WCFL Radio Magazine

1928
SPRING
EDITION

Three Billion-Dollar Radio Trust
By E. N. NOCKELS

Complete and Corrected Log of Radio Stations

New WCFL 50,000-Watt Station

Television for the Home

H. F. L. Isotone, Something New

Scott Shield Grid Nine

The Lynch-Hammarlund A-C Five

Tyrman "70" Using Shielded Tubes

Adapting Battery Sets to A-C Current

The Radio Commission

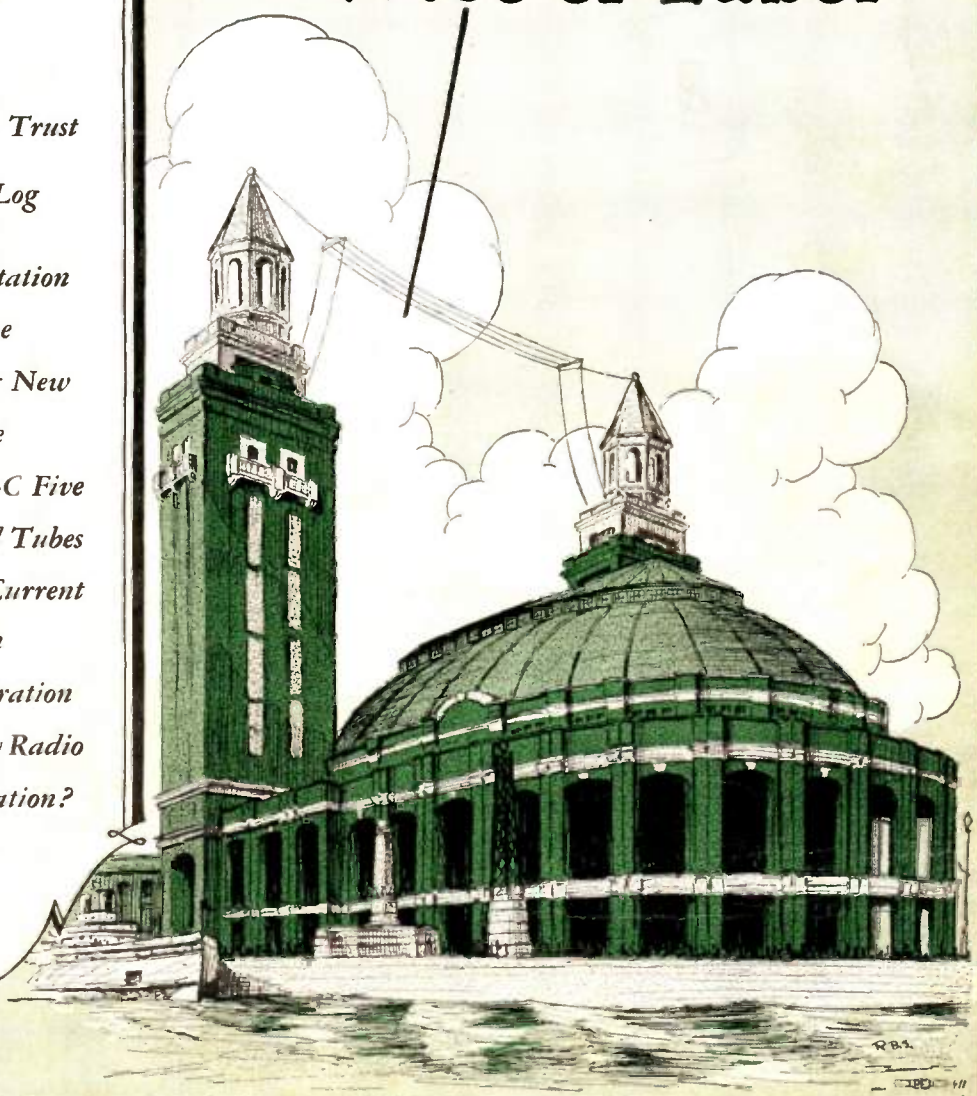
National Labor Day Celebration

Electric Power Transmitted by Radio

Why a Labor Broadcast Station?

Price 35 Cents

The Voice of Labor



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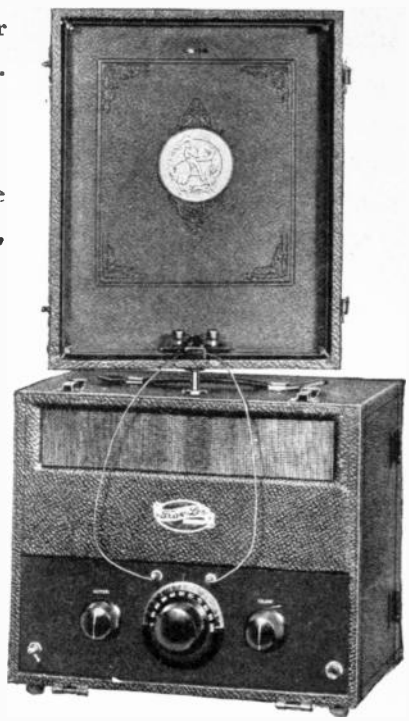
Improved 1928 Model of Trav-ler

The Original "ONE-MAN" Portable Radio

The Trav-ler has already created a new standard in portable radio receivers and is universally accepted by the trade as a profitable item. With its new features and our sound merchandising policy the Trav-ler Portable Radio will go over even bigger in 1928 as an all-season seller.



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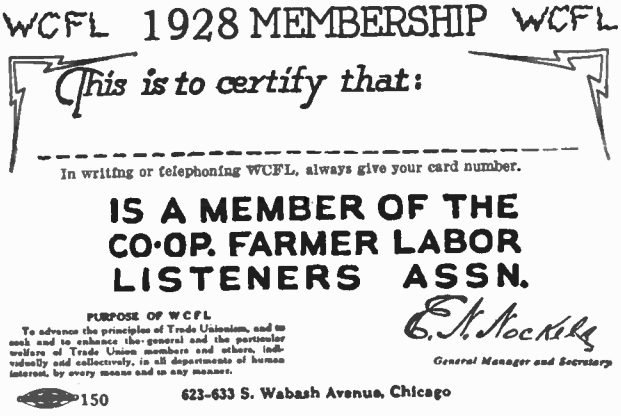
Please send me complete information about the Trav-ler Portable Radio Receiver.

Name_____ Business concern_____

Address_____ My jobber's name and address_____

Trav-Ler Portable Radio

Co-Operative Farmer-Labor Radio Listeners Association



EVERY subscriber to the WCFL Radio Magazine is entitled to membership in the Co-operative Farmer-Labor Listeners' Association, and a membership card properly filled in and serially numbered will be forwarded upon request. Membership in the Association is an added benefit given by the Chicago Federation of Labor to those of its friends who wish to take advantage of the special features in the Magazine and Official Log of the Broadcast Stations. There are no dues or assessments to pay as a member of the Association.

Members of the Listeners' Association are privileged to write WCFL Radio Magazine on any subject connected with the Broadcasting Station, or to ask for advice on building or assembling receiving sets. Also, members of the Listeners' Association may request special vocal or instrumental numbers or special announcements over the air. Just write, telegraph or telephone your request to WCFL, but be sure to give your name, address and the number of your Listeners' Association card.

The form of this card is shown in the illustrations on this page. Note the number printed on the side of the card. Your card is printed in red and blue and the number will appear at the side—but, of course, will not be the same as shown in the illustration.

If you are not now a subscriber to the WCFL Radio Magazine and Official Log of Broadcast Stations, you are cordially invited to take advantage of this offer and become a member now. Tear out the coupon which appears on the other side of this page and send it to The Chicago Federation of Labor, together with your check, express money order or postal order for the amount named. Read the printed directions carefully to avoid mistakes. The Magazine will be sent quarterly, as published, but the benefits arising from membership in the Listeners' Association will begin at once.

The Magazine and Official Log is the exclusive property of the Chicago Federation of Labor and is not printed as a profit-making enterprise. The object is to render service to the workers and farmers, and every dollar received is used to better this service. In becoming a member of the Co-operative Farmer-Labor Listeners' Association you are adding one more interested member to the thousands of earnest men and women who desire to give their co-operation to the work for humanity now carried on so ably by "The Voice of Labor," the splendid broadcast station owned and operated by WCFL, the Chicago Federation of Labor.

Fraternally,

CHICAGO FEDERATION OF LABOR,

JOHN FITZPATRICK, President

OSCAR F. NELSON, Vice-President

E. N. NOCKELS, Secretary

FRED G. HOPP, Financial Secretary

M. B. PHILP, Treasurer

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WCFL Radio Magazine

The Voice of Labor

OFFICIAL QUARTERLY PUBLICATION OF

WCFL RADIOPHONE BROADCAST STATION

and the Co-operative Farmer-Labor Listeners' Association

WCFL Broadcast Station and WCFL Radio Magazine both established, owned and operated by the Chicago Federation of Labor. Editorial Office and Broadcast Studios, 623 South Wabash Avenue, Chicago, Ill. Transmitter located on Navy (formerly Municipal) Pier, Chicago, operating on a wavelength of 483.6 meters (620 kilocycles) by authority of the Federal Radio Commission. Magazine office of publication, 720 North Ridgeland Avenue, Oak Park, Ill. Magazine subscription price, $1.25 per year. Single copy, 35c.

To the Co-operatives, Farmers and the Labor Movement—

Dear Sir and Brother:

Organized Labor and Coöperative Farmers now have their own Broadcast Station, and to preserve and amplify this service on the air have established the WCFL Radio Magazine and Official Log. You have heard our programs and know that we are doing a work worth untold thousands of dollars for the benefit of Coöperative Farmers and Organized Labor.

We are not operating a private enterprise for profit, we give to you and your organization a service without charge that you cannot secure elsewhere at any price. You have heard our programs and you know. No doubt you have often wished that the high spots of talks made by you or your fellow officers of the movement might be preserved for reference. This is one of the objects of the WCFL Radio Magazine.

The Broadcast Log is corrected in each issue. Technical articles give you the last word in Radio Engineering. We give you a lot of value for very little money.

Station WCFL is owned, supported and operated by and for the workingmen and coöperative farmers of North America. It has the official endorsement of the American Federation of Labor, the Illinois State Federation of Labor, the Chicago Federation of Labor and all affiliated unions; also of many Farmers' Unions and Coöperative Movements. This clientele of more than five million persons are not mere listeners, they are part owners; they are vitally interested in the principles and ideals for which the Station stands and to which it alone gives voice. They look to it not only for entertainment, but for information, education and leadership in matters affecting their social and economic welfare.

Like all the other activities of WCFL and associated bodies, no attempt is made to make a profit on the magazine. All receipts are used to perfect the service of the station and its official publication.

Kindly fill out the subscription coupon printed below and mail same with $1.25 (check, postal order or express money order). The Magazine and Official Broadcast Log will be sent you for one year. Your membership card for 1928 in the Coöperative Farmer-Labor Listeners' Association will be mailed immediately upon receipt of your order. Make all checks to Chicago Federation of Labor.

Thanking you for your interest, we remain,

Respectfully,

WCFL RADIO MAGAZINE

E. N. Nockels

Manager and Secretary.

WCFL RADIO MAGAZINE

The Voice of Labor

Official Quarterly Publication of Radiophone Broadcast Station WCFL and the Co-operative Farmer-Labor Listeners' Association

ESTABLISHED, OWNED AND OPERATED BY THE CHICAGO FEDERATION OF LABOR, OFFICES AND STUDIOS 623 SOUTH WABASH AVENUE, CHICAGO, ILL.

$1.25 *per* YEAR

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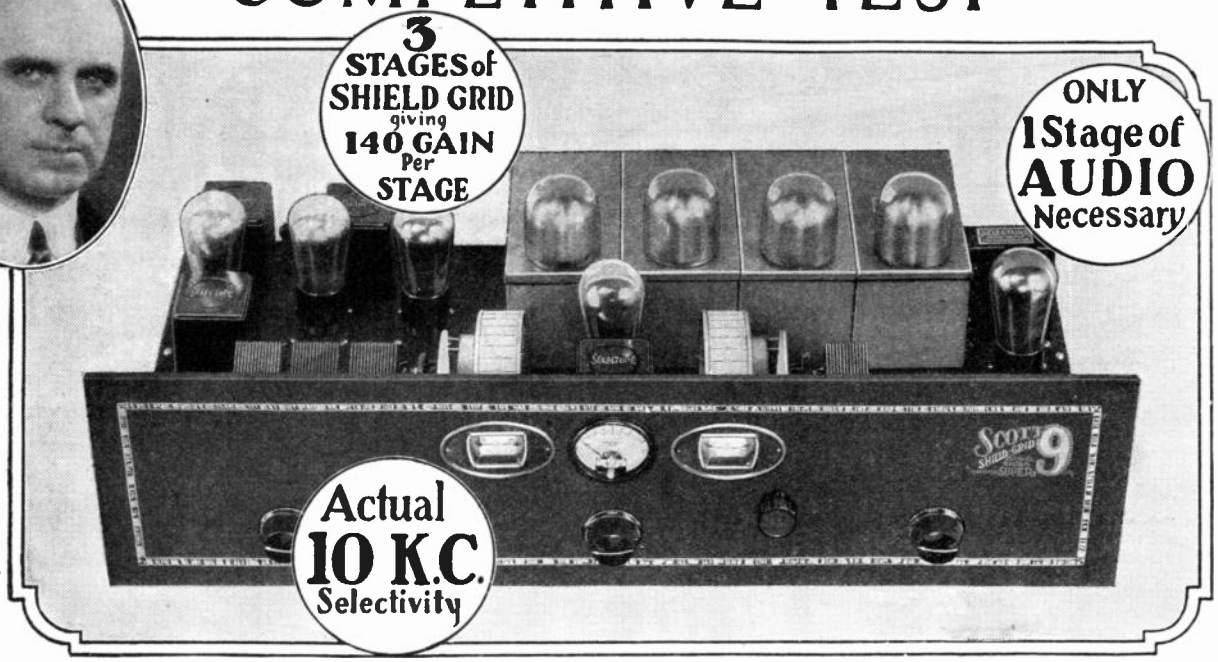
Announcing

A GREAT, NEW RECEIVER

SCOTT CHALLENGES THE WHOLE WORLD OF RADIO TO ANY KIND OF COMPETITIVE TEST

E. H. SCOTT

The New Scott Shield Grid 9 was designed by E. H. Scott, designer of the World's Record Super 10, which prior to the advent of this new model held all records for Radio set performance.



More Actual Amplification • More Distance and Volume than Any Other Existing Receiver Known to Us

This—we believe, is the most powerful, the most selective and the finest toned receiver in existance today. We draw this conclusion from having tested and scientifically measured every other receiver which might claim itself the equal of the SCOTT World's Record Shielded Grid NINE. And there is no question but that this radically new type of receiver will maintain its position of obvious superiority for years to come, for the features of circuit engineering responsible for its amazingly better performance are far ahead of any circuit developed to date.

UNLIMITED RANGE! Without aerial, ground or loop, the SCOTT Shielded Grid NINE brings Pacific Coast Stations to Chicago with loud speaker volume. And so tremendous is the amplification of the *shielded grid* long wave amplifier employed, that it is impossible to determine a range limit for this receiver when used with a short antenna and a connection to ground.

Shielded Grid Tubes Used in an Entirely New Way

Standard circuits commonly in use with the new shielded-grid tubes, provide actual amplification of approximately 40 per stage. The revolutionary new circuit used exclusively in the SCOTT Shielded Grid NINE, gives a practical amplification of 140 per stage, thereby making this receiver many times more powerful than receivers using shielded-grid tubes in a conventional manner. It is this new circuit arrangement developed and used exclusively by us which enables us to challenge the whole world of radio to any kind of competitive test with assurance that the SCOTT Shielded Grid NINE will win.

Only One Stage of Audio Required!

The second detector output of this receiver is so heavy that concert volume and clear, undistorted cathedral tone, even on the most distant stations, is obtained with but a single stage of 2 to 1 audio frequency amplification.

Easy to Build --- Results Guaranteed

Despite the fact that the Scott Shielded Grid NINE is one of the most elaborate receiving systems ever devised — and despite the fact that it embodies many features of circuit arrangement not known to common practice, it is a very easy set to build, and when you buy the kit of parts we positively guarantee that you will get the same results we get from our laboratory model. Both panel and sub-panel are drilled to receive each part and the shield-grid amplifier units come to you fully wired and tested—ready to be connected into the circuit just as though they were a transformer.

Why Pay More *for* Less?

Why pay more than the small cost of the Scott Shielded Grid NINE when no other receiver offers you so much? Why not have a receiver which provides actual 10 Kilocycle selectivity regardless of where located? Why not have a receiver with which you can listen in on all the world—no limit to its distance range. The Scott Shielded Grid NINE is, unquestionably the finest, most powerful, most advanced receiver of the day, and is, beyond all doubt, destined to hold its position of leadership, throughout the coming years. It is the ultimate. Build it—enjoy it NOW.

FREE

Circuit Diagram and Particulars

Find out all particulars of the Scott Shielded Grid NINE. Examine its circuit. See for yourself why it has unlimited range—unlimited power—perfect tone. Proof of the superiority of this great new receiver is FREE to you. Also copies of 6000 and 9000 mile reception verifications and other records made by the Scott World's Record Super 9 and the Super 10, the less powerful predecessors of the new Scott Shielded Grid NINE. Get this information now. Simply clip and mail the coupon. Mail it TODAY!

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CHICAGO, ILL.

SCOTT 9
SHIELD-GRID WORLDS RECORD SUPER

Mail this Coupon

SCOTT TRANSFORMER CO.
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Send me full particulars of the new Scott Shielded Grid NINE.

Name .....

Street .....

Town ..... *State* .....

WRH

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The perfect tonic for your radio

Is your set "run down" after long constant use? The finest radio tonic known is to install a correct, new tube in every socket of your set. One inferior or old tube may be crippling your set and causing poor reception.

Have your dealer test your tubes and install new, wide-awake Cunningham Radio Tubes to replace the old ones.

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E. T. CUNNINGHAM, Inc.

NEW YORK CHICAGO SAN FRANCISCO

Cunningham RADIO TUBES

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The Voice of Labor

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WONDERFUL is the realm of radio! Its possibilities stagger human comprehension. Wireless telegraphy, radiophone and television, all realities within a single generation! Now the experimenters are hurling electric power through the air. And who knows but that greater discoveries are yet to be made!

Radio is such a fascinating world. The explorer entering its boundless realm is completely captivated. Losing himself in the vastness of its possibilities, he eagerly presses onward and upward, face steadfastly toward the dazzling brilliancy of the farther horizon. He gives scant heed to blazing a trail for those who would follow. His technical phrases and dizzy figures are as a foreign tongue.

Radio experimentation is far ahead of the public's appreciation. That's what makes editing a popular radio magazine such a difficult task. How can the experts' technical descriptions be rephrased so that the average reader may grasp an appreciation of the rapid strides of scientific progress and enjoy the entrancing vision of radio's future?

This issue of WCFL Radio Magazine is, we believe, a worthy accomplishment along this line. The lingo of the experts is well interspersed with inspiring pictures of progress—and a bit of lighter reading thrown in for added variety.

Let us know how you like this issue. Write us regarding subjects you desire discussed in future issues. We will journey together into the enthralling and boundless realm of radio.

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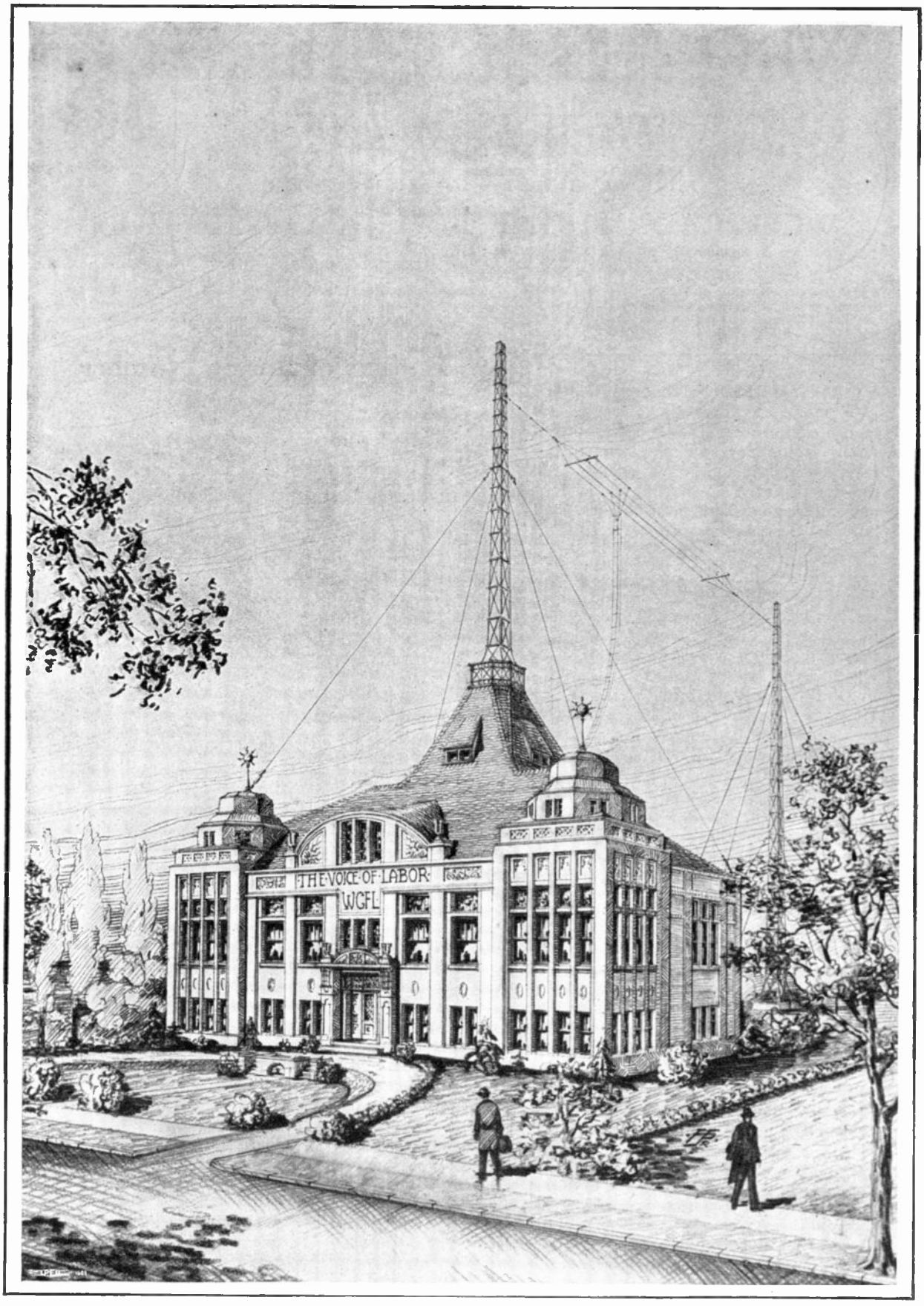

WCFL SUPER POWER STATION

Above is the architect's rendition of the nation-wide super-power radio broadcast station to be erected by the Chicago Federation of Labor, near Downers Grove, Ill.

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VOLUME 1 | SPRING 1928 | NUMBER 3

WCFL 50,000-Watt Station

By E. N. NOCKELS

THE Voice of Labor shall not be crowded from the air! Having launched upon the splendid project of broadcasting its vitalizing message through the ether, Labor is determined that its Voice shall have equal chance with the largest of the multitude of broadcast stations, whose waves insistently beat upon every radio receiving set in the land. The Voice of Labor must be brilliant in logic, captivating in appeal and hurled forth with power enough to carry it clearly and distinctly to the farthermost corners of the continent.

To thus maintain its rightful place on the air, Organized Labor plans the immediate erection of one of the finest super-power radio broadcast stations in America, at a cash outlay of approximately $300,000. This new station will greatly augment but not supplant the splendid service now rendered by Station WCFL, the first Voice of Labor on the air, with its transmitters located on the Navy (formerly Municipal) Pier, Chicago.

The picture on the opposite page is a reproduction of the architect's conception of the proposed super-power station and its giant towers. As will be noted from the picture, the station is to be artistic as well as powerful, and is to be placed amid a beautifully landscaped park.

According to the application filed with the Federal Radio commission, the new station will utilize 50,000 watts of power. This should be sufficient to make the Voice of Labor heard throughout the length and breadth of the land. WCFL will be able to hold its rightful place on the air.

Since the Federal Radio commission will not grant permits for high-powered radio broadcast stations within congested metropolitan areas, a location has been selected for the new Voice of Labor station, well removed from the noise of the city. This will also free the station from much of the interference due to the many power circuits and the hundreds of tall steel-framed buildings in the Loop area.

The site selected is the Edward Ahrens farm of 100 acres in DuPage county, twenty-two miles west of Chicago. The plot is located just west of Downers Grove on the Burlington railroad. It has a south frontage of some 1,300 feet on Ogden road and extends approximately 3,000 feet north to the line of Thirty-ninth street. The land is gently rolling, well adapted to park and home-site development. Approximately twenty acres will be landscaped as a station site. The remaining acreage will be subdivided.

The offices and main studios of the Voice of Labor will remain in Chicago and will be connected by direct wires with the new broadcast station.

Auxiliary studios, designed by experts in acoustics, and spacious enough to accommodate symphony orchestras and bands, will be provided in the new station building. A complete power plant, its boilers heated by oil burners, also will be installed, to be used only in emergencies. Thus the Voice of Labor will be protected fully against interruptions, due to suspension of telephone or power service as the result of storm damage to transmission lines or the obstinacy of public utility companies in dealing with their men. Should the commercial power supply fail, the station will operate with power from its own generator; should the telephone service be interrupted, the artists will be conveyed to the station studios in autos or by train.

Work on the new station will start immediately. It is expected that the dedicatory exercises will be a part of the great national Labor Day celebration to be staged by the Chicago Federation of Labor.

When the new station is in operation, the present station on the Navy Pier, which has rendered such

(Continued on page 59)

And Now Radio Television!

Home Sets Will Soon Be Equipped to Receive Pictures

RADIO television leaped the barrier between the laboratory and the home recently in the first demonstration of television broadcasting, arranged by the Radio Corporation of America and the General Electric company. At three different points in Schenectady, including the home of E. W. Allen, vice-president of the General Electric company, groups of engineers, scientists and newspaper men standing before the first "home television sets" ever to be demonstrated, saw the moving images and heard the voices of a man and a woman transmitted from the research laboratories of the General Electric company several miles away.

So lifelike were the lights and shadows reproduced from the research studios that the curl of smoke from a cigarette and the flash of an eye were transmitted by radio just as a picture unfolds on a screen.

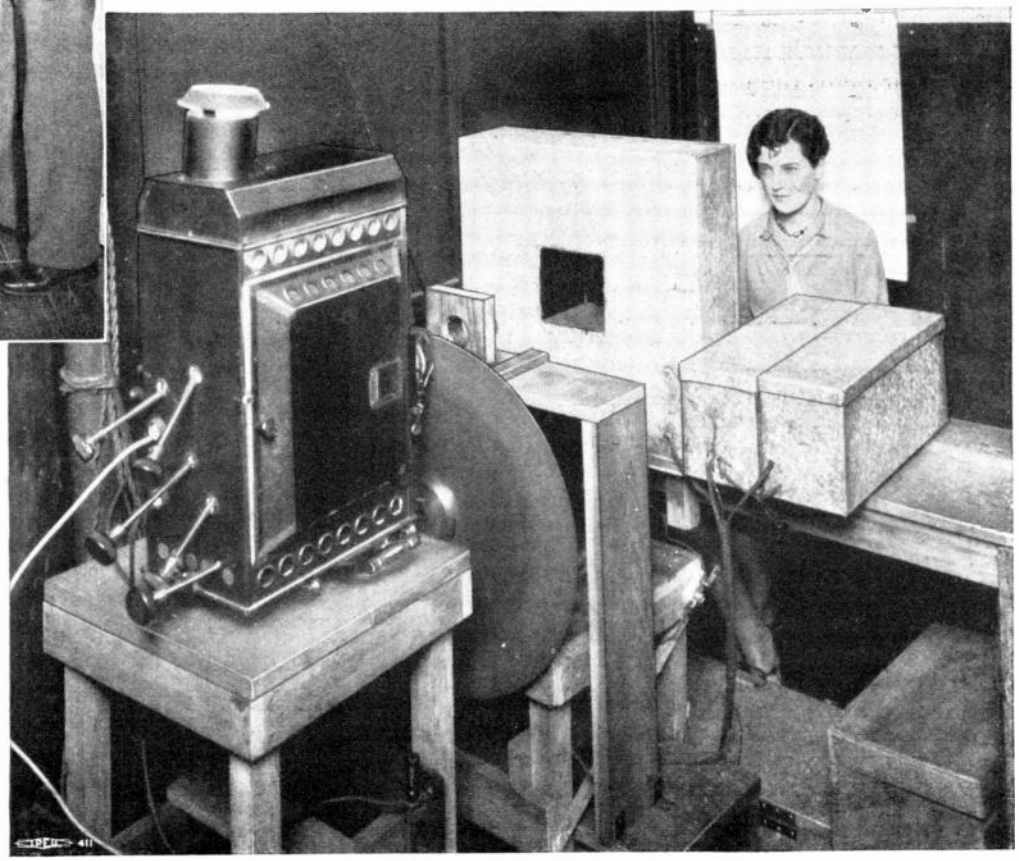
The first home television set is of very simple construction, not unlike the familiar phonograph cabinet in size and exterior appearance. It was developed by Dr. E. F. W. Alexanderson, consulting engineer of the Radio Corporation of America and the General Electric company, and his assistants in the laboratory in Schenectady.

In this instance the transmission of the moving object was made on 37.8 meters wavelength while the voice was simultaneously sent through the air on 379.5 meters, the normal wavelength of WGY. The receiver which Dr. Alexanderson used differs from the ordinary short-wave receiver in that it converts the electromagnetic wave into light instead of sound and the light becomes an image corresponding in movement to the action of artist at the transmitting end.

"While this is an historical event comparable to the early experiments in sound broadcasting, the greatest significance of the present demonstration," declared David Sarnoff, vice-president and general manager of the Radio Corporation of America, "is in the fact that the radio art has bridged the gap between the laboratory and the home. Television has been demonstrated both in this country and abroad prior to this event, but it did

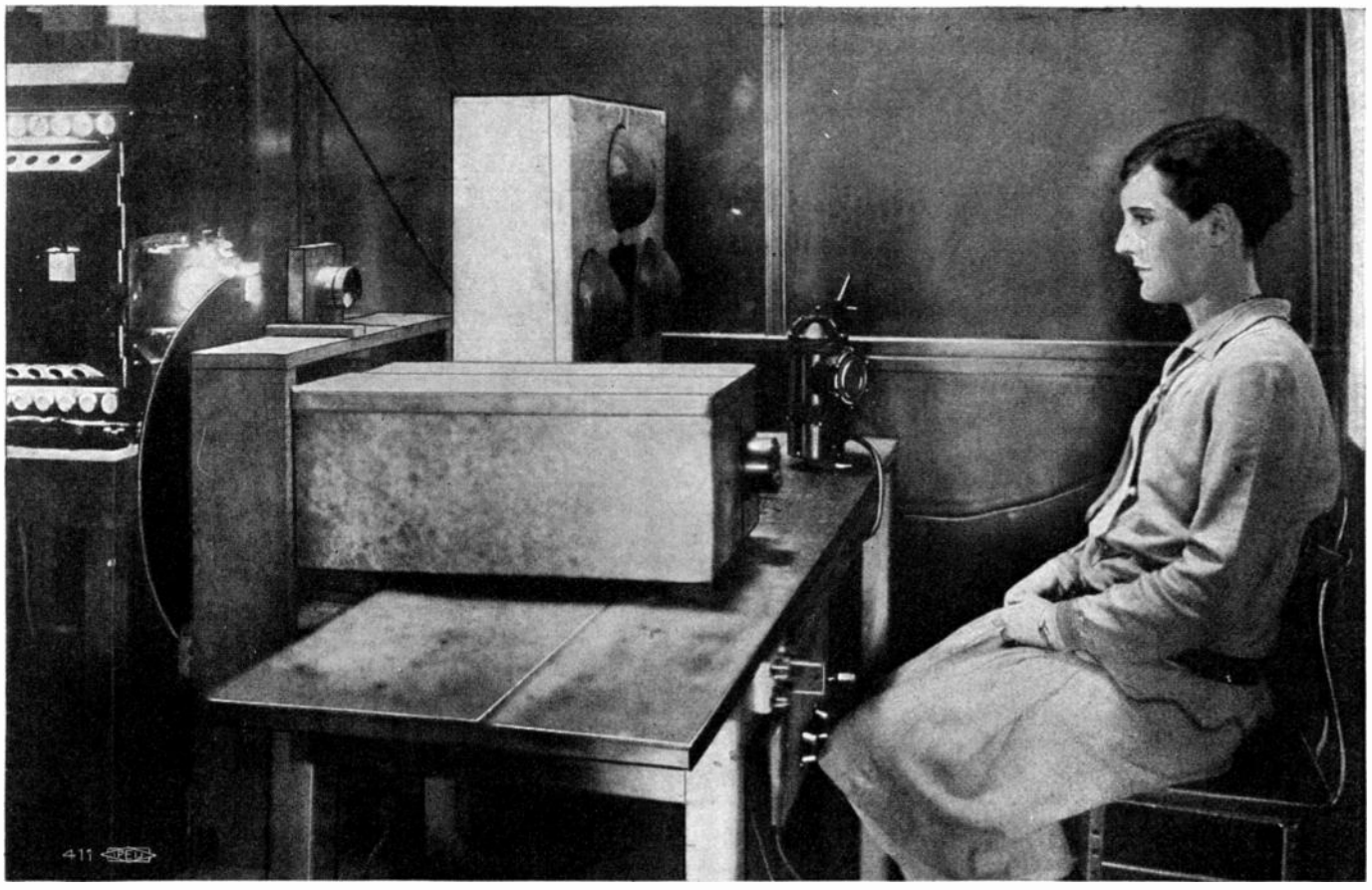
Television receiver for the home is compact and neat, occupying no more space than a phonograph.

WCFL is preparing to broadcast pictures. Watch our September issue for details.



Above — The most conspicuous part of the television receiver is a disc, tweny-four inches in diameter, with forty-eight small holes in it.

At the right — The perforated disc is also the central part of the television broadcasting apparatus. This picture was taken in the laboratory of Dr. E. F. W. Alexander.



This view shows the location of the light and lenses in television broadcasting apparatus.

not seem possible within so short a time to so simplify the elaborate and costly apparatus for television reception, that the first step might be taken towards the development of television receivers for the home.

"With all that has been accomplished there are still many experimental stages to be traveled before a practical television service can be established. The first step contemplated is the placing of laboratory models of the present television receiver at central and strategically located points so that with the aid of technically trained observers, future experiments may be continued not only in the reception of but in the simultaneous transmission both of sight and sound.

"Sound broadcasting has now developed to an art and industry of world-wide scope and significance. The television receiver as at present developed will supplement and not replace the modern radio receiving set in the home. Broadcasting television, it seems clear, will develop along parallel lines with broadcasting of sound so that eventually not only sound but also sight through radio broadcasting will be available to every home," Mr. Sarnoff concluded.

The elements of the television home receiver are a light source, the scanning device and the synchronizing system. The signal, or electro-magnetic wave from the television transmitter, is received in equipment designed to receive modulations as high as 40,000 cycles. The amplifier is substantially the same as the amplifier of the home loud speaker. The receiving system differs from a modern loud speaker system in that a neon gas-filled lamp is substituted for the loud speaker. The amplified current is delivered to this lamp known as the Moore lamp, which responds to the intensities of the current and gives fluctuations of the light intensity just as a diaphragm of the loud speaker reproduces pulsations of the air waves.

The scanning disc is 24 inches in diameter with 48 small holes, each hole 35 mils in diameter and arranged in a spiral so that each of the 48 holes will pass each other and trace successive lines of the picture, completing, or literally painting, a picture in one revolution. In other words, if the disc were revolved very slowly a ray of light through successive holes would trace over the entire object. The disc is revolved by a standard motor, similar to those used in household devices such as the washing machine or vacuum cleaner. The revolutions occur at a speed of 18 per second, slightly faster than a film passes through a motion picture camera. An observer, looking at at this revolving disc as the light from the Moore lamp shines through these small holes, would see the image being sent by radio but this picture would be but 1½ inches square.

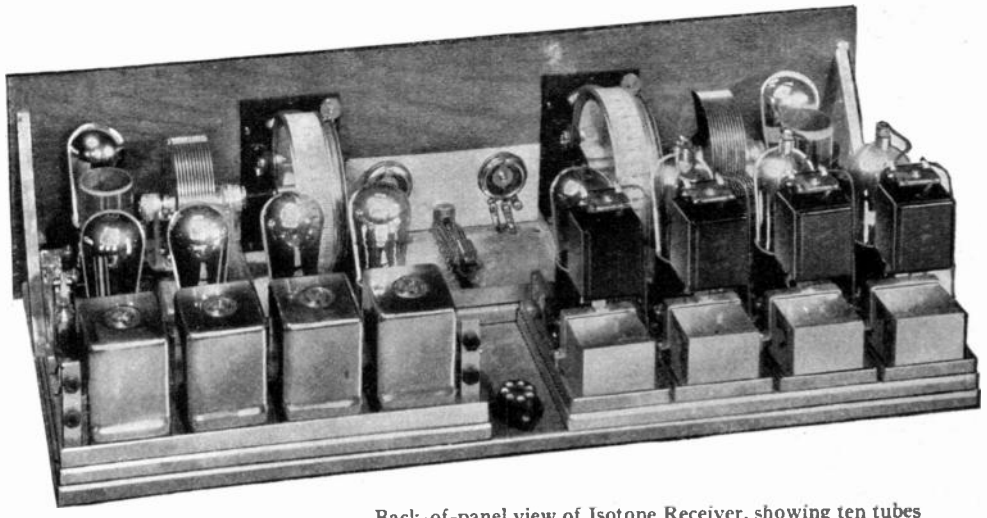
Magnifying lenses enlarge the picture twice, so that it is 3 inches square in the aperture in the front of the receiver cabinet.

Synchronization of the scanning disc of the receiver with the scanning disc of the transmitter is obtained by manually operated control, a push button held in the

(Continued on page 98)

The H. F. L. Isotone Receiver *and* Phonograph Amplifier

By
J. H. WELCHES



Back-of-panel view of Isotone Receiver, showing ten tubes with shields removed. At the right is the screen grid amplifier and at the left the audio and phonograph amplifier.

IT IS with considerable enthusiasm that I set about to describe one of the very finest musical instruments that has as yet been introduced to the professional and amateur custom set builders. The word finest is used in its fullest sense. I mean tone quality that is unexcelled, distance range that leaves small room for improvement, and selectivity that will enable the operator to cope with the most serious situation in interference. By finest, I mean appearance so different that it leaves very little to the imagination. By finest, I mean that intangible certainty and confidence in operation which one feels when he knows that if a particular station is on the air, then he will be able to get that station.

Two quite famous radio engineers who designed this receiver—E. K. Oxner and William Dumke—worked mentally for a couple of years on it and were engaged in experimental work for six months. In that time working every day and a good many nights, they went through over 800 electrical set-ups which were required for the various measurements. They designed, tested and discarded fourteen kinds of radio frequency amplifying units for use with screened grid tubes. Over fifty different radio frequency systems were considered and worked out mathematically. Eight semi-final models of the completed receiver under description were hand built before the accompanying pictures could be presented.

If you could have worked with these two men day after day and night after night in their testing laboratory and watched these various models being built up, measured and discarded, over and over again until a satisfactory system was finally realized, I am sure that you would have an entirely new conception of a modern radio engineering laboratory.

This receiver is so unusually efficient and there are so many new features to talk about that the only way in which we may do justice to it is to consider it in sections. However, before splitting the receiver up into individual units for inspection purposes, let us assume that you have built one of the sets and that you have just completed a very satisfactory job. Let us look at the receiver just as you would see it sitting on your own kitchen table, or if you are one of those fortunate individuals, on your own work bench.

No doubt the first thing that will catch your eye is the name plate which bears the simple inscription H. F. L. Isotone. The word Isotone means perfectly balanced tone and it is a fitting word to describe such a product. The letters H. F. L. are a symbol for reliability and satisfaction to hundreds of thousands of set builders throughout the nation.

This instrument is a combination radio receiver and a three stage push-pull phonograph amplifier. The receiver itself is of the super-heterodyne type and makes use of a screened grid intermediate frequency amplifier of the one-spot type.

The front panel, designed by one of the country's foremost radio panel artists, furnishes an excellent background for the two hand-hammered, illuminated control dials of the rotary drum type. There is a small knob for controlling the sensitivity of the receiver and another one for controlling the volume of the radio amplifier and the phonograph amplifier. In the immediate center of the panel there is a three-position switch, an automatic control for the entire instrument.

EDITOR'S NOTE

We are pleased to present the first release on the receiver described in the accompanying article. This description would ordinarily not be available until next September. WCFL Radio Magazine would appreciate comments and criticisms on this article. We are, at all times, anxious to know how these advance releases are accepted by our readers. Address all letters to Editor WCFL Radio Magazine, 623 S. Wabash Avenue, Chicago, Ill.

This view shows the neat and compact shielding of the H. F. L. Isotone and the attractive panel.

Looking back of the panel we see that the receiver is comprised of four units: a completely shielded tuning assembly on which the two variable resistance controls and the control switch are mounted; a completely shielded three-stage screened grid high-gain intermediate frequency amplifier; a completely shielded three-stage push-pull power amplifier, and the fourth unit which is the base assembly pan which mounts the above mentioned three units.

The three units have individual steel sub pans, cadmium plated and satin finished. Each of the three units is assembled, wired and tested at the factory and the wiring of each unit is concealed under the one-half inch of space between the individual steel sub pans and the large foundation pan. Each of the three units has an individual set of terminal blocks which protrude down through holes in the main foundation pan and allow battery connections to be made from one unit to another by virtue of metal jumper strips.

To construct this highly efficient receiver and unusually powerful phonograph amplifier, the builder has less than an hour's work. He has but to bolt down the three assembled and wired units to the foundation pan, turn the receiver up side down, bolt on twelve metal jumper strips and solder seven flexible wire connections from the terminal blocks to the battery cable socket.

The copper shielding is quite thick, in accordance with the Bureau of Standards recommendations, and in the radio frequency section, each stage of amplifier is individually shielded. The entire amplifier is therefore perfectly shielded both electrostatically and electromagnetically.

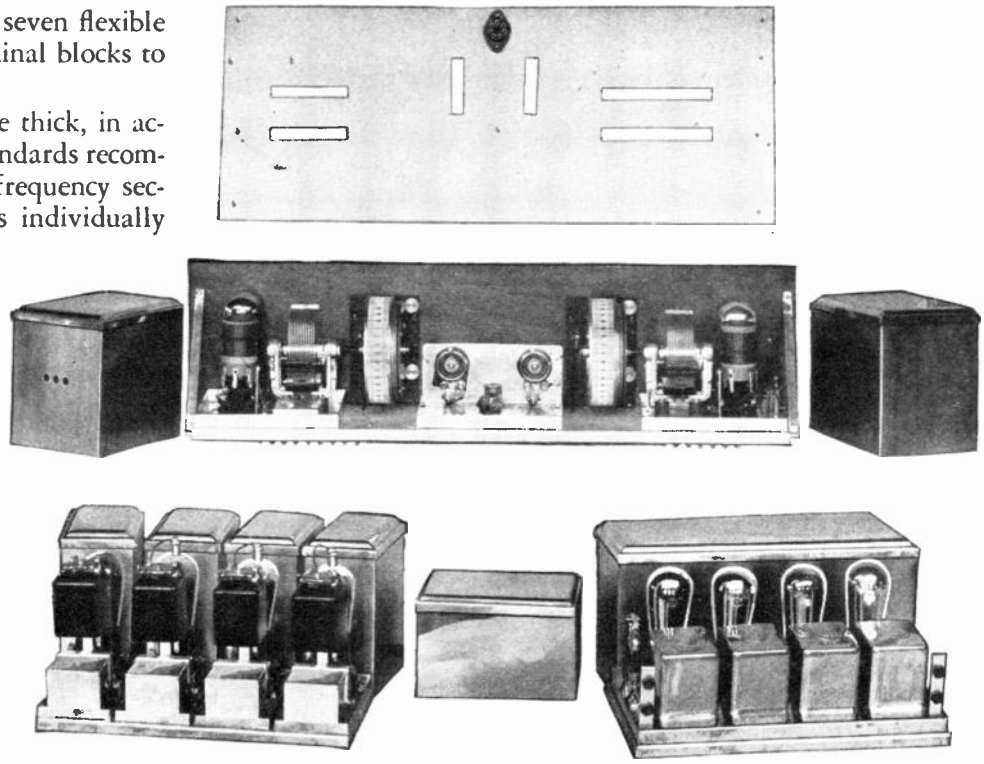
To carry out the perfect shielding idea, the wiring has been shielded by virtue of the space between the individual sub pan and the larger foundation pan and, in addition to this, the radio frequency output or plate lead is shielded by a flexible copper sleeve at the point where it passes from one stage to another. The radio frequency amplifier is therefore one which has an unusual degree of stability and an exceptionally high gain which has never before been realized in an amplifier of this type.

The actual radio frequency gain per stage can be taken as about sixty-five. This gain of sixty-five per stage can be easily measured under operating conditions.

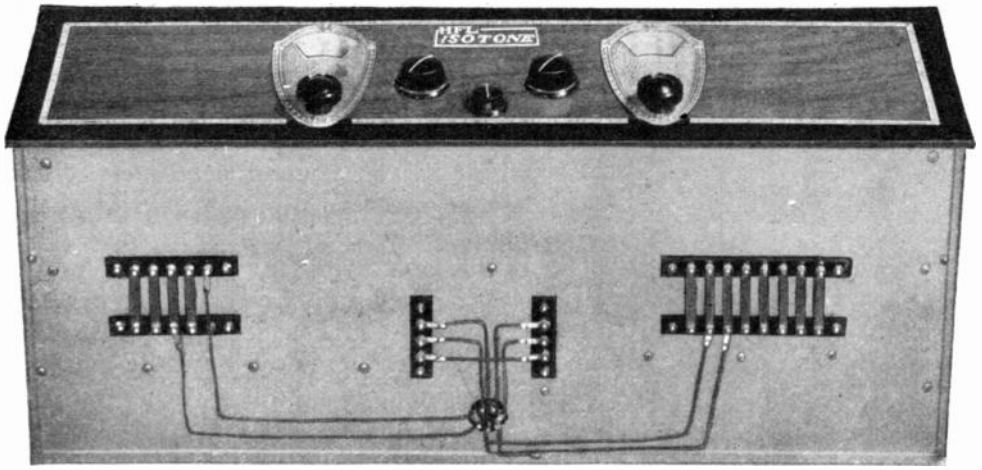
The H. F. L. Isotone has been designed to operate with either a loop or outside antenna, although from an engineering viewpoint the loop antenna is very much to be preferred. Extraneous noises are minimized and the loop allows a larger degree of selectivity. In view of the unusually high gain of the amplifier, an outside antenna is not necessary. The only excuse for employing one of them is in the case of a steel constructed building which would tend to shield a loop antenna, in which case an antenna of 20 or 30 feet will operate quite satisfactorily.

One of the most important features of the H. F. L. Isotone is that it is designed to operate with a standard A battery or A unit and a standard 180 volt B eliminator or batteries. The voltages required from the B eliminator are 45-90 and 180 volts. The audio frequency amplifier has a push-pull combination built into the last stage and has an undistorted output, great enough to drive the largest loud speakers and even drive the dynamic cone speakers to their maximum limits. Music from both radio stations and phonograph records can be perfectly controlled from a mere whisper to full dancehall volume.

The tuning assembly consists of an antenna tuning



Here are the Isotone parts just as the builder finds them when he opens his kit. Putting them together is a very simple matter. The set can be built in less than an hour.



Ten short wires and twelve jumpers complete the wiring of the Isotone. The arrangement is very simple.

unit, a frequency changing unit, two illuminated drum dials, two controls for sensitivity and volume, the control switch, the base assembly pan and all of the miscellaneous by-pass condensers, tube sockets and fixed resistors.

The antenna tuning stage consists of an antenna coupling coil which is provided with antenna and ground binding posts and tip jacks, so that it can be taken out of the circuit and replaced by a standard loop antenna. The tuning condenser is a Hammarlund .0005 Midline and the socket is of the Benjamin non-microphonic type. These sockets are used throughout the receiver. The tuning dial is a national hand-hammered silver-finished illuminated drum, which is driven by means of a heavy cord working in a vernier arrangement, which allows very fine tuning and eliminates all back lash. This section of the receiver uses a 201-A tube, as experiments have conclusively proven that this is the most satisfactory tube to use at this point.

CENTRAL SWITCH SERVES SEVERAL PURPOSES

The center section of the tuning assembly consists of a control switch which serves several purposes. Primarily it turns on the radio set. In this position, nine of the tubes are cut into the circuit through fixed and ballast resistors. Throwing the switch to the opposite side cuts off the entire radio frequency section of the instrument and automatically connects the phonograph microphone transformer and its associate 112 tube into the circuit. Thus, for phonograph use, the amplifier is a three-stage push-pull arrangement, using power tubes throughout and having an audio frequency gain of about 2,000.

When the audio amplifier is used for radio reproduction the first stage is automatically disconnected and the gain across the two-stage push-pull amplifier becomes about 100, which is more than enough considering the unusually large voltage input from the second detector tube.

Just to the left of the control switch is a variable resistance which controls the sensitivity of the intermediate amplifier. At this point it is in an excellent position to control background noises such as result when nearby stations are being received.

The volume control to the right of the control switch is one of the standard variable voltage dividing rheostats, which is connected directly across the first audio frequency transformer. Thus the operator is able to control the volume on both the radio receiver and the phonograph with a single control.

The right section of the front unit assembly is the frequency changing circuit which consists of an oscillator coil, a one microfarad condenser, another drum dial, miscellaneous by-pass condensers, resistors and a socket. The oscillator and antenna tuning circuits are designed so that the two drum dials operate at substantially equal numbers over the entire tuning range of the receiver.

By far the most important unit in the receiver is the screened grid intermediate frequency amplifier. This is the point which required real engineering skill. This is the very heart of the entire receiver and this particular instrument is particularly responsible for the unusual stability and the tremendous range of the receiver. So accurate is the design of this unit that 10 kilocycle selectivity is a thing of the past, and we may now say that 8 kilocycle selectivity is an absolute possibility, if one cares to operate the receiver in such a fashion.

