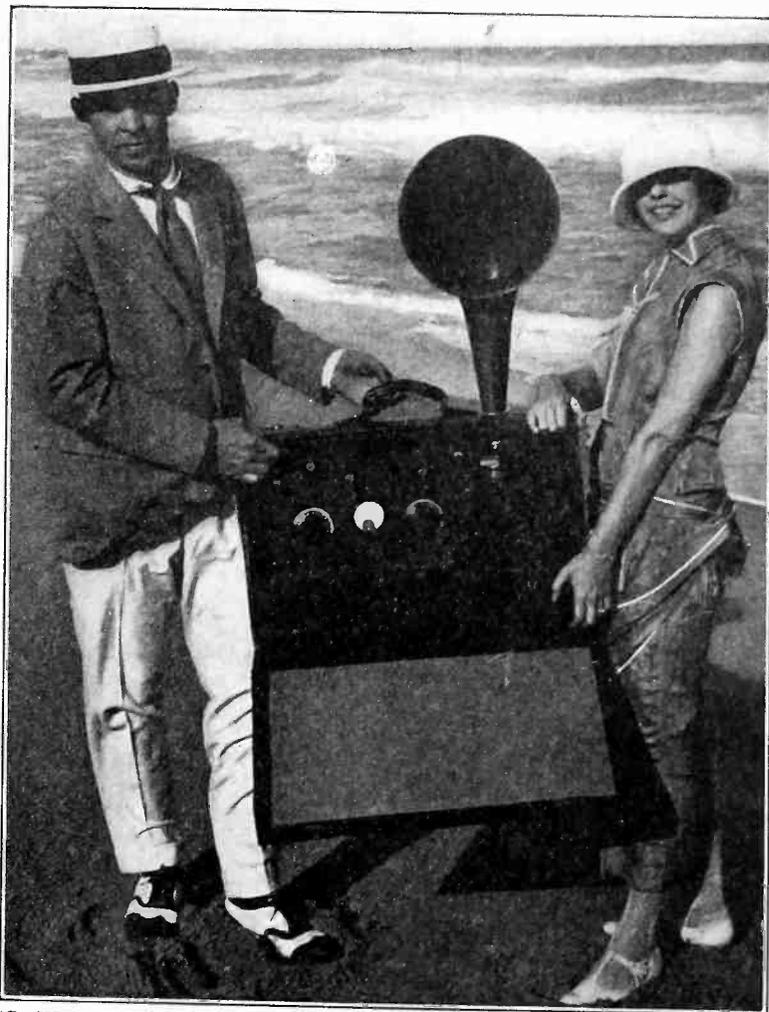
I urge your board to take this project under immediate consideration as the air is charged with music to be drawn upon at will and we can be justly censured if we neglect in our administration of public affairs to take advantage of such opportunities. Please refer to some committee which can make an early report.

In commenting on the above letter the Elizabeth, N. J., "Daily Journal" said editorially:

"Mayor Furber suggests that the delights and advantages of the radio should be available to all the people of a community, as now to the few who can afford to own and operate their private radio sets. What is wrong with an idea like that? And the practical part

of it is that it would cost only a small amount to carry it out.

"Why shouldn't radio service be as available to a community as library service? What a means of education and recreation it would be to connect all the people of a community with the addresses, music and messages that come pouring in these days over a well-connected receiving apparatus."



(C. Wide World Photos)

Major Edwin H. Armstrong, famous radio engineer and inventor, and his wife on the sands of Palm Beach, with the portable suitcase receiver that goes everywhere with them. Phones are not necessary, as the loud speaker is incorporated in the set itself. Using 6 UV199 tubes the set works nicely without antenna or ground.

Radiation Interference Conference

(Concluded from Page 3)

suggested that those owning radiating receiving sets should be instructed how to change them so that they would not radiate.

Dr. A. N. Goldsmith, Chief Broadcast Engineer, Radio Corporation of America, said: "I am strictly in favor of the suggestions and plans as laid down by Mr. Terrell."

Robert L. Lacault, Associate Editor, "Radio News," said: "I would suggest a slogan for this campaign which I think that every paper should feature somewhere in its columns, and that is 'Do unto others as you would have them do unto you.' Mr. Lacault favored the publicity campaign as the logical means of ending the nuisance.

J. A. Harkness, Assistant Vice-President, American Telephone & Telegraph Co., New York City, stated that the broadcasting stations will do everything in their power to eradicate the evil. "We are in full accord with the purpose of this conference and we have already started work in an attempt to clear interference by broadcasting talks and sending out over 6,000 pieces of literature in answer to the various complaints that we have received through the mail. I believe in educating the people who own these interfering sets. Educate them to use their set without disturbing other sets. I want to say that the broadcasters will render all the aid necessary."

A. E. Sonn, Newark "Sunday Call," Newark, N. J., said: "We are doing everything possible through our newspaper and Station WOR and will do so in the campaign inaugurated here this evening. We have been giving educational talks and believe that this sort of publicity, combined with a national campaign such as is planned, will eventually prove successful."

Major E. H. Armstrong, Marcellus Hartley Laboratories, Columbia University, New York City, stated that legislation was not the means of correcting the interference evil. He also called the attention of the conference to the fact that legal means proved a failure throughout Great Britain and explained that it would not have a ghost of a show in the United States. He favored the publicity plan of action as the only method. Major Armstrong stated that he had taken the matter up with Congressman White, in charge of radio legislation at Washington, and that Mr. White's ideas were practically along the same lines as his own.

Jack Binns, Radio Editor, New York "Tribune," said: "I believe the best way to clean up this present situation is to ridicule owners of radiating sets. The set owners will not listen to lectures over the radio. If we poke fun at the owners of these sets they will quickly replace them. You know no one likes to be made the butt of a joke."

At this juncture Mr. Terrell offered a little talk in which he explained that the owners of radiating sets were entirely ignorant of the fact that they are disturbing their neighbors. "These set owners start trying to get distance and as quick as they pick up a point they start tuning in again, and this is what is causing the interference," said the Chief Radio Inspector.

Wm. Henderson, Technical Editor, New York "Evening World," explained that "The World" was refusing to publish everything that appeared to be causing any interference. He said "The World" favored a conference of the sort that was in session and pledged his support. Mr. Henderson announced that he was retiring from The New York "Evening World" to assume the position of Technical Editor on the "New York

Herald," and that in his new position he would do all in his power to eradicate the present existing evils in radio.

J. V. L. Hogan taking the floor again, explained how a single tube could be used for blocking out and stopping all the interference caused by radiation. Major Armstrong at this point informed the meeting that the patent referred to by Mr. Hogan was owned by the United States Government, having been seized under the alien property law, and that it was available for use by any one.

Paul B. Klugh, Executive Chairman, National Association of Broadcasters, said that in his mind there was no doubt that the greater part of the interference was due to the ignorance of the average owner of a receiver, constantly hunting around for stations. Part of it, he claimed, was caused by the owners of sets constantly hunting for distant stations. These sets were mostly regenerative and therefore caused all the little squeaks and howls known as "interfering radiation." "A campaign as outlined here tonight will doubtless help things along wonderfully, but the average salesman of today finds it to his own advantage to sell sets that do not cause this," he said. "There are some sets on the market today, the Neutrodynes for example, which are quiet and orderly and for that reason are recommended by every intelligent salesman. When the average listener finds out that his constant twirling of the dials back and forth is causing interference in his own and other receivers, he will remedy it to the best of his ability. Before this is done, however, the average man must be educated, and we must therefore accomplish this—immediately."

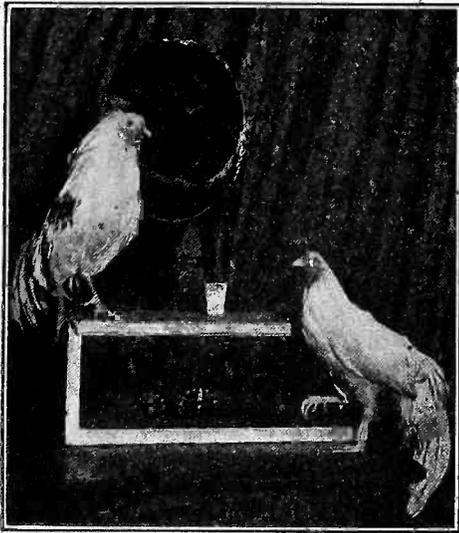
Captain Coles, RADIO WORLD, moved that a permanent Non-Interference Bureau be formed, with a chairman and secretary. Mr. Hogan was suggested, but asked to be excused on account of pressure of work. He stated that he would be glad to give his technical knowledge and do everything possible, but that his time was all taken up and that he could not do justice to the position. Prof. Hazeltine was appointed chairman of a Non-Interference Engineering Committee with Major E. H. Armstrong, Dr. A. N. Goldsmith, L. Espenschied and J. V. L. Hogan as his committee. Mr. Hogan will be consulting engineer to this committee.

Captain Coles, Managing Editor, RADIO WORLD, was elected Chairman of the Publicity Committee, with William Henderson ("World"), Robert Lacault ("Radio News"), A. E. Sonn, (Newark "Sunday Call"), and other newspaper men and broadcasters as members, and with power to add to the committee, which will be made a comprehensive one, covering the country from coast to coast.

Mr. Terrell in a statement to a staff reporter of RADIO WORLD said: "Action like that at this conference, is just what is needed to clean up the present troubles in radio. We do not expect to do wonders over night but we will accomplish great things. I feel that everything will be in tip-top shape by next fall. It takes a concerted movement, like the one formulated here this evening, to bring about the proper improvement. It was just what was needed. This matter extends to hundreds of thousands of people—not a few. It means the straightening out of radio's troubles."

Anything in a Pinch

DID you ever have company at the house, just when the loud speaker "went west"? Do not sit around and fill the air with vivid colors, but just run into the kitchen and get two small cups. Stand them on their sides and place the phones in front of them.



(C. Foto Topics)

Some people might call this a "foul deed" or a "cluck radio set," but in reality, it is "Radio," Japanese Phoenix White rooster, tuning in for "Yoko," full bred Yokohama rooster, at the Hippodrome, New York. Looks as though radio was going to the "chickens" instead of the dogs. Hi!

150 Amateurs Hear 35 European Transmitters

HARTFORD, Conn.—Near the close of the transatlantic amateur radio receiving tests, organized by the American Radio Relay League, about 150 amateurs throughout North America had reported hearing signals from European transmitting stations and A.R.R.L. Headquarters was still besieged with letters and telegrams from every part of the country. With only part of the results obtainable, F. H. Schnell, traffic manager announced that calls of thirty-five Europeans had been verified.

Of the several foreign countries in which zealous amateurs are casting their signals across the Atlantic on low power, Great Britain leads with a total of eighteen successful transoceanic transmitters. France comes next with a total of thirteen and Holland with four. So far the reception of Italian stations has not been reported. These tests are making transoceanic private communication commonplace.

The experience of the last three years of transatlantic amateur transmission was put into play during the tests and officers of the League are confident that with the information gained many of the most trying technical obstacles will be overcome and the near future will see the use of fairly standardized low power equipment.

Interest is now growing in the forthcoming announcement of the award of prizes for successful operators. This will be made as soon as the final reports have been received. Thousands of dollars worth of radio apparatus have been donated by prominent manufacturers. For the first prize, an \$1,100 Grebe transmitter, the amateur must fig-

ure the total mileage covered by his receiving set. Two amateurs have reported about 300,000 air line miles each. The distance between each foreign station and the receiver is counted once nightly.

Sends Radio Message 1,400 Miles on Low Power

SIDNEY, Australia.—With only one-thousandth of the power required to light an ordinary battery flashlight similar to those used in nearly every home, C. D. Maclurcan, an amateur radio experimenter in this city and member of the American Radio Relay League, has succeeded in transmitting radio signals 1,400 miles. His signals were picked up readily in New Zealand. This is regarded as a marvelous record, far surpassing low power work of American amateur operators.



(C. Foto Topics)

Louis Doty, in charge of the 15-story apartment building at 915 West End Ave., New York City, is a warrior who has buckled on his armor in a strong fight against "squealers." They come to him for advice before installing a set. His motto is: "And not a single circuit set shall squeal tonight—at least not in 915 West End Ave." The tenants realize that he has their welfare at heart and co-operate with him. He is shown inspecting a tenant's Neutrodyne and passing it. More power to him.

In practically every country, government regulations have kept the amateur stations on low power and short waves. Far from being discouraged by this practice, the amateur has sought to develop the field allowed him, to the utmost. He has taken it upon himself to explore the possibilities of short waves and low power.

The experimenters in Australia, especially in the cities, are allowed only 10 watts of power, hence more attention has been given to power here than in other countries. Mr. Maclurcan has made a special study of this problem and the distances

covered by his amateur station, 2CM, are regarded as a world's record.

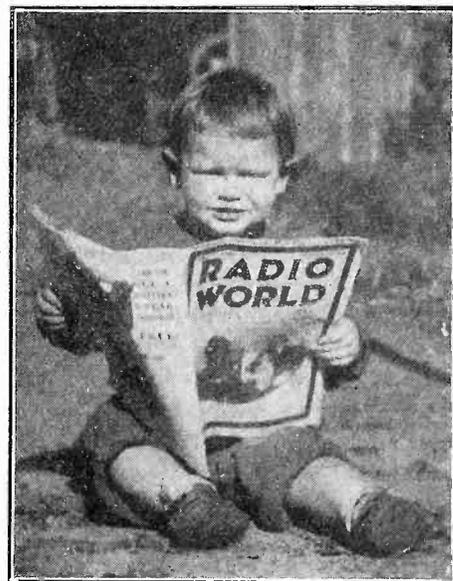
He has made several tests, usually with witnesses present to check him on the results obtained. At one time he exchanged messages with Frank Bell, operator of station 4AA of Waihemo, Shag Valley, New Zealand, over land and water for half an hour. Mr. Maclurcan gradually reduced his plate voltage to 15, thereby securing a plate current of .25 milamp. The input was only .004 watts.

The next day an expert in this work certified that the instruments were correct within one per cent. The antenna consists of a six-wire cage T type, with a top 100' long and 80' high, passed on six hoops 4' in diameter. The counterpoise is fanned out in a circle of 100' in diameter, 7' above ground. Mr. Maclurcan said his success was due entirely to an absolute regard for detail work.

As the result of these experiments, he believes that low power can be used for commercial purposes at a great saving. His set is to be installed soon on a ship bound for San Francisco, during which the commercial advantages of low power will be determined.

White May Aid Publishers

NEW YORK publishers are trying to get on the air, it appears, and have appealed for aid from Congressman White of Maine. Following his return from conferences in New York in regard to his pending bill, Mr. White seems disposed to introduce features in the new bill which will enable publishers to erect transmitting and receiving stations with which to handle news by radio.



Charles B. Gilman, orange grower, of Banyan, Florida, snapped this photo of a junior radio fan busily perusing his favorite radio sheet. The young man is showing extremely good judgment. When he grows up maybe he will be of service to the community and the world at large as a radio engineer.

An Easily Made Semi-power Loud Speaker

By Byrt C. Caldwell

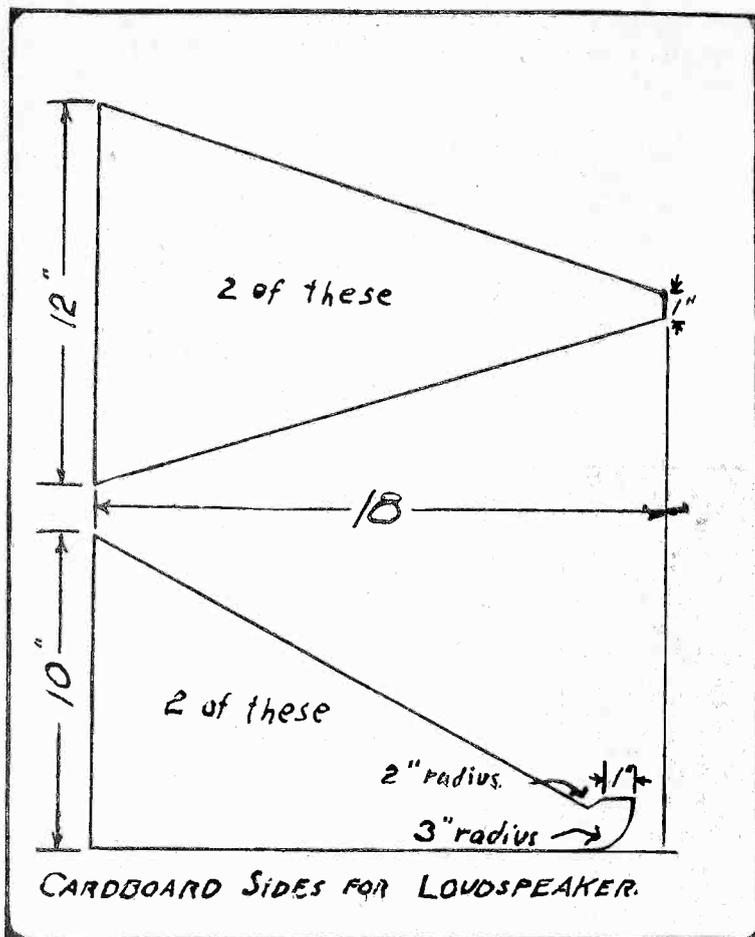


Fig. 1. Cardboard sides to be cut and used for the construction of the loud speaker. Rough cardboard is preferable to bristol board or highly finished cardboard.

MANY of the thousands who last year had radio means of earphones, want to discard the phone sets and who were satisfied with reception by for local reception, and employ a loud speaker instead. In many cases, the price of the loud speakers on the market makes this prohibitive, and in other cases the person has been disgusted with loud speaker reception by the terrible grinding roars that come from some radio store loud speakers.

Of all the horns used, the phonograph horn is undoubtedly the best. The phonograph horn was developed by means of long years of painstaking research and experiment by highly paid acoustical experts. The writer has planned the horn, the description of which follows, by taking the measurements of the sound reproducing chamber of one of the most famous phonographs. This loud speaker is a revelation to those who have heard only the tremendous bursts of sound from the loud speakers placed in stores to sell radio. This reproducer, while it does not take a field current, employs a large magneto magnet, which greatly increases the volume of sound.

It is said that a loud speaker does not increase the volume of sound from a given set. While this is correct, the loud speaker does not actually add to the volume, it prevents large losses from occurring, and so the volume is greater than it would be without the horn. It also directs the sound waves, and so it seems to greatly add to the volume. When the sound waves

leave the receiver, they have a very great amplitude, but they cover a very small area. When they have travelled for some distance, they cover a great area, but they have a very small amplitude. It is in this change that great losses occur if no horn, or a horn of incorrect design is used.

To give best results, the horn should spread the sound waves out gradually, so that these losses are eliminated. It should also be large enough so that the fundamental of the horn is lower than any of the sounds which are liable to be reproduced. It has been found that extremely large horns, with the dimensions at the mouth approximating 8'x8' give wonderful quality results. Another requisite of the loud speaker is that the horn should be made of some non-resonant material. Thin sheet metal is unsatisfactory. The inside surface of the horn should be roughened, so as to absorb some of the scratchy sounds.

The loud speaker described herewith covers all these points and gives a wonderful quality of music and speech. It is also a beautiful instrument, as contrasted with most of the horns which we see on the market today. It is very easy to make and costs very little. These two last points perhaps are the most important to the average fan.

The container is a cabinet made with a mahogany,

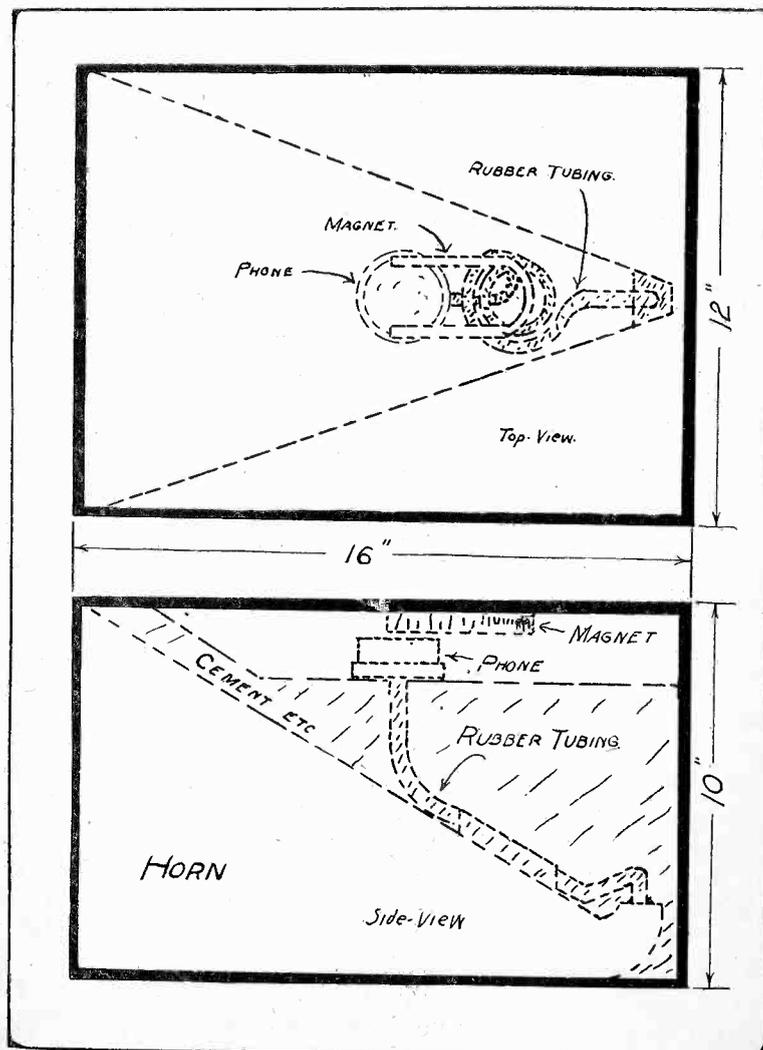


Fig. 2. Top and side views of the speaker, showing the location of the loud speaking unit, and the method of connecting it by a flexible rubber tube or hose, to improve the quality. The magnet over the phone gives better volume

walnut or oak finish. It is size 16"x12"x10" and is made with a hinged cover. The front piece may have a circular, oval or square opening cut in it. This opening is covered with silk cloth of a color to harmonize with the finish of the cabinet. The horn is made in four pieces. As it is a difficult matter to cut wood into the shapes given, the pieces are cut from medium thick, rough cardboard. This cardboard would not give satisfactory results ordinarily, but this is taken care of. When the pieces are cut out, fit them together in the shape shown, and fasten them the entire length of all the edges with sticky paper. This is then placed inside the cabinet, and glued in place. A piece of rubber tubing, with an inside diameter of $\frac{1}{2}$ ", and 2' long is fastened in the small end of the horn by pushing some paper around it, and melting sealing wax over the paper. This rubber tubing can be purchased at any chemical supply store for 30 cents a foot. It is coiled up as shown, and the end is supported about 3" from the top of the cabinet, and pointing up. Cement, plaster, or some other such substance is now poured in to cover the horn. It should fill up all the little crevices. This is to make up for the cardboard horn, and renders it non-resonant, or practically so. The receiver should be fastened to the rubber tubing in the position shown and should preferably be of the type used for loud speaker units. It should have a large diaphragm diameter. Directly over the receiver, a strong magnet from a magneto should be fastened to the hinged cover of the cabinet. When operating, revolve the receiver until the volume is greatest. This magnet is not absolutely necessary, but it adds greatly to the volume.

This instrument may be placed in one room, and the set in another. When tuning the set this way, if you first tune in with the headphones, and then attach the loud speaker, you will have to slightly reduce the condenser setting, as the tuning is changed when the set is at a distance from the reproducer. Also, if you do operate the set at a distance, use two well insulated wires to connect the set to the talker, as it is impossible to use a gas or water pipe, and if poorly insulated wires are used, a great deal of energy is lost.

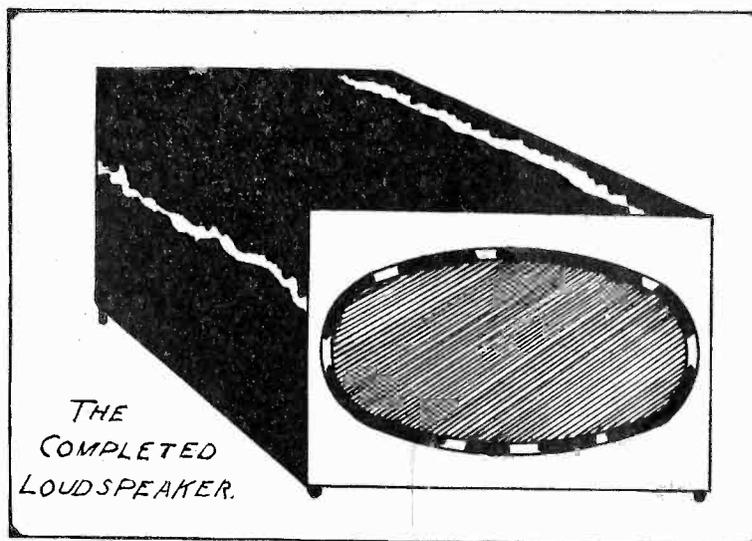


Fig. 3. Completed view of the home-made loud talker. If placed in a nicely finished cabinet and the front covered with silk as shown, a good looking as well as extremely serviceable speaker will be the result.

The Hongkong Radio Society Listens in

THE urge to broadcast and listen in has reached Hongkong, China, where a few foreigners interested in radio, got together about eight months ago and formed the Hongkong Radio Society, membership in which now numbers over a hundred, Consul Webber reports to the Department of Commerce. Today there are over 500 listeners-in, but it is estimated that this number will be doubled within a year's time.

So far there are only two broadcasting stations in Hongkong; one, a 100-watt American set, operated by the local telephone company which transmits phonograph music for an hour each evening; the other, a 10-watt Canadian-made set is operated by the Radio Communication Co., Ltd. This company is planning to install a 1-KW set for broadcasting at Kowloon to serve South China with piano and vocal music, news bulletins, weather and shipping reports. Fans are also able to receive entertainment three evenings a week from the Manila Electric Supply Co., and from the "Evening News" of Shanghai, somewhat irregularly. Broadcasting seems to await the genius and enterprise of American manufacturers and exporters.

The Chinese love anything mysterious, it is said, and consequently radio telephony has a strong appeal to the natives. In South China there should be a good potential market for radio equipment, but commercial and climatic requirements must be considered if American manufacturers and exporters go into this field. English apparatus is high-priced and German imports are irregular. Only dry-cell sets and tubes are desired, since there are few charging plants. The popular apparatus is a three-tube, dry cell American set, capable of receiving 300 miles with a loop aerial. The humidity and continued static make good insulation and radio-frequency necessary in the Far East. Prices for receiving sets vary from \$15 for crystal sets to \$250 for three-tube sets.

