Tuning for Beginners-Flewelling-Portable Set

taulo

SATURDAY, JUNE 16, 1923

AIR USED TO AID REDS

DENY AIR SERMONS HURTING CHURCHES

'AWAKEN CARELESS SOULS' -BOSTON CLERGY

Opinion Crosses Opposition Stand Taken by Minneapolis, Minn., and Newark, N. J., Ministers

BOSTON, MASS.—Boston clergymen differ with Rev. Phillips E. Osgood of Minneapolis, Minn, and Bishop Wilson R. Stearly of Newark, N. J., regarding Radio and the Church. According to these three clergymen, Rev. Arthur T. Brooks of the Dudley Street Baptist Church, Boston, Rev. A. Z. Connad of the Park Street Church, Boston, Dean Rousmanlere of the Cathedral of St. Paul. Episcopal, and others, attendance at church has not decreased in the slightest as a result of the Radiophone broadcasts of church services.

Many are of opinion, on the other hand, that has actually increased interest in the urch, because it has awakened man careless souls who had grown some hat lax in their church attendance.

AGENTS FIND PROPAGANDA BROADCASTER

Private Plants Radical Citizens' Complaints Cause Investigation-Believe Soviet Russia Behind Move

By W. E. Johnson

By W. E. Johnson

PHILADELPHIA.—Federal agents and city police authorities are investigating the reports of the practice of private broadcasting diether processed in the state of the practice of private in the state of the processed in the state of the processed in the state of the state of

ALL DETROIT'S BLIND WILL GET RECEIVERS

D ETROIT.—Every blind person here is to be furnished with a receiving set. The Detroit Westare League, under the direction of Grace D. Davis, has undertaken this task and announces that many afflicted persons already have been supplied. "No one ran realize what a blessing Radio is to persons without sight," Miss Davis says.

photo is Belle Bart, astrologiet, who has foresteld seer of the primer and the property of the primer and the property of the primer and the

First Broadcasts from Mexico

MEXICO CITY.—The first Radiophone broadcasting station ever successfully operated in Mexico now is sending out programs from the Regional Exposition of Nuevo Leon. The station uses a wave length of 400 meters.

FANS LIKE IDEA OF **BIG REWARD OFFER**

ONE TELLS HOW HE HAS FRIENDS SAVE COUPONS

Much Valuable Standard Apparatus Available to Radiophans By Sav-ing Consecutive Coupons

SPECIAL REWARD OFFER Coupon Number 3

This Special Reward Coupon appears each issue in Radio Digest until further notice. When sent in, accompanied by necessary remittance, according to the rules governing same, apparatus can be and rules of offer below.

Save Me — I Am Valuable

The Special Reward Offer announced in the June 2 issue has been received with enthusiasm by the regular readers of the Digest. One fan writes:

"Just the opportunity I have been waiting for. There have been many pieces of apparatus I have wanted but the old pocketbook wouldn't stand for my getting them. Now with the Special Reward Coupons (I have taken your paper regularly since the first number) I am clipping them every week and will soon have two or three pieces of apparatus I have wanted for some time, and at practically no expense."

"Notice quite a few things I want among those you are offering." writes another subscriber. "I have asked several of my friends who take your paper to save their coupons for me. Great stuff Digest; I'm for you."

Many realize that all that is necessary.

their coupons for me. Great stuff Digest; I'm for you."

Many realize that all that is necessary to secure the valuable, standard pieces of apparatus listed below is to clip the coupon appearing on page two of the Digest each week and mail them together with the necessary remittance to the office. There is no limit to the number of focupon series that can be sent in for apparatus.

Rules to Remember

One point must be emphasized to these contemplating taking advantage of the special offer; that is, that the coupons turned in for any lien must be numbered that the coupons turned in for any lien must be numbered of coupons necessary and the cash remittance, of course, depend on the item sought by the reader. There is no limit to the number of series turned in by any one reader. Another point to remember is that cash, checks and money orders but no postage stamps will be accepted.

Another point to remember is that cash, checks and money orders but no postage stamps will be accepted. Another point to remember is that cash, checks and money orders but no postage stamps will be accepted.