The four sections of this amplifier have four individual stage shields, which fit down over small steel trays which are spot welded to the individual sub pan which serves as a base for the amplifier unit.

An analysis of one of these stages will describe the entire amplifier as the other three are exact replicas of the first one which consists of the following units: One socket, a grid biasing resistor, three by-pass condensers, which have a very low resistance to radio frequency currents, an intermediate frequency coupler with a trimming condenser across the secondary circuit and with the exception of the last (or detector stage) a 222 screened grid tube. The detector stage makes use of a 112 tube using plate circuit rectification. This is about the only low-powered tube which will handle the heavy voltage which is built up across the intermediate amplifier.

The intermediate amplifier frequency is approximately 450 kilocycles, and the individual trimmers in each stage allow the operator to compensate for the internal capacity variations of the screened grid tubes. This same operation results in a perfectly peaked amplifier and one which furnishes the absolute in selectivity. An ordinary screwdriver will serve to tune the coupling units and the balancing operation requires less than two minutes. This consists of tuning in a long distance station and tightening or loosening the trimmer condenser until the signal reaches its loudest point. The operation is repeated across the amplifier and thus it is perfectly matched until such time as it becomes necessary to replace one of the tubes, at which time the trimming operation should be repeated.

It may be well to say a few words about the screened grid tube as an audio amplifier. Tube manufacturers recommend that a ¾ volt negative grid bias be applied to this tube. Obviously such a tube would be totally unsuited for a first stage audio amplifier in this receiver. Inasmuch as the input voltage exceeds six volts a screened grid tube at this point would be overloaded more than five hundred percent. This would result in a very large distortion factor. In addition to this there are other very good and sufficient reasons why the screened grid tube is totally unsuited to act as an audio frequency amplifier in a receiver where the tone quality is to be kept above the average standard.

TESTS PROVE ISOTONE'S ABILITY

The original tests with the H. F. L. Isotone receiver were made in the testing laboratory of the High Frequency Laboratories, 28 N. Sheldon St., Chicago, Illinois. This is about a mile away from the loop section of Chicago and the interference at this point is something terrific. The first time that

(*Continued on page* 31)

Veto Rouses Farmers *to* Action

Slaughter of McNary-Haugen Bill Shows Need of Unionization

IN BITTER, savage words echoing the centuries of old-world tyranny and dictation to a peasant population, Calvin Coolidge smashed down the hopes of thirty million American farmers for legislation to restore economic equality to agriculture. The McNary-Haugen bill which represented the best intelligence and earnest thought of farm leaders upon ways and means of giving farm people a fair share of the national income was thrown out of the White House as "a cruel and deceptive piece of folly."

The President's action was taken in the face of Congress having passed this measure by an overwhelming majority for the second time. Senators and representatives of the whole American people have twice demanded approval of the McNary-Haugen bill without success. The veto on May 23rd was accompanied by the most vicious tongue-lashing ever administered to any group of our body politic.

"The veto message clearly reveals the mailed fist of big business and its financial hierarchy," is the opinion of a prominent spokesman for farm organizations in the middle west. "The President plainly and without equivocation delivers the final decree of vested interest and privilege—'the farmer be dammed.' "

In Nebraska, Governor Adam McMullen, upon learning of the veto, called for a hundred thousand farmers to march upon the Kansas City convention of the G. O. P. in a demand for economic justice. Henry Wallace of Iowa declared that "the administration program will tolerate nothing which would restore to the middlewest and south, the same share of the national income which these sections had before the world war." Frank O. Lowden of Illinois stands by with the declaration that he is for the McNary-Haugen bill until a better plan of relief is offered.

MAKES LABOR SITUATION ACUTE

It is clear that a policy of "starving out" the so-called poor farmers and forcing them to seek employment in the cities has found favor with the administration at Washington. The migration from farm to city which has grown to alarming proportions will be given fresh impetus by this action of the President. Thousands of farmers have been hanging on in the face of disastrous losses and mortgage burdens with the belief that the McNary-Haugen bill might provide relief. This phase of the situation offers the greatest problem, not only for farm leaders but for organized labor as well. Present conditions in the labor field are already strained to the breaking point and a fresh influx of job-hungry, untrained farm folks would be alarming. It is unthinkable that this bill should be consigned to oblivion without a single constructive suggestion on how to solve the problems of agriculture.

Active leaders of farm organizations and coöperative marketing agencies were generally prepared for the veto. The only surprise was the savagery displayed in the President's veto message. Considerable doubt was expressed as to whether the message had been dictated by the White House or by the inner circles of Wall Street.

Without any exception the whole group of organized farmers stood behind the McNary-Haugen bill as the only workable means of providing legislation for the relief of agriculture. Among leaders of the different groups there was, however, a deep-seated conviction that the bill would be blocked by the "strong silent man" from the rock-ribbed hillsides of Vermont.

MARKETING IS THE VITAL PROBLEM

"We regret that the President saw fit to veto this bill without offering something in its stead," said Frank E. Wheatcraft, manager of the Farmers Union Livestock commission at Chicago stockyards. "Mr. Coolidge has taken one article of our program for emphasis in his veto message. He declares as his firm belief at all times that the sound basis for action on behalf of agriculture is to build up marketing agencies and facilities to control the sale of grain, livestock and other commodities." This has always been the purpose and the goal of the Farmers Union, which is a self-help organization.

"Due to the very nature of farming, organization into compact units is supremely difficult," Mr. Wheatcraft explained. "The Farmers Union was organized more than twenty-five years ago at Point, Texas. Even in that remote period, the truth had become apparent that marketing rather than production was the vital problem of agriculture. The Farmers Union was premised upon the principle of selling together at profitable prices. Practically every product has been handled by our sales agencies which now operate twenty-eight states. The government has at no time extended assistance to the Farmers Union. Rather it has been the policy to foster increased production—to reclaim arid lands—to subsidize schools, colleges and agents in stepping up production. This blind policy of encouraging and fostering competition in production without thought to the marketing processes has brought disaster to the rural districts and it is clearly up to the government to assist in solving the problem which it helped to create." Mr. Wheatcraft believes that the Farmers Union will now go forward along the same lines, stressing the importance of coöperative marketing and winning new adherents among progressive farmers who realize that blind competition or cut

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The MENACE *of* Radio Monopoly *and the* Radio Corporation *of* America

A NEW field always offers greatest opportunities for commercial exploitation.

The realms of the earth and the sea have long been conquered and their exploitation commercially is either complete or well projected along intensive lines. A new field offers the greatest opportunities for business development and, therefore the realm of the air offers stupendous possibilities of monopolistic control. For this reason Big Business has its eye on aeronautics and radio.

The word MONOPOLY comes from two Greek words which mean "Sole selling rights" or the "Exclusive right to sell." Of course such a right is desired by the Radio Corporation of America as it enables them to raise their prices relative to costs and thus greatly increase their profits. As the realm of the air is new and not as yet exploited, we may look for the most intense effort to secure monopolies in both radio and aeronautics.

A study of monopoly shows that it is of two kinds, natural and artificial. A natural monopoly is the sole control of natural materials or resources. An artificial monopoly may be had in a number of ways and the two best methods, best because legal, are by patents and by special legislation. These are the means now being used most effectively to secure a radio monopoly.

The first would be a monopoly of products or materials created by mechanical devices. There may be some justification for an artificial monopoly in order to safeguard and guarantee reasonable return upon the finances involved and to make possible mass production, which is the only way such products and materials could be produced with profit.

The other, a monopoly of natural resources, is unthinkable, unless we are agreed that it is just and proper to disinherit the living men and women of today. The natural resources of any nation are Nature's gift to the living men and women of that nation. To deny or prevent them from enjoying the benefits of these natural resources through special privileges in the form of a monopoly, is on a par with legalizing highway robbery.

It is true that we have monopoly of natural resources in this country and now another similar outrage is to be perpetrated upon the people. We are to have a monopoly of the air, if the present schemes of the gigantic financial interests are permitted to go through.

It follows that when monopoly is to be secured by new legislation, the law-making body must be manipulated in a manner to enact the laws desired by those who will be benefited by the monopoly thus to be established. In addition, the interpretation of the law must be through courts inclined to favor the interpretation desired by the beneficiaries, while the administration of the law must be through a department or a commission, controlled or in sympathy with the privileged ones in whose special interests the law has been enacted.

> MANKIND *has these domains: the earth, the seas, and the air.*
>
> HIS *conquest of the earth is quite complete.*
>
> HIS *conquest of the seas is less complete.*
>
> HIS *conquest of the air has but barely begun.*

The patent laws are old and very little change has been made in them for many years but something happened a short time ago which has vitally affected the administration of the Patent Office—the Patent Office has been transferred from the Interior Department where it was for decades and given to the Department of Commerce. Why? The transfer was made quietly and little comment appeared concerning it. The matter deserves study.

The patent laws were originally enacted to encourage invention by assuring to an inventor a return on his invention. The theory is good, but industrial and commercial conditions have so changed in the United States that 99.9% of the inventors actually receive absolutely nothing or next to nothing from their inventions. The original purpose of the patent laws has been so aborted that today they have become merely the legalized protection for some of the worst monopolies known in this country. The Radio Corporation wants no new patent legislation; for them the laws are good as they stand, and even were the courts not sympathetic with Big Business the cost of patent litigation can be made such that no inventor not a millionaire can successfully carry through patent litigation against a monopoly unrighteously infringing his patent. But the administration of the Patent Office certainly might be changed by a transfer. Is it thinkable that such a change could prove of advantage in any way to the Radio Corporation?

Democracy never functions with 100% justice or efficiency and a Radio Commission even faulty as it is, is probably the best form of control which can

BUT *why is a radio monopoly desirable?*

THERE *are two chief reasons:*

THE *First is to* CONTROL PUBLIC OPINION.

THE *Second is to* MAKE MONEY.

be devised for radio but the acts of this Radio Corporation now seem of the worst possible character and certain to produce the monopoly in radio all lovers of freedom in the United States should earnestly combat.

The history of the world may be written under several texts. One of these texts could be, "The Efforts of the Few to Control the Many for the Selfish Aggrandizement of the Few."

The Aristocratic Few have always endeavored to enslave the many. "Knowledge is Power," and when one is smarter than you are he can control you. Ignorance is weakness. If by lying to you or by hiding the truth from you he keeps you ignorant he can the more easily control you for his own selfish ends.

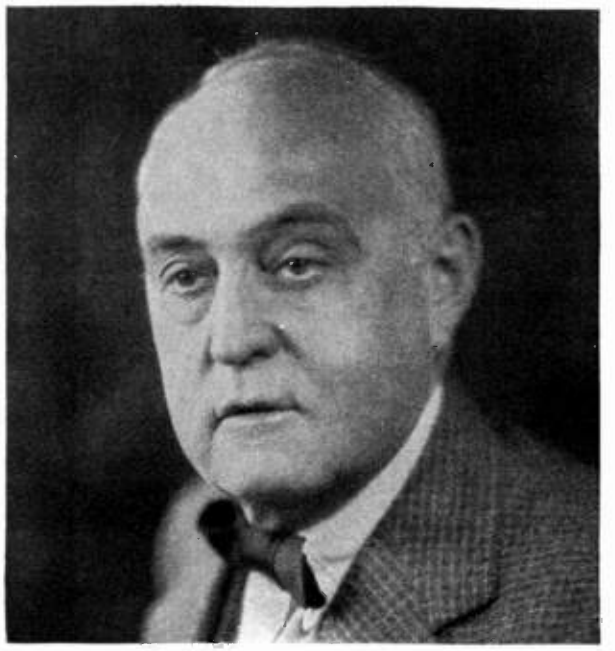
When the printing press was first invented, was is welcomed? No. The aristocratic ruling class regarded it with the utmost fear and aversion. They held it to be the greatest possible menace to their class, and only two presses were licensed in all England. A tyranny, whether in politics or religion, thrives best when its adherents are the most ignorant. Only the truth enlightens. A man who believes a lie is still ignorant and becomes but the tool and the servant of the one who told him the lie.

The printing press could not be forever kept down. Its secret use kindled and spread the fires of freedom until throughout the world the old political and religious absolutism has been done away. But economic absolution, that of industry and finance, remains.

In several ways radio is even more effective than the printing press and if, in man's emancipation from physical, religious, political, and economic slavery, the printing press is of first importance, radio is certainly second. The efforts to control radio by the air hogs is perfectly apparent. History but repeats itself.

The same cloven foot is seen in the attempts now being made to find excuses to limit the assignment of short wave lengths, and even the Department of Commerce itself has applied for short wave lengths to give them later to private aviation companies! ! ! Shades of Jefferson and Lincoln! Is there no one in the United States with the love of freedom and the courage vehemently to protest against this sort of thing?

Radio is a most powerful means of controlling the public mind. Television has come and, as 15% of the people understand nothing but pictures, the power of radio to influence opinion has become that much



EDWARD N. NOCKELS
Secretary Chicago Federation of Labor

greater. In addition 30,000,000 people can be reached and influenced in an instant of time.

Psychologists know that the human mind has a limit in receiving impression and, when many impressions are being received, as in the case of a business man during a busy day, none of them except perhaps the last, has a great chance of making a deep dent in his mind.

But when one is relaxed at home in the evening, in a passive state, with no impressions crowding upon the mind, the suggestions over radio come with great force and, as they are the last received before sleeping, their effect can be tremendous, for when one wakes up in the morning the effect in multitudes of cases is permanent.

There can even be a negative propaganda in the use of radio. The Roman emperors and aristocrats plundered the people—but gave them spectacles and games and entertainments to keep them contented.

Big Business in radio simply repeats history and its programs, when not outright propaganda or delusive special pleading, are chiefly entertainment, entertainment, entertainment. Just keep the "Sweaty night-cap" masses pleased and contented!

Throughout history the religious institutes have chiefly been self-seekers. They, like the traders in the wheat pit, are natural monopolists. They want a "corner" in religion, and usually stand in with the stand-pat crowd, the "let-well-enough-alone" aristocrats. Religion, too, can make men resigned and long-suffering under hardship. It makes for a purer, nobler life, but it also might awaken a demand for justice.

As for educational broadcasting, save in musical entertainment, they will have none of it. They say

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Radio Speeds Operation *of* Trains

Cab-Caboose Broadcasting Has Many Uses

A SUCCESSFUL public test of radio communication on trains was made January 26 on a 110-car freight train running from Selkirk yards, New York, to Utica over the New York Central lines. A large group of railroad officials and radio engineers was carried, and constant communication was maintained between the caboose and the locomotive cab.

Over the 95-mile trip both conductor and engineman, though separated by more than a mile of intervening freight cars, were in oral communication at will, and without any aerial interruption whatever, or interference with their customary duties.

During the trial trip communication was established between conductor and engineman on the moving train, and the signal tower at South Schenectady, when the train was eight miles away.

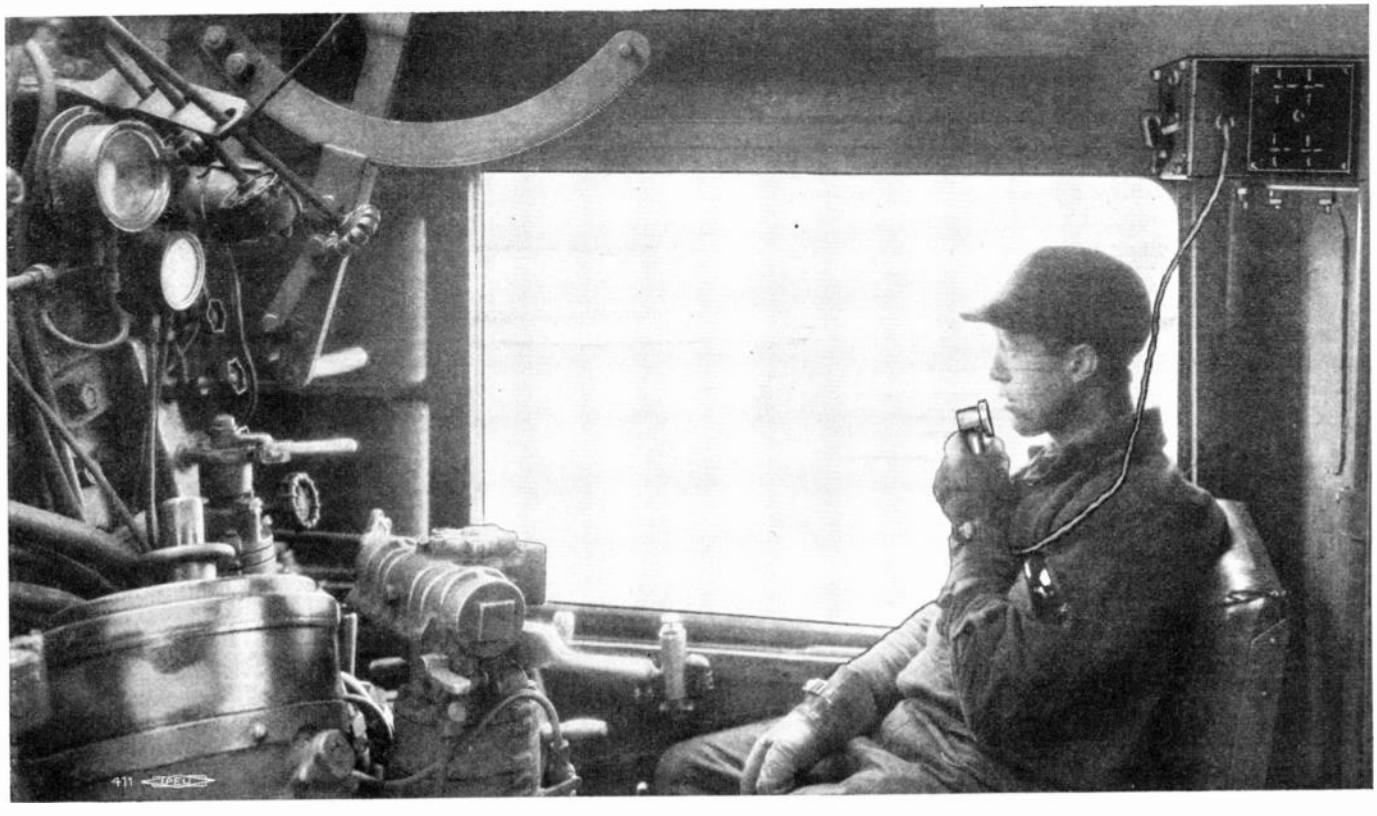
E. W. Rice, Jr., honorary chairman of the board of directors of the General Electric company; E. P. Edwards, manager of the General Electric radio department; S. H. Blake, chairman of the General Electric standards committee, and W. B. Potter, chief engineer of General Electric railway department, talked from the tower to D. B. Fleming, assistant general manager of the New York Central lines, in the caboose, extending their congratulations on the establishing of this new and effective means of communication.

The communication is afforded by small, compact, low-power radio transmitters and receivers operating in the 109-130 meter band. At this wave length the equipment on the train demonstrated that its use set up no interference with outside broadcasting or public radio reception, and in turn it was noted that other broadcasting service in no way interfered with the train communication.

One of the principal features noted by the observers aboard the train was the simple and easy manner in which communication was interchanged. Pushing a button in the caboose caused a piercing whistle to issue from the powerful loud speaker located in the cab of the locomotive over the engineman's head.

The engineman had only to pick up a familiar type of hand telephone to establish the connection, and the conversation between himself and the conductor in the caboose was carried on as easily and fully as clearly as an every-day telephone conversation in the factory, office or home.

This easy method of talking between the extreme ends of a long freight train, if put into general use, would serve to reduce to a minimum hitherto unavoidable delays in the movement of this class of train. These delays arose because of the distance intervening between the locomotive and the caboose, which limited the carrying on of communication by hand signals and light signals or the dispatching of mess-



New York Central engineman communicating with caboose of his train by means of radio.

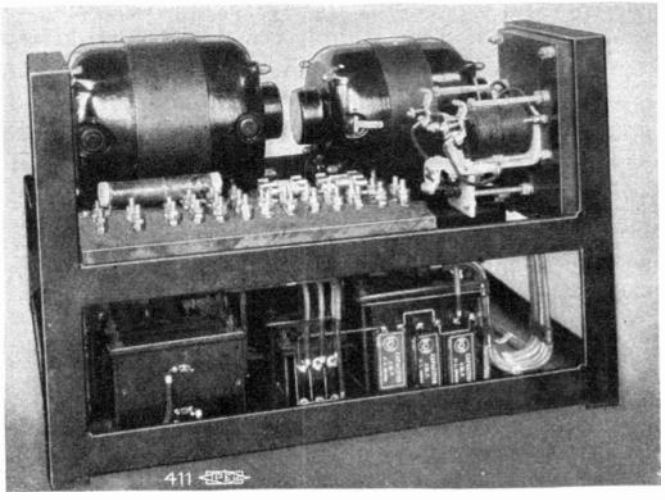
ages on foot by members of the crew. All three of these methods were normally slow and have proved for years great consumers of time.

By the general use of this radio equipment, the railroad observers pointed out, there would be a material cutting down of delays to freight trains, that result from occasional incidents such as the parting of an airhose, the development of a hot box, or the necessity of setting out cars on sidetracks between terminals.

Another feature of the simplicity in the use of this equipment is that it is adjusted and tuned, to the particular wave lengths desired, at terminal points. The entire apparatus is then locked up and no attention is required by the train crew during a trip. The starting and stopping of the transmitter is all automatically performed by the simple action of picking up the telephone.

The demonstration of the equipment as witnessed by the railroad officials follows several months of its continuous and satisfactory service in experimental operation.

On this particular trip considerable time was saved at the start of the run. When the customary pusher engine, which is used to assist in starting the train from the yards, arrived, the engineman was promptly

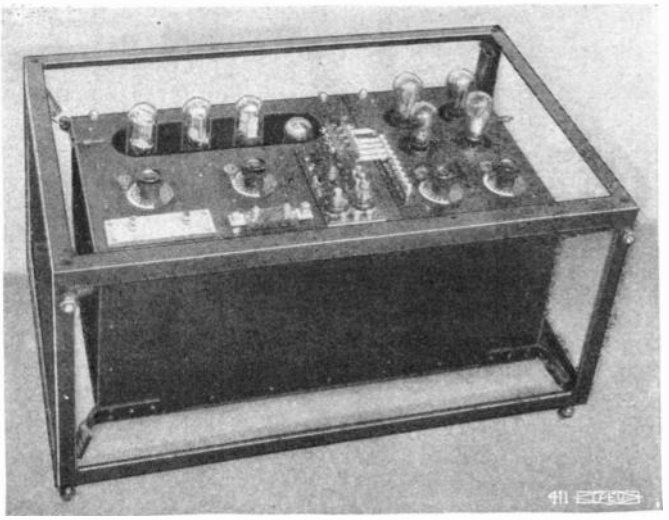


Power unit for transmitter used in broadcasting from caboose of train.

advised over the radio that the pusher was ready to go. Quickly in turn the start signal was relayed back to the engineman. When the latter signal was received both engines started at the same time and the train was off immediately.

The equipment used on both locomotive and caboose sets is comparatively of simple structure and compact. On the locomotive a metal box holds the transmitter and receiver. It is made of steel boiler plate, welded together, and is installed on the deck of the tender. It is completely weather-tight, being made to exclude water or other foreign material. The entire assembly is supported by eight springs, and in addition a system of snubbers is provided to prevent excessive oscillation.

The transmitter compartment contains three 50-watt



Simplex transmitter-receiver unit used in radio communication between cab and caboose.

tubes and one 7½-watt tube. Four of the latter size tubes are used in the receiver. The 7½-watt tubes are the standard train control type, the reliability of which has already been proved by extensive use in signal department service. The 50-watt tube is a standard design used for aircraft and marine applications for a number of years.

The power unit for the equipment, which contains the necessary dynamotors, filter condenser, reactors, etc., is also housed in a metal container. Two dynamotors are utilized. The larger one operates only when transmission is taking place, and supplies plate voltage at 1,000 volts, direct current, to the transmitter. The smaller machine runs at all times when the equipment is on the road and delivers plate voltage and bias voltage for the radio receiver. Its use permits the elimination of all batteries in the set.

Power on the locomotive is supplied from the headlight generator, no storage batteries being required. On the caboose a standard generator, driven by a belt from the axle, is used to charge a 32-volt storage battery. This battery supplies all the power required for transmitting and receiving. The total amount of power drawn by the equipment when transmitting is approximately 30 amperes at 32 volts, direct current, while in receiving, the current is approximately five amperes. This is the current required by the receiver dynamotor and the receiver filaments.

The loud speaker used in both engine and caboose is of a special type capable of producing a maximum amount of voice volume, and designed specially for these train sets. One loud speaker is bolted to the roof of the cab over the engineman's head. The other is mounted to the roof inside the caboose. The opening for the sound is protected by means of a heavy wire screen so that an accidental blow will not damage the sound producing units inside. Excellent speech quality is obtained from this loud speaker, obviating the use of a head-set.

The antenna on the locomotive consists of a brass

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The Scott Shield Grid Nine

THE new Scott Shield Grid Nine will give you a thrill when you hear it, for it has about every quality you have wished for in a receiver. It is rare that one finds combined in one receiver such selectivity, sensitivity and tone quality. The Scott Shield Grid Nine, however, is a set that will satisfy the most exacting. It brings in the far distant stations with such volume that you think you are listening to a local until you hear the call letters. This set gives actual 10 k. c. separation. However, this remarkable selectivity and sensitivity is not secured at the expense of tone. When used with the right type of speaker, preferably one of the dynamic cone type, you find it difficult to believe you are listening to a radio set. The tone will satisfy the most exacting musical critic.

The Scott Shield Grid Nine is a nine-tube receiver and is a product of the laboratory of E. H. Scott, designer of the World's Record Super that established world's records for the night after night of reception of stations from 6,000 to 8,000 miles distant. This new receiver is the most powerful model that Mr. Scott has brought out to date.

The new Scott Shield Grid Nine differs from previous models of the World's Record Supers in that it is a completely shielded receiver. It has one stage of tuned radio frequency using completely shielded plug-in coils. The first detector is made regenerative and regeneration is controlled by a small midget condenser from the panel. The intermediate amplifier is completely shielded and uses three of the new shield grid tubes. This amplifier has taken nearly six months to develop and is a real laboratory product. Each stage is matched to the others with the greatest accuracy.

The Scott Transformer company, who manufacture this unit, has one of the finest equipped laboratories in the country and has made a specialty of transformers for intermediate frequency amplifiers for a number of years. To secure the utmost efficiency from a superhetrodyne it is necessary that each set of transformers be perfectly matched to the others, not only for peak frequency but for amplification as well. For example, if the transformers are simply matched for peak frequency and no attention is paid to the amplification factor in each transformer, trouble will be encountered in securing stability from the amplifier. If the transformers have varying amplification factors, one stage will go into oscillation before the other. One reason for the success of the Selectone transformers is the fact that each set of transformers is not only matched for peak frequency but for amplification as well. In the new Selectone Shield Grid amplifier unit, each stage is very carefully matched with the finest of precision equipment, yet is very stable in operation.

TRIMMER LINES UP DIALS

The oscillator circuit is of the tuned grid type, the oscillator coil being made to plug in and is enclosed in a completely shielded copper can. A special condenser with a trimmer incorporated in it is used to tune the oscillator. It is a simple matter by means of this trimmer to line up both dials on the receiver.

Only one stage of audio frequency is installed on the receiver itself, the second stage being built with the power pack. Each part that goes into the Scott Shield Grid Nine has been specially designed for it and insures maximum results. To secure the utmost efficiency over the whole wave band in the radio frequency stage, it was found necessary to design a special 2-gang condenser with a different capacity tuning the antenna circuit to that for the radio frequency stage. While it is possible to use a standard 2-gang condenser, it is impossible to design inductances for the antenna and radio frequency coils that will give maximum results from the very low waves right through the whole range

to the high waves. The special Selectone 2-gang condenser supplied with kit is matched with the inductances of the antenna and radio frequency coils and gives maximum efficiency throughout the whole wave band.

One feature that will appeal to all super-hetrodyne fans especially is the fact that on the new Scott Shield Grid Nine one is not bothered with repeat points on the oscillator dial. All stations come in at one point only. This has been accomplished by the use of a special condenser and trimmer on the oscillator. A simple turning up or down of this trimmer is all that is necessary to make both dials track practically the same from 0 to 100.

SET EASILY TUNED

Another feature that will appeal strongly to practically everyone is the ease with which this set is tuned. Stations slide in, one after another, smoothly, picked up at practically every point on the dial. A point is all that is necessary to tune out any station. In Chicago, it is possible to give a receiver a real tryout. There are fifty-two stations in this area. From eight to twelve o'clock at night it takes an extremely selective set to cut through the maze of local stations and bring in distance. It is a pleasure to sit at the dials of the new Scott Shield Grid Nine. Station after station comes rolling in and until you hear the call letters, you do not know whether you are listening to a station near by or a thousand miles away. It opens up new fields for the DX fan for the selectivity is so great that we have heard stations on it that previously we had only read about in the call books.

Perhaps the reader may be thinking that a receiver so efficient and powerful must be very complicated and hard to build. Here is where another surprise is met, for it is actually possible to completely assemble the set in about four hours. This may seem like a slight exaggeration, but it is a fact that the construction of this set has been so simplified that a really expert radio man can build the set in less than three hours. The builder is supplied with very complete building instructions which show exactly where to place each part and how to run each wire. In fact, the construction is so simple that even although one has never built a radio receiver before, he will find no difficulty in constructing the Scott Shield Grid Nine.

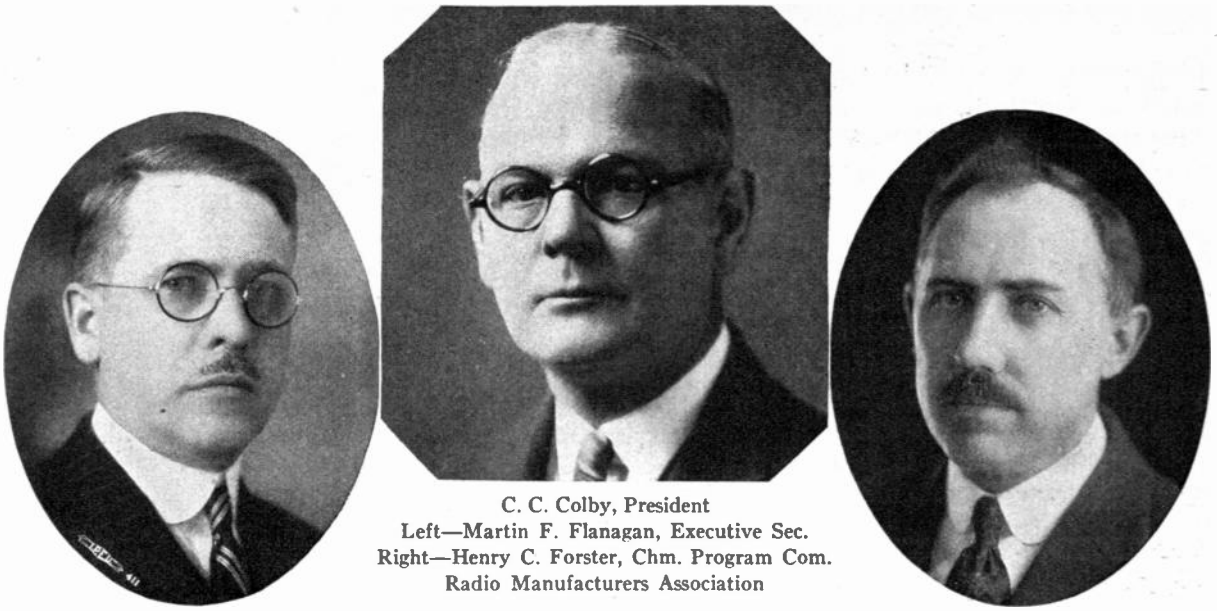
The front panel is supplied with all of the holes drilled ready to attach the parts to it. The bakelite sub-panel not only has all of the holes drilled but also has the tube and coil sockets mounted on it. The only parts necessary to attach to the sub-panel are the Selectone screen grid amplifier and audio transformer. The oscillator and radio frequency coils plug into contacts which are already mounted on the sub-panel. Most of the trouble in making a successful super-hetrodyne receiver lies in the wiring up of the set and the proper placing of the parts. All liability of failure has been removed for the various parts will only fit in one place, so that it is impossible to place one in other than its correct position. Flexible colored leads come from the bottom of the shield grid amplifier unit and are cut to the correct length to connect to the proper parts. This simplifies wiring and eliminates chances of mistakes.

The Scott Shield Grid Nine with electrically driven Phonograph and electrical pickup.

The New Tasman Console used for Scott Shield Grid Nine is a beautiful piece of furniture, an ornament to any room.

One feature that will be appreciated is the very low battery consumption, for the receiver with one stage of audio draws only 29 mills. This means that where a. c. current is not available, the set can be operated very economically with dry batteries. Where a. c. current is available, however, one can use the special B eliminator designed for the set, which has incorporated in it the last stage of audio. The last stage of audio uses one of the new 250 power tubes, which is operated entirely from a. c. current. This new tube has more than double the undistorted output of a 210 power tube. This means that one can listen to an orchestra or an organ at full volume without a trace of distortion. This new power tube is probably the last thing needed to give a perfect radio receiver, for it transforms it into a real musical instrument. While it is possible to get enormous volume from the speaker with this tube in the last stage of audio, it is not used in the Scott Shield Grid Nine particularly for volume, it is used principally to secure pure tone quality.

(*Continued on page 80*)



C. C. Colby, President
Left—Martin F. Flanagan, Executive Sec.
Right—Henry C. Forster, Chm. Program Com.
Radio Manufacturers Association

Guarding *the* Listeners' Interests

SOME three hundred makers of radio apparatus, banded together as the Radio Manufacturers association, are laboring diligently day after day to protect and promote the interests of the more than seven million owners of radio receiving sets in the United Staes—and the interests of millions more who will, sooner or later, get much of their entertainment and news out of loud speakers.

That sounds like a silly claim of altruism, but it isn't. The incentive of the manufacturers to organize was, of course, one of self-interest. Nevertheless, they recognized that their interests would best be conserved by protecting and promoting the interests of the ultimate users of radio apparatus. Therefore, fifteen radio manufacturers, headed by Maj. Herbert H. Frost, early in 1924, organized the Radio Manufacturers association, which now has about three hundred members.

Notable in the achievements of the association of primary benefit to owners of radio sets was the part the association played in defeating the movement in Congress to impose a ten percent tax on radio equipment. Likewise the association has done a good part by radio users in waging relentless war on misleading and deceptive radio advertising. Radio set builders especially appreciate the successful effort of the association's engineering committee to bring about standardization in the manufacture of radio parts. The same committee is laboring diligently to promote safety from shock and fire in the operation of the new power sets. By helping its members to acquire permits to use Navy patents, the association has made better radio equipment available to the general public. The adjustment of patent suits among manufacturers also has tended to reduce the listeners' expense. The association also claims to have had much to do in shaping the present radio law, with the object of bringing order out of chaos on the air.

Thus it appears the Radio Manufacturers' association is well nigh indispensable to the welfare of the radio listener—who plugs in night after night blissfully ignorant of the association's existence. Such is the reward of the well doer!

The pioneer radio set was very fragile. If it got a jolt, it was wrecked. Hence the transportation rates were high—and these rates still prevail. Just recently the Radio Manufacturers association has established a traffic department and hopes to secure a reclassification of radio apparatus, claiming that the modern set is so solidly constructed that the expressman can let it tumble down a whole flight of stairs without damage.

A cross licensing system, which would eliminate practically all litigation among manufacturers over patents, is another of the projects under way. This, too, would tend to lower the cost of radio equipment.

The Radio Manufacturers association's growth in importance in the radio industry is well exemplified in arrangements for the association's fourth annual convention and second annual trade show, to be held in the Stevens hotel, Chicago, June 11 to 15. The exhibits, which will include all the very latest things in radio, will fill completely the immense main exhibition hall and the grand ball room. The entire fourth, fifth and sixth floors will be used for special demonstration purposes, and more than a hundred rooms on other floors will be similarly used. Even with these very liberal facilities the space available is insufficient. Many requests for reservations had to be declined. All indications point to an exhibition and convention of tremendous interest and importance.

Interesting as would be the exhibits to the average radio fan, the privilege of attending will be denied the general public. Admission to the exhibit hall and demonstration rooms will be card and invitation, the attendance being restricted to approximately 350 official delegates, 1,700 representatives of member firms,

and about 25,000 radio jobbers and dealers who will be invited in. It will be strictly a trade show.

The radio industry has assumed gigantic proportions during its brief career. Last year's gross sales are estimated at $750,000,000. Fully half of this volume consisted of replacements due largely to the advent of the new a.-c. set. The use of this set in cities and towns where electric current is available has caused the manufacturers of battery sets to turn with increased interest to the farm market. This market will be developed energetically during the coming season.

During the convention week, the Radio Manufacturers association will meet each morning in business session. The exhibition halls and demonstration rooms will be open from early afternoon until 10 p. m. on all days except Thursday, on which day the exhibits will open at 11 a. m. and close at 5 p. m., so as to enable all association members and guests to attend the annual banquet at the Palmer House. This big get-together will be unique in that there will be none of the conventional speech-making. The entire evening will be given over to fun and entertainment, furnished by the leading radio entertainers of the nation. This feature the radio industry will share with the fans; the entire program will be put on the air.

C. C. Colby of the Samson Electric company, Canton, Mass., is president of the Radio Manufacturers association. Henry C. Forster of the Utah Radio company, Chicago, is chairman of the convention program committee, and Martin F. Flanagan of Chicago is the efficient executive secretary of the association. The association's offices are at 32 West Monroe street, Chicago.

Radio Triangle Serves the Listeners

By C. C. COLBY, *Pres. R. M. A.*

RADIO entails not a single responsibility, but rather three separate services to the radio public from what is more and more recognized as the triangle of radio—the broadcasting interests, the manufacturers of sets, parts, tubes and accessories, and the distributors, jobbers and dealers. Each of these points of the radio triangle has its duties to its public, a joint public, and, I am glad to say, that the triangle, through the close and friendly relations existing between the National Association of Broadcasters, the Federated Radio Trades association (jobber and dealer organization of the country), and the Radio Manufacturers association, has jointly fulfilled its obligations not only to its membership, but to the public.

The initial responsibility, of course, of the Radio Manufacturers association is to furnish satisfactory radio sets and apparatus to the public. Our association comprises over 300 or virtually all of the larger manufacturers of radio receiving sets, parts, tubes and accessories. Always, since its organization four years ago, the association, through its officers, board of directors and individual members, has had a high sense and recognition of their duties, individually and collectively, to the public which it serves. And this is no less true, I believe, of the National Association of Broadcasters and the Federated Radio Trades association.

The public today buys radio apparatus and accepts it as a means to an end—entertainment, education, information, or the various and strong appeals which have made radio a vital and important part of American life. The radio jobber and dealer has the responsibility of placing our wares before the public in a satisfactory manner and at a satisfactory price. The reception of radio by the country and its high favor in universal use testifies to the general satisfaction of these functions by the manufacturing and distributing branches of our industry. On our shoulders, the manufacturer and distributor, rests the responsibility of consumer satisfaction, but our work would go for naught if the broadcasting industry failed to discharge its primary responsibility. Without broadcasting and, furthermore, without the broadcast of satisfactory programs, there can be no public satisfaction with radio, no matter how well the manufacturer and distributor perform their duty.

So after all, the broadcaster bears a special duty to the public and, therefore, has a special relation to the manufacturer and the distributor. The broadcaster's duty is one of vital importance and the strides made by our industry are evidence of his satisfactory discharge of his functions.

Great strides in the improvement of broadcasting programs and also of technique were made during the last year under the auspices of the Federal Radio commission and through the operation of the radio law. The new law makes more difficult the problems of the commission, but there is general confidence that the new legal provisions may be ultimately worked out to the general good of broadcasting and the radio public.

Never before were better broadcasting programs, better radio apparatus, or better distribution service in radio given to the public than today and through the institutional and individual work of the triangle of the industry there is every prospect of continued improvement to the end that the public will be better served and better satisfied, with the inevitable result being the continued advance of our industry.

BLISSFUL ACCORD

Mother: "Are you sure that Ethel is the right girl for Tom?"

Father: "Well, they both like to tune in on the same stations!"

The man who said, "You can't do two things at once," must have tried to quiet the baby and tune in the set at the same time.

Just because a man is always telling about getting something from the air is no sign he is high minded.

The Three-Billion-Dollar

NO OTHER trust, in the history of the United States, has ever been so flagrantly defiant of the law as the Radio Corporation of America.

The reason for this fact probably lies in the simple statement that no other trust has ever piled up such a monumental total of capital and resources as this Three-Billion-Dollar Octopus.

The following table tells the story, as it appears on the December 31, 1926, balance sheets of the five companies which make up the Radio Corporation of America.

American Telephone & Telegraph Co	$1,841,102,088.00
General Electric Company	428,328,764.00
Westinghouse Electric & Manufacturing Co.	226,961,520.00
United Fruit Corporation	203,821,287.00
Radio Corporation of America	61,976,432.00
	$2,762,190,091.00

These figures are taken from the stenographic accounts of the hearings which were held at Washington, D. C., by the Senate Committee on Patents and the House Committee on Merchant Marine and Fisheries, in the consideration of legislation to curb this radio menace. In both of those hearings, witnesses told the story of the creation of the Radio Corporation of America by the other four companies named in the list, and put into the record the various agreements by which these corporations had pooled their radio patents and apportioned among themselves the exclusive monopoly of the great radio field, as well as of the electric field in general.

The operations of the Radio Trust are not confined to an attempt to monopolize the broadcasting field, or even the manufacturing field. The evidence given at Washington revealed the fact that the trust has undertaken to grab the whole art of radio, not only as it now exists, but all future developments as well. The agreements of its constituent members do not cover their present patents, but seek to pool all future acquisitions which they make through their laboratories or by the destruction of competitors.

SEEKS TO CONTROL NINE LINES

There are nine outstanding lines in which the Radio Trust is seeking to perfect this monopoly:

1—By obtaining through chain stations the lion's share of the cleared channels from which the Federal Radio Commission has removed the less favored stations, and which are looked upon as the choicest gifts of the commission.

2—By obtaining as complete a monoply of all commercial and experimental wavelengths, in the low wavelength zone as well as in the channels above the present broadcasting field. So far, the Radio Commission has already given the Trust and its subsidiaries a vast preponderance of these wavelengths, both in number and in the power which these stations are permitted to use.

3—The monopoly of all wireless telephone development in the United States. This particular monoply was alloted to the American Telephone and Telegraph Company as a chief constituent of the Radio Trust in the cross-licensing agreements among the corporations comprising the trust.

4—The monopoly of all wire hookups between stations. This monopoly is now exercised by the American Telephone & Telegraph Company, which is thus the deciding factor in all chain station progress.

5—The monopoly of all wire hookups between transmitting stations and "remote control" studios and events, now one of the most important features of successful programs. This also is in the hands of the American Telephone & Telegraph Company.

6—The monopoly of the construction of all radio transmitting machinery—also a "telephone company" monopoly.

7—The monopoly of receiving set manufacture. This monopoly belongs to the General Electric Company and the Westinghouse Company—these companies to share the business 60 and 40 percent respectively, and the Radio Corporation of America to be the sole selling agency. This monopoly has been further accentuated by the licensing of twenty-five hitherto independent manufacturers, giving the Radio Trust control of at least 75 percent of the receiving set manufacture in the United States.

8—The monopoly of all radio vacuum tubes in the United States. This monopoly was to have been perfected through the famous "tube clause" in the license agreements issued by the Radio Corporation of America to the licensed set manufacturers requiring them to buy their tubes from the trust. The United States District Court at Wilmington, Delaware, however, has declared that this clause violates the Clayton act and has opened the way for millions of dollars worth of triple damage suits by the independent tube manufacturers whom the trust had tried to destroy.

9—The monopoly of all future radio development in such vast fields as television, telephotography, distance actuation, radiant energy, and radio transmission of power. This monopoly is sought through the agreements for the future pooling of all research made by the companies in the trust, and the reciprocal allotment of exclusive fields for their exploitation.

With such an array of monopolistic pretenses, is it any wonder that the country should finally be alarmed by the law-breaking of the Radio Trust? Is it any won-

Radio Trust *by E. N. Nockels*

der that Senator Shipstead of Minnesota should have asked impatiently at the Senate Patent Committee hearings:

"Has this situation ever been called to the attention of the Criminal Division of the Department of Justice?"

The answer was in the negative. But Senator Shipstead will doubtless repeat that question; nor will he be likely to be satisfied by the trust's declarations that it has received the sanction of the Department of Justice for its operations.

TRUST'S CLAIM IS FLIMSY

Yet, amazing as it may seem, the Trust has made just such pretenses. In fact, they presented two letters from the Department of Justice in the Federal Trade Commission's hearings on this subject. The first came from Attorney General A. Mitchell Palmer, head of the Department of Justice in the Wilson administration. This was written at a time when only the General Electric Company and the American Telephone & Telegraph Company had joined the trust. Mr. Palmer acknowledgd the receipt of the texts of the agreements and wrote only this:

"You understand, of course, that this Department cannot advise you in respect to the legality of these license agreements, and therefore that failure to express an opinion is not to be construed as a form of approval."

The fact that Attorney General Palmer, however, refrained from starting criminal prosecutions boldened the trust promoters to continue their operations by adding the United Fruit Corporation and finally the Westinghouse Electric and Manufacturing Company to their law-defying trust. By that time, the notorious Harry M. Daugherty had been made Attorney General of the United States. James R. Sheffield, later ambassador to Mexico, was entrusted with the task of getting a promise of immunity from Mr. Daugherty. He had better luck than the lawyers who had dealt with Mr. Palmer. For on August 25, 1921, Mr. Daugherty wrote to "My Dear Mr. Sheffield," as follows:

"I acknowledge with thanks the receipts of your letter of the 12th instant explaining certain agreements entered into between the Radio Corporation of America, the General Electric Company, the Westinghouse Electric and Manufacturing Company, the International Radio and Telegraph Company and the American Telephone and Telegraph Company.

"You state that if consistent with the practice of the Department, you would be glad to have any views which I might be willing to express regarding the applicability of the Sherman Anti-Trust Act and the Clayton Law to said agreements.

"Your attitude in thus placing the matter before me is much appreciated. I regret to inform you, though, that it would not be permissable for me to comply with your request. To do so would violate the long-standing rule of this Department that the Attorney General will not express an opinion on legal subjects except to the President and the heads of executive departments.

"However, I see no impropriety in saying to you that if in the future complaint is made in reference to the agreements in question, or in regard to anything that may be done thereunder, the Department will give due consideration to all that you have submitted, both orally and in writing.

"Indeed, I am prepared to go a step further and say that, in the event any complaint should reach the Department which it should consider required investigation, no conclusion will be reached or action taken by the Department under my administration without advising you and giving you full opportunity to present your views.

"While I am the head of the Department, if I can prevent it, no hasty action will be taken in cases of doubt and good faith, especially when, as in the present case, the facts are frankly presented to the Department.

"Assuring you of my personal esteem,
Yours very truly,
H. M. DAUGHERTY,
Attorney General."

Except as an expression of that "personal esteem" for a fellow officeholder, that letter has no value now—if it ever had any. Certainly it is not binding on Mr. Daugherty's successor, Mr. Sargent.

It is high time that the "Criminal Division" of the Department of Justice acts on Senator Shipstead's suggestion.

RETRIBUTION

She took my job away from me,
And did it smoothly, too,
Of course I married her next day,
What else was there to do?

A practical man is only a dreamer who has been married a year or two.

When television is combined with radio broadcasting there won't be so many mash notes received by the radio performers!

A word to the wise is sufficient except to a man who is trying to find out what is the matter with his radio!

The "New World" Below 200 Meters

Rich Explorations Await Builders of Short Wave Sets

By E. R. PFAFF
Chief Engineer Carter Radio Co.

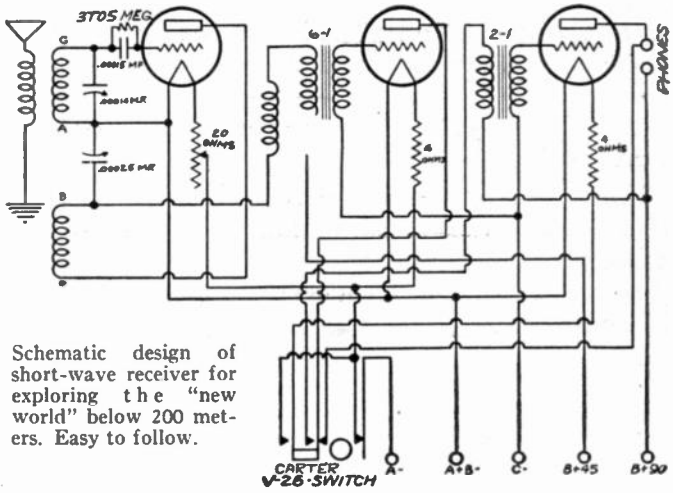
SHORT wave receivers are not new and short wave broadcasting is several years old, but the realm of wave bands 200 meters is still full of romance and mystery to most radio fans.

When one starts to delve into the fascinating depths of the region below 200 meters, even the most hardened and experienced experimenter finds that many of his pet theories must be changed. Not fundamentally, of course, because the same laws of electricity and physics hold true for power plant, telephone and radio, even in the shorter wave bands.

The principal difference is that the extremely high frequencies used (10,000,000 cycles at 30 meters), cause entirely different effects than we experience in the broadcast spectrum. Special precautions must be taken when building such a receiver. Some fundamental circuits widely used for the broadcast frequencies are useless and some things that heretofore seemed impossible are so successful that a one- or two-tube set may be able to consistently hear half way around the world.

One of the amazing peculiarities of short waves is that radio frequency amplification is practically impossible and probably over 95 percent of the receivers in existence today consist of a regenerative detector and one or two stages of audio frequency amplification.

The circuit described in this article is not new—but rather one of the most popular type. It is given, however, because the particular layout design of individual parts and certain niceties of control make it particularly adaptable for broadcast listener, amateur radio operator and experimenter.