Colonial authorities have not taken definite action on the use of radio sets in the foreign colony, but are awaiting the arrival of an expert from London, temporarily permitting experimental broadcasting and receiving subject to the approval of the Hongkong Radio Society. Regenerative sets are prohibited, but assurance that American sets will not be discriminated against is given.

Owen D. Young Encourages the Amateur

DURING the recent transatlantic radio tests Owen D. Young, chairman of the board of directors of the General Electric Company, made an address in which he said:

"Let me say a word about the radio amateurs of the world, for they are engineers in the making. The greatest asset of any new art is to have the youth of the world interested in its development and confident of its future. The greatest inventions have been made by men under 30. Hundreds of thousands of young

men in this country are interested and at work on radio. Future inventive genius of the world is preparing to add its great contributions. Radio is to-day the debtor of many young men, once amateurs, now great inventors. The amateurs of to-day will be the inventors and engineers of to-morrow, not only from the great research laboratories, but from that little spare room in the attic and that old work bench in the cellar will come new and great discoveries. Let the work of the amateurs go on."

Inductively-Coupled Wave Traps and Filters for Eliminating Interference

By Leroy Western

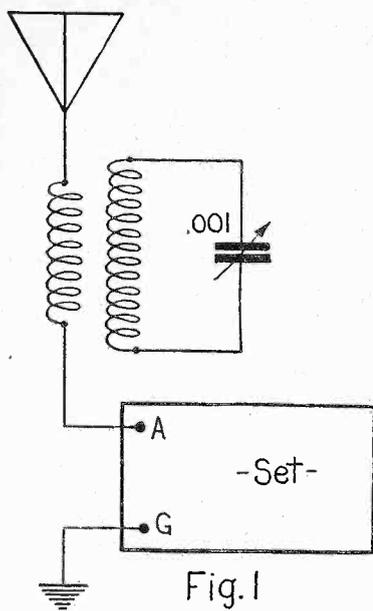


Fig. 1. A series-connected inductively-coupled wave trap which will prove effective on some receivers.

greater distance. Even some of the sets which give very sharp tuning will not operate under these conditions because of shock excitation. In other words, the sheer force of the transmitter, located such a short distance away sets up oscillations in the receiving set which give rise to audible signals in the phones. Particularly is this true of the common variety of single circuit tuner and even the three-circuit tuner comes under this head.

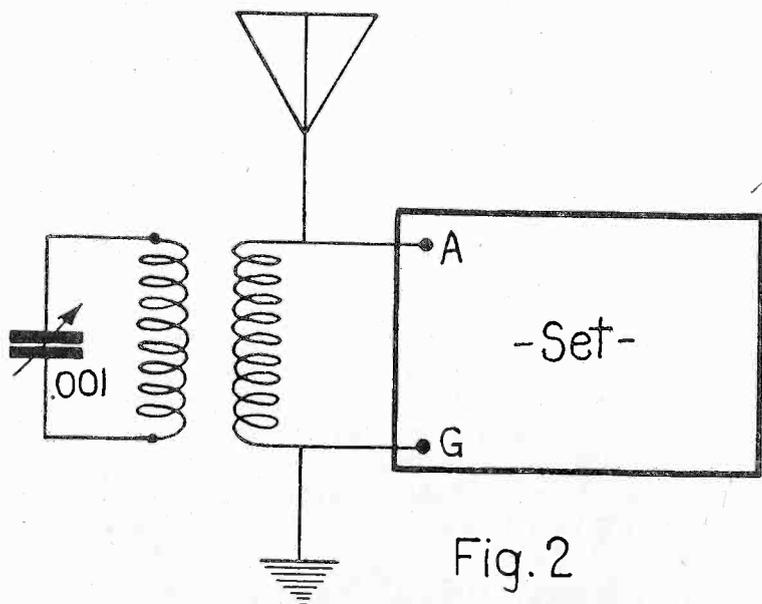


Fig. 2. An inductively-coupled, parallel-connected wave trap which is very much sharper in tuning and more effective.

For those located in such situations as outlined above, the one and only practical way out is the use of a wave-trap or filter such as will be found described and illustrated herewith. In general, there are two different types of wave-traps or filters, namely those conductively coupled to the receiving set and those inductively coupled. The former type are rather ineffi-

THE prevalence of single circuit tuners and the proximity of many broadcast listeners to transmitting stations make necessary the use of some sort of device which will allow the operator to select at will any one of the stations which may be transmitting within the receiving range of his particular set. When a receiving set is located in the same city with a broadcasting station, it sometimes becomes almost impossible with the average tuner to eliminate this particular station and receive some others at a

cient and no mention will be made of them. We will consider only that type of wave-trap which is inductively coupled to the set. Of course, in order to couple the trap, it is necessary to have several additional turns of wire placed in series with the part to which the actual trap circuit is to be coupled. This acts as a coupling coil.

For all practical purposes the coupling coil mentioned may consist of a very few turns of comparatively heavy wire. Refer to Fig. 1. A coil of a very few turns is shown connected in series with the antenna and the antenna binding post of the receiving set and to this is coupled a coil of many turns. The inductance of the wave-trap proper should be wound on an insulating tube 3" in diameter and consists of 45 turns of No.

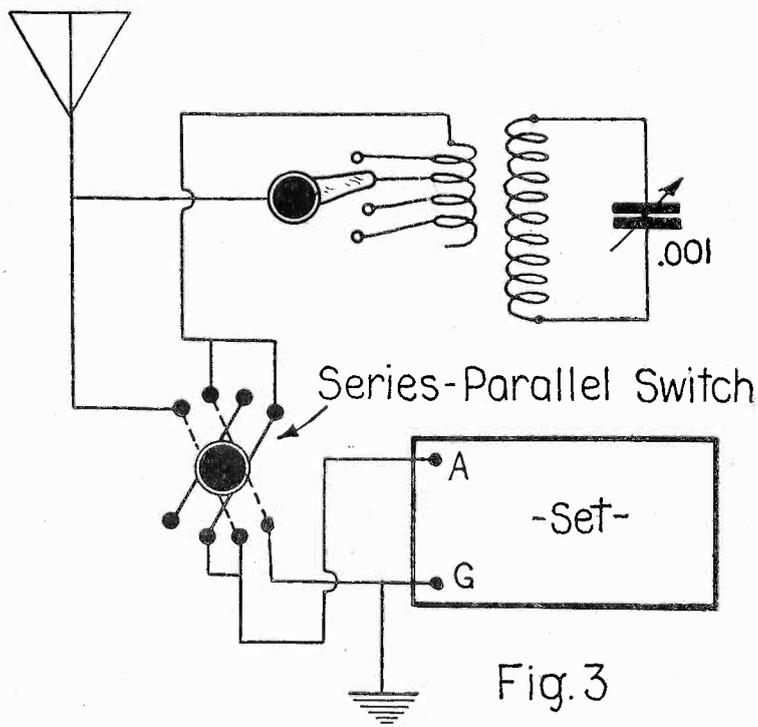


Fig. 3. By the use of the series-parallel switch using the tapped inductively-coupled trap, either method outlined in the preceding figures may be used at will.

24 D.C.C. wire. Over this are wrapped four or five layers of fairly thin oiled silk or other good insulating material and upon this are wound seven turns of No. 20 D.C.C. wire. The inside, or trap coil, is to be shunted by a variable condenser with a capacity of either .0005 or .001 mfd. Special care should be taken in the selection of this condenser to get one with a fairly straight line capacity curve and one which has the least possible losses.

The coupling, or outside coil, is then connected as shown. It will be found that this filter will give excellent results for eliminating CW and phone stations by tuning the oscillating circuit consisting of the large inductance and capacity to the wave length of the interfering signal. The adjustment of the variable condenser affects that of the receiving set proper very little. This trap is very selective in eliminating an interfering CW or phone station on very nearly the same wave length as the desired station, but it does not cut out spark signals to any great extent.

Another still more sharply tuning filter is that il-

illustrated in Fig. 2. Here the constants for the trap coil and the coupling coil are the same as in Fig. 1 but the connections are different. This filter, when used with any standard receiving set, gives excellent results in cutting down interference from nearby spark, CW or phone stations. Where the operator is troubled with the hum from nearby power or A. C. lines, this trap will be found very effective in eliminating such interference. It is very necessary in this circuit, that a vernier condenser be used in parallel with the one illustrated. This statement is made because of the extremely sharp tuning qualities encountered.

Both of the above described interference eliminators have their good points and their bad ones which will very quickly be determined by the operator. Therefore, the circuit shown in Fig. 3 was evolved. Here it will be noticed that a slight change is made in the coupling coil as it is tapped at the first, second, third and fourth turns. These are brought out to a four-point switch and the entire apparatus connected up with a series-parallel switch. All the necessary con-

nections are shown in Fig. 3. When the series-parallel switch is placed in the position indicated by the solid lines, the coupling coil will be in series with the antenna and we will have a connection such as shown in Fig. 1. With the two blades of the series-parallel switch perpendicular we still have a series connection, but when thrown in the position indicated by the dotted lines, the coupling coil is placed in parallel with the aerial and ground post of the receiving set, and a connection, such as shown in Fig. 2, will be found.

If the experimenter does not desire to make an elaborate layout such as shown in Fig. 3, he may try the two other circuits very easily, but after having once used them, it is the writer's belief that he will come to use the apparatus as shown in Fig. 3. After the two coils, the variable condenser, the four-point switch and the series-parallel switch are all mounted on a panel, which can be done in a comparatively small space, a unit will result which, when added to any standard receiving set, will make it several times more selective than it formerly was.

Canadian Radio Amateurs Obey Rules

An Interview with C. P. Edwards, Director General of Radio

COMMANDER C. P. EDWARDS, Director General of Canadian Radio and Wireless, during a visit to New York City last week, was interviewed by a representative of RADIO WORLD on the broadcasting situation in Canada.

He said that there are approximately 1,700 amateur transmitting stations in Canada. The Canadian amateur operates on a more liberal basis than the American amateur, being allowed to use the wave lengths of 175, 200 and 225 meters. Little interference is experienced from them as they are "on their honor" and know the severe penalty for infringing on any other wave lengths. There are very few spark stations in Canada, as they are so unpopular as to be unwanted. They are found only in the outlying districts, where it is possible to operate on a spark without creating interference. There is no law that prohibits the use of spark, but the amateurs have found it to their advantage to use CW.

There are about 100,000 broadcast listening stations in Canada of which it is estimated 95 per cent own regenerative receivers, and while the situation caused by the use of these receivers is bad, it is not as serious as that in the United States.

There is no spark interference in Canada on the broadcasting wave length, as legislation has been put into effect making it very unhealthy for any commercial stations to use below 600 meters, and, therefore, the only interference in that direction comes from American ships and nearby sound and coastwise steamers which break in and create what spark interference there is.

Commander Edwards expressed gratification at the point of view and the instant and welcome stand that the American commercial interests took when the matter was explained to them. The cause was outlined and the government officials had the assurance of all the companies that immediate and direct means of rectifying it would be placed in motion and the entire matter cleared up as soon as possible.

He stated that the Canadian government has the power to pass laws prohibiting the use of regenerative receivers or any receiver likely to cause interference

by creating squeals and howls. However, such action was not to be taken without great forethought, and the easier way was to inform the amateur listeners of the cause of the interference and how to remedy it. Immediate steps must be taken, however, before the situation gets too unwieldy to cope with satisfactorily and quickly.

The Department of Marine and Fisheries is extremely grateful, said Commander Edwards, to the A.R.R.L. for the cooperation they have extended and too much cannot be said of the help they have rendered in more than one way.

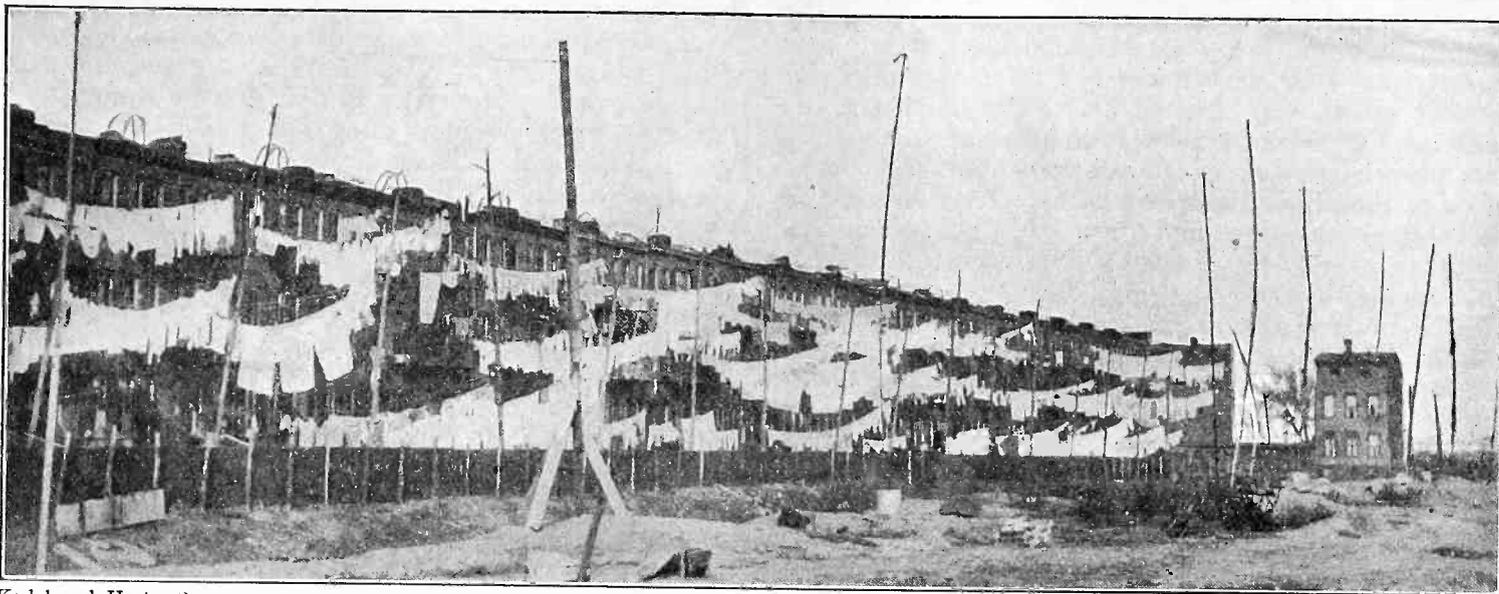
There are at present 39 broadcasting stations in Canada, all working on a set schedule, alternate days, and only on certain periods do they work after 8 P. M. They are strictly watched, and if they overstep their bounds they are warned, or fined, according to the seriousness of the offence.

The bureau which governs radio in Canada has the situation well in hand as every owner of a set, either receiving or transmitting, is listed and has to pay a certain fee before a receiver or transmitter is allowed to operate. For that reason, the prohibiting of regenerative receivers is an easier task, but one that Mr. Edwards hopes will not be necessary. It would seem that the Canadian listeners have seen the "handwriting on the wall" and are themselves working towards a definite end for that purpose. As the broadcasting stations are widely scattered, often 400 to 600 miles apart, some means of getting the distant stations must be had, and regeneration has proved the easiest to handle, as well as the most inexpensive. Some definite understanding must be arrived at before it is too late.

When asked for his views on the interference conference sponsored by RADIO WORLD, Commander Edwards said it was one of the best things possible and commented on the fact that it was encouraging to see a radio weekly start something which proved it had the interests of millions at heart, and yet which was such a tremendous problem from any point of view.

RADIOGRAMS

WORLD NEWS HAPPENINGS BRIEFLY
PHRASED FOR OUR BUSY READERS



(C. Kadel and Herbert)

These days of crowded roofs, there is a very little space for the stringing of aeri-
als. This rear view of a block of houses on Jackson Avenue, Long
Island City, shows where the radio fans string their antennae. Although they are hard to discern in the illustration, they outnumber the clothes-
lines about two to one, as nearly every apartment has one or more antennae connected to the poles.

Some are born foolish, some achieve foolishness, while others
forget to turn the juice off the receiving set.

* * *

As soon as the prevailing "hot weather" abates in Uruguay,
radio development will start up again, and apparatus will be in
demand, Trade Commissioner Brady reports from Buenos Aires.
A new broadcasting station is planned in Montevideo, supple-
menting the work of the Buenos Aires station.

* * *

Fifteen-year-old Thomas Foley, who disappeared from his
home in Astoria, Long Island, one day last week, was located
by wireless from Police Headquarters the next day on the
Standard Oil tanker "Charles Pratt," bound for San Pedro, Calif.,
via the Panama Canal. A description of the boy was broadcast,
and the captain of the "Charles Pratt" replied that he had a
boy answering the description on board.

* * *

A Radiotor (our own idea) is the broadcasting bimbo who
stays in the air through the courtesy of Gimbel Brothers, Wana-
maker, Bell Telephone, WJZ—WEAF—WOR—WHN, and other
stations of the Greek letter fraternity. While the aviator covers
the same territory as the Radiotor he never knows exactly when
he is going off the air, as it were. On the other hand, the
Radiotor takes his microphone and simply signs off—that's that.
—The Booster.

One fine thing about broadcasting campaign speeches by radio
—it is easier to turn the switch than it is to get up and walk
out.—Omaha Bee.

* * *

Yukon residents will dance this winter to music by the best
orchestras from New York to San Francisco via radio. Now
that the period of the shortest daylight is reached, radio fans
are getting perfect results from their instruments and radio
dances promise to become the rage in many a small settlement
along the Yukon River.

* * *

With the treasured Tribune commenting on the ubiquitousness
of aerial song, says F. P. A. in the New York "World," there is
no wish to quarrel when it says, "Alexander Selkirk, were he
now marooned on a desert island, would no longer inquire:

'O Solitude! where are the charms

That sages have found in thy face?"

What he probably would say—and the Tribune might have
said so—would be:

O Solitude! where is the day

When silence this island did bless?

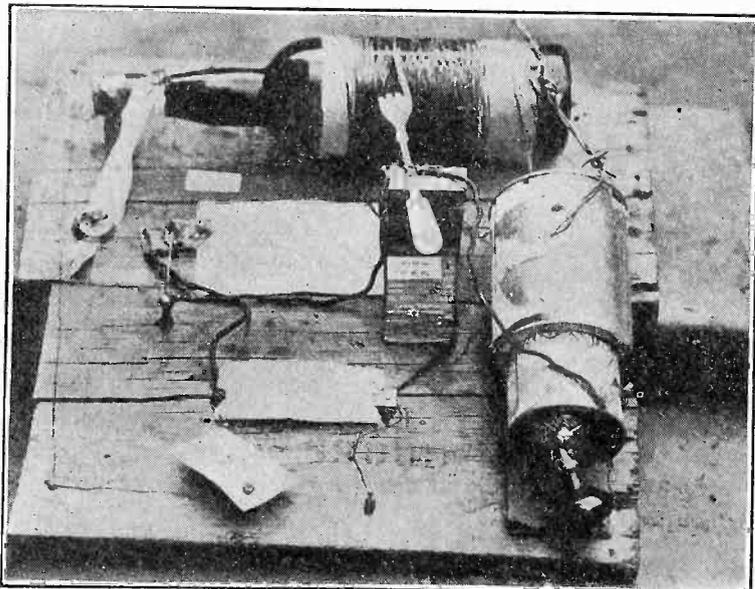
I now hear from KDKA,

And tune in with WHAS.

And probably Longfellow would revise it to—

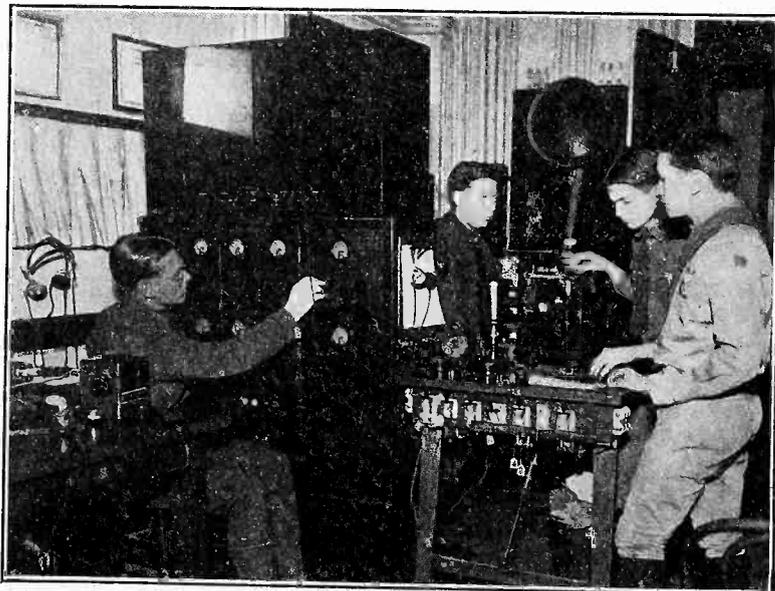
I shot a song into the sky,

And it sounded fine at WJY.



(C. International Newsreel Photos)

Above is pictured a receiving set exhibited at a radio exposition held at
Sydney, Australia. A broken bottle, a one-pronged fork, empty tin fruit
cans, pieces of a packing case, and odd bits of wire comprise this remark-
able bit of construction. The crystal detector is made from a hatpin and a
battery clip. Woop-Woop.



(C. Foto Topics)

The Boy Scouts of America recently ran WJZ for one evening, and made a
grand success of it. Ray Peterson, first class scout, at the control board
watching the modulation control of Channel B. Andrew Bostwick at the rear
of the panel, while Arnold Starwich and Adrian Frederick start up the
oscillograph.