Class A Articles

For two consecutives outpons and amount of cash remittance necessary. The eight classes of items follow: Class Ga. 30) any one of the following articles will be milder to the coupons and thirty cents (80.30) any one of the following articles will be milder to the coupons of the following articles will be milder to the coupons of the following articles will be milder to the coupons and thirty cents (80.30) any one of the following articles will be milder to the coupons of the following articles will be milder to the coupons of the following articles will be consecutively numbered coupons and slay cents (80.60) and some of the following articles will be milder to the coupons of the following articles will be compared to the coupons of the following articles will be compared to the followin

AN EVENING AT HOME WITH THE LISTENER IN (SEE NOTE BELOW FOR INSTRUCTIONS)

Station and City	Met.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
CFCA, Toronto, Ont	400	6:00- 7:00	6:00- 7:00	6:00- 7:00	6:00- 7:00	6:00- 7:00	6:00- 7:00	5:45- 6:45
CFCN, Calgary, Alta	440			11:30-12:30			11:30-12:30	
CKAC, Montreal, Que	430		6:00- 9:00		6:00- 9:00		6:00- 9:00	3:00- 4:30
KDKA, E. Pittsburgh, Pa	360	5:00- 9:00		5:00- 9:00	5:00- 9:00		5:00- 9:00	6:30- 7:30
KFAF, Denver, Colo	360	9:00-10:00	9:00-10:00		9:00-10:00	9:00-10:00	9:00-10:00	0.00- 1.00
KFDB, San Francisco, Calif.	509	10:00-12:00		10:00-12:00		10:00-12:00		9:00- 9:30
KFI, Los Angeles, Calif	469	1 9:00- 1:00	9:00- 1:00	9:00- 1:00	9:00- 1:00	9:00- 1:00	9:00- 1:00	10:00- 1:00
KGW, Portland, Ore KHJ, Los Angeles, Calif	492	10:00- 2:00	19 m st - 10 s	10:00-11:00	2.00	9:00- 2:00	3.00- 1.00	9:00-10:00
KHJ, Los Angeles, Calif	395	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00		10:00-12:00
KPU. San Francisco, Calif	423		10:00-12:00		10:00-12:00		10:00-12:00	
KSD, St. Louis, Mo	546	8:00-12:30	8:00-10:00			8:00-12:30	8:00-10:00	********
KYW, Chicago, Ill	345	7:00- 8:30	9:00- 9:30		7:00- 8:30	10:00 12:00	7:00-10:00	6:00- 7:00
NAA. Radio. Va	435	5:45- 7:30	6:05- 7:20	6:25- 8:40	5:45- 7:40	7:00- 8:40	7.00- 6:30	
PWX, Havana, Cuba	400		0.00 1.20	8:00-10:30	0.10- 7.10	7.00- 0.20	8:00-10:30	· · · · · · · · · · · · · · · · · · ·
WBAP, Fort Worth, Texas.	476	9-30-10-30	9:30-10:30		9:30-10:30	9:30-10:30	7:00- 7:20	3:30- 4:30
WBZ, Springfield, Mass	337	6:30- 8:00	6:30- 8:00	6:30- 8:00	6:30- 8:00		7:00- 7:20	0:30- 4:30
WCX, Detroit, Mich.	517	7:00-10:00		7:00-10:00	7:00-10:00	7:00-10:00		7:00- 8:00
WDAF, Kansas City, Mo	411	6:00- 1:00	6:00- 1:00	6:00- 1:00	6:00-1:00	6:00-10:00		4:00- 5:00
WDAJ, College Park, Ga	360	7:30-11:30	7:20 11:20	10:30-11:30	7:30-11:30	6:00- 1:00 7:30-11:30		11:45- 1:00
WDAP, Chicago, Ill	390	1.00-11.00	10:00- 2:00	10:00-11:00	10:00- 2:00			7:30-11:30
WDAR, Philadelphia, Pa	395	5.20 0.00	5:30- 6:00	5:30- 9:00	5:30- 6:00	4 60 4 66	10:00- 2:00	9:00-12:00