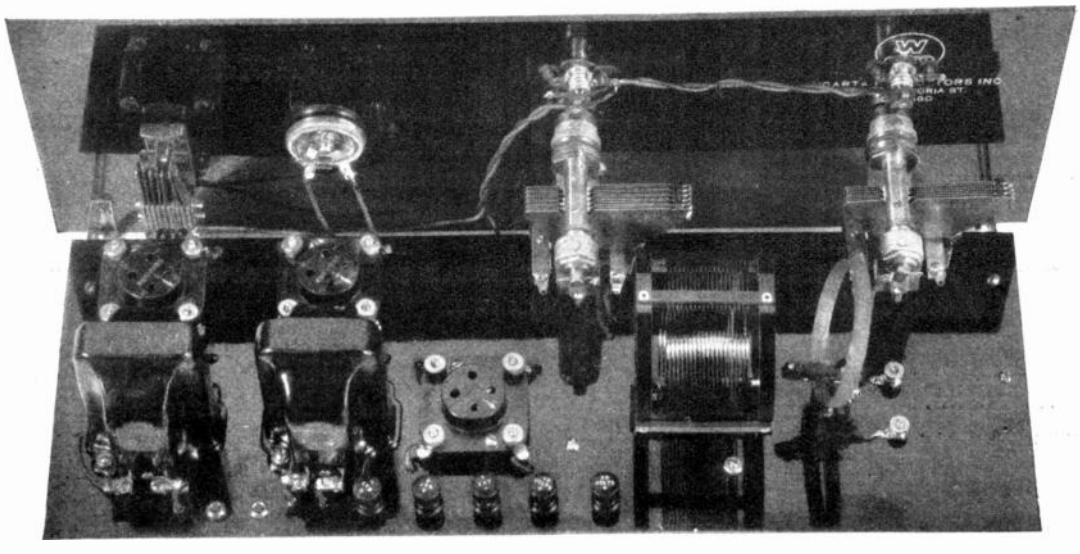
Schematic design of short-wave receiver for exploring the "new world" below 200 meters. Easy to follow.

The broadcast listeners are becoming more and more interested in short wave reception, partly because of the congestion of the regular broadcast channels and partly because there is a "new world" to conquer.

The receiver shown in the accompanying cuts uses only very best parts—each especially chosen because of some feature that was particularly suited to the needs of the set.

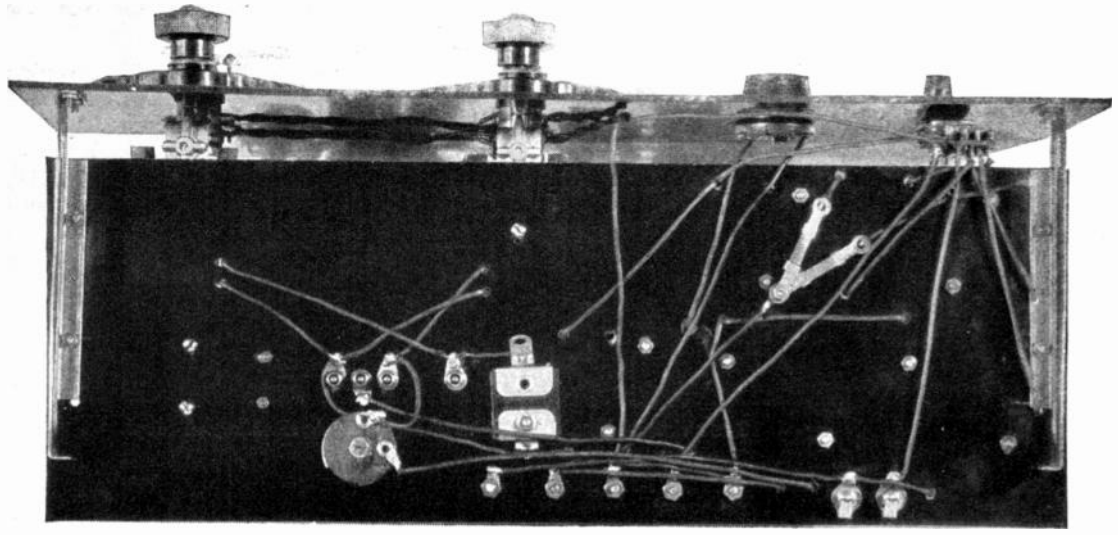
It consists of a regenerative detector, regeneration or "feed back" being controlled by means of a variable condenser, the "feed back" coil being fixed. This arrangement gives very smooth regeneration control with maximum efficiency. The coil (different size coils are plugged in for various wave bands) and condenser are of the very best type with very low losses. This is necessary to obtain selectivity and maximum amplification. Only one tuning control is used.

The audio transformers are chosen because of the



This rear view of the short-wave receiving set described by Mr. Pfaff shows the arrangement of the various parts. A pictorial diagram hardly is needed.

Special significance attaches just at this time to this very interesting article on the short-wave receiver, because short waves are being used for television broadcasting. Build this receiver, do a bit of interesting exploring, and then we will tell you how to make a television hookup.



Here is another of those queer pictures—hard to tell which is right side up. It all depends upon the way one views it. Look at it both ways. It shows very clearly the wiring arrangement of the short-wave receiver.

particularly high amplification obtained without sacrificing tone quality. This high audio amplification (6-1 and 2-1 ratio) is helpful when extreme distance stations are tuned in.

One of the unique features of the set is the switching arrangement. By turning the small jack switch it is possible to turn the set off, operate but two tubes or all three tubes. It is therefore not necessary to plug into various jacks to change the degree of amplification obtained. The speaker or headset connections are made in the back of the set by means of cord tip jacks.

Only one rheostat is used on this set and it controls the detector tube only. This acts somewhat as a volume control. The other two tubes receive their filament control through separate fixed resistors. This permits switching off one of the audio amplifiers without affecting the voltage applied to the other one.

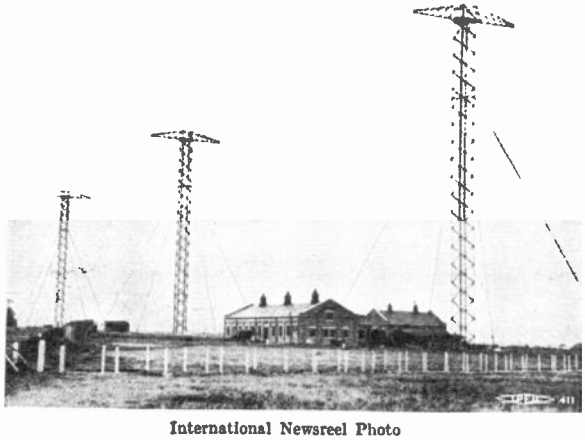
PARTS FOR HOOKUP INEXPENSIVE

The parts required for this set are inexpensive and the results obtainable are remarkable. Already there are about fifty broadcast stations throughout the world operating on these wavelengths giving regular programs. It is not at all uncommon to receive foreign stations every night—consistently both winter and summer, because static interference is much less on these waves.

The following parts were used in the receiver shown in the illustrations. The wiring is simple that anyone can follow the accompanying diagram and wire the set in a very short time.

1 Aero LWT 125 coil kit
1 Hammarlund .00025 condenser
1 Hammarlund .00014 condenser
1 Carter .00015 condenser with clips
1 Carter V26 jack switch
1 Carter M-20 "Midget" rheostat
2 Carter H-4 resistors
2 Carter No. 10 tip jacks
3 Benjamin sockets
1 General Radio No. 285, 6-1 transformer
1 General Radio No. 286, 2-1 transformer
5 Eby binding posts
2 National vernier dials
1 S-M R. F. choke coil (short wave type)
2 S-M brackets
1 7 x 18 Micarta panel
1 5 x 17 Micarta sub-panel
1 Lynch 5 meg. leak
1 25 ft. rubber covered hook-up wire.

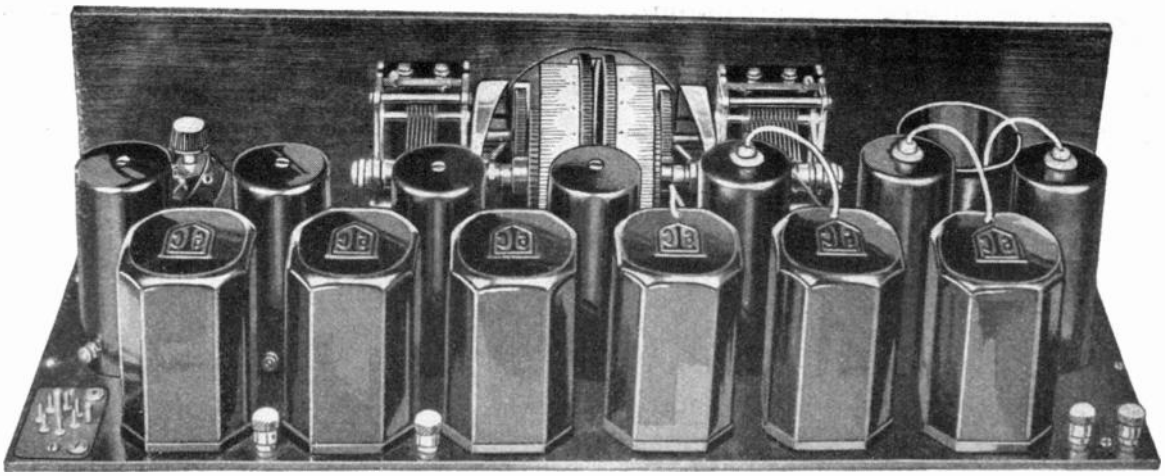
New Wireless Station Exceeds Expectations



International Newsreel Photo

GREAT BRITAIN maintains a chain of powerful wireless stations for communication with Australia and her other far-flung colonies. Here is pictured the latest link in this powerful chain, the new Grimsby wireless station. Note the peculiar construction of the aerial towers. This station was erected by the Marconi company for the British postoffice. The official tests of the new station covered a period of seven days and were completed with excellent results, the station more than fulfilling the requirements of the contract.

The Marconi Wireless Telegraph company, builders of the Grimsby station, recently merged with the Eastern Telegraph company, another British company. This union followed close upon the announced merging of the Mackay companies (Postal Telegraph) and the International Telephone and Telegraph company in the United States.



Rear view of Tyrman "70," showing complete shielding of tubes.

The Tyrman "70" Using Shielded Grid Tubes

AFTER several years of conventional hook-ups the radio fans were startled with the appearance of something new in the field of radio receiving instruments. Never, since the beginning of broadcasting has anything created such an enthusiastic popularity within a few weeks as the introduction of the shielded grid tube. The receiver to be described in the following paragraph is the first commercially designed instrument to do full justice to this new principle and it cannot be regarded as a laboratory experiment, but rather as a finished development with such outstanding merits, that leading engineers regard it as the most successful forward step in the industry.

Tests were conducted in the entire country and the coronation of the efforts of Tyrman engineers was accomplished December 21st, 1927, in Los Angeles, where a party was entertained for two successful hours with uninterrupted full loud speaker reception of 4QG Brisbane, Australia, and 2BL Sidney, Australia, as well as all three Japanese stations. American transcontinental reception was demonstrated without the use of an antenna—an efficiency for seven tubes as never was dreamed of before.

The Tyrman "70," when properly assembled does not oscillate, no matter how much voltage is applied to the filament of the tubes. Due to the utterly stable characteristics of the impedance coupled intermediate frequency amplifier no whistling background of carrier waves can be experienced, the stations sliding in without the usual noises of most super-heterodyn circuits.

THE SHIELDED GRID TUBE

The Shieldplate Type SP122 Shielded Grid Tube is designed as a voltage amplifier in radio frequency circuits specially constructed for its use and also as a space charge grid tube for impedence or resistance coupled audio frequency amplification. Its construction is entirely different from the conventional design. A straight up-and-down filament is surrounded with the spiral control grid, the terminal of which is brought out through the top of the bulb in order to reduce the plate-grid capacity to a minimum. The cylindrical plate is completely shielded on the inside and outside by the second grid, the terminal of the latter being placed where the grid of standard tubes is located in the socket. This second grid, when operated on a plus 67½ volt potential, will act as an electrostatic shield between the control grid and plate, eliminating all capacity effects between the control grid and plate and preventing any feedback, which was the main drawback of previous radio frequency circuits and necessitated neutralizing or introduction of considerable losses.

The filament is similar to that of the UX120 type and draws 0.125 amperes at a maximum of 3.3 volts. It is important not to apply excessive voltage to these filaments, and if proper care is taken in this respect, exceptional long life of the tube is assured. A plate voltage of 135 to 145 volts is recommended with a shield grid potential of plus 67½ and a negative C Bias of 2-3 volts on the control grid. The SP122 tube will have in this case an amplification constant of 170 in comparison with 8 of the 201A tubes and will furnish an actual gain of 45 to 50 in a stage of intermediate frequency amplification against 6 to 7 in previous super-heterodyne circuits. Thus a considerable reduction of tubes is possible with an incomparatively higher gain and perfect stability, if properly designed apparatus is selected for its use. A standard UX base would make these tubes adaptable to all sockets, but as complete shielding is essential, a specially designed Tyrman shielded socket is used, provided with an insulated opening on the top for the control grid cap. Completely shielded units are essential.

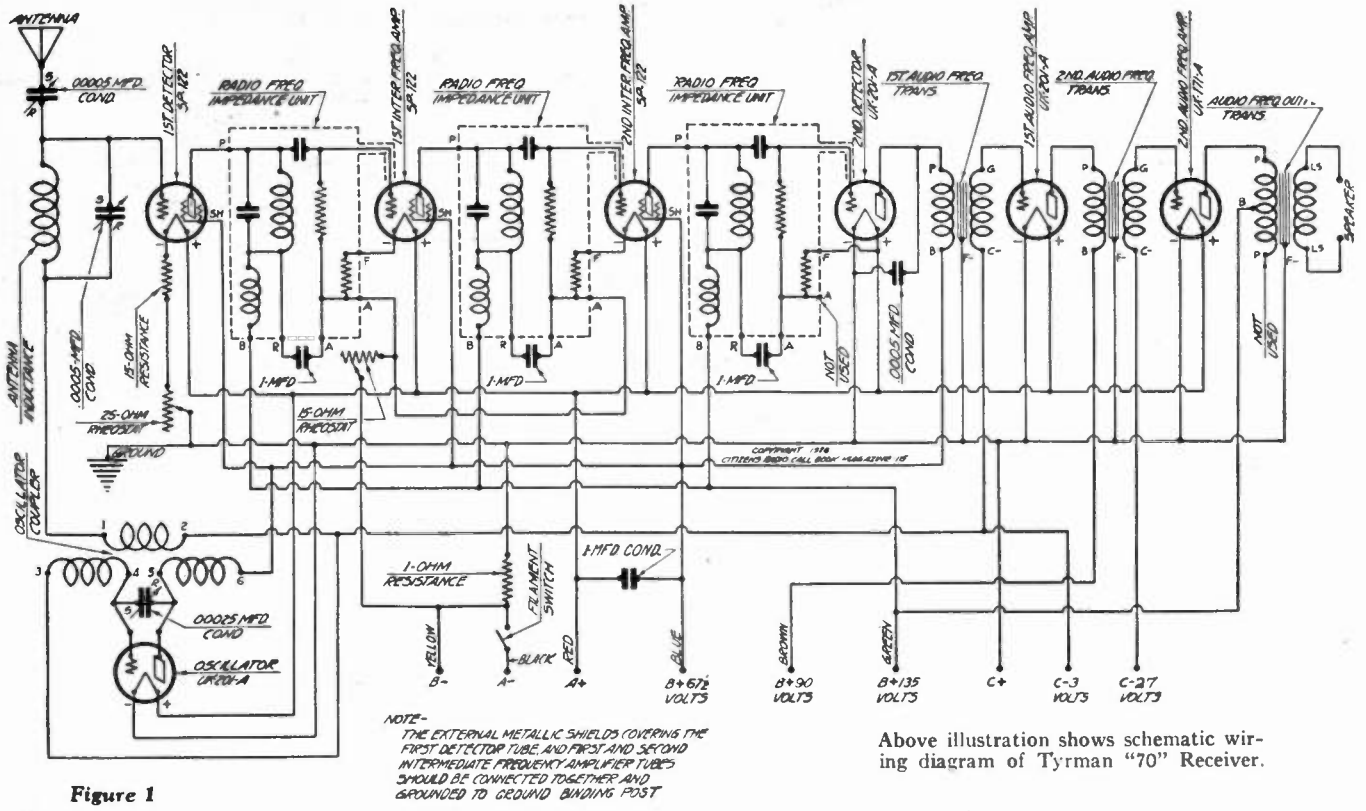


Figure 1

Above illustration shows schematic wiring diagram of Tyrman "70" Receiver.

THE CIRCUIT

The difficulty in building completely shielded tuned R. F. sets has lead to the design of a super-heterodyne receiver and the circuit shown in Figure 1 is the outcome of many months of laboratory research. It was necessary to start at the bottom and design all parts for the tube. Despite opinions to the contrary, it was found that present standards could not be adopted for high efficiency and smooth performance. A glance at the diagram will explain the function of the amplifying units. In conformity with the high impedance (500,000 ohms) of the shielded grid tube, impedance coupled intermediate frequency was made use of. The input circuit consists of an antenna inductance and an oscillator coupler, the frequency change being introduced into the low potential of the inductance. A bias of three volts is applied to the grid of the oscillator tube. The antenna inductance unit consists of a two inch diameter coil with eighty-five turns No. 24 wire space-wound, in order to gain selectivity. The special oscillator will cover a range from 900 to 1800 K. C., thus covering the band necessary to produce the beat of 340 K. C., to which the intermediate frequency amplifiers are matched. This frequency has proven to be most advantageous for single spot reception, the two beat notes being separated at 680 K. C.; thus only one beat will appear within the tuning range of the condenser.

The intermediate frequency impedance units contain all apparatus inclosed in the dotted line. They consist of the tuned

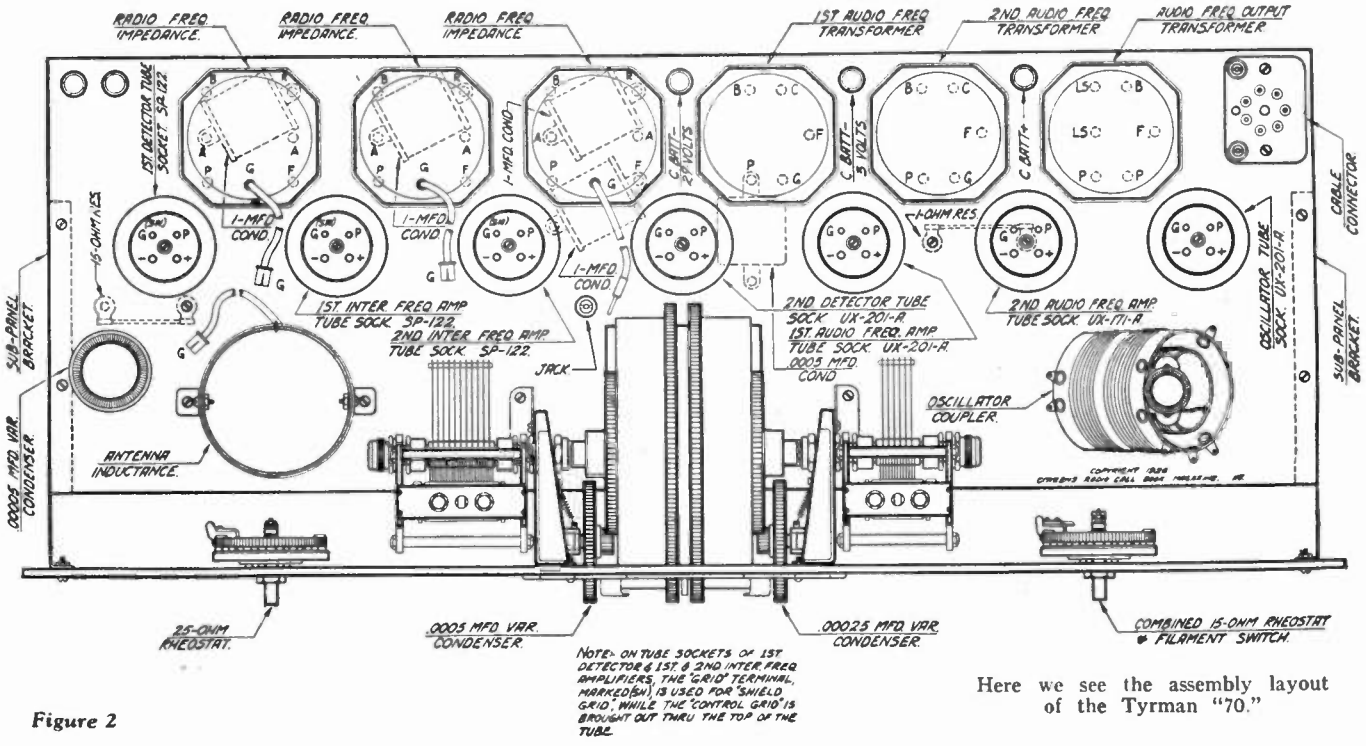
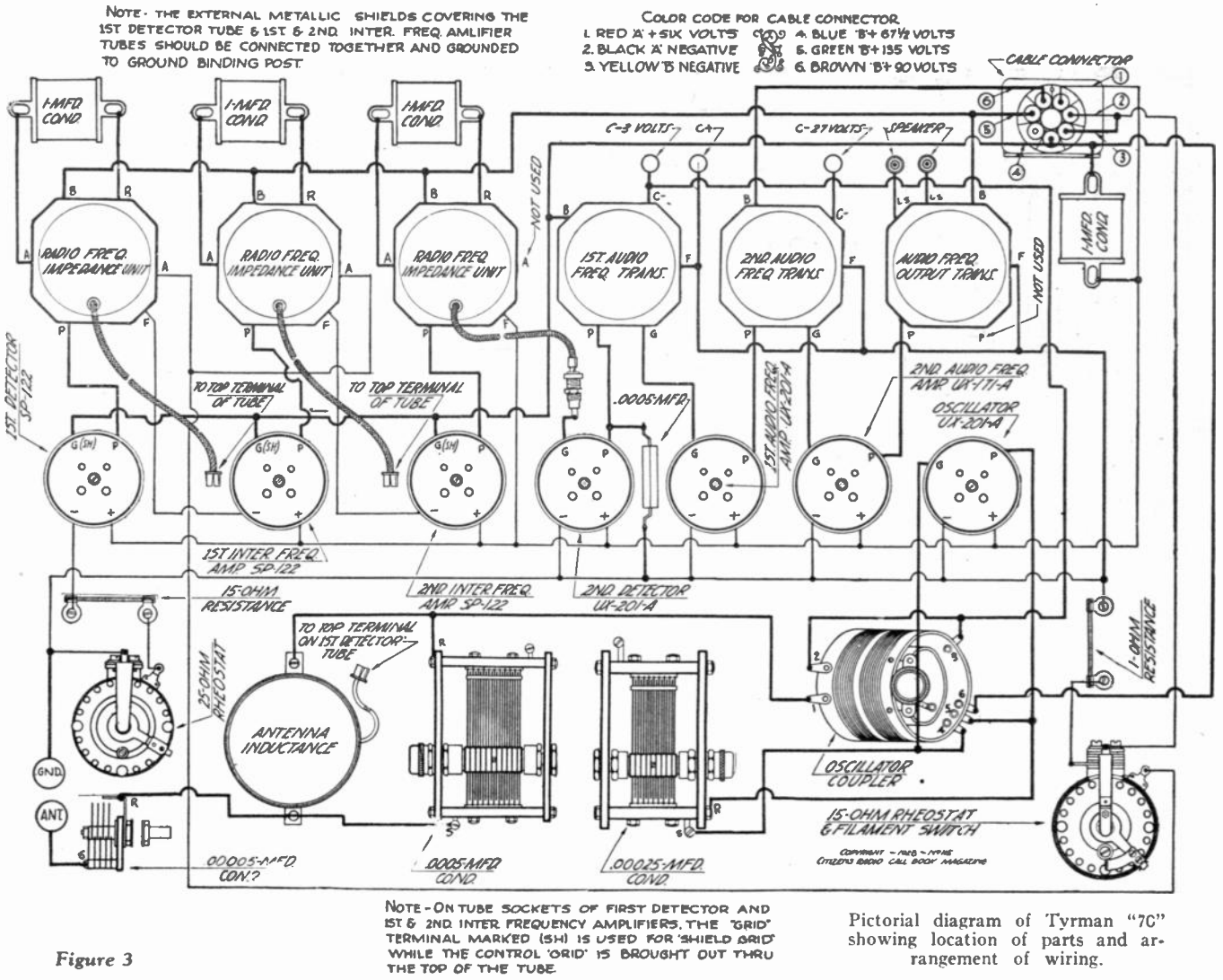


Figure 2

Here we see the assembly layout of the Tyrman "70."



NOTE - ON TUBE SOCKETS OF FIRST DETECTOR AND 1ST & 2ND. INTER FREQUENCY AMPLIFIERS, THE "GRID" TERMINAL MARKED (SH) IS USED FOR 'SHIELD GRID' WHILE THE CONTROL 'GRID' IS BROUGHT OUT THRU THE TOP OF THE TUBE.

Figure 3

Pictorial diagram of Tyrman "7C" showing location of parts and arrangement of wiring.

plate impedance, retard coil, grid coupling condenser, grid resistance and filament resistance. The later is inserted in series with the filament control rheostat and reduces the 6 V. A. Battery current to a maximum of 3.3 volts. Its uncontrolled side also serve as C bias, making the use of separate C Battery unnecessary. Three of these units are used for two stages of intermediate frequency amplification. Shielded Grid tubes are employed in the first detector and the two intermediate frequency stages. The second detector, first audio as well as the oscillator is operated with 201A tubes, while a 171 or 171A tube is recommended for the second audio stage. However, if a 171 tube is made use of, it is recommended to replace the Yaxley 4L resistance with a 5L resistance. The schematic diagram is self-explanatory.

CONSTRUCTION

The assembling of the front and subpanel is illustrated in Figure 2. It will be noted that the Radio Frequency Impedances, audio transformers and the tube sockets are symmetrically arranged. No mistake can be made, if all transformer units face the front panel with their trademark. The intermediate frequency impedances are the first three units to the left, followed by two 3-30 audio transformer and a 3-51 output transformer, the latter to the extreme right. The three 1 mfd. Carter Type by-pass condensers hook into the specially provided terminal screws of the radio frequency impedances. This eliminates wiring of these condensers which should be placed close to the impedance units. A Yaxley No. 669 cable receptor is placed on the right upper corner for the battery connections. This unit is mounted on the top of the subpanel; its mounting bracket should be removed. A pup jack between the third and fourth sockets is provided for the grid leak of the third radio frequency impedance. The grid leads of the first two impedances terminate in a bushing fitting over the tube caps of the second, respectively third shielded grid tubes. The flexible lead of the 9-80 antenna inductance connects to the cap of the first tube.

The Camfield No. 622 oscillator coupler is placed to the right of the subpanel. The frontpanel holds a .0005 tuning condenser for the antenna coupler and a .00025 tuning condenser for the oscillator coupler, mounted as usual to the Tyrman Vernier Drum. The auxiliary brackets are provided for bracing the main brackets to the subpanel, and also can be used as rotor terminal of the condensers, allowing complete subpanel wiring.

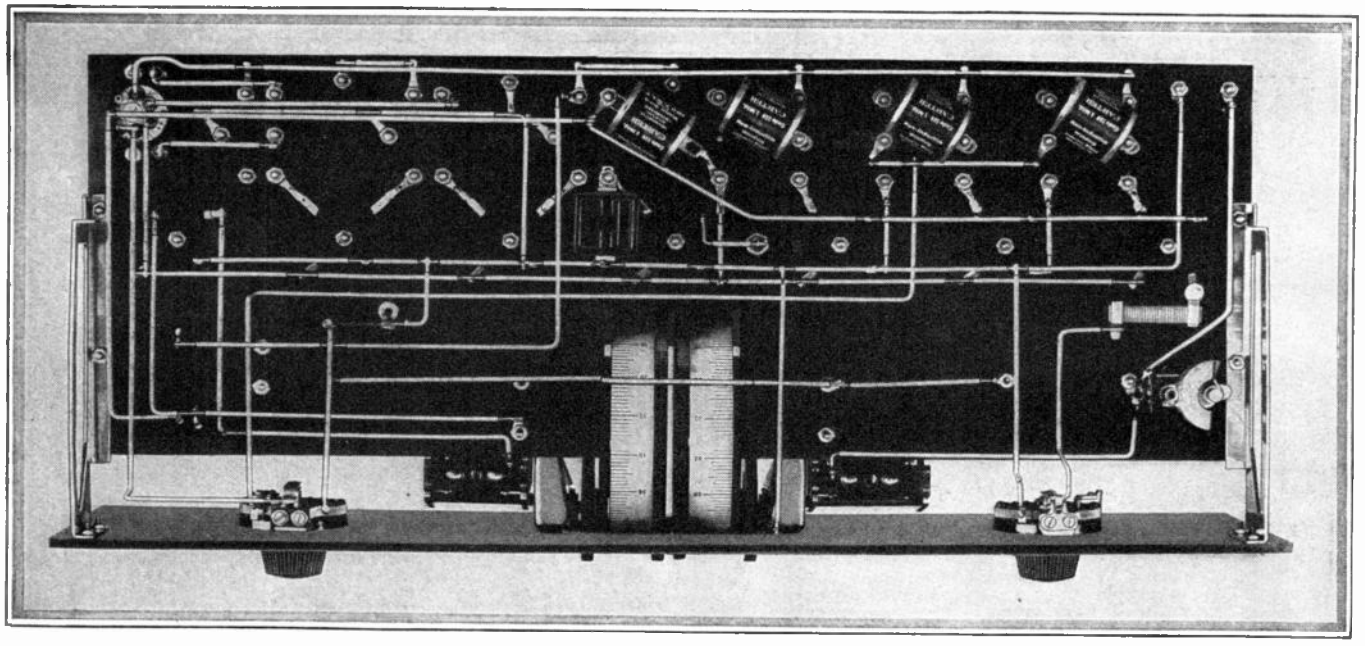
A 25 ohm rheostat controls the filament of the first detector tube in series with a 15 ohm fixed resistance, while a 15 ohm switching rheostat is provided for the second and third shielded grid tubes. The fixed resistances in series with this rheostat are built into the Radio Frequency Impedances.

If the filament Rheostat should not sufficiently control the volume it is recommended that the 25 ohm detector Rheostat be changed to a 40 ohm.

Figure 4 shows all wiring connections and should be followed *exactly* as shown. This is very important in the proper performance of the receiver. Use spaghetti covered bus bar wire and not flexible wire in making the connections.

It is emphatically advised to check all wiring connections, as the sensitivity of the circuit would be greatly affected by imperfect solder joints or loose bolts.

The Vernier Drum escutcheon should be grounded to the —A filament lead. For smooth tuning it is advisable to apply a small quantity of oil or grease to the vernier drum.



Bottom view of sub-panel of Tyrman "70" showing neat wiring.

OPERATION

The tubes should be placed into the sockets as follows: The first three tubes to the left are Shielded Grid Tubes, followed by 301A tubes as second detector and first audio and a 171 or 171A tube as second audio. The oscillator tube is also of the 301A type and placed into the extreme right socket. It is necessary to connect the binding posts of the three Shielded Grid tube shields and that of the second detector to the ground binding post. The antenna connects to the left binding post of the left upper corner of the subpanel. Twenty-four inches to eight feet of aerial will assure coast to coast reception with full loud speaker volume. The same can be affected by disregarding the aerial and connecting the ground to the antenna binding post. With the flexible lead of the antenna inductance, the receiver can be converted into six or five tube operation, by removing the grid connections of the respective tubes and placing the bushing of the flexible lead on the second, respectively third tube cap.

The schematic and pictorial diagram is recommended for battery operation. Special binding posts are provided for the C Battery on the subpanel.

Due to the enormous amplification of the intermediate frequency stages it is advisable to use a reproducer which will stand highest power. Long airchamber speakers with high grade units were found most adaptable. The 3-51 output transformer will assure excellent tone quality covering the entire band of audible notes with a uniform amplification. Under favorable conditions thousand mile stations can be received with the same volume and quality as local signals. It will be noted that the set, if properly connected according to the diagrams, will not oscillate under any conditions.

Color Code of Cable for battery operation

Black	—A
Red	+A
Yellow	—B
Blue	+67½ V B
Brown	+90 V B
Green	+135 V. B.
Grey	Not Used

LIST OF PARTS

3	Tyrman Type 9-90 Shielded R. F. Impedance	$12.50	$37.50
1	Tyrman Type 9-80 Antenna Inductance	3.00	3.00
2	Tyrman Type 3-30 Audio Transformers	8.00	16.00
1	Tyrman Type 3-51 Power Output Transformer	10.00	10.00
7	Tyrman Shielded Sockets	1.25	8.75
1	Tryman Double Vernier Drum Dial	10.00	10.00
1	Camfield .0005 Condenser, Single	6.00	6.00
1	Camfield .00025 Condenser, Single	5.50	5.50
1	Camfield Type 622 Oscillator Coupler	3.50	3.50
1	Yaxley 15 ohm Switching Rheostat 915K	1.75	1.75
1	Yaxley 4L Resistance	.15	.15
1	Yaxley 15 Ohm Resistance	.15	.15
1	Yaxley No. 669 Cable	3.25	3.25
1	Yaxley 25 or 40 Ohm Rheostat	1.35	1.35
1	Yaxley Pup Jack	.15	.15
1	50 mmf. Midget Condenser	1.50	1.50
4	Carter 1 mfd. Condenser	1.25	5.00
1	Carter .001 Mica Condenser	.50	.50
5	Binding Posts	.15	.75
1	7x24" Front Panel Drilled	6.00	6.00
1	8x23" Sub Panel Drilled	5.50	5.50
1	Pr. Benjamin Brackets	.70	.70

The Isotone, New H.F.L. Radio Receiver

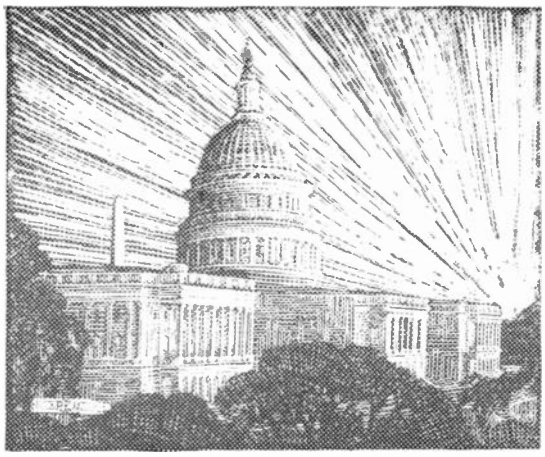
(Continued from page 14)

the set was heard in operation was about 12:30 in the afternoon, at which time WOC at Davenport was coming through with great volume, the temperature was 82 degrees and the sun was shining. This same afternoon at about 4 o'clock, Clearwater, Florida, was picked up with full loud speaker volume and the temperature was still high, although the sun had gone down somewhat.

The reader will notice, if he cares to check on the log that Station WFLA at Clearwater, operates on 580 kilocycles and that Station KYW at Chicago, which was on the air at the same time, operates on 570 kilocycles. Clearwater is rated at 750 watts and KYW is rated at a minimum of 5,000 watts. There was absolutely no lap over from KYW at this demonstration. This is a very unusual demonstration when you consider that these two stations are almost at the top of the wave band, at which point selectivity would ordinarily be extremely poor. This is probably the hardest test I have ever seen a radio receiver put to, but the Isotone responded magnificently.

The second time the receiver was tested was in the evening. The temperature was down to about 70 degrees, although the static was quite bothersome. The first station which the operator tried for was standby KFI on the coast. However, the first station actually encountered was KWKH, Shreveport, La.,

(Continued on page 69)



The People's Legislative Service

By
R. W. HOGUE
Associate Director

THIS is an interesting story. Also, it is unusual. If you don't think so, please tell us why. If you think it is so unusual and important that you must do something about it, we know that we shall hear from you.

We are sick and tired of hearing cock-sure, small-calibre people speak of "the helpless farmer" and "the ignorant laborer." It's not only a silly practice, but it's vicious and false. The farmers and workers constitute the vast majority of American citizens. The very existence of the nation depends upon them. On their shoulders—and their brains—rest the structure of industry, the life of society, the security of government. If they are helpless and ignorant, then America is doomed.

Nothing is more needed and more important in this country today than to have faith in its agricultural and industrial citizens, to strengthen their faith in themselves, and to establish this faith in the mind and heart of the public. This is just what the People's Legislative Service has been doing for seven years.

It has been doing this at the most strategic and the most difficult place possible—the seat of the national government itself. It is here that the interests of the public as a whole are centered and the issues that affect all the people are settled, for good or evil. Popular government, as well as individual human rights, demands the presence in Washington of an organization pledged and equipped to serve the public good. Such an organization is the People's Legislative Service.

It is a voluntary organization, controlled by no political party and subsidized by no individual or group. Its honorary chairman is Senator George W. Norris, of Nebraska. Affiliated with it are a number of progressive groups and labor organizations, as well as such individuals as Frank P. Walsh, of New York and Kansas City; Edward Keating, editor of *Labor,* Washington, D. C.; W. E. Sweet, former governor of Colorado; and E. N. Nockels, secretary of the Chicago Federation of Labor and editor of the *WCFL Radio Magazine.*

A NOTABLE RECORD

An organization cannot always be judged by its high purpose or the names of prominent members. It must be tested by its record. What is the record of the People's Legislative Service? Here it is, in part. Read it carefully, and ask yourself what other organization can present such a notable seven-year record of active and useful service in such vitally important matters.

1. Brought about the first conference of progressive senators and representatives of both parties. The effects of this conference have been increasingly felt in public legislation in behalf of the people.

2. Exposed the threatened market manipulation of the sugar industry, helping to frustrate this scheme, thus saving American householders approximately $600,000,000.

3. Compiled material establishing the truth about railroad wages.

4. Analyzed and refuted claims of railroads in seeking tax exemption of foreign trade profits. Result, annual saving to the public of $300,000,000.

5. Exposed shipping scandals and attempt to destory Seamen's act.

6. Helped to expose combination to reduce railroad wages.

7. Prepared and made effective use of pamphlet, "Are Wages Too High?".

8. Collected material with which to fight open shop campaign.

9. Coöperated in behalf of workmen's compensation bills.

10. Rendered effective service in preventing enactment of vicious anti-sedition bill.

11. Helped to kill anti-strike bill.

12. Initiated active campaign to defeat attempts to repeal primary election laws.

13. Exposed bread trust combine. Results: dissolution of Ward combine, protection of independent bakeries and of organized bakery workers, and saving households millions of dollars.

14. Led fight in behalf of public against false and exhorbitant valuation of railroads.

15. Rendered valuable service in the Tea Pot Dome and Daugherty investigations. As a result of his able work in these investigations, Senator Burton K. Wheeler was indicted on false charges. The present director of the People's Legislative Service and his predecessor organized and directed the national Wheeler Defense Fund committee, which rendered invaluable service toward the acquittal and complete vindication of Senator Wheeler.

16. Fought successful fight for rejection by Senate of Chas. B. Warren as Attorney General of the United States.

17. Rendered valuable service in behalf of the public and the miners in the Senate investigation of the coal industry.

18. Fought the power trust in its effort to capture Muscle Shoals and Boulder Dam and to escape investigation by the U. S. Government. This fight must be continued in Congress and throughout the country.

19. Issued numerous publications, based on careful research, for the benefit of public officials, farmers, industrial workers, progressive causes and the general public.

20. Furnished facts, figures and personal coöperation to senators and representatives in behalf of farm relief.

The chief credit for this notable record belongs to the former director of the People's Legislative Service, Basil M. Manly. The present director and associate director were chosen by Mr. Manly and have the benefit of his confidence and coöperation. During the time since they have been in charge, an unusual amount of work has been done, with demands for increasing services constantly arising.

BY THEIR VOTES

What becomes of eloquent electioneering in behalf of "the sacred rights of the people"; of high principles proclaimed in party platforms; of solemn pledges made in "undying devotion to the country"?

The answer is found in the voting records of members of Congress. There you will find the explanation of the vast difference between pre-election promises and post-election performances. There you will behold the cemetery of sacred pledges, buried with the hopes of a deceived electorate and a betrayed public.

There also can be seen the records of those congressmen who have been true to their public pledges, loyal to the people's interests, and responsive to the nation's needs.

The People's Legislative Service can furnish this valuable information. It has done so for several years, to the complete satisfaction of those who have used this material.

These voting records have been instrumental in defeating more than one member of Congress who felt sure of a lifetime lease on his office. They have helped to elect a number of the most valuable members of both the Senate and the House. They have furnished progressive groups with the best ammunition for effective fighting, namely, the facts. They have been used by progressive bodies and newspapers during important political campaigns.

THE GREAT STRUGGLE

The strongest foes of good government and of human rights are gathered here in Washington, with all their forces of intrigue, corruption and spoilation. There's no denying their purpose—and their power. It is the power of vast wealth, of widespread interlocking directorates, of huge campaign funds, gigantic lobbies, corporation lawyers, publicity bureaus and newspaper ownership. With every weapon of propaganda, coercion, intimidation and financial and political influence and reward, this power is ceaselessly at work to destroy labor, control the government, defy the law and corrupt the courts.

A great struggle is going on in the nation's capitol between these powerful forces of special privileges and the less powerful but determined defenders of clean government, progressive legislation and human rights. Your welfare and the best interests of your organization, your community and your country are at stake. No friend of organized labor, no self-respecting citizen, no upstanding individual can be content to remain unmoved, to do nothing.

What can you do against these powerful forces and in the face of general indifference? Alone, and at a distance, you can do little. But you can do much through the informed, effective fighting organization that is on the job in Washington all the time. That organization is the People's Legislative Service.

The chief hope of human justice and democratic government in America today is found in those valiant and hardpressed members of the United States Congress who are forever "on guard for the people". Theirs is a desperate and a glorious fight, against heavy odds. It is our fight—and yours. Their defeat means your loss, their triumph your gain. They look to the People's Legislative Service for many things. "It has never failed us," says Senator George W. Norris, able and outstanding exponent of high progressive statesmanship.

A LAST WORD

Who are the officials of this organization? Mercer G. Johnston is director and Richard W. Hogue, associate director. The executive committee is as follows: Senator Geo. W. Norris, honorary chairman; Senator Robert M. La Follette, chairman; Representative Geo. Huddleston, vice-chairman; Wm. H. Johnston, treasurer; Senators Burton K. Wheeler and Robert B. Howell; Representatives O. J. Kvale, Mrs. Edward P. Costigan, and Basil M. Manly.

Without endowment or subsidy of any sort, under the handicap of resources both limited and uncertain, and in the face of organized opposition, the People's Legislative Service goes steadily on. Its notable record of the past seven years must be maintained. Its important program must be carried forward. It is facing a crisis which can only be met by the united support of those who believe in its existence and values its work. Among these we count the individuals and the organizations represented by the readers of "The Voice of Labor," to whose editor we are grateful for the request to tell this story.

If you wish to support the work and secure the services described in this story, send your name, with as generous a cheque as you can afford, to the People's Legislative Service, 212 First Street, S. E., Washington, D. C.

An old timer is one who can remember when the kids used to fight for elbow room at the table instead of at the radio set!

Federal Radio Commission. Left to right—Sam Pickard, Orestes H. Caldwell, Judge Eugene O. Sykes, Harold A. Lafount, Judge Ira E. Robinson, chairman. Standing, Carl H. Butman, secretary.

The Czars *of* All Radio

PLEASE stand by, while we present the czars of all radio—the Federal Radio commission. Czars? Yes, and more! Czars and high executioners! In their hands rests the fate of some seven hundred broadcast stations. A smile from the commission may mean an exclusive channel for any station, or a great increase in power. Thumbs down, and the luckless broadcaster must turn off the power and cease operation. Last year a mere frown from the commission was sufficient to scare 47 stations off the air. Just now every broadcaster is anxiously—yea, almost breathlessly—awaiting the commission's pleasure in the reallocation of wave-lengths and power. When this is accomplished, more radio broadcast stations may be in the discard. Certainly many will suffer important changes, for a big shakeup is necessary to make conditions conform to the equalization clause of the recently enacted radio law.

But the commissioners as here pictured do not appear to be such terrors. In fact, they are not. On the contrary they are approachable, agreeable and sympathetic —practical men striving to accomplish a difficult job with the least possible friction and the maximum benefit to the greatest number of people. They are kindly disposed toward the broadcasters but their chief concern is the welfare of some forty million radio listeners — the users of more than seven million radio receiving sets.

How did we come to have a radio commission, and who are these men upon whom rests such heavy responsibility and who wield such great power?

The direct cause of the creation of the radio commission was the decision in the famous Zenith radio case, July 3, 1926, wherein the U. S. Supreme court ruled that the Department of Commerce did not have authority to allocate frequencies or regulate hours of transmission.

That breakdown of governmental authority threw radio broadcasting into utter chaos. Many broadcasters jumped their waves and others changed to more desirable channels without regard to stations then using them. There was a mighty rush to get on the air—stations sprang up like mushrooms. To rescue the listeners from distraction and to save radio from utter ruin, Congress adopted a radio bill in the early part of 1927. This law called for the creation of the Federal Radio commission. Into the lap of this new body Congress tossed the radio muddle, giving the commission one year in which to restore order.

Immediately the air began to clear. Some 47 stations voluntarily ceased operation and the survivors were subjected to strict regulation.

But time flies rapidly and, in March of this year, while Congress debated changes to be made in the radio law, the commission's lease on life expired. This threw radio administration back upon the Department of Commerce. Two weeks later—March 28—the new radio bill was signed by President Coolidge. Thus the Federal Radio commission was restored to power as the czars of all radio, with the added responsibility of equally dividing wave-lengths and power between the five radio zones and the various states.

The chairman of the Federal Radio commission is Judge Ira Ellsworth Robinson of Grafton, W. Va. He

is also the commission's most recently appointed member, and represents the second zone, comprising the states of Pennsylvania, Virginia, Ohio, Michigan, Kentucky and West Virginia. Judge Robinson doesn't profess to know a heap about the technical side of radio, but he is well up on law. He served on the Supreme Court of Appeals of his home state (1907-1915) and as chairman of the Draft Appeals board (1917-1918). He is a lecturer and writer on legal topics.

The first zone—the New England states, New York, New Jersey, Delaware, Maryland, District of Columbia, Virgin Islands and Porto Rico—is represented on the commission by O. H. Caldwell, born at Louisville, Ky., in 1888. He is an electrical engineer and has devoted nearly twenty years to the editing of technical magazines. Before becoming a member of the Federal Radio commission in 1927, Mr. Caldwell was a member of the radio committee of the American Engineering council, the joint body of the principal engineering societies of the United States, and was a director of the New York Electrical Board of Trade.

The third zone consists of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas and Tennessee. The commissioner is Eugene O. Sykes, born in Aberdeen, Miss., July 16, 1876. He studied at St. Johns college, the U. S. Naval Academy at Annapolis, Md., and received the degree of LL.B. from University of Mississippi in 1897. He was a member of the Supreme Court of Mississippi from 1916 to 1924.

Sam Pickard represents the fourth zone—Indiana, Illinois, Wisconsin, Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska and Kansas. When the United States entered the World war, a few weeks before he was to be graduated as a journalist from the University of Kansas, Pickard enlisted in the air service, and was wounded in combat shortly before the armistice. Following the war, Mr. Pickard received a degree in agriculture. His success in establishing the first college of the air—at Kansas State college in 1922—won him the post of director of radio for the U. S. Department of Agriculture. When the Federal Radio commission assembled in March, 1927, Mr. Pickard was made secretary, and was appointed a member of the commission when H. A. Bellows resigned.

The Rocky mountain and Pacific coast states, Alaska and Hawaii, are represented on the commission by Harold A. Lafount of Salt Lake City, Utah. He was born in England 45 years ago and, while he was yet a mere lad, his father located in Logan, Utah, engaging in the hardware business. In this enterprise the son later joined. Mr. Lafount also engaged in a large way in community-building and land-reclamation projects. In 1920 Mr. Lafount became interested in radio, and soon was made president of a company manufacturing loud speakers. He sold his radio manufacturing interests when appointed to the Federal Radio commission in November, 1927, to succeed the late Col. John F. Dillon.

The term of office of each member of the commission will expire on February 23, 1929. Thereafter the commissioners will be appointed for terms of two, three, four, five and six years, respectively. The office pays a salary of $10,000 per year.

Improves A-C Receivers

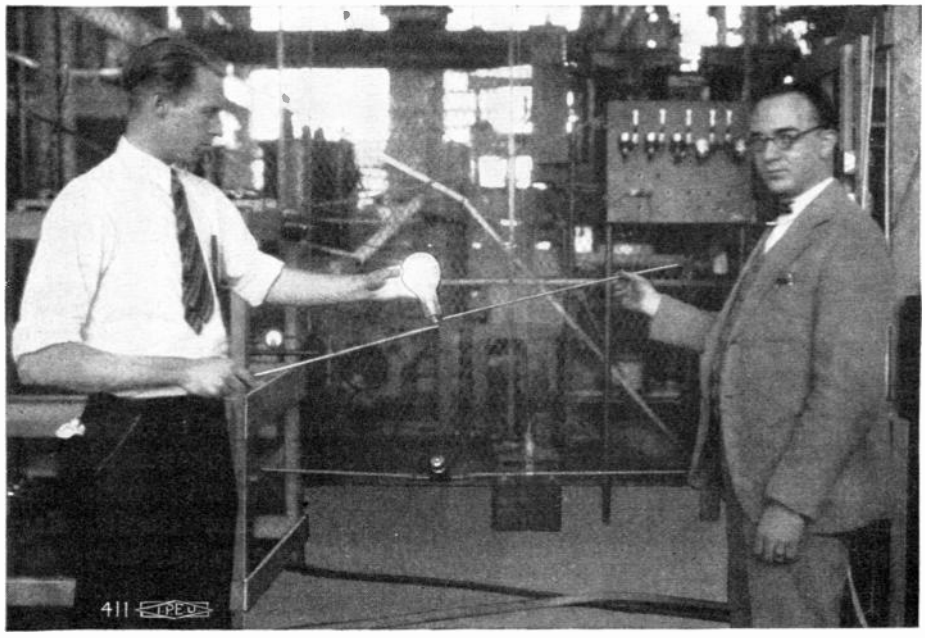
AN analysis carried out by the engineering department of Electrad, Inc., upon many manufactured a. c. electric receivers, has brought to light a point of great interest to set constructors. This is the preference for the use of a center tap resistance shunting the filament of each a. c. tube rather than the use of the filament center tap on transformers. One of the many requisites of an a. c. electric receiver is quiet operation, that is, minimum hum. A well balanced filament circuit is a very important step in obtaining this desired quiet operation. A series of engineering experiments conducted by this organization proved conclusively the determinations arrived at by receiver manufacturers.

