

THE

September, 1923

# RADIO RECORD

ILLUSTRATED

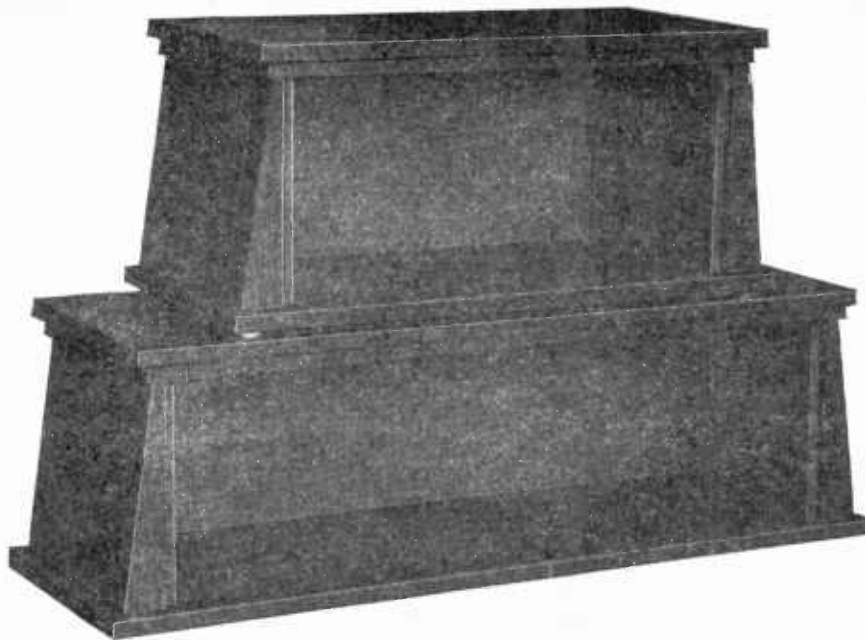
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20  
CENTS



Follies Girls "Listen In"  
on Fire Escape Between Acts





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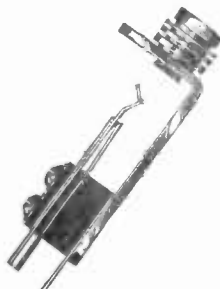
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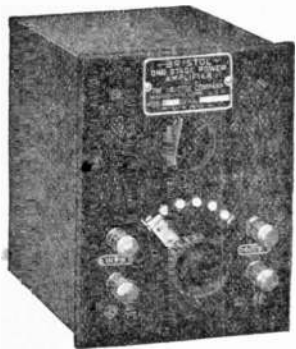
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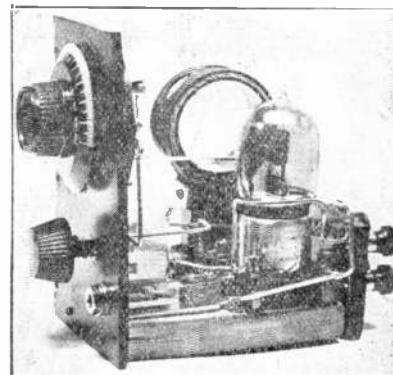
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With tube and one pair of headphones.. \$30



**Commercial Radio Company**

61 So. 4th Street

Minneapolis

# THE RADIO RECORD

ILLUSTRATED

VOLUME I

MINNEAPOLIS, MINN., SEPTEMBER, 1923

NUMBER 4

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### WITH THE EDITOR

**O**RIGINALITY is a wonderful trait. Every now and then some of us break out with real original ideas. Radio offers wonderful opportunities, even inducements, to display originality. But just as sure as anything worth having is worth fighting and working for, the man or woman, who originates must think, plan and work.

Some time ago this magazine announced a cash prize of fifty dollars to the person submitting a new title which would be preferable to The Radio Record Illustrated, that would more adequately name such a publication as this, properly describe it, and at the same time produce for it an air of distinction and individuality such as it deserves. The replies seemed to indicate a lack of study of the matter—lack of originality.

From now on you will be thinking and talking Radio eagerly again. People are jumping into the game enthusiastically. Dealers everywhere sense the change. Radio is here to stay. The Radio Record Illustrated will grow with it. Put on your thinking cap and perhaps you can figure out the name that will fill the bill.

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Stories, articles, drawings, photos, etc., pertaining to radio and radio problems welcomed. Address such communications to the Editor. The publishers waive all responsibility for statements, opinions or partisan expressions contained herein.

## Radio Record Publishing Company

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## These Three Instructive Radio Books FREE

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**How To Make Radio-Phone Receiving Sets.** This is a non-technical book for the beginner. It gives complete constructional data on the building of a complete crystal Detector, tuning coils, loose coupler, and single audion tube set with amplifier units. It furnishes all dimensions and working drawings of every part that must be constructed by the amateur. Written in language that any one can understand. It gives complete descriptions of the theory of Radio and tells what it is all about, teaching the principles of wireless so that the constructor knows what he is doing. 48 pages, 26 illustrations, bound in beautiful two-color cover.

**How To Tune Your Radio Set.** This book, by Muhleman, covers in comprehensive form the fundamental principles of tuning. The characteristics and means of propagation of radi waves described and illustrated so the non-technical reader can easily understand the identical actions as applied to radio. Chapters are devoted to the use and functions of tuning coils, etc. The tuning of non-regenerative sets is explained. Regeneration is explained, followed by instructions for tuning regenerative sets. The book describes how to tune such sets as Reinartz, Flewelling, Neutrodyne, and radio frequency amplifier receivers.

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- “One Hundred Radio Hookups.”
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- “How to Make Radio-phone Receiving Sets.”

# Success of the Summer Brings Radio Back with Renewed Vim and Vigor

By H. S. Williams

WELL here we are another summer almost at our backs. It has been a great season in many ways. Radioally it has far exceeded all expectations and hopes. We all heard the loud laments last spring regarding summer radio. It was going to die absolutely, possibly without rebirth. What a surprise—what a surprise! Already it has blossomed out anew with added vim and vigor. Why? Simply because it has never died.

To review some of the radio experiences of the summer let us drop back a few months. In the early spring the majority of the people naturally became restless due to the backward spring and long winter. Radio had been their chief indoor pastime all winter long so it was not surprising that they turned to other forms of amusement and entertainment. In addition to this natural trend there was the talk by so-called "experts" of the shortcomings of radio during the hot months. It was the public's first attempt so it was no more than natural that this unfortunately incessant propaganda should have its effect. The past three months, however, have brought things out in their own true light.

The greatest chance in receiving conditions came when the listeners were entirely unaware of it. This happened in the latter part of March and April. When summer came with its static a great many people gave up without even trying. Conditions did not change nearly as much as anticipated and from actual experiences there were very few nights throughout the entire summer when some station or other could not be heard.

WDAP of Chicago, KSD of St. Louis, WOAW of Omaha, — of Kansas City, WOC of Davenport, WEAJ of New York City, WLAG of Minneapolis, and countless others were readable throughout the entire summer even on the one tube sets. Warm weather has no effect whatsoever on the quality of the transmitted broadcasts so in most every case the music or voices could be amplified sufficiently so as to be put on a loud speaker.

In the month of July the writer had the pleasure of listening to any of several concerts from points as far away as a thousand miles, the same being amplified sufficiently with an ordinary two step amplifier as to be audible several hundred feet from a small loud speaker. This surely speaks well for summer reception.

Then there was the portable phase of the summer radio set. Many people were under the impression that portable sets were merely

an experiment, but results have exploded this belief. From actual trips in which a radio set was taken along the percentage of failure was very small. An insulated wire thrown up into a tree and connected to the set gave wonderful results, distances as great as a thousand miles being obtained easily. A wire from the top of the automobile to a nearby tree and but a few feet from the ground was always reliable. The concerts received in this way were really wonderful and had it not been for the radio set many a night would have been extremely tame and slow, to say nothing of the valuable information often received via the portable set.

A practical example of this latter fact was born out in the death of President Harding. Stations all over the country hurled the news to millions of shocked citizens. Immediately upon its receipt in Chicago the message was broadcast from the Board of Trade station WDAP. Several days later reports came in from all parts of the United States and Canada informing the station that had it not been for the radio the news would not have been received for a matter of 12 or 14 hours and longer. This was especially true in the outlying districts where all means of communication is cut off when the sun goes down and the local telegraph operator goes off duty. Countless letters were received from this one incident which goes to prove that summer radio is practical.

And now with the coming of crisp fall weather, cool nights when the old fireplace is lit up and started going to take the chill off the air, radio will come back even stronger than the millions ever dreamed of. There are several reasons for this.

First, there is the big fact that radio survived the summer and actually proved successful. Second, the natural tendency for people to revert back to it for want of something to do during the winter. Third, its value and worth in the matter of education and culture. Finally, the recent improvements in broadcasting and receiving equipment and the excellent programs planned have elevated radio to a position from which it can not be shaken.

The foregoing goes to prove that man is ever advancing, ever seeking to better himself, constantly taking advantage of nature's opportunities. We look forward with pleasure to the time when radio will become one of the necessities of everyday life as it surely will, when schools, colleges, and even governments will be conducted solely by the use of radio. Radio is here to stay. Talk it, boost it, USE IT.



# Radio in Hospital Life is New Triumph

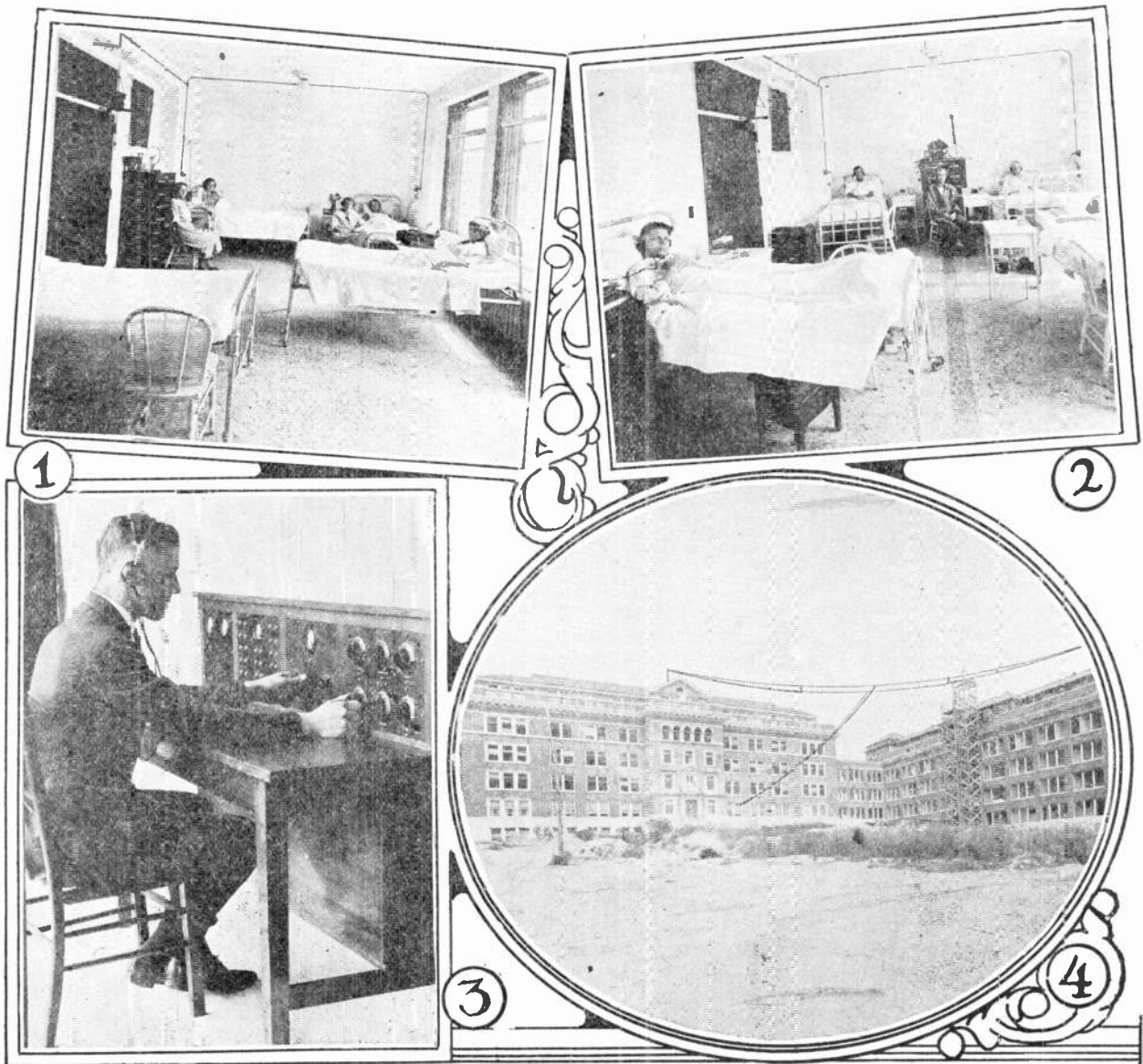
Installation of 458-Phone Receiving Set in Glen Lake Sanatorium at Minneapolis, Minn., is Notable Achievement—Patients Become Eager Fans—Recovery Aided

**R**ADIO as a cure for tuberculosis! It sounds far-fetched, 'tis true, but—Radio as a valuable aid in the cure of that dread disease already is an established fact. Isolated cases where Radio is helping lift the burden of sick and suf-

fering are many, of course, but now comes a practical demonstration of its tremendous curative influence on a broad scale. Scientists point out that in the treatment of tuberculosis one of the first requisites is a radical change in mode of living characterized by

abundant rest. The state of mind of the patient, thus compelled to spend an abnormal amount of time in bed or at ease, becomes a serious factor. Worry or "brooding" over one's condition does not tend to hasten recovery nor is lying in bed con-

ducive of great change of scenery or thoughts. Enter radio with its endless program of entertainment and amusement radiating sunshine and encouragement to the very bed of the patient. With head 'phones clamped



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Scientists point out that in the treatment of tuberculosis one of the first requisites is a radical change in mode of living characterized by

1. View of one of Women's rooms at Glen Lake Sanatorium.
2. Patients in Men's room "listening in."
3. The "Switchboard."
4. The antenna. Another wing corresponding to one shown at right also is under construction at left. The entire institution is radio-equipped.

on the man or woman, boy or girl hears music, lectures, stories and whatnot from North, South, East and West—a variety of subjects to his or her choosing—lifting the minds from the more immediate troubles and steadily but surely aiding in the building up of a morale



the better enabling the patient to face, meet and defeat the assailant.

Less than ten miles from the City of Minneapolis, Minnesota, is located Glen Lake Sanatorium, an institution which when new additions now under construction are completed, will represent an investment of some \$2,500,000. Its capacity will be 458 beds—all radio equipped—a plug and set of headphones for each patient to "listen in" as and wherever he or she sees fit to.

Installation of this 458 phone system marks a great achievement, a new triumph for radio. It is believed to be the first of such proportions ever attempted. Without previous experience or precedent, therefore, the accomplishment stands out as a glowing tribute to those who had the courage to tackle the venture and the perseverance to carry it through to a successful conclusion.

Today Radio is considered next to indispensable at Glen Lake Sanatorium. To attempt to accurately estimate its beneficial effect upon patients would be impossible but the fact remains, Dr. Ernest Marriette, superintendent, told Radio Record, that the patients' minds are turned from themselves and their own conditions, for hours every day, to happier, brighter thoughts from the outside world. It affords them a form of amusement and entertainment admirably suited to their condition. It is always at their bedside, except during rest periods when quiet prevails throughout the institution. And it is always with longing that they lay aside the phones when 9 P. M. comes and the set is closed down for the night. Nine o'clock is the "lights out" hour for all.

But the real story "back of it," so to speak, is almost equally replete with human interest. Certainly it marks a tremendously forward step in Radio development and should not go unchronicled. The idea of the Radio system at Glen Lake Sanatorium was conceived within the institution. Perhaps it was an application of the old adage about necessity being the mother of invention because individual sets had become so numerous that the forty-odd Radio owners—some patients had private sets before—could hardly identify their respective aeriols. Common interference was "tame" as compared to the interference resulting from the mass of wires strung around the buildings. Radio had made its impression. Its value already was appreciated. But the sanatorium was without funds to install complete equipment. The Minneapolis Journal was appealed to and soon a public subscription campaign was under way. Information offered by

Minneapolis radio companies which had been appealed to for data and to bid on the job, revealed the fact that approximately \$7,000 would be needed, and in less than five days it had been donated by the people of the Northwest.