Complete List of Broadcasters

Call	Owner	Location	Meters	Kcys.	Call	Owner	Location	Meters	Kcys.
KDKA	West'ghouse Elec. & Mfg. Co.	E. Pittsburgh, Pa.	326	920	KFKB	Brinkley-Jones Hospital	Milford, Kan.	286	1050
KDPM	West'ghouse Elec. & Mfg. Co.	Cleveland, Ohio	270	1110	KFKH	Denver Park Amuse. Co.	Lakeside, Colo.	226	1320
KDPT	Southern Electrical Co.	San Diego, Cal.	244	1230	KFKO	Conway Radio Lab.	Conway, Ark.	224	1340
KDYL	Telegram Publishing Co.	Salt Lake City, Utah	360	830	KFKV	F. Gray	Butte, Mont.	283	1060
KDYM	Savoy Theatre	San Diego, Cal.	280	1070	KFKX	West'ghouse Elec. & Mfg. Co.	Hastings, Neb.	286	1050
KDYQ	Oregon Inst. of Tech.	Portland, Oregon	360	620	KFKZ	Nassour Bros.	Colorado Springs, Colo.	234	1280
KDYW	Smith, Hughes & Co.	Phoenix, Ariz.	360	830	KFLA	A. R. Willson	Butte, Mont.	248	1210
KDYX	Star Bulletin	Honolulu, Hawaii	360	620	KFLB	Signal Mfg. Co.	Menominee, Mich.	248	1210
KDZB	Frank E. Siefert	Bakersfield, Cal.	240	1250	KFLD	P. E. Greenlaw	Franklinton, La.	234	1280
KDZE	The Rhodes Co.	Seattle, Wash.	455	660	KFLE	Nat'l Educational Service	Denver, Colo.	268	1120
KDZF	Auto Club of So. California	Los Angeles, Cal.	278	1080	KFLH	Errickson Radio Co.	Salt Lake City, Utah	261	1150
KDZI	Electric Supply Co.	Wenatchee, Wash.	360	830	KFLP	E. N. Foster	Cedar Rapids, Iowa	240	1250
KDZO	Nichols Academy of Music	Denver, Colo.	360	830	KFLQ	Bizzell Radio Co.	Little Rock, Ark.	261	1150
KDZR	Bellingham Publishing Co.	Bellingham, Wash.	261	1150	KFLR	University of New Mexico	Albuquerque, N. M.	254	1180
KFAD	McArthur Bros. Merc. Co.	Phoenix, Ariz.	360	830	KFLU	Rio Grande Radio Co.	San Benito, Texas	236	1270
KFAE	State College of Washington	Pullman, Wash.	330	910	KFLV	Rev. A. T. Frykman	Rockford, Ill.	229	1310
KFAF	Western Radio Corp.	Denver, Colo.	360	830	KFLW	Missoula Elec. Supply Co.	Missoula, Mont.	234	1280
KFAJ	University of Colorado	Boulder, Colo.	360	830	KFLX	Geo. R. Clough	Galveston, Texas	240	1250
KFAK	The Electric Shop	Moscow, Idaho	360	830	KFLY	Fargo Radio Co.	Fargo, N. D.	231	1300
KFAR	Studio Lighting Service Co.	Hollywood, Cal.	280	1070	KFLZ	Atlantic Auto Co.	Atlantic, Iowa	273	1100
KFAU	Daily Sun	Boise, Idaho	270	1110	KFMO	University of Arkansas	Fayetteville, Ark.	263	1140
KFAV	Abbott, Kinney Co.	Venice, Cal.	258	1160	KFMR	Morningside College	Sioux City, Iowa	261	1150
KFAW	The Radio Den	Santa Ana, Cal.	280	1070	KFMS	Freimuth Dept. Store	Duluth, Minn.	275	1090
KFBY	W. T. Virgin Milling Co.	Medford, Ore.	283	1060	KFMT	Dr. G. W. Young	Minneapolis, Minn.	231	1300
KFBZ	F. A. Buttrey & Co.	Havre, Mont.	360	830	KFMU	Stevens Bros.	San Marcos, Tex.	240	1250
KFBC	W. K. Azbill	San Diego, Cal.	278	1080	KFMW	M. G. Sateren	Houghton, Mich.	266	1130
KFBE	Reuben H. Horn	San Luis Obispo, Cal.	360	830	KFMX	Carleton College	Northfield, Minn.	283	1060
KFBG	First Presbyterian Church	Tacoma, Wash.	360	830	KFMY	Boy Scouts of America	Long Beach, Cal.	229	1310
KFBK	Kimball-Upson Co.	Sacramento, Cal.	283	1060	KFMZ	Roswell Bdcstg. Club	Roswell, N. M.	250	1200
KFBL	Leise Bros.	Everett, Wash.	224	1340	KFZ	Doerr-Mitchell Elec. Co.	Spokane, Wash.	283	1060
KFBS	Trinidad Gas & Elec. Co.	Trinidad, Colo.	360	830	KGB	Tacoma Daily Ledger	Tacoma, Wash.	252	1190
KFBV	The Cathedral	Laramie, Wyo.	283	1060	KGG	Hallock & Watson Radio Ser.	Portland, Ore.	360	830
KFCB	Nielsen Radio Supply Co.	Phoenix, Ariz.	238	1260	KGN	Northwestern Radio Mfg. Co.	Portland, Ore.	360	830
KFCD	Salem Electric Co.	Salem, Ore.	360	830	KGO	General Electric Co.	Oakland, Cal.	312	960
KFCF	Frank A. Moore	Walla Walla, Wash.	360	830	KGU	Marion A. Mulrony	Honolulu, Hawaii	360	830
KFCH	Electric Service Sta., Inc.	Billings, Mont.	360	830	KGW	Portland Morning Oregonian	Portland, Ore.	492	610
KFCK	Colorado Springs Radio Co.	Colorado Springs, Colo.	258	1150	KGY	St. Martin's College	Lacey, Wash.	258	1160
KFCM	Richmond Radio Shop	Richmond, Cal.	244	1230	KHJ	Los Angeles Times	Los Angeles, Cal.	395	760
KFCP	Ralph W. Flygare	Ogden, Utah	360	830	KHQ	Louis Wasmer	Seattle, Wash.	360	830
KFCV	Fred Mahaffey, Jr.	Houston, Texas	360	830	KJO	C. O. Gould	Stockton, Cal.	360	830
KFCY	Western Union College	Le Mars, Iowa	360	830	KJR	Northwest Radio Service	Seattle, Wash.	283	1060
KFCZ	Omaha Central High School	Omaha, Neb.	258	1160	KJS	Bible Inst. of Los Angeles	Los Angeles, Cal.	360	830
KFDA	Adlers Music Store	Baker, Ore.	360	830	KLS	Warner Bros. Radio Co.	Oakland, Cal.	360	830
KFDD	St. Michael's Cathedral	Boise, Idaho	252	1190	KLX	Tribune Publishing Co.	Oakland, Cal.	360	830
KFDH	University of Arizona	Tucson, Ariz.	360	830	KLZ	Reynolds Radio Company	Denver, Colo.	360	830
KFDJ	Oregon Agricultural College	Corvallis, Ore.	360	830	KMJ	San Joaquin Lt. & Pr. Corp.	Fresno, Cal.	273	1100
KFDK	H. Everett Cutting	Bozeman, Mont.	248	1210	KMO	Tacoma Times	Tacoma, Wash.	360	830
KFDR	Bullock's Hdw. & Spt. Goods	York, Neb.	360	830	KNT	Gray's Harbor Radio Co.	Aberdeen, Wash.	263	1140
KFDU	Nebraska Radio Elec. Co.	Lincoln, Neb.	240	1250	KNV	Radio Supply Co.	Los Angeles, Cal.	256	1180
KFDV	Gilbrech & Stinson	Fayetteville, Ark.	360	830	KNX	Elec. Lighting Supply Co.	Los Angeles, Cal.	360	830
KFDX	First Baptist Church	Shreveport, La.	360	830	KOB	N. M. Col. of Ag. & Mec. Arts	State College, N. M.	360	620
KFDY	S. D. State Col. of Agric.	Brookings, S. D.	360	830	KOP	Detroit Police Department	Detroit, Mich.	286	1050
KFDZ	Harry O. Iverson	Minneapolis, Minn.	231	1300	KPO	Hale Bros.	San Francisco, Cal.	423	710
KFEC	Meier & Frank Co.	Portland, Ore.	360	830	KQP	Apple City Radio Club	Hood River, Ore.	360	830
KFEL	Winner Radio Corp.	Denver, Colo.	360	830	KQV	Doubleday-Hill Elec. Co.	Pittsburgh, Pa.	360	830
KFEO	J. L. Scroggin	Oak, Neb.	270	1110	KQW	Chas. D. Herrold	San Jose, Cal.	360	830
KFER	Auto Electric Service Co.	Fort Dodge, Iowa	231	1300	KRE	Berkeley Daily Gazette	Berkeley, Cal.	278	1080
KFEV	Radio Electric Shop	Douglas, Wyo.	263	1140	KSD	Post Dispatch	St. Louis, Mo.	546	550
KFEY	Augsburg Seminary	Minneapolis, Minn.	261	1150	KSL	The Emporium	San Francisco, Cal.	360	830
KFEZ	Bunker Hill & Sull. Mng. Co.	Kellogg, Idaho	360	830	KSS	Prest & Dean Radio Co.	Long Beach, Cal.	360	830
KFFB	Am. Soc. of Mech. Engineers	St. Louis, Mo.	360	830	KTW	First Presbyterian Church	Seattle, Wash.	360	830
KFFC	Jenkins Furniture Co.	Boise, Idaho	273	1100	KUO	Examiner Printing Co.	San Francisco, Cal.	360	830
KFFE	Eastern Oregon Radio Co.	Pendleton, Ore.	360	830	KUS	City Dye Wks. & Laun. Co.	San Francisco, Cal.	360	830
KFFO	Dr. E. H. Smith	Hillsboro, Ore.	229	1310	KUY	Coast Radio Company	El Monte, Cal.	256	1170
KFFQ	Marksheffel Motor Co.	Colorado Springs, Colo.	360	830	KWV	Portable Wireless Tel. Co.	Stockton, Cal.	360	830
KFFR	Jim Kirk	Sparks, Nev.	226	1330	KWH	Los Angeles Examiner	Los Angeles, Cal.	360	830
KFFV	Graceland College	Lamoni, Iowa	360	830	KXD	Herald Publishing Company	Modesto, Cal.	252	1190
KFFX	McGraw Company	Omaha, Neb.	278	1080	KYW	West'ghouse Elec. & Mfg. Co.	Chicago, Ill.	536	560
KFFY	Pincus & Murphey	Alexandria, La.	275	1090	KYO	Electric Shop	Honolulu, Hawaii	360	830
KFFZ	Al. G. Barnes Amuse. Co.	Dallas, Texas	226	1330	KZM	Preston D. Allen	Oakland, Cal.	360	830
KFGC	Louisiana State University	Baton Rouge, La.	254	1180	KZN	The Deseret News	Salt Lake City, Utah	360	830
KFGD	Chickasha Radio & Elec. Co.	Chickasha, Okla.	248	1210	KZV	Wenatchee Bat. & Motor Co.	Wenatchee, Wash.	360	620
KFGH	Leland Stanford University	Stanford Univ., Cal.	226	1330	WAAB	Valdemar Jensen	New Orleans, La.	268	1120
KFGJ	Mo. Nat. Guard, 138th Inf.	St. Louis, Mo.	226	1130	WAAC	Tulane University	New Orleans, La.	463	650
KFGK	Arlington Garage	Arlington, Ore.	234	1250	WAAD	Ohio Mechanics Inst.	Cincinnati, Ohio	360	830
KFGL	Crary Hardware Co.	Boone, Iowa	226	1330	WAAF	Daily Drivers Journal	Chicago, Ill.	286	1050
KFGM	Heidbreder Radio Sup. Co.	Utica, Neb.	224	1340	WAAG	Gimbel Bros.	Milwaukee, Wis.	280	1070
KFGN	First Presbyterian Church	Orange, Texas	250	1200	WAAM	I. R. Nelson Company	Newark, N. J.	263	1140
KFGP	Gjelhaug's Radio Shop	Baudette, Minn.	224	1340	WAAN	University of Missouri	Columbia, Mo.	254	1180
KFGQ	Emmanuel Missionary Col.	Berrien Springs, Mich.	268	1120	WAAP	Omaha Grain Exchange	Omaha, Neb.	360	830
KFGR	Colo. State Normal School	Gunnison, Colo.	252	1190	WABB	Dr. John B. Lawrence	Harrisburg, Pa.	266	1130
KFGS	Rialto Theatre	Hood River, Ore.	280	1070	WABC	Fulwider-Grimes Battery Co.	Anderson, Ind.	229	1310
KFGT	Utz Elec. Shop Company	St. Joseph, Mo.	226	1330	WABD	Parker High School	Dayton, Ohio	283	1060
KFGU	Central Christian Church	Shreveport, La.	266	1130	WABE	Y. M. C. A.	Washington, D. C.	283	1060
KFGV	Ambrose A. McCue	Neah Bay, Wash.	261	1150	WABG	Arnold Edwards Piano Co.	Jacksonville, Fla.	248	1210
KFGW	Fallon & Company	Santa Barbara, Cal.	360	830	WABH	Lake Shore Tire Co.	Sandusky, Ohio	240	1250
KFGX	Star Electric & Radio Co.	Seattle, Wash.	270	1110	WABI	Bangor Railway & Elec. Co.	Bangor, Me.	240	1250
KFGY	Clifford J. Dow	Linue, Hawaii	275	1090	WABJ	The Radio Laboratories	South Bend, Ind.	240	1250
KFGZ	Robert W. Nelson	Hutchinson, Kan.	229	1310	WABK	First Baptist Church	Worcester, Mass.	252	1190
KFH0	Earle C. Anthony, Inc.	Los Angeles, Cal.	469	640	WABL	Conn. Agricultural College	Storrs, Conn.	283	1060
KFH1	Franklin W. Jenkins	St. Louis, Mo.	244	1230	WABM	F. E. Doherty Radio Sup. Co.	Saginaw, Mich.	254	1180
KFH2	Ross Arbuckle's Garage	Iola, Kan.	246	1220	WABN	Waldo C. Grover	La Cross, Wis.	234	1280
KFH3	Benson Poly. Institute	Portland, Ore.	360	830	WABO	Lave Ave. Baptist Church	Rochester, N. Y.	252	1190
KFH4	Gladbrook Electrical Co.	Gladbrook, Iowa	234	1280	WABQ	Haverford Col. Radio Club	Haverford, Pa.	261	1150
KFH5	Windisch Elec. Farm Eqp. Co.	Louisburg, Kan.	234	1280	WABR	Scott High School	Toledo, Ohio	270	1100
KFH6	North Central High School	Spokane, Wash.	252	1190	WABS	Essex Mfg. Co.	Newark, N. J.	244	1230
KFH7	Yakima Valley Radio Broad-	Yakima, Wash.	224	1340	WABT	Holliday Hall	Washington, Pa.	252	1190
KFH8	casting Association	Juneau, Alaska	226	1330	WABU	Victor Talking Machine Co.	Camden, N. J.	226	1330
KFH9	Alaska Elec. Light & Pr. Co.	Independence, Mo.	240	1250	WABV	John H. De Witt	Nashville, Tenn.	263	1140
KFI0	Church of Latter Day Saints	Seattle, Wash.	236	1270	WABW	College of Wooster	Wooster, Ohio	234	1280
KFI1	Brott Laboratories	Fond du Lac, Wis.	273	1100	WABX	H. B. Joy	Mt. Clemens, Mich.	270	1110
KFI2	Daily Commonwealth	Marshalltown, Iowa	248	1210	WABY	John Magaldi	Philadelphia, Pa.	242	1240
KFI3	Marshall Electrical Co.	Seattle, Wash.	233	1290	WABZ	Coliseum Pl. Baptist Church	New Orleans, La.	263	1140
KFI4	Seattle Post-Intelligencer	Greeley, Colo.	236	1270	WBAA	Purdue University	W. Lafayette, Ind.	360	830
KFI5	Weld Co. Ptg. & Pub. Co.	Oklahoma City, Okla.	252	1190	WBAH	The Dayton Company	Minneapolis, Minn.	360	830
KFI6	National Radio Mfg. Co.	Astoria, Ore.	252	1190	WBAK	Pennsylvania State Police	Harrisburg, Pa.	400	750
KFI7	Liberty Theatre	Bristow, Okla.	233	1290	WBAN	Wireless Phone Corp.	Paterson, N. J.	246	1220
KFI8	Delano Radio & Elec. Co.	Ottumwa, Iowa	242	1240	WBAO	James Millikin University	Decatur, Ill.	260	830
KFI9	Hardsack Mfg. Company	Grand Forks, N. D.	229	1310	WBAP	Star-Telegram	Fort Worth, Texas	476	620
KFI0	University of North Dakota	Stevensville, Mont.	258	1160	WBAU	Republican Publishing Co.	Hamilton, Ohio	258	1160
KFI1	Ashley C. Dixon & Son	Dexter, Iowa	224	1340	WBAV	Erner & Hopkins Co.	Columbus, Ohio	390	770
KFI2	T. H. Warren	Tonawanda, Kan.	226	1320	WBAW	Marietta College	Marietta, Ohio	246	1220
KFI3	Le Grand Radio	Cedar Falls, Iowa	229	1310	WBAX	John H. Stenger, Jr.	Wilkes-Barre, Pa.	360	830
KFI4	Iowa State Teachers' Col.	Fort Dodge, Iowa	246	1220	WBAY	American Tel. & Tel.	New York, N. Y.	492	610
KFI5	Tunwall Radio Co.	Fort Worth, Texas	254	1180	WBBA	Newark Radio Laboratories	Newark, Ohio	240	1250
KFI6	Texas National Guard	Greeley, Colo.	248	1210	WBBD	Barbey Battery Service	Reading, Pa.	234	1280
KFI7	Colo. State Teachers' College				WBBE	Alfred R. Marcy	Syracuse, N. Y.	246	1220

Call	Owner	Location	Meters	Kcys.	Call	Owner	Location	Meters	Kcys.
WBBF	Georgia School of Tech.	Atlanta, Ga.	270	1110	WJAX	Union Trust Co.	Cleveland, Ohio	390	760
WBBG	Irving Vermilya	Mattapoisett, Mass.	240	1250	WJAZ	Chicago Radio Laboratory	Chicago, Ill.	448	670
WBL	T. & H. Radio Company	Anthony, Kan.	261	1150	WJD	Dennison University	Granville, Ohio	229	1310
WBR	Penna. State Police	Butler, Pa.	286	1050	WJH	Wm. P. Boyer Company	Washington, D. C.	273	1100
WBS	D. W. May, Inc.	Newark, N. J.	360	830	WJX	De Forest Radio T. & T. Co.	New York, N. Y.	360	830
WBT	Southern Radio Corporation	Charlotte, N. C.	360	830	WJY	Radio Corp. of America	New York, N. Y.	405	744
WBZ	Westinghouse Elec. & Mfg. Co.	Springfield, Mass.	337	890	WJZ	Radio Corp. of America	New York, N. Y.	455	660
WCAC	J. Finke Jewelry Mfg. Co.	Fort Smith, Ark.	360	830	WKAA	H. F. Paar	Cedar Rapids, Iowa	360	830
WCAD	St. Lawrence University	Canton, N. Y.	360	830	WKAD	Charles Looff	E. Providence, R. I.	240	1250
WCAE	Kaufman & Baer Company	Pittsburgh, Pa.	462	650	WKAF	U. S. Radio Supply Co.	Wichita Falls, Texas	360	830
WCAH	C. R. Randall	New Orleans, La.	268	1120	WKAN	United Battery Co.	Montgomery, Ala.	226	1330
WCAI	Entrekin Electric Company	Columbus, Ohio	286	1050	WKAP	Dutee W. Flint	Cranston, R. I.	360	830
WCAJ	Nebraska Wesleyan Univ'ity	University Place, Neb.	360	830	WKAQ	Radio Corp. of Porto Rico.	San Juan, P. R.	360	830
WCAK	Alfred P. Daniel	Houston, Texas	360	830	WKAH	Mich. Agricultural College	E. Lansing, Mich.	280	1070
WCAL	St. Olaf College	Northfield, Minn.	360	830	WKAJ	Laconia Radio Club	Laconia, N. H.	254	1180
WCAM	Villanova College	Villanova, Pa.	360	830	WKAZ	Turner Cycle Company	Beloit, Wis.	242	1240
WCAO	Sanders & Stayman Company	Baltimore, Md.	360	830	WKAY	Brenau College	Gainesville, Ga.	280	1070
WCAP	Chesapeake & Potomac Tel. Co.	Washington, D. C.	469	640	WKY	WKY Radio Shop	Oklahoma City, Okla.	360	620
WCAR	Alamo Radio Elec. Co.	San Antonio, Texas	360	830	WLAG	Cutting & Wash. Radio. Corp.	Minneapolis, Minn.	417	720
WCAS	Wm. Hood Dunwoody Ind. Inst.	Minneapolis, Minn.	246	1220	WLAH	Samuel Woodworth	Syracuse, N. Y.	234	1250
WCAT	S. D. School of Mines	Rapid City, S. D.	240	1250	WLAJ	Waco Elec. Supply Co.	Waco, Texas	360	830
WCAU	Durham & Company	Philadelphia, Pa.	286	1050	WLAZ	Vt. Farm Machine Corp.	Wells Falls, Vt.	360	830
WCAV	J. C. Dice Elec. Co.	Little Rock, Ark.	360	830	WLAL	Naylor Elec. Co.	Tulsa, Okla.	360	830
WCAW	Kesselman O'Driscoll Co.	Milwaukee, Wis.	261	1150	WLAN	Putnam Hardware Co.	Houlton, Maine	283	1050
WCBA	Charles W. Heimbach	Allentown, Pa.	280	1070	WLAP	W. V. Jordan	Louisville, Ky.	360	830
WCBD	Wilbur G. Voliva	Zion, Ill.	345	870	WLAQ	A. E. Schilling	Kalamazoo, Mich.	283	1060
WCK	Stix-Baer & Co. & Fuller Co.	St. Louis, Mo.	360	830	WLAZ	Electric Shop	Pensacola, Fla.	254	1180
WCM	University of Texas	Austin, Texas	360	830	WLAW	Police Dept. of N. Y. City	New York, N. Y.	360	830
WCX	Detroit Free Press	Detroit, Mich.	517	580	WLAX	Putnam Electric Company	Greencastle, Ind.	231	1300
WDAE	Tampa Daily Times	Tampa, Fla.	360	830	WLB	University of Minnesota	Minneapolis, Minn.	360	830
WDAF	Kansas City Star	Kansas City, Mo.	411	730	WLB	Crosley Mfg. Co.	Cincinnati, Ohio	309	970
WDAG	J. Lawrence Martin	Amarillo, Texas	263	1140	WLW	Clive B. Meredith	Cazenovia, N. Y.	261	1150
WDAH	Trinity Meth. Church (So.)	El Paso, Texas	268	1120	WLW	Round Hills Radio Corp.	Dartmouth, Mass.	360	830
WDAJ	Atlanta & West Point R.R. Co.	College Park, Ga.	360	830	WMAH	General Supply Company	Lincoln, Nebr.	254	1180
WDAK	The Courant	Hartford, Conn.	261	1150	WMAJ	Drovers Telegram Company	Kansas City, Mo.	275	1090
WDAO	Automotive Electric Co.	Dallas, Texas	360	830	WMAK	Norton Laboratories	Lockport, N. Y.	360	830
WDAP	Board of Trade	Chicago, Ill.	360	830	WMAK	Trenton Hardware Company	Trenton, N. J.	256	1170
WDAR	Lit Bros.	Philadelphia, Pa.	395	760	WMAN	Broad St. Baptist Church	Columbia, Ohio	286	1050
WDAS	Samuel A. Waite	Worcester, Mass.	360	830	WMAZ	Utility Battery Service	Easton, Pa.	246	1220
WDAU	Slocum & Kilburn	New Bedford, Mass.	360	830	WMAZ	Chicago Daily News	Chicago, Ill.	448	672
WDAV	First Nat'l Bank	Centerville, Iowa	268	1120	WMAZ	Alabama Poly. Inst.	Auburn, Ala.	250	1200
WDAY	Fargo Radio Electric Co.	Fargo, N. D.	244	1280	WMAZ	Kingshighway Pres. Church	St. Louis, Mo.	280	1070
WDBC	Kirk, Johnson & Company	Lancaster, Pa.	258	1160	WMAZ	Mercer University	Macon, Ga.	268	1120
WDZ	James L. Bush	Tuscola, Ill.	248	1210	WMC	Commercial Appeal	Memphis, Tenn.	500	600
WEAA	Fallain & Lathrop	Flint, Mich.	280	1070	WMU	Doubleday-Hill Elec. Co.	Washington, D. C.	261	1150
WEAF	West. Elec. Co. (A. T. & T.)	New York, N. Y.	492	610	WNAC	Shepard Stores	Boston, Mass.	278	1080
WEAH	Wichita Board of Trade	Wichita, Kan.	244	1230	WNAL	University of Oklahoma	Norman, Okla.	360	830
WEAI	Cornell University	Ithaca, N. Y.	286	1050	WNAL	R. J. Rockwell	Omaha, Nebr.	242	1240
WEAJ	University of South Dakota	Vermilion, S. D.	280	1070	WNAN	Syracuse Radio Telephone Co.	Syracuse, N. Y.	286	1050
WEAM	Borough of North Plainfield	North Plainfield, N. J.	252	1190	WNAP	Wittenberg College	Springfield, Ohio	230	1300
WEAN	Shepard Company	Providence, R. I.	273	1100	WNAQ	Charleston Radio Elec. Co.	Charleston, S. C.	360	830
WEAO	Ohio State University	Columbus, Ohio	360	830	WNAH	C. C. Rhodes	Butler, Mo.	231	1300
WEAP	Mobile Radio Company	Mobile, Ala.	360	620	WNAS	Austin Statesman	Austin, Tex.	360	830
WEAR	Balto. Am. & News Pub. Co.	Baltimore, Md.	360	830	WNAT	Lenning Bros. Co.	Philadelphia, Pa.	360	830
WEAS	Hecht Company	Washington, D. C.	360	830	WNAV	Peoples Tel. & Tel. Co.	Phoenixville, Tenn.	236	1270
WEAU	Davidson Bros. Company	Sioux City, Iowa	360	830	WNAW	Peninsular Radio Club	Ft. Monroe, Va.	360	830
WEAY	Will Horowitz, Jr.	Houston, Texas	360	830	WNAZ	Dakota Radio Apparatus Co.	Yankton, S. Dak.	244	1280
WEB	Benwood Company	St. Louis, Mo.	360	830	WNJ	Shotton Radio Mfg. Co.	Albany, N. Y.	360	830
WEV	Hurlburt-Still Electrical Co.	Houston, Texas	360	830	WOAB	Valley Radio	Grand Forks, N. D.	280	1070
WEW	St. Louis University	St. Louis, Mo.	261	1150	WOAC	Maus Radio Co.	Lima, Ohio	266	1130
WFAB	Dallas News & Dallas Journal	Dallas, Texas	476	620	WOAD	Friday Battery & Elec. Corp.	Sigourney, Iowa	360	830
WFAC	Carl F. Woese	Syracuse, N. Y.	234	1280	WOAE	Midland College	Fremont, Nebr.	360	830
WFAD	H. C. Spratley Radio Co.	Poughkeepsie, N. Y.	360	830	WOAF	Tyler Commercial College	Tyler, Tex.	360	830
WFAG	Electric Supply Company	Port Arthur, Texas	360	830	WOAG	Apollo Theatre	Belvidere, Ill.	224	1340
WFAM	Hi-Grade Wireless Inst. Co.	Asheville, N. C.	360	830	WOAH	Palmetto Radio Corp.	Charleston, S. C.	360	830
WFAN	Times Publishing Company	St. Cloud, Minn.	485	620	WOAI	Evening News & Express	San Antonio, Tex.	385	780
WFAO	Hutchinson Elec. Ser. Co.	Hutchinson, Minn.	360	830	WOAJ	Ervin Electrical Co.	Parsons, Kans.	360	830
WFAT	Wo. Wesleyan College	Cameron, Mo.	360	830	WOAL	Em. E. Woods	Webster Groves, Mo.	286	1050
WFAV	New Columbus College	Sioux Falls, S. D.	258	1160	WOAN	Vaughn Conservat'y of Music	Lawrenceburg, Tenn.	360	830
WFI	U. of Neb. Dept. of Elec Eng.	Lincoln, Neb.	275	1090	WOAO	Lyradion Mfg. Co.	Mishawaka, Ind.	360	830
WGAJ	Strawbridge & Clothier	Philadelphia, Pa.	395	760	WOAP	Kalamazoo College	Kalamazoo, Mich.	240	1250
WGAL	Lancaster Elec. Supply Co.	Lancaster, Pa.	248	1210	WOAR	Henry P Lundskow	Kenosha, Wis.	229	1318
WGAN	Cecil E. Lloyd	Pensacola, Fla.	360	830	WOAT	Boyd M. Hamp	Wilmington, Del.	360	830
WGAQ	Glenwood Radio Corp.	Shreveport, La.	360	830	WOAV	Penn. National Guard	Eric, Pa.	242	1240
WGAZ	Ernest C. Albright	Altoona, Pa.	261	1150	WOAW	Woodmen of the World	Omaha, Nebr.	526	570
WGAY	North Western Radio Co.	Madison, Wis.	360	830	WOAX	Franklin J. Wolff	Trenton, N. J.	240	1250
WGZ	South Bend Tribune	South Bend, Ind.	360	830	WOC	Palmer Sch. of Chiropractic	Avenport, Iowa	484	620
WGI	Amer. Radio Research Corp.	Medford Hillside, Mass.	485	620	WOI	Iowa State College	Dames, Iowa	360	830
WGR	Federal Tel. & Tel. Co.	Buffalo, N. Y.	360	830	WOO	John Wanamaker	Philadelphia, Pa.	509	590
WGV	Interstate Electric Co.	New Orleans, La.	242	1240	WOQ	Western Radio Company	Kansas City, Mo.	360	830
WGY	General Electric Co.	Schenectady, N. Y.	380	760	WOR	L. Bamberger & Co.	Newark, N. J.	405	740
WHA	University of Wisconsin	Madison, Wis.	360	830	WOS	Mo. State Marketing Bureau	Jefferson City, Mo.	441	680
WHAA	State University of Iowa	Iowa City, Iowa	283	1060	WPAB	Penn. State College	State College, Pa.	283	1060
WHAB	Clark W. Thompson	Galveston, Texas	360	830	WPAC	Donaldson Radio	Oklmoke, Okla.	360	830
WHAD	Marquette University	Milwaukee, Wis.	280	1070	WPAH	Wis. Dept. of Markets	Waupaca, Wis.	360	830
WHAG	University of Cincinnati	Cincinnati, Ohio	222	1350	WPAJ	Doolittle Radio Corp.	New Haven, Conn.	268	1120
WHAH	Hafer Supply Co.	Joplin, Mo.	283	1060	WPAK	N. Dak. Agricultural College	Agricultural Col., N. D.	360	620
WHAK	Roberts Hardware Co.	Clarksburg, W. Va.	360	830	WPAL	Superior Rad. Tel. & Eqp. Co.	Columbus, Ohio	286	1050
WHAM	University of Rochester	Rochester, N. Y.	283	1060	WPAM	Auerbach & Guettel	Topeka, Kans.	360	830
WHAP	Otta & Kuhns	Decatur, Ill.	360	830	WPAP	Theodore D. Philips	Winchester, Ky.	360	830
WHAR	Paramount Radio & Elec. Co.	Atlantic City, N. J.	231	1300	WPAP	Gen. Sales & Engineering Co.	Frostburg, Md.	360	830
WHAS	Courier-Journal & Lo. Times	Louisville, Ky.	400	750	WPAT	St. Patrick's Cathedral	El Paso, Tex.	360	830
WHAV	Wilmington Elec. Spec. Co.	Wilmington, Del.	360	830	WPAU	Concordia College	Moorhead, Minn.	360	620
WHAZ	Rensselaer Poly. Inst.	Troy, N. Y.	380	760	WPAZ	Dr. John R. Koch	Charleston, W. Va.	273	1100
WHB	Sweeney School Co.	Kansas City, Mo.	411	730	WPG	Nushagwa Poultry Farm	New Lebanon, Ohio	234	1280
WHK	Radio Box Co.	Cleveland, Ohio	283	1060	WQAA	Horace A. Beale, Jr.	Parkesburg, Pa.	360	830
WHN	Loew's State Theatre	New York, N. Y.	360	830	WQAC	E. B. Gish	Amarillo, Tex.	360	830
WHT	Mich. Limestone & Chem. Co.	Rogers, Mich.	300	1000	WQAD	Whithall Electric Co.	Waterbury, Conn.	242	1240
WIAB	Joslyn Automobile Co.	Rockford, Ill.	252	1190	WQAE	Moore Radio News Sta.	Springfield, Vt.	275	1090
WIAC	Galveston Tribune	Galveston, Texas	360	830	WQAF	Sandusky Register	Sandusky, Ohio	240	1250
WIAD	H. R. Miller	Philadelphia, Pa.	254	1180	WQAH	Brock-Anerson Elec. Eng. Co.	Lexington, Ky.	254	1180
WIAP	Gustava DeCortin	New Orleans, La.	234	1250	WQAL	Coles Co. Tel. & Tel. Co.	Mattoon, Ill.	258	1160
WIAI	Heer Stores Company	Springfield, Mo.	252	1190	WQAM	Electrical Equipment Co.	Miami, Fla.	360	830
WIAJ	Fox Riv. Val. Radio Supply Co.	Neenah, Wis.	224	1340	WQAN	Scranton Times	Scranton, Pa.	280	1070
WIAK	Journal-Stockman Co.	Omaha, Neb.	278	1080	WQAO	Calvary Baptist Church	New York, N. Y.	360	830
WIAO	School of Eng. of Milwaukee	Milwaukee, Wis.	360	830	WQAP	West Texas Radio Co.	Abilene, Tex.	285	1050
WIAQ	Chronicle Publishing Co.	Marion, Ind.	226	1330	WQAS	Prince-Walter Company	Lowell, Mass.	266	1130
WIAS	Home Electric Company	Burlington, Iowa	360	830	WQAV	Huntington & Guerry, Inc.	Greenville, S. C.	258	1160
WIAU	Am. Trust & Savings Bank	Le Mars, Iowa	360	830	WQAW	Catholic University	Washington, D. C.	236	1270
WIK	K. & L. Elec. Supply Co.	McKeesport, Pa.	360	830	WQAX	Radio Equipment Co.	Peoria, Ill.	360	830
WIL	Continental Elec. Supply Co.	Washington, D. C.	360	830	WRAA	Wm. M. Rice Inst.	Houston, Tex.	360	830
WIP	Gimbel Bros.	Philadelphia, Pa.	509	590	WRAB	Board of Public Education	Savannah, Ga.	360	830
WIAB	American Electric Co.	Lincoln, Nebr.	275	1090	WRAD	Taylor Radio Shop	Marion, Kans.	248	1210
WIAD	Jackson's Radio Eng. Lab.	Waco, Tex.	360	830	WRAF	The Radio Club, Inc.	Laporte, Ind.	224	1340
WIAP	Muncie Press	Providence, R. I.	360	830	WRAH	Stanley N. Read	Providence, R. I.	231	1300
WIAG	Norfolk Daily News	Norfolk, Neb.	283	1060	WRAL	Northern States Power Co.	St. Croix Falls, Wis.	248	1210
WIAK	C. L. White	Norfolk, Nebr.	360	830	WRAN	Black Hawk Electrical Co.	Waterloo, Iowa	236	1270
WIAM	D. M. Per								