"With respect to the use of center tap filament resistances in place of the filament center taps on power transformers," says F. Richter, chief engineer, "it is much easier to obtain an electrical balance with the former when it is located adjacent to the tube filaments because it permits the use of any length of filament leads and is independent of the electro static capacity factor of the transformer winding. We have found in the manufacture of center tap resistances suitable for this work, that an accuracy of 1 per cent and even a fraction of 1 per cent is very easily obtained whereas the same accuracy with a transformer winding is quite difficult to obtain. Not that the transformer can not be accurately tapped, but rather, that the economical consideraions encountered in the design and construction of the transformer plus the electro static capacity factor encountered in the winding and the connecting leads, tends to increase the possibilities of an unbalanced filament circuit.

"The use of center tap filament resistances permits the use of rheostats, or any other simple means of reducing the filament voltage to the required value. If one were to utilize the transformer filament center tap, and endeavor to reduce the filament voltage to a predetermined value it would be necessary to place voltage reducing resistances in each leg of the transformer winding, in order to maintain the electrical balance. But if a center tap resistance is used in place of the transformer center tap, one voltage reducing resistance located at any point of the filament circuit between the center tap resistance and the transformer is satisfactory. This is a more economical method of operation. One precaution, however, is essential when center tap filament resistances are employed. They should at all times be located as close as possible to the tube filaments; as a matter of fact their location should be directly adjacent to the tube circuit."

And Now They Broadcast Power!

High Frequency Radio Tube Dispenses With Wires



At the left—A 200-watt lamp lighted by radio pick-up from six-meter oscillator with power output of ten kilowatts, using a short brass rod for an antenna. Is the day close at hand when electric power lines will be unnecessary?

Below—Looks like a big gas jet, but it is a standing electric arc, caused by broadcasting power by radio, so hot that it scatters molten copper in all directions. A most remarkable phenomenon, says our correspondent who witnessed it.

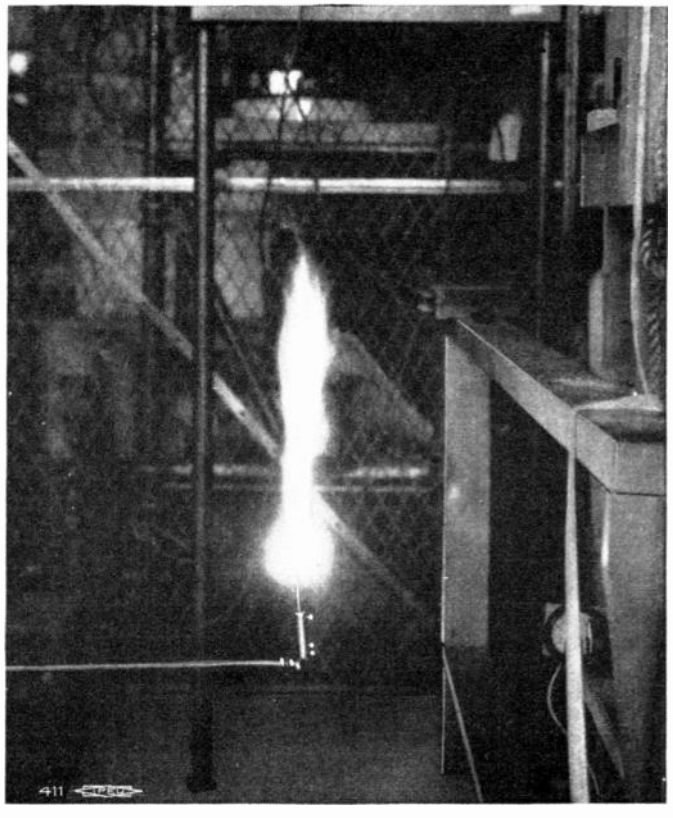
RADIO'S newest and strangest phenomenon is a high-frequency radio tube that has been developed in the laboratories of the General Electric company at Schenectady, N. Y. Standing about two feet in height and measuring five inches in diameter, this device, as one writer put it, can produce "fryless fried eggs" and "unbaked baked apples." Demonstrations of the tube opened up broad imaginative vistas to the layman, who immediately began to think of the immense possibilities in the broadcasting of power.

Will the day come when a turn of the switch will produce light drawn not from wires but from etheric sources? Will an antenna some day pick up enough power to run an automobile? Is it true that the energy that brings a radio program into a home represents only a fraction of the strength of a fly, but cannot this energy be harnessed in sufficient quantity to do the work of man?

Engineers have always been skeptical about the possibility of using the energy in the air, as they have been about harnessing the rays of the sun. But they were virtually nonplussed at the freakish actions of the radio tube developed at Schenectady. It burned an incandescent electric light lamp to full brilliancy without wires or socket; it killed rats exposed to the radiating wires, and it caused humans in its proximity to feel a strange warmth not unlike the kind actuated by stimulants now taboo.

The tube is harmless appearing. It is set in a wooden cage and surrounded by a network of wires, condensers and electric meters. It operates as a self-excited oscillator on a wave length of six meters, or down near the "purgatory" of radio where few now venture except the experimenters and the amateurs. (This is far, far away from the broadcasting band, as will be shown by the fact that Station WCFL operates on 483.6 meters.)

The tube radiates from 10 to 15 kilowatts of power, which is 10,000 to 15,000 watts. (Station WCFL reaches you with only 1,500 watts.) The tube's output



is probably 50 times as much as any short-wave tube has ever been able to produce. It is connected through a coupling system to a copper bar approximately three meters long, which constitutes the tuned aerial circuit, and it is able to radiate into space the full wattage generated by the oscillator.

It takes a tremendous lot of power more than this to do the heavy work of man, so that the experiment did not point directly to perfection of power transmission by radio. It did point to that indirectly, however, as a possible goal. The tube, "turned on," caused a sausage suspended on a receiving aerial in a glass tube standing some distance away to steam under the high frequency currents induced without wires and without flame. An egg was fried in another tube. An apple impaled on an aerial was baked. And so forth.

PRODUCES STANDING ARC

The *WCFL Radio Magazine* correspondent who witnessed the demonstrations regarded as the most striking of the short-wave effects the standing electric arc which he described as a close imitation of the famous ball of fire reputed to accompany tropical thunderstorms.

"The operator touched the end of the radiating aerial with a metal-tipped pole," he reported, "and immediately a greenish white arc arose to a height of a foot or more. When the pole was removed the arc remained, like a plume of fire, sputtering and sending molten copper in all directions until blown out.

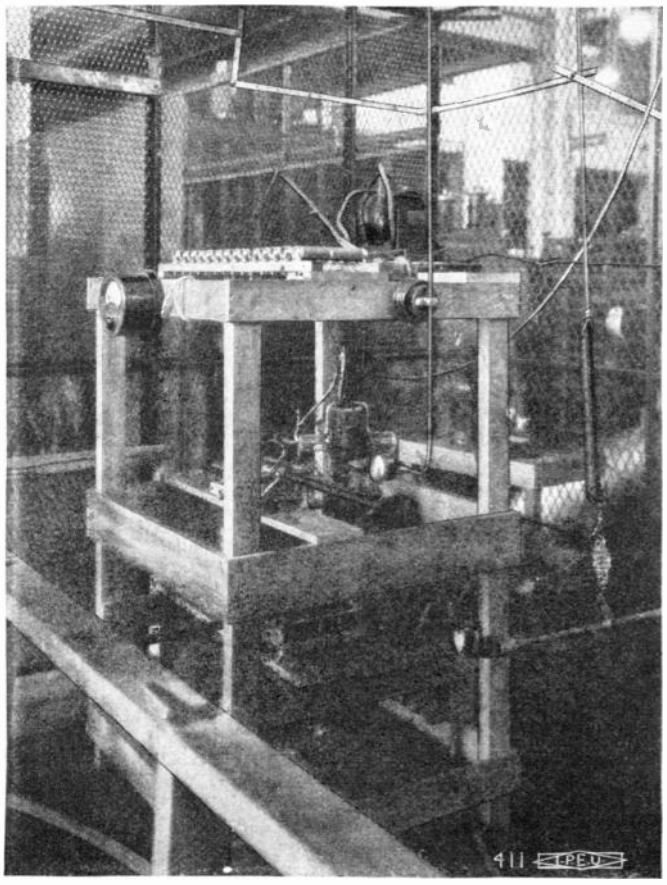
"By skillful manipulation as many as three of these arcs were established simultaneously along the aerial, giving the appearance of a row of flaming gas jets. No more extraordinary sight could be imagined than a powerful electric arc, representing thousands of volts, standing entirely by itself on the end of a wire without a visible return circuit. Smaller standing arcs of this nature were established on the ends of a receiving aerial several feet from the radiating system, demonstrating the transmission of power currents through space."

"No one can safely predict or promise a utility for such new things," Dr. W. R. Whitney, director of the research laboratory, was quoted as saying. "But it is clear that further experiments must be carried out. It may be assumed that if we had a perfectly harmless method for warming the blood it might have value, because fevers are sometimes artificially produced in order to start convalescence, and it may well be that raised blood temperatures or fever is one of nature's factors in recovery from infectious diseases." This was in regard to the effects on rats, which are generally used for experiments by the medical profession in order to determine effects on human beings.

NO PLANS FOR TUBE'S USE

The executive engineer of the research laboratory, L. A. Hawkins, said:

"We have no definite plans for high-power short-wave investigation. The proposition was to build a high-power tube of this type, and our time has so far been taken entirely with the apparatus itself. Vacuum tube technique had to be improved considerably before it was possible to design and produce an oscillator which would give the large power output we were seeking.



Inside this framework is the tube which makes possible the broadcasting of electric energy.

"We have not studied the applications of the tube at all, except to make a record of the interesting sidelights which its operation have brought out. The demonstrations indicate that many of the high-frequency phenomena may be worth investigating, and it is likely that in the future applications will suggest themselves, as they always do when a new field is entered."

As always, the scientist is cautious and conservative, leaving it to others, less trained, to do the imagining, as here.

B Eliminator Designs Change

AN analysis carried out upon B eliminators during the past year by the Engineering Department of Electrad, Inc., shows a decided change in B battery eliminator design.

In the first place, the use of wire wound variable resistances in place of tapped resistances is becoming more prevalent. The tapped resistance affords the possibility of obtaining certain specific voltages where the plate current drain is predetermined and the load is constant. The use of wire wound variable resistances, however, does not only afford constant voltage when

(Continued on page 89)

The Melody Masters

WCFL'S Own Orchestra

"THE hottest thing since the Chicago fire!" exclaims a radio listener after enjoying an hour with Elmer Kaiser's Melody Masters, the WCFL station orchestra. And that's just typical of the flood of appreciation constantly pouring in to WCFL.

When the writer started to prepare this brief article on the musical program of WCFL, a few "fan" letters were sought, from which to glean bits of human interest and color.

" 'Fan' letters?" repeated Franklin Lundquist, genial manager of the station. "How many do you want? Here are the more recent receipts. Look 'em over." And he opened a cabinet brimful of letters. Most of them expressed delight with the work of the orchestra, but many mentioned individual performers, some in endearing "mash note" fashion. It's too bad they're all married!

"Elmer Kaiser's orchestra is just wonderful, and we cannot hear enough of it," write Mr. and Mrs. L. A. McFadden of Terre Bonne, Oregon. "Allow an ardent listener to compliment your programs," says Harvey J. Henell of Milwaukee, Wis. Thus the letters come from far and near.

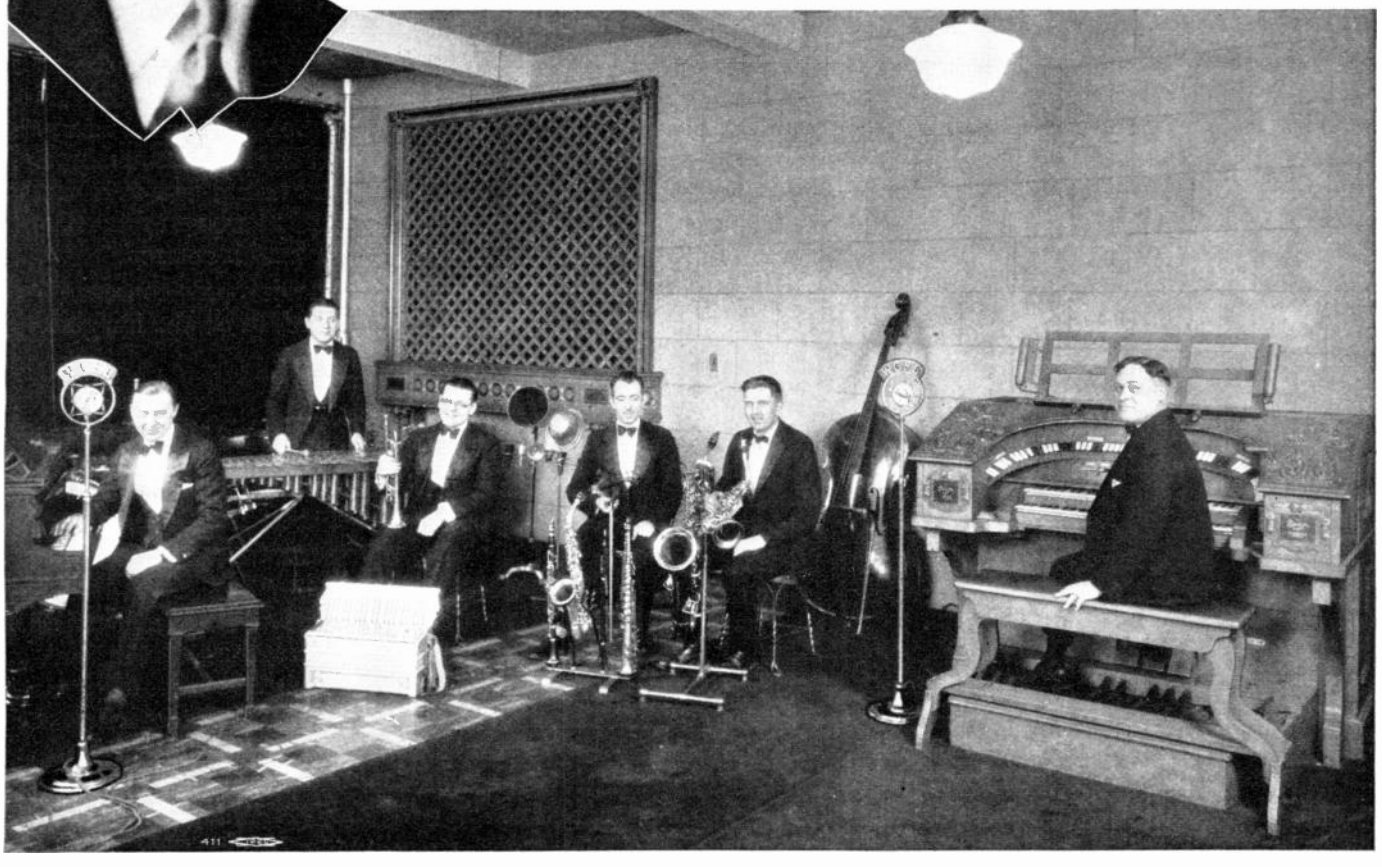
Elmer Kaiser, director of Melody Masters, the WCFL Station Orchestra.

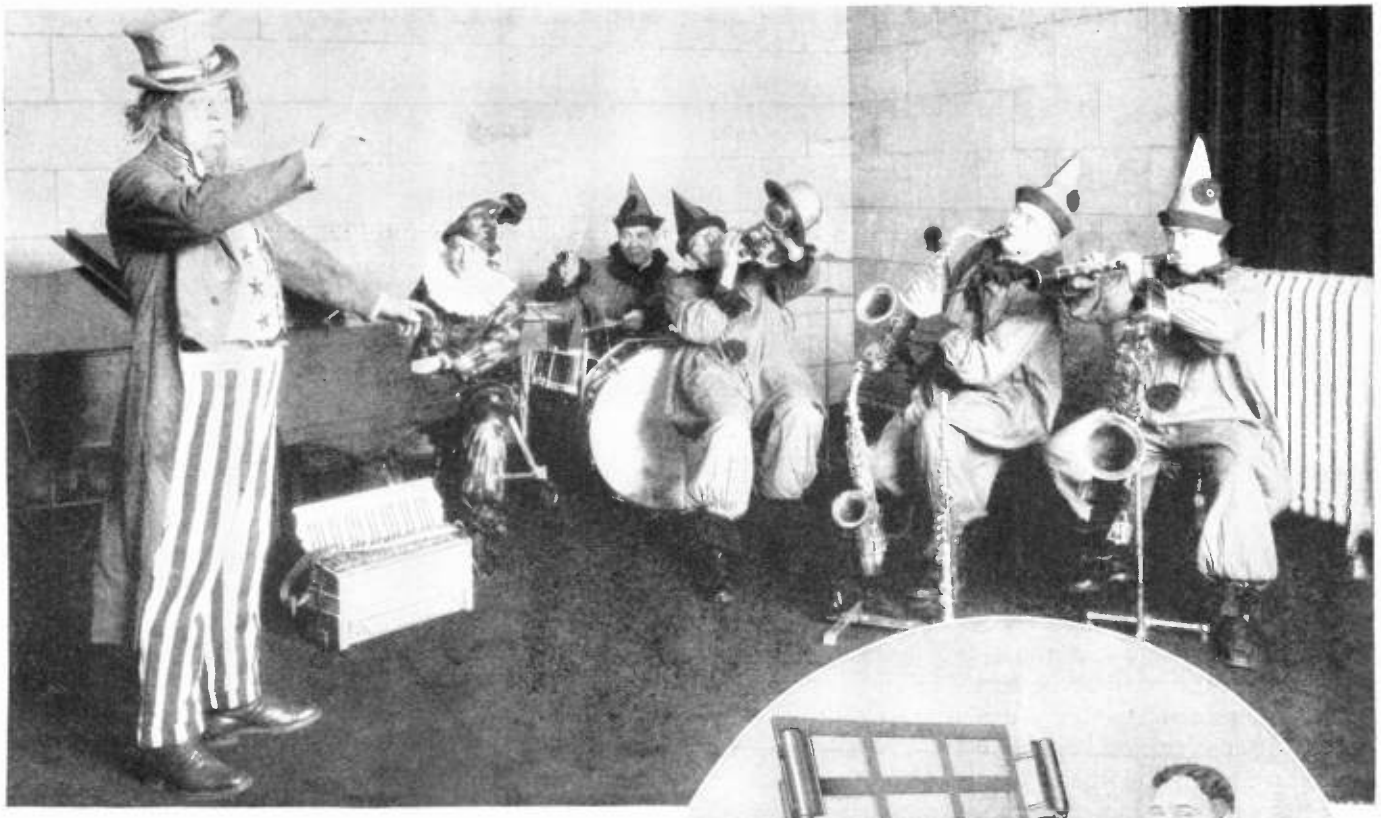
The Melody Masters. Left to right: Elmer Kaiser, director; Al Taterka, Lou Klatt, Irving Price, Harold O'Halloran, Roy Farr.

WCFL was one of the first Chicago radio broadcast stations to sign up with the Musician's union giving full-time employment to a regulation orchestra. The musical organization thus secured — Elmer Kaiser's Melody Masters — has long been famous in Chicago musical and amusement circles. Radio fans were quick to manifest their approval, and the orchestra since has grown steadily in favor with the unseen audience.

Elmer Kaiser, director of the orchestra and pianist, has an exceptionally wide radio following, having been heard over most every radio station in Chicago. He also has had extensive theatrical experience and is a favorite in the larger ball rooms.

The other members of the orchestra, all of whom are exceptionally versatile, named as they appear in the





The Nockey Club entertainers in carnival attire.

At the right: Roy Farr at the Barton organ, playing his request hour program.

Below: Three Grand Pianos in the Main WCFL Studio. Pianists O'Halloran, Kaiser and Klatt.

accompanying picture, from left to right, are: Al Taterka, drums and traps; Lou Klatt, cornet, accordion and piano player; Irving Price, saxophone, cornet, viola and cello; Harold O'Halloran, saxophone and piano player and basso soloist; Roy Farr, organist.

A special feature of the work of the Melody Masters is the Nockey Club program, from 2:30 to 5:15 each Sunday afternoon, at which time a request program is played. So great is the interest in this feature that the orchestra has difficulty complying with all requests.

Each listener sending in a written request for the Nockey Club hour is made a member of the club and is mailed a membership card.

The Melody Masters also play a request program each Monday afternoon from 5:00 to 6:00 o'clock.

Roy Farr, organist, plays a request program during the noon hour each week day, and from 5:00 to 6:00 p. m. each day except Monday.

What Is the Farmers Union

By J. E. LEONARD, IOWA FARMERS UNION

FOR sometime past I have been asked the Question: "What is the Farmers Union?" In this article I will endeavor to answer this question as briefly as possible, setting forth our aims and desires.

To begin with, we believe in true co-operation among the farmers as the only fundamental solution of their problems. While we recognize the need for helpful legislation to place the farmer on an equal footing with other groups of society, we believe that the farmer is his own greatest problem. The salvation of the farmers today rests largely in their own hands, just as the salvation of the laborer rested in the hands of the industrial worker. We firmly believed that "in Union there is strength," and that the farmer in his present partially organized state is prey to certain other groups of society who have had the good business sense to organize. We believe that the principles of co-operation should be substituted for those of competition, for instead of competition being the life of trade for the farmer, we now know that it is ruin. United the farmer can command the respect and influence that the great organizations of capital and organized labor possess. As individuals the farmers are powerless.

COST OF PRODUCTION

We believe in the farmer's right to *cost of production* for the things that they produce and sell, and that this right so long denied them by other favored groups of society, can be secured only by organized control over their surplus products; their marketing associations and their source of credits. All society is dependent on the basic industry, agriculture, for the two prime necessities of life—food and clothing. Society has the right to demand that sufficient of each be produced to provide for its needs. But society has no right to demand that the ones who produce these necessities should be penalized for doing so by producing below cost. *In order to insure sufficient products in years of failure, it is necessary that the farmer produce what is a surplus in years of average yield.* He cannot anticipate the weather or the ravages of the animal or insect pests. So he must plant and cultivate and harvest with the emergency of a small crop in mind and the likelihood of a surplus in years of average yield in order to protect the consumer. And yet this surplus, which is society's margin of safety, is the farmer's ruin. It must be exported and it sets the price for his entire crop, at home and abroad. In other words, the farmer is the only American producer that sells on a world market and buys on a protected home market. He is the only business man that has nothing to say about the price of the products that he produces. As it is to-day he must take what he is offered.

PRACTICE THE GOLDEN RULE

We believe in practicing the GOLDEN RULE and not in the Worship of the Golden Calf in our relationship with our fellow man. *We seek nothing for ourselves that we do not gladly concede to others.* We believe that every faithful laborer is worthy of his hire, and that the professional man and the business man and the industrial worker are all entitled to the same American standard of living that we seek for the farmer.

The Farmers Union does not seek to tear down other classes of society in order to build up the farmer. It seeks to raise the farmer to the same level as that enjoyed by other classes of society. It expects to pay and does pay sufficient for the things it buys to provide a decent American standard of living for those engaged in the necessary processing and marketing of other products. All that the Farmers Union desires is an equal opportunity. It believes that between the producer on the farm and the consumer in the cities and towns—somewhere in the process of marketing—there are those that toil not, yet they reap vast profits. It believes that much of this profit can be eliminated and returned to the farmer and to the consumer, by a system of co-operative marketing. *It believes that by such a co-operative system the producer shall receive a fair share of the wealth that he creates and that the consumer shall pay less for the necessities of life.*

We believe that we must have a democratic form of government "of the people, by the people and for the people," and "that all men are created equal," as enunciated by the Declaration of Independence and in the Constitution of the United States.

We believe that all governments derive their just power to rule from the consent of the people, and we are unalterably opposed to the increasing centralization of government in the hands of appointive boards, whether at Washington or elsewhere. We do not believe that any small group of men should have the exclusive power to rule any industry, whether it be farming, the radio or any commodity. We do advocate greater efficiency in government as well as greater honesty and economy, but this goal cannot be reached by removing government farther and farther from the control of the people. It is far better for the people to make mistakes and then correct them than to have any form of dictatorship, and thereby lose all ability for self-government. If this is not true belief, then all the wars fought in the name of Liberty and to make the world safe for Democracy have been fought in vain.

COST OF PRODUCTION OR PEASANTRY

We believe that the farmer must build up a powerful organization, owned by the farmers, controled by the farmers and officered by men of their own choosing, that will always be independent of all outside influence. The organization should be financed through its own efforts and not through any tax subsidies, an organization that shall always remain free to serve the interests of the farmers and that through the various business

interests it shall be able always to serve the farmers at cost.

Neither the Iowa Farmers Union nor the Farmers Union of any other state has ever attacked any organization of labor. At all times we have been on terms of friendly co-operation. Our paths are parallel, our battles are one, because in the final analysis we find that the various groups of society that have preyed on the farmer have invariably preyed on the industrial worker.

We believe that the Farmers Union is the only Farm Organization in existence to-day that has in operation a practical plan that is designed to procure for the farmer his inherent right: *Cost of production.* And cost of production he must have or submit to a peasantry that will put to shame the darkest days of the lowest peasant of old Russia.

Face to face with the above facts, can anyone doubt that between organized labor and the organized farmer there can exist anything but a bond of perfect friendship? This fact is born out by the co-operation of the two groups at various times when their united efforts were needed to secure desirable action. Another proof of this co-operation is found in the program of Labor's Radio Station WCFL, the Voice of Labor, where the Farmers Union Live Stock Commission house has alloted for its use one half hour each Tuesday and Thursday.

In the building up of the Farmers Union it was necessary that there be established businesses that would help to stablize the farmer's financial statis, and we find that the first of these is the Farmers Union Mutual Life Insurance company, a legal reserve company organized under the state laws of Iowa and admitted to do business in nine other states. The company now has over $8,500,000 of life insurance in force and over $450,000 of assets.

The Farmers Union Mutual Insurance company, better known as the Property Insurance, has over $20,000,000 of property insurance in force and over $23,000 set aside as surplus.

The Farmers Union Service association is in reality the Farmers Department Store, or the Wholesale Department dealing in staple farm commodities such as binder twine, fence wire, flour, work clothing, lubricating oils and hundreds of other farmer needs.

The Farmer Union Life Stock Commission house at Chicago during the past year did a business in excess of $15,000,000 and the other eight houses established on the principal live stock markets of the central west had a successful year.

The Farmers Union Marketing association is the latest venture of the Farmers Union, but not a new idea in this country as it has been working in other states with wonderful success. This marketing plan is designed to obtain for the farmers their right, cost of production, as, working under a ten-year plan the various institutions of the Farmers Union are assured of a steady supply of products, and with a steady supply the commission houses should control the supply and therefore the prices.

We believe that only through such a plan and program will the farmers of this nation ever be free men and women, masters of their own souls and fate, owners of their own businesses and able to dictate their own fortunes. Most of all they will then be able to look their sons and daughters in the face and know that they have done their part to insure their future and that of their posterity. What more can mortal man hope for, than this, "I have done my duty."

New Shielded Grid Tube

THE tremendous advantage of the shielded-grid tube, with its enormous amplification with stability in the high frequency circuits, have appealed to radio fans generally. To adapt this higher efficiency to modern electric sets, an a. c. shielded-grid tube has just been placed on the market by the Arcturus Radio company, a. c. tube manufacturers of Newark, N. J.

The popularity and general use of the 222 type shielded-grid tube has been considerably counteracted by the universal appeal of tubes permitting operation from a. c. house lighting power sources. However, this new tube is said to combine the advantages of the shielded-grid tube with the convenience of a. c. design.

In the Arcturus a. c. shielded-grid tube there is one more element than in the standard tube. The filament draws a current of 0.35 amperes and its normal operating potential is 15.0 volts. The additional element, i. e., the screen grid, is a combination grid interposed between the usual plate and control grid and a fine mesh arrangement completely enclosing the whole tube structure, thus introducing a completely shielded tube.

The addition of a four element to the new tube makes necessary five terminals to each tube. The tube is mounted in a standard UX base and the terminals are connected as usual, except that the screen-grid is connected to the regular grid terminal at the base and the control grid is connected to a special terminal, mounted on the top of the tube.

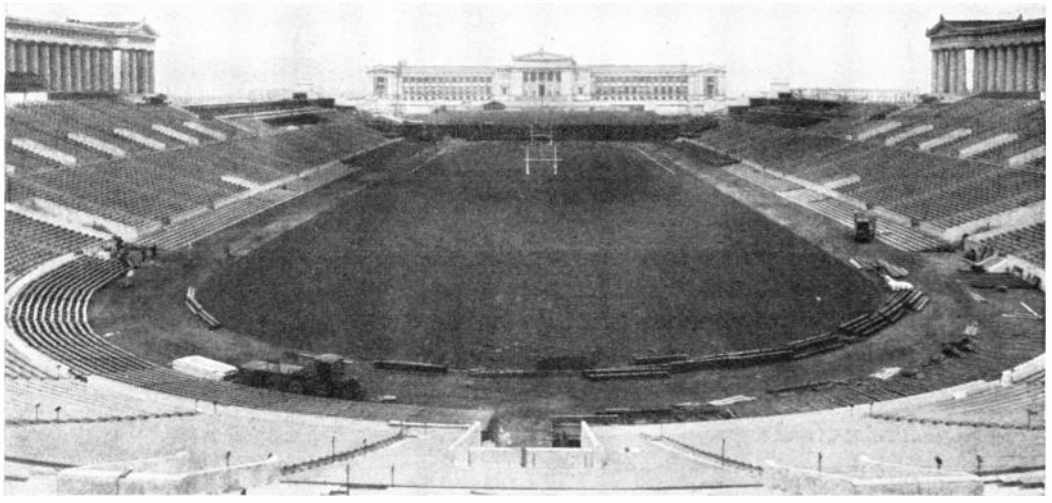
It is reported that the characteristics of the a. c. shielded-grid tube are similar to those of the conventional 222 d. c. design, except for a higher mutual conductance. Also slight variations have been made from d. c. design in input and plate impedances, better adapting the tube to use in standard circuits and with standard coils and auxiliary equipment.

No Defense

Reporter: "What are you?"
Man in Cell: "I'm a radio saxophone player."
Reporter: "And did they arrest you on that charge?"

Unions To Stage Huge Celebration

Labor Day Festivities at Soldier Field Will Set New Record



Immense Soldier Field Stadium Where Unions Will Celebrate on Labor Day

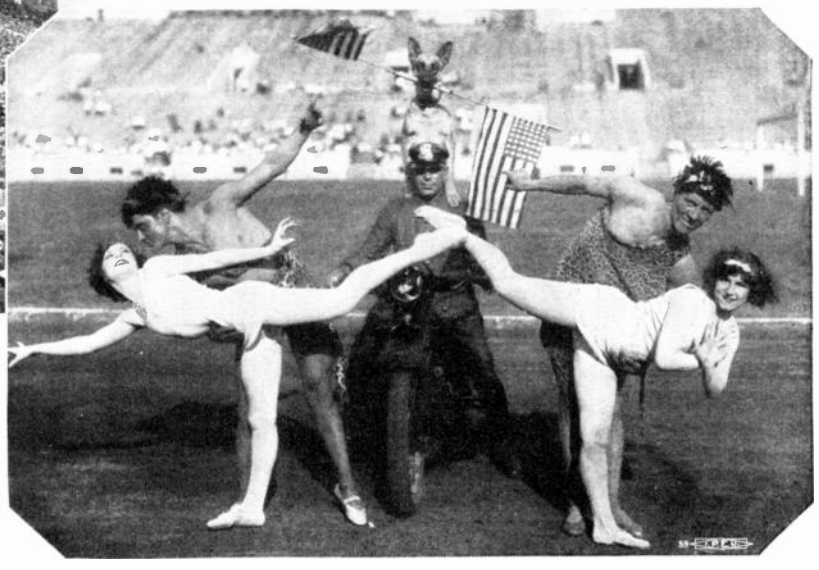
THE greatest celebration in the history of organized labor—that's the gauge of the festivities the Chicago Federation of Labor will stage on next Labor Day, September 3. Inspiring in magnitude, nation-wide in scope, replete with surprises and intensely interesting in every detail, the celebration will set a new record, not only for Labor Day festivities but for other public demonstrations as well.

Organized workers of the nation have been invited to join with the Chicago unions in this great celebration. Central bodies in several large industrial centers in this region have signified their intention to participate. Large automobile delegations are anticipated from nearby points; the railroads have announced attractive low rates effective over a large area and are featuring the Chicago Labor Day celebration in their advertising. The Farmers Union has been accorded a prominent place in the arrangements, and large delegations of members of this organization are expected to attend.

The daylight festivities will be staged in the immense Soldier Field stadium, the scene last year of the Eucharistic congress, the Army-Navy football game and the Tunney-Dempsey fight, and where just recently the German-Irish transatlantic fliers were given such a hearty welcome. It is anticipated that the stadium's seating capacity of 150,000 again will be taxed to the limit. Parking space for 100,000 automobiles has been arranged for in Grant Park adjacent to the stadium. Other arrangements are being made on a similar scale.

The program will be the most elaborate of its kind ever arranged. The dignity of labor, the nobility of service and the tremendous contribution trade unionism has made to human progress will be inspiringly dramatized both in oratory and pageantry. The music and entertainment will be the very best that can be procured. The acts will cover the broadest possible

Part of the multitude at Labor Day celebration last year. Indications point to a much greater attendance this year.



Entertainers at Chicago Federation of Labor celebration last year. The entertainment this year will greatly surpass all previous efforts in elegance and beauty.

Speakers for Labor Day Fete

THOSE who would learn of the labor movement from men who are recognized authorities as well as able orators, should attend the great National Labor Day celebration, to be staged in Soldier Field Stadium, Chicago, on September 3. Above are pictured three of the orators who will speak on that occasion. At the left is President John Walker of the Illinois Federation of Labor. In the center is President John Fitzpatrick of the Chicago Federation of Labor, the organization that is sponsoring the great National Labor Day celebration. At the right is President William Green of the American Federation of Labor.

range of thrills and human delights—from breath-taking, awe-inspiring athletic feats of daring and artistic pantomine to uproarious comedy and soul-inspiring music. For swift and harmonious action the flights from one extreme to another, the program will set a new high record. There will be so much doing all the time and the acts will change so quickly that the average spectator will be as busy as a small boy attending his first three-ring circus. In fact, it may be necessary to stage the entertainment in three-ring circus fashion, in order to present properly all of the features and surprises now scheduled.

Admission to organized labor's stupendous and spectacular Labor Day celebration on Soldier Field will be by ticket only. The tickets are selling rapidly at one dollar each. One ticket will admit a union member and his family.

The day's festivities will be concluded with a grand ball in the ball room on the Municipal Pier.

The day's program will be broadcast by WCFL.

How Long Will Tubes Last?

THE average life of a vacuum tube cannot be accurately determined by burning the tube for several thousand hours, or until the filament is destroyed. The reason for this is that such a test does not duplicate the conditions under which a tube is normally operated. In a receiver, the tubes are turned on and off many times in the course of their useful existence, and it is this change from a cold filament to incandenscence that imposes the greatest strain on the filament. Most metallic filaments are characterized by a positive temperature co-efficient. In other words the resistance of the cold filament is lower than the resistance of the hot filament. Consequently more current is passed through the filament just as the current is turned on than when, a few seconds later, the tube is operating at its normal temperature. This sudden current surge is responsible for the burning out of many tubes, particularly of the Type 27 a. c. tubes, where a particularly hot filament is required to heat the cathode.

In appreciation of this fact, some manufacturers, such as the Arcturus Radio company, makers of a. c. tubes, employ a carbon filament heater, which has a negative temperature coefficient. In other words the current is lower when first turned on than when the filament heater is hot. The current rises slowly to its correct value.

In all cases the life of a tube can be accurately determined only by subjecting it to intermittent tests—by turning the current on and off several hundred times during a thousand hour life test to simulate the actual conditions of operation.

Station WCFL is preparing to broadcast pictures.

Editorial Short Waves

Life Is a Complicated Proposition

TUBERCULOSIS meningitis among children under ten years old in Chicago has increased alarmingly during the past year. In 1927 there were twenty-two more cases than during 1926. This is sadly disappointing for, during the period mentioned, a strict ban was placed upon milk from untested cows. Dairy farmers who would ship milk to the Chicago market must first show that their herds are free of bovine tuberculosis. One of the chief arguments in favor of compulsory and universal testing was that milk from untested cows furnished one of the most serious sources of tuberculosis in children. In spite of this ban, one form of tuberculosis has increased alarmingly.

Dr. Benjamin Goldberg, superintendent of the Municipal Tuberculosis sanitarium, is inclined to the idea that this increase is due to the fact that active cases of tuberculosis have not been reported to the health authorities, and through these cases children have become infected.

It is possible that the very fact that Chicago's milk supply is now as safe as can be made has created a feeling of security in the minds of many and gives rise to carelessness as to other preventive measures.

The battle against disease calls for not only direct attacks but for guarding against flank and rear attacks and machine gun nests in unsuspected places.

* * * *

Will Radio Regulate the Weather?

HIGH-POWERED radio stations are having a disturbing effect upon weather conditions, declares Captain W. H. Parker of the White Star liner Homeric. He claims that man's violent churning of the ether is responsible for climatic vagaries in England and in Egypt and is increasing the severity of storms at sea. This unusual indictment of radio was made by the mariner after his ship arrived in New York harbor on April 12, two days late, due to having been buffeted by unprecedented gales. Some of the waves rolled forty feet high and broke windows on the promenade deck.

Wireless officials regard the captain's weather theory rather facetiously, yet it is interesting. Other explanations of storms and droughts are so hackneyed. We welcome something new that we can blame for disagreeable weather.

And suppose Captain Parker is correct. Stranger theories have been proved to be sound. What interesting possibilities are suggested! If radio communication piles up forty-foot sea billows, how mighty and terrible will be the tempest aroused by transmission through the ether of high voltages of power, as is now being planned! And, if radio agitation angers the elements, why can't it likewise be used to sooth the wrath of nature? Counter irritants are successfully employed in materia medica, why not in the realm of natural science? By hurling gigantic electric currents through the air into the face of the onrushing blizzard, man may yet be able to pull the fangs of the monster. Perhaps such broadcasting will offer a satisfactory antidote for that horrifying scourge of the elements, the tornado.

It may be some time before man, speaking through radio, will be able to calm the angry waves. However, in other realms radio already has diminished the billows. A news dispatch from Washington states that radio is credited with greatly diminishing the deluge of speeches mailed out by congressmen under postal franks. William Tyler Page, clerk of the House of Representatives, says that the volume of such matter now being sent out is less than it was ten years ago, or even two years ago.

Great is radio!

* * * *

Fear Not, Bishop, No One's Lookin'

AGAIN is religion made ridiculous by one of its prominent beneficiaries decrying the progress of science—emulating the old woman who tried to sweep back the tide with a broom. Dr. M. B. Furse, bishop of St. Albans, speaking at a conference at Barnet, England, said he is doubtful whether modern scientific discoveries have brought happiness to the human race. Then he plaintively declared that his bath is the only place that he can obtain privacy, and expressed the fear that he was to be robbed of this by television.

"I view with great trepidation the coming of the day when, by television, my morning ablutions will be reflected on the screen in New York for the entertainment of the American public," said he.

Such egotism! What consummate vanity! How utterly ridiculous! Surely the bishop never has visited America. Who wants to waste time gazing at a bishop in his bath—or any other place for that matter—when the beaches are thronged with feminine loveliness arrayed in bathing suits that leave little to the imagination!

Splash on, bishop; no one's lookin'. Leave the ring on the tub.

* * * *

Why Labor Needs a Radio Station

"THIS is Station WCFL, the Voice of Labor, on the Navy Pier, Chicago."

Sitting comfortably in the evening before your radio receiver, turning the dials in quest of a bit of entertainment or a soothing song, you have heard that announcement many, many times. Perhaps you have wondered why Labor wants to bother with a broadcast

station. Aren't wage scales, working conditions, unemployment and legislation problems enough? Why have a voice on the air?

Ask the starving union miners in Ohio, Pennsylvania and West Virginia. Ask the Chicago gardeners and greenhouse workers. For now many months the union miners in the Pennsylvania soft coal region have been locked out of their jobs and more recently evicted from their homes. Nightly appeals made in their behalf over Station WCFL have augmented greatly the steady stream of clothing and supplies sent to the suffering families by more fortunate union workers. A benefit entertainment, participated in by many celebrities, raised thousands of dollars for the miners' relief.

More important than the supplies and the cash thus raised for the relief of suffering, was the opportunity afforded to the union miners by Station WCFL to present their case to an impartial and fair-minded public. How else could the distressed miners have been put in a proper light before right-thinking folks in other walks of life? Certainly not by the metropolitan press, for the big-city press obeys the voice of its master. Furthermore, the greatest of dailies covers but a restricted area. Radio reaches the world. As a defensive weapon radio has proved a veritable life saver to the starved and bleeding miners.

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Four thousand men are employed in greenhouses in the Chicago area, yet, so powerful and relentless has been the opposition to unionism that Gardeners and Florists Union 10,615 has less than 300 members. Only one of the big greenhouses was completely organized. Then, on February 16, the management of this one greenhouse that had been fair to union labor, was induced to break its contract with the union. The men were ordered to turn in their union cards and sign a yellow dog contract under penalty of losing their jobs.

It was a desperate situation. What could a handful of greenhouse workers do against the master florists' powerful organization? Fight? Yes, they fought—fought like only self-respecting union men can fight.

The message went broadcast over the air: "The master florists have locked out the union. They have denied their men the right to organize. Other union men and the public generally are urged to buy no more flowers, until the master florists withdraw their un-American demands and return to a sane and equitable way of dealing with their men."

The master florists hurried into court in a vain effort to enjoin WCFL, but the broadcasting was kept up for several weeks. Never before did flowers go begging so sorrowfully at a holiday season as in Chicago at Easter time!

Then the retail florists raised a protest. Their business was being ruined by the obstinancy of the growers they patronized. Next there was dissension in the ranks of the master florists. The realization was brought poignantly to them that, after all, their business rests largely upon union labor—union men are the principal ultimate consumers of greenhouse products.

1928 looks like an unusually busy year. (This cartoon appearing in The Chicago Tribune, is reproduced through courtesy of that paper.)

The greenhouse workers have proved that even a small and struggling union can wage a swift and effectual fight, when it has right on its side—and the aid of a powerful broadcast station.

There is always distress in some quarter. Who knows when trouble will knock at your door? In the day of your need, from whence will come your aid? How will you get your message across?

Why bother with radio? Why should there be a Voice of Labor on the air? Ask the starving coal miners or the locked-out greenhouse workers. They know—and, how!

* * * * *

Radio Helps Corn Borer Fight

NO recent gift of science to the farmer has done more to lighten his labors, add to the productivity of the soil, give protection to his growing crop and prolong the life of the harvest than the radio is doing. The timely market information as to condition and price is invaluable to the man on the farm with something to sell and since he is able to get this knowledge at the same time as the buyer, his bargaining ability becomes all the more effective. Thousands of farmers are actually making money by listening in on the radio to the market reports sent from the several broadcasting stations.

One of the most important pieces of work for the benefit of agriculture was that done this spring jointly by radio stations in twenty-five states in putting before

(Continued on page 56)

WCFL Ostracized for

THE Radio Corporation of America, the Radio Trust, the giant octopus of the air, and its closely allied interests, are determined to stifle freedom of communication through the ether. The Radio Trust seeks to dominate all firms and organizations coming within its broad sphere of influence, forcing them to do its bidding. Freedom of the air is seriously threatened. Believing that the gravity of this situation warrants a prompt and thorough investigation by Congress, WCFL addressed an open letter to members of the 70th Congress, asking for such an investigation. Because of this effort for the preservation of freedom on the air, WCFL was declared "technically no longer members of the National Association of Broadcasters, Inc."

Below is reproduced the letter sent by the Chicago Federation of Labor, owners of Station WCFL, which brought about this ostracism from the National Association of Broadcasters, Inc. Read it. Lack of space prevents further comment at this time. More will be said in the September issue of WCFL Radio Magazine.

March 16, 1928.

To the Senators and Representatives
of the Seventieth Congress
of the United States of America,

Greetings:

The Chicago Daily Tribune, which styles itself "The World's Greatest Newspaper," carried a half column editorial on page 10 of their Friday, March 16th, 1928, issue, captioned, "Disregard for the Radio Public," and concluding as follows:

> "Better no radio legislation leaving the determination of the property rights of broadcasters and listeners to the courts, than the kind approved by the House."

This is but another trick editorial resorted to by those who are the foremost leaders for the establishment of perpetual ownership of property rights in wave lengths on the air.

On behalf of W-C-F-L, the "Voice of Labor," representing the Labor Movement of this country as applying to radio legislation, Labor's broadcasting station desires to commend Congress for the careful manner of its procedure in protecting the people and the listeners' freedom of the air. Up to date, Congress has NOT shown disregard for the radio public. Up to date, it has withstood the insidious propaganda of the Radio Corporation of America, its subsidiaries and closely allied interests, who are seeking special privileges of legislation in connection with this new, wonderful and all-important science and art of Radio.

The statement of Merlin Hall Aylesworth, President of the National Broadcasting Company of New York City, at hearings before the Committee on Interstate Commerce, United States Senate, Seventieth Congress, February 4th and 6th, 1928, only proves conclusively that the monopolization of the air is already here.

The presentation of Mr. L. S. Baker, Managing Director of the National Association of Broadcasters, Inc., and his col-

leagues, to the members of Congress is further evidence of a radio trust.

The statement of Manton Davis, General Attorney for the Radio Corporation of America, at hearings before the Committee on Patents, United States Senate, Seventieth Congress, February 20th and 21st, 1928, is further conclusive evidence of the radio propaganda to separate the people from free use of the air.

The statement of Manton Davis and his associates before the public hearings of the Federal Radio Commission recently, further demonstrates their desire and aspiration not only to hog the air so far as broadcasting is concerned, but also radio telegraph, telephone, television, wired wireless and all of its ramifications, to the exclusion of any and all others on this North American Continent.

This Radio Corporation of America, in their mad rush and desire to own, control and operate and censor Radio, have inadvertantly furnished a chain of statements giving any and all valid reasons for Government ownership of Radio.

The Labor Movement has only to take the statements of these representatives of the Radio Trust and its allied interests to show the falsity of their concern on behalf of the people for the use of the free air. It is true that at an expenditure of millions of dollars and at a loss to themselves at the present time, they are putting out on the air wonderful music and entertainment with which to lull the people to sleep while, with their preparedness and perfumed, silk gloves, they will be able to pick the pockets of the people for all time to come.

W-C-F-L, the "Voice of Labor," is not a commercial proposition; it has no stocks or bonds to sell and therefore no dividends to declare, or interest to pay; it is a paid listeners' radio broadcast station, operating on a basis of twenty-five cents paid quarterly by the Labor Movement of the United States.

Therefore, we most respectfully petition Congress for the introduction of a bill for investigation of the Radio Trust in order that we may be assured a new deal for Radio that will protect the rights and interests of all the people for all time to come.

Respectfully submitted:

CHICAGO FEDERATION OF LABOR

John Fitzpatrick President

E. N. Nockels Secretary.

Keeping Your Radio Set Up to Par

By J. H. WELCHES

VERY often after a radio receiver has been installed and the service man has departed, the receiver will operate in a manner that is quite satisfactory for a period of three or four months and then develop some very radical tendencies. Probably the most annoying development is that of noise. Noises are introduced into a receiver from several different sources other than the main reason of outside interference. Some of these other sources are leaking bypass condensers, grid leaks which do not maintain constant resistance values, C batteries which have been in service too long, oxidization of the metal on the tube prongs, loose connections and corrosions.

When your set begins to develop one of these bothersome noises, the first thing to do is to remove the antenna in order to determine whether the noise is being picked up from the air or whether the disturbance is being generated within the equipment itself. If the noise ceases when you disconnect the antenna from the receiver, the first thing to do is to make a careful inspection of all the antenna and lead-in wires to see that there are no loose connections or leaks across the insulators due to accumulated soot. (Insulators should be scrubbed off about once every six months.)

If the antenna seems satisfactory upon inspection, it is safe to assume that the noise is being picked up from some outside interference sources and usually the set owner is quite helpless. There are so many sources of outside interference and so many different ways of dealing with them that they will not be considered at this time, since we are interested in eliminating disturbing noises from the equipment itself.

If, after the antenna has been disconnected, the scratching noise still persists, there is a regular order in which one may progress toward the spot which is causing annoyance. Tackle the ground wire first and make certain that the connection to the ground pipe is tight and not oxidized. It is a good idea to use a ground clamp at all times. This will eliminate the troublesome grounding noises.

After inspecting the ground, the next thing to look at is the grid leak. Twist it around a couple of times in the connecting clips to make sure that the terminals are clean, then take the grid leak out of the clips entirely. If the noise stops, that's the answer and you need a new grid leak.

The next points of inspection are the battery connections. Try the A battery first. Be sure that there are no acid corrosions on the wires where they make contact with the battery terminals. The best thing to do at this point is to wash all of the acid off of the battery terminals and the cable wires and clips with a brush, soap and water. Then cover all of the connection surfaces with vaseline, which will keep the acid from crawling and spoiling the joints.

B battery terminals of the clip type can be cleaned by pulling the wires back and forth in the clips. Usually the ends of the battery cable leads are covered with solder and this solder tends to oxidize after a certain time. The oxidized surface makes a very poor and noisy connection. This applies to all surfaces which are lead coated and which are not soldered together.

WEAKENED BATTERIES NOISY

It is well to remember that both B and C batteries tend to introduce a great amount of noise into a set when the cells have depreciated appreciably and the resistance of the cells has increased. About the only way to determine this point is by the substitution of batteries after all other tests have failed to disclose the reason for the trouble.

A batteries are, in a few isolated cases, responsible for noise when they have become old and dirt has dropped down between the plates allowing leakage paths between the cells themselves. Substitution will quickly show up a noisy A battery. All A batteries introduce a small amount of noise into a receiver if they have been charged recently, although the noise from this source should not be annoying to any great extent.

Probably a good fifty percent of the noise in all radio receivers are due to the imperfect contact of the vacuum tubes with their associate socket springs. The first thing to do is to take the tubes out, one at a time and wipe the prongs off with a good clean cloth. A little alcohol would not do any harm. I say one at a time because the service man may have matched the tubes into your receiver when it was installed and, if you get them twisted around, you may experience very much less satisfactory operation. On the other hand, if you mark the positions in which they were originally, and then try them in different sockets you may sometimes realize a very definite gain in both tone quality and amplification.