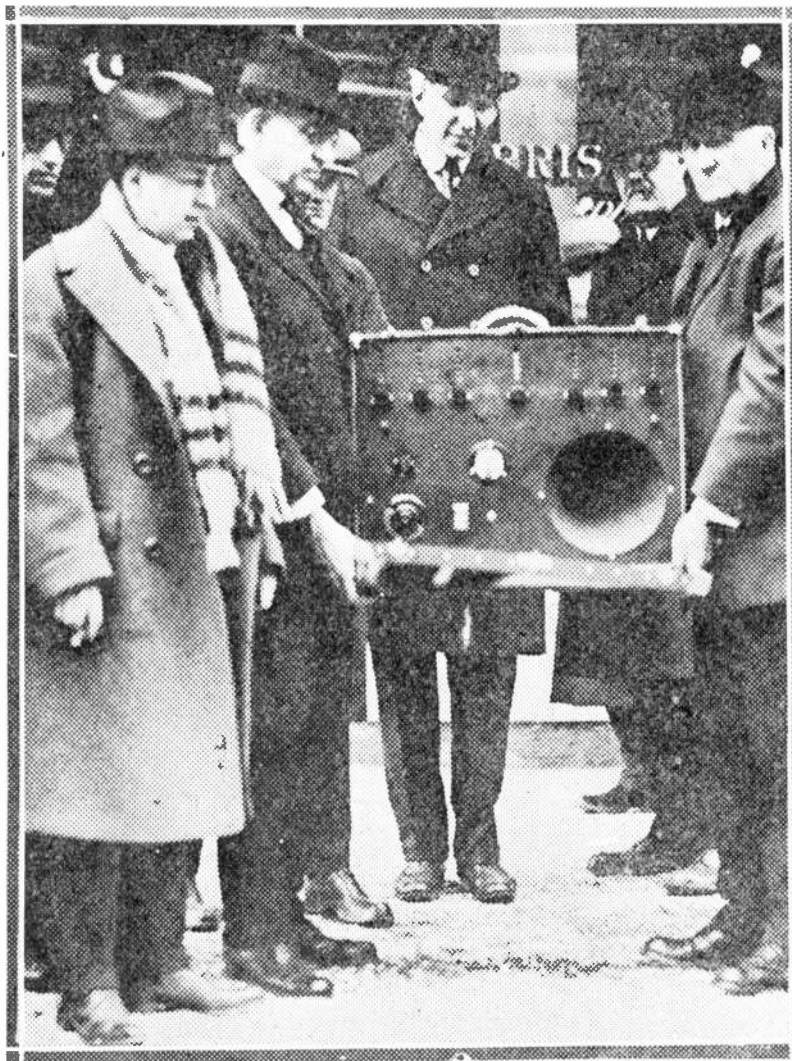
Then came the huge task of installing the system, a "job" which fell to the lot of the Findley Electric Company of Minneapolis, the successful bidder. Engineers had been busy designing the most effective equipment possible, based, of course, upon the particular requirements of building, location and so forth. Thoughtful study and much experimenting finally produced the novel plan by which it has become possible to reproduce at every bedside in every room in the hospital, programs from near and far. In addition to this, by the installation of a microphone and control panel, local reproduction from an especially prepared room in the hospital was made possible.

The size of the undertaking necessitated the design of very special equipment. The receiving set itself is of radio frequency, two circuit type, made by the American Radio & Research Corporation, and an additional power amplifier is used for the individual headsets which are connected in small groups and are brought by many individual circuits to the control panel where Improved Anti-Capacity Radio jacks are located for each circuit, enabling the operator to test the reproduction in each circuit in the battery controls and facilities for testing and charging both the A and B batteries. A separate panel is provided for the modulation control of the microphone circuit and great care is given to the metering and modulation of this circuit making wonderful results possible in the reproduction of local concerts.

When the installation of this "set"

(Continued on page 24)

## The Latest Wrinkle for Traveling



This set literally "picks 'em out of the air." It has neither aerial nor ground. It is the invention of Stewart C. Whitman (left) of Minneapolis.



# Answering the Question of Development

## Leading Manufacturers' Replies to Radio Record Survey Show Most Notable Advancement to Be Application of Time Tried Merchandising Principles to Youthful Radio Industry

**W**HAT do you expect by way of developments in the radio industry for this fall? In the answer to this question, put to leading manufacturers of radio sets and apparatus by Radio Record, they seem to be of very much the same opinion according to the letters which were received. Perhaps the outstanding development, summarizing the expressions of these manufacturers, will be in the application of time tried merchandising principals to the new industry.

It was only a short time ago that radio came under the head of a "fad." It was the main topic of conversation everywhere and the chief concern of the owner was the fact that his neighbor was "getting Honolulu" when the best he could do was Los Angeles. It became a free-for-all contest for distance and every conceivable means of boosting the distance was applied at the sacrifice of clearness and purity of tone value. Broadcasting, too, was just hitting its stride and had settled down to making broadcasting a serious business in full realization of the potential greatness within its power.

The fan, however, has been quick to see that his receiver was not an auto horn, but a musical instrument capable of bringing the entertainment world to his door, not in squeals, squawks and scratches, but in pure tones of full volume. He relaxed in his desire to "get the North Pole" and settled down to bringing in nearer points clearly rather than distant points loudly and unsatisfactorily. In this connection, we quote from J. E. Coombes' letter (Thorcarson Electric Mfg. Co.):

"That practice was the yesterday of radio, however, and with the dawn of a new season we are finding a more desirable reaction from this 'noise-some pestilence.'

"In our relationship with the greater manufacturers of receiving sets we are pleased to have witnessed a persistent and untiring effort in testing integral parts and constructing their apparatus so as to obtain the most perfect tone quality possible, even though it might mean a slight sacrifice in volume. In almost every instance these manufacturers have specified a lower ratio in their amplifying transformer than they have been using heretofore.

"The attitude of these manufacturers of sets is a clear forerunner of the attitude of the man who 'builds his own,' and are we far wrong in predicting that the contest this fall will

not be who can make the most noise, but who can make the best musical instrument?"

It was also questioned as to what the general interest would be and how it would compare with last year at this time. Again the opinion was almost universal. The reasons given were, mainly, that broadcasting had reached a much higher plane and that the programs broadcast would be of a better quality. This was substantiated in letters received by Radio Record from many stations throughout the country. The reason of lesser importance was through their belief that fans, even though they had temporarily abandoned the time spent with their sets, their interest would

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### It's Here to Stay

**I**F you're a Radio fan you know how you've been "rarin' to go" lately. Well, other folks are just the same—and manufacturers are one jump ahead of you all. Don't worry about Radio not being here to stay. It's only getting started.

---

again pick up as soon as the summer weather and the attendant outdoor activities subsided. In fact, emphasis was laid on the point that the "carried-over" interest was so much greater this year than it was last, that there was an impetus already which was beginning to be felt by many manufacturers in the demand for their products.

What will be the developments along financial lines and the matter of partial payments? And the answer was: "What did the automobile, phonograph and many other industries do?" In other words, in the plan of merchandising, dealers as well as manufacturers are going in for partial payment plans which will meet with instant success. Too many to count are the fans who have to be content with crystal sets or inexpensive tube outfits because they cannot afford to pay out the amount of a large set. It is within their ability to pay a certain amount down and the balance in monthly payments and

dealers will find a spontaneous response in this method of merchandising. When it is realized that 95 per cent of the automobiles, vacuum cleaners, washing machines and phonographs are purchased on the time payment plan, it is not hard to see the natural course for radio sets.

"Confidence in manufacturers and a strong guarantee of service," quoting H. T. Melhuish, assistant sales manager of the Radio Corporation, "will be a marked demand this fall and winter. There will be an increased demand for all types of radio receivers and the buying public is rapidly becoming discriminating and is less inclined to class radio broadcast receivers as toys. The cabinet models are becoming particularly desirable to the increasing number of discriminating buyers. It is expected that this fall and winter season will show a marked increase in demand for types of radio receivers in which all batteries and loud speakers are made a part of the entire receiving unit, and all enclosed in a well designed mahogany cabinet.

"The demand for radiotron tubes will undoubtedly surpass any demand heretofore known or conceived. The principal demand will be for the dry battery radiotrons, UV-199, WD-11 and WD-12 tubes, but there will also be a heavy demand for the radiotron UV-201A.

"The radio receiver is rapidly replacing other types of music reproducers and musical instruments in many sections of the country. This is natural, due to the feeling of personal contact which the radio receiver inspires, because the broadcast listener is hearing an actual reproduction of entertainment being carried on.

"Probably the best advice that can be given to any radio dealer would be: First, to stock an ample supply of radiotrons to meet the early fall demand; second, to become aggressive in his sales methods rather than to wait for business to come into the store; third, to make his store as attractive as possible so that women would enjoy coming in and looking over his merchandise. When his store is so arranged, women should be invited to come in, but it must be remembered that they are not interested in parts and accessories, not in viewing shelves full of receivers, nor in hearing technical explanations. They have but two principal interests to which the dealers must cater, and these are the appearance of the receiver and the simplicity of its operation. In comparison with these two, the price of the receiver is a minor factor.

"The seasonableness of radio is caused more by the mental attitude of the trade than by any actual seasonable nature for broadcast reception. In localities where there is good broadcasting, there should be no occasion for 'an off season.'

"In the past, radio receivers have been sold in large quantities, principally because the public demanded them, but the time is rapidly approaching when active and aggressive merchandizing must be carried on by the radio dealer, if he is to survive. The public will not always demand receivers in such quantities, and the time is nearing when the dealer who does not use aggressive selling methods will be required to seek some other line of business or else be satisfied to do a modest parts business at a small profit.

"Just as soon as the radio trade

overcomes the idea of the reasonable nature of radio business in centers where broadcasting is being conducted, the reasonable nature of the business will disappear."

Undoubtedly it will be some time before radio travels along a standardized, even tenor. It cannot do otherwise until experimenters and manufacturers reach the stage of near-perfection in their sets and apparatus. It is noticeable, however, that simplicity of operation and standardization, wherever possible, has been followed in the endeavor to bring the in-

dustry to a point where the purchaser can have confidence that his up-to-date set of today will not be obsolete tomorrow. This factor has held back many a purchaser and, unfortunately, is a period through which the industry must travel. It is felt that developments have come to a point now where this hindrance will prove to be but a minor influence and that the right kind of propaganda, backed by the power of honest advertising and honest merchandising, can accomplish the end to which we are striving.

## New Triumph for Radio Through Visualizing Current Events With Words and Music

By R. H. G. Mathews, WJAZ, Chicago

THE story of the first attempt of a broadcasting station to visualize by means of music and spoken word a current event of large significance—in this case the final tribute paid President Harding in the City of Washington—is one of intense human interest to fans and non-fans alike. It is dramatic. It marks a new epoch in broadcasting.

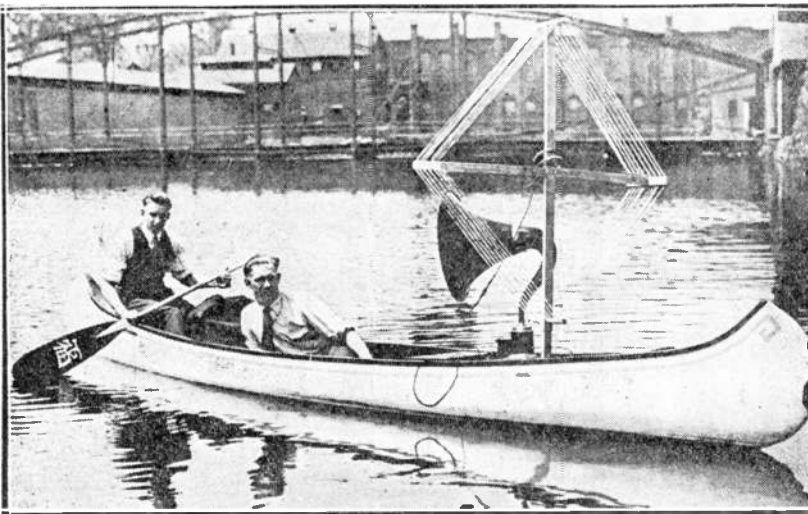
The listeners of WJAZ—the Zenith-Edgewater Beach Hotel Broadcasting Station, Chicago—were carried in imagination to the starting point of the funeral cortege and accompanied the sorrowful procession step by step up Pennsylvania Avenue, now to the tune of "Abide With Me," again to children's voices singing

"Nearer My God to Thee," again to the inspiring strains of "Onward Christian Soldiers," the impressive "Chopin's Funeral March," Harding's favorite "Lead, Kindly Light," and so on up the wide stairs of the Capitol Building. Then as strong male voices sang "Lead Kindly Light," the coffin mantled in the Red, White, and Blue was placed on the catafalque in the rotunda. The brief and impressive funeral services followed concluded by the sounding of taps.

When the procession got under way the bells of St. John's Episcopal Church began to toll "Nearer My God to Thee," and continued until Rev. J. Freeman Anderson's voice was lifted in prayer. "Nearer My

God to Thee," played by the church chimes, fell on the ears of the mourners loud and clear at first, fainter and fainter as the procession neared the Capitol—the key-note as it were of the pathetic spectacle.

All this passed before the mental vision of the listeners with the aid of the word pictures painted by N. A. Fegen. Introductory words of the program were spoken by E. F. McDonald, Jr., the narrative by Mr. Fegen and the invocation by Rev. J. Freeman Anderson. The station was literally submerged with enthusiastic comments on the effectiveness of this program. To some people it was so realistic as to provoke tears.



Many Such Outfits Graced America's Lakes this Summer

### "Wouff-Hong"

Initiation of candidates into the "Royal Order of Wouff-Hong" will be one of the principal features of the "night of mystery" at the second American Radio Relay League national convention, to be conducted in Chicago under the auspices of the Chicago Radio Traffic Association, September 12 to 14.

The order of the mysterious "Wouff-Hong" has become an institution in amateur radio and its membership is spreading rapidly over the entire country wherever there are radio men. One story has it that the "Wouff-Hong" is a mythical instrument used to eliminate interference by annihilation of those who are overzealous in their use of the ether.

One of the problems to be met and solved at the convention will be the elimination of interference caused by those amateurs who spend too much time in the ether with inconsequential messages.

### RADIO FANS RIDICULE STORIES OF GREAT "WAR WAVE"

"All poppycock" is the way radio engineers refer to stories from Germany of a mysterious radio wave developed by scientists as a new weapon of offense and defense, powerful enough to force airplanes into sudden landings and stop magneto driven automobiles. The tale has attracted wide attention among radio fans, who had heard of a "wave" which stopped 20 magneto driven automobiles on their way from Berlin to Hamburg, and forced five French commercial airplanes to land. The planes, under the treaty of Versailles, were confiscated, according to the story, and it was said that the Germans were developing the wave to strike back at the French, whose planes were flying above German territory. It even was said that the interallied commission had traced the waves to the powerful station at Nauen.



# “WHB,” Kansas City, “The Heart of America”

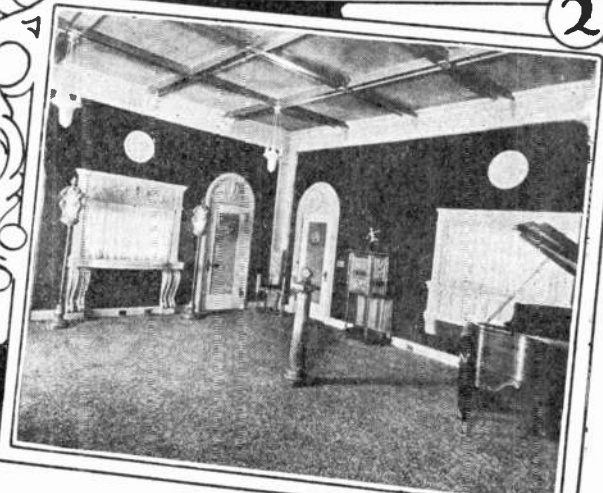
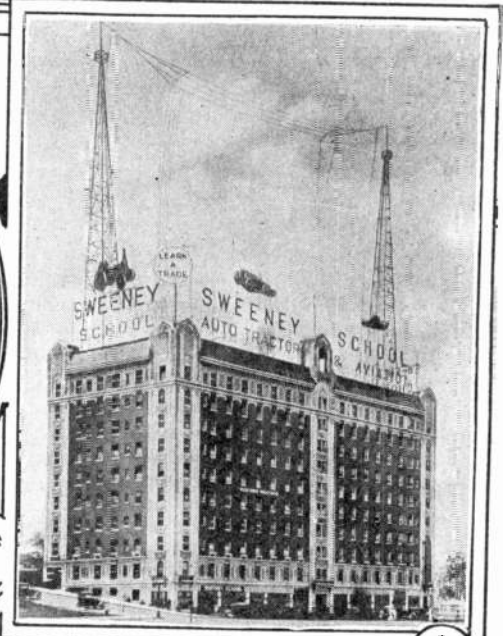
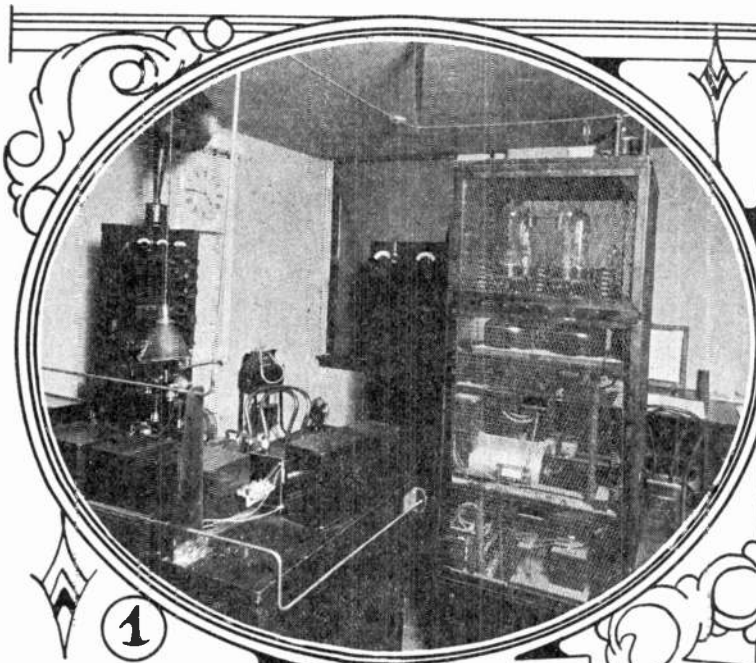
Sweeney School's Station Represents Last Word in Modern Broadcasting—  
Every Day Crammed With News and Music—Many New  
Features Promised During Fall and Winter

**C**HILE, Hawaiian Islands, Alaska, Nova Scotia, Cuba, Porto Rico, Balboa Canal Zone—they all know WHB of Kansas City, Mo., “The Heart of America.” For more than eighteen months now this station has been pounding out daily

than a dozen times during the day followed by weather and road reports at 3 p. m., popular musical program from 12:40 to 1, popular and classical program from 2 to 3, educational program from 7 to 7:30 and then, Sunday, Tuesday and Thursday

nights, the regular evening program from 8 to 10 o'clock.