WEAF, New York, N. Y	492	5:30- 8:00	5:30- 6:00	5:30- 8:00	5:30- 0:00	6:00- 1:00	5:30- 6:00	
WFAA, Dallas, Tex	476	8:30- 9:30	8:30-12:00		5:30- 8:00		5:30- 8:00	**********
WFI, Philadelphia, Pa	395	4:30- 5:00	4:30- 5:00	8:30- 9:30 4:30- 9:30		8:30- 9:30	8:30-12:00	9:30-10:30
WGI, Medford, Mass	360		7:30- 9:00	4:30- 9:30		6:30- 8:30		5:30- 6:30
WCM Adams C.	429	9:30-10:30	9:30-10:30		8:30-10:00			8:30-10:00
WGM, Atlanta, Ga WGR, Buffalo, N. Y	319							7:30- 8:00
WGY, Schenectady, N. Y.	380	6:00- 8:00		6:00- 8:00	*********	6:00- 8:00		********
WHA, Madison, Wis		6:45- 9:00	6:45- 9:00		6:45- 9:00	6:45-11:00		6:30- 7:30
WHAS, Louisville, Ky	360	7:00- 9:00		7:00- 8:00	7:00- 9:00	7:00- 8:00		desperant.
WHAS, Louisville, My	400		7:30- 9:00	7:30- 9:00	7:30- 9:00			
WHAZ, Troy, N. Y	380	8:00- 9:30	*********					
WHB, Kansas City, Mo	411	Tarage trees	8:00-10:00		8:00-10:00		Landing Co. Co.	8:00-10:00
WHK, Cleveland, O	360	5:00- 5:30	5:00- 5:30	7:00- 8:45	5:00- 5:30	5:00- 5:30	5:00- 5:30	7:00- 8:45
WIP, Philadelphia, Pa	509	4:00- 5:30		5:00- 5:30	5:00- 5:30	5:00- 5:30	8:10-10:00	
WJAX, Cleveland, O WJY, New York, N. Y	390		6:30- 8:30		7:15- 9:30			
WJY, New York, N. Y	405		5:30- 9:30		5:30- 9:30	5:30- 9:30		
WJZ, New York, N. Y	455	5:30- 9:30	5:30- 9:30	5:30- 9:30	6:30- 9:30	5:30- 9:30	5:30- 9:30	6:30- 8:00
WKAQ, San Juan, P. R	360		6:30- 8:00				6:30- 8:00	A Contract
WLAG, Minneapolis, Minn.	417	6:30-10:30	6:30-10:30		5:30-10:30	6:30-10:30	6:30-10:30	7:30- 8:30
WLW, Cincinnati, O	309	7:00- 9:00	9:00-11:00	7:00- 9:00	9:00-11:00	Action Disease		1100 0100
WMAO, Chicago III	448		7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	2.0
WMC. Memphis, Tenn	500	8:00- 9:30	8:00-12:00		8:00- 9:30	8:00-12:00		
WOAL San Antonio, Texas.	400		9:30-10:30		7:30- 8:30		0.00	9:30-10:30
WOC, Davenport, Ia	484	7:00- 8:30		10:00-11:00	7:00- 8:30	7:00- 8:30	9:30-10:30	7:00- 9:00
WOO, Philadelphia, Pa	509	6:00- 9:00				6.00. 0.00	100000	
WOR, Newark, N. J.	405	5:15- 6:30	7:00-10:00	5:15- 6:30	5:15- 6:30	7.00-10-00	5:15- 6:30	
WOS, Jefferson City, Mo	441	8:00- 9:30	De l'accompany de	8:00- 9:30	5.40- 0.00	8.00- 0.30	0.20- 0.30	
WSB. Atlanta. Ga	429	8:00- 9:30 10:45-12:00	10:45-12:00	10:45-12:00	10-45-12-00	10:45 19:00	10.45 19.00	7:30- 9:00
WSY, Birmingham, Ala	360	8:00- 8:45	15.15 12.00	8:00- 8:45	10.30-12.00	8.00 8.45	10.40-12:00	7:30- 9:00
WWJ. Detroit Mich	517	8:00- 8:45	8-00- 7-30	6.00 7.20	6.00 7.20	6.00 0.30		7:30- 8:30

Instructions for Use.—All the hours above are given in Central Standard Time. If your city uses Eastern Time, add one hour to each of the periods stated; if your city uses Mountain Time, subtract one hour; if your city uses Pacific Time, subtract two hours. If in addition your city is using Daylight Saving Time, add one hour to this result.