About the only way to clean the socket springs themselves is to move the tubes up and down, in and out of the sockets until the springs are cleaned by the simple process of pushing the dirt off to one side. Wherever possible get at the springs with a cloth and alcohol and rub hard. It is very good practice to clean the tube prongs and sockets at least once a month. While we are on the subject of tubes, it is well to remember that this applies to all tubes used in the B eliminator and power amplifier and it also applies to rectifier cartridges which are used in A eliminators.

Noise is sometimes introduced into a receiver by vir-

ture of a poor contact at the switch. In such a case the trouble can be corrected by bending the contact spring or springs so that the pressure is heavy enough to keep the switch from moving around when it is in the "on" position.

Certain kinds of hissing noises are built up within the tubes themselves. Very often they can be eliminated by changing the tubes around to various positions in the radio. Tubes in the radio-frequency section of the receiver will not amplify such noises since they are working at a super audible frequency, so the noisy tube can be placed in this section of the receiver and the one which was taken out can be placed back in the audio frequency amplifier. Thus you would be experiencing perfectly quiet operation even though one of the tubes was exceptionally noisy. Most radio listeners are familiar with the ringing noise which is set up when a tube has a loose element. The same remedy applies to tubes of this type. Place them in the radio frequency section of the set.

Detector tubes of the gas type are notorious noise makers and I doubt if the additional sensitivity is worth the extra noise which they introduce into the receiver. Usually the 201-A tube will be found satisfactory for detector purposes.

Once in about ten thousand cases, the by-pass condenser leaks enough to create a racket and, if you have an occasion to suspect this part of the instrument, simply disconnect the lead going to one side of the condenser. If the noise stops, obviously the condenser is at fault. If it doesn't you may assume that the condenser is not at fault and look further.

HOW TO FIND LOOSE CONNECTIONS

About the only other points at which you may expect to find noises are the general wiring connecting points throughout the entire receiver. If all of the above mentioned tests have been made and you are still unable to locate the cause of your trouble, turn the set up side down (with all of the power applied) and shake the connections one at a time with your finger to see if you cannot locate one of them which may be loose. Bear in mind that any two metals which have been placed together for any length of time are subject to corrosion, and you may expect to find a noisy joint in any spot of the receiver which has a mechanical connection of this type. Loosely soldered connections will show up equally well under the finger pulling method and the remedy is quite obvious.

Nowadays hardly anyone uses acid solder or acid fluxes, so you may generally disregard this cause of trouble. If, however, you notice a deposit of white powder around any particular connection you may rightfully suspect that it is an acid joint and the best thing to do is to apply a hot soldering iron to all joints of this character.

Another very bothersome development in a receiver is that of distortion which may develop from any one of several causes. There are a great many new receivers for that matter, which would sound much better if the general causes of distortion were better understood.

J. H. WELCHES

Probably the greatest source of all distortion trouble is the grid leak. It is a common practice on the part of manufacturers to insert grid leaks, having resistance values which are too high, into the detector circuits. This is good practice from a standpoint of sensitivity but, if one really wishes to obtain the best tone quality from a radio receiver, the grid leak value should not exceed one-half megohm. The reader will find that the substitution of grid leaks to bring the value down to approximately one-half megohm will materially improve the tone quality of his set.

Another point at which distortion arises is the C biasing battery used in the amplifier circuits. The standard biasing voltage recommended by tube manufacturers for detection is 4½ volts of negative C bias with 45 volts of plate voltage. On an amplifier circuit the same 4½ volts of C bias will require 90 volts of plate voltage to keep the vacuum tube working at its most satisfactory point. As far as tone quality is concerned, thousands of radio set owners presume that the biasing voltages being applied to their sets are correct and no effort is made in the way of experiment to determine whether or not the tone quality might be improved by slightly raising or lowering grid biasing voltages.

While we are on the subject of C batteries, it may be well to mention that all dry batteries of the B and C types will create distortion after they have depreciated to a point where the resistance of the cells begins to rise rapidly. This condition becomes apparent by the sharp crackling noises and the blurring of music and speech. When a standard 4½ volt C battery drops to 4 volts it is entirely useless and should be replaced. When the

(Continued on page 84)

More Reasons for Television

Elinor Charier, sugar-coated blues singer, a feature on Monday evenings.

Madam Dorothy Derfuss, WCFL operatic contralto, has a voice of great charm.

Photo by Drake

Collete Winkler O'Shea, classical contralto, has an appreciative WCFL following.

Gladys V. Neumann, familiarly known as "The Glad Girl of Radio," because of the joy and sunshine of her popular songs.

Grace Lynn, contralto, sings popular numbers with charming effect, quite a favorite with WCFL listeners.

Photos by Moffett, except as noted

WCFL Staff—Singers—Speakers

Little Joe Warner, dialectician and singer—a royal favorite with the children, is heard nightly over WCFL.

R. L. Redcliffe, speaker, well known to WCFL listeners for his earnest appeals on behalf of the suffering union miners.

Harold O'Halloran, chief WCFL announcer. Also basso soloist and member of Elmer Kaiser's Melody Masters.

Bert Squires, assistant WCFL announcer, and baritone soloist, well known for his semi-classical numbers.

Franklin C. E. Lundquist, business manager of Station WCFL, member of Musicians' Union No. 10.

"Chief Shavehead." Wonder why they call him that? Otherwise Henry Kukista, popular tenor soloist. Usually heard on Monday evening programs of WCFL.

Warner photo by Underwood and Underwood
Other photos on this page by Moffet.

The Menace *of* Radio Monopoly

(Continued from page 17)

to themselves: "People know too much anyhow. The ignorant are less dangerous. There is no money in it."

Thus we come to the second reason for Monopoly in radio—MONEY.

The Rothschilds fortune is one of the greatest in Europe. It was founded by the first of this house by his manipulation on the London stock market of the news as to the outcome of the battle of Waterloo. Just before that battle he stationed relays of swift horses, with fast boat transportation across the channel. The moment the battle was won, he started for London and reported that the French had won. The English securities, already weakened, collapsed and Rothschild bought them in. When the true report came that Napoleon had been defeated the Rothschild fortune was made. He got the MONEY.

Something similar has happened in the United States. The Western Union was once the only telegraph company covering the United States, and Jay Gould controlled it. For days he held back the full reports of a presidential election and meanwhile cleaned up on the stock market, altho he was threatened with lynching for his act. He, too, got the MONEY.

Is it thinkable that history might repeat itself if a real MONOPOLY is secured in radio? Is it worth scheming for? Just a slight influence on an agricultural product for even one day might make a lot of easy MONEY for the aristocrats controlling radio.

But there is money, ye-ah, real MONEY awaiting the Aristocratic Radio Monopoly without such action if they can secure their ends. Let's make some computations:

The total advertising bill in the United States in 1925 was $1,330,000,000.

In radio broadcasting at 24 hours a day for 365¼ days there are 8766 hours. Some stations boast a 24 hour service and most active stations will accept advertising. The very lowest advertising rate is $200 per hour. The highest on record is $65,000 for a chain hook-up for one hour of 17 stations, an average of $3825 for each station. But did each get this much? No. Some stations pay for their programs. The big aristocrats in the east get it all. There are about 600 stations and none of the better stations charge less than $500 per hour. Remember, of course, that the larger the number of stations the more the competition, and this tends to keep down the hourly rate.

Suppose 600 stations each receive $100 an hour for 8766 hours. The total amount would be $525,960,000. This is too large an amount and out of proportion to the total annual advertising bill, so let us cut the stations down one-half to 300, and the hours one-half to 4383, but let the charge be $200 per hour. The total will be $262,980,004, or about 20% of the total advertising bill.

If the radio trust should think this too small an two-thirds to 200, and the hours two-thirds to 2922, and let the average charge be $300 per hour. The total amount would be $175,320,000, or about 12%.

Or let the number of stations be reduced to 50, which would be a monopoly number broadcasting 8 hours a day at an average of $1500 an hour, and the total is $219,150,000, or about 16% of the annual total advertising bill of the United States.

Or finally, let the 50 stations be operated as a chain hook-up and thus be considered as one, and let this one operate

2 hours a week at	$100,000,	$ 200,000
2 hours a week at	75,000,	150,000
14 hours a week at	60,000,	840,000
14 hours a week at	50,000,	700,000
48 hours a week at	25,000,	1,200,000
Each week		$ 3,090,000
Total for the year		$160,680,000

(. . . or 12% of the annual Total, and this is a reasonable amount.)

If the Radio Trust should think this too small an amount in view of the total amount spent for advertising in the United States, it is evident that if and when the radio monopoly aristocrats get the number of stations down to 50, chain broadcasting will be mostly done away with and maintained chiefly for propaganda purposes, since the chain stations operating individually would produce a larger revenue than they will operating on a chain.

Remember, this is the largest nation in history which has used and understood a common language, we are a rich nation of buyers and spenders, and will soon be 150,000,000 in numbers, and also that the would-be monopoly broadcasters are interested in radio both as manufacturers, providers of service, and holders of huge royalty producing patents. Broadcasting makes these other assets valuable and therefore the radio aristocrats would be well paid did they not receive a single penny for the operation of their stations at any time. Big monopoly will certainly charge all the traffic will bear.

But the income from monopoly broadcasting is not the only profits sought by the Big 6 Aristocrats of the Radio Monopoly. There are the profits from the manufacture and sale of radio parts, the royalty fees from other manufacturers and users, and the profits from transmission lines and other service.

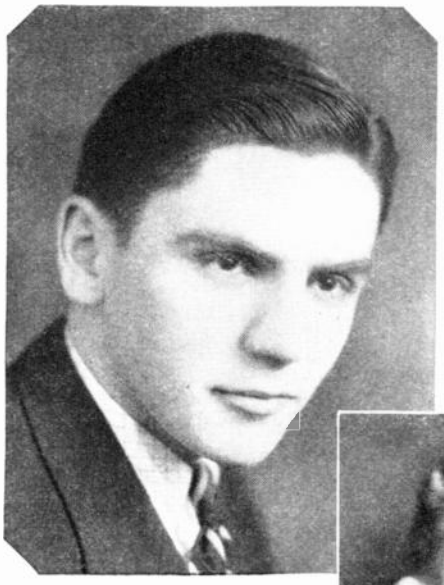
Already, the volume of radio apparatus has reached $550,000,000 a year and is the fifth business in size in the United States.

The royalties this year should alone total $100,000,000, and wired wireless and television are coming on the stage—to say nothing of the many and extremely important uses to which vacuum tubes are now being put in war, aviation, prospecting for oil and minerals, and electricity.

Although we are just at the beginning of radio development, the total profits in the business are already $200,000,044 a year. "Where the carcass is there will the eagles be gathered together," and with equal truth we may say "Where the money is there will the monopolists be," in radio, aeronautics, mines, patents, or water power.

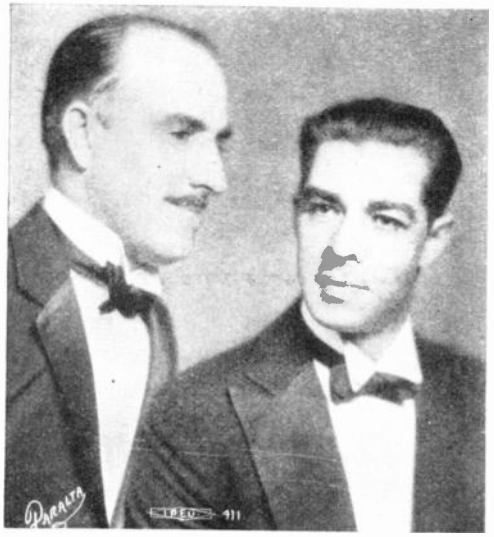
Two hundred million dollars a year profit right now! Do you wonder big business is after it? They will be well paid for their effort. The mass of the people are asleep and apparently don't know or care, if only they are entertained. The united effort of the Co-operative Farmer Labor Radio Listeners, under intelligent direction, is the best hope that radio, that last and greatest road to the minds, the hearts, and the pocketbooks of men and women, shall be kept reasonably free from the monopolistic control of the selfish few.

You've Heard 'Em—Here They Are!



Robert Hawk, reader and impersonator, heard almost nightly over WCFL. Also reads the Bulletin Board.

Photo by Russell



"The Harmony Boys," Holmes and Spencer, a popular feature over WCFL. Also favorites in vaudeville.

Paralta Photo

Marty Shea, tenor, a young singer whose popular numbers have won him great favor with WCFL listeners.

Photo by Moffett

Lou Klatt and his "stretch box." Lou is also a popular cornetist and pianist. He is one of the Melody Masters.

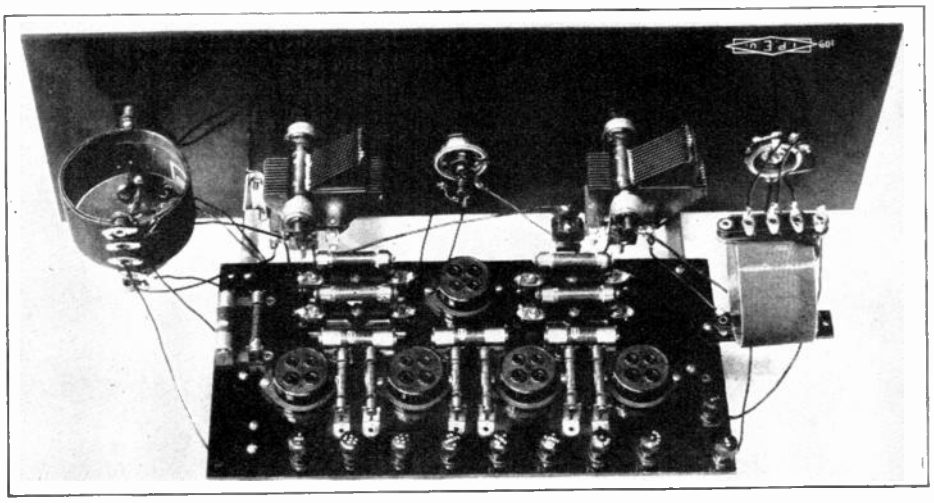
Theatrical Studio Photo

Roy H. Peterson, baritone. His ballads feature the Monday evening program of WCFL. His "request" mail is unusually heavy.

Photo by Moffett

The Lynch-Hammarlund A-C Five Receiver

By
ZEH BOUCK

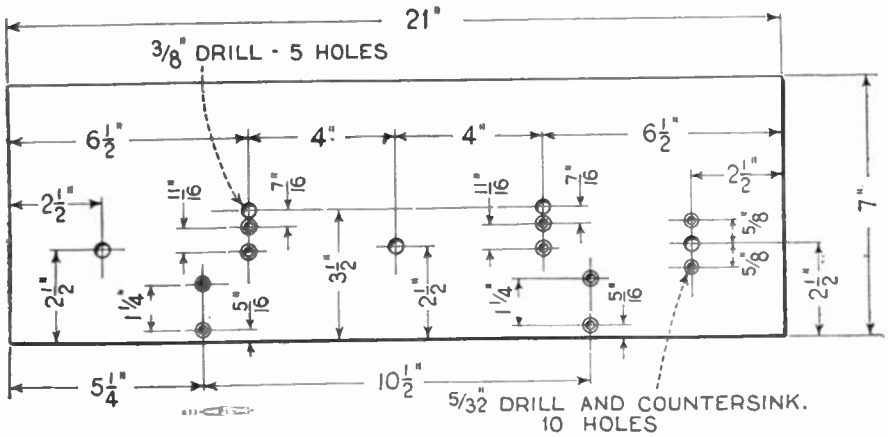


Here is a queer picture — either way you look at it, it seems up side down. It's the back-of-panel view of the Lynch-Hammarlund A-C Five.

THE Lynch-Hammarlund Five receiver was described in the preceding number of this publication. The remarkable popularity of this receiver following its introduction to the radio enthusiast has more than justified a revision of the circuit to adapt it to the use of alternating current tubes.

The general acclaim accorded this receiver may be credited to its electrical efficiency and mechanical convenience. The electrical characteristics of the set, as far as the radio frequency channel is concerned, are practically identical with those of the original Roberts circuit, which remains today probably the only receiving system introduced during the hey-day of circuit production that has maintained its popularity with the rolling up of some five years.

The Roberts receiver has always been controlled by two dials tuning one stage of radio frequency amplification and a regenerative detector. It may be remarked in passing, that no really efficient receiver has ever been produced that did not owe its efficiency to the combination of radio frequency amplification and regeneration. The Roberts receiver effects with a minimum of tubes the requirements and specifications of an ideally selective and sensitive receiver.



This diagram shows how holes should be bored in panel for Lynch-Hammarlund A-C Five Receiver. It is easy to follow.

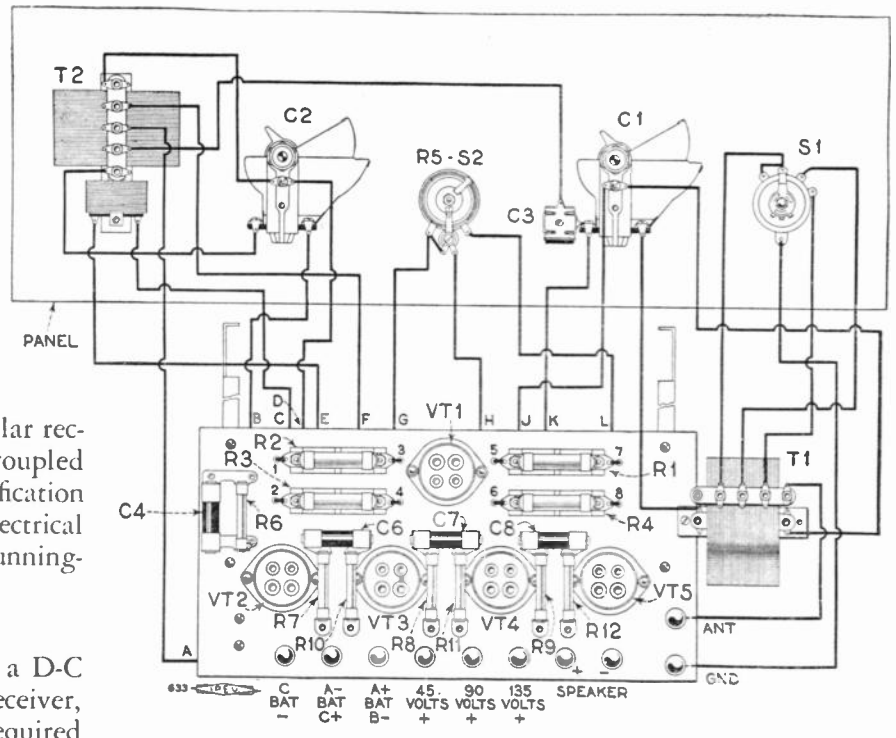
The mechanical convenience of the Lynch-Hammarlund design is the result of the chassis or "deck" arrangement in which practically all the components of the audio and detecting systems are premounted on a simple sub-panel eliminating at least 50 per cent of the mechanical effort generally associated with receiver construction.

CONVERTING TO A-C OPERATION

The conversion of the Lynch-Hammarlund Five to A-C operation is a relatively simply matter necessitating comparatively few and elementary variations from the direct current procedure. However, this article is not written merely for the enthusiast who has already constructed the D-C model and who now desires to convert it to A-C operation. The general excellence of the receiver is such as to justify a complete new construction on an A-C basis by thousands of interested fans who at present are in ignorance of the excellencies of this general arrangement. However, the electrical features of the A-C model are best illustrated in a description of the steps necessary to alter the D-C set to A-C operation.

The conversion has been accomplished by the use of Arcturus A-C tubes. While it is possible to convert a Lynch-Hammarlund receiver to the use of alternating current tubes of other manufacture, Arcturus tubes

have been chosen for this particular job, in consideration of the mechanical and electrical characteristics which particularly recommend them for conversion purposes. The Arcturus A-C tubes are all of the relatively humless heater type and plug into the standard UX sockets without adaptors of any kind. A common cathode heater connection makes this possible. This particular feature holds for all types of Arcturus tubes, including the detector. Also, Arcturus tubes are made in a hi-mu type, the A-C 32, which particular recommends them for use in resistance coupled circuits. The A-C 32 tube has an amplification constant of 30 and is comparable in its electrical characteristics with the R. C. A. and Cunningham hi-mu tubes.



This pictorial design shows the compact arrangement and neat wiring arrangement of the Lynch-Hammarlund A-C Five.

LIST OF PARTS

Presuming that the reader possesses a D-C model of the Lynch-Hammarlund Five receiver, the following additional parts will be required in effecting the conversion:

1 volume control Clarostat
1 Arcturus type A-C 28 amplifier tube
1 Arcturus type A-C 26 detector tube
2 Arturus type A-C 32 hi-mu tubes
1 Arcturus type A-C 30 power tube

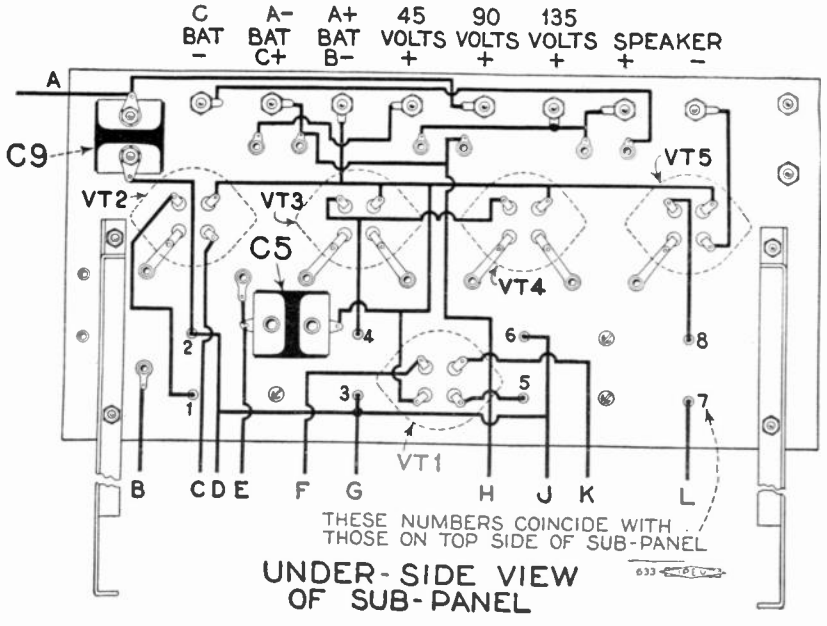
(Arcturus type 28 amplifier tubes may also be used in place of the hi-mu tubes with satisfactory results.)

2 Polymet 2. mfd. bypass condensers.

1 filament lighting transformer with a 15 volt secondary such as the Thordarson type TY 121 or the Dongan type 6513.

The mechanical appearance of the A-C receiver converted from the D-C job remains identical with that of the original design as will be observed from the accompanying photographs. The circuit changes are as follows resulting in the arrangement shown in Fig. 1:

Turn the receiver up side down and clip all wires running to the filament terminals of the sockets at the point where they connect to the connection lugs on the socket. Also disconnect the lead running to the A plus B minus post and likewise the lead running to the A minus C plus post at the posts. Short circuit all connections at the terminals of the 20 ohm rheostat and filament switch. Run a wire from this short circuited connection to the wire running from the ground post to the inductance switch. Now rewire the filament or heater circuit with twisted flexible cable. Twisted red and black Braidite is recommended for this purpose as the coding facilitates the correct connections. As a matter of consistency, connect the red wire to the plus filament post of all sockets. The twisted heater conductor is then led to the posts originally marked A plus and A minus. Coding is immaterial at this point. The effect of these alterations is such that the filament or heater circuit is now completely isolated from the rest of the receiver while the two radio frequency secondaries are grounded on the low potential sides.



DETECTOR CIRCUIT

Remove the grid lead in the detector circuit from its clip mounting. Replace it so that only one side makes contact with the clip nearest to the socket, that is, the clip that is electrically wired to the grid terminal of the socket. The grid leak will now stick out past the detector socket being held in position only by one clip, the

(Continued on page 82)

Some Editorial Short Waves

(Continued from page 45)

farmers the new farm problems growing out of the ravages of the European corn borer.

Stations in Ohio, Indiana, Michigan, Pennsylvania, New York, the New England states, Delaware, New Jersey, West Virginia, North Carolina, Virginia, Illinois, Iowa, Kansas, Kentucky, Minnesota, Missouri, Nebraska, South Dakota, North Dakota and Wisconsin participated in this big movement. They broadcasted for farm listeners one 10-minute program each week from March 5 to May 1 This was prepared by the radio service of the United States Department of Agriculture in collaboration with the information section of the corn borer control campaign organization.

* * * *

High Wattage Will Ruin Radio

"RADIO belongs to all of the people, like air and water. Each living person has the right to breathe the air and drink the water without interference.

"No commercial interest has a greater claim to the rights of the air than the humble individual. No one has a right to proclaim: 'I own certain radio waves or channels.'

"Unfortunately, the general public is led to believe that the number of radio channels is limited, and consequently these channels must be limited and given to the survivors of the fittest. Large commercial interests are trying to deceive Congress regarding the number of available waves. Fortunately, science and invention have opened the door and now there are channels enough in space, for transmission and reception of radio waves for the use of every person who is now using or intends to use radio."

These interesting statements are made by Dr. H. Preston Pratt in an address on the radio situation, which he is soon to release. This address is being prepared at the request of electrical engineers, radio manufacturers and others, including the Chicago Federation of Labor. Liberal excerpts will be published in the next issue of *WCFL Radio Magazine.*

Continuing, Dr. Pratt says:

"The time has come, when every city and town requires a broadcast station, and is entitled to one, if only for emergencies.

"There are also many new types of radio transmitting service that we must make provision for. A receiving apparatus just recently invented will cut in and out many stations on the same wave length.

"The more stations that are continually on the air, with an equal low wattage, the better will be the reception, the less the interference.

"Interference is largely due to an unequal wattage in space.

"The unequal wattage of our high power and super-stations is actually forcing all of the weaker stations off their assigned wavelengths, due to too much power or wattage on the air. So long as this unequal distribution of wattage in space continues, it will be impossible for the weaker stations to maintain the integrity of their assigned tuned wavelengths. Consequently there will be much inductive disturbance and combined heterodyning.

"If the Federal Radio commission or Congress would force all the present stations to 200 watts, or less, the radio situation would clear up within four months.

"There are wavelengths, time and space enough for over a million broadcasting stations of all types, which

(Continued on page 85)

Daughters of American Revolution

(The Journal of Electrical Workers and Operators)

THOSE of us who thought the Daughters of the American Revolution was merely an organization of Mayflower worshippers, now know different. It is a tight, compact, rich, ever-busy machine for dissemination of propaganda. William Allen White asserts it is related to the Ku Klux Klan. There is evidence that it is the womanly arm of the "Key Men of America," a high-powered snooping organization. It has placed friends of labor on its blacklist, and certain A. F. of L. unions. It knows no more, and cares so little about democracy that its name is a misnomer. It appears to do the bidding of the armour-plate and gunpowder trusts.

The Daughters of the American Revolution holds its national meeting in its own expensive building in Washington. It makes this meeting an occasion for much dancing, and much whooping it up for shallow patriotism. It moves hand in hand with social Washington. Speaking of social Washington, let us interpolate at this point, a paragraph from the Wall Street Journal. Now no one will accuse the Wall Street Journal of being unpatriotic, extreme or flighty. This is what it says:

"The naval lobby is all social Washington. I have met many naval officers and they are all not merely gentlemen but good fellows and good company. A commission is not granted unless to one who is fit to enter into society, and the consequence is that all social Washington knows the naval officers and likes them. Being such favorites, they can make things very pleasant for new Congressmen and their wives and at no considerable expense. All the rest follows. If anybody proposes to cut down a fleet which is partly obsolete, or a personnel which is redundant, he comes up against an impervious wall of opposition. He hears no argument any more than he hears a real argument in defense of the United States Shipping Board."

This we know, if the present personnel of the Daughters of American Revolution could be transported back to 1776, they would be whooping it up for George III, and reaction.

How WCFL Serves *the* Public

Voice of Labor Aids Many Public Movements

STATION WCFL transmitters are located on the Navy Pier, formerly the Municipal Pier, one mile out in Lake Michigan, at foot of Grand avenue. The city of Chicago has leased the towers at the pier to the Chicago Federation of Labor for ten years for broadcasting purposes.

Because of the location of its transmitters, Station WCFL is in constant touch with the boats on the lake and to receive S. O. S. calls.

The mayor of Chicago and his cabinet can broadcast messages when necessary from the mayor's office.

Prominent among WCFL program features are:

CIVIC PROGRAM

Band Concerts by the city of Chicago from Navy Pier.

Lectures, educational talks and public entertainments are frequently given on the Navy Pier and broadcast by remote control.

Election returns and other matters of public interest are announced from time to time.

Special civic talks by city officials and department heads.

Special health talks furnished by the Chicago Health Department.

Musical programs from the public schools, conventions and similar gatherings.

FEDERATION OF LABOR PERIOD

Each evening from 7:00 to 8:00 o'clock is known as the Chicago Federation of Labor period.

During this period industrial problems are discussed by members of the labor movement.

Talks about the unemployment and employment situation—where employment can best be had on the farms, in industrial plants and at seasonable occupations throughout the United States.

Talks by the Chicago Federation of Women's High School teachers.

Union Motor Club talks, supplying information on good roads throughout the country, also supplying routes for trips.

Traffic and safety talks.

Illinois League of Women Voters talks.

Infant Welfare Society of Chicago talks.

Household economics talks.

Juvenile Protective association talks.

Garden Clubs of Chicago and suburbs.

CO-OPERATION IN CIVIC MOVEMENT

Active co-operation is extended to civic and public movements, such as:

The Red Cross Drive,

Old Ironside Drive,

Striking Miners Benefit,

American Legion drive and talks,

Mississippi Flood Benefit — the Honorable Chas. Dawes, vice-president of the United States, was among the many noted speakers.

The 1933 World's Fair committee broadcast their initial program April 19th from the Auditorium theatre. Many noted speakers, including Rufus C. Dawes, president of the World's Fair Centennial committee, also president of the Chicago Association of Commerce, spoke.

MUSICAL ENTERTAINMENT

Musical entertainment is furnished by the Actors' Equity and Musicians' Union, who are affiliated with the American Federation of Labor.

WCFL studios are located at 623 South Wabash Avenue through arrangements with the Brunswick-Balke-Collender company. These studios are devoted both to radio broadcasting and to recording and reproducing of the work of world famous musical artists. Station WCFL is thus enabled to utilize the services of many nationally known and world-famous Brunswick artists under most favorable circumstances.

RELIGIOUS SERVICES

Religious services by the Grace Methodist Episcopal Church and the Radio League of Reconciliation are broadcast daily from 1:00 to 2:00 p. m.; Sundays, 11:00 a. m. to 12:30 p. m., and from 5:15 to 6:30 p. m.

FARMERS' ACTIVITIES

Daily reports are broadcast on the markets, crop conditions and subjects of special interest to farmers, including daily weather reports by the United States Department of Agriculture Weather Bureau.

Livestock reports furnished by the Farmers' Union Livestock commission and the Farmers' Unions of the central states.

Government reports and statistics prepared by the Chicago branch office of the United States Bureau of Agricultural economics.

CO-OPERATION WITH NEWSPAPERS

WCFL programs are sent to all newspapers in the country, including our weekly publication of

The Federation News, which has a circulation of 76,000.

WCFL Radio Magazine, which has a circulation of over 100,000.

In both these publication we give our radio fans general information about radio and radio broadcasting. Also, our weekly program in detail.

Station WCFL is operated not for profit but solely for public service. It is non-sectarian and non-political.

The Aims, Objects and History of WCFL

RADIO Broadcast Station WCFL, on the Navy (formerly Municipal) Pier at Chicago, is near the geographical center and center of population of the United States. It is in the second largest city, in the greatest labor center, and in the center of the greatest farming region of the country. With adequate power, it will serve the entire North American continent.

The Station is owned by the Chicago Federation of Labor. Its construction and maintenance have been and are being paid for by voluntary contributions from members of Labor Unions. A large number of Labor Unions have pledged one dollar a year from each member for the support of the station. Farmers' Unions have given assurance of similar support. WCFL is assured of abundant financial support, solely from voluntary contributions from listeners, to whom this station makes a special appeal. Without offering any objection to the method of financing a station by programs paid for by advertisers, it is submitted that the soundest method is by contributions from interested listeners. This method may not be practical for other stations, but it is for WCFL, by reason of its principles and clientele.

Primarily, Station WCFL is the Voice of Labor. It is the only station in the United States through which Labor can proclaim its principles and ideals. It is the voice of more than five millions of members of Labor Unions and Farmers' Unions. It is not operated for profit, but for public service only. It stands unalterably for the freedom of the air, as well as for freedom of speech and of the press.

All other leading stations are owned by Capital and speak the voice of Capital. Surely, in the entire United States, there should be one unlimited station which speaks primarily the voice of the workshop and the farm.

As stated above, Station WCFL is owned, supported and operated by and for the co-operatives, farmers and labor movements of the North American continent. It has the official endorsement of the American Federation of Labor, the Illinois State Federation of Labor, the Chicago Federation of Labor and all affiliated unions; also of many Farmers' Unions and co-operative movements. This clientele of more than five millions are not merely listeners; they are part owners. They are vitally interested in the principles and ideals for which the station stands and to which it alone gives voice. They look to it, not only for entertainment, but for information, education and leadership in matters affecting their social and economic welfare.

The general field of its program service is indicated above. Being assured of adequate financial support, Station WCFL is in a position to furnish a wide variety of entertainment. Because of its special and extensive clientele, it can command the services of speakers and performers of national repute. Its control studios are located in the Brunswick-Balke-Collender building on a long term lease. By reason of its affiliation, the station is able to avail itself of the services of the greatest artists in the country, who come here to perform for reproduction on phonographic records. By special authorization from the Society of Authors, Composers and Publishers, this station is permitted to broadcast, without charge, copyright music, songs, etc.

Station WCFL programs include the following:

(1) One hour a day is devoted to talks on subjects of special interest to Organized Labor, given by men and

WCFL History Briefs

1924—Pressmen, Local No. 3, presents resolution asking Chicago Federation of Labor to consider advisability of establishing a radio broadcast station for benefit of Organized Labor. Painters and Decorators, Local 194, later presents similar resolution.

Survey and investigation authorized by executive board of Chicago Federation of Labor. Upon favorable report, executive board given full power to act. Action deferred, Secretary Nockels being on sick leave for six months due to serious illness. Upon his return plans for establishment of radio broadcast station are resumed.

January 13, 1926 — Department of Commerce warns that no wave length will be granted to Chicago Federation of Labor.

January 18, 1926—C. F. L. declares intention to go ahead and build station at all cost.

January 29, 1926—Charter granted to C. F. of L. Radio Broadcasting association (not for pecuniary profit) by State of Illinois.

March 27, 1926—Plans for station prepared, to be built by C. F. L.

March 31, 1926—Typographical Union No. 16 votes over $10,000 for radio station.

April 10, 1926—City grants lease to north tower of Municipal (Navy) Pier for broadcast station. Many unions vote voluntary assessment.

May 8, 1926—Aerial erected at Municipal Pier and work progressing on station.

May 8, 1926—45,000 unionists pledged to pay voluntary assessment of $2.00 each to support WCFL. Illinois Manufacturers association attempts to block station by protesting use of Municipal Pier. Much smoke—no fire!

June 3, 1926—Amalgamated Clothing Workers donate $10,000 to WCFL.

June 15, 1926—American Society of Authors, Composers and Publishers grants free license to WCFL to broadcast all copyright music.

June 19, 1926—First union-made receiving set exhibited at Union Label exposition.

June 19, 1926—WCFL tested and ready for inspection by Department of Commerce.

June 25, 1926—Radio Inspector of Department of Commerce inspects and approves WCFL.

July 10, 1926—Call letters WCFL assigned to Chicago Federation of Labor.

July 11, 1926—License granted by Department of Commerce and WCFL goes on the air at 491.5 meters.

July 15, 1926—Government license for WCFL to broadcast formally received.

July 27, 1926—Regular program begins every evening, except Monday and Sunday from WCFL.

August 5, 1926 — WCFL acquires A. T. & T. license to use patents and telephone facilities for remote control.

(See next page)

women of prominence in the Labor Movement, or by persons specially qualified to speak on the chosen subject.

(2) Frequent educational talks on subjects of special interest to the public generally. These talks cover a wide field, including household economics, health, co-operative activities, industrial problems, employment balance and many similar topics. Department of Labor reports and statistics are featured.

(3) Reports to farmers on market, weather and crop conditions, and occasional talks on subjects of special interest to farmers. Government reports and statistics pertaining to agriculture, horticulture and livestock are broadcast.

(4) Religious services are conducted every afternoon and on Sunday morning and evening, over the station. The station is operated not for profit, but solely for public service. It is non-sectarian and non-political.

(5) Civic programs, band concerts and other public entertainments are frequently given on the Navy Pier, and are broadcast from this station.

(6) Election returns and numerous other matters of public interest are announced from time to time as they occur.

(7) Musical festivals from public schools, conventions and similar gatherings are broadcast.

September 2, 1926—Broadcast by remote control from Alamo Cafe begins.

September 7, 1926—Mayor Dever agrees to make announcements over WCFL by remote control from City Hall.

September 21, 1926—Contracts signed to broadcast by remote control from Brevoort hotel, Wicker Park Lutheran church, Irving Park Lutheran church.

October 1, 1926—Barton $25,000 organ placed at disposal of WCFL for broadcast.

October 4, 1926—A. F. L. national convention at Detroit, Michigan, gives official endorsement to C. F. L. for establishment of its broadcast station.

December 11, 1926—Official celebration of labor radio success at Ashland auditorium. Speeches and entertainment broadcast by remote control, 11,000 laborites present. Mayor Dever and other prominent speakers.

March 1, 1927—C. F. L. moves to Brunswick building, 623-33 S. Wabash Ave., Chicago, acquiring 10,000 square feet of floor space for studio and office.

May 14, 1927—WCFL opens new Brunswick studios with impressive ceremony and excellent program.

May 28, 1927—Federal Radio commission awards WCFL practically an exclusive wavelength (620 kilocycles—483.6 meters) effective June 1. WCFL shares time with WLTS, Lane Technical High school, Chicago.

January 26, 1928—Application made to Federal Radio commission for increase in power from 1300 watts to 10,000 watts with option to increase to 50,000 watts.

May 15—Contract closed for 100-acre tract 22 miles west of Chicago and near Downers Grove, site for nationwide super-power station for WCFL.

(8) By far, the greater part of the time is devoted to entertainment programs, chiefly musical in character. It is also fortunate in that it has co-ordinated with Brunswick-Balke-Collender company in the construction of two of the most modern and complete studios in the United States, devoted both to radio broadcasting and to recording reproducing of the work of world famous musical artists. Station WCFL is thereby entitled to utilize the services of many of these artists under the most favorable circumstances and at minimum expense.

(9) Station WCFL operates a radio telegraph service with other cities on 1,950-meter wave length, and is on the air with short-wave transmitters for extreme distance work, and ship wave sets to serve vessels plying the Great Lakes and desiring to communicate with their Chicago base of operations, the Navy Pier.

WCFL owns its own workshop and experimental laboratories and builds practically all of its own equipment. At present, it operates an excellent 1,500-watt transmitter, using the 620 kilocycle channel. The station will greatly improve its service, and expects eventually to serve its special clientele over the entire North American continent. Plans have been completed for a 50,000-watt station.

WCFL 50,000-Watt Station

(Continued from page 9)

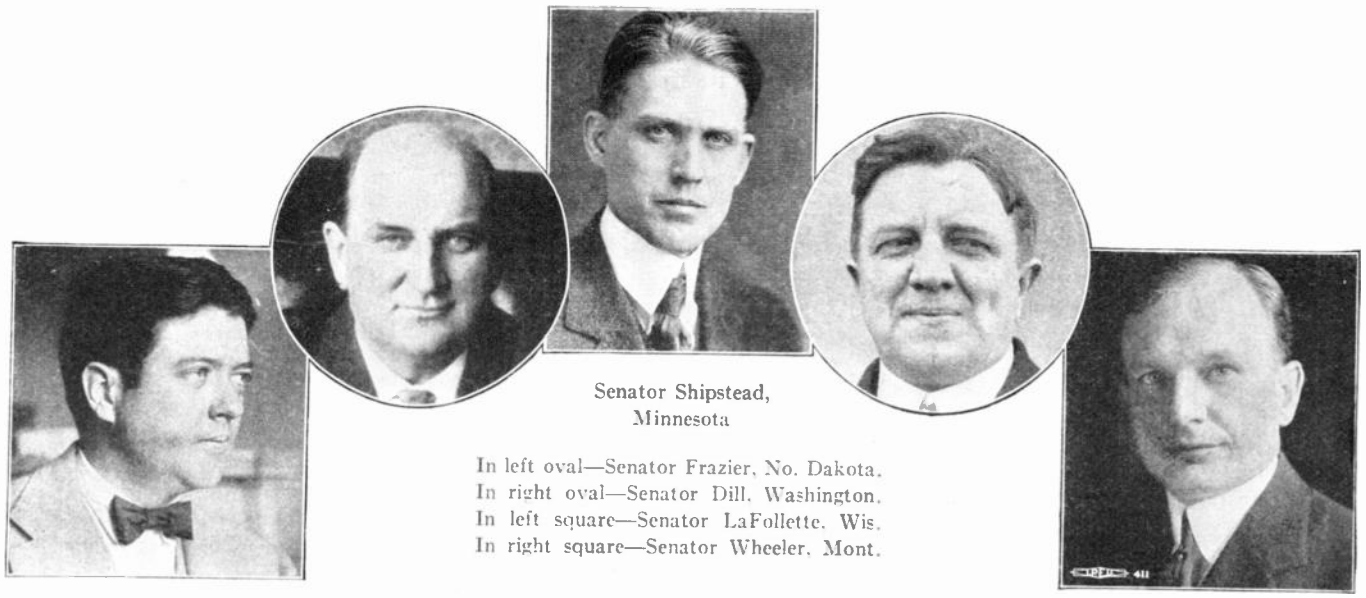
valiant and efficient service to organized labor, will be operated as an auxiliary and experimental station. Both stations will broadcast from studios in the headquarters of the Chicago Federation of Labor.

The disposition of the eighty acres, remaining after the creation of a park of twenty acres for the new broadcast station, suggests some very interesting possibilities. As before stated, the land is well suited for subdividing. Also it could be disposed of at good profit in acre plots to buyers who want suburban garden homes.

Another and more inspiring suggestion is that the land to be held as a site for a co-operative labor housing project, such as recently completed by the Amalgamated Clothing Workers in the Bronx, New York. Tiring of tenament conditions, the clothing workers procured a large tract of land, close to parks and accessible to transportation, and erected six large strictly modern buildings, containing a total of 303 apartments, ranging from three to five and seven rooms each. These apartments were offered to union members on an investment of $500 per room and monthly rental of $11 per room. Loans for most of the buyers were arranged through the Amalgamated bank, and the Amalgamated Clothing Workers' Credit union. So great was the demand for the co-operative apartments that more buildings must be erected.

Now that the New Yorkers have blazed the way, a similar model housing project could be carried out by Chicago unions. The land recently acquired by the Chicago Federation of Labor would make a splendid site for such a project.

Build your television receiver—Station WCFL will soon commence broadcasting pictures.



Senator Shipstead, Minnesota

In left oval—Senator Frazier, No. Dakota.
In right oval—Senator Dill, Washington.
In left square—Senator LaFollette, Wis.
In right square—Senator Wheeler, Mont.

Report *to* Voters *at the* Polls

*Five Progressive Senators Seek Renomination**

THE Northwest, with its ranches, mines, farms and magnificent trade centers, has been likened unto a great industrial empire. But it is more than that. It is a great democratic republic. It has supplied the United States with more progressive representatives than any other single section of the nation. Beginning with the Wisconsin Idea, so ably presented by the elder LaFollette, running through Minnesota and North Dakota, as agrarian democracy, Northwest progressivism reaches to Montana and Washington as a form of aggressive and fearless championing of common rights and interests.

This year will see five senators who have ably and loyally championed labor's cause for six years in the U. S. Senate, go before the voters of their respective states for nomination and election. Their campaigns this year will be complicated by two conditions: first, this is presidential year, and national issues have a habit of getting entangled with state issues; second, misleading and deceiving tactics are being employed by their opponents.

The senators involved are:

Senator Robert M. La Follette, Wisconsin; Senator Henrik Shipstead, Minnesota; Senator Lynn J. Frazier, North Dakota; Senator Burton K. Wheeler, Montana; Senator C. C. Dill, Washington.

The date of the primaries in which these men will go before the voters are:

Wisconsin—first Tuesday in September—September 4, 1928.

Minnesota—third Monday in June—June 18, 1928.

North Dakota—last Wednesday in June—June 27, 1928.

Montana—third Tuesday in July—July 17, 1928.

Washington—second Tuesday in September—September 11, 1928.

Strong, heavily financed campaigns have already begun to move against these five men in their five states. In some instances, it is known that these campaigns are being directed from Washington. In all cases, the same tactics are being used. The plan of their opponents is to subsidize venal sheets, who have records for loud and vehement outcry against some abuses, and to have these sheets to cry down these progressives, as standpatters, double-crossers, time-servers and other futilities.

No one, for example, at all familiar with national politics can doubt the effectiveness, honesty, loyalty of Senator Wheeler. He has been a good public servant all the time and in all ways. He has fought labor's battles. But already, a so-called labor paper in Butte has begun its campaign of vilification to prove that Wheeler is a tool of selfish interests. In Minnesota similar outcries are being made against Senator Shipstead. One ruse in Minnesota is to conduct a whispering campaign. "Shipstead has forgotten the workers. He has been seduced by high society"—so runs the poisoned rumor.

Shipstead is very popular in Minnesota—as are all the other four senators in their respective states. In all the states there is a farm issue, and all the men have met that important question successfully. Shipstead has been a friend of the farmer, and a spokesman for them for many years—a long time before he went to the Senate.

The tactics of labor's foes in the five Northwest states are the tactics of Napoleon, "Divide and then conquer." The tactics of labor in the five states will be "Unite and win." Ears will be closed to lies. Rumors will be stifled by facts. The records of these five men in Washington

* Reprinted from Journal of Electrical Workers and Operators

will stand the closest scrutiny. They have been 100 per cent for labor and the public.

The American Federation of Labor has warned the voters of Minnesota against the attack on Shipstead.

The Association of Railway Union Executives has set its official indorsement upon the five progressive Senators. It would be a loss if any one of them failed to return to the Senate.

New Electrad Truvolt Divider

ARTHUR MOSS, treasurer of Electrad, Inc., announces that his company will feature in the next issue of WCFL Radio Magazine a universal voltage separator, called the Truvolt Divider.

This newest Electrad product is a complete resistance unit for simplifying the construction of B battery eliminators. It is so arranged with variable taps that the proper grid and plate voltages are easily obtained with any set and eliminator combination. By dividing the filter voltage into usable values, it eliminates a great deal of the mathematical calculations and much wiring.

It is said that the Truvolt Divider will make it comparatively easy for even the non-technical radio fan to construct a B power unit which will deliver the proper voltages for receivers of present or anitcipated future design.

Preliminary tests have proved that the divider is going to be very well received by professional and amateur eliminator builders and experimenters. Every indication points to the device being one of the big sellers in the Electrad line.

Mayor's Radio Commission Comes to Naught

AT a recent meeting of the Mayor's Radio commission of the City of Chicago, called for the purpose of endorsing and recommending to the city council for their concurrence the plan for reallocation of frequencies for broadcast stations, which was submitted by the National Association of Broadcasters and the Radio Manufacturers association before the recent hearings of the Federal Radio commission, Edward N. Nockels, general manager of WCFL, the "Voice of Labor," replied as follows:

"The plan for reallocation of frequencies for broadcasting stations, which is being considered, cannot be approved by the Chicago Federation of Labor for two fundamental reasons. First, because it recommends a reduction in the number of stations, and second, because it treats the situation from a purely mathematical standpoint.

"To reduce the number of stations means, fundamentally, a reduction of service to the listener, therefore, the creation of a true monopoly in broadcasting, which is strictly against the principles of Labor.

"To approach the situation from a truly mathematical angle is a fallacy, because the location, range and service of a broadcast station certainly does not depend on any mathematical formula.

"We certainly cannot find anything in the amendment to the Radio law which compels the Federal Radio commission to cancel any station license, or to allocate frequencies purely evenly in every state in this country. By what divine power can a political division of this country create a radio broadcast station when it is against its economic aspects?

"The Chicago Federation of Labor believes in the principle of 'Live and let live,' therefore will not permit, if it is within its power, a monopoly in radio broadcasting.

"The plan which you are considering, if it is used, will eventually lead to such a monopoly and this monopoly will be held by the so-called radio trust which now controls 'chain broadcasting' and it is certain that the present 'chain stations' will be given first consideration.

"The present 670 broadcasting stations can be easily accommodated and give maximum service on the present 89 channels available for broadcasting. It is only necessary that the channels be assigned discretionately and with a 'division of time' for all stations.

"No one station is entitled to monopolize a channel all to itself. Radio broadcasting is far from becoming a public utility, therefore cannot be considered as such. Less than one-tenth of the 250 stations using power from 500 watts up cannot advantageously use more than one-half time on a single wave length. The rest of these stations will be satisfied with one-third or even one-fourth time on a hetrodyne-free channel. Then again, these stations using between 500 and 1,000 watts can duplicate channels on the east and west coasts without objectionable interference. The large majority of stations using power less than 500 watts can most certainly duplicate their wave lengths many times over throughout the country.

"If the problem can be solved in this manner, the Chicago Federation of Labor surely does not desire the city of Chicago to endorse a plan of reallocation of broadcasting stations that does not follow the principles of justice to all."

The same contention is made against the engineer's plan as submitted to the Federal Radio commission, the final result being that the Mayor's Radio Commismission of Chicago decided to take no action whatsoever in reference to the situation.