Call	Owner	Location	Meters	Kcys.
WRAZ	Radio Shop of Newark	Newark, N. J.	233	1290
WRC	Radio Corp. of America	Washington, D. C.	469	640
WRK	Doron Bros. Elec. Co.	Hamilton, Ohio	360	830
WRL	Union College	Schenectady, N. Y.	360	830
WRM	University of Illinois	Urbana, Ill.	360	830
WRR	City of Dallas	Dallas, Tex.	360	620
WRW	Tarrytown Radio Research	Tarrytown, N. Y.	273	1100
WSAB	S. E. Mo. State Teachers Col.	Cape Girardeau, Mo.	360	830
WSAC	Clemson Agricultural College	Clemson College, S. C.	360	830
WSAD	J. A. Foster Company	Providence, R. I.	261	1150
WSAG	City of St. Petersburg	St. Petersburg, Fla.	244	1230
WSAH	A. J. Leonard, Jr.	Chicago, Ill.	248	1210
WSAI	U. S. Playing Card Co.	Cincinnati, Ohio	309	970
WSAJ	Grove City College	Grove City, Pa.	360	830
WSAL	Franklin Electric Co.	Brookville, Ind.	246	1220
WSAN	Allentown Radio Club	Allentown, Pa.	229	1310
WSAR	Doughty & Welch Elec. Co.	Fall River, Mass.	254	1180
WSAT	Donohoe-Ware Co.	Plainview, Tex.	268	1120
WSAU	Camp Marienfield	Chesham, N. H.	229	1310
WSAW	J. J. Long	Canandaigua, N. Y.	275	1090
WSAX	Chicago Radio Laboratory	Chicago, Ill.	268	1120
WSAY	Irving Austin	Portchester, N. Y.	230	1300
WSAZ	Chase Radio Co.	Pomeroy, Ohio	258	1160
WSB	Atlanta Journal	Atlanta, Ga.	429	700
WSL	J. & M. Electric Co.	Utica, N. Y.	273	1100
WSY	Alabama Power Company	Birmingham, Ala.	360	830
WTAB	Fall River Daily Herald	Fall River, Mass.	248	1210
WTAC	Penn. Traffic Company	Johnstown, Pa.	360	830
WTAF	Lewis J. Gallo	New Orleans, La.	268	1120
WTAG	Kern Music Company	Providence, R. I.	258	1160
WTAH	Carmen Ferro	Belvidere, Ill.	236	1270
WTAJ	The Radio Shop	Portland, Me.	236	1270
WTAK	Swan-Bower Company	Steubenville, Ohio	266	1130
WTAL	Toledo Radio & Elec. Co.	Toledo, Ohio	252	1190
WTAM	Willard Storage Battery Co.	Cleveland, Ohio	390	770
WTAN	Orendorff Radio Co.	Mattoon, Ill.	240	1250
WTAP	Cambridge Radio Elec. Co.	Cambridge, Ill.	242	1240
WTAQ	S. Van Gorden	Oseo, Wis.	226	1330
WTAR	Reliance Radio & Elec. Co.	Norfolk, Va.	280	1070
WTAS	Geo. D. Carpenter	Elgin, Ill.	275	1090
WTAU	Ruegg Battery & Elec. Co.	Tecumseh, Nebr.	360	830
WTAW	Agricultural & Mech. College	College Stations, Tex.	254	1180
WTAX	Williams Hardware Mfg. Co.	Streator, Ill.	231	1300
WTAY	The Oak Leaves	Oak Park, Ill.	226	1330
WTAZ	T. J. McGuire	Lambertville, N. J.	280	1070
WTG	Kans. State Agr. College	Manhattan, Kans.	360	830
WWAC	Sanger Bros.	Waco, Tex.	360	830
WWAD	Wright & Wright, Inc.	Philadelphia, Pa.	360	830
WWAO	Mich. College of Mines	Houghton, Mich.	244	1230
WWI	Ford Motor Company	Dearborn, Mich.	273	1100
WWJ	Detroit News	Detroit, Mich.	517	580
WWL	Loyola University	New Orleans, La.	280	1070
WWT	McCarthy Bros. & Ford	Buffalo, N. Y.	360	830

CANADA

CFAC	The Calgary Herald	Calgary, Alta.	430	700
CFBC	King's Radio Shop	Timmins, Ont.	450	670
CFCA	Star Pub. & Printing Co.	Toronto, Ont.	400	750
CFCB	Marconi Company	Vancouver, B. C.	440	680
CFCD	Canadian Westinghouse Co.	Winnipeg, Man.	440	680
CFCE	Marconi Company	Halifax, N. S.	440	680
CFCF	Marconi Wireless Tel. Co. of Canada	Montreal, Quebec	440	680
CFCH	Abitibi Pow. & Paper Co., Ltd.	Iroquois Falls, Ont.	400	750
CFCI	Motor Products Corp.	Walkersville, Ont.	440	680
CFCK	La Cie de L'Evenement	Quebec, Que.	410	730
CFCL	Radio Supply Co., Ltd.	Edmonton, Alta.	410	730
CFCN	Centennial Methodist Church	Victoria, B. C.	400	750
CFCW	W. W. Grant Radio, Ltd.	Calgary, Alta.	440	680

Call	Owner	Location	Meters	Kcys.
CFCO	Semmelhaack-Dickson, Ltd.	Bellevue, Que.	450	670
CFCW	The Radio Shop	London, Ont.	420	710
CFCX	London Advertiser	London, Ont.	430	700
CFPC	Inter. Radio Devel. Co.	Fort Frances, Ont.	400	750
CFOC	The Electric Shop, Ltd.	Saskatoon, Sask.	400	750
CFTC	Bell Telegraph Company	Toronto, Canada
CFUC	University of Montreal	Montreal, Que.	400	750
CFVC	Roy Russell Brown	Courtenay, B. C.	450	670
CFYC	W. W. Odium, Vancouv. World	Vancouver, B. C.	400	750
CFZC	Canadian Westinghouse Co.	Montreal, Que.	400	750
CHAC	Radio Engineers, Ltd.	Halifax, N. S.	420	710
CHBC	The Albertan Pub. Co.	Calgary, Alta.	410	730
CHCB	Marconi Company	Toronto, Ont.	440	680
CHCC	Canadian Westinghouse Co.	Edmonton, Alta.	400	750
CHCD	Canadian Wireless & Elec. Co.	Quebec, Que.	410	730
CHCE	W. Canada Radio Supply, Ltd.	Victoria, B. C.	400	750
CHCF	Radio Corp. of Winnipeg	Winnipeg, Man.	430	700
CHCL	The Vancouver Merchants Exchange, Ltd.	Vancouver, B. C.	440	680
CHCO	Western Radio Company	Calgary, Alta.	400	750
CHCS	Radio Shoppe	London, Ont.	410	730
CHCX	B. L. Silver	Montreal, Que.	420	710
CHCZ	Toronto Globe	Toronto, Ont.	420	710
CHFC	J. Milliken Sons	Toronto, Ont.	410	730
CHIC	Canadian Westinghouse Co.	Hamilton, Ont.	400	750
CHOC	Canadian Westinghouse Co.	Vancouver, B. C.	400	750
CHVC	Metropolitan Motors	Toronto, Ont.	410	730
CHXC	J. R. Booth, Jr.	Ottawa, Ont.	450	670
CHYC	North Electric Co., Ltd.	Montreal, Que.	410	730
CJBC	Dupuis Freres	Montreal, Que.	420	710
CJCA	The Edmonton Journal, Ltd.	Edmonton, Alta.	450	670
CJCB	J. G. Bennett	Nelson, B. C.	400	750
CJCD	T. Eaton Company	Toronto, Ont.	410	730
CJCE	Sprott-Shaw Radio Co.	Vancouver, B. C.	400	750
CJCF	The News Record, Ltd.	Kitchener, Ont.	420	710
CJCG	Manitoba Free Press	Winnipeg, Man.	410	730
CJCH	United Farmers of Ont.	Toronto, Ont.	410	730
CJCI	Maritime Radio Corp., Ltd.	St. John, N. B.	400	750
CJCN	Simons, Agnew & Co., Ltd.	Toronto, Ont.	410	730
CJCS	Eastern Tel. & Tel. Co.	Halifax, N. S.	410	730
CJCX	Percival Wesley Shackleton	Olds, Alta.	400	750
CJCY	Edmund Taylor	Calgary, Alta.	420	710
CJDC	The T. Eaton Co., Ltd.	Toronto, Ont.	410	730
CJGC	London Free Press Prtg. Co., Ltd.	London, Ont.	430	700
CJNC	The Tribune	Winnipeg, Man.	400	750
CJSC	The Evening Telegram	Toronto, Ont.	430	700
CKAC	La Presse Pub. Co., Ltd.	Montreal, Que.	430	700
CKCB	T. Eaton Company	Winnipeg, Man.	450	670
CKCD	Vancouver Daily Providence	Vancouver, B. C.	410	730
CKCE	Canadian Independent Tel. Co.	Toronto, Ont.	450	670
CKCK	Leader Publishing Co., Ltd.	Regina, Sask.	420	710
CKCR	Jones Electric Company	St. John, N. B.	400	750
CKCS	Bell Telephone Company	Montreal, Que.
CKCZ	Canadian Westinghouse Co.	Toronto, Ont.	450	670
CKKC	Radio Equip. & Supply Co.	Kitchener, Ont.	410	730
CKOC	Wentworth Radio Supply Co.	Hamilton, Ont.	410	730
CKQC	Radio Supply Company	London, Ont.	410	730
CKUC	Canadian National Rys.	Toronto, Ont.	440	680
CKY	Manitoba Telephone System	Winnipeg, Man.	450	670
CKZC	Lynn B. Salton	Winnipeg, Man.	420	710
CZ	Granby Consolidated Min. & Power Company	Anyox, B. C.	600	500
DA	Whalen Pulp & Pap. Co., Ltd.	Swanson Bay, B. C.	600	500

CUBA AND PORTO RICO

PWX	Cuban Telephone Co.	Havana, Cuba	400	750
WGAD	Sp. Am. Sch. of Radio Tel.	Ensenoda, Porto Rico	300	1800
WKAO	Radio Corp. of Porto Rico	San Juan, Porto Rico	360	830

New Broadcasters

THREE new Class A stations went on the air during the last part of December and seven more opened in January, the licenses being as follows:

Call	Stations	Frequency Kcys.	Wave Length Meters	Pwr. Wts.
KFMX	Carleton College, Northfield, Minn.	1060	283	500
WABX	Joy, Henry B., Mt. Clemens, Mich.	1110	270	150
KFMW	Sateren, M. G., Houghton, Mich.	1130	266	50
KFMY	Boy Scouts of America, Long Beach District Council, Cal.	1310	229	20
WABZ	Coliseum Place Baptist Church, New Orleans, La.	1140	263	50
WBBF	Georgia School of Technology, Atlanta, Ga.	1110	270	500
WABY	John Megaldi, Jr., Philadelphia, Pa.	1240	242	50
WBBE	Alfred R. Marcy, Syracuse, N. Y.	1220	246	10
KFMZ	Roswell Broadcasting Club, Roswell, N. M.	1200	250	500
WBBG	Irving Vermilya, Mattapoisett, Mass.	1250	240	100

Airin Ireland to Be Free

EARLY this year it is expected that radio broadcasting will start in the Irish Free State. A £30,000 broadcasting company and the Radio Association of Ireland, have recently been organized in Dublin, according to Consul Hathaway, who also reports that the government prohibition against the importation and use of foreign-built wireless apparatus will probably be removed by February 1.

Arrangements between the Irish postal authorities and the broadcasters were said to be nearing completion a month ago, awaiting the approval of the Dail. The broadcasting company composed of four cooperating groups, however, will handle sales independently. Part of the expense of establishing a broadcasting station will be met out of sales privileges, license fees and import taxes. Popular interest, first established last summer through the broadcasting of charitable fetes in Dublin, has been stimulated by the organization of the association devoted to developing the study of radio for amateurs and fans. Branches are being formed in several cities.

British radio manufacturers are said to be showing considerable interest in the radio development in the Free State, where German exporters are also active. American exporters can soon enter the field, it is believed, but should offer the cheaper grades of goods at first.

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IMPORTANT NOTICE

While every possible care is taken to state
correctly matters of fact and opinion in technical
and general writings covering the radio field, and
every line printed is gone over with a scrupulous
regard for the facts, the publisher disclaims any
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may be printed in good faith and on information
furnished by those supposed to be trustworthy.
This statement is made in good faith and to save
time and controversy in matters over which the
publisher cannot possibly have control.

JANUARY 26, 1924

Fewer But Better Broad- casters

A RECAPITULATION of radio
broadcasters on January 11
shows that there were 534 stations
listed by the Department of Com-
merce, 15 less than on December 1.
Only 12 new stations went on the
air during the past month, whereas
34 passed out of existence in De-
cember. The loss is not regarded
as serious to the popular industry,
however, although many fans hated
to see some of their old friends de-
part. The remaining stations are
reaching a higher plane of efficiency
and rendering better programs with
necessarily less interference. Some
of the matter broadcast by defunct
stations will be handled, perhaps
more effectively, by other stations.
This is true in the cases of some
of the churches and newspapers in-
cluded in the list of deletions.
Of the existing stations, 290 are of
Class A, 46 in Class B, and two in

Campaign Against Radiation Interference Launched

THE conference sponsored by
RADIO WORLD to consider
methods of combating radia-
tion interference met, organized
and laid out a plan of educational
campaign in one session at the En-
gineers' Club, New York City, on
January 16.

The gathering was notable for the
distinguished and representative
character of its attendants. It pos-
sessed a quasi-official authority, as
the meeting was presided over by
Mr. W. D. Terrell, Chief Radio
Supervisor, who was designated to
attend the conference as the per-
sonal representative of Secretary
Herbert Hoover, of the Department
of Commerce, whose many duties
detained him in Washington.

The radio press was amply rep-
resented, the prominent daily news-
papers sent their radio editors, the
broadcasting stations were strongly
in evidence, the National Associa-
tion of Broadcasters was repre-
sented by its executive chairman,
while the engineers present exem-
plified strikingly the high calibre talent
radio has enlisted in its service.

The outstanding feature of the
conference was the genuine and
heartly spirit of co-operation which
evidenced itself early in the meet-
ing and grew in intensity as the
minutes passed. While diverse in-
terests were present and ably rep-

resented there was no clash even in
opinion. The good of the whole
radio art and industry was the basis
on which all minds met and it was
astonishing to note the speed with
which unanimity was reached.

The conference decided that an
educational campaign was the best
method of curing the radiation in-
terference evil. To that end, a com-
mittee of radio engineers of ex-
ceptional standing was formed to
serve under the chairmanship of
Prof. L. A. Hazeltine, of Stevens
Institute of Technology. This com-
mittee will prepare technical mate-
rial of an educational character
which will be distributed to the
technical and lay press and to
broadcasting stations by a publicity
committee whose membership will
cover the United States. Both com-
mittees already are at work.

RADIO WORLD feels a keen sense
of honor and pride in having been
the instrumentality through which
this important meeting was brought
into being. The opportunity was
one which clearly gaged our ideas of
public service and the co-operation
with which our efforts were met is
distinctly gratifying. There re-
mains no doubt that great good will
be accomplished by the two com-
mittees appointed and we bespeak
for them the whole-hearted co-op-
eration of our readers.

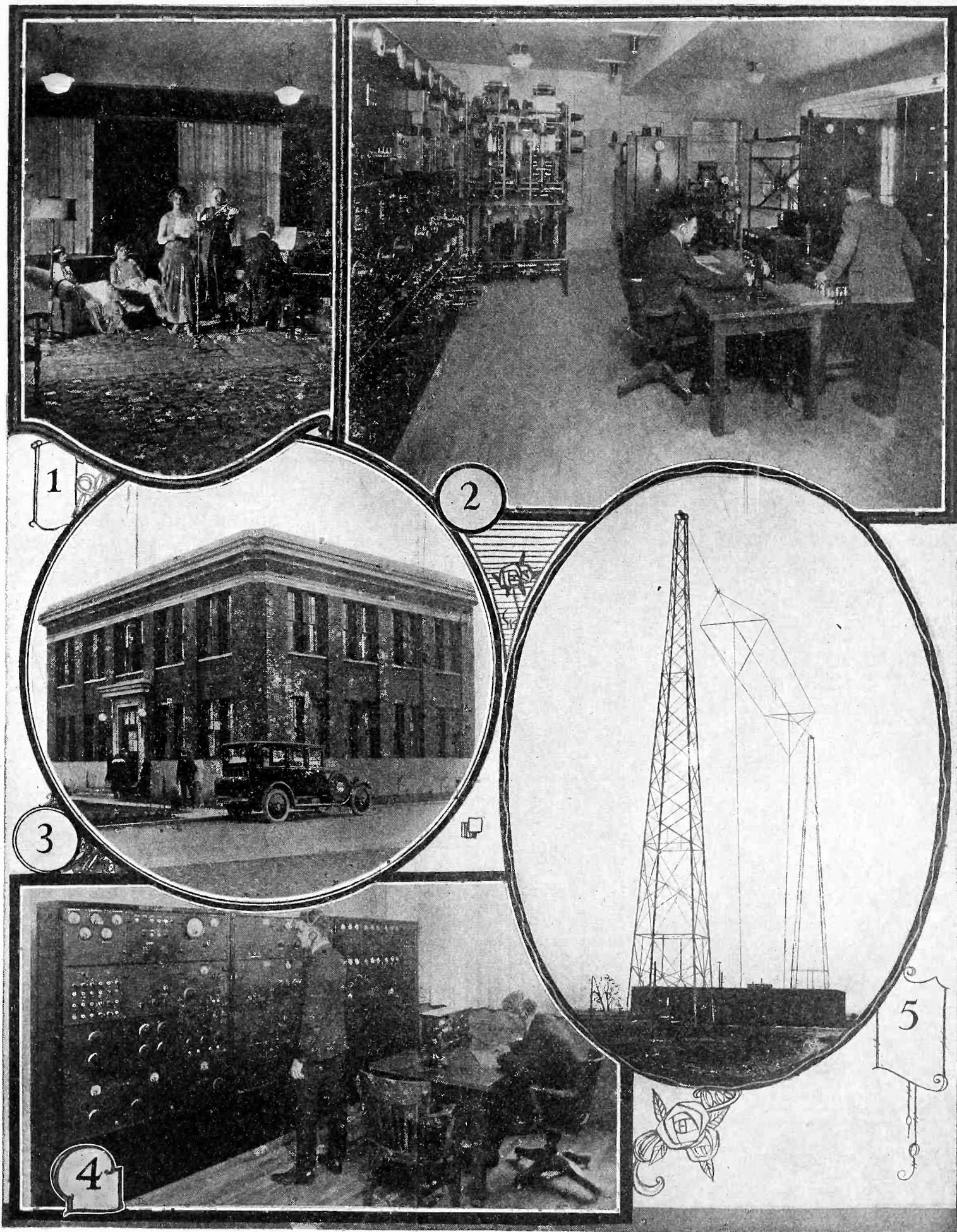
Class D, experimental, while only
196 of the 360-meter stations re-
main in Class C. In the past two
months, 67 stations ceased broad-
casting and 24 opened, showing that
the decrease in numbers is gradual
but steady. The prophecy that soon
there will be fewer but better sta-
tions is being fulfilled.

Women in Radio

THE interest of women in radio
frequently has been chronicled
in various forms by RADIO WORLD.
We have published a number of il-
lustrations of women who have built
their own sets, of women who are
graduates of radio schools, of wo-
men radio instructors. And now we
learn of one who is preparing her-
self for the position of ship's wire-
less operator. The widespread in-
terest of the former weaker sex in
radio has led the Bedford Branch of
the Brooklyn, N. Y., Y. M. C. A. to
establish a course in radio instruc-
tion for women along the same lines
which have successfully marked its

efforts in that direction for men.
The extremely popular addresses de-
livered every Sunday afternoon by
the gifted Dr. S. Parkes Cadman
from the Bedford Branch, and
broadcast through Station WEAJ,
have been enjoyed by a great radio
audience which includes many wo-
men listening in at their homes.
Doubtless this has had much to do
with creating and fostering their
interest in radio and led them to
desire proficiency in the manipula-
tion of receiving sets. They are
most heartily welcome to the great
army of radio fans. There is noth-
ing about elementary radio, at least,
which the average woman cannot
master and there is no reason why
the more adept of the sex should
not go on and become especially ex-
pert. A woman by nature should
be an excellent tuner and develop
into a fine DXer. Many husbands
will give three rousing cheers on
the day their wives become at least
expert enough to remember to turn
off the rheostat when they close
down the set for the night.

New Station KGO, Oakland, Calif.



1—Interior of the main studio at Station KGO, Oakland, California, with a vocal program in progress. This is one of the largest single broadcasting studios ever designed. 2—Interior of the power house and control room at KGO. Nine motor-generator sets supply filament and plate current for the oscillator, modulator and kenotron rectifier assembly. Everything is in duplicate to prevent any chance of delay due to breakdown. 3—Exterior view of Station KGO. This is the only broadcasting station occupying an entire building of its own. 4—The control room of Station KGO. Here are located the remote control apparatus, the modulator controls and the listener, who hears every word and keeps the programs at their best quality. 5—The antenna system of KGO. It is of the multiple tuned type. The masts are 150' high and 250' apart. The counterpoise is 14' above ground, and hid by the power house, described and shown above. (For a detailed description of this station see page 4.)

Here Are Good Broadcast Programs

Station WJZ, New York City

455 Meters (660 Kcys.) E. S. T. Jan. 25.—12:15 A. M.—Friday Noon Hour of Music from the Brick Presbyterian Church, Nevada Van de Vere, contralto; Mildred Dilling, harpist. 3:00 P. M.—Organ recital by Leo Riggs on the Hotel Astor organ, direct from the Hotel Astor. 4:00 P. M.—Recital by Ida Karlyn, soprano. 5:00 P. M.—“The Larger Aspect of World Affairs” by the New International Interpreter. 5:30 P. M.—Closing reports of the New York State Department of Farms and Markets; Farm and Home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; “The Conditions of the Leading Businesses”; “Evening Post” News. 7:30 P. M.—Burr McIntosh, the cheerful philosopher. 8:00 P. M.—“From New York to San Francisco in an Air Mail Plane,” by Honorable Paul Henderson, Second Postmaster-General in Charge of Air Mail. 8:15 P. M.—Loose-leaf current events. 8:30 P. M.—Concert by the City Island Orchestra of eighteen pieces, with fifteen male voices. 9:30 P. M.—“Work of the New York Assembly,” by Julius Berg. 9:45 P. M.—Sterling Male Quartette. 10:00 P. M.—Address by General Charles H. Sherrill. 10:15 P. M.—Sterling Male Quartette. 10:30 P. M.—Paul Specht and his Alamac Hotel Orchestra Dance Program, direct from the Congo Room of the Alamac Hotel.