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Looking Ahead

Portable Sets Galore for the Summer Radiophan—Next issue is the Portable Set Number of Radio Digest. You hot weather airphone fans, get next week's copy early so you can begin building a compact receiver for the beach, camp, automobile, or whatever good use you may have in mind. There will be lots to take your choice from. For instance—

A Flewelling Cigar Box Portable—Costs little and hears 'em all on a short length of wire for an aerial. Read about it next week.

The World's Smallest Regenerative Set—Three and one half by three and one quarter inches only, and has picked up stations over 800 miles away. It was built by Roslyn Russel of Niagara Falls, N. Y., and will be explained in detail June 23.

Camper's Set Complete—Designed by H. J. Marx. A dandy outfit for the lover of the out-of-doors. Another feature in the Digest next week.

R.D.-86 Hook-Up Diagram—A wonder for the fan who desires a simple, sure-fire set for the beach. See page 14 issue of June 23.

Even Q. & A. Next Week Will Be Portably Inclined—that is, hand picked so that they will be of most benefit to those contemplating the use of a small set this summer.

Have a Copy with You on Your Vacation WHEN YOU WANT

Radio Digest YOU WANT IT!

BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW

SEND IN THE BLANK TODAY

	Publisher Radio Digest, 123 West Madison St., Chicago, Illinois.
	Please find enclosed check M. O. for Five Dollar (Six, Foreign) for One Year's Subscription to Radio Digest, Illustrated.
	Name
	Address
(See Sys	City State

U. S. REDS USE RADIO

Continued from page 1)
weeks. All of the messages, he said, were in the guise of an appeal on behalf of the working class, but like all radical propaganda, the main parts of the talks embraced attempts to belittle the existing form of government. This new form of propaganda, federal agents believe, is being paid for by the Russian soviet government. A question arises as to whether legal methods can be found to close up such stations that broadcast radical propaganda, and a conference will be held soon with officials in Washington concerning such a move.

They Took It Good-Naturedly

CHILLICOTHE, OHIO.—Local Kiwanians recently thought they were dancing to Radio music and were so pleased by the novelty that they girated till midnight, when it was disclosed to them the music was furnished by a phonograph connected with tube amplifying set.



RADIO "BUGS" Get into Business for Yourself

Why not turn your hobby into money? You can easily make \$15.00 a day, or as much more as you like, by our wonderful plan of selling Radio direct to the millions of people just waiting for our better parts or sets. pole just waiting for our better parts or sets rectory prices and tell you how to build a profitable business of your own. Knott products are up-to-the-minute. Knott products are up-to-the-minute. Knott products are up-to-the-minute. Knott products are up-to-the-minute. National plans are unique and unbeatable. Radio is just, beginning to come into its own—are be your own boas? Write TODAY for what to be your own boas? Write TODAY for what to be your own boas? Write TODAY own to be instructions. How To Sell Real Radio.

E. R. KNOTT MACHINE CO. 1-D Ellery St., S. BOSTON 27, MASS.

We claim to handle only standard and well-known Radio merchandie

On top of that we have the most at-tractive discounts of any Radio job-ber to offer you. It will be worth while writing for our latest discount sheet.

WERNES & PATCH 159 N. STATE ST., CHICAGO, ILL.

AT LAST A REAL RADIO MAP

WITH SIGNAL SYSTEM
with separate index of Broadcasting Stations. Designed by a Radio Expert.
Map printed in two colors on heavy paper, size

10"324".

16 pare Index rives call letters, names and addresses of Broadcasting Stations, Kilocycles, Medicases of Broadcasting Stations, Kilocycles, Medicases of Broadcasting Stations, Kilocycles, Medicases of Broadcasting Stations, Medicases of Stational Stations of Stationary Later Permanent and resulting made on map and index by use of small colored signates. These take places of colored headed pins made on map and index by use of small colored signates. These take places of colored headed pins. No Badio Stationary without this corrections. No Badio Stationary S

system. PRICE 50 CENTS PER SET—Send 124 for postage.

Carried by Radio, Book and Stationery Stores.

Jobbers, write for discounts.