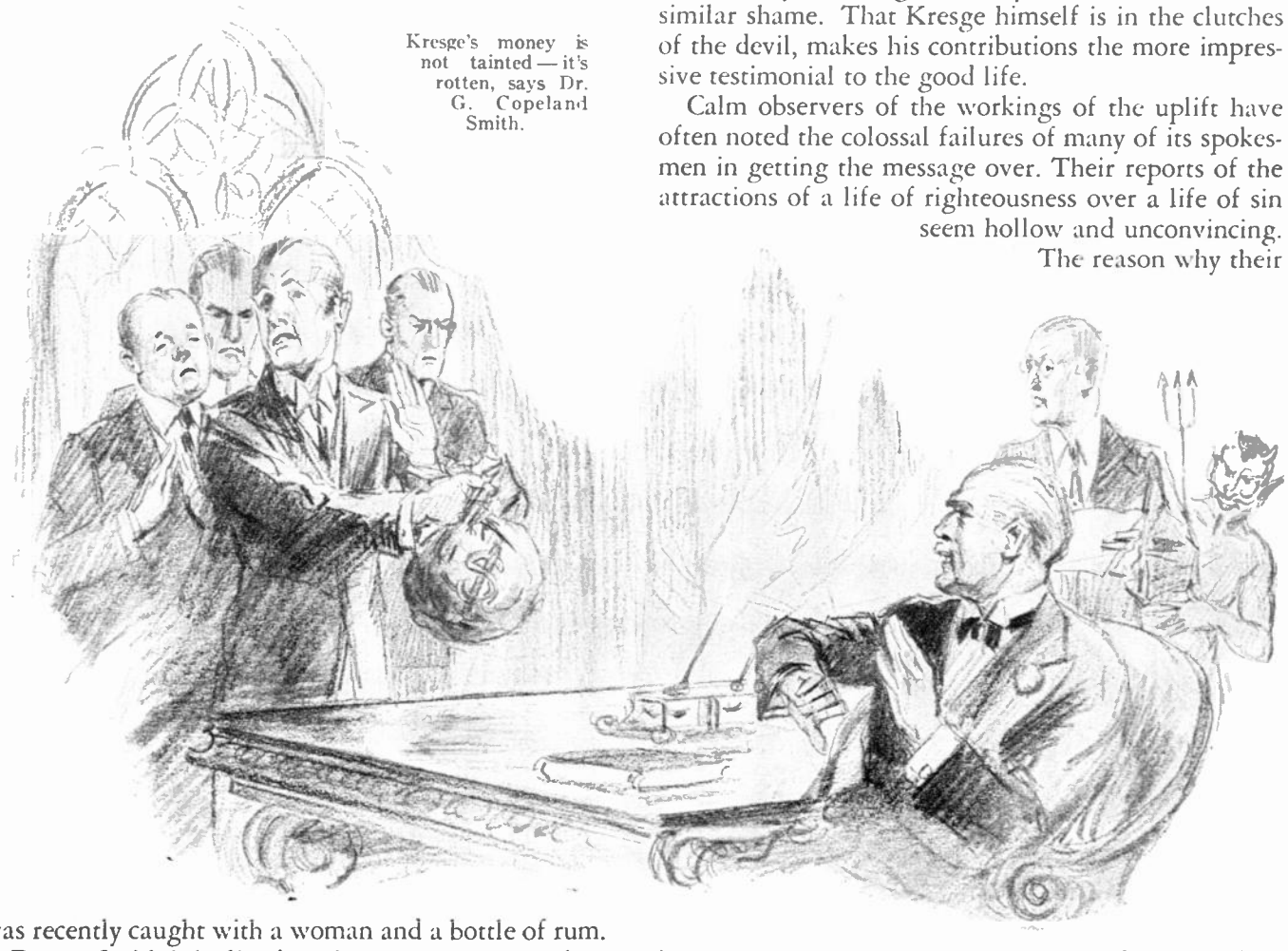
Programs Are Appreciated

"Station WCFL has become a source of unending pleasure to us. Your programs are very interesting and highly enjoyable. The management of the station deserves every compliment for their splendid efforts. It is only fair that you be told this."—Mr. and Mrs. L. F. Gregory, Hammond, Ind.

High Testimony to Virtue

By
EDWIN P. REESE

THE Reverend Doctor G. Copeland Smith, pastor of Grace Methodist Episcopal church, Chicago, known to readers of this magazine as the preacher who broadcasts his sermons over WCFL, appears to be mad at the Anti-Saloon League. It seems that the League has been taking rich gifts from one of its oldest and most devoted members, the merchant prince and stubborn foe of union labor, Sebastian S. Kresge, who was recently caught with a woman and a bottle of rum.



Kresge's money is not tainted — it's rotten, says Dr. G. Copeland Smith.

Doctor Smith is inclined to view Mr. Kresge as a low and degraded person, whose largess to the League has brought that organization into contempt. Kresge's money is not tainted—it is rotten, says the preacher, and the outfit that is managing the League are turned into laughing stock by the Lothario of the five and ten. Not only that, but Doctor Smith sees the church of which he is a preacher and those of a dozen or so other denominations responsible for the League, badly smirched. He thinks something ought to be done about it. Make Kresge take back the money.

In this painful situation it will certainly do no harm to make a few suggestions. An unprejudiced observer finds it hard to take the most mournful view of the situation. It seems that the earnest men of the church are overlooking something. They see the newspapers bulging with stories about Kresge's habits and these revelations are invariably coupled with references to his benefactions for uplift.

What they fail to see is that the outstanding argument to be drawn from Kresge is one for a life of purity and against a career of sin. Through all the tears and moans one fact is clear—Mr. Kresge thinks so poorly of a life of bestiality that he gives freely to save others from a similar shame. That Kresge himself is in the clutches of the devil, makes his contributions the more impressive testimonial to the good life.

Calm observers of the workings of the uplift have often noted the colossal failures of many of its spokesmen in getting the message over. Their reports of the attractions of a life of righteousness over a life of sin seem hollow and unconvincing. The reason why their fulminations leave the hearers cold and unmoved is beyond doubt largely due to the speakers' utter ignorance of sin in any personal way. They know it only by hearsay, and hearsay evidence is not good even in our courts of justice. They speak with authority on the worth of a life of decency, but the hectic and gaudy pleasures of a life of shame have, by they own admissions, never taken hold on their lives. The exhorter who has only a stainless background for his thunderings naturally falls short of the mark.

The plain truth is that the crowds want to hear from someone who has been one of the boys or, in the case of a lady revivalist, one who has often been out with the boys. Look at the following of Dr. Billy Sunday! He honestly admits that he was not always as good as

he is now. Yea, more, he glories that he once played baseball on the Sabbath and filled up at a corner saloon. Although he clothes his adventures in amour with considerable mystery, he tells enough to let one surmise that in his carefree days he winked at a pretty woman and even let his alcoholically stimulated imagination run to carnal achievement. Billy stands before his tabernacle throng as a real sinner, now wonderfully rescued from the burning. He is a convincing argument in the flesh. Little wonder that when he lets out the whoop the sawdust trail is thronged.

Take our charming girl friend, Mrs. McPherson, wealthy, famous and the chief promoter of one of the most popular of modern religions. Where would she be but for the wicked insinuation that her pretty feet once trod with Ormiston the primrose way? Suppose the California beaches had never been combed for the missing pair? How much money would she be able to collect for Four-Square Gospel Light Houses if the herd got the idea that her experiences in the Arizona desert were mostly a piece of ordinary press-agenting? But people believe in Aimee. They are convinced that she knows life, which means that she knows sin. Hence she is marvelously used to keep thousands in the path of purity. Her message, while not much like thunder, is lightning—swift, flashing and dramatic. Life speaks to life. When she declares that sin is an abomination, her hearers credit her with knowing her subject quite thoroughly. Of course, they simply go wild over her.

There is a steadily growing belief that if Kresge were to forsake his booze and his adulteries and start out with a revivalizing tent he would be one of the great wonder workers of the century. He might not get so far in the corrupt and contented cities of the Atlantic seaboard but, out here in the cornlands he would be given a hot welcome from mobs frantic to hear about sin from the world's greatest and possibly richest sinner. For some reason he does not choose that way of atonement. That is his business. But it does seem a bit strange that, when near the end of a long career in carnality, Mr. Kresge offers a half million or more to keep others from being like himself, he should be reviled and spit upon.

With all due apologies to the learned and esteemed Dr. Smith, we are inclined to think that one of the most foolish ideas put forth in this mess is that Kresge ought to be compelled to take his money back and be prevented by force and arms from making further contributions to the cause of moral progress. Why should such high privileges be limited to the stainless, or what is more important, to those whose evil doings have never been brought to light? Besides this, Mr. Kresge surely does not need this money he so gladly gave away. Neither do his several ex-wives and the many ladies of joy he has so often befriended have need of further financing. If he is not to be allowed to spend this half million in the cause of temperance and purity what can he do? If the money were forced back on him, he would be almost compelled to blow it for more whiskey and more women. Spreading more moral poison, he would only send still others to the hell toward which he is hopelessly tobogganing.

Prince Carol, a Horrible Example

UPHOLDERS of strict monogamy as against the practice of varietists find much to assist argument and strengthen faith in their mode of culture in the fate of former Crown Prince Carol. Once heir to the throne of Roumania, now he is a prince out of a job, almost broke, living with his latest sweetie, Magda Lepeścu, in a small room in a cheap hotel at Cannes. All on account of women, or rather too many of them.

The former heir is seeking to recoup his shattered fortunes by gambling, after selling a couple of automobiles. He and his beloved are reported to form a pathetic picture at a little table playing low stakes, while his former cronies, ladies and gentlemen from many lands, risk, what to Carol would be, fortunes.

Whether Carol has heard of Solomon whose women numbered into the hundreds—Solomon, the wisest of all the men who have lived—no information is available. It is known that, starting early in his still young life, the Roumanian prince began collecting girls and generally in a way that resulted in shocking headlines in the newspapers. He first took a peasant maid of great beauty whom he later renounced, when he saw a chance to get the throne by marrying into a royal line. Tiring of his young queen before his father, the late King Ferdinand, died, he was off again, decamping with the present sharer of his hopes and sorrows, the red-headed Lepescu virgin. One is tempted to suspect that there were other women the reporters did not write about.

How Solomon ever made out with all his flocks and herds and droves of women history gives no satisfying account. We are assured, however, that he finally went to his long rest. It does not take much faith to believe that before he reached the judgment throne he had commenced to doubt his wisdom in accumulating so large a harem. In Carol's case the drawbacks to a life of philandering and promiscuity are most obvious and deplorable. Had he let women alone he would doubtless be king, which is something better than being a tinhorn race track sport. Carol probably thinks he has been having one gay time and confirms his choice with the famous verse of Edna St. Vincent Millay:

"My candle burns at both ends;
It will not last the night;
But ah, my foes, and oh, my friends,
It gives a lovely light!"

Regardless of his consolation, a question is bound to recur, and the questioner wonders if Carol had it to do over again, would he or would he not?

Some Breezy Comments

Financing Holy Wedlock

MUSSOLINI, dictator of Italy, is not exactly a man after our own heart. We don't like some of his drastic methods, which sometimes include jails and firing squads for objectors. However, we are compelled to admire his success in getting things done. He produces results. Benito works his will. All his laws are enforceable; he attends to the enforcing himself. He never asks if it will work; he makes it work. Believe it or not, he can tell F. Scott McBride how to make prohibition go in this country. If he were in Governor Al Smith's shoes no hostile legislature would be able long to block state measures. Placed in Mayor Thompson's office, Mussolini would have every emissary of King George in the lake with their hats floating within twenty-four hours after his edict. Benito seems to be a statesman.

His project for a bigger and better Italy calls for, among other things, more population. That is the reason why Mr. Mussolini has decided to boost marriages in his country from the present 300,000 a year to at least 400,000. That he is a wise bird may be seen in the fact that, while he might have the fugitives from matrimony lined up and shot at daybreak, he does nothing of the kind. He knows shooting would do no good. In fact it would only make matters worse. He is interested in the baby crop. Il Duce sees his objective and drives hard at it.

So the dictator has decided to finance matrimony by establishing a bank to loan money to love-infected couples to be repaid at convenience with small interest charges. Before the war, $52.90 was sufficient capital for furnishing an apartment, buying linen and kitchen utensils. Now, however, $264.50 is barely sufficient. The Fascist government (a term used by Mussolini in referring to himself) will see to it that newlyweds get $529 to set the love nest in operation. This will also pay the first month's rent and leave a little sum for emergencies. No installment houses and loan sharks to reckon with. If that isn't giving matrimony a fair break, nothing is fair.

Mr. Mussolini is not bothered greatly by idealism. Few successful statesmen are. Mussolini sees the situation with photographic exactness and puts the remedy on the bad spot. He sees that financial difficulties drive couples apart, break up homes and decrease the baby yield. So he removes the financial difficulties and thus gives the laggards little excuse for avoiding the marital yoke.

The infant industry in Italy is due to pick up and become a roaring business. Think of the many other trades that will have a profit in this revival. Ponder, if you will, the increased military power and the possibilities for larger industrial and commercial exploitation that will come to Italy. Then judge Mussolini.

* * * *

Between Men and Gods

TAKING a count, a man of noble birth, into one's home, in a great, free democracy like ours, is serious business. Due to the fact that a count is neither a man nor God, but occupies some half-way station, his presence in the house is a most terrifying proposition. Certain folk in elevated society found out about this recently. At first a lot of them were crazy to entertain a nabob. Count Keyserling, who lectured recently in Chicago, had many offers from eager would-be hostesses, but when they were fully apprised of the necessities of a count they were ready enough to back up.

The requirements of counts, it appears, are more exacting than those of just folks. When the count is a literary highbrow to boot, he is almost impossible.

The Count indicated a willingness to sit around with the family, like any other 100 percenter.

When it comes to entertaining a count, no one of a less station than a retired bootlegger can qualify for the honor. This being as it is, the count's managers sent out two typewritten pages of directions for the one who was to do the entertaining. They mentioned that the count does not meet any group of men unadorned by the presence of ladies, and that in any group of the two sexes there must be a large proportion of young and attractive women; that he must have champagne, if possible; if not, the lighter French wine at his meals, and

that the aforesaid meals may be composed of roast beef, roast lamb, the white meat of chicken and oysters, not less than a dozen at a serving; that he must have rooms of moderate temperature and a supper after his lecture; that for six hours before his lecture the count will see no one and that his nibs is passionately fond of walking.

When no one wanted to take this large order the count sensed the blunder. He wrote that it was all a mistake; that he was no more difficult to have around than the home-grown or garden variety of house guest, and would they just forget the letter and take him in any way. When Count Keyserling indicated a willingness to sit around with the family, listen to the radio, drink home brew, play with the dog and pull up his chair to the table like any other 100 percenter, it was not the least trouble to provide for him.

From this we might learn to take heart. Gradually the American ideal of equality is penetrating to the dark interior of central Europe long in the feudalism of caste and divine right. One hundred years or less, when their counts want to come over to instruct us, they will not bother about a bill of particulars, but will come right on and eat corn pone and sow belly like freemen do.

* * * *

Morality Scores Victory in New York City

ONE of the most interesting recent bits of news concerning New York City is that the charming Sodom of the western world is in fair way to become decent. It may yet be a fit place in which to brood a family.

Hard as it is to believe, a play of doubtful morality recently has been put out of business in that sink-hole of vice! Like minorities elsewhere, the God-fearing folks of New York had to rely upon stealth and strategem rather than upon main strength and awkwardness to accomplish this remarkable result. The play in question centered around the commercial activities of a prostitute in the seaport town of Marseilles.

The triumph of indignant righteousness was so sudden that the play promoters are still gasping. The like had never happened and it just could not be done. For years the show mongers of New York had been impudently thumbing their noses at the censors and other guardians of public morals. When they found that they were up against a padlocking if they staged the story about the gal who was a friend of many sailors, they were petrified with astonishment.

It appears that although New York City and its environs have the majority of population, the up-state and rural communities have more votes in the state legislature. As a consequence, the big town often has forced upon it a manner of life that is awkward and inconvenient to its sinners.

New York City usually keeps a crafty lobby on hand at the state capitol in Albany to watch carefully for hostile bills introduced in the legislature. This lobby generally is well supplied with money and liquor to be used in stemming an avalanche of threatening bills. When near the close of the last session of the legislature the lobby was hiccoughing and snoozing, the sober

Hard as it is to believe, a play of doubtful morality was put out of business in New York.

and righteous slipped through a bill giving the district attorney the right to close any show that he considers objectionable.

Naturally, a great many morals, all of them sound, might be drawn from this proceeding. One, however, seems most forthright. The purification of America, in spite of jest and ridicule, is a possibility, and it will come faster when the purifiers do less ranting and get down to honest-to-goodness polirical tricks.

* * * *

Peggy and Her Blue Diamond

ONE of the recent pieces of news carried by the sensation mongering press tells about the $300,000 diamond recently acquired by Peggy Hopkins Joyce. It is of the blue variety, weighs 127 carats and is mounted on a diamond studded platinum choker.

Miss Joyce in her joyous career of light and loveliness corralled, all told, four or five husbands, all more or less millionaire in their makeup. She is the reported cause of a murder or two, several suicides and countless duels. She is said to regard these former triumphs as

(*Continued on page 66*)

Odd Uses *for* Light Socket Antenna

THERE is still a persistent misconception to the effect that the light socket antenna is a "good enough" substitute in place of the usual antenna. Yet the experience of hundreds of thousands of users indicates that, given a modern stabilized set and the usual signal strength of present-day broadcasters, the light socket antenna actually out-performs the average antenna.

The light socket antenna, according to William Dubilier, inventor of this device, works well on conduit or BX house-wiring. It is generally supposed that if the lighting wires are placed in grounded protective coverings, the pick-up system is shielded and signals cannot reach the wave interceptor. Yet as a matter of fact such wiring functions as a huge loop, with the ample capacity between the wires and the grounded conduit or BX, so that excellent distance, together with selectivity, is obtained with such an arrangement.

In large apartment houses, with plenty of steel framework to interfere with the radio waves, the usual loop interceptor is not satisfactory. Here the light socket antenna, together with a ground connecion, may be employed to intercept better signals and also to get away from the directional effects caused by the steel masses. The simplest plan is to wind one or more turns of wire on the usual loop, connecting the ends of this winding to light socket antenna and ground, thus obtaining an antenna coupler effect in addition to whatever signals may be intercepted by the loop direct. Such an arrangement is really a "booster" arrangement. It is especially valuable on DX reception in the very heart of the large city.

Even with the usual antenna, the light socket antenna may be utilized as a "booster." Sometimes the usual antenna has certain directional characteristics which result in narrowing the choice of programs. If the light socket antenna is employed in addition to the usual antenna, there is generally a noticeable gain in signal strength, while the directional effect of the antenna is overcome. Sometimes the antenna may be located in the shadow of a tall hill. Signals from over the hill are extermely weak, due to the "radio shadow" effect. However, by utilizing the light socket antenna, this "radio shadow" effect is usually eliminated, since the electric light lines extend far beyond the "dead spot" to which the usual antenna is confined.

Fading, which is common in many sections, particularly with respect to certain stations, can sometimes be overcome by intercepting the signals at two different locations. It is a fact that in one locality weak signals may be experienced, while in another locality a thousand feet away, good signals may be had. The light socket antenna, in addition to the usual antenna, sometimes serves as an excellent "booster" for fading signals.

Even in the open country, where there are no problems in putting up an antenna, the light socket antenna has definite advantages. First, there is the matter of cost, for it costs less than the average outdoor antenna. Secondly, there is the lightning hazard, especially where timid folks are concerned. Thirdly, with overhead electric wires going great distances, the light socket antenna provides a Beverage type antenna such as is employed in transoceanic radio receiving stations, or one many miles in length.

It goes without saying that good results with the light socket antenna depend on using a device that is properly designed and built, with at least two different coupling condenser capacities and a reversible plug so as to secure the best arrangement for the wide range of conditions encountered.

Peggy and Her Blue Diamond

(*Continued from page 65*)

small stuff beside the capture of the largest and best diamond of its kind in the world.

Anxious mamas will continue to preach to flappers the superior attractions of the fireside, children and the church. That is right. The difficulty is to get many of them to believe such old fashioned wisdom. They may give academic assent to the mother's contention but continue to ponder the achievements of Peggy, who, although she found many thorns in the garden of love, still gathered a big lot of roses. When they read of the lithsome Peggy placing in her diadem the big blue diamond, one wonders that more girls are not following in her footsteps. Why they don't might be the theme of an editorial.

* * * *

The Chain Letter Nuisance

THIS is to be read only by income tax-payers or those who expect to be. It is also a warning. One of these fine mornings a letter may come from an old friend marked "personal." You will hastily open it. You may have a feeling that the writer is informing you that he has made you the sole inheritor of his vast estate or, as a close second in luck, is forwarding a case of prewar from his cellar. Sad to say, it is no good fortune that is coming. He is telling that he has written a letter to the collector of internal revenue to send along with his income tax payment protesting "against any part of the enclosed check being used for the enforcement of the Volstead act or any other crank legislation." He is asking you to write the same kind of a letter when you contribute to the upkeep of free institutions and also to write to seven (why that mystic number is not stated) of your friends and urge upon them the high duty of writing similar letters.

This is one of the latest chain letter abominations. The chain letter is one of the favorite methods of the savers of society of keeping the country from going to the dogs. Thomas J. Gaines, a New York insurance broker who admits that he is responsible for this latest

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German Radio Progressing

A WIDE selection of radio novelties from England, France and Germany are proudly displayed to his friends and associates by William Dubilier, of the condenser company that bears his name, who recently returned from Europe.

From his observations, Mr. Dubilier has been most impressed with broadcasting progress in Germany. In fact, he believes Germany has made the greatest strides of any country in the past year. Broadcasting in that country is under government supervision. Each listener-in pays a yearly license fee of $12, which goes to support the broadcasting stations and the necessary microphone talent. About a dozen excellent broadcasting stations are in operation, giving their audiences the very finest programs possible. Under this system of public support, the advertising or sponsored program is unnecessary, and the studio director is free to provide programs of utmost appeal.

In Germany the multi-valve, or vacuum tube with several tube units within the same glass bulb, is highly popular just now. Complete radio sets, capable of excellent loud-speaker rendition on local signals, retail for $12.00. The broadcasting stations are of sufficient power to provide good service with sets of moderate amplification.

Across the border, in France, broadcasting is also conducted by the government, although there are a few independent broadcasters. The broadcasting service is far from ideal in that country, but fortunately the listeners-in can tune in on British, German, and other foreign stations if need be.

Mr. Dubilier saw an anti-fading device in France which impressed him deeply. This device maintains a uniform signal strength irrespective of whether it is receiving from a local or distant station, and compensates for fading.

Although broadcasting in France is under strict government control, Mr. Dubilier tells of a radio inventor of note who installed a broadcast transmitter and proceeded to render a real broadcasting service to eager listeners, without the formality of even consulting the government. The government decided to deal with this bold infraction of the law, but before the heavy hand of the law could reach out and do its work, the French broadcaster had gained the support of his listeners. Whereupon the government, upon further reflection, decided not to interfere with this popular broadcaster who has the rare distinction of operating without a license.

British broadcasting, according to Mr. Dubilier, is steadily progressing, with one organization, under government control, handling it. The stations in various parts of England are engaged mainly in network operation. Interesting work is being done with short-wave broadcasting, in order to bring programs from the mother country to the far-flung colonies. However, the programs as a whole are not on a par with those in Germany and in this country, although better than those of France.

While in England, Mr. Dubilier saw an intensely interesting device which does not use tubes or batteries or high potentials, yet serves as an excellent amplifier.

WCFL is preparing to broadcast pictures.

Radio Picture Transmission Is Simple

SCIENTISTS have succeeded in sending pictures by radio, and are now working to bring "radio vision" into the home. One of the leading workers in the field is Dr. Alfred N. Goldsmith of New York, chairman of the board of consulting engineers of the National Broadcasting company, who thus explains the process:

"At the transmitter it has been necessary only to substitute for the microphone the compact picture transmitter which operates from a paper or film positive. Ordinary wire line or 'remote control' of the transmitter is employed as usual. The time of transmission is brief, so that picture is received within a minute or two.

"At the receiving set, there has been added only a small amplifier and a simple recorder. These are actuated from the receiver without any constructional changes and with only a slight wiring modification. The present form of the picture adjunct consists merely of a small amplifier, a Moore tube of special construction, and a sheet of photographic paper mounted to be driven by a small motor. The development of the picture and its fixation are as simple as ordinary tank development of films."

The picture shows: left to right standing, Geo. J. G. Harbord, and David Sarnoff, president and vice-president, respectively, of the Radio Corporation of America, and Dr. Goldsmith, with machine.

Big Job *for the* Radio Commission

IT WAS relatively easy for Congress to decree in the new Radio Act, signed March 28, that the Federal Radio commission "shall make an equal allocation of broadcasting licenses, wave lengths, periods of operation and station power." However, the addition of this provision has given the Federal Radio commission a big and difficult job.

And we are not saying that the "equalization clause" of the new radio law is not a wise one. On the contrary, we are well impressed with its intent. Of course, time and experience may suggest a better method of making radio satisfactorily serve the greatest number of listeners. Nevertheless, we regard with genuine favor the "equalization clause" in the present radio law. In fact, WCFL Radio Magazine would favor limiting the maximum power of broadcast stations.

Elsewhere in this issue, in an article, entitled "The Federal Radio Commission," mention is made of the five radio zones into which the United States is divided. These five zones differ vastly in area, but in population four of them are approximately equal, that being the basis of division. The first zone has 27,385,288 population, the second zone 28,123,000, the third 28,088,618, and the fourth 26,786,192. The fifth or western zone has only 11,266,244 population, but its area is much larger than that of any other zone. It could not have been made equal in population without unduly extending its geographical boundaries.

In number of radio listeners the five zones are not so well balanced. The first zone is credited with approximately 1,900,000 radio receiving sets, the second zone 1,700,000, the third zone 1,200,000, fourth zone 1,800,000 and less than 900,000 in the fifth zone. New York leads all the states in radio receiving sets, having nearly as many as there are in the entire fifth zone. Pennsylvania is second with 820,000 and Illinois a poor third with nearly 600,000.

In number of broadcast station and power the five zones haven't a semblance of equality, yet the Federal Radio commission is charged with making readjustments until the zones are relatively equal in these important respects. Such is the intent of the "equalization clause."

There are in the United States approximately 700 broadcast stations using a total of about 608,000 watts of power. Illinois leads with 70 stations with a power total of 83,170 watts. New York has 63 stations, but its power total is 162,500. In proportion to population Illinois has twice too many stations and uses nearly three times too much power. New York has six too many stations and is using more than three times the power its population justifies, on a strict percentage basis.

Radio manufacturers, dealers, broadcasters and other interested parties have deluged the Federal Radio commission with schemes and suggestions for the solution of the "equalization" riddle. The commission has had the problem studied by its own experts, and the five commissioners have made personal surveys.

Yes, the "equalization clause" was easy enough for Congress to write — but its enforcement certainly has given the Federal Radio commission a large order. Sweeping changes must be made in wave lengths, power and hours of broadcasting; some stations may be silenced and others moved. However, as before stated, we are in favor of the "equalization clause" of the new radio law. It's a move in the right direction.

Many Stations May Be Silenced

JUST as WCFL Radio Magazine goes to press, word is received that the Federal Radio commission has started its long-expected action to clear the air. Owners of 162 radio stations have been notified by the commission that their licenses to broadcast will be cancelled on August 1, unless these owners can show that "public interest, convenience or necessity will be served" by the continuation of the stations affected.

It is expected that many of the stations receiving the citations will cease operation on August 1 without protest. However, owners of many of the other stations will appear before the commission in Washington on July 9, at which time hearings will be held to determine the fate of the protesting stations.

Ninety-one of the stations that may be silenced are in the fourth zone, which includes Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota and Wisconsin. Twenty-two of them are in Chicago and vicinity.

Special significance attaches to the fact that none of the stations receiving these notices is included in what are commonly known as chain stations. Although names of some of the chain stations apear in the list, these stations exist only upon paper or as auxiliary stations. In most instances they use the same transmitters as are used by the main stations. In other instances two or more stations are owned by the same interests, as for instance, WTAS is owned by the same interests as are the Chicago Tribune and Stations WGN and WLIB.

SHORT WAVES ASSIGNED

Another bit of late information of great importance is the allocation by the Federal Radio commission of seventy short-wave channels for transoceanic service. The Mackay companies received licenses on twenty-three building permits heretofore issued, and the Radio Corporation of America received licenses on twenty-nine construction permits already issued. This brings the total assigned to the the Mackay companies up to thirty-seven and the Radio Corporation's total up to sixty-five. The American Publishers were assigned

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New Turn in Short Wave Fight

THE contest for short wave licenses before the Federal Radio commission has taken a new turn. In behalf of the independent radio industry, the Radio Protective association has filed a protest with the commission against the issuance or renewals of such licenses to the Radio Corporation of America or any of its subsidiaries. It charges that this corporation is part of the so-called Radio Trust and controls an interest in the radio patents of the American Telephone and Telegraph company, in violation of Section 17, the anti-monopoly clause of the Radio Act. The text of the protest follows:

"The Radio Protective association, representing the independent radio industry of the United States, has heretofore asked your honorable body to enforce Section 17, of the 'anti-monopoly' clause of the Radio Act of 1927, by refusing license renewals to the broadcasting stations of the General Electric company, the Westinghouse Electric and Manufacturing company, the Radio Corporation of America, and the National Broadcasting company. These include Stations WGY, WJZ, WBZ, WRC, WEAF, KOA, KYW and KFKX.

"These radio companies, in violation of Section 17, control an interest in the radio patents of the American Telephone and Telegraph company, which they are using 'unlawfully to create a monopoly,' to quote the language of Section 17. As their present license will expire May 31, we renew our protest at this time.

"We are also informed that the Radio Corporation of America—which with the General Electric and Westinghouse companies and the American Telephone and Telegraph company chiefly comprise the Radio Trust—is now seeking to obtain certain licenses for the use of short waves in commercial trans-Atlantic communication. We are told that this company has promised, if given a monopoly of this service, to use these wavelengths 'patriotically' in maintaining American supremacy in overseas radio communication.

"Our membership is made up largely of manufacturers whom this same 'patriotic' trust has undertaken to destroy in the domestic radio industry. In their name we protest against the issuance of any further shortwave or commercial licenses to the Radio Corporation of America because of its violations of Section 17. That section was passed by Congress to make unlawful just such relations as those which exist between the Radio Corporation of America and the American Telephone and Telegraph company.

"As to the claim that your commission is under obligations to issue licenses to the Radio Corporation of America on any wavelength on which you have heretofore issued construction permits, we respectfully suggest that the law imposes no such obligation. Section 21 of the Radio Act declares that you are not bound to issue such a license where 'cause or circumstance rising or first coming to the knowledge of the licensing authority since the granting of the permit would, in the judgment of the licensing authority make the operation of the station against the public interest.' The continued violation of Section 17 is certainly 'against the public interest.' The illegal nature of the relations existing between the Radio Corporation of America and the American Telephone and Telegraph company could not have been previously called to your attention or, we are sure, your honorable body would never have issued such construction permits.

"As to the alleged 'patriotism' of this Radio Trust on the basis of which it asks an international monopoly, or the pretence that it was 'created at the request of the United States government,' we should be pleased, at your convenience, to lay before you ample proof of the falsity of these claims."

The Isotone, New H.F.L. Radio Receiver

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operating at 760 kilocycles. They came through very loud and they should have, for their power has just been increased to 3,500 watts. After about ten minutes of fussing with the set in order to find out where the various wave channels were located, it was an easy matter to receive KFI with enough volume to drive a Magnavox Dynamic cone for all it was worth. On KFI the static was something terrific, so long distance fishing was abandoned for the evening and another test was arranged for the second evening following.

On this night the designers of the H. F. L. Isotone receiver, a represenstative of Station WCFL and the writer met to put the receiver through a real stiff test. This was an excellent night as the temperature had gone down to 58 degrees and the static was not bad at all. Stations came in one after the other and, no matter what station was tuned in, the volume was as much as we could stand. It seemed as though almost any place the dial was turned that we bumped into what seemed to be a local. The only way we could tell was to wait for the announcement. Three of the west coast stations were picked up, KGO, KHP and KFI, in rapid succession. At the end of two hours we had logged forty-eight stations all over the country. In every case the volume had to be turned down. The selectivity was perfect and in cases where a local was actually modulating over ten kilocycles it was possible deliberately to cut off the side bands of the local in order to bring in the distant station. These results were accomplished with a small loop antenna at a spot where reception is quite difficult with other receivers in Chicago, the most congested broadcasting center on earth.

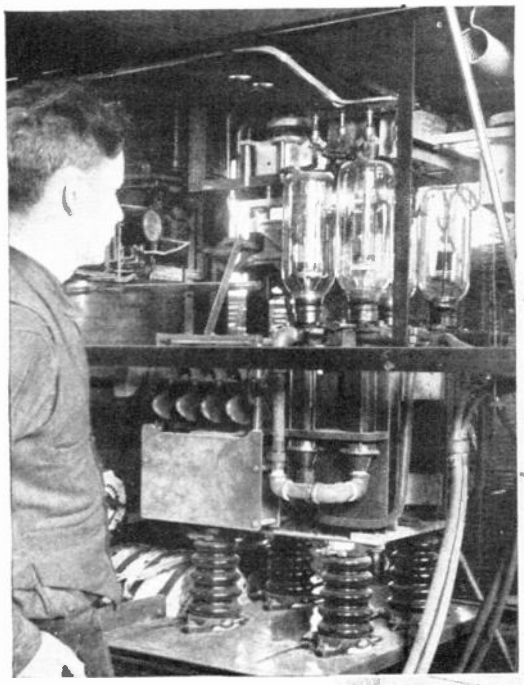
Distance in any kind of an ultra sensitive receiver is limited by a phenomenon, known to engineers as the vacuum tube shot effect. In plain English this means that one can only go so far in the way of sensitivity. After a certain point the incoming jabs of static are amplified so much more than the incoming waves of speech and music that reception over a greater distance becomes an impossibility. This receiver is therefore the absolute limit in sensitivity until such time as radio engineers learn to conquer static.

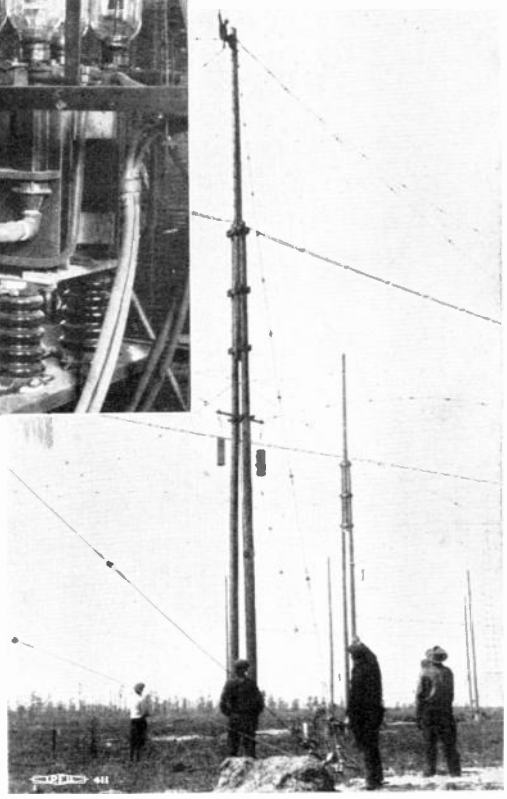
The audio frequency unit houses a microphone transformer having a ratio of three to one which is used to feed the output of the phonograph pickup into the audio frequency amplifier. It will be noted that the audio frequency amplifier consists of three tubes and when the switch is thrown to the phonograph position the other tube is automatically connected into the circuit between the microphone transformer and the first audio frequency transformer which normally is fed by the detector tube in the radio set. Thus it will be seen that when the phonograph amplifier is in operating condition it is really a three stage push-pull power amplifier using power tubes throughout and having a large overall gain, which is enough to drive any dynamic type of loud speaker to its fullest capacity.

Just to the right of the screened grid amplifier is the audio

(Continued on page 88)

Radio Progress Shown in Pictures





Underwood and Underwood Photos

Hiz-zoner, Mayor George Cryer of Los Angeles, is very much up in the air—but not at all disturbed. He is broadcasting a description of his city as viewed from an airplane—an airy first-hand impression, we'll say.

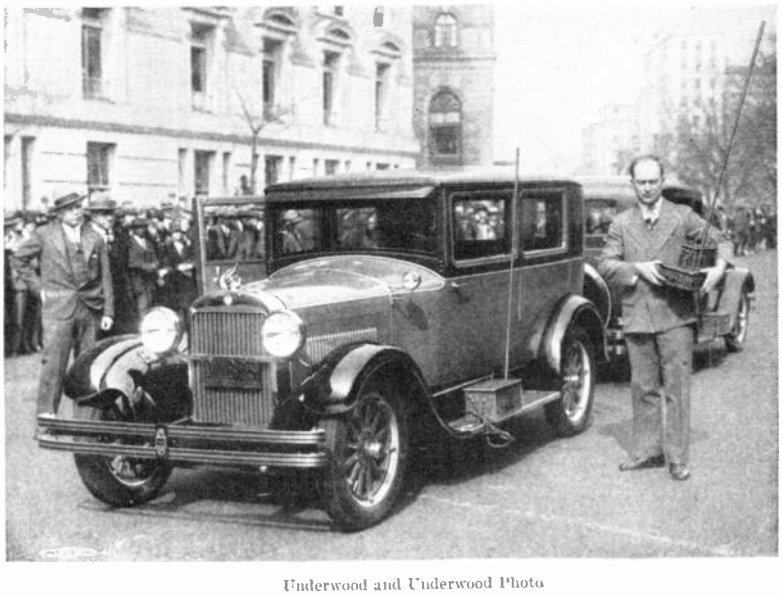
International Newsreel Photo

The beam system is the latest thing in radio communication. Simplicity and directional control are among the advantages claimed. Here is pictured a part of the equipment of the Radio Corporation of America's beam station at Rocky Point, L. I., said to be the most efficient of its kind yet installed.

The top view shows the interior of the transmitter. Note the water-cooled tubes, the hose for the water circulating system and the general neat appearance of the whole equipment. The adjoining picture shows the peculiar construction of the antenna.

This novel use of radio ought to help solve the traffic problem—or will it complicate matters? Nevertheless, it isn't necessary to be seated at the wheel in order to start and steer your car. A radio broadcast instrument will do that small job for you, if your car is equipped as this one is. Perhaps it will also open the garage door!

Noonday crowds at Washington, D. C., recently watched with amazement a driveless motor car follow a man bearing a box with a rod extending from it. By means of radio waves Maurice Francill, inventor of the device, started the motor, guided the car and blew the horn, all without anyone being in the car. This picture shows Francill with his control box and the radio-operated car.



Underwood and Underwood Photo

A Tiny Crystal *with a* Mighty Task

By VIRGIL C. SCHOENBERG, *Chief Engineer The Voice of Labor*

THE Piezo Crystal truly has a mighty task—that of acting as the governor of the frequency of the gigantic tubes now in use.

Interference caused by a station being off its assigned wavelength, now the principal source of radio interference is doomed.

A device that automatically holds a station constantly to a certain fixed frequency or wavelength, much the same as the balance wheel dictates the speed of a watch, or a governor regulates the speed of a steam engine, has been put in use by WCFL, "The Voice of Labor," Chicago.

This device consists of a piezo crystal ground to a certain size and general form, and placed in a specially designed transmitting circuit. The size and shape of the crystal governs the frequency or wavelength of the transmitter and holds it constant, and the only way to change it is to replace the crystal or change it to another size.

Such crystals have been in experimental use for months on the WCFL short wave set, a type of set on which constant frequencies are difficult to maintain. After tests demonstrated that the crystal would control the wavelength, and that normal power could be used with it Virgil Schoenberg Chief Engineer of WCFL, announced that both stations of WCFL are equipped with crystal control.

Although with the simple, broadly tuned receiving sets a shift in the wavelength is scarcely noticeable, with the sharply tuned sets now being sold, the greatest source of interference is the station that is off its assigned frequency. Since the station wavelengths are separated by only ten kilocycles, it is a serious matter when a transmitter changes its wavelength even as little as two kilocycles, which in the case of a station operating on 483 meters, would be but .2 of one per cent. It a shift greater than two kilocycles occurs, there is a whistling sound beat note, or other distortion heard in the receiving set, and the signals from two stations are jumbled together so that neither can be heard clearly.

This shifting of wavelength has been difficult to prevent, as it may be caused by such seemingly trivial things as a sagging of the antenna and a variation of the amount of current used in the transmitter. Frequent checks with a wave meter, the only possible way hitherto of determining whether the station was near its assigned frequency, were unsatisfactory, and radio engineers have been looking for some way to automatically regulate the wavelength. *"Vibrating Crystals"* W. C. F. L. The Voice of Labor is now using this regulator. It has been known to scientists that certain crystals have the power of vibrating at frequencies in the radio range. These crystals are called piezo crystals. The engineers learned that the frequency at which the crystal vibrated was governed by its size and shape. They also learned that by using the crystal in a specially constructed circuit, and building the oscillation on up through the high power transmitting set, the wavelength emitted is exactly the same as that of the crystal.

Extra! Television! Extra!

WCFL expects to be the first Chicago station to broadcast television. Experiments are now being conducted with television broadcasting apparatus in the WCFL laboratory and workshop on Navy Pier. Build your television set and be ready to get the first broadcast pictures.

The Chain Letter Nuisance

(*Continued from page 66*)

outrage, is due for a lot of unpopularity, especially among the tired business men, and deservedly so. The aforesaid T. B. M., after he has been diverting himself the night before, is hardly in a mood to dictate any more letters than absolutely necessary. But on the other hand he must not fail an old friend, and then, it is the duty of all good men to aid worthy causes.

The result is that in his desperation he turns the writing over to his capable secretary, grabs his golf bag and beats it to the nineteenth hole. There he nurses his grouch through the long afternoon, pondering the vileness of men who add to his tremendous burden of responsibility by dumping more letter writing upon him. He is sure to go home late, if he gets there at all, and this will provoke a quarrel with the missus and a swift kick for the dog.

After all that has been done for the tired business man through the invention of automobiles, golf courses and musical comedy coryphees, it seems too bad that this chain-letter scheme should spoil it all. We present this matter to the Society for the Promotion of Human Happiness.

Many Stations May Be Silenced

(*Continued from page 68*)

twenty channels, the American Telephone and Telegraph company nine, bringing their total to twelve, and eight were assigned to the Robert Dollar company.

A new complaint has been issued by the Federal Trade commission against the Radio Corporation of America, charging a violation of Section 3 of the act of Congress entitled 'An Act Against Unlawful Restraints and Monopolies." The cause of the complaint is the practice of the Radio Corporation in requiring companies that build sets under its licenses to agree to equip such sets exclusively with R. A. C. tubes.

Recent Scientific Achievements

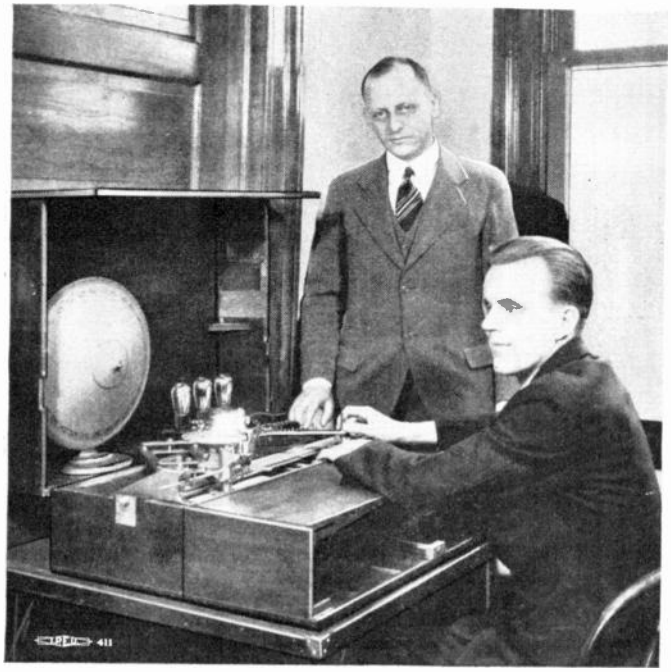
Below — Not radio, but nevertheless something in the realm of electricity. One look at the familiar countenance suggests that, for what else would Thomas Edison be working at! He is eighty-one years old, yet labors daily for the advancement of electrical science and invention. Here he is admiring his latest invention, an improved miner's lamp which will do much to eliminate gas explosions. The battery was perfected after more than 50,000 individual experiments.

International Newsreel Photo

You have been taught that entertainment and information come to you by radio through the ether. Some folks have other ideas about this great phenomenon. Proof of the theory that shadow or "opaqueness" rather than ether is the conductor of radio waves, was obtained at a test made at the government air mail field at Maywood, Ill., according to A. J. Musselman, originator of the "opaqueness" theory, who conducted the test with the co-operation of A. Frietag, government radio operator, and others. The antenna of a government low-wave transmitter and the aerial of a receiving set were placed in a path of a 450,000,000 candle power searchlight, 1,000 yards apart. Frietag then sent the Morse alphabet while Musselman and others were stationed at the receiving set with an audiobility meter. Signals came through stronger, according to Musselman, when the great beam of light through which the waves were made to pass was turned off. The scientist said that the lack of difference in the strength of the signal when the light beam was merely switched away from the antenna and aerial but not turned off, also was favorable to the theory.

The picture shows the 450,000,000 candle power searchlight at the government air mail field, used in testing the Musselman theory.

Underwood and Underwood Photo



Another radio achievement! It helps the blind to read ordinary print! Here is pictured a new apparatus, combining the principles of radio, the televisor and the selenium cell, with which a blind person may read from books, magazines and other printed matter, was demonstrated by its inventor, Robert E. Naumberg, of Winchester, Mass., in New York, recently. By a complicated action of a light cell the shape of the letter is magnified and transferred to a moving steel rod which shapes them. All a blind person need do is to grasp the rod lightly and the letters of the words will be formed in his hand.

Photo shows Toivo Laminan, a blind student of Tufts College, reading an ordinary printed book with the aid of the "Visograph," as it is called. Standing is Robert E. Naumburg, inventor of the device.

Wide World Photo

AMERICA'S VERDICT

Engineers, Jobbers and Set Builders Acclaim the *Tyrman* "70" the Greatest Receiver for D-X Reception, Volume and Tone Quality

"Since the beginning of broadcasting no radio development submitted to the public has farther-reaching possibilities than this Shielded Grid Receiver."

"The Tyrman "70" provides an ideal set for anyone who desires the utmost in sensitivity."

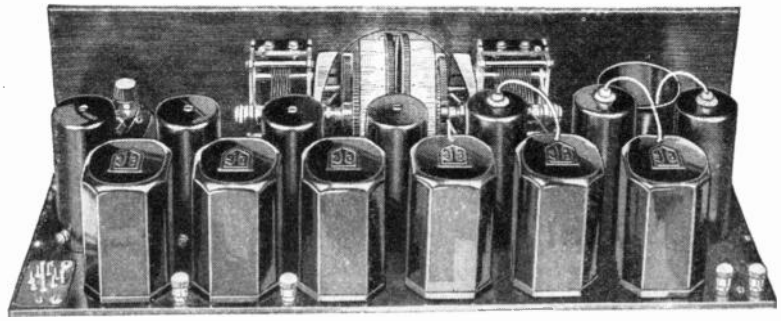
"One of the interesting features of this new receiver is that it will not oscillate no matter how little or how much voltage is applied through the control rheostats."

"The Tyrman "70" is not critical. Stations slide in and out without whistling background of carrier waves."

"Getting extreme sensitivity and good loud speaker volume with seven tubes is something new in radio construction. The Tyrman "70" does it."

"I have built during the past two years 30 different receivers of nearly every type but the Tyrman "70" certainly takes the gold medal."

Excerpts from letters, editorials, and report



Tyrman "70" Shielded Grid Amplimax presents an appearance of a well-designed factory receiver

FROM every part of the country—from hamlet and city—from laboratories of engineers—from jobbers, dealers and set builders, come scores of letters praising the Tyrman "70" as the greatest receiver of all times for D-X Reception, Volume and Tonal Reception.

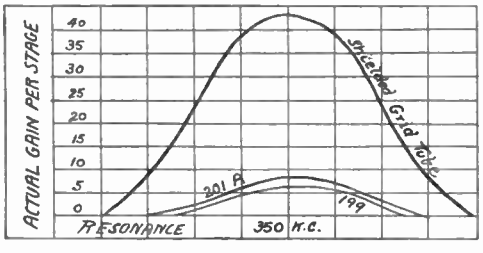
Tryman "70" Embodies New Principle

The Tyrman "70" embodies the newly developed Shielded Grid tube. For months laboratories throughout the country had been experimenting with the Shielded Grid tube, and until the Tyrman "70" was announced, setbuilders had to content themselves with reading enthusiastic laboratory reports which stated that the Shielded Grid tube produced amplification ten times greater than obtained with the ordinary tube.

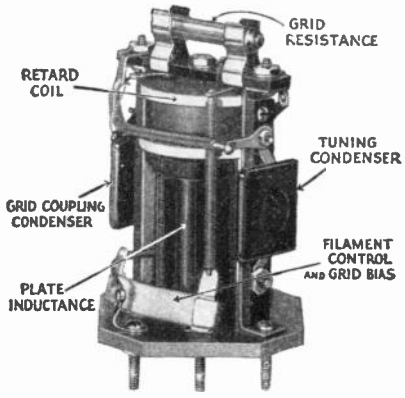
Thousands of set builders already knew of the new Shielded Grid tube and when the Tyrman "70" was announced, were ready to accept it. The result was astonishing because

Tryman "70" is Designed Especially for the Shielded Grid Tube

The Shielded Grid tube necessitated an altogether different technique. It was necessary to start from the bottom and design the parts around the tube. That is the secret of Tyrman "70". It is not just another circuit or a makeshift. It took months of experimenting under the supervision of Ernst Tyrman, one of America's outstanding engineers.



Amplification of Shielded Grid Tube many times greater than ordinary tubes



Tyrman Shielded R. F. Impedance Unit is responsible for the success of the Tyrman "70"

Tyrman "70" is especially designed for Shielded Grid Tube reception

5 Points of Superiority

1. Sensitivity never approached before by any receiver regardless of construction or number of tubes
2. Amplification of weakest signals at a ratio of 50 per stage
3. Tube plate impedance for intermediate coupling
4. Hairline selectivity—Power—Faithfulness of tone
5. Low current consumption of 22 mill. B and 1¼ Amp. A Permits full A. C. or battery operation

Tyrman "70"
Shielded Grid Amplimax

Needs No Outside Aerial

The Tyrman "70" needs no outside aerial—two to eight feet is ample which is conclusive proof that Tyrman "70" is correctly designed.

If you want to build a set that will give you real downright satisfaction, build a Tyrman "70".

If you want a real money maker—here is the opportunity to go to your customers with the first really new development in years—one where demonstrations mean sales.

Hundreds of Custom Built set builders tell us that the Tyrman "70" has put new life into their business and is making BIG money for them.

Get the facts—now while this is before you clip the coupon and send for diagrams and full details of the Tyrman "70".

MAIL COUPON TODAY!

TYRMAN ELECTRIC CORP.
Dept. 328, 141 W. Austin Ave.
Chicago, Illinois

Gentlemen:

Kindly send me, gratis, special literature describing the Tyrman "70" Shielded Grid Amplimax in detail.