Jan. 26.—5:00 P. M.—Dance program by Jules Berkin's Rosemont Orchestra. 5:30 P. M.—Closing reports of the New York State Department of Farms and Markets; Farm and Home reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; Bradstreet's financial report; “Evening Post” News. 7:00 P. M.—“Uncle Wiggly Stories,” by Howard Garis. 7:30 P. M.—Concert by the Estrella Mandolin Club. 8:45 P. M.—Recital by Ernest Ehler, tenor. 9:00 P. M.—Address by Honorable Fiorello H. La Guardia, Representative of the Twentieth District of New York. 9:15 P. M.—Canadian Society dinner by direct wire from the Hotel Biltmore; “The Land We Live In,” by Secretary Davis, and other addresses.

Station WBAP, Fort Worth, Texas

476 Meters (630 Kcys.) C. S. T. Jan. 27.—11:00 A. M.—12:15 P. M.—Services of the First Presbyterian Church; Rev. J. K. Thompson, D.D., pastor; W. J. Marsh, organist. 5:00-6:00 P. M.—Vesper concert. 11:00-12:00 P. M.—Concert.

Jan. 28.—7:30-8:30 P. M.—Concert by a group of Fort Worth artists. 9:30-10:45 P. M.—Concert by Tommie's Texans dance orchestra.

Jan. 29.—7:30-8:30 P. M.—Concert by the 350-voice choir of the First Baptist Church, broadcast from the church. 9:30-10:45 P. M.—Concert by Will Foster, organist of the First Methodist Church.

Jan. 30.—7:30-8:30 P. M.—Concert by a group of Fort Worth artists. 9:30-10:45 P. M.—Concert by Texas Hotel orchestra, George Freeman's Sooner Serenaders.

Jan. 31.—7:30-8:30 P. M.—Concert by the old time fiddlers of Burelson, Tex. 9:30-10:45 P. M.—Concert by the Masonic Temple orchestra, presenting an opera.

Feb. 1.—7:30-8:30 P. M.—Concert by the Texas Christian University, under the direction of Prof. H. D. Guelick. 8:30-10:45 P. M.—Concert by the Butcher School of Hawaiian Music.

Feb. 2.—7:00-7:30 P. M.—Review of the interdenominational Sunday school lesson and radio Bible class by Mrs. W. F. Barnum.

Station KFAE, Pullman, Wash.

330 Meters (910 Kcys.) P. T. Jan. 25.—Dr. E. A. Bryan, talk on Economic History of the Northwest Music Recital by Mu Phi Epsilon, women's honorary musical fraternity. The Home Medicine Chest and How to Use It, by Dr. P. H. Distine. Pruning the Apple Tree, by M. D. Armstrong. Efficient Work and Its Reward, by Dr. D. W. Hamilton.

Jan. 26.—Play-by-play report of Idaho-W. S. C. basketball game.

Jan. 28.—Mining Investments, Dean L. O. Howard. Poultry in Winter, W. D. Buchanan. Violin duets, Anastacia Roble, Hillyard, and Eleanor Robinson. Vocal selections. Instrumental numbers.

Jan. 29.—Play-by-play report of Pacific-W. S. C. basketball game.

Jan. 30.—Diet for the Rural Home, Miss Leila Wall Hunt. Fruit Diseases Treated in Winter, Geo. L. Zundel. Mandolin and guitar duets, Dorothy Gilbert and Rex Turner. Talk on the New Books, Miss L. Webb. Vocal numbers.

Station WLW, Cincinnati, Ohio

309 Meters (870 Kcys.) C. S. T. Jan. 25.—10:30 A. M.—Weather forecast and business reports. 1:30 P. M.—Market reports. 3:00—Business reports. 4:00 P. M.—Lecture recital.

Jan. 26.—10:30 A. M.—Weather forecast and business reports. 1:30 P. M.—Stock exchange and business reports.

Jan. 27.—9:30 A. M.—Sunday school services conducted by the editorial staff of the Methodist Book Concern. 11:00 A. M.—Services of the Church of the Covenant, Rev. Frank Stevenson, ministers. 7:45 P. M.—Services of the Church of the Covenant, Rev. Frank Stevenson, minister.

Station WOO, Philadelphia, Pa.

509 Meters (580 Kcys.) E. S. T. Jan. 25.—11:00 A. M.—Grand organ. 11:30 A. M.—Weather forecast. 11:55 A. M.—Naval Observatory time signal. 12 Noon.—Luncheon music by the Tea Room Orchestra. 4:45 P. M.—Grand organ and trumpets. 5:00 P. M.—Sports results; police reports. 7:30 P. M.—Dinner music from Hotel Adelphi Concert Orchestra. 8:00 P. M.—North Frankford Male Chorus. 8:30 P. M.—Special musical program broadcast direct from the Fox Theatre. 9:15 P. M.—Grand organ recital, Miss Mary E. Vogt at the Console. 9:55 P. M.—Naval Observatory time signal. 10:02 P. M.—Weather forecast. 10:10 Dance music from Hotel Adelphi, Sam Brown, director.

Jan. 26.—11:00 A. M.—Grand organ. 11:30 A. M.—Weather forecast. 11:55 P. M.—Naval Observatory time signal. 12 Noon.—Luncheon music by the Tea Room Orchestra. 4:45 P. M.—Grand organ and trumpets. 5:00 P. M.—Sports results; police reports. 9:55 P. M.—Observatory time signal. 10:02 P. M.—Weather forecast.

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Jan. 31.—11:00 A. M.—Grand organ. 11:30 P. M.—Weather forecast. 11:55 A. M.—Naval Observatory time signal. 12 Noon.—Luncheon music by the Tea Room Orchestra. 4:45 P. M.—Grand organ and trumpets. 5:00 P. M.—Sports results; police reports. 9:55 P. M.—Naval Observatory time signal. 10:02 P. M.—Weather forecast.

Station WGI, Medford, Mass.

360 Meters (830 Kcys.) E. S. T. Jan. 25.—12:00 Noon.—The Ampico in the Chickering, Amrad Round Table, the Brunswick Console. 12:40 P. M.—Weather forecast. 12:45 P. M.—Farmers' Produce Market report. 3:00 P. M.—Miss Dorothy H. Goodwin, on “Down on the Cape.” The Brunswick Console. 3:30 P. M.—Talk by Miss Dorothy Dean, Girl Scouts. 5:30 P. M.—Closing stock market report. Live stock markets report. 6:15 P. M.—Code Practice, Lesson No. 222. 6:30 P. M.—Meeting of the Big Brother Amrad Club. 7:00 P. M.—Boston police reports. 7:30 P. M.—Verses by Mr. Charles L. H. Wagner. Radio poet. Red Cross Health Talk by Henry Copley Green. 7:45 P. M.—Drayton Drake, tenor. 8:00 P. M.—Edward Dana, General Manager of the Boston Elevated Railway, 8:15 P. M.—Drayton Drake, tenor.

Jan. 26.—6:30 P. M.—Meeting of the Big Brother Amrad Club. 6:45 P. M.—Code Practice, Lesson No. 223. 7:05 P. M.—Weather forecast. New England crop notes. 7:30 P. M.—Talks on New England Business Problems by Arthur R. Curnick. Arthur Murray's course in ball room dancing. Musicales.

Jan. 27.—4:00 P. M.—“Adventure Hour,” conducted by the Youth's Companion. Musicales. 8:30 P. M.—Talk on “World Unity” under the auspices of the Greater Boston Federation of Churches. Evening's musicale.

Station WJAR, Philadelphia, Pa.

395 Meters (760 Kcys.) E. S. T. Jan. 25.—11:45 A. M.—WJAR Daily Almanac. 12:02 P. M.—Organ recital from the Stanley Theatre; features from the studio; Arcadia Concert Orchestra, Fery Sarkozl, director. 2:00-3:00 P. M.—Arcadia Concert Orchestra; Artist Recital. 4:30 P. M.—Program of dance music. 7:30 P. M.—Dream Daddy with the Boys and Girls. Book Review by Robert Bruce. Artist Recital from the studio. George Gibbs. “The Working Girl in Fiction.” The Walter Greenough Players in “His Japanese Wife,” by Grace Griswold. 10:10 P. M.—Howard Lanin's Dance Orchestra from the Arcadia Cafe. Special features from the “Gingham Girl.”

Jan. 26.—11:45 A. M.—WJAR Daily Almanac. 12:02 P. M.—Organ Recital from the Stanley Theatre; features from the studio; Arcadia Concert Orchestra, Fery Sarkozl, director. 2:00-3:00 P. M.—Acadia Concert Orchestra. Artist Recital. 4:30 P. M.—Program of Synconation by Bobbie Lee and his Cotton Pickers. 7:30 P. M.—Dream Daddy with the Boys and Girls.

Station KDKA, East Pittsburgh, Pa.

326 Meters (920 Kcys.) E. S. T. Jan. 25.—9:45 A. M.—Union Live Stock Market report. 11:45 A. M.—Arlington time signals. 12:00 Noon.—Weather forecast and United States Bureau of Market reports. 12:10 P. M.—Noon concert by Broudy's Orchestra from Kaufman's dining room, Pittsburgh, Pa. 6:00 P. M.—Concert arranged for re-broadcasting in England, by the Westinghouse Band under the direction of T. J. Vastine. 7:00 P. M.—Organ recital by Lucile Hale, from the Cameo Motion Picture Theatre, Pittsburgh, Pa. 7:15 P. M.—Radio Boy Scouts meeting conducted by Richard Victor, Scoutmaster. 7:45 P. M.—The Children's Period. 8:00 P. M.—Market reports. 8:15 P. M.—Sunday school lesson for January 27, presented by Dr. R. L. Lanning. 8:30 P. M.—Concert by the Westinghouse Band under the direction of T. J. Vastine. 9:55 P. M.—Arlington time signals and weather forecast.

Jan. 26.—9:45 A. M.—Union Live Stock Market reports furnished by the National Stockman and Farmer. 11:55 A. M.—Arlington time signals. 12:00 Noon.—Weather forecast and United States Bureau of Market reports from the National Stockman and Farmer. 1:30 P. M.—Concert by Daugherty's Orchestra from McCreery's dining room, Pittsburgh, Pa. 6:00 P. M.—Recital of Negro Spirituals by Harry Austin and Harvey B. Gaul; Spirituals arranged by Harvey B. Gaul and trio from the KDKA Little Symphony Orchestra. 7:30 P. M.—“Bringing the World to America,” prepared by “Our World.” 7:45 P. M.—The Children's Period. 8:00 P. M.—Feature. 8:15 P. M.—“Liability for Automobile Accidents,” James C. Reed, Professor of Business Law, University of Pittsburgh. 8:30 P. M.—Addresses and music from the Eleventh Annual Banquet of the Westinghouse Veteran Employees Association, held at McCreery's dining room, Pittsburgh, Pa. Mr. M. B. Lambert, toastmaster; music by the Westinghouse Band, under the direction of T. J. Vastine, and the Blue Ridge Male Quartet. 9:55 P. M.—Arlington time signals and weather forecast.

Station WRC, Washington, D. C.

469 Meters (640 Kcys.) E. S. T. Jan. 25.—5:15 P. M.—Instruction in international code practice. 6:00 P. M.—Children's hour by Peggy Albion. 8:00 P. M.—“The Bramble King,” by Page McK. Etchison, secretary of the Men's Organized Bible Class Association. 8:15 P. M.—Concert by The City Club Trio under the direction of Sam Rosey. 8:45 P. M.—Song Recital by Alice Phelps, soprano. 9:00 P. M.—“The Political Outlook,” by Frederic William Wile. 9:15 P. M.—Song recital by Herbert F. Aldridge, tenor. 9:30 P. M.—Piano recital by Mrs. Page McK. Etchison. 9:55 P. M.—Re-transmission of time signals and weather reports. 10:00 P. M.—Song recital by Ruth Peter, soprano soloist.

Jan. 26.—5:15 P. M.—Instruction in international code practice. 6:00 P. M.—Children's hour, by Peggy Albion. 8:00 P. M.—Song recital by Emma Martin, soprano. 8:15 P. M.—Violin recital by Eva Scotney. 8:30 P. M.—Song recital by Ethel Holtzelaw Gawler, soprano. 8:45 P. M.—Piano recital by Katherine Ofterdinger. 9:00 P. M.—Song recital by Earl Carbank, baritone. 9:15 P. M.—Piano recital by Katherine Ofterdinger. 9:30 P. M.—Song recital by Ethel Holtzelaw Gawler, soprano. 9:55 P. M.—Re-transmission of time signals and weather reports. 10:00 P. M.—Dance program by Rosey's Washington Five.

Station WBZ, Springfield, Mass.

337 Meters (890 Kcys.) E. S. T. Jan. 25.—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield Market reports. 6:00 P. M.—Dinner concert by the WBZ Quintette. 7:00 P. M.—“Quick Thinking,” a dramatized story prepared by the Youth's Companion. 7:30 P. M.—Bedtime story for the kiddies. Current Book Review by R. A. MacDonald. Bedtime story for grownups by Orison S. Marden. 9:55 P. M.—Arlington time signals. 11:00 P. M.—Program of chamber music by the WBZ Quintette.

Jan. 26.—11:55 A. M.—Arlington time signals; weather reports; Boston and Springfield Market reports. 7:00 P. M.—Dinner concert by the Hotel Kimball Trio transmitted from the Hotel Kimball. 7:30 P. M.—Bedtime story for the kiddies. “Bringing the World to America,” prepared by the Berean Male Quartette. 9:00 P. M.—Bedtime story for grownups by Orison S. Marden. 9:55 P. M.—Arlington time signals.

Station WGY, Schenectady, N. Y.

380 Meters (790 Kcys.) E. S. T. Jan. 25.—11:55 A. M.—Time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 12:45 P. M.—Weather forecast. 2:00 P. M.—Music and household talk, “New Uses for the Old Wash-stand.” 6:00 P. M.—Produce and stock market quotations; news bulletins. 6:30 P. M.—Children's State Department of Health. 7:45 P. M.—Musical program. 10:30 P. M.—Program furnished through courtesy of National Biscuit Company.

Jan. 26.—11:55 A. M.—U. S. Naval Observatory time signals. 12:30 P. M.—Stock market report. 12:40 P. M.—Produce market report. 9:30 P. M.—Dance music by Jack Symond's Orchestra, Hampton Hotel, Albany, N. Y.

Station WHAS, Louisville, Ky.

400 Meters (750 Kcys.). C. S. T. Jan. 25.—4:00 to 5:00 P. M.—Selections by the Strand Theatre Orchestra. Police bulletins. Weather forecast. Piano solos, Alice Brodt. "Just Among Home Folks," a daily humorous column appearing in The Courier-Journal. Selections by the Walnut Theatre Orchestra. Late news bulletins. 4:50 P. M.—Local livestock, produce and grain market reports. 5:00 P. M.—Official Central Standard Time announced. 7:30 to 9:00 P. M.—Concert under the auspices of Miss Helen I. Mitchell. Reading: an interesting historical episode. Late news bulletins. Official Central Standard Time announced.

Jan. 26.—4:00-5:00 P. M.—Selections by the Walnut Theatre Orchestra. Police bulletins. Weather forecast. Old-fashioned fiddler, Charles Elder, accompanied by Miss Sue Elder. "Just Among Home Folks," a daily humorous column appearing in The Courier-Journal. Selections by the Strand Theatre Orchestra. Late news bulletins. Selections played on the Alamo Theatre organ. 4:50 P. M.—Local livestock, produce and grain market reports. 5:00 P. M.—Official Central Standard Time announced. 7:30 to 9:00 P. M.—One-hour concert, University of Louisville Male Quartette. Soprano solos, Miss Margaret Bickel. Selections by Barney Rapp and his orchestra of the Brown Hotel. Selections by the Seelbach Hotel Orchestra. Late news bulletins. Official Central Standard Time announced.

Station WOAW, Omaha, Neb.

526 Meters (570 Kcys.). C. S. T. Jan. 25.—6:30 P. M. Dinner program presented by the Mizpah Lodge Masonic Orchestra, W. M. Olson, director. 9:00 P. M.—WOWL dance program presented by Frank Hodek's Orchestra transmitted from the Roseland Dance Palace.

Jan. 26.—6:30 P. M.—Dinner program by Ackerman's Orchestra of Empress Rustic Garden Dance Palace. 9:00 P. M.—Program under auspices of Omaha Printing Co.

Jan. 27.—9:00 A. M.—Radio chapel service conducted by Rev. R. Brown of the Omaha Gospel Tabernacle and minister of the Sunday Morning Radio Congregation and his associates. 6:00 P. M. Bible study hour under personal direction of Mrs. Carl Grey. 9:00 P. M.—Musical chapel service by courtesy of Zion English Lutheran Church, Rev. Nels Lundgren, pastor. Auspices Woodmen of the World.

Station WFAA, Dallas, Texas

476 Meters (630 Kcys.). C. S. T. Jan. 25.—12:30-1:00 P. M.—Address, Dr. Robert Stewart Hyer, Southern Methodist University, on the Sunday school lesson, "Israel Saved at the Red Sea." 8:30-9:30 P. M.—Paul Skinner's Orchestra.

Jan. 26.—12:30-1:00 P. M.—Address, Dr. Ellis W. Shuler, Southern Methodist University, on "Igneous Rocks." 8:30-9:30 P. M.—Musical program, W. A. Green Company's Choral Club, Earle Behrends, director. 11:00-12:00 P. M.—Mrs. O. Ledford and assisting musicians in varied program.

Jan. 27.—6:00-7:00 P. M.—Radio Bible Class, Dr. William M. Anderson, Jr., pastor First Presbyterian Church, teacher. More than 6,000 enrolled as members. 9:30-10:00 P. M.—Dr. G. M. Gibson, pastor Munger Place Methodist Church, South, brief address, followed by music. 10:00-11:00 P. M.—Oak Cliff Orchestra, Durward Cline, director.

Station KPO, San Francisco, Calif.

423 Meters (770 Kcys.). P. T. Jan. 26.—8:00 to Midnight—Dance music by Art Weidner's orchestra from the Fairmont Hotel.

Jan. 27.—11:00 A. M. 12 Noon—Church services will be conducted by Rev. Robert Jackson, pastor of Fitzgerald Memorial Church. He will speak on "God's Radio." A religious cantata entitled "The Cradle of Bethlehem" will be presented by the Fitzgerald Memorial Church choir. (This will all take place in the KPO studio). 8:30-10:00 P. M.—Concert by Rudy Seiger and his Fairmont Hotel orchestra, broadcast from this station by wire telephony.

Jan. 28.—8:00-9:00 P. M.—G. Harold Montague Schulteis at the Robert Morton organ. 9:00-10:00 P. M.—"Events in the Far East" by Arthur Warren. 10:00-11:00 P. M.—E. Max Bradfield's versatile band playing in the Rose Room Bowl of the Palace Hotel.

Station KGW, Portland, Oregon

492 Meters (610 Kcys.), P. T. Jan. 25.—11:30 A. M.—Weather forecast. 3:30 P. M.—Lecture by Margery Smith of Oregon Agricultural College. 7:30 P. M.—Weather forecast and market reports. 8:00 P. M.—Accordion solos by John Sylvester. 8:15 P. M.—Dance music by George Olsen's Metropolitan orchestra of the Hotel Portland, directed by Herman Kenin. 9:00 P. M.—Oregon Development lecture by O. W. Meilke, ex-president Chamber of Congress, "How the Oregon Development Program Will Tell the Story of Oregon." 10:30 P. M.—Hoot Owls with Pantages frolic.

Jan. 26.—11:30 A. M.—Weather forecast. 3:30 P. M.—Children's program. 10:00 P. M.—Weather forecast and dance music by George Olsen's Metropolitan orchestra of the Hotel Portland.

Station KGO, Oakland, Calif.

312 Meters (960 Kcys.). P. T. Standard Program.—On the air every Tuesday, Thursday and Saturday evening with general programs of instruction and entertainment, known as "The Sunset Station."

Station KFI, Los Angeles, Calif.

469 Meters (630 Kcys.). P. T. Feb. 3.—10:00-10:45 A. M.—L. A. Church Federation service. 4:00-5:00 P. M.—Federated Church Musicians' vesper service. 6:45-7:30 P. M.—Bedtime story and concert. 8:00-9:00 P. M.—Ambassador Hotel concert. 9:00-10:00 P. M.—Examiner concert. 10:00-11:00 P. M.—Theron Bennett's Packard Six.

Feb. 4.—5:00-5:30 P. M.—Evening Herald news bulletin. 5:30-6:00 P. M.—Examiner news bulletins. 8:00-9:00 P. M.—Evening Herald concert. 9:00-10:30 P. M.—Examiner concert. 10-11 P. M.—Ambassador-Lyman's Cocanut Grove Orchestra.

Feb. 5.—5:00-5:30 P. M.—Evening Herald news bulletins. 5:30-6:00 P. M.—Examiner news bulletins. 6:45-7:30 P. M.—Vocal and instrumental concert; bedtime story. 8:00-9:00 P. M.—Ambassador-Lyman's Cocanut Grove Orchestra. 9:00-10:00 P. M.—Examiner concert. 10:00-11:00 P. M.—California School of Artistic Whistling.

Feb. 6.—5:00-5:30 P. M.—Evening Herald news bulletins. 5:30-6:00 P. M.—Examiner news bulletins. 6:45-7:30 P. M.—Nick Harris detective stories and concert. 8:00-9:00 P. M.—Evening Herald concert. 9:00-10:00 P. M.—Examiner concert. 10:00-11:00 P. M.—Hollywoodland Community Orchestra. 11:00-12:00 P. M.—Ambassador-Lyman's Cocanut Grove Orchestra.

Feb. 7.—5:00-5:30 P. M.—Evening Herald news bulletins. 5:30-6:00 P. M.—Examiner news bulletins. 6:45-7:30 P. M.—Y. M. C. A. concert and bedtime story. 8:00-9:00 P. M.—Ambassador Hotel concert. 9:00-10:00 P. M.—Examiner concert. 10:00-11:00 P. M.—Wa Wan Club concert.

Feb. 8.—5:00-5:30 P. M.—Evening Herald news bulletins. 5:30-6:00 P. M.—Examiner news bulletins. 6:45-7:30 P. M.—Wa Wan Juniors concert and bedtime story. 8:00-9:00 P. M.—Evening Herald concert. 9:00-10:00 P. M.—Examiner concert. 10:00-11:00 P. M.—Vocal and instrumental concert. 11:00-12:00 P. M.—Ambassador-Lyman's Cocanut Grove Orchestra.

Feb. 9.—5:00-5:30 P. M.—Evening Herald news bulletins. 5:30-6:00 P. M.—Examiner news bulletins. 6:45-7:30 P. M.—Bedtime story and concert. 8:00-9:00 P. M.—Dance music. 9:00-10:00 P. M.—Examiner concert. 10:30-11:00 P. M.—Vocal and instrumental concert. 11:00-12:00 P. M.—Ambassador-Lyman's Cocanut Grove Orchestra.

Station KYW, Chicago, Ill.

536 Meters (560 Kcys.) C. S. T. Jan. 25.—9:30 A. M.—Late news and comment of the financial and commercial markets. (This service is broadcast every half hour during the twenty-four.) 11:35 A. M.—Table talk by Mrs. Anna J. Peterson. 12:30 P. M.—"The Progress of the World," by Review of Reviews. 6:30 P. M.—News, financial and final market and sport summary. 6:50 P. M.—Children's bedtime story. 10:00-12:30 P. M.—Midnight revue. 11:00-11:10—Clyde Doerr and his orchestra from the Pompeian Room of the Congress Hotel. 12:00-12:30 P. M.—Organ solo by W. Remington Welch, McVicker's Theatre.

Jan. 26.—9:30 A. M.—Late news and comment of the financial and commercial markets. (This service is broadcast every half hour during the twenty-four.) 10:30 A. M.—Farm and Home Service. 11:35 A. M.—Table talk by Mrs. A. J. Peterson. 6:30 P. M.—News, financial and final market and sport summary. 6:50 P. M.—Children's bedtime story. 8:00-8:58 P. M.—Musical program. 9:05 P. M.—Under the Evening Lamp, service including stories, articles and humorous sketches furnished by Youth's Companion.

Jan. 27.—11:00 A. M.—Central Church Service broadcast from Orchestra Hall, Chicago. Dr. F. F. Shannon, pastor. 6:30 P. M.—Excerpts from the New Testament—An American Translation by Prof. E. J. Goodspeed, read by William Ziegler Nourse. 7:00 P. M.—Chicago Sunday Evening Club service broadcast from Orchestra Hall, Chicago. Special musical program under the direction of Edgar Nelson. The speaker will be Dr. H. E. Fosdick.

Station WOR, Newark, N. J.

405 Meters (740 Kcys.). E. S. T. Jan. 25.—2:30 P. M.—Josephine Bougan, mezzo-contralto, accompanied by Frances Hortense. 2:45 P. M.—Soprano solos by Ruth Dale. 3:00 P. M.—Mary E. Dryer, on "Conditions of Women in Germany." 3:15 P. M.—Heny Hull, on "The Parts I Have Played." 3:30 P. M.—Josephine Houghan, mezzo-contralto, accompanied by Frances Hortense. 3:45 P. M.—Soprano solos by Ruth Dale. 6:15 P. M.—Charles Amsterdam, semi-classical and popular piano solos. 6:30-7:00 P. M.—"Man in the Moon Stories for the Children." 7:00 P. M.—Fritzi Leighton Entertainers.

Jan. 26.—2:50-3:00 P. M.—Children's program arranged by "Uncle Robert." 3:00 P. M.—Helen Gaubis, coloratura soprano. 3:15 P. M.—Dorothy Drummon, piano. 3:30 P. M.—Solos by Helen Gaubis. 3:45 P. M.—Dorothy Drummon, piano. 6:15-7:15 P. M.—"Music While You Dine" by Kenneth Kitchen's Club Orchestra. 7:15 P. M.—Fred J. Bendel, on "Sporting News Up-to-the-Minute." 8:00-9:00 P. M.—Vernon Orchestra. 9:00 P. M.—Lilyan Mae Chaddenger mezzo-contralto. 9:15 P. M.—Hon. Herbert C. Pell, Jr., Chairman, Democratic Committee. 9:35 P. M.—Lilyan Mae Challenger, mezzo-contralto. 9:45 P. M.—Frank B. Gilbreth, engineer, on "The One Best Way to Do Your Work." 10:00-11:00 P. M.—Jimmie Shearer and his Revue.

Station KSD, St. Louis, Mo.

546 Meters (550 Kcys.). C. S. T. Jan. 26.—7:00 P. M.—Orchestra concert, organ and instrumental specialties broadcast direct from Missouri Theatre.

Station WOC, Davenport, Iowa

484 Meters (620 Kcys.), C. S. T.—Jan. 25.—10:00 A. M.—Opening market quotations and household hints. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12:00 Noon—Chimes concert. 2:00 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program, C. A. Russell, on "Water Purification." 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 7:20 P. M.—Sunday school lesson—International lesson for next Sunday discussed by Dr. Frank Willard Court, pastor St. John's Methodist Episcopal Church, Davenport, Iowa. 8:00 P. M.—Musical program (1 hour) Erwin Swindell, musical director. Program by the Exchange Club of Rock Island, Ill.