L. L. SMITH & CO.

9 Knapp Street



COMPARE IT WITH WHAT YOU ARE NOW USING OURS IS BETTER MAIL US NOT Return it at Our Expense

ZOBEL-STEIN LABORATORIES 322 9TH ST. BROOKLYN, N.Y. SOUTH 2650,

CALIFORNIA TO GET MAMMOTH STATION

GENERAL ELECTRIC PLANS DUPLICATE OF WGY

Oakland to Get New 1000-Watt Plant-Reserve Power for Tests-Building Now

Building Now

SCHENECTADY, N. Y.—Faith in the permanence of Radio broadcasting is demonstrated by the recent ainouncement of the General Electric Company that the first plant to be constructed exclusively for popular broadcasting will be erected in Oakland, Calif., to house the large Pacific coast station of that company, Work will be started this month on a two-story studio building, the antenna towers and the power house. Workmen are already assembling the Radio equipment. It is expected that the new station will be incated on East 14th Street, Oakland. The site was selected after a thorough inspection of available properties in San Francisco and vicinity. The Oakland plot was chosen because of its technical advantages, the availability of musical talent and the proximity of the site to San Francisco, the great commercial center of the Pacific coast.

the site to San Francisco, the great commercial center of the Pacific coast.

Two Story Brick Structure

The plans provide for a two-story brick structure. On the first floor will be the office of the studio manager, a general correspondence room, a reception room for artists and quarters for motor-generator sets and storage batteries. There will be two studios on the second floor, the main studio large enough to accommodate large bodies of musicians such as a band or symphony orchestra, and a smaller studio from which solo numbers and addresses may be broadcast. The use of two studios will make possible continuous broadcasting. The Radio control room will be on the second floor.

One thousand feet back of studio building will be the power house and antenna system. The antenna will be multipletuned and strung between two steel towers, each 150 feet high and placed 200 feet apart. Beneath the antenna proper will be the counterpoise consisting of a network of wires, fourteen feet above the ground, covering an area of 150 by 300 feet. In addition to the high 11 by 300 feet and 11 december 11 be a small building for the tuning apparatus at the end of the multiple-tuned antenna.

Transmitter Similar to WGY

The transmitter will be similar to that which is now used almost daily at WGY.

Transmitter Similar to WGY

The transmitter will be similar to that which is now used almost daily at WGY. Many developments which have brought this station a reputation for exceptional transmission quality will be part of the Facility was station endipment.

The west station will be operated with 1000 watts in the antenna but the equipment will be designed in excess of that power for test purposes.

Every part of the equipment in the power house and in the control room will be in duplicate, assuring uninterrupted service. If one outfit or part of an outfit breaks down during the operation period another part will be ready to be brought into the circuit.

It is probable that an auxiliary studio, connected with the transmitting equipment of the station by telephone lines, will be located in San Francisco.

The Pacific coast station of the General Electric Company will utilize remote control to broadcast church services and musical entertainments from San Francisco and Oakland. The Pacific Telegraph & Telephone Company has offered to provide land wire connections for this service.

WHK Starts Cop Program

CLEVELAND, OHIO.—WHK, the broad-casting station of the Radiovox Company, has made special arrangements with the Police Department of the City of Cleve-land, by which special bulletins of public interest will be broadcast at 6:00 P. M. each evening.

TUNES IN FOR MUSIC; GETS STATION H-

COLUMBUS, OHIO.—Alex Harris tuned his set one night recently with the intention of listening to a concert from RSVP or some other place but for a time he thought he had Station H.—L. He was called away from his set and while he was gone a droplight wire became entangled with the set. The result was a fire.

LISTEN TO BIRTHDAY PARTY FOR ALFONSO

EW YORK.—Many Radiophans in the United States as well as in the South American republics listened with interest on an evening recently to the broadcasting by Station PWX Havana, Cuba, of speeches and music from the Spanish Casino there in honor of the birthday of King Alfonso, of Spain.

"OLD RELIABLE" PIANIST POPULAR



Miss Jeanne Wynne, one of the best known Radiophone entertainers in the country. She is a pianist of widely recognized ability and is an exclusive star at WGM, "Old Reliable," the Atlanta Constitution, Atlanta, Ga.

STREET LOUD SPEAKER SILENCED BY OLD LAW

City's Police Chief Holds Horns Are "Nuisances"

ELIZABETH, N. J.—Years ago the local board of works passed an ordinance prohibiting peddlers and others from making noises on the streets. This ordinance was invoked only recently to stop the use of large loud speaking horns in front of stores of Radio dealers. Chief of Police league.