A glance at the accompanying photographs of Station WHB speak volumes. It is a high-class station in every sense of the word—and a powerful one at that. It is owned



programs starting with market reports at 8:25 a. m., and continuing three nights a week until the close of its musical programs at 10 p. m. The market reports go out no less

1. The operating room of WHB, Kansas City, Mo.
2. Antenna 305 feet from ground.
3. Reception room.
4. Studio.

and operated by the Sweeney Automotive & Electrical School and the aerial towers high above the school's own building “Just a Step from the Union Depot.” The building itself

is 130 feet high while the towers continue upwards for another 175, making the aerial 305 feet from the ground. A counterpoise 150 feet below the aerial is used.

The unusually attractive studio is located on the tenth floor. It is 20 by 25 feet with a 14-foot ceiling. The walls are lined with three layers of cotton flannel, with a quarter-inch air space between each layer, and then covered with velvet. The color of the velvet on the ceiling is grey and that on the walls a dark warm red. The cornices, columns, frames, door and window casings are finished in Caen stone effect. The reception

room resembles a Japanese garden.

The set is a standard Western Electric 500 watt transmitter and splendid long distance records have been achieved. Best results, of course, were secured during last winter but excellent results also have been obtained during the summer. Soon the station's daily schedule will be speeded up again to meet the greater needs of the fans during the fall and winter. "Arrangements have already been made," John T. Schilling, operator-announcer, informs Radio Record, "to broadcast either from the studio or from ten outside sources which include the

Convention Hall, various theatres, Indian Village and churches. Also, negotiations have been completed with an orchestra for the broadcasting of winter concerts, which we believe will give the highest class music in the country. This orchestra is known as the Sweeney Radio Orchestra and is on the payroll of the school."

#### Defective Plumbing

"I've come to fix that old tub in the kitchen."

"Oh, mamma! Here's the doctor to see the cook!"—Harvard Lampoon.

## KLX Promises Many Treats With New Outfit

SOME time in October Station KLX at Oakland, Cal., will come on the air with a standard improved 500-watt Western Electric transmitter and an antenna 300 feet above the ground, suspended between the Oakland Tribune's new 22-story building and the Oakland Bank building. Its wave probably will be 509 meters. It will be "on" every evening, beginning at 7 o'clock. Between 7:30 and 8 is the DX period there. At 8 o'clock on Mondays, Wednesdays and Fridays, it will give two-hour programs, also special broadcasts during the afternoon and once a week between 11 and midnight. Instrumental and

vocal will predominate with broadcasting from both the studio and remote control. The remote control will be portable so that the station can take advantage of any and all special events worth broadcasting.

The present station has been heard consistently in Pennsylvania, Alaska, Northern Mexico, and the entire Pacific Coast region. It is owned by the Oakland Tribune and Preston D. Allen is the engineer in charge with an assistant operator and Seth T. Bailey as announcer and program manager.

"Where Rail and Water Meet," is the slogan KLX uses in signing off, with a marine bell and steamboat

whistle following. The signature has created no end of comment. "Our special features," Mr. Bailey informs Radio Record, "have been and will continue to be the broadcasting of the best that reaches this part of the coast in the way of opera singers, soloists on instrumental pieces and the best local talent obtainable. Our new station will be one of the most up-to-date in the country. The set will be a W. E. 500-watter, including the two latest improvements by the W. E. engineers, namely the new microphones and the device for improving quality and eliminating harmonics."

## "Distinctive Station" to be Title of WBZ

STATION WBZ, Springfield, Mass., is now making elaborate plans for fall and winter broadcasting which will make it one of the distinctive stations in the East. It is on the air Monday, Wednesday and Friday nights from 6 until 7, dinner concert; 7, baseball scores, agricultural information; 7:45, addresses by prominent men; 8, baseball scores; 8:15 to 9:30, musical concert.

Some of the features which WBZ will broadcast are a series of lectures on "The Art of Story Writing," community cooking, courses in psychology, economics, and English literature, etiquette, speeches from banquets, and many other features. Broadcasting is accomplished from the Hotel Kimball Studio, four miles from the radio station, which is located at the Westinghouse Plant at East Springfield; banquets from the Kimball Hotel and recitals in the municipal auditorium, municipal chime in the Campanile and church services will be broadcast. The station is owned by the Westing-

house Electric Company. Chief operator, H. E. Hiller.

The apparatus being used was formerly that of Westinghouse Station WJZ in Newark, which was heard consistently in Europe last winter. This fall it is expected to establish new long distance records, far exceeding its old mark of 3,000 miles.

### Radio Works a Miracle; Makes Deaf Hear

The first sounds ever heard by Harriet Hallring, aged ten, of Newark, N. Y., came to her over the Radio. Harriet had been learning lip reading in the Newark schools for six years and was thought by teachers and physicians alike to be totally deaf. When she playfully adjusted the receiver of the Radio set to her ear and heard for the first time the sound of a human voice she became so terrified that she threw off the head set in terror. Then fright gave way to curiosity and she became fascinated with the sound although she was unable to

distinguish words. Physicians declare she may be able to learn to talk through the use of the Radio.

#### Shocks by Wireless

At Clichy-Levallois, a suburb of Paris, some electricians received severe shocks from touching a large mass of stored telegraph wires not connected with any system. An investigation showed that the shocks were caused by Hertzian waves sent out from the great wireless station on the Eiffel tower, a few miles distant. By a curious accident the group of wires happened to present all the conditions of height, distance and position essential to receiving communications from the Eiffel tower.—Washington Star.

#### New Brandes Factory Open

The Brandes Products Corporation, of Newark, N. J., has started production at its new plant. The corporation, only recently incorporated with capital stock of \$250,000, to operate as the manufacturing division for C. Brandes, Inc., 37 Lafayette Street, New York, N. Y.



# Building the Set for the Beginner

Standard Circuits Recommended Over So-Called "Trick" Circuits by Man Who Has Been "Through The Mill"—Two-Variometer Hook-Up His Choice for Real Novice

By N. Williams

**A**BOUT six months ago one of those hard luck spells hit my shack and I blew two brand new 50-watt tubes at a clip. Closing my eyes I saw sixty dollars flying away on a pair of wings. Of course it was no more for that night—so I just went to bed to try and dope out a way of getting new tubes. The next day, fortunately, one of my friends asked me to make a set for him. Of course, I wanted to make the best, so I built a plate and grid variometer set. It worked great until my friend got hold of it. I had

1. Use only the best apparatus which is not always the most costly. It is cheaper in the long run.

2. Simplify as much as possible without sacrificing efficiency.

3. Never run leads to grid and plate near and parallel to each other.

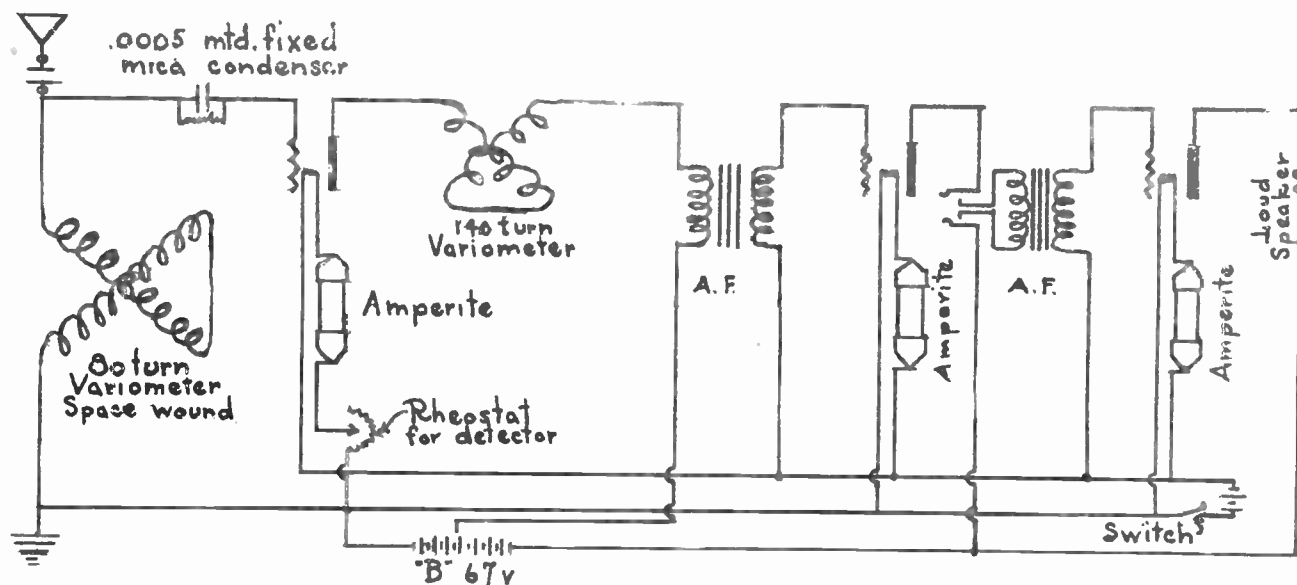
4. Wire neatly and solder wherever possible.

5. Don't use unnecessary parts.

The hookup is shown in the accompanying diagram. You will notice that the two variometers do not have the same number of turns. The tuning variometer has but eight

which are hardly used and which can be easily done away with?

The rheostats became very perplexing with the introduction of the new tubes. In several cases I had to tear out the rheostats and put new ones in because a party wanted to use a UV-201-A or UV-199 tube. The number of new tubes with their varying filament currents and voltages has caused quite a havoc in the set situation. Over night people have found their sets improperly equipped or the new tubes which require 20 and 30 ohm rheostats. A



to go over to show him how to use it every night for a week and he still found it hard tuning it.

I changed my mind right then and there about the kind of a set for the beginner. I have made a good many sets since, and have had absolutely no more trouble with them. After experimenting with various circuits, I finally decided on a two variometer hookup as the most simple and yet efficient set. Fortunately, not one of the sets refused to operate properly at the first attempt. That is due not only to the simplicity of the hookup itself but to a few simple rules which I have laid down for myself as law. They are:

turns, while the plate variometer has 140 turns. In order to get sharp tuning it is quite necessary that the tuning variometer has as little capacity as possible. This can be obtained by space winding the rotor and stator. The Radial Single Circuit Tuner is built along this line and therefore works as an ideal single circuit variometer.

You will notice that only one jack is used, the loud speaker being connected directly to the second tube output by fahnstock clips. Head phones can always be used in the first stage, and the loud speaker is practically always used on the second stage. In other words, why design a set with a good many parts

good many people want to replace a burned out tube with a UV-199 in order to require recharging of A battery less often. This requires a sixty ohm rheostat. When making a set the question arises—what rheostat shall I buy? When a new and better tube comes in the market, what rheostat will that require?

Due to this peculiar condition in the tube situation I turned my attention toward amperite—the automatic filament current adjuster. The principle on which this device operates is rather singular and therefore interesting. In fact I spent a great deal of time searching out the facts of this little ingenious device. It con-

*Continued on Page 29*

# Laboratory Tests Reveal Valuable Data

Exhaustive Experiments Conducted During Summer Months—Aerial Declared To Be Heart of Receiving Set—Results of Laboratory Work Offered to Radio World for First Time

By Calvin K. Kattler, M. E.

**E**ARLY in the spring of 1923 an officer of the Dispatch Printing Company of St. Paul, Minn., who by the way is quite a fan, conceived the idea of establishing a laboratory for the investigation of radio principles and the testing of the various apparatus for reception, at quite a benefit to the firms' customers besides being of general interest to all. A laboratory was established and it was my particular good luck or fortune to be placed in charge of the work. Testing began the earlier part of May.

Preliminary work consumed some time. First there was the question of a suitable location, then the obtaining of necessary apparatus, classification of different phases of the experimental work, and so on. This attended to the work got under way and right in the heat of the summer. The results of those experiments, therefore, are of unusual interest.

First came the question of aeri-als. Many kinds and types were used and in spite of what had been said to the contrary and the statements of the various manufacturers as to the accomplishments of their apparatus on most any type or form of aerial, it soon became evident that the aerial circuit was really the heart of the receiving set. By the aerial circuit is meant all of the apparatus included between the aerial supports and the points where the current enters the ground.

With a good aerial circuit the unusual is accomplished. With an average or a poor one the reception is handicapped or entirely unsatisfactory. That no receiving set is better than its aerial became more evident as the work progressed, in fact it was found to be true that in certain cases an excellent aerial might take the place of a step or more of amplification. All of the aerial construction work was such as to give as little resistance to the wave currents as possible. The various types and factors were tried out with the results about as follows:

As to length, the results proved that the best and most efficient depended upon the characteristics of the receiving set provided that it was above a certain minimum. Whereas all of the sets would function on most any aerial real recep-

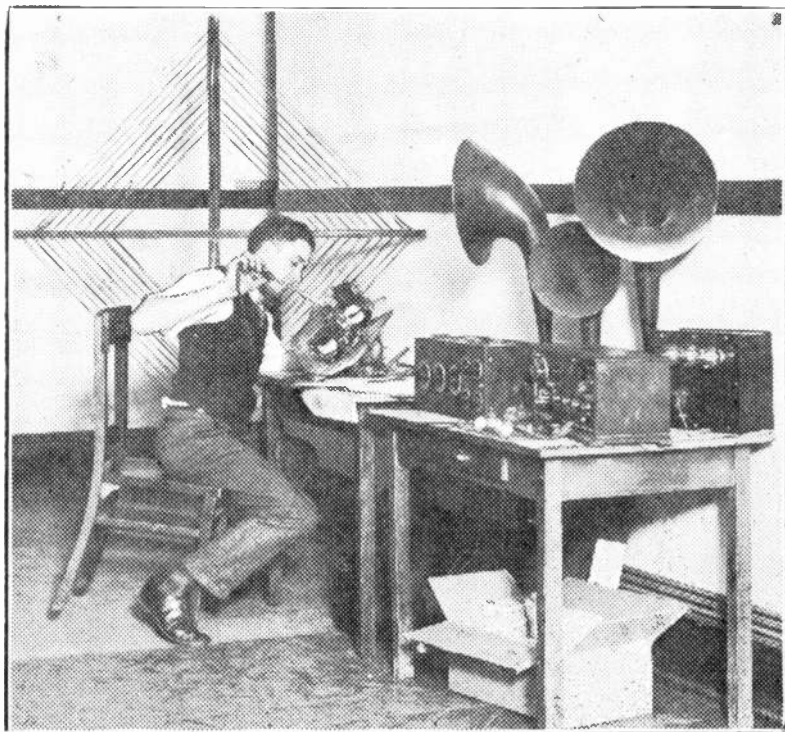
## Many Problems Solved

**T**HE writer of this article put in the whole summer solving Radio problems when others "threw up the sponge." Maybe he has cracked the very nut that has had you "stumped." He too had his problems—what Radio fan has not?—requiring patience and perseverance. You profit by that experience.

tion meant that the best length had to be determined by trial upon the receiver. Even the apparatus and the hookup were no criterion. The best length ran from 80 to 250 feet including the lead-in wire, but not the ground. The latter was a constant for all, merely a 20-foot wire with the ground block on one end and an 8-foot stake driven into the earth at the other. Short aeri-als proved to be more selective than others but there was also a limit

where the short aerial would decrease the signal strength materially. They were necessary only when the set was not selective. For others a length up to 200 feet worked splendidly. Signal strength and the volume proved to be almost proportional to the length in the better class of receivers within the limits given.

The height of the aerial proper, that is, the effective height proved to be even more important than the length for all receivers, even those employing radio frequency. The exact proportion could not be determined but the writer feels safe in saying that the strength and volume is nearly proportional to the square of the height. This may differ some due to other factors but height is the important factor and should be the first consideration in installation. The effect will be plainly marked especially on regenerative sets. The detector does not respond in proportion to the change in voltage but in a much greater degree hence the importance of high aeri-als where the wave is unhampered and unabsorbed



Mr. Kattler at work in a busy corner in the Dispatch Laboratory



by other wires. At a height of 50 or 60 feet the wave is practically unrestricted and true to form whereas at a much lower height it may be partly absorbed and bent back a little out of form because of these resistances.

Particular attention was paid to the type of aerial to determine the effects, if any, upon various factors such as static, selectivity, directional tendencies and so on. Almost every type ever heard of for reception was tried out. Some of the commoner types were the L, T, triangular, V shape, umbrella and, of course, the single wire. Any of those tried would get results but the latter varied considerably. After repeated tests it seemed evident that the plain single wire or V-shape were as effective as any and more so than most of them. These two will suffice for all general purposes, are easily installed and the directional effect will be scarcely noticeable unless the wire is unusually long. Some of the above aerials were more satisfactory in some respects than others but this was usually at the expense of the signal strength.