Jan. 26.—10:00 A. M.—Opening market quotations and household hints. 10:55 A. M.—Time signals. 11:00 A. M.—Weather and river forecast. 11:05 A. M.—Market quotations. 12:00 Noon—Chimes concert. 12:30 P. M.—Closing stocks and markets. 3:30 P. M.—Educational program, C. C. Hall, on "Chemistry of Bread Making." 5:45 P. M.—Chimes concert. 6:30 P. M.—Sandman's visit. 6:50 P. M.—Sport news and weather forecast. 9:00 P. M.—Orchestra program (1 hour) P. S. C. Orchestra, Gerald M. Barrow, director. (Popular selections released through the National Association of Broadcasters, of which WOC is a member). V. B. Rochte, baritone soloist.

Station KHJ, Los Angeles, Calif.

395 Meters (760 Kcys.). P. T. Jan. 25.—12:30-1:15 P. M.—News items. Music. Weather report. 2:30-3:30 P. M.—Matinee Musicale. 6:25 P. M.—Live Stock and vegetable reports. 6:30-7 P. M.—Children's Program presenting Richard Headrick screen juvenile. Bedtime story by "Uncle John." 7-7:30 P. M.—Organ recital from First Methodist Episcopal Church. Arthur Blakely organist. 8-10 P. M.—Program presented through the courtesy of Wee Tot's Villa, Metta Merrill Purinton, arranging. Lecture by Walter F. McEntire, "Francis Thompson, the Mystic Poet." 10-12 P. M.—Broadcasting Art Hickman's Orchestra by line telephony from the Los Angeles Biltmore Hotel.

Jan. 26.—12:30-1:15 P. M.—News items. Music. Weather report. 2:30-3:30 P. M.—Matinee Musicale. 6:40 P. M.—Live stock and vegetable reports. 6:45-7:30 P. M.—Children's Program presenting Helene Pirie, screen juvenile. Bedtime story by "Uncle John." 8-10 P. M.—De Luxe program. 10:30 P. M.—Program presented by Salvatore Santaella, pianist; M. Ochi Albi, Russian cellist, and Chico de Verde, violinist.

Station WFI, Philadelphia, Pa.

395 Meters (760 Kilocycles), Eastern Standard Time. Standard Program.—Daily 10:15 A. M.—Produce market and livestock report. 1:00 P. M.—Meyer Davis Bellevue Stratford Hotel Concert Orchestra. 1:50 P. M.—Agricultural report. 3:00 P. M.—Concert. 6:30 P. M.—Meyer Davis Bellevue Stratford Hotel Concert Orchestra. 7:00 P. M.—Talks to children. On Tuesday, Thursday and Saturday evenings special features starting at 8:00 o'clock. On Sunday chapel service at 4:30 P. M., and services of the Arch Street Presbyterian Church, Philadelphia.

Station CKAC, Montreal, Canada

425 Meters (700 Kcys.). E. S. T. Jan. 25.—11:30 A. M.—News. 1:45 P. M.—Rex Battle and his Mt Royal Hotel concert orchestra. 2:15 P. M.—News. 4:00 P. M.—Weather and stock reports. 4:30 P. M.—Joseph C. Smith and his Mt. Royal Hotel dance orchestra. 5:15 P. M.—News.

Jan. 26.—7:00 P. M.—Kiddies' stories in French and English. 7:30 P. M.—Rex Battle and his Mt. Royal concert orchestra. 8:30 P. M.—Studio specials. 9:15 P. M.—Silent. 10:30 P. M.—Joseph C. Smith and his Mt Royal dance orchestra. 11:30 P. M.—Late News. Announcements of weekly radio showers.

Station WOO, Philadelphia, Pa.

509 Meters (590 Kcys.) E. S. T. Jan. 24.—11:00 A. M.—Grand organ. 11:30 A. M.—Weather forecast. 11:55 A. M.—Naval Observatory time signal. 12:00 M.—Luncheon music by the Tea Room Orchestra. 4:45 P. M.—Grand organ and trumpets. 5:00 P. M.—Sports results, police reports. 9:55 P. M.—Naval Observatory time signal. 10:02 P. M.—Weather forecast.

Station WEF, New York City

492 Meters (610 Kilocycles). Eastern Standard Time. Regular Schedule.—Mornings—Tuesday to Friday, inclusive, 11:00-12:00 A. M. Afternoons—Monday to Saturday, 4:00-5:30 P. M. Evenings—Monday, Tuesday, Wednesday and Friday, 7:30-10:00 P. M.; Thursday, 7:00-12:00 P. M.; Saturday, 7:30-12:00 P. M. Sunday, 2:45-5:30 and 7:20-10:00 P. M.

Station WJY, New York City

405 Meters (740 Kcys.) E. S. T.—Jan. 25.—7:30 P. M.—Popular song concert by Philip Krumholz. 7:45 P. M.—Popular song concert arranged by Edgar Donnell Publishing Company. 10:00 P. M.—Charles D. Isaacson program.

Busy DX Nite Owls Report Their Progress

DX Nite Owls, Attention!

THE DX season is now upon us.

All faithful DXers are requested to get ready for the fray and prepare themselves for the night vigil.

Send your records to the DX Editor of RADIO WORLD.

Write only on one side of the paper and write clearly.

Give full particulars of your location, your set, your aerials and other items of interest.

How is This for a Crystal Set?

From J. F. Hood, 1397 Manistique Ave., Detroit, Mich.

I have become greatly interested in your DX column and so decided to get into the game. I have a crystal set using a variable condenser and a loose coupler for tuning. I have a 150-foot antenna, 50 feet from the ground. It is in three parts.

I have logged the following stations: WCX, WWJ, my local stations, WWI Dearborn, Mich.; WJAX, WTAM Cleveland, WDKA Pittsburgh, WLW, WSAI Cincinnati, WDAP, WJAZ Chicago, WHAS Louisville, WOR Newark, WHAZ Troy, WGY Schenectady, WMAH Lincoln, Neb.; WDZ Tuscola, Ill.; and also KOP, a local station.

Here Is a Nice Crystal Record

From Robert Deuel, 25 Mountain Avenue, Maplewood, N. J.

I wish to submit my DX records on a single circuit crystal set. I use a honeycomb coil for the inductance. My aerial consists of a single wire 150 feet long.

Here is my list: WOS, Jefferson City, Mo., 1,200 mi. (verified by a letter from Missouri State Marketing Bureau); WCAP, Washington, D. C., 212; WDAP Chicago, 900; WGY, Schenectady, N. Y., 150; WHAZ, Troy, N. Y., 160; WJAZ, Chicago, 900; KDKA, Pittsburgh, 425; WSB, Atlanta, Ga., 860; WTAM, Cleveland, O., 568; KOP, Detroit, Mich., 677; KYW, Chicago, 900; also 4 stations in Philadelphia, all locals. Total stations heard is 30.

From the Atlantic to the Pacific—From South Car'lina

From C. J. Hill, Aitken, S. C.

Herewith is a list of stations I have received on my set without any amplification:

WSAG, Minneapolis, Minn., 1,150 mi.; WOAL, San Antonio, Tex., 1,000 mi.; WOAW, 900 mi.; WHB, WOO, WDAF, 825 mi.; WBAB, 950 mi.; WOAP, 800 mi.; WGI, 900 mi.; WGY, 775 mi.; WEA, 675 mi.; WLW, WSAI, 425 mi.; WWJ, WCX, WWI, KOP, 625 mi.; WHAZ, 800 mi.; WHAS, 425 mi.; KDKA, 500 mi.

With two stages of audio-frequency amplification I can hear from coast to coast.

I get KHJ, Los Angeles, Cal., 2,350 miles, nearly every night; WKAQ, San Juan, Porto Rico, 1,500 miles; PWX, Havana, Cuba, 900 miles.

I have heard 87 different towns and cities.

A Runner-up for Bradley

From George Franz, 268 South Clarkson Street, Denver, Colo.

I am sending in my list of stations which were received both early morning and evening. It is not as many stations as the Bradley family are getting down in Justin, Tex., but some of them are more distant. The closest station received here being 75 miles away.

I am using a Neutrodyne receiver built last week. All stations were received on a Magnavox.

KGW, Portland, 12:15 A. M.; KHJ, Los Angeles, 12:25 A. M.; WDAP, Chicago, 6:10; KFFO, Colorado Springs, 6:12; KSD, St. Louis, 6:17; KYW, Chicago, 6:19; WJAZ, Chicago, 6:25; WMAO, Chicago, 6:37; WLAG, Minneapolis, 6:42; WHB, Kansas City, 6:44; WTAM, Cleveland, 6:47; KOKA, Pittsburgh, 7:15; WLW, Cincinnati, 7:36; WOC, Davenport, 7:45; KFI, Los Angeles, 7:50; WOS, Jefferson City, 7:55; WDAF, Kansas City, 8:02; KHJ, Los Angeles, 8:15; KFAD, Phoenix, 8:20; WBAF, Fort Worth, 8:45; KFAE, Pullman, Wash., 10:10; KWH, Los Angeles, 10:35; KPO, San Francisco, 10:58; 9XN, Chicago, 11:15.

Twenty-four in all, total distance 19,735 miles. Not so bad for a new set.

This Fan Just Loves Jazz

From Edgar Wallis, Spangle, Wash.

Here is my "listening in" record of last night. I do not go in for distance as a rule, preferring to listen to all of a good program out here than one dozen parts of programs in the east.

Some college in Northfield, Minn. Did not get call letters. 7:00 P. M., WOAW, Omaha, John Belding fiddling on the Seed House program. Forrest Walden and chorus singing. 7:15, KLX, Oakland. News and weather for California. 7:40, WEA, New York. Announcing tomorrow's program. 8:25, KFO, 8:30, WJAZ, Geo. B. Smith singing at Crystal Studio. 8:35, KFI, Ambassador Hotel, Los Angeles. Also heard the Fort Worth Police Band playing "The Old Gray Mare." 8:37, CKCD, Vancouver. News reports and phonograph music. 9:04, KDKA, Pittsburgh. Queen City Orchestra playing "Maggie, Yes Ma'am." 9:00, KJS, signing off. 9:20, KHJ, Los Angeles. Time and weather report. Dr. Luteman speaking. All of the above was on a regenerative receiver with one stage of audio. I find that by removing UV200 and using UV201A for a detector it clears things up a lot. My list numbers nearly 100 stations. I wish the studios would play all of their jazz on their silent nights as I am getting so I prefer static instead.

Nothing Less Than 550 Miles Here

From R. V. Hammer, 216 North Walnut Street, Creston, Iowa.

I am still DX-ing. Here are a few more stations 500 miles or more from Creston that I have heard since you printed my list in the December 1, 1923 issue:

CYL, Mexico City, Mex., 1,565 mi.; KLX, Oakland, Calif., 1,550 mi.; KGO, Oakland, Calif., 1,550 mi.; WNAC, Boston, Mass., 1,250 mi.; WJAR, Providence, R. I., 1,235 mi.; CKAC, Montreal, Que., Can., 1,125 mi.; CHYC, Montreal, Que., Can., 1,125 mi.; WHN, New York City, N. Y., 1,100 mi.; WJY, New York City, N. Y., 1,100 mi.; WIAD, Philadelphia, Pa., 1,000 mi.; WEAM, N. Plainfield, N. J., 1,050 mi.; CFRC, Kingston, Ont., Can., 970 mi.; WSAC, Clemson College, S. C., 900 mi.; WCAR, San Antonio, Tex., 875 mi.; WCA, New Orleans, La., 830 mi.; CFCA, Toronto, Ont., Can., 820 mi.; WABT, Washington, Pa., 800 mi.; WEV, Houston, Tex., 800 mi.; WFAH, Port Arthur, Tex., 795 mi.; WJAS, Pittsburgh, Pa., 790 mi.; WOAV, Erie, Pa., 790 mi.; WPAB, State College, Pa., 780 mi.; WABP, Dover, Ohio, 640 mi.; WEAO, Columbus, Ohio, 625 mi.; WCAH, Columbus, Ohio, 625 mi.; KFJZ, Fort Worth, Tex., 625 mi.; WRR, Dallas, Tex., 610 mi.; WABM, Saginaw, Mich., 600 mi.; WTAW, College Station, Tex., 600 mi.; KFKZ, Colorado Springs, Colo., 600 mi.; AA3 Denver, Colo., 585 mi.; KFEL, Denver, Colo., 585 mi.; WWI, Dearborn, Mich., 580 mi.; WRK, Hamilton, Ohio, 560 mi.; WOAN, Lawrenceburg, Tenn., 550 mi.

In addition, I have heard 28 new stations less than 500 miles from Creston. This brings my total list since Sept., 1922, to 268.

Here Is Some Nice Loud Speaker DX

From Charles and Morris Gooze, 2059 Virginia Park, Detroit, Michigan.

Here is a little record which might be of interest to other DX Nite Owls. The set used is a Westinghouse R-C with several improvements. One of these is a Bradlystat, the other a "C" battery. The list includes stations from 24 States, Canada and Cuba, making a total of 110 stations. An average of three new DX stations per night, when listening, is the regular procedure.

Those marked with an asterisk are received on a loud speaker made of a pair of good phones and a ten-cent megaphone.

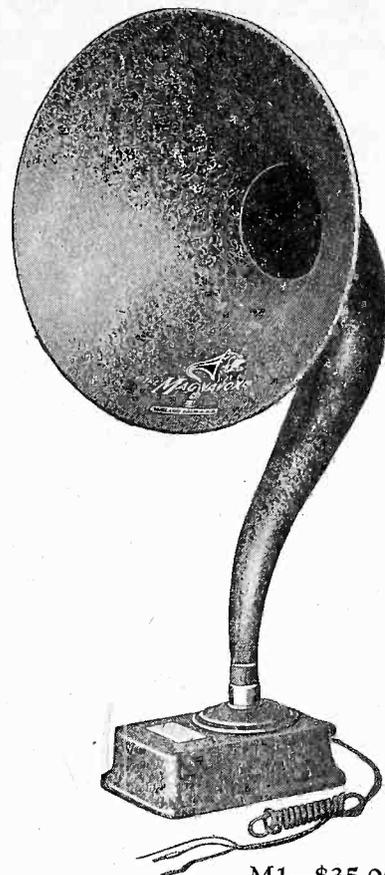
United States—KDKA*, KFI*, KFIL, KFIX*, KFJW, KFKB*, KFKX*, KHJ*, KLZ, KPO, KOV, KSD*, KYW*, WAAM, WAAW, WABK (Pa.), WABT, WBAD, WBAH, WPAP*, WBAV, WBZ*, WCAE*, WCAH, WCAJ, WCAP*, WCAS, WCAU, WCBF*, WCK*, WDAE, WDAF*, WDAP*, WDAW*, WEA*, WEAN*, WEAO*, WEB, WEV, WFAA*, WFAH, WFI, WGR*, WGY*, WHA, WHAM*, WHAS*, WHAZ*, WHB*, WHK, WHN, WIAD (Pa.), WIAS, WIL, WIP, WIAD, WJAK, WJAR*, WJAS*, WJAZ*, WJY*, WJZ*, WLAG*, WLW*, WMAF, WMAJ*, WMAK*, WMAO, WMAJ, WMC*, WNAV, WOAL, WOAW*, WOC*, WOO, WOO*, WOR*, WOS*, WPAD*, WPAH, WPAL, WPAM, WRAD, WRAX, WRC*, WRK, WRM*, WRW, WSAB, WSAI*, WSB*, WSY*, WTAL, WTAM*, WTAS*, WWA*, WQAN, WPA, KFGD—8XAD, 8XS, 2XB.

Canada—9ZE, CFCA*, CFCA, CHYC*, CKAC*, OA*.

Cuba—PWX.

The distances vary up to 2,100 miles. No Michigan stations are included. The long distance stations are not merely freaks of atmospheric conditions, but come pounding in whenever they are on the air.

MAGNAVOX Radio Products



M1—\$35.00

Magnavox Reproducer for dry battery receiving sets

THIS new semi-dynamic Magnavox Reproducer is particularly recommended for dry battery receiving sets where low voltage and low current consumption tubes are used. The M1 is supreme in its class.

Magnavox Reproducers

R2 with 18-inch curvex horn \$60.00
R3 with 14-inch curvex horn \$35.00
M1 with 14-in. curvex horn. Requires no battery for the field . \$35.00

Magnavox Combination Sets

A1-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 1 stage of amplification \$59.00
A2-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 2 stages of amplification \$85.00

Magnavox Power Amplifiers

A1—new 1 stage Power Amplifier \$27.50
AC-2-C—2-stage Power Amplifier \$55.00
AC-3-C—3-stage Power Amplifier \$75.00

Magnavox products can be had at Registered Magnavox Dealers everywhere. Write for new 32-page catalogue.

The Magnavox Company Oakland, California

New York Office: 370 Seventh Avenue

Canadian Distributors Perkins Electric Limited, Montreal

Radio Merchandising

Advertising Rates: Display, \$5.00 an inch, \$150.00 a page. Classified Quick-Action Advertising, 5 cents a word. Phones: Lackawanna 0976 and 3003

Talk Between Japan and Newark, N. J., Heard on Loud Speaker

THE imaginations of radio fans all over the country, some weeks ago, were fired by the report that Station WOR, Newark, N. J., would attempt to establish communication with Japan, Australia and New Zealand. It remained for a little group of men in San Francisco, however, to realize the greatest thrill from the experiment.

In the laboratories of the Howard Radio Company, San Francisco, the Newark broadcast was brought in on the Dictogrand loud speaker. Following it came the answering voice from far-off Japan, still on the loud speaker. For several breathless minutes the four listeners seated in the room heard clearly the conversation between these extremities of the Orient and Occident, all on the loud speaker.

Thomas L. Kennon, manager of the Howard Radio Company, issued a sworn statement covering the occurrence. The affidavit was also signed by Count Christian Lerche-Lerchenberg of Denmark, William J. Proud, L. F. Croft, and T. L. Kennon.

New DeForest Officers

THEODORE LUCE was elected president of the DeForest Radio Tel. & Tel. Co. at the recent annual meeting of the company in Jersey City. Mr. Luce holds many corporate interests throughout the country. In New York, among other interests, he is vice-president of A. C. Allyn & Co., and vice-president of the Fuller-Luce Co.

Other officers elected are the following: William H. Priess, vice-president, in charge of engineering; Charles Gilbert, vice-president and treasurer; J. Harrison McKinnon, secretary and assistant treasurer.

The new board of directors is composed of A. C. Allyn, Frank W. Blair, William Buxbaum, Charles Gilbert, Malcolm N. Fay, E. H. Jewett, Arthur Lord, Theodore Luce, and William H. Priess.

Mr. Jewett, whom Mr. Luce succeeds as

president, found the difficulties of dividing his time between Detroit and Jersey City too great to maintain. While he held the presidency of the DeForest Co. he spent much time in New York and Jersey City to the detriment of his large Detroit interests. Unlike Mr. Jewett, Mr. Luce has most of his affairs centered here and will be able to give considerable personal attention to the affairs of the DeForest Co.

Cosmopolitan Phusiformers

THE Cosmopolitan Phusiformer is one of the interchangeable units which make possible the famous Phusiform Circuits. They may be used to construct radio receiving sets in a great number of combinations. Through their use the constructor can build a tuned radio-frequency amplifier which is claimed to be totally free of self-oscillation. Yet the marvelous simplicity of the wiring of the Phusiform circuits is not to be found in any multi-stage receiver existing today. Where non-oscillating tuned radio-frequency amplification has been attained in the past it has been accomplished through the introduction of special and complicated apparatus to overcome the inherent tendency of circuits of this type to break into oscillation or "squeal." The complete interchangeability of all Cosmopolitan Phusiformers provides another desirable feature—it facilitates wiring, and eliminates the need of special transformers for the different stages of a multi-stage amplifier.

The Phusiformer can also be used either singly or in combination to construct many of the very popular circuits or "hook-ups" of the present time.

The Phusiformer is the electrical equivalent of a close-coupled two-circuit aperiodic tuning coil, while its peculiar construction makes for extreme efficiency. Its electrical characteristics permit its rendering exceptional results in any circuit where a coil of this type is required. For the beginner who desires to experiment with the various "hook-ups" or for one who desires to construct a set where the initial cost is an item, the Phusiform method is especially valuable.

Radio Literature Wanted

Manufacturers of and dealers in radio apparatus and accessories are notified that literature and catalogues describing their products have been requested, through the Service Editor of RADIO WORLD, by the following:

Jesse V. Ball, Long Lane, Mo.
Grant Johnson, Thornton, Iowa.
Otto A. Holquist, 10 Pratt St., Nashua, N. H.
Arrow Battery Service, 6 Eightieth St., Woodhaven, N. Y.
F. P. Ronnan, 37 Sackville St., Halifax, Nova Scotia, Canada.

Prizes Offered For New Radio Slogan

IT has been suggested that a better slogan than the one now in use for Crosley radio products might be obtained from radio fans, and so a contest is being conducted with a view to finding a possible successor to "Better Costs Less," used at present by the manufacturers of this apparatus. This contest has been described through Station WLW and is open to all, no matter whether they are radio fans or not.

Eighty-six prizes with a total value of \$400, are offered and they will be distributed after the judges have made their selections. More than one slogan may be submitted by any entrant, but they must reach the office of The Crosley Radio Corporation, Cincinnati, by the first of February. Announcement of the winners will be made about February 20 or 27th.

General Electric's Big Business in 1923

THE General Electric Company for the year 1923 reports gross sales of \$304,199,746, against \$242,739,527, in the previous year, a gain of about 25 per cent.

Radio and Electrical Business Opportunities

Rate: 40c a line. Minimum, 3 lines.

A HIGH CLASS YOUNG MAN familiar with neutrodyne sets to make installations and give service, with a future selling opportunity. Write, stating education, radio experience and reference K., 437 5th Ave., New York.

TEN THOUSAND buys half interest in old-established, well-rated electric and armature winding business. Box 123, RADIO WORLD.

LARGE ELECTRICAL STORE with established trade, located on busy thoroughfare, has window space and store space to let; excellent opportunity for live wire who understands radio business. P. O. Box 82, Jamaica, N. Y.

Who Is America's Most Popular Radio Entertainer?

Everybody is interested in this query: Who is America's most popular radio entertainer? You have your favorite. Who is she or he? Let us know your choice, whether a comedian, an opera singer, a jazz band, or a story-teller.

RADIO WORLD wants to be able to tell the world the name of the entertainer who stands highest in the regard of listeners-in.

Use the accompanying blank and mail to Broadcasting Manager, RADIO WORLD. Cut off. Fill out. Mail today.

BROADCASTING MANAGER, RADIO WORLD,
1493 Broadway, New York City.

Dear Sir:

My favorite entertainer is..... Station.....

My second choice is.....

Name.....

Street Address.....

City and State.....

Hayden Sales Company

109 Grand Street

Jersey City, N. J.

now have ready for delivery "THORIO" T NO. 7. A six volt, 1/4 ampere detector tube which operates on dry cell or storage. Thorio tubes will fit the large standard socket. Price \$4 each. See advertisement.

The filament kontrol of infinite adjustment
FIL-KO-STAT

Everywhere

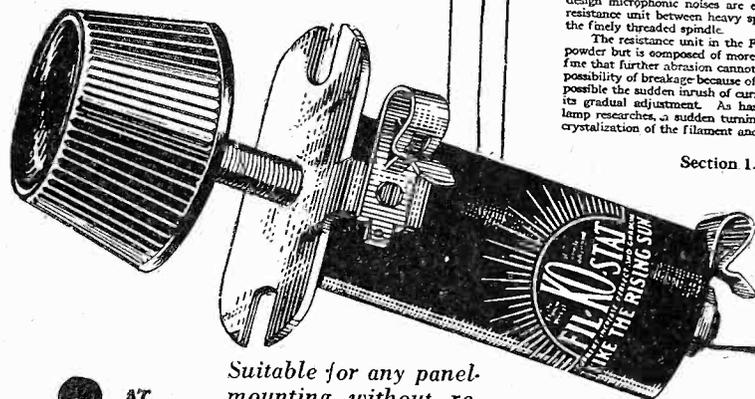
In current Radio literature, the FIL-KO-STAT is being praised by foremost authorities as the supreme achievement in vacuum tube filament control.

Kenneth Harkness in his recent volume, "Radio Frequency Amplification," says the FIL-KO-STAT is indispensable. W. J. Merrit Garvey's "Experimenters' Pocket Reference" tells why he prefers FIL-KO-STAT to all other filament controls and R. P. Clarkson Radio Data Sheet Expert, in his card on Filament Control, states that only FIL-KO-STAT gives ideal results.

All these endorsements are the result of laboratory tests and actual use of the FIL-KO-STAT. Put one in your set to-day and you will be of the same opinion.

FIL-KO-STAT

- Provides scientifically correct filament control
- Assures longer tube life
- Is not a carbon powder rheostat
- Has no discs to break
- Has no wires
- No puzzling adjustments
- Ideal "off" position for all tubes adjusted at the laboratory
- Full resistance 30 ohms



Suitable for any panel-mounting without re-drilling. Equipped with Fahnestock clips. Heavy nickel plated drilled and tapped mountings for rigidly setting up FIL-KO-STAT on table or board—15 cents.

\$2 AT DEALERS EVERYWHERE
 In Canada 2.75

RADIO FREQUENCY AMPLIFICATION

THEORY AND PRACTICE

KENNETH HARKNESS

PAGE 119

"Fil-KO-Stats ** provide fine regulation essential if maximum efficiency is to be obtained ** particularly useful tuning in weak stations. Fil-KO-Stat gives such fine control of filament temperature that it has become *** almost indispensable**."

RADIO CONSTRUCTORS AND EXPERIMENTERS POCKET REFERENCE

By W. J. MERRIT GARVEY

Including Special Treatise on Vacuum Tubes and Filament Control

Price 15 Cents

PAGE 9

"***found Fil-KO-Stat** enabled operator to make micrometer adjustments **allowing infinite-simal current changes**eliminating**noises."

"***but only the Fil-KO-Stat construction appears to give the ideal results**microphonic noises are eliminated*** makes possible sudden in-rush of current and then its gradual adjustment."

SUN-GLOBE RADIO DATA SHEETS
 Copyrighted by R. P. Clarkson.

FILAMENT CONTROL
 Card No. 2

The previous card has indicated the necessity for delicate filament control for sharp tuning. It is essential that the tube used for the detector should operate at the exact required filament potential, that the grid potential should be correct, and that the proper plate potential should be furnished for the desired intensity of signal. Both grid and plate potential, which are usually fixed unless a potentiometer is used, are correct only for some best filament potential. Filament adjustment is, therefore, fundamental.