Mulcahy says use of these horns violates the ordinance as a "nuisance."

The dealers argue that the ordinance was passed before Radio was thought of, but the Chief was obdurate and said the use of such horns will have to end. The dealers indicated they will fight the police ruling.

VOYAGERS ENJOY SHIP-TO-SHIY TALK

VOICES FROM ONE VESSEL CARRY TO SECOND

Pacific Coast Ships in Epochal "State-room Radiophone Confab" Unique Experiments

By Strachan McMillan
LOS ANGELES, CALIF.—For the first
time in the history of shipping on the
Pacific Coast, if not in the entire world,
passengers while enroute on two liners,
more than a thousand miles apart, were
able to carry on telephone conversations
with each other from their private staterooms. This was revealed recently at
Los Angeles Harbor with the arrival of
the liner H. F. Alexander from San Francisco.

Los Angeles Harbor with the arrival of the liner H. F. Alexander from San Francisco.

Passengers who arrived on the liner, stated that on Thursday evening, just as the ship was nearing Los Angeles Harbor, Radiophone communication was established with the S. S. Dorothy Alexander, of the same line, just as that vessel was pulling into the Puget Sound.

Equipped with Radio Switchboards
The two ships, together with the S. Matsonia, were equipped with Radio switchboards a short time ago, but this was the first time that the instruments were experimented with to any degree of success. Both liners, which belong to the Pacific Steamship Company, were equipped with Radio switchboards is stated to be inexpensive and mechanically simple, and permits the plugging of any stateroom of the ship onto the other line.

Capt. A. P. Bartlett in command of the S. S. H. F. Alexander stated that he expected, on account of the success of the recent experiment, that all ships will be so equipped and that it will be only a short time until then "And," continued the captain, "if telephone companies on shore will install Radio switchboards, in the son country of the success of the recent experiment, that all ships will be so equipped and that it will be only a short time until then "And," continued the captain, "if telephone companies on shore will install Radio switchboards, and persons who are on the mainland may secure telephonic communication with the island from an ordinary telephone.

Wave Bath World's Latest in Wonders

But, Dear Reader, This Radio Dip Is Medicinal—Not Your Saturday Night Favorite

NEW YORK.—The Radio bath is now added to the long list of ether wonders.
Two physicians, after months of experiment, declare they have perfected a process of providing an electric bath by Radio. But this bath is medicinal, not the ordinary Saturday night favorite, and those who joyfully conceived the idea of bath broadcasting stations, fitted to throw a bath about one while walking on the street, or working in the office, are doomed to disappointment.

Curse Narvons Afficience

Cures Nervous Afflictions

Cures Nervous Afflictions

The process, invented by Dr. W. S. Benson and P. B. Schanne, both of Newark, N. J., consists of baking or sweating patients in strong electromagnetic waves diffused over the entire body. A cabinet is used for the purpose. The allments which it is declared to treat with success are rheumatism, neuritis, pneumonia and nervous afflictions.

At no time during the treatment, according to the physicians, is the patient in direct contact with an electric primary circuit. So powerful are the waves inside the cabinet that a disconnected electric light bulb, held within the field of the waves, will glow with light. The waves penetrate every cell and tissue of the human body, energizing cells and exercising muscles.

THE ANTENNA BROTHERS

Spir L. and Lew P.

Aw That's Tube-Bad









A.R.R.L. DON'T LIKE "SILENCE" PEROIDS

CUTS OUT AMATEUR AID IN EMERGENCIES

Relay League Thinks That Enforcement Would Destroy Co-operation with Commerce Department

Washington, D. C.—Enforcement of a quiet period for amateur Radio operators between 7:30 and 10:30 P. M., as proposed by the department of commerce, would prevent the valuable assistance of amateur stations in emergencies, such as storms, floods and wrecks arising during those hours, according to the American Radio Relay league board of direction which has submitted recommendations to the department through its secretary.

A special meeting of the league was held in New York recently to consider amateur regulations originally discussed by its representatives and the chief supervisor of Radio.

New Yoluntarily Observed

by its representatives and the oner supervisor of Radio.