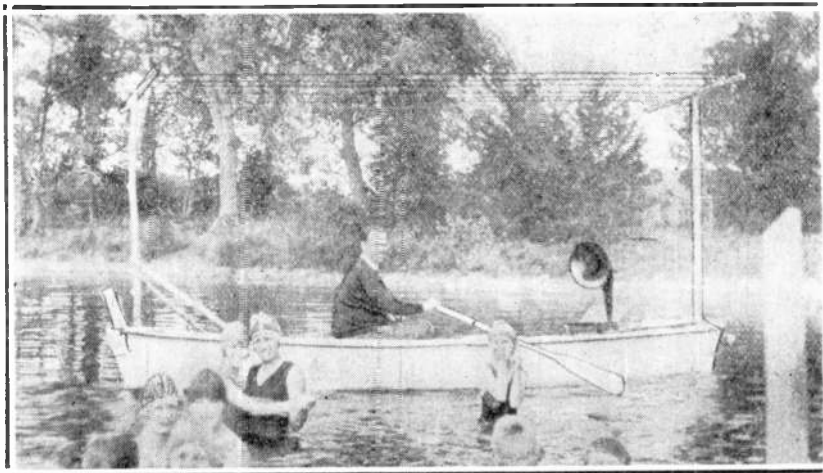
Insulated wires were used exclusively for lead-ins and these were always of No. 14 size. This seemed to be the best size of wire to use for all aerial purposes. Numbers 10 and 12 were used at a decrease in the signals and volume and poorer operation of the sets.

Short and direct lead-ins are desirable to those of any length. A long lead-in wire tends to shorten the effective height of the aerial. The wire should also be kept as far from conductors and other wires as possible.

Many of the sets were operated without the ground connection but this was found to be just as important for satisfactory reception as the aerial. There are several ways of testing the ground connection and one of these was always employed on new installations. Usually the ground in question was made part of the 110-volt lighting circuit and tested. A little care was all that was required. If the lights failed to light up as brilliantly as in the socket the ground was improved or changed.

After considerable experience the writer established the precedent of never placing an aerial or wire of any kind leading into the receiver above or even below power wires whether the latter were being used or not.

The tests upon loops were not as exhaustive as upon the aerials; however, some splendid results were accomplished with the loop used. After some experimenting a loop was adopted consisting of 10 turns of



"Dishing out" the music to bathers at Annandale, Minn. A simple but serviceable receiving set much used this summer at the L. G. Lindsay camp.

No. 18 wire wound spirally and spaced one inch, the outside of the loop being 4 feet on a side. This loop proved to be very effective for all work. Practically no difference between it and the aerials could be determined for local work and it brought in distant stations almost as well as the low aerial. The latter was about 10 feet high. Stations up to 600 miles distant were heard on a loud speaker with but one stage of radio frequency—and this during the summer when good reception was at a minimum. No change was made in any of the receivers to accommodate the loop. A condenser across the loop was discarded, the condensers in the set proving sufficient. Grounding the loop proved to increase the volume of the signals considerably. That is, the receiver was just grounded in the customary way. The loop also proved to have a front and back, the former being the side attached to the grid.

Exhaustive work was done on tubes to determine their characteristics and comparative values. A number of each were tried out so that the results would be accurate. In those of the same make quite a variation in the operation was noted. Some, especially, would prove far better detectors than others. There was also some discrepancy between the various makes as detectors. Many of each of the standard makes of detector tubes were tried. Of these a certain small percentage had to be discarded because they were below the average in sensitivity and not capable of detecting signals. This percentage varied with the make. Those of later manufacture were found to be less critical than formerly, in fact the later ones hardly require any adjustment. However, higher filament current is required to get the usual volume.

Hard tubes proved to be good detectors where the signals were not too weak. Where a strong signal is desired, however, soft tubes are the best by far. Combinations of hard tubes work better in radio frequency receivers than in regenerative sets. The hard tubes also proved to be noiseless in operation as far as the tubes were concerned. The UV-201A and the UV-199 are the writer's choice as amplifiers. Both give splendid results with economical operation. The voltage can be varied anywhere between  $22\frac{1}{2}$  and several hundred with a continual increase in volume. At the higher values, however, the C battery should be added for both makes of the proper voltage, depending upon the B battery voltage used.

The voltage used on the detector tube was variable and depended upon the tube itself. The proper voltage had to be determined by trial. Some would give increased volume up to 45 volts; others would cease to function at all at such values,  $16\frac{1}{2}$  to  $22\frac{1}{2}$  being more nearly correct. Considering the power consumption the results speak very well for the UV-199 dry cell tubes. They proved to have roughly 80% of the volume of the standard 6-volt tube. In fact the writer was a trifle surprised at the splendid properties of these tubes. Unlike the WD-12 they are perfectly stable in operation. Shielding of tubes was found to be of great benefit when several steps of amplification were used. Especially when the tubes were in the field of the tuning apparatus was the effect noticeable. Often times even a poor shield would prevent all tendencies to howl.

Although the receiving sets in the laboratory were legion many were soon eliminated by a process of com-

(Continued on page 30)

# How Many Have You Heard?

A new and original but as yet partial list of leading broadcasting stations, with just the "dope" you want, and compiled from information supplied Radio Record. The list will be "kept up" and enlarged just as fast as stations "report in."

Call	Location	Owner	Wave Length	Announcer	Distance Heard	On the Air
KDZE	Seattle, Wash.	Rhodes Co.	455	Carl E. Raymond, W. E. Jones	.....	Mon., Wed., Fri., 8:30 p. m.
KDYM	San Diego, Cal.	Savoy Theater	280	Bob Johnson	3,000 miles	Mon., Wed., Fri.
KFBC	San Diego, Cal.	W. K. Azbill	278	W. K. Azbill, G. Hicks	2,000 miles	Thurs., Sun., 8 to 9 p. m.
KFFR	Reno, Nev.	Sparks High School	226	Jim Kirk	Oakland, Cal., Salt Lake City	Wed. and Fri. nights.
KFGX	Orange, Tex.	First Presby. Church	250	W. E. and G. Gray	.....	Sun., 8 to 9:15 p. m.
KFJJ	Carrollton, Mo.	Carr Radio Shop	236	E. Hitchcock	Port Arthur, Tex.	Da., ex. Fri. and Sun., 5:15 to 5:45 p. m. Fri., 8 p. m. Sun., 12:30 to 1 p. m.
KFI	Los Angeles, Cal.	Earl C. Anthony, Inc.	469	Ned Lawrence	2,000 miles	Da., 5 to 6, Da. ex. Sat., 8 to 9, Da., 9 to 10, Mon., 10 to 11, Wed., Fri., Sat., 11 to 12.
KLX	Oakland, Cal.	Oakland Tribune	509	Seth T. Bailey	Pa., Alaska, Mexico	Da., 7 to 7:30 p. m., Mon., Wed., Fri., 8 to 10 p. m.
KOP	Detroit, Mich.	Dept. of Police	286	B. D. Fitzgerald	.....	Da., 1 and 6:30 p. m., mostly police and public safety.
KSD	St. Louis, Mo.	St. Louis Post-Dispatch	546	.....	.....	Da., Markets, 8:40 a. m. to 4 p. m. Music, 8 p. m.
KZN	Salt Lake City	Deseret News	360	J. N. Cope	Hong Kong, China	Da., 8 to 9:30 p. m. Wed., Sat., 10 to 12 p. m.
WBZ	Springfield, Mass.	Westinghouse Elec. & Mfg. Co.	337	.....	3,000 miles	Mon., Wed., Fri., 6 to 9:30 p. m.
WBAA	W. Lafayette, Ind.	Purdue Univ.	360	R. V. Achatz, L. W. Franklin	750 miles	Mon. and Fri., 7:15 to 8:15 p. m.
WBAH	Minneapolis, Minn.	Dayton Co.	.....	Alberta Bachman	Pac. and Atl. Coasts	.....
WBAP	Fort Worth, Tex.	F. W. Star-Telegram	G.	C. Arnaux, W. E. Branch, E. L. Olds	5,050 miles	Concerts, 7:30 to 8:30 and 9:30 to 10:45, except Sat. and Sun. Sat., 7 to 7:30, Bible Class.
WBAV	Columbus, Ohio	Erner & Hopkins Co.	390	H. E. Day	Los Angeles	Mon., 7 p. m.
WCAJ	University Place, Neb.	Neb. Wesleyan Univ.	360	J. C. Jensen	New York City	Da., 10:30 a. m., News, 7 p. m., Stories, 8 p. m., Music and Lectures. Thurs., 8 to 9, Sun., 10:30.
WCAS	Minneapolis, Minn.	Dunwoody Institute	216	A. P. Upton	Pac. and Atl. Coasts	Mon., Wed., Fri., 6:30 to 7:15. Mon., 9:30 to 11 p. m.
WCK	St. Louis, Mo.	Stix, Baer & Fuller	360	Helen G. Hatfield	2,000 miles	Da., 12 a. m. to 12:30 p. m., 3 to 5 p. m., Mon., Wed. and Fri., 7 to 8 p. m.
WDAF	Kansas City, Mo.	Kansas City Star	411	Leo Fitzpatrick, John F. Pratt, R. M. Reed	London, Eng. 3 times	Markets and Sports during day. 6 to 7 p. m., Concerts daily, 3:30 to 4:30. Frolic, 11:45 to 1 a. m. Sun., Concert, 4 to 5 p. m.
WDZ	Tuscola, Ill.	Jas. L. Bush	278	Curtis Marsh	150 miles	Grain markets.
WEAF	New York City	Amer. Tele. & Tele. Co.	.....	V. A. Randall, A. V. Lufrio, G. MacNaunc, A. Ropps, H. Hahn	England, France, Hawaii	Tues. and Fri., 11 to 12 a. m., Mon. and Sat., 4 to 5:30 p. m. and 7:30 to 10:00. Sun., 3:30 to 4:30 and 7:30 to 10:00.
WFAM	St. Cloud, Minn.	Daily Times	360	Otto A. Kupp	1,500 miles	Twice a week, 7:30 to 9:00 p. m.
KGG	Portland, Ore.	Hallock & Watson	360	C. H. Watson, J. H. Hallock	3,900 miles	Da., Music, 5 to 6 p. m. News, 7:30 to 8. Wed. and Sun., 9 to 10:00, Musical and Church. Sat., 8 to 10:00 Radio talk.
WGY	Schenectady, N. Y.	Gen. Elec. Co.	380	K. D. Hager, R. Weldaw, C. S. Jester, A. O. Coggeshall, E. H. Smith	Hawaii, Peru, England, Iceland, Ireland	.....
WHAS	Louisville, Ky.	Courier-Journal	400	H. A. Sayer, Fred Harlow	2,600 miles	Da., 4 to 5 p. m., ex. ex. Mon., 7:30 to 9, Sun., 9:57 to 10:40 a. m. and 4 to 5 p. m.
WHB	Kansas City, Mo.	Sweeney A. & E. Sch.	411	J. T. Schilling	Chile, Hawaii, Alaska, N. Scotia	Da., Markets. Music, 12:10 to 1, 2 to 3. Ed., 7:00 to 7:30. Sun., 8 to 10:00 p. m.
WIAO	Milwaukee, Wis.	Sch. of Engineering	360	F. C. Raeth	1,000 miles	Da., 11:30 a. m. to 12 noon, 5 to 6 and 7 to 7:30 p. m.
WIL	Washington, D. C.	Union Trust Co.	350	L. Quaintance	.....	Da. ex. Sun., 5:30 to 6:30 p. m.
WJAX	Cleveland, Ohio	.....	390	E. G. Johnson	Costa Rica	Da., Markets. Concerts Tues. 7:30 and Thurs. 8 p. m.
WLAG	Twin Cities, Minn.	Cutt. & Wash. Ra. Cor.	417	Mrs. E. Poehler, P. Johnson, E. R. Buell	4,332 miles	Da. ex. Sun. nights, 9:30, 10, 10:30, 11:10, 11:30, 1:30, 2:30, 4:30. Household, 10:45 a. m. Children, 5:30 to 6:30. Lecture, 12 noon, 2, 4, 5, 6, 7:30 and 10 p. m. Music, 12:30, 2:35, 8:30. Wed. and Sat., 10:30 to 12 or 1. Sun., 10:30 and 7:45. Mon., 4 p. m.
WMAH	Lincoln, Neb.	General Supply Co.	254	E. C. Nickerson	Australia, Iceland	Mon. and Thurs. 8 p. m.
WNAX	Yankton, S. D.	Dakota Radio App. Co.	236	W. W. Eymmer	.....	Da., 11:30 a. m. and 4 p. m. Wed. and Sat. 9 p. m., concert.
WOAW	Omaha, Neb.	Woodmen of the World	526	Gene Rouse, Lester Palmer	3,470 miles	Da., 9 to 11 p. m., except Wed. Sun. 9 to 11 a. m.
WOC	Davenport, Iowa	Palmer Sch. of Chiropractic	.....	.....	10,000 miles	Concert every night except Tuesday.
WOS	Jefferson City, Mo.	Mo. St. Mktg Bureau	441	J. Melton Witten	5,400 miles	.....
WPAH	Waupaca, Wis.	Wis. Dept. of Markets	360	M. M. Littleton	Alaska, Calif.	Da., 9:30, 10:30, 11:30 a. m., 12:30, 2:30, 4:30 p. m., Markets.
WPAK	Bismarck, N. D.	N. D. Agriculture Col.	360	E. A. Hamilton	1,000 miles	Mon., Wed., Fri., 7:30 to 8:15 p. m., Educational and Sports.
WRAR	David City, Neb.	Radio and Electric Shop	226	W. Baer, Thomas	.....	6:30 to 7:30 p. m., Music.
WSAJ	Grove City, Pa.	Dept. of Physics	360	H. F. Harmon	1,000 miles	Sports and College Entertainments.
WSY	Birmingham, Ala.	Alabama Power Co.	360	"Radio Richard"	3,000 miles	Mon., Wed., Fri. and Sun., Popular, Classical, Religions.
WTAW	College Sta., Tex.	Agri. & Mech. Col. of Texas	254	H. C. Dillingham	N. J. points	Wed. and Fri., 8 to 8:30 p. m. Sun., 11 a. m.
WWJ	Detroit, Mich.	Detroit News	517	.....	4,400 miles	Da., 9:30 a. m. to 12:45 p. m., 4 to 6 p. m., Markets. Concert, 7 to 8:30 or 8:30 to 10 p. m., alternate Tues., 11 to 12 p. m. Sun., Church and 7:30
WQAL	Mattoon, Ill.	C. W. Thompson Co.	258	R. A. Lumpkin	Miami, Denver, North Dakota	Tues. and Thurs., 9 p. m.



## CANADA

CFCK Edmonton, Alta. ....	Radio Supply Co. ....	110 T. Sacker .....	Ohio, Cal., Nev. ....	Da., 8 to 8:45. Sun., 3:30 to 4:30 p. m.
CHAC Halifax, N. S. ....	Ra. Engineers of Can. ....	380 J. A. Martin .....	Cincinnati .....	Da., 7:30 to 9 p. m.
CFCA Toronto, Ont. ....	Star .....	25 O. E. McGillicuddy .....	Los Angeles (2,300) .....	Da., 12:00, 2:30 to 3:30. Music, 5:20 to 6 and 8:45 to 9:45 p. m.
CJCA Edmonton, Alta. ....	Journal .....	50 G. R. A. Rice .....	Tampa, Florida. ....	Da., 12:30. Ev., 7:30 to 8. Concert, 8:30 to 9:30.

## Tales of the Far North Expected from WNP

By D. C. Wallace  
Div. Mgr. for Minnesota A. R. R. L.

THE McMillan expedition is the first Arctic expedition in history which has gone towards the North Pole fully equipped for radio communication. There are some eight members of the party, one of the eight being Donald Mix, the radio operator. Mr. Mix was chosen from among the members of the American Radio Relay League, as being the best fitted for this expedition. An expedition of this nature takes a man of such a disposition that he can live in cramped quarters with the other members of the party for a very long time. The expedition expects to be gone for about 15 months. Mr. Mix is an excellent operator, a thorough experimenter, has been an active American Radio Relay League man for many years, and in the language of the American Radio Relay League officials, was "raring to go."

The set is of 100 watts output, and the antenna is four wires about 20 feet long, between the two masts of the 35 foot schooner Bowdin. The set was manufactured in Chicago, and was tested out on S. Kedzie Ave., Chicago, with an antenna similar to that carried on the Bowdin.

During one night in May, the set was tested out, and communication was established with various other amateur stations from coast to coast. The writer was fortunate enough to be on the air that night, and heard the station, (which used call 9ZN) working various stations. The transmitter was working in fine shape, and dots and dashes came in with an audibility

sufficient to be heard over all the house. Long after daylight signals continued coming in with extreme volume, and communication was established in broad daylight between 9ZT, the writer's station, and 9ZN.

The operator at 9ZN, Mr. Lowe, said during that communication, that as soon as they were through communicating with 9ZT, they were going to pack the set and take it down to Southport, Maine, where it would be installed on the Bowdin. On the last day of May, the set was installed on the Bowdin, and at intervals during the next week or so, WNP (the call of the Bowdin), could be heard throughout the greater portion of the United States, testing and communicating with the various amateur stations. During these tests, the Bowdin used a wave length of around 200 meters, the wave length assigned to amateur stations for use in their experimentations and communications.