The wire type of rheostat is limited in resistance, and only roughly adjustable. Its construction makes it very difficult to provide good contact at all time. Both of these faults affect filament control. The heating of the filament depends upon the current which in turn depends upon the impressed voltage. The actual heat given off—the temperature of the filament—determines the electron flow. It is, however, a function of the square of the current multiplied by the resistance (I²R). Any filament adjustment must therefore be very fine for its effect is multiplied immensely in electron emission. Any varying contact between parts immediately more than offsets direct adjustment.

Various types of compression resistances have been devised such as carbon discs pressed together, a disc and a ball of carbon susceptible to varying pressure, and various forms of pressure devices using powdered carbon. All of these are temporarily good except for microphonic noises, but inevitably soon wear either by abrasion of the plates or their breaking or the packing of the powdered carbon. The proper solution of the problem is undoubtedly the compression type but only the Filkostat construction appears to give the ideal results. In this design microphonic noises are eliminated by cushioning the resilient resistance unit between heavy spring members which are operated by the finely threaded spindle.

The resistance unit in the Filkostat type of control is not carbon powder but is composed of more than 4-5 metal granules powdered so fine that further abrasion cannot take place in operation. There is no possibility of breakage because of the use of metal and it further makes its gradual adjustment. As has been determined from incandescent lamp researches, a sudden turning on and off of the current prevents crystallization of the filament and gives it a longer life.

Section 1. Card 1.0986

MADE AND GUARANTEED BY



RADIO STORES CORPORATION

Sole International Distributors
 Dept. R.W. 126 218-222 West 34th Street, New York

Chicago Minneapolis Kansas City Los Angeles

Women's Radio Class at Bedford Branch Y. M. C. A.

ON January 29, at 4:00 P. M., the Bedford Branch Y. M. C. A., 1125 Bedford avenue, N. Y., will start its first radio class for women. This is in response to a demand to offer women a chance to thoroughly learn

the underlying principles of radio. The course will cover the same instruction that the men's classes receive. The women's class will meet every Tuesday and Thursday afternoon from 4:00 to 6:00 for a period of nine months. Women interested in taking this course should write to the Educational Department of Bedford Branch Y. M. C. A. for information.

The demand for radio instruction at Bedford Y. M. C. A. has become so great that on January 28, at 1 P. M. a day class for men in radio will be started. This class will meet every Monday, Wednesday and Friday from 1:00 to 4:00.

WHAT YOU HAVE BEEN LOOKING FOR The MICRO-COUPLER

Patent Pending

Made for use as Coupler, Wave Trap, R. F. Transformer and special Amateur Low Wave Coupler, all with coarse and vernier controls.

Send for Descriptive Literature

Unmounted\$3.60 | Prepaid Unit Panel\$7.75 | Insured

The Amateur Radio Equipment Supply
1504 Federal St., Philadelphia, Penn., U. S. A.

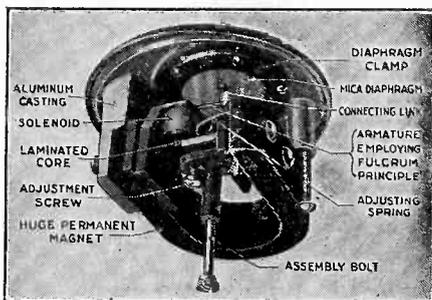
USE EVEREADY Radio Batteries

-they last longer

THE TRINITY LOUD SPEAKER

TYPE "A"
21" FIBER HORN
\$25.00

TYPE "B"
(For Phonographs)
\$12.50



INTERIOR CONSTRUCTION

An ear phone is an ear phone no matter how fancy the horn that covers it may be, and, due to the delicate construction of an ear phone it is utterly incapable of giving true tone reproduction, especially when relatively large currents are passed thru its coils, such as the output of a two-stage or power amplifier.

The Trinity Loud Speaker element embodies the well-proven and tested principles of the phonograph reproducer with the soundest principles of electromagnetic design best adapted for loud speaker operation. It is not an ear phone when placed on a head band and a loud speaker when covered with a horn. It is a sturdy loud-speaking element ALWAYS.

SEND FOR LITERATURE.

TRINITY RADIO CORPORATION

446 TREMONT STREET, BOSTON, MASS.

THE TUBE'S THE THING

Get Radio Reception Without Noise

Myers RADIO VACUUM Tubes

Guarantee Perfect Clarity

Hear without noise or tube hiss with Myers Tubes. They give much greater amplification, are perfect Detectors and Oscillators. They add 50% to the efficiency of your set because they reduce interference.

TWO TYPES: Myers Dry Battery Tube 2½ Volts—¼ Ampere. Myers Universal operates on either 3 Dry Cells or storage batteries. Ready for mounting. No sockets or extra equipment needed. **\$5.00 EACH**

See that you get the New Improved Myers Tubes. You will know them by the Silver Coating. Others are not guaranteed.

At your Dealer, otherwise send purchase price and you will be supplied Postpaid.

Sole Manufacturers

F. B. Myers Co. Ltd. Radio Vacuum Tubes

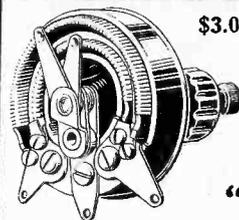
240 Craig Street West

Montreal, CANADA

Glen Cove DXer Gets KGO On Opening Night

DR. W. H. MORRIS, of Glen Cove, N. Y., well known to readers of RADIO WORLD, had the honor of being the first Eastern fan to pick up the new General Electric Station KGO at Oakland, California. He heard the entire opening program, beginning with the prayer dedicating the station, followed by songs and talks by California notables. Oakland is 2,600 miles from Glen Cove.

In a communication to RADIO WORLD, Dr. Morris says: "I guess I put one over on the would-be DX fans this time. Today is Friday and not an account have I seen in any paper as yet. Had KGO again last night. They broadcast Tuesday, Thursday and Saturday."



\$3.00

HERE IT IS! Two Rheostats in One PREMIER "DUOSTAT"

Trade Mark

You will see the advantages of this remarkable new apparatus at once. A real innovation. Think of it! One high-class Rheostat that completely replaces two of the ordinary types; does the work even more efficiently, and, in addition, greatly simplifies installation and wiring. One hole to drill, THAT'S ALL. That's what you get in the "Duostat."

Two independent resistor windings, each operating one tube. Bakelite Moulded Base, silver etched dial, "NICHROME" wire windings. Made for all types of tubes. No. 12, two windings, each 7 ohms. No. 13, two windings, each 25 ohms. No. 14, two windings, each 40 ohms. Price, all types, \$3.00.

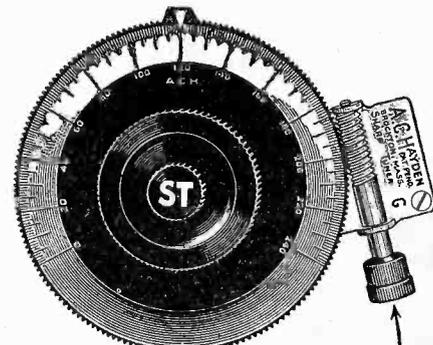
You can't afford to leave out the "DUOSTAT" in your next "hook-up." Send for our free Bulletin No. 92. Ask your dealer.

Premier Electric Company

1805 Grace Street

CHICAGO

USE A C H SHARP TUNER DIALS



Why the A.C.H. is different

3 in. DIAL

156-to-1

4 in. DIAL

215-to-1

Rough tuning with dial or one thousandth of an inch in either direction.

MONEY BACK GUARANTEE

Price ACH 3" Dial Complete.....\$2.50

Price ACH 4" Dial Complete.....\$5.00

Regular fitting 5-16" hole, ¼" and 3-16".
Bushings, 5c. each extra. 10c. for all.

"Kindly accept my thanks for ACH Dial. The shield does away with body capacity, that I have been troubled with before. I only wish I had purchased one month ago."
G. E. Allen, Hamardville, Conn.

"Please send me 6 more dials, I am enclosing \$3.00, balance C.O.D. I have had excellent results with the ACH on my set."
B. N. Harrah, Rainage, W. Virginia.

To retain your good will you must be satisfied or money back.

The ACH will improve any set.

Send for circular No. 8 on RV Loud Talker and Detector Set. A truly wonderful set.

All ready for you to put together.

A. G. HAYDEN RADIO & RESEARCH CO.

Brockton, Mass., U. S. A.

Mail Orders sent prepaid in U. S. A.

OUT OF THE ETHER

Chats About Broadcasting Stations

By Hirsch M. Kaplan

What did you think of the band concert as offered by the Long I Grotto Band which played through Station WEA? Were they not great stuff? I'll say they were! We'd like to hear some more of them and hope that our request is taken seriously.

Quite unexpectedly our equatorial friend Station PWX came through with an excellent program of string music as played by Gumersindo Garcia's Quintet. We didn't hear many of the selections, but the few that we did hear were greatly enjoyed.

We've been doing a great deal of experimenting the past few weeks—that is to say, we've been trying to see what the broadcasting stations on the wave band between 200-300 meters were doing in their efforts to keep us B C Ls happy. For our slight efforts we've already been rewarded with some very delightful offer-

ings, and some were so splendid that we've determined to keep it up.

The first station on these low waves to be heard was KFKX, which operates on a wave of 278 meters. They entertained us with a very splendid program of cello selections. The next stations to be heard were WNAC and WEAN who presented a charming recital of vocal numbers as sung by the Criterion Quartet. Then we heard some one say, "Willie, Tommy, Andy and Sammy," which on further investigation we found stood for the call letters WTAS. This station amused with a program of popular dance numbers. We then decided to try the lower waves and on 253 meters we tuned in Station WSAR and were greeted with another program

of dance selections as played by the Doughty & Welch Orchestra. Before calling quits we thought we would try one more and much to our pleasure we found that Station WIAD of Philadelphia was on the air and offering a variety program. That is a little bit of everything—could be called a teaser. Now that we've found that it pays to stay on the low waves we are going to keep it up.

We've just picked up a queer one—at least it appears queer to us. It was the broadcasting of vocal numbers which, instead of being accompanied by the usual piano, were accompanied by an organ. (Concluded on page 29)

Lattice Coil Specialties



Variometers
Vario-couplers
R.F. Transformers
Micro-Mike
Condensers
Plain Coils
Tapped Coils

Make that New Circuit
AUTO—MILO—or Any Other PLMX
TALK Right Out Loud by
Using Quality Apparatus as supplied under
the ESTRU Trade Mark.

UNI-FLEX PARTS Flexible Units In-
terchangeable for
all Kinds of Circuits.

Write for Literature



2905 WEST MADISON STREET

Trade- "THORIO" -Mark DETECTOR—AMPLIFIER

T. No. 1. Detector-Amplifier. 1 1/2 Volt Filament. 1/4 Ampere. Plate Voltage, 22 1/2-90.
T. No. 3. Detector-Amplifier. 3 Volt Filament. .125 Ampere. Plate Voltage, 22 1/2-90.
T. No. 5. Detector-Amplifier. 6 Volt Filament. .25 Ampere. Plate Voltage, 22 1/2-90.
T. No. 7. Detector. 6 Volt Filament. 1/4 Ampere. Plate Voltage, 10-22 1/2.

Filament licensed under Patent No. 1422019 July 4th, 1922.

THORIO TUBES GUARANTEED
Superior to any on the market for Volume, Clearness, Distance and lack of Tube Noise. Mailed Post Paid to any address in the United States at \$4.00 each.

HAYDEN SALES COMPANY
109 GRAND STREET JERSEY CITY, N. J.
Dealers' orders given prompt attention.

YOU SAVE 50% OF THE USUAL COST



WORLD RADIO BATTERIES

Batteries Are Guaranteed 2 years in Writing Will ship C. O. D. subject to inspection, or allow 5% discount for cash with order. Orders shipped same day received. WRITE TODAY.

World Battery Co.
Dept. 17
1219 So. Wabash Ave.
Chicago, Ill.

2 VOLT STORAGE BATTERY for		6 Volt, 100 Amps. \$12.50	
WD11 —	WD13 \$5.00	6 Volt, 120 Amps. 14.50	
6 V., 60 Amps. \$8.50		6 Volt, 140 Amps. 16.00	
6 V., 80 Amps. 10.00			

B-T Better Tuning



Tells you why and shows you how to get the best results. Unusually successful circuits described and illustrated with B-T photo diagrams. Sent on receipt of 10c.

BREMER TULLY MFG. CO.
531 S. Canal St. CHICAGO

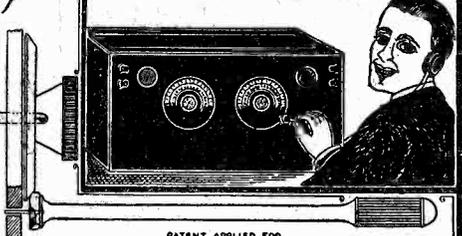
The Whole U.S.A. at Your Finger Tips



with
A KENNEDY TUNER
PATENT PENDING
NONE GENUINE WITHOUT THIS SIGNATURE



HUNT'S UNIVERSAL HAIR-LINE RADIO TUNING DEVICE



PATENT APPLIED FOR

WE REPAIR RADIO TUBES



WD-11.....\$3.50	UV-199.....\$3.50
WD-12..... 3.50	0-299..... 3.50
UV-200... 2.75	UV-201A... 3.50
UV-201... 3.00	C-301A... 3.50
0-300..... 2.75	UV-202... 4.00
0-301..... 3.00	C-302... 4.00
DV-6A.....\$3.50	

Mail orders solicited and promptly attended to.
Dealers and agents write for special discounts.

H. & H. RADIO CO.
P. O. Box 22-B
Clinton-Hill Station Newark, N. J.

BE CONVINCED WITH YOUR OWN EARS

I give demonstrations each evening at my home, 470 West 159th Street, N. Y. C., of my Tuner, bringing in Stations from New York to Los Angeles.

The Kennedy Tuner has no taps and no switches to turn and only one control to pick Stations with. Volume can be increased or decreased by turning dial on Kennedy Tuner, making receiver so simple anyone in family can operate.

Kennedy Tuner and Diagram\$5.00
Diagram without Tuner.....\$1.00

Send your check, money order, or pay postman C. O. D. as preferred. Call at 137 West 48th Street by day or 470 West 159th Street evenings.

Satisfaction Guaranteed or Money Refunded

T. J. KENNEDY
137 West 48th Street New York City

ONE VERNIER FOR ALL DIALS

Gives micrometric adjustment outside the field of inductivity.

Tested and approved by amateurs and experts. Enables you to tune distant stations easier and more clearly. Simple as A B C. Installed from outside, no dismantling of your set necessary. Audibility made more natural or less distorted by the fine adjustments obtained. One Hunt's Device handles all dials on set or several sets. Costs only one dollar on guarantee of money refunded if not satisfied. Ask your dealer or order direct from Hunt Co., 486 Shrine Bldg., Memphis, Tenn.

FILL OUT AND MAIL NOW

SUBSCRIPTION BLANK

RADIO WORLD

RADIO WORLD 1493 Broadway, New York City

Please send me RADIO WORLD for.....months, for which please find enclosed \$.....

SUBSCRIPTION RATES:

Three Months	1.50
Single Copy	\$.15
Six Months	3.00
One Year, 52 Issues.....	6.00

Add \$1.00 a Year to Foreign Postage; 50c for Canadian Postage.

FREE FREE FREE

Sets assembled free with order

HEAR 2,000 MILES ON A ONE TUBE SET

Distance, Volume, Very Select Tuning EASILY OPERATED

Guaranteed to Work or Money Back

PARTS SUPPLIED IN SETS

1 cabinet, 1 drilled grade A hard rubber panel, 1 23-plate condenser, 1 varometer, 1 rheostat, 1 tube socket, 2 3-inch dials, 3 initialed binding posts, 3 lengths spaghetti, 3 lengths bus wire, 1 grid leak and condenser, 1 diagram, etc.

All Standard Parts.

List Price\$29.75

Our price, ONLY \$7.50

Why pay MORE

UNASSEMBLED or ASSEMBLED

Mutual Radio Device Company

25 R.W., Third Ave., New York, N. Y.

Coast to Coast on One Tube and No Body Capacity

These popular hook-ups use UV-199, WD-11 or WD-12 Tubes. One hook-up gives selectivity and 1,500 miles with absolutely no body capacity, while the other gives the remarkable distance of coast to coast. Both prints postpaid for 50 cents or any of the above tubes postpaid \$4.95. No stamps accepted.

Radio Outfitting & Supply Co.
Box 1107 LANCASTER, PA.

11 FEET LONG
Separator
Insulator
Turnbuckle
\$7
COMPLETE
POSTPAID

INSIDE AERIAL
Substitute for Outside Antenna
130 Feet Stretched Copper Wire
NOT A LOOP
BUT A FULL SIZE ANTENNA.
Often doubles tone getting far stations in areas with outside antenna

12 INCHES DIAMETER
Separator
Insulator
Suspend near ceiling

Unaffected by Wind-Rain-Sleet-Lightning
INTER-STATE SIGNALS, COLUMBUS, OHIO
Dept. G

RADIO BARGAINS

Acme Audio or Radio Transformers.....\$3.75 ea.
Federal Phones.....\$4.50 set
Columbia 180° Moulded Coupler.....\$2.50 ea.
11-Plate ACE Vernier Condenser.....\$1.98 ea.
23-Plate ACE Vernier Condenser.....\$2.49 ea.
43-Plate ACE Vernier Condenser.....\$2.98 ea.
"Everything in Radio!" Write for Free catalog. Mail orders solicited.
ACE RADIO COMPANY
710-712 Broadway Schenectady, N. Y.

I. R. M. to Fight Radio Fraud

GREAT interest has been shown in the case of F. A. D. Andrea, Inc., of New York City, against Julius Hossfeldt, 135 West 90th St., New York City, dealer in radio equipment.

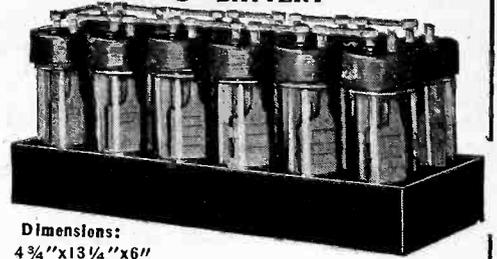
Hossfeldt is accused of fraudulent use of the trade-mark "Neutrodyne" which, it is claimed, is the exclusive property of a group of manufacturers incorporated under the name Independent Radio Manufacturers, and their licensees, one of which is F. A. D. Andrea, Inc. The prisoner is in the Tombs awaiting trial.

Walter C. Russ, attorney for the plaintiffs, has announced that this is the first step taken by the I. R. M. in a country-wide campaign to protect purchasers of radio apparatus against unscrupulous or ignorant dealers.

"When the public buys any well known trade-mark product," Mr. Russ declared, "it has reasonable assurance that it is getting the goods of the manufacturer owning the trade-mark. Unfortunately, in the radio industry, this has not been the case. There seems to be a prevailing disregard of patent rights to radio parts and there is an appalling amount of promiscuous construction of sets which are being sold as the product and under the name of established manufacturers. The I. R. M. are starting a herculean campaign against all infringers of their trade-marked goods. District Attorney Solomon is greatly interested in the case and is awaiting a hearing and is determined to give his full co-operation against offenders."

STORAD

"B" BATTERY



Dimensions:
4 3/4" x 13 1/4" x 6"

24 Volt Unit

The Ultimate Battery for "B" Circuit Work

Voltage of the Storad "B" Battery is constant and steady. 3 to 6 months' service on one charge. Recharge cost is very slight. (We can furnish charger at small cost.) A Storad will last for years and pays for itself in less than a year. Capacity 2250 M. A. H.

USE A STORAD STORAGE "B" BATTERY

It has extra heavy 2"x1"x1/4" plates and large acid circulation.

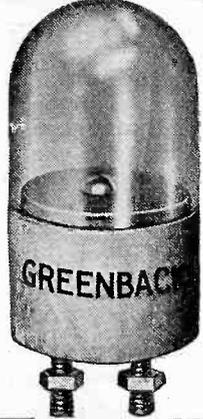
It has glass jars, which eliminate cell leakage and allow observation of battery condition.

It will hold its charge for many months at constant voltage.

It prevents many noises in the set ordinarily blamed to static and aids long distance reception.

All Batteries Shipped Dry
SEND MONEY WITH ORDER \$7.25
OR SHIPPED C. O. D. (East of Miss. River)

Write for Dealer Proposition
The Cleveland Engineering Lab. Company
2115 Superior Viaduct, N. W., Cleveland, O.



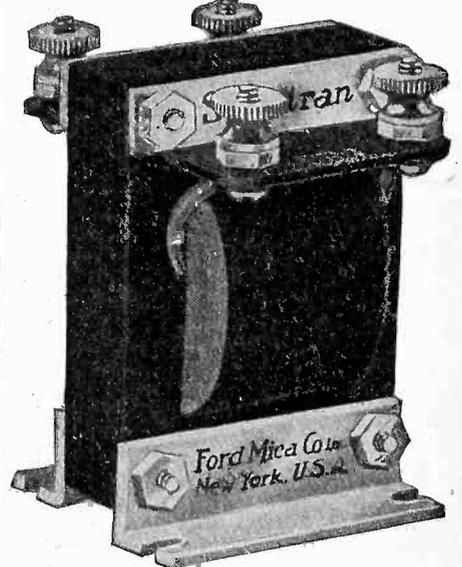
AT LAST! GREENBACK FIXED DETECTOR

No more indistinct sounds. No time wasted finding sensitive part of crystal. Greatest improvement on market. **FOOL-PROOF, DUST-PROOF, TROUBLE-PROOF.** Used wherever a crystal detector is part of circuit. Get one today! Pin dollar to this ad with name and address and get **98c** it quick postpaid.

FULLY GUARANTEED LORAIN MFG. CO.
Dept. W, 128 N. Wells St. Chicago, Illinois

SUPERTRAN

Audio-Frequency Transformer



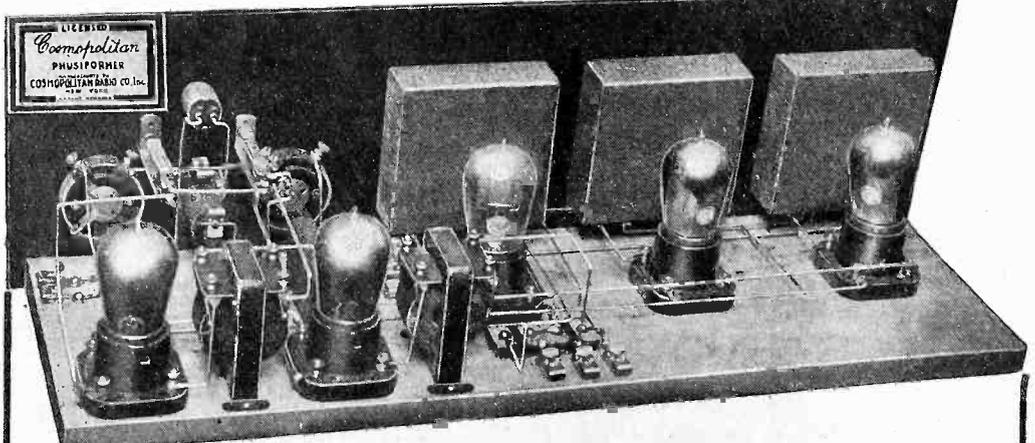
Assures a range of unusually long distance and preserves the natural tone of Broadcasting, both the human voice and music, exactly as when transmitted through the Microphone.

Works equally well with all types of modern tubes.

Price \$6.00

At your dealers or by mail postpaid on receipt of purchase price. Write for our free literature.

Ford Mica Co., Inc.
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COSMOPOLITAN PHUSIFORMER

Converts any set to the equivalent of a Neutrodyne and then some.

More satisfactory than any instrument heretofore given to the public.

It meets the following requirements:

- 1—Non-oscillation
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- 7—Inexpensive
- 8—Wave Trap

LIST PRICE \$8.50

For further particulars apply to any radio dealer or write to address below.

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GROVER C. DAHLBENDER, Secretary and Treasurer

Factory: 151 East 126th Street, New York City Office: 2255 Broadway, New York City

Radio and Electrical Business Opportunities
Rate: 4¢ a line. Minimum 3 lines.

New Radio and Electric Firms

Horan-Astarita Co., New York City, electrical machinery, \$5,000; T. F. Horan, F. W. and K. Astarita. (Attorney, M. Greenberger, 1,133 Broadway.)

Phenix Radio Corp., New York City, 1,000 shares common stock, no par value; W. A. and M. and A. Eisenhauer. (Attorneys, A. and H. Bloch, 99 Nassau St.)

Advance Battery Corp., New York City, batteries and electrical goods, \$25,000; B. Zernoske, J. Weinberger, H. W. Phillips. (Attorney, M. Weiss, 5 Beekman St.)

Induction Radio Corp., Brooklyn, N. Y., to make radio sets, \$3,000; C. A. Friedrich, W. W. Brinkman. (Attorney, H. Schapiro, 261 Broadway.)

Republic Radio-Craft Corp., N. Y. City, \$25,000; R. Robins, M. Eidenberg, M. Altman. (Attorney, L. Feuerman, 38 Park Row.)

G. A. Helleken Electric Co., New York City, 200 shares common stock, no par value; G. A. Helleken, J. F. Mathias, R. J. Mo-

kowski. Attorneys, Breckenridge, Kelly & Nevin, 2 Rector St.)

Cosmopolitan Radio Co., New York City, \$50,000; J. P. Farson, G. C. Dahlbender. (Attorney, W. H. Fain, 54 Wall St.)

Inwood Radio Corp., New York City, \$2,000; A. E. Rhine, J. Henry. (Attorney, W. M. Ziff, 15 Park Row.)

100-FOOT SPREADERS

Price \$2 Each

28 TEST SETS

Mahogany Boxes with Sound Board and Buzzer
\$4.50 EACH

Call or Write

Pioneer Mfrs. Supply Co.

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1,000 MILES Guaranteed on Our New

ONE TUBE RECEIVER

Complete with tube, phones, batteries, aerial, insulators, etc. Ready to work. Quantity limited. Send money order for shipment by return mail. Money back if you want it.

\$17.50

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SPECIAL \$ SAVERS

Satisfaction or money back

KNOCK DOWN NEUTRODYNES

Most popular receivers today.

- \$80.00 Model KD 50, Freed Eisemann Receiver. ALL parts included. Special at..... \$69.85
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 - 2.00 Neutroformer Coil..... 1.45
 - 65.00 Crosley XJ "Better, Costs Less"..... 54.50
 - 1.00 Curtis Rubber Ear Caps..... .65
- CONDENSERS**
- 2.00 23 Plate R. C. Co..... 1.25
 - 2.75 43 Plate, R. C. Co..... 1.45
 - 4.00 23 Plate, Vernier, R. C..... 2.10
 - 4.50 43 Plate, Vernier, R. C..... 2.35

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THAT SUPERDYNE RECEIVER!

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ALL STANDARD MERCHANDISE AT LOW PRICES. Write for Agent's Price List. Always include Parcel Post and Insurance.	
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All Sizes

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I. R. NELSON CO.