Now Voluntarily Observed.

Since the period of quiet hours between 7:30 and 10 P. M. now is being adhered to voluntarily by amateur operators throughout the country and has been extended in some instances to the hours between 7:30 and 10:30 P. M., through a definite local agreement, the board considers it unnecessary for the department to enforce this regulation.

"It is our conviction," the recommendations state, "that if transmission is prohibited between certain hours, it will destroy rather than create amateur cooperation with the department; whereas it voluntary quiet hours are permitted, the past records show that we can count on nearly perfect observance of the plan."

Want Wave Band Subdivided

on nearly perfect observance of the plan."

Want Wave Band Subdivided

The board went on record as being in favor of a virtual subdivision of the amateur wave band between 150 and 220 meters, recommending that this band be available for special license continuous wave transmitters, that wave lengths between 150 and 200 meters be open to continuous wave general transmitters, that all modulated services, including sparik, AC tone, CW, ICW, unfiltered CW and phone, be restricted to the band from 176 to 200 meters, and that all types of transmitters be permitted 'to operate at will on any wave length within the band to which that type is eligible."

SPRAY SERVICE TO SAVE FRUIT CROPS

WMAK Furnishes Daily Advice of Specialists to Eastern Growers

LOCKPORT, N. Y.—Station WMAK of this city, located in the heart of the Niagara fruit belt, has inaugurated a Radio spray service for farmers and fruit growers. A fruit specialist makes the announcements relative to spraying faily at 11 A. M. Eastern time. It is estimated that fruit growers in western New York have lost thousands of dollars worth of apples and peaches in past years because they were not familiar with the opportune time to spray and what chemicals to employ. It is expected that the Radio Service will not only improve the quality but also the quantity of the 1923 harvest.

Club Makes Fan Directory TIFFIN, OHIO.—A Radio directory giv-ing the names of owners of receiving sets and description of their apparatus, is being compiled in this city by the Tiffin Radio club.





MULTIPOINT

A Synthetic CHYSTAL DETECTOR sensitive over its entire surface all detector troubles. Extraordinary clearness all detector troubles. Extraordinary clearness sold participate on the surface only. Join the ever increasing fine.

Price mounted, Sensitiveness guaranteed..... 50c RUSONITE CATWHISKER

Order from your dealer or direct from us. RUSONITE PRODUCTS CORP.

Numerous Letters from Fans Show Listener In Audience Wants Variety

Entertaining a Million Persons a Night Proves Big Job but Program Directors Get Valuable Hints from "Bouquets and Brick" Letters from Fans

By William H. Easton

If the Radio audience could realize some of the problems that have to be solved by those who are engaged in preparing the programs, they would, I am sure, not only sympathize with them but would wonder how they preserve their sanity. No one before has ever had to entertain a million or so people every night; and consequently the wine have undertaken this simple little task have had to stumble along as best they could, learning as they go, and profiling wherever possible by their mistakes. They are, however, exceedingly fortunate in having an audience that tells them frankly just what it thinks about them frankly just what it thinks about their efforts; and with the hundreds of letters that reach them daily as a guide, they have been able to work with some degree of certainty.

The first Rule, Give Variety

The first Rule, Give Variety

The first profit that the letters lay down is: Give the Radio public infinite variety. If you were to open their mill some morning the first letter would probably say. "I rollyed your concert so much last night. That's right; give us more good music and do away with those execrable popular selections." Then the second letter would say. "For the love of Mike, cut out the Upivar and give us good old American Jazz." Letter number three would read as follows: "Frof. Simpkins' address on "The Color of Cats' was the most interesting speech I ever listened to," and letter number four would state, "Why do you inflict your audience with such stupid stuff as the talk on cats? I hung up my receiver in disgust."

With testimony like this it is quite evident that it is every difficult to satisfy

in disgust."

Mard to Satisfy Everybody
With testimony like this it is quite evident that it is very difficult to satisfy
everybody all the time. The only thing to
be done is to draw from the entire field of
music, literature, science, politics, culture,
hygiene and religion, and thus please
every one at least part of the time. Consequently, those who do not like jazz
music must bear in mind that many will
listen to nothing else; while those who do
not like speeches must remember that a
very large number of Radio listeners are
isolated or are invalids and absolutely depend upon Radio for their contact with the
outside world.