Soon after that the expedition started, and on the first night out many stations were communicated with. At 9ZT the signals from the Bowdin were quite strong, but on that night there was so much static that it did not seem advisable to try to establish communication with the Bowdin. The volume of the signals seemed to indicate that reliable communication could be had at all times at even so distant a place as Minnesota. Since then, many sleepless hours have been spent between the hours of midnight and 4 A. M. listening for the Bowdin,

and never has the signal strength been sufficient to carry through on any night that 9ZT was in operation.

Several of the East Coast stations worked them at wide intervals, but recently it was found that as the antenna interfered with the sailing, and the Bowdin uses sail power, so the antenna was only put up for an hour or so once a week, and then being anxious to save all power for use in the Arctic region, very little power was used, and signals were not heard as far west as the Mississippi.

As winter approaches and darkness prevails, and the Bowdin gets up farther north and finally gets frozen in for the winter, communication will be more in order, as then the sails

The transmitter at 9ZT has been allowed to remain up and the first radio equipped Arctic expedition will tell of the happenings of the Far North.

The transmitter at 9ZT has been reported from every state in the Union, and from eleven countries, including Australia and four cities in New Zealand. Communication has been established with practically every active amateur station from coast to coast, and, for example, the west coast was communicated with 47 times during the month of May. This station is in operation on three or four nights each week between the hours of midnight and daybreak, and on some of these nights, it is probable that the Bowdin and 9ZT will be in direct communication for some time.

## Organ Recitals from the Morman Tabernacle

EXTENSIVE improvements now are being made in Station KZN, of The Deseret News, Salt Lake City, Utah, on the completion of which the station will entertain fans throughout the United States, Canada, Alaska, Mexico, and the Hawaiian Islands with extraordinary programs this fall and winter. Among the noteworthy features in store for those "picking up" KZN will be remote control broadcasting of organ recitals from the great Mor-

mon Tabernacle, concerts from one of the largest conservatories in the West, dance music from the Roof Garden of the Hotel Utah, and so forth, to say nothing of the station's own features.

KZN is on the air every evening, except Sunday, from 8 to 9:30 (mountain time) plus special entertainments Wednesdays and Saturdays from 10 to 12 o'clock. Its regular run of programs includes musical selections, addresses by promi-

nent people, sport results, bedtime stories for the children, etc. Its long distance record is Hong Kong, China. It has been heard in most every state, in every province of Canada, the Hawaiian Islands, by ships at sea 4,000 miles from Salt Lake City. J. N. Cope is manager, operator and announcer; Miss Rheva Brown, secretary and program director, and Clyde Nelson, studio instructor.

## Static Ogre Traced to Lair in Mexican Hills

SOME night when the static imp is dancing inside the headphones, and hiss and sputter and rattle cut suddenly into the midst of a fragile violin solo broadcast from some station you are fond of, stop and give a thought to the static ogre of Mexico—and then forget your troubles.

That is the advice broadcast recently from Hartford, Conn., to radio listeners by S. Kruse, technical editor for the American Radio Relay League, who declared that the nation's static has its natural element in the Mexican mountains, and that all the northern states get it the far outer fringe.

"What we get here is very second grade stuff," he said. "In Mexico they have the real thing, and the life of a radio operator on a Gulf steamer or in a shore station is well nigh impossible. The static growls and rumbles and raves and pops.

At one time, the Mexican operators at the old station in Tampico threw their 'phones on the floor and refused to work.

"This does not spoil reception for an evening now and then—it blazes away for six months at a stretch, and during that time the owner of a radio set had better use it for a radio hutch. On a tugboat off the Mexican coast I have heard static crash and bang so that it was totally impossible to hear any sign of a high power station less than 10 miles away. Yet that same station was being heard in Boston at that moment without any trouble.

"A radiophone is simply helpless in that sort of a mess, and communication is accomplished entirely by code. The Mexican government and the United Fruit company and the United States navy have strong stations all around the gulf, and by using high power and repeating they

manage to get traffic through.

"But it certainly is tough on operators, for they have to unravel a signal from a roaring boiler shop effect that is 10 times as loud. At times, they have to repeat each word five times, and if it gets extra loud and an important message must go through they repeat each letter as many as ten times.

"Where does the static come from? No one knows. It starts somewhere in the Mexican mountains—the radio compass proves that—but just where or why no one knows. Neither does any one know why it disappears entirely in the winter and leaves wonderfully perfect conditions to compensate the man who has had the grit to stick. And, finally, no one knows why there are hours in each day when it lets up suddenly and then crashes out again in full volume."

## What Happened at WLAG on Friday the 13th?

It Never Rains But it Pours—"Ops" Have Busy Time Keeping Up With Unlucky Day's Doings

IT WAS Friday the 13th. The ride down to the station in the morning had been entirely uneventful. The sky was clear. Everything was sailing along beautifully. The first market reports are scheduled to go out at 9:30. According to the report of the operator on duty the night before the set was working fine when the station signed off. Naturally no trouble was anticipated and after shifting to the market report wave length of 417 meters the generators were started so as to allow the tubes to warm up.

A couple of fuses up in the attic let go "toot sweet." This being possible they were replaced and the generators started a second time. Then the filament current began to vary considerably. The low voltage meter wobbled all over the scale. The entire circuit was checked and no trouble found. It steadied down after a while and then it was found that the high tension circuit was low. This was brought up and the trouble thought to be cleared.

By this time the reports were due. The change over switch was kicked over but no radiation. Before the

switch could be thrown the plate over-load circuit breaker tripped. This happened several times when a widely fluctuating grid current was discovered. The set was shut down and the whole transmitting unit thoroughly checked. The tubes were taken out of their sockets, cleaned and tried again. No results. The operators were getting desperate about this time when it was noticed that the modulators were drawing only half of their rated current. New tubes were installed but still no results. All the tubes were shifted around but this likewise produced no radiation.

After an hour's work spent in looking and checking over the various units things began to go back to normal. First the grid current came back to almost its true value, and then the filament voltage stopped shimmying. After a little more Chinese persuasion (that's the way you would write it) the radiation meter was moved a little. This gradually climbed and when the station again started modulating the circuit breaker tripped about every other word. This finally stopped and WLAG was finally on the air. All this without any apparent reason or cause. Noth-

ing what so ever was done to the set and apparently nothing had happened. It was simply jinxed due to Friday the 13th. No further trouble was experienced that day nor has it happened since.

This is an interesting and true account of what sometimes happens to radio sets. They come and go without any apparent reason or cause. Furthermore no one seems to know why or when these "freaks" come or go. We would be glad to hear from readers who have similar accidents befall them. Tell us what happened, when, its significance and remedy.

### Will Willie Win?

"Willie," said Mrs. Fan, to their young offspring. "Daddy and I have arranged that he shall give you a dime every time he is caught swearing."

"Gee, that's great!" cried the youngster. Then he added hopefully: "When are you going to tune the radio set, Daddy?"—Radio Digest.

### Radio Alimony

In a divorce case in Kansas the family radio set was awarded by the judge to the wife.



## Modulating System Feature of CFCA, Toronto

THE Toronto (Ont.) Star's station, CFCA, has many interesting features but none more important, perhaps, than its remarkable modulating system. It is the invention of Dr. C. A. Culver, until just recently chief high frequency engineer for the Canadian Independent Telephone Company. "The main feature that distinguishes this system from others now in general use," says CFCA's letter to Radio Record, "is that the ordinary grid-leak, which forms a part of all high frequency circuits, is replaced by one or more vacuum tubes. These tube grid-leaks serve to control the grid current in the oscillation circuit and as a result control the potential of the grid of the oscillators, thus modulating the power out-put of the transmitting tube.

"The voice currents from the pick-up devices, after passing through an amplifier, control the grid-leak cur-

rent which is passed on by the modulator tube, and thus modulate the out-going energy. By this plan of modulation it is possible to control the out-put of a number of power tubes by means of one or two comparatively small tubes. In the so-called "constant-current" or Heising system of modulation, there is required as many modulator tubes as oscillators, and of the same capacity. It will thus be seen that the system used by CFCA is much more economical from the standpoint of tube replacements. Further, in operating this new system, it is not necessary to utilize as many steps of voice current amplification.

"In modulating schemes formerly used, the power tubes, during operation, were subjected to an average overload of 50% and to an instantaneous overload of as high as 400%. Tubes thus overloaded naturally have a shorter life than if they were

working at their normal out-put. As a result of the superior operation of CFCA's modulating system, the total plate energy required to put, for instance, 500 watts of well modulated energy into the antennae is less than 60 per cent of that required by a constant-current system."

The Fall and Winter plans of CFCA, although not completely formulated as yet, will include many special features. The broadcasting of sporting events, both from the studio and from the scene of action, will be stressed. It is altogether likely that more stuff will be sent out by means of remote control than has ever been sent out that way before, although the Star Concert Orchestra of 8 pieces will "carry on" the good work which has been appreciated in the past by so many fans in Canada and the Eastern states.

## Many Features on Greater WLAG Program

BIG medicine" is in the making at WLAG, the Twin Cities station "In the Land of Ten Thousand Lakes." Plans still are in the preliminary stage so no real definite announcements are possible at this time. However, this much is certain, WLAG is going to run a heavy program this fall and winter as will be imagined from a glance at its "On the Air" data in this issue, a schedule which becomes effective this month. Then, since the station now is a Twin Cities station instead of a Minneapolis institution only, there is going to be a St. Paul studio also, from which a certain run of features will be sent out by remote control. And still another feature which it is already possible to announce is the institution of a Sunday afternoon musical program. This latter will be in addition to the morning and evening church services and will supply something for which fans have been clamoring enthusiastically for a long time.

The rest hour goes back to the old time in vogue last winter, namely, from 6:30 to 7:30 p. m., when fans will have an opportunity to listen to distant stations. Lectures and talks are to be more numerous and hence will cover a greater variety of subjects. Plenty of music is assured with full concerts running until 12:30 or 1 a. m. Wednesday and Saturday.

Co-operation of the two cities is, in itself, a fact worthy of more than

passing mention, but still more important to the radio fan's standpoint is the assurance of well rounded out programs. The increased support from St. Paul subscribers has opened the way for this marked extension and development. Certain improvements at the station also have been made to place WLAG in a position second to none in the country. In keeping with this increased service the addition of Earl R. Buell as assistant program director and announcer has been made necessary.

WCAS, Dunwoody Institute, Minneapolis, is now broadcasting on a wave length of 246 meters, instead of 360. With the new wave length, it is believed there will be no interference with other stations at any time.

WBAH, Dayton Company, Minneapolis, also plans new features for the near future.

### RADIO IN THE FAR NORTH

As Robert W. Service said: "Strange things are done in the land of the midnight sun." Today Radio is penetrating that great frozen north with its welcome word and song from the outside world. One of the big stations supplying this service is CJCA at Edmonton, Alta., operated by the Edmonton Journal. Great pride is taken in the work they are doing. This fall it is planned to continue the club meetings of "Igloo Hut." The station

has just been strengthened by the installation of a new 500-watt-out-put transmitter. It is supplied directly from the city 60-cycle 100 Vt. supply and transformed to 10,000 Vts. D. C. by rectifier valves and smoothing circuit. This is said to eliminate "the hum usually accompanying A. C. supply, even on a loud speaker using power tubes for amplification."

### New Thirty-Story Detroit Hotel to be Radio Equipped

Radio service for each of its 1,215 guest rooms will be one of the novel features of the 30-story Book-Cadillac hotel under construction at Detroit. The hotel, to be the tallest transient and commercial hotel in the world and the tallest building in Detroit, will cost \$14,000,000 and will be completed this fall or winter.

### Heard in July by 9ZT

Following are stations over 1,000 miles away heard during July by Minneapolis amateur station 9ZT, operated by D. C. Wallace, 54 Penn Avenue North: 1FK, 1KC, 1ANA, 1BBO, 1CPO, 2BN, 2FP, (2GK), 2QP, 2WR, (2AGB), (2CBW), (2CKL), 2CTO, 2CUI, (2CUR), (3AB), (3BG), 3JJ, 3SU, 3ARP, (3BBV), (3BFU), (3BGJ), 3BVA, (3CHG), (4FG), 4GL, 6KM, (6RM), 6AAK, (6ARB), (6AVN), 6BEO, (6BJQ), 6BNT, 6BVS, (6CBI), 6CGW, 7CF, 7RY, (7AGF).

## Checking Them Up Around the Stations

Contributions to this Department are Invited. Make Them Short and Snappy so Everybody will get a Hearing.

### WMAH TO OPEN OCTOBER 1

The General Supply Company of Lincoln, Neb., advises Radio Record that it will open its new WMAH 500 watt station about October 1. It will be on the air Monday and Thursday evenings at 8 o'clock. Remote control will be used extensively. The station's wave length is 254. It has been heard on the coasts of Australia and Iceland and in every state in the Union. H. C. Harvey is operator and E. C. Nickerson announcer. A vertical antenna is used for transmitting.

### MAY BROADCAST BILLY SUNDAY

While definite arrangements had not been made when this issue went to press it was expected that station WGR at Buffalo, N. Y., would broadcast Billy Sunday October 15. Sunday is to appear there in connection with the W. C. T. U. convention at that time.

### ONLY ONE OF ITS KIND

WGR at Buffalo, up on the roof of the famous Statler Hotel, has the distinction of being the only Federal transmitter in the world. The station is owned and operated by the Federal Telephone & Telegraph Company. All transmitting apparatus is manufactured by the company, but not offered for sale, much less the high-grade condenser microphone designed to go with the set.

### STICKS TO HIGH CLASS STUFF

Continued high grade programs of a musical nature on all of its regular and special schedules during the fall and winter is the good word from WOAW at Omaha, Neb. Do not "look" for the Woodmen Wednesday evenings, that is their silent night.

### FORT WORTH STATION SILENT

Station WPA of the Fort Worth (Tex.) Record is temporarily out of commission.

### MORE POWERFUL EQUIPMENT

WQAL, Mattoon, Ill., operated by C. W. Thompson Company, is going to be heard in every state just as soon as new and more powerful equipment

can be installed. At that time the station's schedule will be increased to include regular market reports. Remote control broadcasting will be used on special occasions.

### "Twin Voice" Announcer Making Records



J. N. CARTIER, the well known "Twin-Voice" of Station CKAC, La Presse, Montreal, Canada, has undertaken the task of making over one hundred gramophone records for a school of correspondence giving French and English lessons with the aid of talking machines. The school officials, in Montreal, were facing a handicap, when it came to find a speaker capable of registering perfect French and English. Several "talkers" were tried and each found lacking the proper voice vibration or other requirements.

The president of the company, a radio fan, who is a listener-in of CKAC, made arrangements with Mr. Cartier and a test record was made. This record was found so good that the entire French and English courses were undertaken. These educational records will sell throughout the Dominion, the United States and Europe.

### DISCONTINUES BROADCASTING

WEAK, at St. Joseph, Mo., announces that it has discontinued broadcasting. No reason is given.

### MILWAUKEE STATION REBUILT

If you haven't heard WIAO of Milwaukee yet then tune in hard on 360 meters and be sure you get it. That's the tip from Frederick C. Raeth, di-

rector-announcer. The station was rebuilt during July and is broadcasting high class programs every day and evening except Wednesday and Saturday nights.

### MOSTLY DANCE MUSIC

WRAR, at David City, Neb., is going to run heavy to dance music this fall and winter. This station is unique in that it was manufactured by the Radio and Electric Shop, which company owns and operates it. It is built in a cabinet on a Formica panel. Remote control will be used for special programs.

### WISCONSIN MARKET SERVICE

The Wisconsin Department of Markets announces resumption of its daily market service over WPAH on September 1. All reports are secured over leased wires at the station at Waupaca and go on the air almost immediately.

### FEATURES RADIO TALKS

KGG, at Portland, Ore., operated by Hallock & Watson, is featuring talks on various phases of radio every Saturday evening from 8 to 8:30 o'clock.

### ST. LOUIS ANNOUNCER AT WLAG

Listeners-in on the program of WLAG, the Twin City station, Saturday, August 18, had many a good laugh over the stories told by Miss Hill, of KSD, St. Louis, who "took the air" during a visit in Minneapolis.

### DAVENPORT CONCERTS AGAIN

The full winter schedule of WOC, Davenport, Iowa, will go into effect again about September 15, featuring a musical program every night except Tuesday.

### WOS CLAIMS TWO RECORDS

Jefferson City, Mo., home of WOS, operated by the Missouri State Marketing Bureau, lays claim to a couple of notable records. First, that Jefferson City is the smallest city in the United States with a Class B radio-telephone station; second, that WOS is the only station in the United States possessing a band and orchestra of its own.



**WHB ENGAGES ORCHESTRA**

Arrangements just completed assure high class music for WHB, Kansas City, Mo., this season. The Sweeney Automotive & Electrical School, owners, announce the engagement of an aggregation of 11 musicians under the name of the Sweeney Radio Orchestra. An addition to WHB's program this winter will be a special Sunday midnight program.

**KEEP GOING IS SLOGAN**

Asked what its plans were for fall and winter WDZ, Tuscola, Ill., flashes back the answer: "To keep going." This station is owned by James L. Bush and broadcasts grain market information every half hour for the benefit of elevator men and farmers.

**FOOTBALL "DOPE" PROMISED**

Football "dope" will be added to the repertoire of WTAW at College Station, Texas, this month. The station is operated by the Agricultural and Mechanical College of Texas. It features educational, industrial and agricultural information.