Bond Street Newark, N. J.

WAAM

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SLEEPER-MONOTROL

GRIMES INVERSE DUPLEX CIRCUIT

One control—no aerial, no ground.

Four tube set, \$140 Three tube set, \$115

Booklet on request

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This New Unique RADIO RECORD BOOK Enables You to keep for Reference What You Hear and How You "Tune In." Increases Radio Pleasure at Small Cost. Popular Edition, space for 300 Complete Records in Each Book, 50c each.

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Each Book also contains Accurate List of U. S. Broadcasting Stations to Nov. 15, 1923, alone worth the price of the book.

Size of Book 8x11 inches. Record Pages good paper, suitable either pen or pencil. Cover, heavy, flexible cover stock.

"Ra-Owls" Everywhere Like It. However,

Your Money Back if Not Satisfied.

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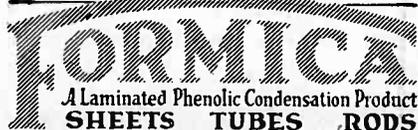
THESE BACK NUMBERS OF RADIO WORLD ARE OUT OF PRINT

April 22, 1922	October 28, 1922
April 29, 1922	January 13, 1923
May 20, 1922	January 20, 1923
June 24, 1922	January 27, 1923
August 5, 1922	February 24, 1923
October 21, 1922	May 12, 1923

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UNITED RADIO MFG. CO.

PANELS CUT—DRILLED

Neatly—Lowest Prices

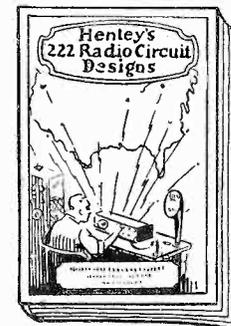
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A Complete and Up-to-Date Collection of Modern Receiving and Transmitting Hook Ups

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256 Pages.

284 Diagrams and Illustrations Specially made for this book.

AN ENTIRELY new and thoroughly practical book on radio circuit designs which will meet the needs of every radio enthusiast, whether novice or expert, amateur or professional. It is replete with correct and trustworthy radio information from which any one can successfully build and operate any of the circuits given. Contains the largest collection of radio circuits and Hook Ups ever published and includes all the standard types and latest developments.

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It surpasses all other books in the scope of its subject matter, in the simplicity and novelty of presentation, and in thoroughness of detail.

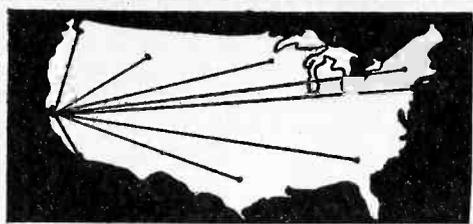
THE COLUMBIA PRINT

1493 BROADWAY NEW YORK CITY

DO SQUEALS AND HOWLS bother you? Are you making your own worst interference due to letting your receiver create interfering radiation? If you are, see article by C. White entitled "How to stop re-radiation on Single Circuit Receivers" in RADIO WORLD for December 8th issue. Radio World, 1493 B'way, New York City. 15c. a copy.

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ON ONE TUBE

Broadcasting from Atlantic Coast, Mexico, Hawaii, Canada and Cuba heard in California by users of **CROSS COUNTRY CIRCUIT**. Range due to simplicity of set and only one tuning control. Easily and cheaply built by any novice. Dry cell tubes may be used. All instructions, blueprint panel layout, assembly photo, etc. Postpaid 25c. Stamps accepted.
VESCO RADIO SHOP, BX RW-117, Oakland, Cal.

Interesting Radio Survey Among Farmers

THE importance of radio in the production and marketing of agricultural products is brought out in a special survey of about 1,200 representative farmers, just completed by the United States Department of Agriculture. More than 50 per cent of the 1,200 farmers replying reported that they owned tube sets employing three or more tubes, while approximately 50 per cent of the farmers reporting have home-made sets

ranging from simple crystal detectors to tube sets.

More than 75 different makes were found among the manufactured sets purchased, although the bulk were confined to about 15 of the leading makes that are more or less widely advertised in radio and general magazines. The average cost of the manufactured sets was \$172.

Comparatively few of the owners of home-made sets operate crystal receivers, the survey revealed. The average cost of the crystal sets was \$11. The average cost of the home-made tube sets was \$83.

Eighty per cent of these farmers said they were interested in receiving both weather and market reports.

NOW \$25 FOR \$10

BEL-CANTO LOUD SPEAKER

Delivered direct from factory to you on receipt of only \$10.

BEL-CANTO MFG. CO.

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RUSONITE
 RADIO CRYSTAL

Entire Surface Sensitive

The Recognized Standard Crystal Rectifier

Used all Over The World

Hundreds of Thousands of Satisfied Users. Rusonite Has Revolutionized Crystal Radio Reception.

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Guaranteed

Price mounted 50c

RUSONITE CATWHISKER 14K. GOLD

Supersensitive ; will not oxidize

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Order from your dealer or direct from

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The very best way to know all Radio facts is to own a Lefax Perpetual Radio Handbook. When you buy it, you become a registered owner. That means complete facts as they are discovered, are mailed to you every month—printed, punched, ready to insert instantly in your Lefax Handbook. Lefax doesn't, cannot grow old. It keeps on giving you information, but you pay only once. There is no charge for the first twelve monthly mailings.

Here is a different, better book on Radio. It was written by Dr. J. H. Dellinger and L. E. Whittemore, Chiefs of the Radio Laboratory, U. S. Bureau of Standards, Washington, D. C. Ordinary books on Radio grow old and out-of-date almost as soon as printed. Changes occur rapidly. Lefax gives them all, as they happen. You get all the new ideas, in loose leaf form, pocket size, beautifully, accurately illustrated. And you get a complete list of broadcasting stations, with full information about each one.

The binding is flexible imitation Morocco leather—long, long wearing and very attractive. Pages are most readable and are indexed with linen tabs, plainly marked. There isn't anything else like Lefax, by any name or in any form. Look into it. Ask your Radio dealer, book store or stationer for

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WEIGHS ONLY 8 OZ.

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20,000 TURNS EQUIVALENT TO 3,000 OHMS

Order TODAY by Postcard and Pay Postman on arrival

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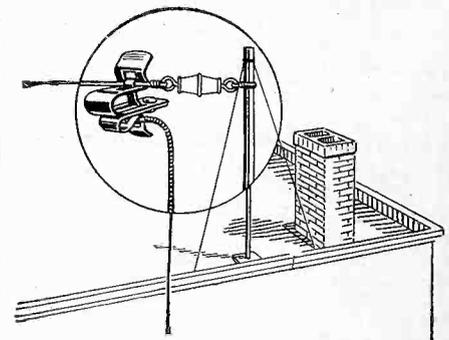
A \$200,000.00 COMPANY stands squarely back of the guarantee on every Scientific headset

THE PHONE IT TOOK A SOLID YEAR TO DESIGN

We Guarantee The Scientific Headset to be the greatest value on the market. Try it for five days. If not satisfactory send it back and your money will be refunded immediately. Circular on request. Dealers wanted.

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**FAHNESTOCK'S
 LATEST RADIO HELP**



**No. 31
 THE**

Antenna Connector

Price 10c

Snap larger connector over Antenna Wire; insert Lead-in Wire into smaller clip and a perfect connection is the result.

At Your Dealers

Fahnestock Elec. Co.

LONG ISLAND CITY
 NEW YORK

Out of the Ether

(Concluded from page 25)

Suppose all the pianists at the Connecticut Agricultural College which operates Station WBAL must be on their vacation or else have gone on strike. Anyway, the program was a good one.

Yes, sir, our friend from the WEST, none other than Wendall Hall KYW'S Red Headed music accompanied by his ukelele is again in our midst. He is keeping us awake these nights with his splendid entertainment which he renders through Station WEAJ. It's about time those in charge of the stations in and about New York City got wise to the fact that he is the class of entertainment which the fans relish and obtained some more of his kind.

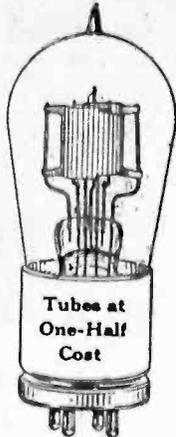
Are you a movie fan? If you are, or even if you're not, I would suggest that you listen to the short talks on "Current Motion Pictures" as delivered by "Hollywood" McCosker from Station WOR every Monday evening at 8. His talks are so delightful and so chuck full of information that many we know who seldom visit the movies know all about the screen and its stars. Here is a chance for you

to become better acquainted with the stars whom you have seen or at least know by name.

Our theatrical program for this week was presented from Station WDAR. This station offered the three-act comedy, "The Champion," which was produced by the Domino Club. It was a splendid performance and we had all that we could do to keep our sides from splitting with laughter.

The Ultimate Radio Receiver
THE FLEX-O-DYNE CO.
 1674 Broadway (At 52nd St.)
 New York, N. Y.
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1/2 Price
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New Tubes
 Burned out or broken tubes repaired and guaranteed equal to new.
Harvard Radio Laboratories
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VACUUM TUBES REPAIRED
 WD-11, WD-12, UV-201A, UV-199 and others for **\$3.00**
 Quick service. All tubes repaired by us guaranteed to work as good as new. Send your dead tubes. We prepay parcel post to you. All you pay is \$3.00 to postman.
THOMAS BROWN CO.
 511-519 ORANGE ST. NEWARK, N. J.

IT'S A FRAME-UP
CAST ALUMINUM FRAMES
 FOR YOUR RADIO SET
 MAKE IT RIGID and STRONG
NO WARPING SPRINGING NO SHORT CIRCUITS BROKEN WIRES
NO MORE CABINETS
 JUST APPLY FLAT SANDRAGANY OR PLATE GLASS COVERS TO THE FRAMES
A SIZE FOR YOUR SET. PRICE 85c. Each
QUINBY RADIO CONSTRUCTION CO.
 Subway Bldg., 181st Street and St. Nicholas Avenue
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"The best I ever spent \$65 on"



CROSLLEY MODEL X-J
THAT'S the unanimous opinion of owners of the Crosley Model X-J Radio Receiver. It is the last word in radio efficiency at a price within the reach of all.
 Local interference can be easily tuned out and far distant stations quickly and clearly heard.
 This 4-tube set, combining one stage of tuned radio frequency amplification, detector and two stages of audio frequency amplification, is the best radio receiver ever offered for consistent performance.
 Listen in on a Crosley Model X-J for real enjoyment. Then go to any good dealer and purchase this unequalled instrument for just \$65.
 Free Catalog on Request.
Crosley Manufacturing Co.
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Radio of Excellence
PARAGON
 Type RB 2A, \$125.00
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 AMPERITES 1.10
 MYERS HI-MU Vacuum Tubes 4.35
 Service That Is Certain
RADIO & MECHANICAL TRADING CORP.
 23 Warren St. New York City

WD-11 and WD-12 TUBES REPAIRED
 WD-11 or WD-12, \$9.50 C-302 or UV-202, \$9.50
 O-300 or UV-200, 2.75 C-301A or UV-201A, 3.00
 O-301 or UV-201, 3.00 DV-6 or DV-6A, 3.00
 C-200 or UV-199 3.00
 All tubes guaranteed to work like new.
 Mail Orders Given Prompt Attention
 "24 Hour Service"
RADIO TUBE CORPORATION
 70 HALSEY STREET, NEWARK, N. J.
 TUBES SENT PARCEL POST, C. O. D.

STANDARD ELECTRICAL DICTIONARY—By Prof. T. O'Connor Sloane. Just issued an entirely new edition brought up to date and greatly enlarged. Price, \$5.00. The Columbia Press, 1400 Broadway, New York.

RADIO CONSTRUCTOR plans make set building EASY!
2 Most Popular Circuits
 (Just off the Press.)
 Blue Prints showing Full Size Templates for drilling panel, wiring connections and complete instructions.
 Neutralized Receiver (Embodying Neutrodyne Principle), 3-Tube Cockaday 25c each
 The Radio Constructor hailed by experts as the Book of Wonder, is used by everyone in constructing their sets. It contains full size templates for drilling panel, wiring connections and complete instructions of 7 Popular Circuits. Get your copy today. If your dealer cannot supply you, mail us his address. 50c
 S. Newman Publisher
THE RADIO CONSTRUCTOR
 74 Day Street, New York

An Absolute Guarantee with every instrument made them famous!
SHAMROCK
 (FOR SELECTIVE TUNING)
180° Vario-Coupler
 list price, **\$3.50 each**
DOUBLE DUTY PIG-TAIL Variometer
SHAMROCK MFG. CO.
 316 W. Market St. Newark N. J.



For best reception you need



The Goodman

The nicest short wave tuner on the market. Great for present broadcasts, local and DX. Used in all parts of the world. Certificate of merit from testing laboratories. Pamphlet on request.

L. W. GOODMAN, Mfr., Drexel Hill, Pa.

"RADIO WORLD" SAVES MR. CRONT \$42.00

POPULAR SCIENCE MONTHLY, one of the important American monthly magazines, offered a number of prizes to those of their readers turning in the best letters telling why the Classified Adv. Dept. interested them. The second prize was won by John S. Cront, San Francisco, Calif. His letter runs as follows:

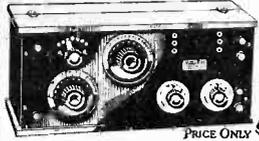
"Others are making money by reading this department, and thus learning what to buy, how to buy it, and what to pay for it.

"I found an advertisement of RADIO WORLD. From this Radio Magazine I obtained exact technical information unobtainable and unpublished in other periodicals for many months.

"This information meant \$42 cash in my hand.

"This Section is primarily, in my opinion, a distinct service to readers; and, secondarily, an excellent market place for goods and service.

"JOHN S. CRONT."



MIRACO GETS 'EM FROM COAST TO COAST

PRICE ONLY \$29.50

At rock-bottom prices you get the efficiency of sets costing three times as much. Users tell us that Miraco Radio frequency receivers pick up stations from coast to coast. Operate either on dry cells or storage battery. Solid mahogany cabinets—finest workmanship throughout. Order direct or send for bulletin.

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WRITE FOR OUR MONTHLY RADIO BARGAIN SHEET

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MORE THAN A LOUD SPEAKER

Bristol Audiophone, Sr., 15-in. Horn...\$32.50
Bristol Audiophone, Jr., 11-in. Horn...\$22.50
Bristol Single Stage Power Amplifier...\$25.00

Write for Bulletin 3006-W

The Bristol Company
Waterbury, Conn.

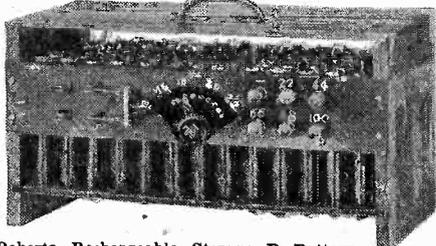
For Maximum Amplification Without Distortion and Tube Noises use the well known

Como Duplex Transformers
Push-Pull
Send for literature

COMO APPARATUS COMPANY
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Get a REAL "B" Battery One with Power—Rechargeable

Roberts Rechargeable "B" Battery
LASTS A LIFETIME



Roberts Rechargeable Storage B Battery.

A swing of the Switch Levers gives instant voltage, changes on detector and amplifying tubes. No change of wiring necessary. Only three (3) main terminals to connect.

Type A—100 volts with variable detector from 16-22 volts, \$20.50.
Type B—100 volts with variable detector from 16-22 volts, and variable voltage from 44-100 volts for amplifier, \$23.50.
Type C—140 volts with variable detector from 16-22 volts, \$26.50.
Type D—140 volts with variable detector from 16-22 volts, and variable voltage from 44-140 volts for amplifier, \$30.00.

Batteries can be obtained from the following dealers:

Brooklyn Radio Service, 573 Myrtle Ave., Smith and Livingston Sts., B'klyn, 17 John St., N. Y. C.
Romco Battery Co., 146 W. 68th St., N. Y. C.
Matthews, Conroy Storage Battery Co., 147 East 75th Street, New York City
Auto Electric Store B. & S. Co., 201 Paterson Street, Paterson, N. J.
Stephens Radio Supplies, 6-8 Nassau Road, Roosevelt, L. I. or direct from

W. Roberts Storage B Battery Co.
1120 Myrtle Ave., Brooklyn, N. Y.
Tel. Pulaski 2023. Open till 9 P. M.
Dealers write for Terms. Mail Orders Filled.

YOU DON'T NEED TUBES

to hear concerts from out of town. If you want to get new stations

ON YOUR CRYSTAL SET

write me today. I get new records every day from people using my plans who hear programs on Crystal from stations 400 TO 1000 MILES AWAY

No tubes, batteries or amplifying apparatus necessary. I hear KDKA (Pittsburgh Pa.) on Galena. You may already have everything you need and just have it connected up wrong. Send self-addressed envelope for picture of my set, and reasons why you need my plans.

LEON LAMBERT
562 South Volusia, Wichita, Kan.

"Shenandoah" Breaks Away from Mooring

THE navy's great dirigible "Shenandoah" was torn from her mooring mast at Lakehurst, N. J., during a violent wind storm on January 16 and was driven about by the gale for eight hours before she again gained the mooring mast. She had 22 men aboard and was under control at all times. Her radio equipment kept her hangar informed of her movements. All broadcasting stations were closed down so as to give "clear air" for the "Shenandoah's" messages during her wild trip.

PATENTS

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Send sketch or model and description, for advice as to cost, search through prior United States patents, etc. Preliminary advice gladly furnished without charge.

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Use Our Card Catalog Directory in use now with over 200 Radio Manufacturers and Jobbers

Your ENVELOPES ADDRESSED At \$2.50 per 1,000

Write for Particulars

Sydell's Radio Trade Directory
410 W. 31st St., New York, Chickering 9840

DO YOU WANT TO BUY, SELL OR EXCHANGE RADIO OR OTHER GOODS? TRY THIS DEPARTMENT AT 5c A WORD

RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS

FREE RADIO CRYSTALS! To introduce my "3-E" SUPER SENSITIVE DETECTOR CRYSTALS, I will mail you a sample crystal for 3 cents in stamps to cover postage and packing. J. T. PIERCE, 4171 Woodlawn Avenue, Los Angeles, Calif.

MARVELOUS mixture renews old batteries. Cheap, easily made, save money. 25c silver. Bornkey-RW. Lock Box 617, BURNHAM, Pa.

DETECTIVES NEEDED EVERYWHERE. Excellent positions, cities, towns. Particulars free. Captain Wagner, 188 East 79th St., New York.

PATENTS—SEND DRAWING OR MODEL FOR EXAMINATION AND OPINION. Booklet free. Watson E. Coleman, Patent Lawyer, 644 G St., Washington, D. C.

WE WANT YOU

As our representative in your local town. A small investment will start you into a radio business of your own. Easy instructions for assembling. Large profits. Write at once to RAY-DEE-ART-CRAFT INSTRUMENT CO., REDLANDS, CAL.

EVERY RADIO OWNER needs our TRANS-CONTINENTAL 1/2 inch PURE COPPER RIBBON AERIAL. Doubles Range and Volume. 75 feet \$2.75. United Sales Company, Aberdeen, So. Dak.

MAGNAVOX R3 or M1—Latest nationally advertised reproducers. List, \$35. Introductory, \$25. The factory sealed carton is your guarantee. RADIO CENTRAL, Dept. W., Abilene, Kans.

CRAM'S RADIO BROADCASTING MAP of the UNITED STATES AND CANADA. Scale 100 miles to the inch. In two colors, size 34x28. Printed on high-grade map paper, up-to-the-minute information, indicating all amateur and standard broadcasting stations, with complete index to stations. 35c postpaid. The Columbia Print, 1493 Broadway, New York City.

BARGAINS—Kennedy Intermediate tuner and detector, 3,000-meter wave length, used three months; perfect condition; \$113.00. New UV201 tubes, \$3.95. Two Willard storage B batteries, used about one month, \$5.00 each. N. W. HILL, HUNTINGDON, PA.

\$100.00 a week to agents. Box 732, New Britain, Conn.

Pocket Radio Sets for Police

WESTCHESTER COUNTY, N. Y., plans to use Station WRW, Tarrytown, N. Y., to broadcast police information and bulletins to officers on post. Motorcycles will be equipped with receiving sets and a portable receiver for each patrolman is said to be in process of development.

Radio at the Big Political Conventions

THE National Republican Convention to nominate a candidate for President of the United States will be held at Cleveland, Ohio. The proceedings will be broadcast by radio and \$25,000 has been offered by one of the broadcasting stations for the privilege.

The National Democratic Convention will be held at Madison Square Garden, New York City. A well known sports promoter has agreed to pay \$55,000 for the moving picture and radio broadcasting privileges.

Ballads Are Still Popular

THE broadcasting managers and announcers of WJAZ were enabled to get a pretty fair consensus of opinion as to just what type of song was most popular with the fans, when Mme. Irene Pavloska, who sang at the station, was appealed to for an encore.

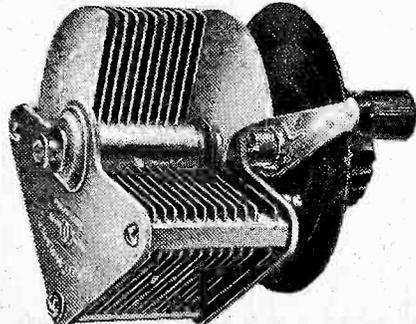
Messages came in from all parts of the United States and Canada. An analysis of the vote showed that although there were many requests for classical numbers, the majority wanted love songs.

Which indicates that although on the face of it people like jazz, they prefer the old heart throbbers when they can ask for them without revealing their names.

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LOUD SPEAKER, \$9.50
Complete—Ready for Immediate Use
Delivered Anywhere in the U. S. A. A Marvelous Speaker for the price of a headset.
Dealers and Jobbers Write for Discounts.
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Don't Ask for Rheostat—Say
FIL-KO-STAT
FOR REAL FILAMENT CONTROL



Knob and Lever Vernier Control. Max. Min. Ratio 23 Plate Vernier 60-1. Price \$3.50 with knob and lever but not a dial.

Thank You!
"I read about a dozen different radio publications, but I want to say RADIO WORLD tops them all and is the real top-notch of radio publications. Everything is concise and so explained that it does not require an engineer to understand the hook-ups published and also because if RADIO WORLD hasn't published it—it hasn't happened yet."—E. E. Gibboney, Everett, Pa.

Cockaday Coil Set \$2.50
Including full size blue prints of panel layout, complete picture hookup, and fully illustrated instructions for construction and operation.
Coils are fully assembled, made exactly as specified by Mr. Cockaday, D coil bank wound. Far more efficient than any home-made coils.
Standard parts for this sensational circuit—panel, coils, condensers, verniers, variable resistance, vernier, rheostat, socket, double jack, dials, switch, contact points, posts, busbar, wire, spaghetti, etc. (no tubes or phones).
Complete for \$11.65
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Complete 5 Tube Neutrodyne Parts for Freed-Eisman or Fada \$75.00.
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FROM WHOLESALE DIRECT TO YOU
Rebuild or Remodel Your Set at the Lowest Possible Cost.
Free on Request—Handy
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Scale 100 miles to the inch
In two colors—Size 34x28"
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UP-TO-THE-MINUTE INFORMATION
INDICATING ALL AMATEUR AND STANDARD BROADCASTING STATIONS
WITH COMPLETE INDEX OF STATIONS
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Baldwin Type C, Double	7.95
Western Electric	9.95
Ambassador	3.50
Diamond	3.00
Dr. Seibt, 6,000 ohm (German)	5.75

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Federal No. 65	\$5.50
Jefferson, 3-1 and 6-1 Ratio	2.85
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All-American, All Ratio	3.95
Modern Push-Pull, per set	11.00
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Neutrodyne Parts (genuine, guaranteed parts) for 5 tube set, complete \$32.50
Write us as to what you need and let us surprise you with our low prices. Send Money Order, or pay the Postman. Money Back if not Satisfied. Postage paid on all orders over \$5.00.
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Our prices are the lowest on all standard sets and apparatus. If you wish to buy an article which is not listed below, ask us for our price. We pay postage and express on all purchases, and give our guarantee of satisfaction, in addition to that of the manufacturer. All apparatus and sets are brand new.

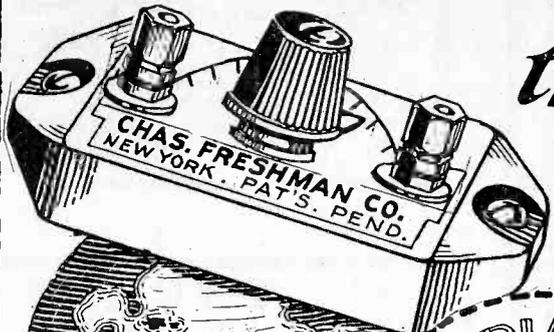
List	Our Price
\$35.00 Magnavox R-3, M-1. Music Master 2 1/2" horn	\$28.00
25.00 Trinity Loud speaker (See ad in Radio World)	20.00
65.00 Cresley Model X-J, "Better, Costs less."	55.00
6.50 Tubes, U.V.199, U.V.201A, W.D.11, W.D.12	5.50

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Biltmore Set Outfits contain complete parts for all kinds of sets. Drilled panel, directions, etc. Everything complete ready to assemble and wire. Save money and avoid disappointments and delay by buying everything at the same time. If the set you wish to build is not listed below, write us.

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- Neutrodyne. Five tube. Save \$105—Make your own neutrodyne... 45.00
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- Superdyne. Four tube. The set just described in Radio World. Results equal those obtained on an eight tube super-heterodyne... 38.00
- Major Armstrong's Radio Flivver. Two tube. This set is the most powerful ever made. In actual tests, using only a loop, this set has given greater volume than a regenerative set using an outdoor antenna, three stages of audio frequency amplification, and three stages of power amplification. It is slightly harder to operate than an ordinary set, but it is well worth any little trouble encountered at first... 25.00

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"The Standard Unit for Every Tube Set"

EVERY tube and every circuit require a different grid leak resistance. The method employed in the Freshman Variable Grid Leak permits you to adjust your circuit to any resistance you wish, from 0 to 10 Megohms in an unbroken range of 180 degrees.

The Freshman Variable Grid Leak and Condenser combined, takes the place of a grid condenser, leak mounting and grid

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ORIGINAL VARIABLE GRID LEAK

Ask your dealer or write for our free diagrams of Neurodyne, Tri-Flex, Kaufman and other good circuits.

Either Base or Panel Type Complete with .00025 or .0005 MF. Freshman Condenser.....

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Either type without Condenser.... 75c

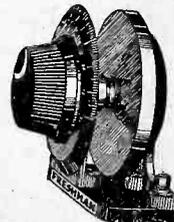
At your dealers, otherwise send purchase price and you will be supplied without further charge.



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GRID LEAK

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