Name.....

Address.....

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

Radio News in Pictures

"Johnny the Gloom Killer" is thoroughly at home before the mike.

Underwood and Underwood Photo

Seems to take life rather seriously, doesn't he? But why shouldn't he? He's the chief joy killer. Joy killer, did we say. Correction please. He's Johnny, "the chief Gloom Killer," head of an organization of a thousand joy dispensers, formed by the orphan and homeless boys in Father Flanagan's Boys' home.

The home is located eleven miles west of Omaha, Nebraska, on the Lincoln highway. It is an institution which exists for boys of all races, religions and color, coming from any place in the world.

In it are boys of thirty-three states and three countries. The home is supported entirely by the general public, no money coming from any church, city, state or organization.

The boys broadcast over WOW each Sunday from 11 a. m. to 12 m. During the last year they formed the National Gloom-Killer club, which has received notice throughout the entire United States and in which are enrolled members such as Will Rogers, Tom Mix, Babe Ruth, Paul Whiteman, Senator George W. Norris, and more than twenty governors and a host of other prominent folks. Will Rogers, the humorist, was chosen national chief by vote of the radio listeners.

Father Flanagan's Boys' home believes in teaching a trade to each boy. They also receive an education comparable to the ninth grade.

Many of the boys in the home have been placed in fine homes throughout th United States. However, those boys, who are not placed, are kept at the home until old enough to support themselves .

The home has three full-sized bands, under the direction of Captain Joseph Benesch, a graduate of the Vienna Conservatory of Music. None of these boys could play an instrument before entering the home.

The home is not conducted along the lines of the usual orphanage. It is an institution where individuality is given preference over group life. The home has taken care of more than two thousand boys in eleven years and boasts of not one boy being in a jail or penitentiary today.

Father Flanagan's Boys' band played for President Coolidge at the "summer White House" last year.

This super radio set built and operated by Wellington Muir of Lockport, N. Y., picked up station 2FC, Sydney, Australia, and successfully re-broadcast 2FC programs with the co-operation of WMAK, a Western New York broadcasting station. The program clear and distinct, consisted of orchestra selections, tenor, contralto and violin solos. This set also picked up via Sydney, Australia, a program originating from 2LO, London, England. By telephone transmission the program was relayed to WMAK and re-broadcast. It is expected the signals encircled the entire world. During this phenomenal feature Big Ben, chorus singing, organ selection, "God Save the King" and announcements were clearly heard. There is a 15 hour time difference between Sydney and Eastern Standard time. Plans are in progress to re-broadcast through this source, programs from Paris, Berlin and other Continental stations.

How to Bring in Those Distant Stations

Haynes' Radio Log Simplifies the Listener's Quest

THE radio log on the following pages is a special adaption of Haynes' Radio Log, prepared expressly for the WCFL Radio Magazine.

Haynes' Radio Log enjoys the reputation of being the most accurate log available to radio listeners. It is also the most up-to-date one because of its frequent revisions, and the dexterity with which they are published in a form condensed to a single page, instead of a book of many pages.

Unfortunately, many listeners do not grasp its ingenious efficiency instantly. It is different. It may require two or three minutes of study and the use of your pencil to adapt it to your particular radio set. It is not hard, nor technical; in fact it is easy and simple.

Carefully examine the photographic reduction below. Read and verify the statements set forth in typewriter type. Then enter your dial settings in the Radio Log on the following pages, for familiar, nearby stations. Then you will be all set for tuning in stations you would never find accidentally, and identify stations whose call letters are hard to distinguish.

HAYNES' RADIO LOG, 111 W. MONROE, CHICAGO, - ILL.

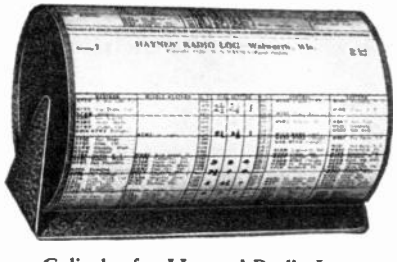
Copyright, 1927—By Walter Haynes—Patent Pending

Power 5 10 15 20 25 50 75 100 150 200 250 300 500 750 1000 1500 2000 2500 5000 10000 15000 30000
Code A B C D E F G H I J K L M N O P Q R S T U V

WESTERN	MIDDLE WESTERN	K. C.	DIAL SETTING			W. L.	CENTRAL	EASTERN
KWBS Portland C.....	KGFN Aneta, N. D. C...	1500				199.9	WNBL Bingtn. C	WRAM Providence K...
KGEH Eugene, Ore. F....		1490				201.3	WHBM-WIBJ Chicago H	WGMU-WRMU N. Y. W.
KGBS Seattle H	KGBY Columbus, Neb. F	1480				202.6		WPSW Philadelphia F
KFXD Jerome, Ida C.....		1470				204	WIBW-WSAX Chicago H	WIBS Elizabeth, N. J K
							KGFO Terra Haute H...	WLBX Le. Island Cy. K
KGEZ Kalispell, Mont. H.	WMBD Peoria Hgts., Ill. K	1460	0	3	5	205.4	WRK Hamilton, O. H	WABF Kingston, Pa. K..
KGTT San Francisco F ...	KGDW Humboldt, Neb. H	1450				206.8	WLBV Mansfield, O. F.	WNBF Endicott, N.Y. F
	KGCN Concordia, Kas. F						WNBA Forest Pk., Ill. J	
KFVD Venice, Cal. K.....	KGCU Mandan, N. D. H	1440				208.2	WJBZ Chicago Hgts. H	WLBZ Dover-Fort. M K
KVOS Seattle F	KSOO Sioux Falls K....	1430	4	5	5	209.7	WCGS Springfield Ill. K	WOKT Rochester, N. Y. M
	WLBF Kansas City F....						WTFI Tocoa, Ga. K....	WRCV Norfolk, Va. H....
KRSC Seattle F....	KFNF Shenandoah I....	1420				211.1	WBMN Detroit H	WCDA-WRST-WBRS N Y K
	KGDX Shreveport, La. K						WIBL Decatur, Ill. K	
	KGBZ York, Neb. H.....	1410				212.6	WSIX Springfd. Tn. F	WRAX Phila., Pa. K....
KFEC-KFIF Portland F...	KFWF St. Louis K.....	1400	5	6	7	214.2	WKBN-WMBW Y'tn.O.F	WICC Bridgeport, Cn K
KRLO Los Angeles K....	WPEP Waukegan, Ill. K	1390				215.7	WKBB-WCLS Joliet I.	WQAA Parkersburg M
KGER Long Beach H....	KGCB-KGFG Okla. City F						WHFC-WEMS Chicago H	WOKO Peekskill, N.Y. K
KFQW Wenatchee, W. H..	WLBO-WKBS Galesb'g H	1380				217.3	WKBV Brookv'le, Ind. H	WKBW Buffalo M
	WKBC Birmingham O ..		7	8	8		WMCO Saginaw, Mich. K	WKBO-WKBQ-WCGUNTM
KJBS San Francisco F....	KGEW Ft. Morgan, Co. B	1370				218.8	WCWB Milwaukee M	
KXL Portland F.....	WKBH La Crosse, W M	1360				220.4	WHBU Anderson, Ind. C	WHBW Phila F
KFWC San Bernardino H..	KGRC San Antonio F....						WJBK Ypsilanti C....	WMBO Auburn, N. Y. M
KWIC Inglewood, Cal. K....	WHBF Rock Isl., Ill. H.	1350				222.1	WHDD Bellefontaine, O. H	WCBA-WSAN Allent'n M
KGFH La Crescenta H....	KFXR Oklahoma City F.	1340	8	9	9½	223.7	WCRW-WFKB Chicago M	WCAM Camden, N. J M
	KFYS Girardeau, Mo. F.						WPCC Chicago M.....	WNRC Greensbro, N C K

Technical terms of wave length and kilocycle translated into ordinary dial settings which you use.
Works on any set. Only about 25 settings needed.
Note how one setting automatically logs many stations.
Note how the markings progress in numerical order.
Note the convenient geographical divisions and power code.
It is simpler, better, more accurate------perfection.

KFOA Seattle O.....	WJAD Waco, Tex. M.....	670	70	70	69	447.5	WMAQ-WQJ Chicago OM	WEEI Boston M
KFRC San Francisco M..	CZI Mexico City O.....	660				454.3		WJZ New York V
KRLD Dallas M.....	KFNF Shenandoah O.....	650	74	73	73	461.3	WHAS Louisville M.....	
KFI Los Angeles S.....	WOS Jefferson City M.	640				468.5		WRC Wash., D. C. M
CJGX Yorkton, Sask. M...	KOW Denver K.....	630				475.9	WSB Atlanta O.....	
	KFDM Beaumont, Tex. M	620	80	80½	79	483.6	WCFL-WLTS Chco PH.	
KGW Portland O.....	KUSD Vermillion K.....	610				491.5	WEMC Berrien Spgs. O.	WJAR Providence M
KFUT Salt Lake F.....	WBAP Ft. Worth P.....							WEAF New York V
	WFAA Dallas M.....	600				499.7		WBDY Charleston G
KLX Oakland M.....	WOW Omaha O.....	590	87	88	88	508.2		CFCN Imperial Pts K
CJCA-CNRE Edmonton M..	WMC Memphis M.....	580				518.9		WIP-WOO Phila M
KNTR Los Angeles M.....		570	90	90	90	526	KYW-KFKX Chicago R.	WCAE Pittsburgh M
KFBK Sacramento H.....	WHO Des Moines, S....	560				535.4	WCAH Columbus K.....	WTAG Worcester M
KFBC San Diego H.....	KSD-KFUQ St. Louis M..	550	93	93	93	545.1		WNYC New York M
								WTIC Hartford M
								WMAK Lockport N



Cylinder for Haynes' Radio Log

Haynes' Radio Log is published in two forms. Both in two colors. The single chart form is gummed for mounting on the attractive cylindrical device as illustrated. The eight-page form lists all of the broadcasting stations in the United States in alphabetical order, as well as the principal stations of Canada, Cuba and Mexico, in addition to the Haynes' Radio Log chart.

The WCFL Radio Magazine is published quarterly and Haynes' Radio Log five to eight times each year, depending on necessity, to render exceptional service to its subscribers. Arrangements have been made which enable us to make the following Club offers:

No. 1		No. 2		No. 3	
WCFL Radio Magazine	$1.25	WCFL Radio Magazine	$1.25	WCFL Radio Magazine	$1.25
Haynes' Log, 8 page form	.75	Cylinder and Revisions	1.50	Cylinder and Revisions	1.50
	$2.00		$2.75	Eight page form	.75
Both for one year	$1.75	Both for one year	$2.25		$3.50
				All for one year	$2.75

For any club offers address

WCFL RADIO MAGAZINE, 623 S. Wabash Ave., Chicago

The WCFL Radio Log

Revision 18 **May, 1928**

Power	5	10	15	20	25	50	75	100	150	200	250	300	500	750	1000	1500	2000	2500	5000	10000	15000	30000	50000
Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W

WESTERN	MIDDLE WESTERN	Kc.	Dial Setting	W. L.	CENTRAL	EASTERN
KWBS-KLIT Portland, Ore. **C**	**KGFN** Aneta, N. D. **C**	**1500**		**199.9**	**WRAH** Providence, R. I. **K**	**WCLB-WGOP-WWRL** N.Y. **H**
	KPOF Denver, Colo. **M**	**1490**		**201.3**	**WHBM-WIBJ** Chicago **H**	**WGMU-WRMU** N. Y. **H**
		1480		**202.6**	**WRUF** Gainesville, Fla. **S**	**WTFF** Mt. Vernon Hills, Va. **T**
KFXD Jerome, Ida. **C**	**WMBH** Joplin, Mo. **H**	**1470**		**204**	**WHBL** Sheboygan, Wis. **K**	**WKEN** Grand Island, N. Y. **N**
KFBI An Aeroplane, Cal. **F**	**WIBW** Topeka, Kas. **K**	**1470**		**204**	**KGFO** Terre Haute **H**	**WLBX** Long Island City **K**
	WMBD Peoria Hgts., Ill. **K**	**1460**		**205.4**	**WRK** Hamilton, Ohio **H**	**WABF** Kingston, Pa. **K**
KOOS Marshfield, Ore. **F**	**KGGF** Pitcher, Okla. **H**	**1450**		**206.8**	**WLBV** Mansfield, Ohio **F**	**WNBF** Endicott, N. Y. **F**
KFUS Oakland, Cal. **H**	**KGCN** Concordia, Kas. **F**	**1440**		**208.2**	**WRAF** LaPorte, Ind. **H**	**WGM** Jeannette, Pa. **F**
	WNBA Forest Park, Ill. **J**	**1440**		**208.2**	**WJBZ** Chicago Hgts. **H**	**WLBZ** Dover-Fox't. **M. K**
KGHF Pueblo, Colo. **K**	**KSOO** Sioux Falls, S. D. **K**	**1430**		**209.7**	**WCBS** Springfield, Ill. **K**	**WOKT** Rochester, N. Y. **M**
KVOS Bellingham, Wash. **K**	**WLBF** Kansas City **F**	**1430**		**209.7**	**WTFI** Toccoa, Ga. **K**	**WIVA** Norfolk, Va. **H**
KFCR Santa Barbara, Cal. **H**	**KPNP** Muscatine, Iowa **H**	**1420**		**211.1**	**WBMH** Detroit, Mich. **H**	**WCDA-WRST-WBRS** N. Y. **K**
KGFJ Los Angeles, Cal. **H**	**KWEA** Shreveport, La. **K**	**1410**		**212.6**	**WJBL** Decatur, Ill. **K**	**WRAX** Philadelphia, Pa. **K**
KFEC Portland, Oregon, **F**	**KFWF** St. Louis **K**	**1400**		**214.2**	**WCWK** Ft. Wayne, Ind. **K**	**WKBN-WMBW** Y'tn, O. **F**
KFVD-KGER Venice, Cal. **KH**	**WPEP** Waukegan, Ill. **K**	**1390**		**215.7**	**WKBB-WCLS** Joliet **I**	**WOKO** Mt. Beacon, N. Y. **M**
	KGCB-KGFG Okla. City **F**	**1390**		**215.7**	**WHFC-WEHS** Chicago **JH**	**WQAA** Parkesburg, Pa. **M**
KFQW Wenatchee, Wn. **H**	**WLBO-WKBS** Galesburg **H**	**1380**		**217.3**		**WKBW** Buffalo, N. Y. **M**
KOW Denver, Colo. **K**	**WKBC** Birmingham **B**	**1370**		**218.8**	**WKBV** Brookville, Ind. **H**	**WKBO-WKBQ-WCGU** N. Y. **M**
	KGEW Ft. Morgan, Colo. **H**	**1370**		**218.8**		**WEDH-WRAK** Erie, Pa. **EF**
KGTT-KFQU San Francisco **FH**	**WKBH** La Crosse, W. **M**	**1360**		**220.4**	**WHBU** Anderson, Ind. **C**	**WHBW** Philadelphia **H**
KGRC-KGCI San Antonio **K**	**KSTP** St. Paul, Minn. **Q**	**1360**		**220.4**	**WJBK** Ypsilanti, Mich. **C**	**WMBO** Auburn, N. Y. **H**
	WOMT Manitowoc, Wis. **F**	**1350**		**222.1**	**WHBD** Bellefontaine, Ohio **H**	**WCBA-WSAN** Allentown **H**
KMIC Inglewood, Cal. **K**	**KFXR** Oklahoma City **F**	**1340**		**223.7**	**WCRW-WFKB** Chicago **M**	**WCAM** Camden, N. J. **M**
KFBL-KXRO Everett, Wash. **F**	**KFVS** Girardeau, Mo. **F**	**1340**		**223.7**	**WPCC** Chicago **M**	**WNRC** Greensboro, N. C. **M**
KFUR Ogden, Utah **F**	**KFVG** Independence, Kas. **F**	**1330**		**225.5**	**WDAD-WLAC** Nashville **S**	**WMAC** Cazenovia, N. Y. **M**
KGHB Honolulu **K**	**KSO** Clarinda, Iowa **M**	**1320**		**227.1**	**WJAY** Cleveland, Ohio **M**	**WSGH-WSDA** Brooklyn **M**
KFUP-KFEL Denver, Colo. **HK**	**WCLO** Kenosha, Wis. **H**	**1320**		**227.1**	**WWAE** Chicago, Ill. **M**	**WFJC** Akron, Ohio **M**
KELW Burbank, Cal. **M**	**KTAP** San Antonio, Tex. **K**	**1310**		**228.9**	**WOWO** Ft. Wayne, Ind. **R**	**WHBP** Johnstown, Pa. **K**
KGCL-KPCB Seattle **H**	**KFEQ** St. Joseph, Mo. **O**	**1300**		**230.6**	**WCOC** Columbus, Miss. **M**	**WQAN-WGBI** Scranton
KFPZ Los Angeles, Cal. **K**	**KUT** Austin, Tex. **M**	**1290**		**232.4**	**WJKS** Gary, Ind. **M**	**WBRL** Tilton, N. H. **M**
KFQZ Hollywood, Calif. **K**	**KFJY** Ft. Dodge, Iowa **H**	**1290**		**232.4**	**WSBC** Chicago, Ill. **M**	
KDYL Salt Lake City **M**	**KWK-WMAY** St. Louis **OH**	**1280**		**234.2**	**WCAH** Columbus, Ohio **K**	**WMBS** Lemoyne, Pa. **K**
KFWM Oakland, Cal. **M**	**KFMX** Northfield, Minn. **M**	**1270**		**236.1**	**WGBF** Evansville, Ind. **K**	**WSUF-WTAR** Norfolk, Va. **M**
	KFDX Shreveport, La. **K**	**1270**		**236.1**	**WTAD** Quincy, Ill. **K**	**WHAP-WMSG** N. Y. **OM**
	WLBI Wenona, Ill. **K**	**1260**		**238**	**WADC** Akron, Ohio **O**	**WQBA-WJBB** Tampa, Fla **K**
KFJR Portland **M**	**WNAD** Norman, Okla. **M**	**1250**		**239.9**	**WBAW** Nashville, Tenn. **S**	**WOAX** Trenton, N. J. **M**
	KWCR-WJAM C. R., Ia. **K**	**1250**		**239.9**	**WOAN** Lawrenceburg **M**	**WCAP** Asbury Pk., N. J. **M**
KFON Long Beach, Cal. **M**	**KFKB** Milford, Kas. **P**	**1240**		**241.8**	**WEDC-WGES** Chicago **M**	**WMAL** Washington, D. C. **M**
	WEBC Superior, Wis. **K**	**1240**		**241.8**		**WEBR** Buffalo, N. Y. **J**
KFCB Phoenix, Ariz. **H**	**KWUC-KSCJ** Sioux City **PM**	**1230**		**243.8**	**WDOD** Chattanooga **M**	**WCAO-WFBR** Baltimore **K**
KFIO-KFPY Spokane **HK**	**WLB-WHDI-WGMS** Mpls. **M**	**1220**		**245.8**	**WWL** New Orleans, La. **M**	**WEVD-WGBB** N. Y. **ML**
KLS-KJBS Oakland **KH**	**KFH** Wichita, Kas. **M**	**1220**		**245.8**	**WFBE-WKRC** Cincinnati **K**	**WAAT** Jersey City **L**
KFWC Ontario, Cal. **H**	**WRRS** Racine, Wis. **F**	**1210**		**247.8**	**WLBT** Crown Point, Ind. **F**	**WIOD** Miami Beach **O**
KFHA Greeley, Colo. **M**	**WREC** Memphis, Tenn. **M**	**1200**		**249.9**	**WSAZ** Huntington, W. Va. **H**	**WBBY** Charleston, S. C. **G**
KFJF Gunnison, Colo. **F**	**KFRU** Columbia, Mo. **M**	**1200**		**249.9**	**WIBR** Steubenville, Ohio **F**	**WCOA** Pensacola, Fla. **M**
KEJK Los Angeles, Cal. **K**	**KOCW** Chickasha, Okla. **K**	**1190**		**252**	**WOK-WMBB-WORD** Chicago **S**	**WGAL-WKJC** Lancaster **CF**
KFSG Los Angeles, Cal. **M**		**1190**		**252**	**WKBF** Indianapolis, Ind. **K**	
KMO Tacoma, Wash. **M**	**KFKU-WREN** Lawrence **MN**	**1180**		**254.1**		**WRVA** Richmond, Va. **O**
	WTAQ Eau Claire, Wis. **M**	**1180**		**254.1**		**WHEC-WABO** Rochester **M**
	KTNT Muscatine, Iowa **Q**	**1170**		**256.3**	**WASH** Grand Rapids **K**	**WBBR** Rossville, N. Y. **O**
		1170		**256.3**	**WCSO** Springfield, Ohio **M**	**WEBJ-WLTH** N. Y. **M**
	WEBW Beloit, Wis. **M**	**1160**		**258.5**		**WBT** Charlotte, N. C. **O**
KFUL Galveston, Tex. **M**	**WNAL-KOCH** Omaha **K**	**1160**		**258.5**	**WIL-WSBF** St. Louis **K**	**WFBL** Syracuse, N. Y. **N**
KGA Spokane, Wash. **Q**	**WRHM** Minneapolis **O**	**1150**		**260.7**	**WOOD** Grand Rapids **M**	**WCAU** Philadelphia **M**
		1150		**260.7**	**WCMA** Culver, Ind. **M**	**WFIW** Hopkinsville, Ky. **N**
KGEF Los Angeles, Cal. **O**	**WDAG** Amarillo, Tex. **O**	**1140**		**263**	**WJAZ-WMBI** Chicago **S**	**WSEA** Virginia Beach, Va. **M**
	WOI Ames, Iowa **S**	**1130**		**265.3**	**WHK** Cleveland, Ohio **M**	**WICC** Easton, Cn. **M**
	KTSA San Antonio **Q**	**1130**		**265.3**	**WNOX** Knoxville, Tenn **O**	**WBES** Takoma Pk., Md. **H**
KFWI San Francisco **M**	**KSBA** Shreveport, La. **O**	**1120**		**267.7**	**WLAP** Louisville, Ky. **E**	**WDAE** Tampa, Fla. **M**
	KFIZ Fond du Lac, Wis. **H**	**1120**		**267.7**	**WBAO** Decatur, Ill. **H**	**WNJ-WGCP-WAAM** N. J. **K**
KOAC Corvallis, Ore. **M**	**KFLX** Galveston, Tex. **H**	**1110**		**270.1**	**WHAD-WISN** Milwaukee **MK**	**KQV-WJAS** Pittsburgh **M**
KGU Honolulu, Hawaii **M**	**KLDS-KMBC** Kansas City **P**	**1110**		**270.1**	**WMAZ** Macon, Ga. **M**	**WGST** Atlanta **M**
KVL-KRSC-KKP Seattle **HFC**	**KFJF** Oklahoma City **S**	**1100**		**272.6**	**WRM** Urbana, Ill. **M**	**WPG** Atlantic City **S**
KSMR Santa Maria, Cal. **H**	**WFBJ** Collegeville, Minn. **H**	**1100**		**272.6**	**WBAA** W. LaFayette, Ind. **M**	**WSKC** Bay City, Mich. **K**
KFBK Sacramento **H**	**KFBB** Havre, Mont. **F**	**1090**		**275.1**	**WFBM** Indianapolis **O**	
KTBI Los Angeles, Cal. **M**	**CYB** Mexico City **O**	**1090**		**275.1**	**WTAS** Chicago **M**	**WEAN** Providence, R. I. **M**
KEX Portland, Ore. **R**		**1080**		**277.6**	**WGHP** Detroit, Mich. **N**	
	KWWG Brownsville, Tex. **M**	**1080**		**277.6**	**WKAR** E. Lansing **M**	
KTAB Oakland, Cal. **M**	**WOAI** San Antonio **S**	**1070**		**280.2**		**WHAM** Rochester, N. Y. **S**

TELEVISION! BUILD RECEIVER: WCFL SOON WILL BROADCAST YOUR PICTURES!

The WCFL Radio Log

Revision 18 **May, 1928**

Power	5	10	15	20	25	50	75	100	150	200	250	300	500	750	1000	1500	2000	2500	5000	10000	15000	30000	50000
Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W

WESTERN	MIDDLE WESTERN	Kc.	Dial Setting	WL	CENTRAL	EASTERN
KVI Tacoma, Wash. K	KFXF Denver, Colo. K	1060		282.8	WAIU-WEAO Columbus, O. SN	WDRC New Haven, Conn. M
		1060		282.8		
KFAU Boise, Idaho Q	WCAL-WDGY Minneapolis M	1050		285.5		WBAL Baltimore, Md. S
KOB State Col., N. M. S	KMMJ-WJAG Norfolk, Neb. K	1050		285.5		
KPLA Los Angeles, Cal. M	WKY Oklahoma City I	1040		288.3	WENR-WBCN Chicago MK	WBET-WSSH Boston MH
	KGBX St. Joseph, Mo. H	1040		288.3	WDBO Orlando, Fla. M	WNAT-WIAD Phila., Pa. H
CNRV Vancouver, B. C. M		1030		291.1	CFRB King, Ont. O	CJBC-CKSM Toronto MO
KGEZ Kalispell, Mont. H	KPRC Houston, Tex. O	1020		293.9	WTMJ Milwaukee O	WGL-WSYR New York MO
	KGCH Wayne, Neb. K	1020		293.9	WLBW Oil City, Pa. M	WODA Paterson, N. J. O
KQW San Jose, Cal. M	KUOA Fayette, Ark. M	1010		296.9	WSMK Dayton, Ohio J	WWNC Asheville, N. C. O
	WSMB New Orleans, La. N	1010		296.9		WDEL Wilmington, Del. H
WKWO Avalon, Cal. K	KMOX St. Louis, Mo. S	1000		299.8		WBAK Harrisburg, Pa. M
		1000		299.8		WPSC State College, Pa. M
KSL Salt Lake City S	WNAX Yankton, S. D. O	990		302.8	WBRC Birmingham, Ala. K	WGR Buffalo, N. Y. N
		980		305.9	WHT-WIBO Chicago S	WHAZ Troy, N. Y. M
KOMO Seattle, Wash. O		970		309.1		WABC-WBOQ N. Y. RM
CKCK-CNRR Regina M	CJBR Regina, Sask. M	960		312.3		CKGW Toronto, Ont. S
KPSN-KPPC Pasadena OF		950		315.6		KDKA Pittsburgh, Pa. W
KOIN Portland, Ore. O	KFAB Lincoln, Neb. S	940		319	KOIL Council Bluffs, Iowa S	
	WIAS Ottumwa, Iowa H	930		322.4	WHAS Louisville, Ky. M	WRHF Washington, D. C. I
KFAD Phoenix, Ariz. M	KICK Red Oak, Ia. H	930		322.4		WKAQ San Juan, P. R. M
KOA Denver S	CYX Mexico City M	920		325.9		WPCH-WRNY N. Y. M
CFQC-CNRS Saskat'n M	CJWC-CHUC Saskt. KM	910		329.5		CJGC London, Ont. M
KSEI Pocatello, Idaho K	KFQB Ft. Worth, Tex. O	900		333.1	WHA Madison, Wis. N	WBZ Springfield, Mass. U
KSAC Manhattan, Kas. M	WJAD Waco, Tex. M	900		333.1	WLBL Stevens Pt., Wis. O	WBZA Boston M
KNX Los Angeles, Cal. M		890		336.9	WSM Nashville, Tenn. S	
	WHB-WOQ Kansas City M	880		340.7	WAPI Auburn, Ala. O	WJAX Jacksonville, Fla. O
KFQD Anchorage, Alaska H		870		344.6	WLS Chicago, Ill. S	
KWG Stockton, Cal. F		870		344.6	WCBD Zion, Ill. S	
KJR Seattle, Wash R	KVOO Bristow, Okla. S	860		348.6	WIP-WOO Philadelphia M	WGBS New York M
KLZ Denver, Colo. M	WEW St. Louis, Mo. O	850		352.7	WWJ Detroit, Mich. O	
CKLC Red Deer, Alta. O	CZE Mexico City M	840		356.9	CFCA-CNRT Toronto M	CKCL-CHNC Toronto M
KFWB Los Angeles, Cal. O		830		361.2	WSAI Cincinnati, Ohio S	
KMJ Fresno, Cal. F		820		365.6	WEBH-WJJD Chicago MO	WCSH Portland, Me. M
KHQ Spokane, Wash. O	WDAF Kansas City, Mo. O	810		370.2		WLWL-WMCA N. Y. SM
KNRC Santa Monica, Cal. M	WOC Davenport, Iowa S	800		374.8		
	WCAJ Lincoln, Neb. M	790		379.5		WGY Schenectady, N. Y. W
KGO Oakland, Cal. S	CKY-CNRW Winnipeg M	780		384.4		WMBF Miami Bech M
		780		384.4		WQAM Miami, Fla. N
		770		389.4	WBBM-WAAF Chicago SM	WABI Bangor, Me. H
		770		389.4	WJBT Chicago M	
KTW Seattle, Wash. O	KMA Shenandoah, Iowa O	760		394.5		WHN New York M
KWSC Pullman, Wash. M	KWKH Shreveport, La. R	760		394.5		WQAO-WPAP Cliff'e M
KHJ Los Angeles, Cal. M		750		399.8	WEAR-WTAM Cleveland OR	PWX Havana M
	WCCO Minneapolis S	740		405.2		WFI-WLIT Philadelphia M
CKCD-CHPC Vancouver O	CYJ Mexico City O	730		410.7	CFCF-CNRM Montreal PO	CHYC-CKAC Montreal NO
		720		416.4	WGN-WLIB Chicago UM	
KPO San Francisco O	WOS Jefferson, Mo. M	710		422.3		WOR New York S
		700		428.3	WLW Cincinnati, Ohio S	WMAF Dartmouth, Ms. M
CFAC-CNRC Calgary M	CFCN-CJCJ Calgary PK	690		434.5	NAA Arlington, Va. O	CNRO Ottawa M
KFSD San Diego, Cal. M	WAAW Omaha, Nebr. M	680		440.9	WJR-WCX Detroit S	WIBG Elkins Pk., Pa. F
KFOA Seattle, Wash. O		670		447.5	WMAQ-WQJ Chicago OM	
KFRC San Francisco O	CZI Mexico City O	660		454.3		WJZ New York V
KUOM Missoula, Mont. M	WRR-KRLD Dallas Tex, M	650		461.3		WNAC-WBIS Boston M
	KFNF Shenandoah, Iowa Q	650		461.3		WCAE Pittsburgh M
KFI Los Angeles, Cal. S		640		468.5		WRC Washington, D. C. M
CJGX Yorkton, Sask. M	WSUI Iowa City, Iowa M	630		475.9	WSB Atlanta, Ga. O	
WTAW College Sta., Tex. M	KFDM Beaumont, Tex. M	620	→	483.6	WCFL-WLTS Chicago PH	WJAR Providence, R. I. M
KFBU Laramie, Wyo. M	KFUM Colo. Spgs., Colo. O	620		483.6	WEMC Berrien Springs O	
KGW Portland, Ore. O		610		491.5		WEAF New York W
	WBAP Ft. Worth, Tex. S	600		499.7		
	KTHS Hot Springs, Ark. N	600		499.7		CFCH Iroquois Falls K
KLX Oakland, Cal. M	WOW Omaha, Neb. O	590		508.2		WEEI Boston, Mass. M
KMTR Los Angeles, Cal. M	WMC Memphis, Tenn. S	580		516.9	WFLA Clearwater, Fla. N	WSUN St. Petersburg, Fla. N
CKUA-CHCY Edmonton M	CJCA-CNRE Edmonton M	580		516.9	WWVA Wheeling, W. Va. K	WTAG Worcester K
		570		526	KYW-KFKX Chicago S	WNYC New York M
KXA Seattle, Wash. M	WHO Des Moines, Iowa S	560		535.4		WTIC Hartford, Conn. M
KWRL Portland, Ore. P		560		535.4		WCAC Mansfield, Conn. M
KFDY Brookings, S. D. M	KSD-KFUO St. Louis, Mo. M	550		545.1		WMAK Buffalo, N. Y. N
WDAY Fargo, N. D. K	WFAA Dallas, Tex. M	550		545.1		WPTF Raleigh, N. C. O

TELEVISION! STATION WCFL IS PREPARING TO BROADCAST PICTURES!

The Carter Adapter Harness

By E. R. PFAFF*

THE NEW Carter Adapter Harness makes it possible to convert practically any battery-operated set to AC tube operation. When making this conversion, it is not necessary to do any wiring or make changes in the set. The entire operation takes but a few minutes.

Simply remove the present tubes, disconnect the A and C batteries, insert the adapters which are part of of the Carter Adapter Harness, into the tube sockets, insert the AC tubes, and attach the end of the Harness to the binding posts on a Karas AC Former or other suitable filament supply. The terminals and wires are clearly marked.

Since the A and C batteries were disconnected, the A battery terminals, or leads, remained unused. The C— terminals or binding posts, should be connected to the C+ binding posts with a short piece of wire. The receiver is then ready to operate—without any batteries whatsoever, and in most cases with better tone and greater volume than before.

The following detailed information is given for those interested in the theory of operation. No technical knowledge or consideration of the following specifications is required to make the installation.

The Adapter Harness supplies AC current to the tubes. There are usually three different voltages supplied by a harness of this nature. The radio frequency and audio amplifier tubes (Type 326) use one and a half volts to light the filaments. The detector tube (Type 327) uses two and a half volts to light the filament. ment. When a power tube is used, five volts AC is supplied directly to this tube from the AC Former.

After the harness is installed, the old filament wiring remains unused, except for B— and C bias voltages. The A—and A+ terminals are automatically connected together by the adapters, making sure that grid returns in the set all connect to a common point. point, that is, very often some C battery or grid connections connect to the negative filament terminal wires, others connect to the positive filament. It is obvious that this would result in an open circuit if these wires were not connected together.

This old filament wiring, to which is connected all of the grid circuits of the 326 type tubes, is connected to the center tap of the 1½-volt winding of the filament transformer.

Some filament transformer manufacturers choose to tap all of their filament windings, others tap all but the 1½-volt winding, while still others do not tap any of them. There is a Carter Harness for every need, so when seeking information about AC conversion, be sure to specify the type of set and the name of the transformer that you are planning to use.

A variable resistance or C bias regulator (see illustration), is connected in series with this grid lead. By adjusting this resistance, the C bias voltage for these tubes can be set at any desired value. Then, in order to prevent this resistance from causing undesirable coupling between tubes, two small By-Pass Condensers are inserted in the circuit to lower its resistance to the radio frequency energy. A ⅕-ohm rheostat (marked "Filament Regulator" in illustration) is inserted in this 1½-volt circuit to reduce the voltage applied to the 326 type tubes in case the circuit should be unstable and have a tendency to produce undesirable oscillation. All of this apparatus is housed in a small container which is part of the harness.

The cathode, or fifth terminal in the detector tube, is the element that emits, or gives off, small particles of electrical energy that flow to the plate of the tube. The connection of this element to the old filament wiring is taken care of inside of the detector adapter.

The center tap of the 2½-volt or heater winding is brought out in the form of a flexible lead, marked "Detector, B+ 45, or A+." When a transformer not having a center tap is used, the harness contains a suitable fixed center tap resistor to supply the connection for the flexible lead, marked "Detector B+ 45, or A—." Tube manufacturers recommend that this be connected to the detector binding post, or to one of the other designations just given. Although the receiver will work, with any of these connections, it is best to try them to see which is most satisfactory for your particular case.

(Continued on page 80)

*Chief Engineer Carter Radio Company.

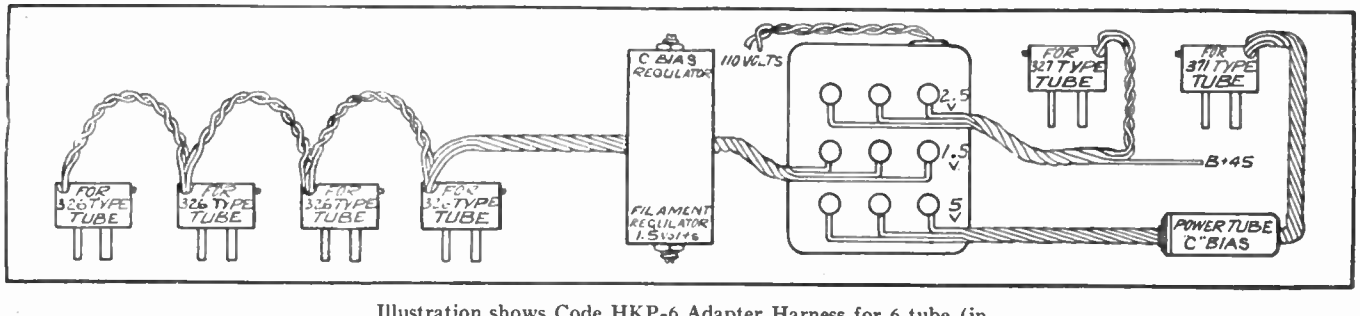


Illustration shows Code HKP-6 Adapter Harness for 6 tube (including power tube) set, using Karas "AC Former" or equivalent.

The Carter Adapter Harness

(Continued from page 78)

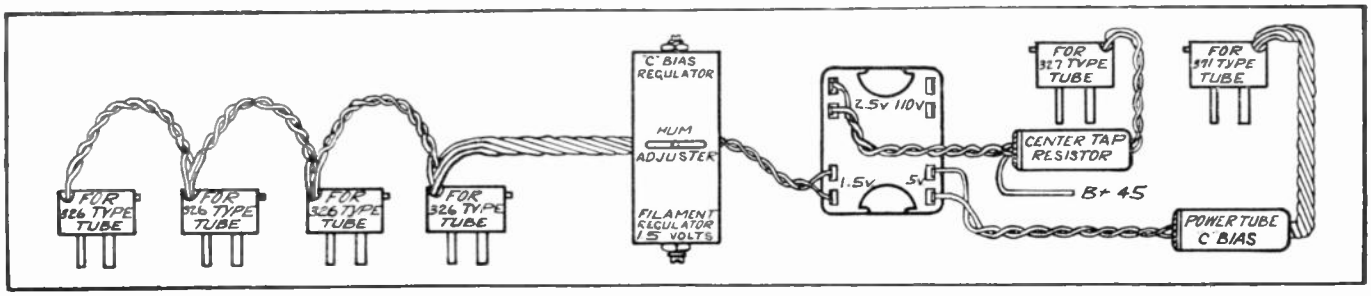


Illustration shows Code HSP-6 Adapter Harness for 6 tube (including power tube) set, using Silver Marshall or Bremer-Tully Filament Transformer or equivalent.

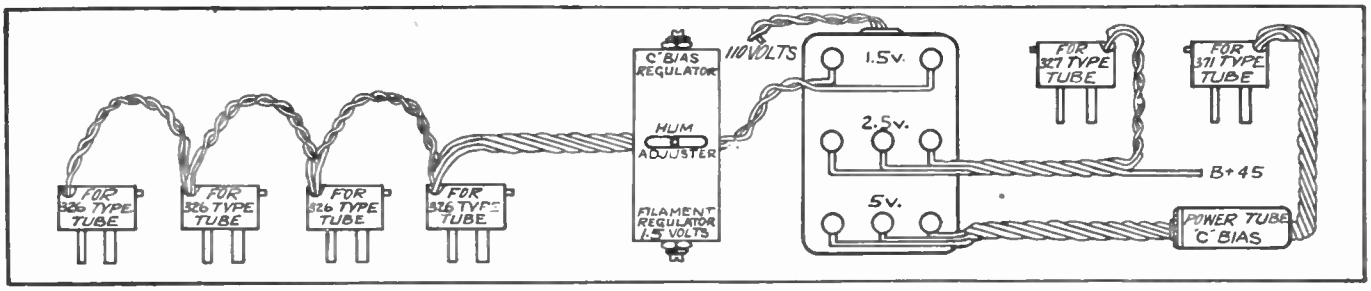


Illustration shows Code HTP-6 Adapter Harness for 6 tube (including power tube) set, using Thordarson, Jefferson or Acme Filament Transformer or equivalent.

The detector part of the Adapter Harness just described, and the power tube part of the adapter harness, are separate from the remainder of the harness for the reason that no electrical connection exists between them. The power tube part of the harness has a small container unit, in which is the necessary resistor to bias the power tube, that is, to provide C voltage. This fixed resistor is 2000 ohms, and is suitable for either the 371 or 312 type power tube. When a transformer not having a center tap is used, the harness contains a suitable fixed center tap resistor to supply this connection. The type of power tube that is in the set before the conversion is made, should be re-used, since the circuit is especially designed for that particular tube, and it is not advisable to change unless expert advice is received.

After the set is converted the old volume control usually becomes inoperative. The most effective volume control for AC operated sets is a variable resistance connected across the aerial and ground terminals. The Carter No. 100 Auxiliary Volume Control consists of a suitable variable resistance on a 10-foot cord. The other end of this cord may be connected across the aerial and ground binding posts of a radio set. This permits adding a volume control to any converted set without changing the wiring.

The Harness comes in a box with complete instructions. Standard harnesses are available for 5, 6 and 7 tube sets, both with or without power tube.

The Carter Adapter Harness is ideal for use with most of the popular transformation kits now generally available. By way of illustration, we are showing in Fig. 5 the Harness in connection with the Karas AC Former or equivalent. The design illustrates the connections for a 6 tube receiver with a 5 volt 371 AC excited Power tube.

It shows clearly the complete connections for 4 type 326 AC tubes, a type 327 AC Detector and a CX 371 Power amplifier and requires no comment other than calling attention to the general simplicity of the arrangement.

There are a number of the popular AC Kits that can be used in connection with the Carter Harness. In general the connections shown in Fig. 6 will apply if the Karas AC Former arrangement shown in Fig. 5 does not.

We wish to emphasize the fact that this data is given for the information of those who may be interested in the technical details, and that the actual conversion of a battery operated set to AC tube operation, requires but a very short time and is so simple that anyone can do it. No tools are required whatsoever, and the set itself is not disturbed or altered in any way.

Moon Frolic

She stood on the bridge at midnight
  Which really seemed absurd,
But a cop was standing by her side
  And never said a word.

Sparker: "Smith is a steady sort of fellow?"

Barker: "Yes, he always keeps one set until he gets it paid for!"

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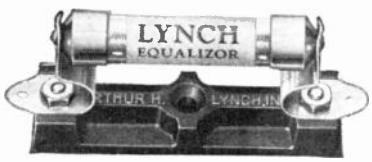

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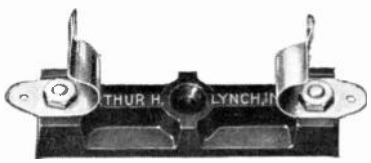

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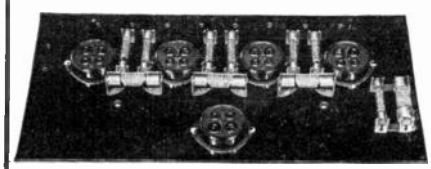

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with sockets and all the resistors and condensers for a three stage amplifier of the latest design already mounted.

$12.50

Metallized Resistors

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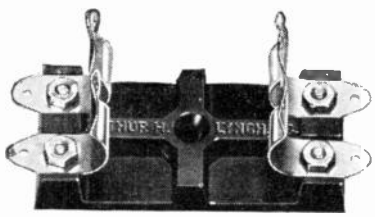
.012 to .2 Meg. 75 cents
.0005 to .01 Meg. $1.00



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Get Your Book By Return Mail

The Lynch-Hammarlund A-C Five Receiver

(Continued from page 55)

free terminal being unsupported. A wire is easily connected, by mechanical pressure, in the groove on this free end. This wire provides an extra lead to the receiver and is designated on the wiring diagram as "plus D 4.5 to 9 volts."

The grid returns from the first two audio frequency tubes have automatically been grounded by the connection effected between the 20 ohm rheostat (which has been shorted out of the electrical significance) and the ground post. No additional changes are made in the audio frequency amplifier.

With A-C tubes the volume control or regenerative control of volume is seldom adequate on local stations. To provide satisfactory variations of signal intensity the Clarostat volume control is connected to antenna and ground posts. This has not been indicated on the circuit diagram. The volume control Clarostat is a table mounting device requiring no mechanical or electrical alterations in the receiver itself.

It is desirable that two additional bypass condensers be used in the A-C job. The Polymet type C905 is practically well suited mechanically and electrically to the designated use in the Lynch-Hammarlund receiver. These are connected between ground and plus 90 and 180 volts potential points. They are designated as "C" on the wiring diagram.

POTENTIAL CONNECTIONS

An additional lead is wired to the plus filament prong on the detector socket (which, incidentally, is the cathode to the detector tube) through which the B return is effected. This extra lead is designated on the wiring diagram as "minus B, minus D and plus C." It is important that an extra lead be wired for this purpose rather than use the red coded heater wire. An amplification plate potential of 180 is supplied to the post marked "B plus 135 volts" on the D-C receiver. Plus 90 volts is tapped off to the indicated post and likewise, 45 volts for the detector circuit. The minus side of the B battery is connected to the special lead designated on the diagram. If it is possible to tap the B battery between 4.5 and 9 volts, this tap may be connected to the special lead designated as "plus D". If, however, it is impracticable to secure this special potential from the B battery, an extra battery may be connected between the D minus lead and the D plus lead. A "C" potential of 1.5 volts is connected between the B minus lead and the ground post—negative to the ground. If convenient and practicable this may be tapped off from a larger C battery supplying from 22.5 to 30 volts to the grid of the power tube, (the C minus 9 volt post on the D-C set.) Fifteen volts A-C potential are applied to the heaters for the Arcturus tubes. The tubes may be turned on and off by a switch placed in the primary circuit of the heater lighting transformer.

Any efficient eliminator, such as the Briggs and Stratton, supplying the necessary potentials, can be used in place of the batteries.

PARTS FOR COMPLETE A-C RECEIVER

If it is desired to build a complete receiver of the Lynch-Hammarlund A-C Five design rather than converting an already existing D-C set, the following parts will be required in addition to the special list given above:

1 Lynch five tube DeLuxe kit which includes the following:
1 Lynch .00025 mfd. cartridge type fixed condenser
3 Lynch .006 mfd. cartridge type fixed
1 Lynch 2.5 megohm metallized resistor
1 Lynch .1 megohm metallized resistor
1 Lynch .5 megohm metallized resistor
5 Eby universal sockets
1 Micarta 6x12x3/16-inch sub-panel
4 Sets special mountings

All of this material is completely assembled on the sub-panel ready for wiring.

2 ML-23 Hammarlund .0005 mfd. variable condensers
1 EC Hammarlund equalizing balancing condenser
1 Polymet .006 mfd. fixed condenser
1 Polymet .0005 mfd. fixed condenser
2 Polymet 2. mfd. bypass condensers
1 404 Carter inductance switch
1 HR 23 Hammarlund antenna coupler
1 TCT 23 Hammarlund coupler coil
1 Micarta 7x21x3/16-inch drilled and engraved panel
2 8629 Benjamin sub-panel brackets
2 192 Marco vernier dials
10 Eby engraved binding posts.

OPERATION

The operation of the Lynch-Hammarlund A-C Five receiver is identical with that of the D-C model. A slight readjustment of the neutralizing condenser may be necessary. While the design of the heaters on the Arcturus tubes is such as to provide for reasonable variations in line voltage, it is desirable that the heaters be lighted across a potential of 15 volts. This assurance is best effected by using an A-C volt-meter. However, if such an instrument is unavailable, the proper adjustment to the transformer voltage (generally effected by variable taps) can be achieved by noting the length of time it requires for the cold filaments to heat to normal operation. At 15 volts it will require exactly 30 seconds from the time the current is turned on to when satisfactory reception is secured.

Readers interested in building the A-C model of the Lynch-Hammarlund Five are referred to the preceding number of this publication for panel layouts and other constructional details.

Sparker: "Why do you favor the new invention combining the radio with the phonograph?"

Barker: "Well, you can silence both with one brick!"

Mr. Spinks: "Well, dear, I've quit smoking."

Mrs. Spinks: "Oh, you brute! That's just like you. I only need 10,000 more coupons to get a nice radio set!"

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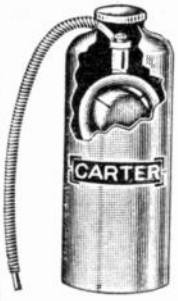
NEW ITEMS



Tube Shield and Shielded Connector

Consists of Tube Shield, Connector with Shielded Wire and Adapter Ring. For use with the new shielded grid tubes. Covers the entire tube and gives complete shielding. Tube shield, connector with shielded wire, and adapter can each be purchased separately.

Carter Tapped Resistors for A. C. Filament Circuits

Simple to mount, compact. ($1\frac{13}{16}$" long by $\frac{3}{4}$" wide.) In 6, 10, 20, 25, 40, 60 ohm resistances.

"Hi-Watt" Rheostats and Potentiometers

Heavy duty type dissipating 20 watts. Sturdily built, with positive and smooth working contact arm. ½ to 250 ohms.

New Wall Receptacle Jack and Outlet Plate

Has both aerial and ground jacks and a provision for a center A. C. receptacle for house current. Furnished in satin brass, bakelite or etched bronze finish.

Wire Wound Tapered Rheostats and Potentiometers

By increasing the spacing between the turns of resistance wire at narrow end of the tapered strip, straight line current regulation is obtained throughout entire travel of the knob. Especially desirable in A. C. circuits.

"IMP" Power Switch

One of the smallest switches made for 6 or 110 volt circuits. Quarter turn positive snap switch, compact and rugged construction. Complete with "on" and "off" name plate.

Also Manufacturers of—

ADAPTERS, Tube
"B" BLOCKS
CONDENSERS
- Buffer, Bypass
- Filter
- Mica Molded
- Block

HUM ADJUSTERS
JACKS
- "Hold-Tite"
- Short, Tip
- Receptacle
- Portable

KIT, VOLTAGE CONTROL
NAME PLATE
OUTLET PLATES
PLUGS
POTENTIOMETERS
- "Hi-Pot"
- "Hi-Watt"
- "Imp"
- "Midget"
- Tapered

RESISTANCES
- Adjustable
- Filament
- Fireproof, Grid
- Steel-Tube Vitreous
- Tapered
- Wire Wound

RHEOSTATS
- "Imp," "Tapered"
- "Hi-Ohm," "Midget"

STEEL-TUBE VITREOUS RESISTORS
SWITCHES
- Aerial and Ground
- Automatic Power
- Battery ("Imp")
- Dial Light
- Filament
- Inductance
- Jack, Lock, Pilot

VOLUME CONTROLS
- Aerial and Ground Type
- "Hi-Ohm" (carbon type)
- "Hi-Pot" (carbon type)
- Portable Auxiliary
- Tapered (wire wound)
- Speaker type

Carter Radio Co.
300 S. RACINE AVENUE
CHICAGO, ILL., U.S.A.