**"FULL SHOW" FROM SAN DIEGO**

Here's a real "special" from KDYM, at San Diego, Calif., for fans the coming winter. Plans for the winter, it is announced by "Bob" Johnson, announcer, are many and varied. One thing sure is the broadcasting of the full show from the Savoy Theatre, which owns the station. Mr. Johnson adds: "It is believed we are the first broadcasting station in the United States to broadcast from the stage successfully for a period of over one year."

**A MODEL STATION**

Don't grope around in the air for KOG, at Los Angeles. It "ain't no more." Now it's KFI, which station, according to Ned Lawrence, radio editor of the Evening Herald and programmer and announcer, "is looked upon as a model of acoustics and electrical excellence." He goes further and adds: "Our station is built especially for reception with padded walls, ceiling and floor proof from outside interference and echo-less within. Our micrometers are of the most advanced type and our transmission by isolated cable for a mile or more to a central broadcasting station is regarded by electricians as a perfect exemplification of the efficiency of remote control."

**A Tip About Batteries**

It is not advisable to connect old and new plate batteries of the dry cell types in the same circuit.

**TO OPEN BOOKING OFFICE**

The fact that so many persons have been helped in the matter of finding "jobs" through radio has decided CKAC to open a booking office in connection with the studio. J. N. Cartier, manager-announcer, thinks this plan also will be a big service to those seeking entertainers since CKAC has been besieged with requests for entertainers made known through the station.

**Joins Staff of WLAG**

EARL R. BUELL, former Minneapolis newspaper man and verse writer, is WLAG's new acquisition "In the Land of Ten Thousand Lakes." His dual title is assistant program director and announcer.

**QUALITY INSTEAD OF DISTANCE**

KFGX at Orange, Tex., is not after any long distance records but rather aims at good service and good modulation over a certain zone, E. M. Doane writes. "Its 500-watt set is seldom run more than half capacity—120 milliamperes on the plates which is less than 250 watts, but with this we get good radiation and good modulation, at the same time keeping the tubes moderately cool." KFGX is owned by the First Presbyterian church.

**Dying Man "Listens In"**

An aged resident of Trumansburg, N. Y., on his deathbed, listened in with members of his family to a radio sermon delivered by Rev. G. A. Bierdemann, pastor of the Trinity Evangelical Lutheran church of Albany, N. Y.

**RADIO ROLLO**

Rollo ran a radio, or thought he did, at least.

He got his set for Christmas. It was a good set—when he got it. But it went from the store to Rollo, Or from better to worse. It was a Crystal set, And it used a non-skid crystal, And a Real Cat-whisker, gold-tipped. But Rollo busted it very quickly. Trying to find a "point" on the flat crystal.

But it didn't worry Rollo. He had a Tom-cat who had nice long whiskers.

And nice long claws.

But Rollo forgot about the claws.

And tried to get a new cat-whisker from him.

Now Rollo doesn't feel so well.

And the Cat is up the tree.

**TAKES RADIO ON TAPE**

An instrument which, it is said, marks one of the most important advances in wireless telegraphy yet made, is described by its inventor, a Frenchman named Yves Marrec, as eliminating jamming and interference and reducing the cost of wireless messages by at least one-third. The new device receives and prints wireless messages on a tape, something which, it is said, never before has been accomplished.

**TUNE LOW FOR KFJJ**

The wave length of KFJJ at Carrollton, Mo., is only 236, "the place where you occasionally hear amateur stations," says Geo. F. Grossman, operator, in advising fans how to "pick 'em up." He adds further, "the radiated wave is very sharp and must be tuned in carefully."

**Woodrow Wilson Radio Fan**

Woodrow Wilson has had a super-sensitive radio receiving set installed in his home in Washington and is said to spend considerable time listening to the programs from stations in Washington and other cities. "Uncle Joe" Cannon is another statesman who has become a radio fan since his retirement from political life.

**FOOTBALL FROM SCHENECTADY**

If you want to get first hand reports of important intercollegiate football games from the East this Fall tune in for WGY, the General Electric Company's big station at Schenectady, N. Y. Weekly popular radio dramas, comedies and pallophotophone addresses also are among the features promised in addition to WGY's regular run of offerings.

**Big Order from China**

China has contracted with American firms for radio facilities costing \$13,000,000.



Listening to election returns via Radio—a picture typical of many such town-hall scenes throughout rural America today. It is interesting to note, also, that the practice is gaining in popularity. Municipalities, school boards and communities apparently are taking up the idea with marked enthusiasm, promising no end of entertainment this fall and winter.

## Some Radio Terms and What They Mean

A GREAT many of the radio novices of today undoubtedly are mystified, even baffled, by the strange terms and phrases which the more experienced "Bug" uses. Perhaps he has heard some of his better known friends called "Hams" and has wondered just how many "Tubes" they have burned out or how many "Sets" they have ruined to earn this titled distinction.

Along with this, perhaps coming down on the car in the morning, he has heard such terms as "DX," "CUL," "QRX," "OM," "YL," "TICKLER," etc. At lunch one of his friends speaks of his "Batt" going dead or of his set refusing to oscillate while at the office, the office boy complains of his "Catwhiskers" refusing to work, and all such apparent trash.

However, they all have a meaning and while we're in the mood we may as well take the time and help some of the more recently smitten bugs up a wave length or two.

"Ham"—The nickname usually conferred upon one who has had some experience along transmitting lines although of late it is more or less applicable to anyone experimenting with radio. It is in no way a "low brow" title, but rather one of reverence.

"DX"—Applied to long distance receiving.

"CUL"—Used in telegraphy, meaning "See you later."

"QRX"—A n international

radio telegraphic abbreviation, meaning "Stand bye" or "Wait."

"OM"—A telegraphic term meaning "Old Man." For example, "CUL OM" means "See you later, old man."

"HI"—A telegraphic way of laughing. Instead of trying to laugh over the wire, you would reply to a joke with "HI, HI." Where call is used it would be "Dit dit dit dit (pause) dit dit."

"YL"—A ham term meaning "Young Lady."

"TICKLER"—That coil or part of a regenerative tuner used to regenerate or feed back its energy so as to increase the amplification or volume of the receiving set.

"SK"—A term meaning the end or completion of communication.

"QST"—An international abbreviation which, when followed by the call letters of a station, is a general invitation for any one to answer.

### Course in Mathematics

WOR at Newark, N. J., announces a new feature in the form of an educational series entitled "Some Tools of Algebra," to be given by William W. Strader, teacher of mathematics.

### Loud Speakers on Crystal Set

Every "expert" is being besieged to explain how a loud speaker can be attached to a crystal set.

It can't be done! That is, unless the receiving signals are exceptionally loud.

Amplifiers added to crystal

sets often make an excellent combination, but usually the same if not better results can be had by using the tube in a regenerative set alone. This also allows you to secure long distances.

### Interesting Study

In the old days the sensitivity of an audion tube could sometimes be increased by placing a large horse-shoe magnet so that the poles of the magnet were on each side of the tube. This probably affected the electrons flowing from the filament to the plate. The amateur experimenter will find this a good field to investigate as he may hit upon some new idea along this line that will be an improvement upon the present-day vacuum tube.

### Tips to Dealers

Have you made an effort to sell a set to the nearest hotel and to the restaurant nearby? Why not?

Every brokerage office and grain elevator in the land ought to have a radio.

### Boy Is Honored

Leland M. Martinson, nine years old, of Fargo, N. D., was paid the honor of a special concert by the local broadcasting station recently in recognition of his interest in radio work. At the present time he has only a crystal set but it is of exceptional merit. During summer vacation he plans to earn enough money to buy a bigger set for long distance work.



## Questions and Answers

This department is conducted for the benefit of Radio Record readers by the Dunwoody Industrial Institute, Minneapolis, M. R. Bass, Director; A. P. Upton, Instructor.

Mail your questions to Question Editor, Radio Record, 504 Tribune Annex, Minneapolis, Minn. Enclose 2 cent stamp if mailed answer is desired.

*Q. If a battery is run down would signals be weak, fade and be hard to tune?*

*A. Yes, either A or B battery or both in this condition would have these effects.*

*Q. Could a lamp bank and rectifier be used on an A C line to use with V T's?*

*A. Not satisfactorily because of the disturbing hum that would be present without an expensive filter system.*

*Q. Can a Magnavox be used with a two step amplifier?*

*A. Yes, under favorable conditions on reception from the best stations.*

*Q. Can I use a loud speaker on a pickle tube set?*

*A. Usually there is insufficient volume from such a set without amplifiers to operate a loud speaker.*

*Q. Is it necessary to disconnect B battery when filament is turned off?*

*A. No.*

*Q. Why do certain crystals give out in a few days?*

*A. They evidently have become dirty or greasy. Clean them in ether or alcohol to renew their sensitivity.*

*Q. How is sensitive point on crystal found with a buzzer?*

*A. Connect lead from armature or back contact on buzzer to crystal. Start buzzer, then adjust cat whisker until the buzzer is heard in the fones. When crystal is so adjusted, it will pick up signals O. K.*

*Q. Why do signals fade?*

*A. This is caused by atmospheric conditions, swinging aerial, or loose connections.*

*Q. What causes howling in a tube set?*

*A. Incorrect methods of tuning, wrong value of grid leak or defective grid condenser or leak or both. Excessive B battery on detector may also cause this. If amplifier is used, the amplifier tube may be soft, or transformer incorrect for the tubes used, or defective.*

*Q. Why are signals louder when I hold my hand in certain positions near the set?*

*A. This is due to the capacity effect of your body with respect to the set.*

*Q. How can body capacity effects be reduced?*

*A. Mount instruments back from panel 3½ to 5 inches and fasten insulating extension rods on the shafts for control thru the panel. Shielding the rear of the panel will help but unless properly added may cause a decrease in signal strength because of the energy induced therein, which is passing to ground.*

*Q. Is detector B battery connected in any way with the amplifier B battery?*

*A. When the former is used in common with the two tubes, the B batteries are in series.*

*Q. What causes whistling in a tube set?*

*A. Carrier waves of transmitting stations or harmonics thereof, or other receiving sets tuning in.*

## AUSTRALIAN CRYSTALS

(Trade Mark)  
THEY TALK OUT LOUD

FULLY GUARANTEED  
This crystal is new on the market; it has a 90% sensitive surface and is receiving loud and clear up to 50 miles.

**35c**

Dealers Wanted  
At your dealer or direct by mail postpaid  
**RADIO PHONE EXCHANGE**  
1100 W. Broadway Minneapolis, Minn.

## CARTER "TU-WAY" PLUG



Takes 1 to 4 head sets and all types tip terminals; No tools necessary.

**NEW LIST PRICE \$1.00**

We also manufacture:

Carter "HOLD TITE" Jacks—Carter Vernier Reostats—Carter Automatic Reostats  
Carter Resistance Units—Carter Control Switches etc.

Famous for originality of design and tested excellence of workmanship.

**CARTER RADIO CO.**

209 S. State St., Chicago

Minneapolis Sales Office, 217 Kasota Bldg.

# Radio Tuning Chart GIVEN FREE

to every Radio Fan who fills in the blank below, properly

The RADIO RECORD, leaves no stone unturned to give its readers the very latest in Radio news activity among the broadcasting stations—the manufacturers and dealers—so at this time it gives us pleasure to announce that we have arranged to give every person who will properly fill in the blank below and accompany it with a remittance of \$2.00 to pay for a one-year subscription to the Radio Record, a

## Premier Radio Tuning Chart—FREE

Nothing like the Premier Radio Tuning Chart has ever before been offered to our readers.

**ANY SET CAN BE CHARTED—ANYONE CAN FOLLOW THE CLEAR, CONCISE DIRECTIONS**

After tuning in from 4 to 6 stations clearly and charting them, you can locate other stations at the rate of one a minute until you have received all the stations that your set is capable of reaching. After you have heard a station once, you can tune it in again at any time on a moment's notice.

Complete directions, two instruction charts, three blank charts and one scale strip ready for use are included. The introduction and directions are nicely printed in a 5½x8½ 8-page booklet, and are easily understood.

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**MAIL THIS COUPON TODAY**

RADIO RECORD, Date.....1923  
504 Tribune Annex, Minneapolis, Minn.

Gentlemen:

Enclosed find (money order, check) for \$2.00 for which please enter my subscription to the Radio Record for one year from date, and send me FREE the PREMIER RADIO TUNING CHART.

Name .....

St. No. or R. Route.....

City..... State.....

JOBBER AND RETAILERS IN

# RADIO PARTS

Complete Line of Parts  
For REFLEX

REFLEX  
TRANSFORMERS

VARIOCOUPERS

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CONDENSERS

*Hennepin*  
**HARDWARE**  
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Orders Shipped on First Train

1-8 in. Formica Panels Per sq. in. 13-4c  
3-16 in. Formica Panels Per sq. in. 21-2c  
3-16 Hard Rubber Panels Per sq. in. 11-2c  
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No. 14 Tinned Copper Wire Per 100 ft. \$1.00  
No. 16 Tinned Copper Wire Per 100 ft. \$.60  
No. 14 Square Tinned Bus Wire Per 100 ft. \$2.00

Dealers - Write for illustrated catalog No. 4 R

**WESTERN RADIO CORPORATION**

Cedar Rapids, Iowa

## RADIO

Unbreakable Vulco panels

Condensers  
Aluminum Shields  
Any size desired  
Orders promptly filled  
Prices on request

**SERVICE MACH. SHOP**

298 W. University, St. Paul

*Q. Will a loud speaker work on a crystal set?*

A. Usually there is insufficient volume from crystal set to operate a loud speaker.

*Q. Which is better, lead in at center or at end of aerial?*

A. If 90 feet or more, lead in can best be connected to center of aerial. If less than this amount, connect to arc end.

*Q. What is the trouble with a tube set that will not oscillate when B battery is O K?*

A. Voltage may be insufficient on either plate or filament. Tickler may be reversed or of too few turns. Ground connection may be poor.

## Glen Lake Installation

Continued from page 8

was undertaken the main, or what is now called the administration building, already was built and in operation so the wires had to be run in so-called wire moulding, but in the two new wings just being completed all Radio wiring is accorded the same attention and consideration as the electrical wiring. Everything is in regular conduits leaving nothing showing but the neat socket on the wall right beside the electric socket. In the central building the main or feed wires run down the corridors behind the regular moulding near the ceiling with lead-ins to every room which, in turn, branch out to each bed.

But how to get a perfectly balanced circuit, a system that would produce uniform volume at each headset regardless of how many other phones might be in operation! That was just one of the major problems which, as P. B. Ford, one of the Findley company engineers admits, kept them awake nights "figgering" and experimenting. Flocks of phones were scattered all over the company's shop, store and offices during the tests—and the nut was cracked. Now one can walk through the sanatorium, plug in anywhere and get the same volume. This feature has been very favorably commented upon by Frost phone engineers who visited Minneapolis to see the successful operation of so many of their headsets in a single group.

Among the patients in the hospital was one Arnold Hague, a radio expert, and he has been placed in charge of the equipment with the title of chief operator. Morning, afternoon and evening he can be found at the "switchboard" but rest periods find him, like all other patients, at ease, so the set is "dead."

Another great advantage in having

this equipment throughout the sanatorium is that the superintendent or his assistants may talk to all or groups of the patients at one time. What a tremendous advancement! The superintendent has a message for the patients, or perhaps the men folks only, or the social secretary has a story to read them or may be it's a special entertainment or Sunday service from within the building—it matters not—a little plugging around, a few adjustments here and there and the message, music or story is heard in all or such parts of the building as is desired. This marks a very advanced step in hospital operation.

In their eagerness to "listen in" many patients are said to have become real authorities on stock and grain markets. They miss nothing. Market quotations may be "dry" stuff to most people but many of the patients follow the daily reports in minute detail. Everything over the Radio is news from the outside. The lecture periods of stations within range invariably attract large audiences. In fact Radio today has become as much a part of the daily life of Glen Lake Sanatorium as eating and sleeping. It's a wonderful relief from the former chief indoor sport of reading. It's a liberal education, too.

In addition to the main set, the children's building where one hundred children are being cared for, is equipped with a separate D7-A DeForest receiving set, to which four Western Electric loud speakers are connected through an amplifier, making it possible to reproduce local and long distance programs very effectively.

Great credit is due those who were instrumental in making possible this new triumph for Radio, those who so liberally contributed to help others less fortunately situated, those who conducted the campaign and last but far from least the engineers who contrived and constructed the equipment.

They used to say the Western Union is inconvenient. A gent down in Nebraska got by with a collect message by presenting one of those yellow cards Leo down at the Night Hawks passes out.

### MacMillan's Radio Hunch

Captain Donald MacMillan first got his idea of taking radio on his trip northward to the pole at a "duck dinner" given in his honor in Chicago last spring.



### Station's Statement Shows Mass of Detail

**D**ID you ever stop to figure out the volume of "business" transacted by a radio broadcasting station? Probably not. If you had you would have been amazed at the amount of "stuff" handled. It is interesting, as well as enlightening, therefore, to study the statement of CKAC, La Prese. Montreal, Canada, for a nine-months' period.

From September 30, 1922, to July 1, 1923, CKAC gave 231 concerts, 62 recitals and 80 addresses by eminent men and women. 45 Casavant organ recitals on the electric instrument installed within the walls of the studio, besides using the same organ for accompaniment purposes during Sunday's sacred concerts.

#### ITEMIZED HAPPENINGS

- 66 Announcements for the benefit of charitable institutions.
- 18 Clubs organized and special concerts given.
- 600 Kiddies' stories.
- 74 Orchestras entertained the fans.
- 6 Brass bands played.
- 13 Choirs sang.
- 2 Dramas played.
- 2 Comic operas given.
- 250 Government communiques read.
- 2247 Artists performed singly.
- 212 Artists from various local theatres.