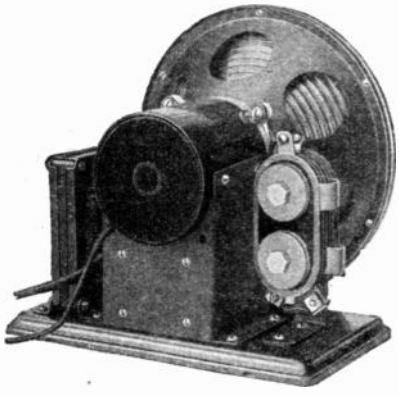
UTAH *Dynamic Power* SPEAKERS

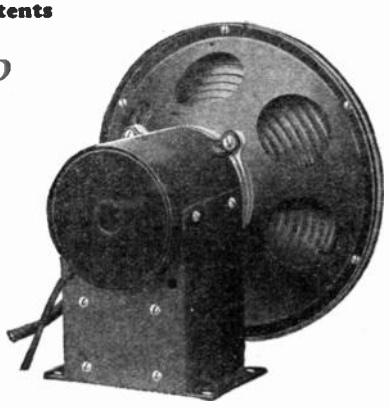
Licensed Under Magnavox and Lektophonic Patents

Raytheon Kino Lamp

A NEW NEON LAMP FOR TELEVISION RECEIVING SETS

$12.50





UTAH DYNAMIC SPEAKER

Model A-100—$50

Equipped with Westinghouse Dry Rectifier designed to operate with A. C. sets or direct from lamp socket. Size, width 9½ in., depth, 7½ in., height, 9 in.

Note — Specially processed corrugated cone. True reproduction under all conditions.

Dealers write for our proposition

UTAH DYNAMIC SPEAKER

Model D-200—Without Rectifier—$40

110 to 220 volts D. C. Field current consumption 45 to 90 milliamperes. Size, 8½ in. wide, 7 in. deep, 9 in. high.

Model R300 . . . . . $35.00

6 to 12 volts D. C. Field current consumption .5 to 1 ampere. Operates from A battery.

Write for descriptive literature

NEWARK ELECTRIC CO.

"Nothing but Radio"

226 WEST MADISON STREET
CHICAGO
Telephone
Dearborn 0083, 0084

Keeping Your Radio Set Up to Par

(Continued from page 49)

voltage of the B battery block depreciates to 35 volts it should be replaced. It is an excellent idea to replace all C batteries at least once each year, whether the volt meter shows a voltage drop or not.

Tone quality immediately suffers when filaments are worked too far below their rated points and also too high above their rated voltages. The standard 201-A tube will not reproduce tones satisfactorily if the filament voltage is allowed to drop below 4 volts or to exceed 5½ volts. This applies also to alternating current tubes, although the voltages, of course, are different. Wherever possible filament voltages of both A. C. and D. C. tubes should be measured and the voltage controlling devices should be adjusted so that the volt meter reads the amount of voltage specified by the tube manufacturer.

ANOTHER CAUSE OF DISTORTION

Just as improper C bias will spoil the tone quality of a receiver, so will variation in applied plate voltage distort this same tone quality. The receiver will not operate satisfactorily with a B battery or B eliminator furnishing about 45 volts to the tubes. In this condition the tube becomes a rectifier and as an amplifier is very unsatisfactory. Allowing plate voltage to fluctuate too much is about as bad as incorrectly applied grid voltage. The reader should bear in mind that plate voltages should be measured at the plate terminals of the tube sockets and that a correct reading cannot be obtained unless one of the newer type volt meters is employed, which has a resistance value of 1,000 ohms per volt.

Do not under any consideration allow anyone to sell you a volt meter which has a resistance value lower than this amount, as it will be utterly useless when it comes to testing plate voltages. Very often the volt meter requires more plate current, for proper operation, than the entire radio set. Plate voltage at the tube socket terminals will be materially decreased if the meter draws too much current at this point. The meter might read sixty volts, whereas in reality the tube might be receiving ninety volts or higher.

Another distortion point in receivers of the type employing A. C. tubes is the resistors which furnish biasing voltages. All resistors of this type should be by-passed by a condenser having a capacity of not less than two microfarads. Not only will the tone quality be greatly improved by the insertion of these by-pass condensers, but the apparent volume coming from the loud speaker will be much greater. These by-pass condensers need not be of the expensive type, as the highest biasing voltage in use at this time (on the 350 tube) is only 80 volts. Therefore, for all purposes, grid biasing resistors can be shunted by any inexpensive paper condenser rated at 90 volts D. C. working voltage.

Naturally a certain amount of distortion is produced in loud speakers of all types. The worst offenders are those of the receiver unit type in which the tapering paper horn has a regular or somewhat modified receiver unit affixed to its base and which serves as a sound producing device. Distortion develops in the diaphragm of the unit itself, in the incorrect taper of the horn and from the material of which the horn is made. A somewhat better loud speaker is one of the expontential type which makes use of a specially designed unit having mechanical features which tend to overcome the distortion produced by the diaphragm.

From a distortion standpoint the best loud speaker of all is a power driven dynamic cone. This speaker has no mechanical connection made between the small cone, which actually produces the sound, and the large electromagnetic driving unit. Although these units are quite expensive, they are well worth the investment, if one really wishes distortionless operation. There are on the market several fine speakers of the cone type which are mechanically driven and which produce comparatively clear music and speech. The writer would recommend one of these cone type loud speakers or one of the new air-chrome loud speakers.

This last mentioned speaker is coming into national prominence at this time, due to the fact that it sounds very good to the average ear and it produces tones which compare favorably with those coming from the larger power-driven dynamic cone speakers. The air-chrome speaker costs considerably less than the power-driven cones, which probably accounts for their unusual popularity.

THE MYSTERIOUS SEX

THE little woman with the big eyes began to pout. The big man with the little moustache stirred uneasily.

"Well?" he sighed, finally.

"Dora's husband," she began, "always takes her out at least *once* a week. And goodness knows how many times he brings home flowers and candy, even if it *isn't* her birthday."

"Tom likes society," he replied apologetically. "And he does plenty of things that make presents quite necessary."

"Helen's husband," continued the young matron, "loves company and they entertain ten times more than we do."

"Business," muttered her husband. "He sells real estate and mortgages and has to do everything possible to drum up trade."

The little woman with the big eyes twitched and twirled her handkerchief.

"Mary Potter's husband," she sniffed, "likes bridge and isn't ashamed to teach his wife how to play, either."

"Good gracious," exclaimed the big man with the little moustache, "just what do you want me to do?"

"I want some new clothes, of course. What on earth did you think I wanted?"

Veto Arouses Farmers to Action

(Continued from page 15)

throating at the market place has been responsible for the terrific losses visited upon agriculture.

Speaking from the organization standpoint, Milo Reno, veteran president of the Farmers Union of Iowa, expressed the belief that the President's veto would prove a blessing in disguise, if it stimulates the unionization of agriculture.

"Opinions have wavered between self-help and governmental assistance," Mr. Reno said. "The political appeal and the vision of a beneficient Uncle Samuel bearing gifts to our farm population has kept thousands of hard-headed farmers from joining the Union in its program of selling at cost of production plus a profit. Hoping against hope, the Farmers Union and the Corn Belt committee, representing more than a million organized farmers, threw every ounce of energy behind the demand for this McNary-Haugen bill. They won the fight in the House and in the Senate only to have the work of seven long years characterized by the President as the product of 'fools, deceivers and charlatans.' " Commenting upon the proposal of Governor McMullen that a hundred thousand farmers march to the Kansas City convention, Mr. Reno expressed doubt that anything could be accomplished by such action.

It is the universal belief of corn belt farm leaders that the action of President Coolidge in vetoing the McNary-Haugen bill will bring about an upheaval in the ranks of the Republican party. Just how this will come about is uncertain, but the American farmers are not Roumanian peasants and will not be pettifogged of bamboozled into any senseless political gestures.

Some Editorial Short Waves

(Continued from page 56)

can be operated independently without interference, providing the wattages are cut down to a minimum and the transmitting voltages are increased.

"There are two important factors in radio transmission—pressure and power. The first, gives distance and separates waves. The second, the increased volume. Increased wattage does not mean increased distance, but volume and trouble; while pressure or voltage means increased distance and supplies side pressure to separate waves.

"If all stations were compelled to confine their power to five watts, and vary the active voltage pressure for their distance, then they would be able to cover the whole country from coast to coast without wave interference. For example, 50,000 actual voltage potential pressure with only five watts of power will do the trick, provided the transmitting stations are properly constructed and the receiving sets are rebuilt, so they do not re-radiate."

WCFL to Broadcast Pictures

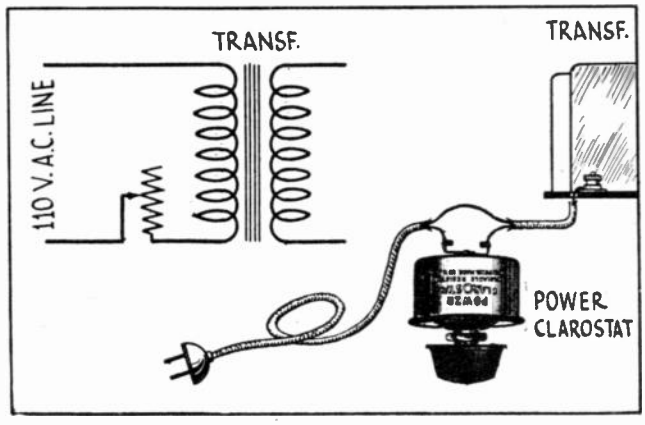
Experiments are now being conducted in the WCFL laboratory and workshop on the Navy Pier, Chicago, with television broadcasting apparatus. It is expected that these experiments will be completed within a short time and that before many weeks Station WCFL will be broadcasting pictures. Full announcement will be made in the September issue of WCFL Radio Magazine.

Build your television receiver and get ready to "tune in" on the first pictures.

Line-Voltage Control

THE problem of compensating for line-voltage fluctuations is one now receiving careful consideration. In many cases the power transformer is provided with several primary taps, so as to make the necessary allowance for different line voltages. However, since it is inconvenient to change connections, some variable resistance means must be employed in the primary or input circuit.

A simple solution is a suitable variable resistor in the input or primary circuit. The resistance value must total several hundred ohms, in order to have a regulating effect in connection with the usual electrified receiver or radio power unit. When such primary resistance is employed, the lowest voltage tap on the transformer primary should be utilized, with the series resistance serving to reduce the input voltage to the desired point. The power clarostat, with a 25-500 ohm range, provides a satisfactory line-voltage control when arranged as shown in the accompanying diagram.



Aside from compensating for line-voltage fluctuations, the primary resistance also serves as a group control for the radio receiver and amplifier. Instead of having to raise or lower the voltages of individual circuits supplied by socket power, it becomes possible to raise or lower all voltages in a single group. This is highly desirable, especially where circuits have been carefully balanced and must be maintained in step.

Speaks To Foreign Amateurs

A YOUNG American radio amateur who has been carrying on conversations with thirty-four nations reaching into the far corners of the world is Allen F. Prescott, a student at the University of Chicago.

Much of the radio traffic carried on by Prescott is with the Donald McMillen station on the vessel Bowdoin in the Arctic ice at Anatolok Bay, Labrador. Messages from this crew are relayed by Prescott to all parts of the United States.

Besides holding frequent conversations with the McMillen party, Mr. Prescott has conversed with the station operated by the University of Michigan party wintering in Greenland and has also talked with a Norwegian whaler within 13 degrees of the Antarctic

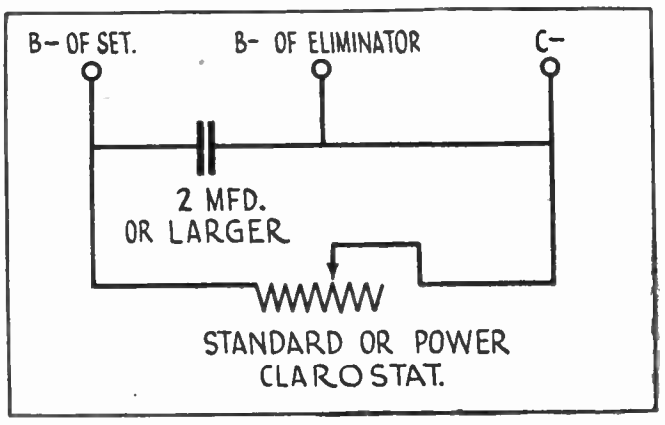
circle of the South Pole in the Antarctic sea. He has many radio friends in Australia and New Zealand with whom he communicates.

Although he has talked with amateurs in many countries, Prescott says that his most interesting experience was in following the ill-fated course of the British barkentine, E. R. Sterling, enroute last December from Australia to England. By arrangement with its radio operator, Prescott conversed with the vessel daily in its course around the Cape of Good Hope and up the west coast of Africa.

Then one night he heard an S O S sent out as the ship was wrecked off the Cape Verde Islands. He took a graphic story from the radio operator, learned some of the crew had been killed and then the ship's station became silent.

C Battery Eliminator

WITH the use of the more recent rectifier tubes, such as the Raytheon BH in place of the old B type, and the 280 filament rectifier in place of the 213, there is usually a higher voltage obtainable from the B-power unit than is required for the proper operation of the —71 power tube. The output voltage, with the average current drain, may often run as high as 220 volts, or 40 volts higher than is required for the maximum safe operation of the —71 power tube. This being the case, a C-battery eliminator or grid-biasing tap is not only desirable in connection with the radio power unit, but is actually a precautionary measure,



since it reduces the total voltage available to safe limits.

In the accompanying sketch is shown the simplest form of C-battery or grid biasing tap for the usual B-power unit. The components comprise a small panel with three binding posts, a 2 or 4 mfd. condenser of 160-volt rating, and a standard or power type clarostat. The connections are made as indicated. The three binding posts serve to connect with the minus B terminal of the set, the minus B terminal of the B-power unit, and a C minus connection to the power tube. Even with a voltage drop of 40 volts to supply the C or grid biasing requirements, there is still ample total voltage to operate the power tube with most of the present-day B-power units. If not, the —12 type power tube may be used instead at its full efficiency

The New Isotone

(Continued from page 69)

frequency and phonograph amplifier. One of the unusual features is the audio filter which is connected into the detector plate circuit. This consists of a resistance and a by-pass condenser, and its function is to stabilize the audio amplifier and to eliminate a lot of troublesome noise which would otherwise be present.

The first audio frequency transformer of the audio amplifier proper has a three to one ratio and it feeds into a UX 112-A tube. This in turn feeds into an input transformer of the push-pull type which is followed by two UX 171-A tubes. All of the audio transformers are specially designed so that the amplification of low notes is brought up to maximum and the higher notes are reduced.

The advantages of the push-pull audio stage are quite well known. Any undesirable harmonics which might build up in each individual tube are automatically cancelled out by the other tube. The push-pull stage balances itself at all times. It may be said that such an amplifier operating under normal conditions will reproduce just exactly what is put into it and not develop any peculiar musical tendencies of its own.

Another highly desirable feature of an amplifier of this type is that the plate current being applied to the tubes does not swing. This is because the two tubes are always operating at opposite halves of the A. C. cycle. When the plate current is at its maximum on one of the tubes it is likewise at a minimum on the other tube at the same instant.

Due to the automatic switching arrangement in the receiver, the phonograph pickup can be left connected to the microphone transformer at all times.

The Isotone is an instrument that your wife can tell her friends about. The pictures speak for the appearance of the front panel. This panel may be obtained in bakelite or in one of the artistic Lignole designs. Lignole is a trade name and these particular panels are manufactured of wood beautifully finished in walnut and mahogany with inlaid decorations of white cedar.

The appearance of the receiver behind the panel is very brilliant. All of the copper cans are buffed to a jewelry finish, and this beautiful gloss is perpetuated by a heavy coating of jeweler's lacquer. The effect of these highly polished shielded cans with their beveled tops against the satin finish steel sub pans is unusually beautiful. Since this receiver has standard dimensions of 7" x 26" x 10" thousands of cabinet variations may be realized.

The designers of the Isotone have promised the writer some interesting information on a complete power supply for the instrument. They have in mind a power unit which will furnish A, B and C power direct to the cord which plugs into the Isotone. This information will probably not be available for a couple of months. If this material is available at that time the writer will be pleased to present it to his readers in the September issue of this magazine.

WCFL Will Broadcast Pictures

Get your television receiver ready. Station WCFL is preparing to broadcast pictures. Full announcement will be made in the September isue of WCFL Radio Magazine.

The Scott Shield Grid Nine

(Continued from page 21)

The volume is controlled simply by turning a knob one way or the other and it can be regulated from a mere whisper up to full orchestral volume. Tone quality is perfect throughout the whole range.

Another feature that will appeal to those who have the old type phonographs is the fact that one can use the power amplifier for the phonograph records. The combination console illustrated is one especially designed to hold a phonograph turn-table and electric pick-up in addition to the radio. This very convenient arrangement makes it possible to play your phonograph records.

This new receiver is powerful and sensitive enough to satisfy the desire of the most ardent DX fan for long distance reception and its tone is beautiful enough to completely satisfy the fan who wants above everything else, a receiver with good tone quality.

B Eliminator Designs Change

(Continued from page 37)

the drain is predetermined, but will also provide the correct voltage in the event that the load cannot be predetermined or changes when tubes are added or when tubes are changed. In this day of variance in tube design and the addition of external radio and audio amplifiers, variable voltage distributing resistances are absolutely essential.

The changes incorporated in present B eliminators show a better understanding of the function of the voltage distributing resistances. Fans now seem to realize that all of the current output of the eliminator does not flow through the resistance and consequently the voltage reducing resistances are selected with greater economy, that is, the wattage rating of the resistances is not two or three times the rating necessitated by the current flow.

The potentiometer type of output circuit has been definitely accepted as best suited since it affords a constant load upon the rectifier and filter circuits, improving voltage regulation and protecting filter condensers against high peak voltages.

When a woman borrows trouble trust her to bring it right back.

"Did he give you the benefit of the doubt?"
"Sure. He called me a damned liar."

They call her Dial because someone is always trying to tune in with her by turning her head.

Then, there, is the absent-minded professor who twisted the cat's head, stepped on its tail and thought he was getting Spitzbergen, Sweden!

Build Your Television Receiver

Build your television receiver—Station WCFL will soon commence broadcasting pictures.

Destroy *the* Radio Trust

By OSWALD F. SCHUETTE
Exec. Sec. Radio Protective Assn.

AS A result of congressional investigation, the newspapers have printed large headlines about the "Three Billion Dollar Radio Trust." They have told about its flagrant defiance of the anti-trust laws. But nothing has been done to dissolve the trust or to put its responsible officials in jail.

Some time ago, it was announced that the Department of Justice had begun a long delayed investigation of this trust. But the authorities at Washington since have been strangely silent. Maybe they fear that they will find something, some new Teapot Dome scandal, for instance, and that it will be an unpleasant revelation in this presidential year.

Seven years ago, Attorney General Daugherty of the Teapot Dome administration gave the Radio Trust a letter of immunity against anti-trust prosecution. Daugherty is gone; but his promise of immunity is apparently being kept inviolate by his successors.

For four years, the Federal Trade commission has been "investigating" this same Radio Trust. But it has brought the trust no nearer to justice.

Because the Radio Trust has "hogged" the broadcasting channels of the nation, congress ordered a reallocation of all wavelengths. In the course of this reallocation, charges were made to the Federal Trade commission that the Radio Trust stations were violating the "anti-monopoly" clause of the Radio Act, and that their licenses, therefore, should be revoked. But nothing has been done.

PATENT POOLING VIOLATES LAWS

Testimony given before the committees of both houses of Congress revealed flagrant violations of the anti-trust laws by the patent pooling of the American Telephone and Telegraph company, the General Electric company, the Westinghouse Electric and Manufacturing company, and the Radio Corporation of America. But nothing has been done.

A bill was introduced by Senator Dill of Washington to forfeit patents used by corporations convicted under the anti-trust statutes. The Radio Trust rushed its highest priced attorneys to Washington to fight this bill. It was as if a delegation of bootleggers had hurried to the capitol to fight against the measure to confiscate automobiles used to violate the Volstead law. The Dill bill is still pending.

Against the Radio Trust, the people seem helpless.

And what is this Radio Trust?

It is the most powerful monopoly that has ever defied the law!

It has three billion dollars in resources!

It is made up of the American Telephone and Telegraph company, the General Electric company, the Westinghouse Electric and Manufacturing company, the United Fruit corporation, the Radio Corporation of America, the Radio Marine Corporation of America and the National Broadcasting company—to say nothing of a long list of other and less known subsidiaries.

"Patriotism is the last refuge of the scoundrel!" That goes for the Radio Trust. To cloak its flouting of the law, it pretends to be patriotic. It hires ex-generals of the army and ex-admirals of the navy, and ex-colonels and ex-captains, to fortify this false pretense of its patriotism. It pretends that it was created at the request of the government of the United States. That pretense is false! The records at Washington prove it a lie.

The Radio Trust pretends that it has created the art of radio. That, too, is false. The achievements of the independent radio genius of America, which that trust is trying to throttle, attest the falsehood of its pretense.

PATENT POOLERS SHOULD BE JAILED

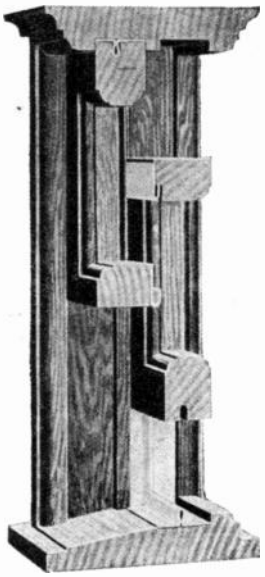
The Radio Trust pretends that the ownership of a large number of radio patents entitles it to control the radio industry of the United States. It owns these patents only by virtue of an illegal pool of competing patents, maintained in defiance of the anti-trust laws. If the Department of Justice did its duty, the men who made those agreements would be in jail, and the patents, restored to their original competitive owners, would serve to build up instead of destroy the art of radio.

The Radio Trust pretends that the government has sanctioned its monopoly and its defiance of the anti-trust laws. With brazen effrontery, it exhibits a letter written by ex-Attorney General Daugherty to one of its lawyers, Ex-Ambassador Sheffield, as a warrant for its immunity. The signature of Daugherty alone is enough to prove how false is such a pretense of governmental sanction.

The Radio Trust pretends that it has helped the independent radio industry by granting licenses under some of its patents. These licenses exact a royalty of 7½ *per cent on the turnover* of the licensees, with a minimum of $100,000 a year each. The public that buys these licensed sets must pay that royalty blackmail as its tribute to the treasury of that grasping monopoly.

The Radio Trust pretends that it has done a public service by establishing highpowered radio stations to broadcast its radio programs, and insists that it has therefore earned a right to maintain these stations despite the prohibitions of the anti-monopoly laws. That is another false pretense. Big advertisers have paid the cost of the programs and the public has been

(Continued on page 98)



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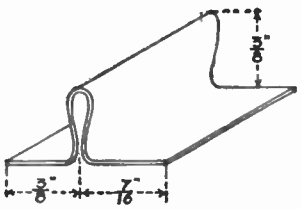
Ninety per cent of all sliding windows stick or rattle. Federal Metal Weather strip eliminates sticking and rattling and also *absolutely* keeps out all rain, wind or dust. No drafts can pass this perfect weatherstrip. You are entitled to the comfort it gives in winter. Installed now, you save in cleaning bills all summer. Write or phone for circular.

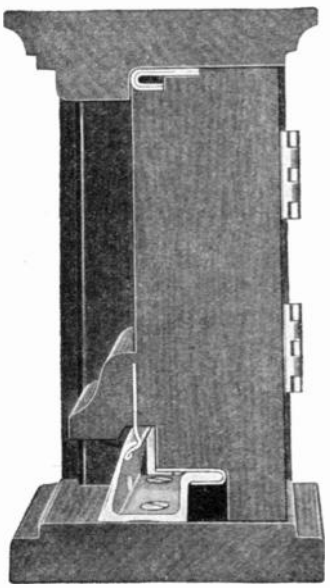
Above is cross section of a standard, sliding window, protected with Federal Metal Weatherstrip.



This shows one of the many styles and sizes we carry in stock at our mammoth Fullerton Ave. Warehouse and Plant.

Sun Porch Swinging Windows

usually stick and jam. Federal equipped windows swing easily—no sticking—no rain can blow through the cracks at top, bottom or sides. Keep out the dirt that you now find seeping in. The cost is very low. Ask for our estimator to call. No obligation.



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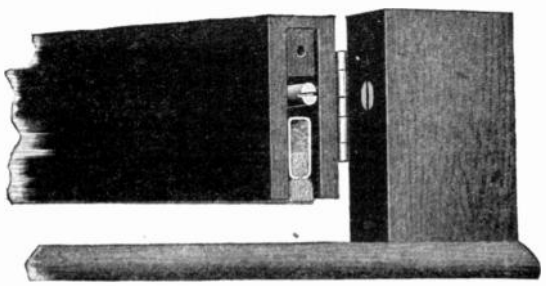
Phone or write us for an estimate. No obligation; we are ready to come at any time. Don't wait—get the best weatherstrip service in town—it costs no more. We are installing Federal Metal Weatherstrip in hundreds of windows and doors of buildings all over Chicago. *Satisfaction guaranteed!*

Phone Spaulding 4660 today!!

Dept. 6-L



A tight fit at the bottom of the door. Can't push up the ends of rugs and carpets. Used on entry doors, it clears a door mat. Keeps out all dust and rain. Used inside it insures privacy—acts as a sound deadener. Hospitals are large users of this self-adjusting door bottom.

Sold and Installed in Chicago and Vicinity by

Metal Weatherstrip Products Company

4538-4558 FULLERTON AVENUE CHICAGO, ILLINOIS

The Strange Adventure *of* Adolph Gooch

By
EDWIN BAIRD

"WELL, bless my eyes,!" delightedly exclaimed the smart-looking stranger, rising from his seat in the smoking car. "If it isn't McWhinney! Of all men! How are you, Mac? I haven't seen you since—"

The ungainly young man with the pasteboard suitcase, who had just boarded the train at Elmwood Junction, smilingly interrupted:

"I arrest you in the name of the law," said Gooch, and heedless of his victim's violent protest, handcuffed him.

"I guess you're makin' a little mistake, Mister. My name ain't McWhinney."

"What!" The polished stranger, still shaking hands, scrutinized the yokel's face. Then he laughed apologetically. "By George, you're right! You're *not* McWhinney! There's a strong resemblance—fooled me completely—but I see now your countenance is more intelligent. I hope you'll pardon my nasty blunder. Meanwhile, won't you sit and smoke with me? My name," he added, proffering an excellent cigar, "is DeGolyer—Thaddeus Meadowcroft DeGolyer."

"Mine's Adolph Gooch," said the gawk, sitting down, lighting the cigar and placing his feet on the cheap suitcase. "You in the cigar business, Mister?"

"No," smiled Mr. DeGolyer, "I'm chief of the Secret Service. McWhinney was one of my best men."

"Huh?"

"And I need a good man to take his place. What's your line of work, Mr. Gooch?"

"Why," said Mr. Gooch, visibly flattered, "I ain't never done nothin' much but work on pa's farm. But now I'm gonna look for a job in the city."

"I see. How would you like to be a detective?"

After recovering from his shock, Mr. Gooch contrived to gasp: "I—I'd *like it!*"

"Good! I'll put you on my payroll at once"—plucking from his pockets some important-looking documents. "Your salary, at first, will not be large—only six hundred dollars a month—but there are many perquisites. McWhinney often earned five thousand a month. You can do likewise."

The pop-eyed Gooch, too dazed for speech, gulped and nodded. Then he signed a paper, wrote thereon his age and birthplace, and whispered eagerly:

"And now am I a sure-enough detective?"

"Not quite. You haven't your equipment yet." DeGolyer exhibited a pair of handcuffs, a microscope and a bright tin star. "The Secret Service," he explained, "requires a slight deposit on these—a small matter of one hundred dollars."

Mr. Gooch evinced dismay. "Mister, I'm sorry. I been savin' my money for thirteen years, and all I got is ninety-three dollars and eighty-four cents."

"Oh, well, give me what you have, and I'll make up the remainder."

The grateful Gooch, his radiance restored, joyously removed his shoe and therefrom took a ragged bankroll, which DeGolyer promptly pocketed, magnanimously declining the eighty-four cents.

"You are now," said he, "a full-fledged detective, authorized to arrest any person who breaks the law. For each arrest

you will receive a bonus of fifty dollars. Take all law-breakers to detective headquarters, and collect your bonus there."

He then enumerated some of the laws—and there was an amazing variety of them, it seemed—that were commonly violated; and Mr. Gooch, agape, listened breathlessly.

"And watch out for cigarette smokers," he was warned. "Don't let one of them get away."

"Is it agin the law to smoke cigaroots, Mister?"

"Absolutely! Cigars and pipes are permitted, but cigarettes —*no!* Arrest every person you see smoking one."

They parted at the city railroad station, DeGolyer telling him to call tomorrow at headquarters for expense money and a month's pay in advance.

Mr. Gooch, alone, wiped his perspiring brow. He was feeling a bit feverish.

Suddenly, though, he grew alert. His gaze became riveted on a slender youth at a nearby ticket window. The youth was carrying a black leather valise—*and smoking a cigarette!* The observing Gooch noticed he smoked it nervously, his mien furtive, clearly denoting fear of arrest. Then, pinning the tin star to his coat, he briskly approached the perturbed young man, and seized him by the shoulder and snatched the cigarette.

The young man whirled round and tried to wrench free, but he hadn't a chance with the stout country lad.

"I arrest you in the name of the law" said Gooch, and, heedless of his victim's violent protests, handcuffed him and called a taxicab.

"Detective headquarters," he told the taxi driver.

As the taxicab bore them away, a police department automobile whirled to a stop at the curb, and a squad of plain-clothes officers leaped out, raced inside the depot, spread swiftly through the crowds, eagerly scanning every face, quietly questioning the railroad employees, anxiously searching everywhere.

They were still thus searching, fruitlessly, when Adolph Gooch entered the city detective bureau and inquired for "Chief DeGolyer."

"Never heard of 'im," grunted the desk sergeant; and then, all at once, this same desk sergeant sprang from his stool and started in unutterable astonishment at Gooch's manacled prisoner. "Merciful heaven!" he gasped, and, seizing the prisoner and the black valise, rushed both into an adjoining room.

Gooch sat down and waited for his fifty-dollar bonus. The taxi driver also waited—for a similar purpose.

From the adjoining chamber came sounds of excited telephoning. In ten minutes two hasty gentlemen dashed in from the street, and hurried to this chamber and closed the door.

Presently these two emerged, with Pat Duffy, chief of detectives, and addressed themselves to Gooch.

"I congratulate you," said one, producing a fountain-pen and check. "To whom shall I make the check payable?"

"Adolph Gooch." And he was thinking of what they'd say back home when they learned how easily he could make fifty dollars.

The man filled out the check and gave it to Gooch; and Gooch looked at the check and nearly swooned. He rubbed his eyes and looked again. It was still the same. It was a certified check, payable to his order, and it called for $27,500!

"Well, Mister," he said, when he felt he could trust his voice, "this is real decent in you; but I didn't hardly expect—"

"It is in accordance with our agreement," said the man. "We offered a reward of twenty-five thousand dollars for the recovery of the nine hundred thousand dollars worth of bonds that were stolen from our bank yesterday, and an additional reward of twenty-five hundred for the arrest of Russell Joyce, the bank clerk who stole them. We find the bonds are all intact, and young Joyce is in custody. I trust everything is quite satisfactory?"

"Yes, Mister," said Gooch, "everything sure is. I got all the money I want now, so I guess I won't wait for my first month's pay. I'm goin' right back to Elmwood Junction and show 'em a little speed."

Latest Shrieks of

Sutanly, Sutanly

Mandy: "How come, Honey, yo' all smacks yo' mouf so when yo's eatin' watahmelon?"

Zeke: "Cause hits watahmelon, chile, daas how come, dass how come."

* * * *

To Be Congratulated

Mr. Condenser: "I've gotten a lot out of this old set."

Radio Salesman: "You're lucky. Most people put a lot in their old sets!"

* * * *

There's a Limit

A little nonsense now and then
Is relished by the best of men.
Some announcers well might heed this rhyme
We don't like nonsense all the time.

* * * *

Perhaps It Is

Mae B. Bright thinks that a hope chest is something you sit on beside the radio while trying to get that special network broadcast you read about in the evening paper.

* * * *

This Restless Age

"My wife just can't learn to park the car."

"Mine keeps ours always on the go, too."

* * * *

Getting Station W-I-N-K!

Snap: "She's some broadcasting baby."

Snapper: "Yes, she has a broad cast in her eye!"

* * * *

N. G.

"Come, Dolly, hold my hand," said I.
"Oh no, I can't," said she;
"With aces up across the board
A straight's no good to me."

* * * *

Cash Please

Mister: "That hat is becoming."

Missus: "Yes, it's becoming antique. I'm glad you remind me of it. I'll buy another one today."

* * * *

So Homelike!

Twirl: "So your radio set kept you company while your wife was away?"

Twirler: "Yes, I pasted her picture over the end of the loudspeaker and didn't miss her at all!"

Preventive

She: "I'm afraid I'm getting a double chin."

He: "Have you tried necking?"

* * * *

The Usual Greeting

Mother: "Johnnie, I'm shocked. Did you stick your tongue out at that man who just passed?"

Johnnie: "It's all right, Mama—it was the doctor."

But It's Flat

Kip: "There's something on your nose."

Gyp: "Oh, yes. That's my face."

* * * *

To Be Expected

Ethel: "I hear you've been making some nasty remarks about me."

Clara: "Who told you that?"

Ethel: "Oh, a friend of ours."

* * * *

Question

Tommy: "I'm doing calisthenics, now."

Tessie: "Will you be able to sell them?"

* * * *

Regular Procedure

Husband: "I have a confession to make."

Wife: "Wait till I call in the cook; she used to be a stenographer."

* * * *

No News

Motorist: "There's something wrong with my clutch."

Maiden: "I could have told you that six weeks ago."

* * * *

As in Every Family

"How's your son with the car?"

"Practically every night."

Official Information

Nick: "I heard you had trouble with your gall bladder."

Hupp: "Oh, that came out all right."

* * * *

Know Your Women

Feed a fickle woman taffy
Feed a heavy woman grub,
Feed a skinny woman diamonds,
Feed a cullud woman lub.

* * * *

Peach of a Message

"Lissen, George, Pa didn't pay the light bill and they shut off the—"

"I'll be right over, girl, right over."

* * * *

Ambition

"Why do you want to drive a bus when you get big, Bobby?"

"Oh, I dunno—just to scare people, I guess."

* * * *

Worse

Hikk: "A mule down south got a colt."

Kikk: "That's nothing, the ass next door got a shot gun."

* * * *

Unbroken Monotony

"Did you find California all that it was cracked up to be?" the returned Eastern tourist was asked.

"No," he replied, "There wasn't a single earthquake while I was there."

* * * *

Squash!

Bim: "Do you think the radio will take the place of the country newspaper?"

Bam: "I doubt it. You can't swat a fly with a radio set!"

Man-Made Static

A Sure Sign

Sue: "What makes you think that Mary is thinking of getting married?"

Ethel: "Well, every time the Wedding March comes in over the radio she gets up and marches about the room like a bride going down the aisle!"

* * * *

Thoroughly Aired

Will: "So they had a radio wedding?"

Bill: "Yes, and a broadcasted divorce!"

* * * *

Now! Who Threw That Cabbage?

Tube: "In that new radio play a murder is supposed to be committed just before it begins getting on the air."

Crystal: "Well, there's nothing new in that. A jazz band always murders something as an overture!"

Ouch!

He: "What do you think of my new bathing suit—no so bad, eh?"

She: "Oh, it's pretty snappy for a poor fish."

* * * *

Man!

He: "Jenkins got married two days after he met the girl."

She: "Yes, and it took him six weeks to pick out a radio."

Not So Dumb!

Smith: "That dog of yours seems to be a faithful companion."

Smithers: "Yes, and very useful. When I'm tuning in my set he sits beside me and licks my fingers for me!"

* * * *

Quite So, Quite So

Mrs. Sparker: "What happened when you knocked the radio off the table last night?"

Mrs. Parker: "Oh, it sounded like my husband had gotten China and Jerusalem at the same time when he started broadcasting about me being so clumsy!"

* * * *

The Sting

Tom: "That girl gave me the wrong number."

Tim: "Anyone can make a mistake."

Tom: "Yeh, but she's no telephone operator."

* * * *

Modern Adaptation

Bobby: "Pa, what is an idle worshiper?"

Pa: "A man who gets his religion via the radio on Sunday while lying in bed at home!"

* * * *

As Per Usual

Prospect: "What are your terms?"

Instalment Dealer: "As much down as you can give and as much each week as we can get."

* * * *

Of Course Not

Doctor: "You must quit drinking and smoking, give up late hours and refrain from dancing."

Patient: "But, Doctor, I don't indulge in any of those things."

Doctor: "Then there's no hope for you."

What'd He Mean?

Station Manager: "What did you think of the timbre of the voice of that new soprano we used last night?"

Pianist: "Oh, I thought she was sawing it!"

* * * *

Broadcast Lifesavers

Friend: "What are the chief supporting factors of your station?"

Announcer: "Cigarettes, chewing gum and automobiles!"

* * * *

Such Wifely Obedience!

"Boo-hoo," sobbed the young wife on her mother's shoulder. "He-he t-told mum-me to go t-to the devil."

"And what did you do?" indignantly asked her parent.

"I came right home t-to y-you," replied the daughter.

* * * *

Advice to Bargain Hunters

Phil: "Where can a fellow pick up a cheap aeroplane?"

Carl: "Oh, wherever one happens to fall, I suppose."

* * * *

The Real Low Down

Sammy: "Pa, what did you mean when you told ma that you had the 'low down' on that radio set she wants you to buy her?"

Pa: "Oh, I found out the smallest amount they will accept as a first payment on it!"

* * * *

No Hot Music Coming In!

In days of old,
Though girls were cold,
Sheiks sat contented.
They sat that way
For in that day
Radio sets had not been invented!

At Mother's Knee

Mrs. Blib: "Do you believe that a child can be raised without the strap?"

Mrs. Blab: "Absolutely! I never use anything but a hair brush."

* * * *

Encouragement

Play your sax
And never cease,
Papa wants to
Break our lease.

Force of Habit

New Arrival: "So this is hell, eh? Isn't it rather crowded down here?"

Old Timer: "Yes, it is. You see, we got a Los Angeles real estate man recently, and he's been advertising the place a bit."

* * * *

No Evidence

She: "Are you really a medical student?"

He: "Yes, certainly."

She: "You haven't learned much about hearts yet, have you?"

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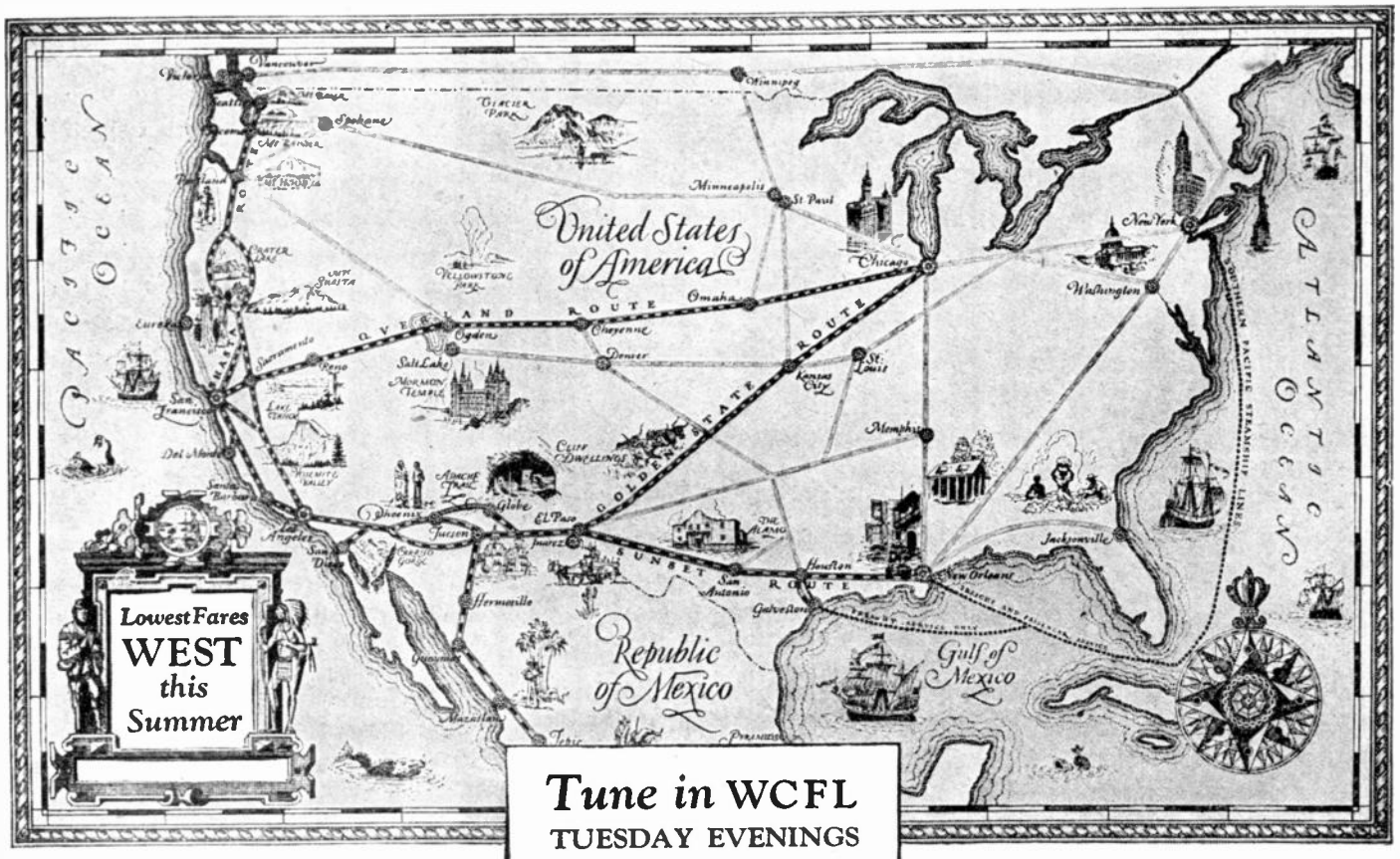

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GOLDEN STATE ROUTE, the direct line from Chicago and Mississippi Valley cities to Los Angeles, San Diego (through Carriso Gorge) and Santa Barbara — via Kansas City and El Paso, over prairie, mountain, painted mesa;

OVERLAND ROUTE (*Lake Tahoe Line*), shortest route across the center of the continent via Omaha and Ogden, crossing Great Salt Lake by rail, over the Sierra Nevada, along Donner Lake, and down through American River Canyon and the picturesque gold country of '49 days to San Francisco; and

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Over each route is operated, among other fine trains daily, a premier train unsurpassed in service and appointments.

Southern Pacific agents are in nearly all large cities. Let them help you plan your trip.

Write your name and address in the margin below, tear off and mail to E. W. Clapp, traffic manager, Dept. X-1, Room 1022, 310 S. Michigan Boulevard, Chicago, for illustrated booklet, "How Best to See the Pacific Coast."

Southern Pacific

Radio Beacon Guides Airplanes

MUCH of the uncertainty of night aviation and flying in foggy weather is eliminated by a directive radio beacon device, recently perfected by the U. S. Bureau of Standards. Within a radius of fifty miles the avaiator is guided unerringly, constantly warned of any deviation, either to the right or the left, from his proper course. The value of the new invention is apparent.

The broadcasting is done by a special kind of radio station. Instead of a single antenna, it uses two loops, placed at an angle to each other. Each antenna emits a set of directive waves—that is, waves that are stronger in one direction than others. The sets of waves are modulated at different frequencies.

The use of headphones for receiving the guiding radio signals is eliminated, the recording being done by two vibrating reeds on the airplane control board. These reeds are white-tipped on a dark background. When vibrating they appear as vertical white lines. The reed on the right is tuned to a frequency of 65 cycles and the one on the left to 85 cycles. If the lines appear of equal length, the pilot knows that he is keeping to his course. If he deviates to the right, the signals from that direction will come in stronger and the line on the right will lengthen. When the deviation is toward the left, the line on that side lengthens.

The greatest usefulness of the beacon is within a range of thirty miles from the sending station. However, it is reliable at night up to fifty miles. Beyond 100 miles the signals frequently are unreliable.

The receiving set is simple, light and is proof against the engine ignition interference. In place of a trailing wire, it employs a short vertical rod for an antenna. The same set and antenna can be used to receive telegraphy, telephony and aural interlocking beacon signals. The visual indicator plugs into the set just as do the headphones.

The first directive radio beacon station to be erected by the government is the one at College Park, Md., and is pictured on this page. Another is in operation at Bellefonte, Pa. The services of both stations are available to all government and commercial planes equipped to receive the signals.

Recently the government has awarded contracts for six more radio beacon stations, twelve marked beacons and twelve radio control stations, to be placed along established air routes. These will augment the seventeen radio stations along transcontinental air routes. Reports on weather conditions from intermediate points are collected at these stations and are furnished to flyers. Thus the flyers are warned of local storms.

The directive radio beacon receiving set used on airplanes is simple, compact and light. It can also be used for receiving radio and wireless messages and aural interlocking signals.

At left — First directive radio beacon broadcast station erected by government at College Park, Md. Note the queer arrangement of the antennas. Contracts have been let for six more of these stations.

And Now Radio Television

(Continued from page 11)

hand. By means of this button, of the bell ringing type, the picture may be held in the field of vision with a little practice, as naturally after a time as driving an automobile or steering a bicycle.

The reproduced picture or object has a pink color, which is characteristic of the neon gas used in the lamp. D. Farlan Moore, inventor of the lamp and an engineer at the Edison Lamp works of the General Electric company, found in early work that this gas was most efficient and most sensitive for reproducing a light which will go on and off in a millionth part of a second.

The transmission system is of the type using a disc with spiral holes, a duplicate of the disc in the receiving machine. A spot of light is projected on the object through the moving disc and the reflection of this light is intercepted by photo electric cells, which convert the light to electric waves, ready for the short wave transmitter.

Radio Speeds Operation of Trains

(Continued from page 19)

pipe mounted around the water tank of the tender. It is supported on insulators about 12 inches above the metal framework and is so low that it does not interfere with taking on water and coal. On the caboose a simple wire antenna is provided.

Before leaving the Selkirk yards the observers inspected a similar type of radio telephone transmission in use there on a switch engine serving the hump over which freight cars run in the classification process. In this case the hump locomotive is equipped with a radio receiver and loud speaker, and the engineeer is directed by voice instructions from the yard master direct. This apparatus has been in service for several months and it is giving very satisfactory results, particularly in stormy or foggy weather, when the older signal methods were difficult to carry out.

Destroy the Radio Trust

(Continued from page 90)

lulled into believing it was the beneficiary of trust benevolence. A dangerous benevolence! What $3,000,000,000 trust would not pay such a trifle to entrench its illegal monopoly?

The Radio Trust is the greatest menace of the hour to our democratic institutions. It endangers the safety of the republic.

The Radio Trust seeks a monopoly of communications, of broadcasting, of manufacture. It destroys its competitors and calls it public service.

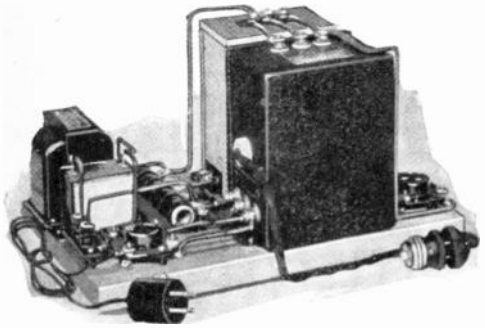
It levies a tribute of blackmail on the public purse, and calls it patent royalty.

It defies the law, and calls it patriotism!

The Radio Trust is a challenge to the people of the nation.

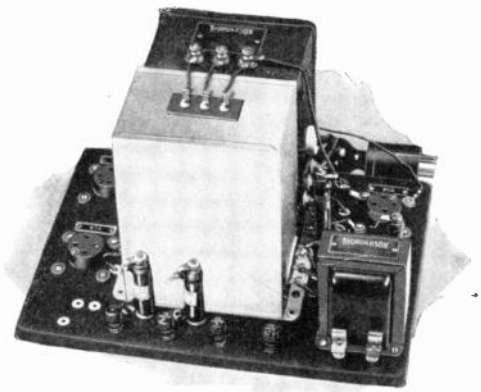
The Radio Trust must be destroyed!

How's Your Old Audio Amplifier



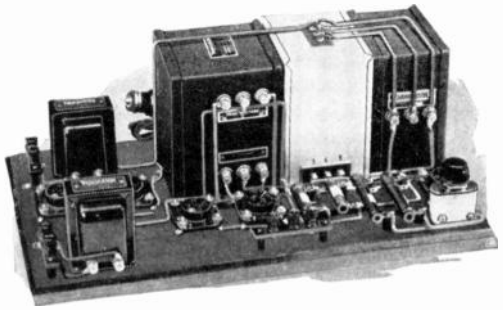
THORDARSON 171 TYPE
POWER AMPLIFIER

Built around the Thordarson Power Compact R-171, this power amplifier supplies "A," "B," and "C" current for one UX-171 power tube and B-voltage for the receiver. Employs Raytheon B. H. rectifier.



THORDARSON 210 TYPE
POWER AMPLIFIER

This amplifier, mounted on a special metal chassis, uses the Thordarson Power Compact R-210. Provides "A," "B," and "C" current for one UX-210 power tube and "B" voltage for the receiver. Employs one 216-B or 281 rectifier.



THORDARSON 210 PUSH-PULL
POWER AMPLIFIER

This heavy duty power amplifier operates two 210 power tubes in push-pull and has an ample reserve of power for "B" supply for the heaviest drain receivers. Built with Thordarson Power Transformer T-2098, and Double Choke Unit T-2099.

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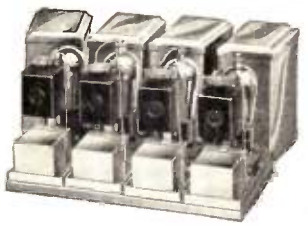

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