The first remote control operated in Montreal by CKAC when New Year's eve cabaret entertainment was broadcast from Hotel Mount Royal.

Over twenty thousand letters have been received.

The advertising derived from the artist's point of view speaks for itself: Eight orchestras found permanent employment through being known via radio, and over one hundred soloists secured engagements.

This station inaugurated the first visit ever paid by a station to another in another country, when a group of French artists from CKAC went and performed at WBZ.

These items, of course, are in addition to the regular broadcast of weather, news bulletins, financial and livestock reports given daily.

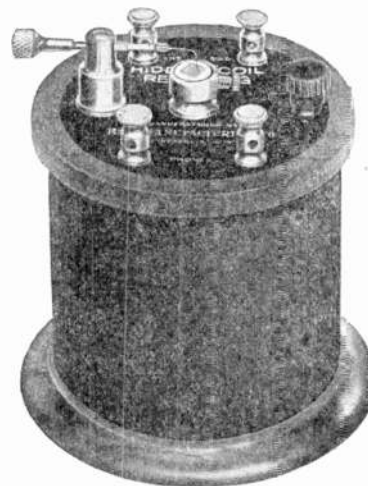
#### Meteors Cause Statics. Radio Expert Suggests

(Science Service Correspondence.) Atmospheric or "static," the nightmare of the radio operator, may be in some cases due to meteorites which, arriving suddenly in the uppermost regions of the atmosphere, cause electric disturbances which herald their coming to radio listeners over half the surface of the earth.

That is the suggestion made by a radio expert at a scientific meeting in England. He was a veteran of the Great War and while listening in on his radiophone noted the resemblance between some of the atmospheric and the swish of a shell passing high overhead. He then thought that the sound might really be due to a little

"dud" of a meteorite with which the earth is bombarded continually from the depths of space, and propounded it as an interesting though possibly "mad" theory. The explanation suggested is that the arriving stranger sets up an electric disturbance which is responsible for the irregular waves known as atmospheric.

## HIDDEN COIL



### CRYSTAL RECEIVING SET

**THE NEW MODEL** is simple, compact and beautiful in design and finish. All metal parts are nicked and highly polished. Wood parts are finished in mahogany and polished to a hand finish. Selective slide tuner; a very efficient receiver.

**SATISFACTION GUARANTEED**

**\$5.00**

*including crystal  
Liberal discounts to  
Dealers and Jobbers.*

**RAO MANUFACTURING COMPANY**  
720 So. Fourth Street  
Minneapolis, Minn.



## BERWICK SUPREME

**2200 Ohms—3000 Ohms**

Close to one hundred thousand now in use, successful and popular—**BECAUSE** they are built as a high grade phone and sell at a low price. They are built to stand the severest test—the **SATISFACTION** of the **ULTIMATE CONSUMER**. Sensitive and powerful.

**Every set individually tested and guaranteed for performance and service to jobber, dealer and consumer. Prompt delivery.**

#### THE EVENING MAIL RADIO INSTITUTE Certificate of Excellence

This is to certify that the Berwick Telephone Headset manufactured by the Triangle Electro Trading Co., has been tested in the Laboratory of The Evening Mail Radio Institute. It has been found that the instrument agrees with the standards set by the Institute. The materials used in its construction are of a quality commensurate with the price, and the design is based upon sound engineering practice.

SEAL

Signed,  
**RAYMOND FRANCES YATES,**  
Director.

## TRIANGLE ELECTRO TRADING CO.

Manufacturers, New York  
Northwestern Sales Office and Warehouse  
**LA SALLE ELECTRIC SUPPLY COMPANY**  
Tribune Annex Bldg., Minneapolis



## LITTLE TATTLER PHONE

**\$4.00**

LIST

*Why Pay More?*

Write for Literature.

**G. C. Kowfeldt & Co.**

527 Marquette Ave.  
Minneapolis, Minn.

*"The home of Radio Bargains"*



**Complete Sets  
Full Line of Parts  
All Standard Makes  
Expert Wiring**

Mail Orders Promptly Filled.

See Our Reflex Systems.

**BLOOMINGTON  
RADIO SHOP**

Downtown store, 111 So. 12th  
Street

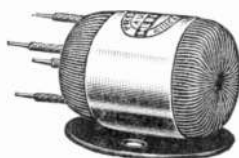
Lakestreet store, 3005 Bloom-  
ington

**Minneapolis Minnesota**

## New Apparatus

### A NEW TRANSFORMER

The Premier Electric Company, Chicago, has brought out a new audio frequency transformer under the name of "Hegehog." It is said to be the smallest, most compact audio frequency transformer yet developed and it is highly efficient. The coil windings, primary and secondary, are automatically wound to the required



number of turns with No. 44 copper wire, then thoroughly impregnated by a special vacuum process to give the highest possible insulation resistance. The core has a definite number of very fine, special alloy silicon wires distributed and bent around the coil so as to completely enclose it, producing a full magnetic field of highest efficiency and making it 100% shielded. It is easily mounted either on the panel or base.

### NEW DRY CELL TUBE

A new De Forest product, manufactured for the O and T Electric Corporation, New York, is the O-T Silvertone Dry Cell Tube. It is a high vacuum flash tube for use as an amplifier or detector on two or three dry cells for the filament or on a storage battery with 20 ohm rheostat in series and on from 20 to 150 volts on plate, the output gradually rising as the plate voltage is increased.

The filament is specially treated tungsten and can be operated at 3 volts, although tube reaches its maximum output at about 4 volts. It is advisable to couple two or three dry cells in series for each tube, as in this manner its maximum output will be reached and the life of the batteries will be prolonged.

The current consumption is extremely low—.15 of an ampere, and the low temperature, together with the simple and rugged construction, insures long life if the tube is properly handled. The rating of the O-T Silvertone tube is: Filament volts, 3 to 4; Filament amperes, .15; plate voltage, 20 to 150. This tube is standard equipment for several of the high grade sets.

### A LOUD CRYSTAL

A new crystal, made by the Radio

Phone Exchange, Minneapolis, under the name of the Australian Crystal, has just been placed on the market after a series of extensive tests. The appearance of the crystal is similar to others but the big advantage lies in two points; first, the surface is sensitive at almost any point, in fact, the makers claim 90%. Second, due to its ingredients, it receives broadcasting clearly and very loudly. A recent test on a local station five miles distant showed it possible with an Australian crystal to tune in the station, place the phones on the table and the music was clearly audible. In some cases it was uncomfortable to keep the phones on both ears. It has been used with good results for reception up to 50 miles with a standard hook up and aerial. It is also specially adaptable to reflex systems.

### NEW MODEL BY RAO COMPANY

The Rao Manufacturing Company, Minneapolis, has brought out a new model in a very compact and efficient crystal set. The set is cylindrical, 4½ inches in diameter by 5 inches high. The coil is hidden and covered with imitation leather. The wood base and top casing are of wood highly polished in mahogany. All posts are plainly marked in white on the jet black top. All metal parts are highly polished nickel and the crystal detector is of a novel design. The set is very effective for short range reception and makes an attractive outfit.

### IMPROVED RADIO JACKS

The new Improved Radio Jacks and Switches are the latest improvements in Radio material that is of genuine interest to the amateur set builder. The Improved Radio Jack



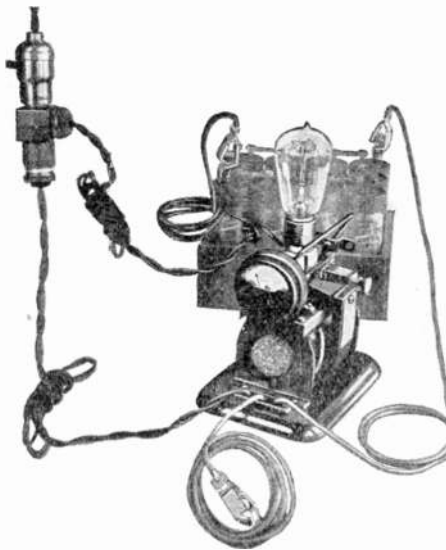
is radically different from the old time telephone jack that is now being used. It takes up very little space in that it is less than one-half the size of the old telephone jack. At the same time the Improved Jack takes any standard phone plug.

The binding post feature eliminates soldering. Amateurs who have



soldered connections to the old style telephone jacks will appreciate the "no soldering" feature of the Improved Jack. The blades of the improved jack are at right angles which shortens the leads resulting in the anti-capacity feature. The shortness of the improved jack enables one to build a more compact set. There is plenty of room behind the jack so that the lamps, transformers or any other parts may be placed close to it and near the panel. Improved Jacks are made especially for Radio use and they save money, time, and labor in assembling a radio set. They are made in five different styles, open circuit, closed circuit, double circuit, double filament control and single filament control.

The France Manufacturing Company of Cleveland has Brought Out a New Charging Attachment



The attachment converts any F-F Battery Charger into an instrument that will charge any "B" Storage Battery of from 24 to 96 volts. The charging rate is varied by use of different sizes of ordinary lamps in accordance with instructions.

No "A" battery is needed to make the F-F Battery Charger and Attachment function. No changing of connections or alterations on Charger are required. There is nothing complicated about Attachment that can get out of order.

**IMPROVED RADIO SWITCH**

Radio Improved Switches are made especially for radio use and save money, time and labor in assembling a radio set. They require

only one hole and no soldering. This includes also the new Improved Detector Amplifier Switch. The A Battery Switch is very handy for an on-and-off the Rheostat, its use saving battery current during intermissions in programs. Many experimentors now are using the double-  
(Continued on page 30)



**OUTING BOOTS**  
Made to your individual measurements. Comfortable as a slipper; firm, waterproof leather that will stand hard service.  
*They smile at all the punishments you can give them. Send for catalog.*  
**OUTING BOOT COMPANY**  
520 W. Lake St., Minneapolis

*FOR YOUR RADIO*

## The BULL DOG MAST SEAT



enables any one to install an aerial mast on the peaked or metal ridge roll type of roof, with the ordinary tools found in every home.

By using this simple and efficient device the customary trouble, labor and expense is eliminated.

No more 2x4, crooked or bent poles, but a trim, rigid mast—one you are proud to show to your friends.

Sockets will accommodate wooden pole or iron pipe.	Price for one inch diam. socket .....
Price for one and one half in. diam hinged type \$3.00	Price for one and one-half inch diam. socket.....
	<b>\$2.00</b>
	<b>2.50</b>

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**Mast Seat Mfg. Co.**  
119 5th St. S. E.  
MINNEAPOLIS

*Jobbers and Distributors Write for Discount*

**MAST SEAT MFG. CO.,**  
119 5th St. S. E., Minneapolis, Minn.  
Gentlemen: Enclosed is \$.....  
send me Mast Seats to cover remittance.

Name .....

Address .....

City .....

*Check, Money Order or Bank Draft*

## NICK'S AUTO PAINT SHOP

*Satisfaction Guaranteed*

**1411 Hennepin Ave. Minneapolis, Minn.**

### CARPRAD AERIAL-LESS RADIO

Why be troubled with interference and static? Do away with that aerial and receive long distance on one ground wire only. Our new self-contained set is now ready to demonstrate. Here is a set with all batteries inside of the cabinet. Simple to operate and exceptionally efficient. These sets come supplied with all batteries, tubes, and fones. It requires no storage battery.

These prices are on complete and ready to operate sets.

CARPRAD NO. 1-A. A single tube set, complete .....	<b>\$40.00</b>
CARPRAD NO. 2-A. A two tube set, complete .....	<b>\$60.00</b>
CARPRAD NO. 3-A. A three tube set, complete .....	<b>\$88.00</b>
CARPRAD NO. 2-B. A two tube set in portable case, weight complete 12 pounds...	<b>\$90.00</b>

We do expert wiring and repair work, and build any style set to order. Let us put your set in first class order.

**The CARPRAD CO., Radio Studio**  
**10 So. 4th St. Granville 6197 Minneapolis, Minn.**

# Cure Sought for "Fading" and "Dead Spots"

Government Experts at Washington Trying to Clear up Mystery Surrounding Two Big Difficulties in Radio Transmission

**C**AUSES of two of the principal difficulties in radio transmission, "fading" and "dead spots" are the subject of a thorough research now in progress at the United States bureau of standards.

Everything connected with radio circuits, tubes, antennae, and other factors involved—has been thoroughly studied except the radio waves themselves. The present investigation is intended to give greater knowledge of what happens in the transmission of these waves. The first phase to be studied has been that of the mysterious phenomenon known as "fading" or irregular variation of the signals the amateur hears at night.

A related problem, one of the pet worries of the armchair radio fan, is "Why is a dead spot?" More locally the question is, "What's the matter with Baltimore?" Owners of receiving sets in that city found themselves barely able, or more often, unable to hear signals or concerts from Washington, 40 miles away, while stations at much greater distances were received clearly. Messages from Washington to Baltimore frequently have to be sent by way of Boston or New York.

Some of these things sounded rather doubtful to the scientists when the amateurs began to complain of them, but further investigation showed the problem to be a real one and to exist everywhere. It is believed to be intimately associated with the general problem of atmospheric, and variations of signal intensity by day and by night, and to lead to the discovery of some of the peculiarities of the ways in which radio waves are transmitted.

All these phenomena are related, says Dr. J. H. Dellinger of the bureau of standards, to properties of the little known "Heaviside" surface, the boundary of the outer conducting portions of the atmosphere which surrounds the earth at a height of from 50 to 100 miles. When this is in good working order, transmission is good; when it gets ruffled or disturbed the reverse is the case.

What causes the disturbances in this layer is still unknown, as is the cause of "dead spots," but it is known that "atmospherics" which are thought to be due to its disturbances have certain centers of action

from which they proceed to cause varying degrees of mental and aural anguish to radio fans. One of these centers is over the state of Texas, another is in California.

A scientific paper on the investigation of the fading of signals and other radio wave eccentricities is soon to be issued by the bureau of standards. These researches are still under way and promise future results of great importance for if the cause of these trials of the great army of "listeners in" can be determined, a big step toward a remedy will have been taken.

## Help for the Fans Thru Night Instruction

By A. P. Upton

While the construction and operation of receiving sets is intensely interesting pastime, yet how much more effectively could this work be done by those who understand the principles involved.

Can you distinguish between dif-

ferent types of circuits and name the defects and advantages of each?

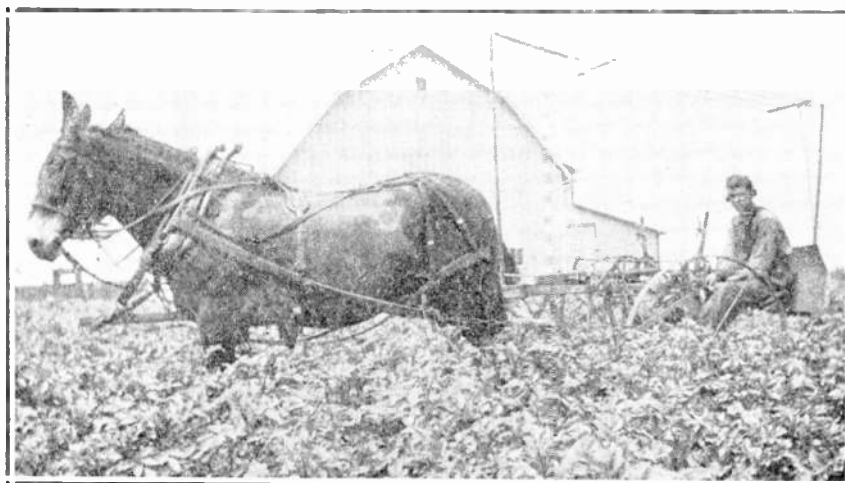
Do you know why certain crystals have the property of allowing signals to be heard when properly used?

Can you describe the action of rectifier tubes and three element detector and amplifier tubes?

Are the functions of radio and audio frequency amplifiers clear to you?

You can make the subject of radio instructive and much more interesting as well as highly entertaining by understanding the main underlying principles involved. The reception and transmission of both damped and undamped and modulated continuous wave signals are considered in courses in Elements of Radio and Advanced Radio offered in the Night School Courses at Dunwoody Institute, commencing October 1st. Enrollment should help you to bring in those distant signals just beyond the present range of your set by making improvements therein in construction and operation.

## The Winning Photograph



The accompanying photograph showing a cultivator equipped with Radio receiving set, one of more than two hundred submitted in the recent contest conducted by the Cutting & Washington Radio Corporation, was awarded first prize because it demonstrated so forcibly the practical and educational features of Radio. The picture was submitted by Gordon Curtis, farmer of Osseo, Minn., who whiles away many a lonesome hour on the cultivator by "listening in" as the team plods back and forth. Second prize was awarded to Mrs. Wm. Daley, 2505 Irving Avenue North, Minneapolis, for a picture of several children, grouped around their playhouse, listening to the Radio. This, too, the judges decided, brought out the more practical and educational side of Radio. The judges were W. S. Harris, president, A. J. Brennan, sales manager, and Gordon Tucker, all of the Cutting & Washington Company. The prizes were kodaks presented by E. B. Meyrowitz, Inc., Minneapolis.



## Building The Set

Continued from page 13

sists of a very thin filament whose diameter is about as large as that of a hair. This filament is hermetically sealed in a small exhausted glass tube almost 1 3/4 inches long by 1/2 inch diameter. The hair-like filament has the peculiar thermo-electric property of changing its resistance rapidly with small increases in current. For example, if you try to put a 20% overload in current on a UV-201-A tube with an amperite No. 1-A in series, the resistance of the amperite will increase in resistance 400%, so that the voltage necessary will be 10 volts instead of the usual six volts. Because there are no moving parts, the amperite appears to be a fixed resistance. It

is really fixed in adjustment, but it automatically changes in resistance in order to compensate for the variations in the battery voltage. I have traced the noiseless operation of the amperite to this very fact, that it has no moving parts which give rise to the usual grinding noises. I use an amperite for every tube.

Of course any tube on the market can be used in this circuit. For DX work it is best to use a UV-201 or WD-11 tube as detector. I have found that UV-201-A and UV-199 do not work quite as well as detectors, although they make good amplifiers. Although the circuit is regenerative, the howling and squealing is very easily controlled by the plate variometer. For local reception the plate variometer is always kept as practically fixed and all tuning is

done with the tuning variometer making it a uni-control receiver. I have no trouble at all getting stations like Davenport, Philadelphia and Chicago on favorable nights on the loud speaker using a 75-foot one-wire aerial. I really believe these standard circuits are the best for the experienced amateur as well as people who are just learning radio and for those people who want a set that will work whenever company calls.

### France Active in Radio

While the United States has been carrying on an intensive campaign in broadcasting and the use of radio by amateurs, France has been hard at work developing its commercial radio business through private enterprise.

# RADIO RECORD CLASSIFIED BUSINESS DEPT.

Reliable advertisers all over the country offer their most attractive specials in these columns. Follow these advertisements every month.

Classified advertising rate, five cents per word for each insertion, 5% discount for three insertions, 10% discount for six insertions, 20% discount for a continuous run of 12 insertions for one year. Name and address must be included in the above rate. Cash must accompany all classified advertisements unless placed by an accredited advertising agency. No advertisement of less than 10 words accepted. Each initial and figure to count as one word.

Advertisements for the July issue must reach us not later than June 5.

The Radio Record is the fastest growing and most read and reread monthly magazine published in the Northwest.

THE RADIO RECORD PUBLISHING CO., 504 Tribune Annex, Minneapolis, Minn.

### RADIO SETS AND ACCESSORIES

**RADIO CABINETS**—all sizes and finish. Bird Houses, Signs and Toys. Roos Bros. Factories, 30 16th Ave. N. E., Minneapolis, Minnesota, Dinsmore 7131.

**BUILD YOUR OWN RADIO TUBE SET.** Write us for price of parts and instructions. Elwin Mfg. Co., 502 Tribune Annex, Minneapolis, Minn.

**INFORMATION FREE**—Radio fans who desire any information about Radio, parts, markets, etc., may obtain same by writing the Radio Record Pub. Co., Minneapolis, Minn.

### PHONOGRAPHS AND ACCESSORIES

**BUILD YOUR OWN PHONOGRAPHS.** We supply you with motors, tone arms, and all accessories at wholesale prices. Write for catalog AX. PLEASING SOUND PHONOGRAPH CO., 204 E. 113th St., New York.

### DETECTIVE MANUALS

**LEARN OF DETECTIVES**—Do you want to learn all about the Underworld of large cities, their criminals, gamblers, grafters, white-slavers, opium dens in Chinatown and how to detect these. Send \$1 introductory price for a \$3 book. Ashley Press Printers Corner 1st Ave. So. and 4th St., Minneapolis, Minn.

### AGENTS AND SOLICITORS

**MANNA SOAP**—MANNA KLENSER. Agents wanted. Good profits, good proposition. Send 25c for 1/2 lb. sample of each. Manna Products Co., Minneapolis, Minn.

**AGENTS WANTED** in every town in the United States, whole or part time. Big commissions for little effort. Write to Manager Clyde, 4410 W. Lake Harriet Blvd., Minneapolis, Minn.

**DO YOU WANT AGENTS,** buyers, or want to sell some merchandise or commodity. Place your proposition directly before the thousands of readers of the Radio Record. Write us for information and special rates for trial display or classified advertising. Radio Record Pub. Co., Minneapolis, Minn.

### NAMES AND ADDRESSES

**RADIO DEALERS**—We supply you with live, up-to-the last minute names and letters of radio fans. Write for our terms, 3-City Adv. & Clipping Service, Minneapolis, Minn.

### SHORT STORIES WANTED

**SHORT STORIES** and movie plots wanted. Has your story been published? We'll see that it is. Tell us your troubles. Authors Manuscript Pub. Co., Room 3, 2617 Clinton, Minneapolis, Minn.

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**RADIO DEALERS**—Do you want information of thousands of radio fans in this great Northwest including St. Paul, Minneapolis, and Duluth, Minnesota. Write for the terms of our clipping service. 3-City Adv. & Clipping Service, Minneapolis, Minn.

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**HIGHEST PRICES PAID** for old gold, silver, platinum, diamonds, and false-teeth. Mail to Brady's Refinery, 79 Reid Ave., Brooklyn, N. Y.

**RADIO WRITING PADS.** Newest novelty advertising. Big money for agents. Send 10c for sample. Radio Novelty Adv. Co., 510-11 Northwestern Bldg., Minneapolis, Minn.

**KEEP COOL** without ice. ICE-OLA. Artificial ice keeps food and drink cool and fresh. No more ice bills. Costs a few cents to make. Formula sent for 25c, stamps or coin. Twin-Plus Sales Co., Minneapolis, Minn.

**FREE ADVERTISEMENT** for your business. To add 500 subscriptions to our list, we will insert your 20-word classified advertisement free with a one-year subscription at \$2. Radio Record, Minneapolis, Minn.

### PATENT ATTORNEYS

**INVENTORS**—Send sketch or model of invention for opinion concerning patentable nature and exact cost of patent. Book, "How to Obtain a Patent," sent free. Tells what every inventor should know. Established twenty-eight years. Highest references, prompt service, reasonable charges. Chandler & Chandler, 448 7th St., Washington, D. C.

### MAPS, ETC.

**HENRY FORD** is building in the Twin City Midway District one of his large automobile manufacturing plants. He is also buying considerable land immediately on the Mississippi River. If you are interested in this development project of Henry Ford's, mail 25 cents for a new and revised map of the great Midway District, showing the location of the Ford properties and projects. W. C. Stephens, corner of University and Raymond, St. Paul, Minn.

### AUTO TIRES AND TUBES

**BUY BETTER TIRES**—With 8,000 mile guarantee. 30x4 1/2 Non Skid, \$8.95. Templeton Cord 30x3 1/2, 12 per cent oversize, \$12.98. These tires are 30 per cent under regular prices. Other tires priced in proportion. Minnie-Paul Auto & Tire Co., Minneapolis, Minn.

### WANTED—MISCELLANEOUS

**DO YOU NEED PRINTED MATTER?**—500 bond letter heads, 250 XX envelopes, \$4.75. The Radio Printers, 5th floor, Tribune Annex, Minneapolis, Minn.

**TWENTY-FIVE CENTS** will bring you a sample copy of the Radio Record. Back numbers 1 and 2 may be had two for forty cents in stamps. Send and get them. They will make a most comprehensive and complete radio reference file. Radio Record Publishing Co., Minneapolis, Minn.

**SPECIAL CLASSIFIED ADVERTISING OFFER.** For the issue of June, July, and August, we will place your classified advertising once in the Radio Record and once in the Ninth District Banker, two distinct publications, for five cents per word for one insertion in each. Three insertions in each for thirteen cents per word. Send your copy in at once to get in the July issue. Forms close June 5. Radio Record Publishing Co., Minneapolis, Minn.

## Laboratory Tests Data

Continued from page 15

was given a thorough trial and enough time spent on it to bring out all of its qualities. The regenerative sets were in abundance, but there were also a good many of the newer type of radio frequency receivers. These were classified into several groups according to their rated capabilities, and then the best of the lot given a more thorough test. It was surprising to all in the laboratory to note the different results from different receivers. Since they were all operated from a common switch block and with the same apparatus and batteries, it took but a moment to change from one set to the other. This made the comparison accurate. Some sets employing the same number of tubes as the others would give 100% better results. The difference was more noticeable among regenerative sets. This was due in part to the method of regeneration employed and the coupling of the set.

Stations from all over the United States were heard throughout the entire summer with many of the receivers. Many came in as loud as the local stations and with as little effort in tuning. But some would not receive farther than 100 miles during the summer months although their rating was supposed to be as good as the others. Hence the necessity for the purchaser of radio equipment to be on the alert and buy reliable apparatus from responsible dealers. In every case those sets that were constructed with care and more accurate detail proved to be the best. Often these small details meant success or failure.

Almost every standard known type of hookup was represented but a comparison of the respective merits would be beyond the scope of this article. It suffices to say that in the regenerative class a standard receiver built by the Cutting and Washington Radio Corporation was chosen as the most meritorious for general purposes. This set had an equal range with any three tube set, was equal in selectivity and appearance, and for volume and ease of operation seemed to outweigh them all. There were many other receivers that did splendid work but when all of the qualities were assembled from the data the above seemed to outweigh them all. The writer laid a considerable stress of selection upon

the reradiation or interference caused by the sets to any other in the vicinity and this was perhaps a deciding feature in the selection of the C. W. In the radio frequency class the Cleartone receiver was chosen for its simplicity of operation, selectiveness, range of operation and economy of upkeep. Employing but one stage of radio frequency, it brought in powerful signals even with the UV-199 dry cell tubes. Considering its initial cost and appearance it proved to be a splendid machine for general use.

In the selection of these machines almost every factor of radio reception was considered. There were other machines that could get as good or even better results under certain conditions since some of them employed more tubes, etc., but ease of operation for the uninitiated, initial cost, cost of upkeep, capacity to use any of the standard makes of tubes, and many other factors had to be kept in mind.

The question of interference proved to be a very interesting subject for investigation. Some work was done upon the static malady but with every method when the signals were brought up to their former strength the ratio of static to signal was almost as great as before. The loop is without question the best means of getting around this interference. With it the writer has received signals hundreds of miles during a rain storm without any discomfort. The writer is of the opinion that the static question is more or less going to take care of itself. A fault with all radio fans is to urge their machines to the limit which increases the opportunities of the local disturbances. With the increase in the power and improvement of broadcasting stations this will not be necessary. The success of the summer's reception was more due to the big powerful stations that could be heard with ease every night than to those farther away that required careful adjusting and high regeneration. And the static was less troublesome, too.

Then, of course, there was the howling or reradiating neighboring set and aerial shadows to work on. Theory and detail were carried out to some extent on these but not far enough to predict any of the results.

Wave traps were almost thoroughly investigated. Many different types and hookups were tried out. They all have their merits but with

the new allocation of wave lengths the writer doubts the merits of using them except for eliminating the local station. Otherwise they are not worth the extra trouble of adjustment. It must be understood that a wave trap eliminates the wave upon which it is set only. This makes it effective for local work.

A little may be said about batteries, since they constitute a most important part of the receiving set. The laboratory batteries were kept in the best of condition. Dry cells were replaced as soon as they showed any signs of weakening. The storage cells were kept charged or even overcharged most of the time. They gave splendid results without harm to the batteries. Oftentimes they registered 8 to 10 volts and no harmful effects could be noticed after four months of operation. The terminals were carefully watched and kept free from corrosion. It was found that this could lower the voltage materially or even prevent the current from flowing entirely. No wires were used of less than No. 14 size for carrying the current and all leads were placed as direct and made as short as possible. It is believed that placing batteries in an adjoining room should be practiced as a last resort only.

The work on the whole was extremely interesting and, it is believed, brought out a lot of useful information. It convinced the writer of several interesting things, that radio is here to stay, that there is nothing hard, unusual or eccentric about it, that it is useful and simple and should have a place in every home, club room, lodge or place where human beings are assembled.

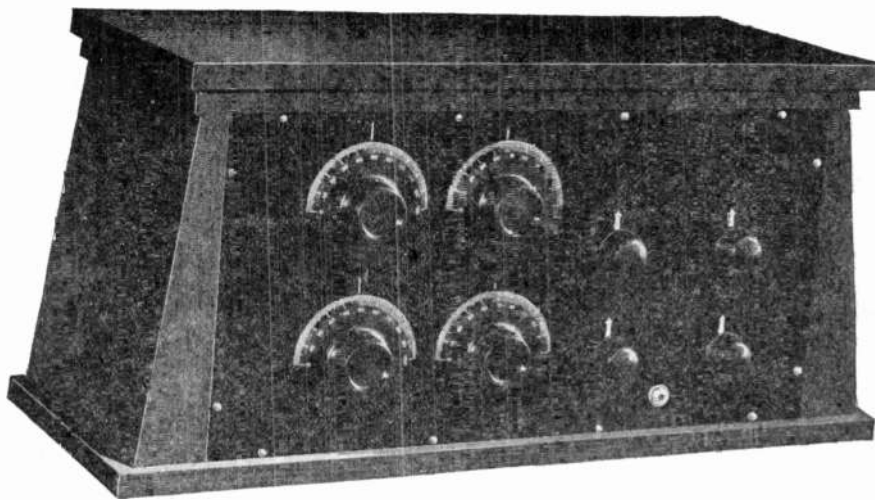
## New Apparatus (Continued from page 27)

pole-double-throw switch for switching from a six-tube radio frequency circuit to a three-tube regenerative circuit. It is also used for switching



storage battery from a receiving set to a battery charger. These switches are fitted with attractive red caps which enhances the appearance of the panel.





From New York  
to California,  
then back to  
New York in  
**One Minute**

"SOME SPEED" — but a mere detail for the "Wright." The "Wright" is the finest, most up-to-the minute Radio Set it is possible to manufacture; UV-199 tubes; 2 Radio Frequency; 1 Detector; 2 Audio Frequency. Only two outside connections, aerial and ground. All batteries contained in set. One jack only; simply turn the rheostats and the different stages will come in automatically. Pull the plug to disconnect your battery supply. Push it back in and you have the same station you were listening to. Absolutely no body capacity. Why not carry a line of Radio Sets this season that will make your customers meet you with "the happy morning smile" even after having listened-in half the night? - - **\$158.00**

*Jobbers and dealers: write for discounts*

## Wright Radio Manufacturing Company

Manufacturers and Distributors

1568 Selby Avenue

St. Paul, Minnesota

*Enter—*

## THE RADIO SEASON

The interest in radio has already started up again. Broadcasting stations everywhere have launched their fall and winter schedules—the stage is all set for a bigger, better radio season than ever.

In buying your receiving set, be sure that you get one that will give you every satisfaction. Get one that will bring the dope in clearly and with a pure tone. Get one with national range so that the pick of the world's entertainment is at your finger tips.

Because we know that you want such a set, we ask you first to investigate the Commercial Receiver. After trying it out for yourself, we have no doubt but what you will

### Buy a Commercial Radio Receiver

It is a single circuit Ultra Audion Tuner with one stage Audio-Frequency Amplifier.

It has a ¼ inch Bakelite panel, bezel peepholes, special variocoupler, vernier rheostat and dial vernier controls with jacks for detector or amplifier.

Assembled in handsome mahogany finished cabinet with hinged cover. Room for both A and B batteries using new pickle tubes. All connections plainly marked and accessible. Two controls. Tunes in stations from all parts of the U. S. Guaranteed range. Moderately priced and efficient in every respect.

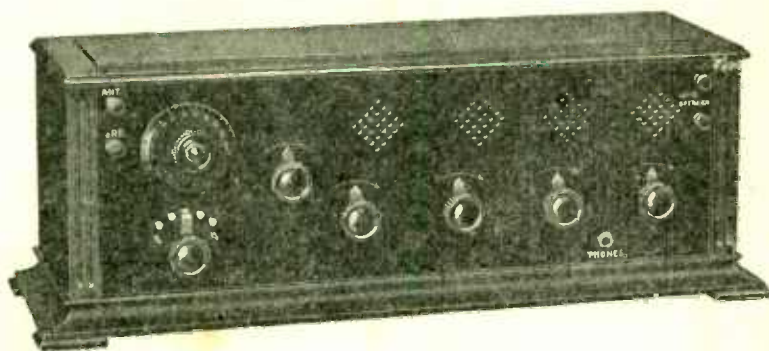
**\$75.00**

## Commercial Radio Company

61 South Fourth Street

Minneapolis, Minn

# The Cleartone



**\$60<sup>00</sup>**

The above illustrated model is so well and favorably known that it requires but little comment.

Four tube radio and audio frequency receiver, constructed of parts the best quality obtainable; solid mahogany cabinet, highest grade workmanship. In the hands of thousands of owners is regularly bringing in broadcasting programs from stations all over the country on the ordinary inexpensive horn without power amplification.

**GRADED FIRST - among a large number of receivers tested in St. Paul Dispatch Laboratory this past summer.**

#### Complete set:

Cleartone Receiver .....	\$60.00
Headset .....	6.00
4 O. T. Silvertone Tubes.....	26.00
Three Dry Cells .....	1.20
45 Volt B Battery.....	5.50
	<hr/>
	\$98.70

O. T. Silvertone Tubes manufactured under DeForest patents for The O. and T. Electric Corporation, New York, N. Y. Filament Volts, 3-4; Filament Amperes, .15; Plate Voltage, 20 to 250. More volume than from any dry cell tube on the market. List. \$6.50.

**L. G. LINDSAY, Factory Representative**  
**603 Kasota Bldg., Minneapolis, Minn.**

**WARNER HARDWARE CO.**  
**Minneapolis, Minn.**

**COMMONWEALTH APPLIANCE CO.**  
**St. Paul, Minnesota**