Must Keep, Improving

outside world.

The second point that the letters prove is, there must be constant improvement in broadcasting both technically and artistically. No station can maintain its programs on a dead level and retain the interest of one one in. Curiously enough, they are all to the effect that the programs are getting so poor. This is not the case. They are just as good as ever; but the

SUMMER CLEARANCE Price List

NOW READY

Send for list of BARGAINS

ECONOMY RADIO CO.

132 Nassau Street, NEW YORK CITY

Summer Static vercome

'Good-bye Aerial"



ANTENELL No aerial or antenna needed

All outside wiring, aerial, lightning ar-resters, switches and other inconveniences so inductive to static are climinated. Merely plug Antenella in any light socket and you can enjoy all Radio pleasures in any room in your home, apartment or hotel. No current consumed.

New Improved ANTENELLA \$1.25 NOW formerly \$2.00

our dealer's otherwise send purchase and you will be supplied postpaid.

Gas. Freshman G. Inc.

Radio Gondenser Goducts

106 SEVENTH AVENUE, NEW YORK

taste of the audience has improved. It is for this reason that Westinghouse Station KDKA is experimenting so constantly in every direction. Its engineers are incessantly striving for better tone reproduction and for the elimination of unpleasant noises. Its program staff is incessantly working for better artistic effects and for entirely new features. They began with the phonograph; then introduced artists and speakers in person; then went outside of the studio for church services, important meetings, symphony concerts, operas and sporting events, and recently established an orchestra so that incidental music could be rendered in the best possible manner. Thus, in accordance with the well-known formula, "Every day in every way we are getting better and better." But no one realizes more fully how much more must be done in order to continue to preserve the good opinion of the Radio audience.

The third important fact that develops

serve the good opinion of the Radio audience.

Want No Interference
The third important fact that develops from the correspondence is, Interference must be eliminated. Not only must the audience be able to hear this station clearly and distinctly whenever they wish to hear it, but they must also be at perfect liberty to eliminate its signals and receive equally clearly the program to some other station that may, for the moment, please them better. This is their most serious problem at present. The great increase in the number of stations has filled the ether with chaos and confusion, and if this is not remediad broadcasting, and the serious problem at present. The Radio engineers, and those broadcasting stations that are interested in Radio for its own sake, and not for selfish reasons, are struggling with it valiantly. Though the situation may at times look hopeless, one should not forget that worse troubles

than this have been smoothed out.

Broadcasting is only an infant. If it develops as rapidly within the next two years as it has in the past two (and there is every reason to believe that it will), interference will disappear; trivial programs will make way for those of reason there is and importance; and it will be possible to hear not only the large American stations clearly and distinctly almost anywhere in the United States, but stations in London, Paris and Rome as well.

Give Radio Instruction

CEDAR RAPIDS, IOWA.—The Board of Education here has gone on record as favoring Radio Instruction. Receiving sets will be used for instruction during class hours, and will be operated for the benefit of the parents in the evening.

Wayfaring "Ham" Tells Story

WAJAHING HAM Tells Story
MILWAUKEE, WIS.—Upon his recent
return from California, Charles S. Polacheck addressed the Milwaukee Radio
Amateurs' Club. Inc., under the title of
'Some experiences of a Wayfaring 'Ham'
in the West."

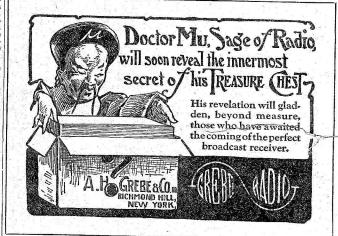
When telephones are of the same resistance, connect them in parallel. If they are of different resistance, connect in series.

CUNNINGHAM

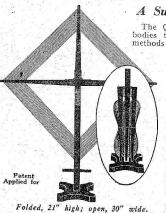
C-300 or UV-200\$2	. 7
	.00
C-302 or UV-202. 3 C-201A or UV-201A. 3	
Also the new UV-199 3 NEW DX 11/2 VOLT TUBES 4	.50
All tuber grounds 1	-00
All tubes guaranteed to work like new.	

"24 Hour Service" RADIO TUBE CORP.

55 Halsey Street Newark, N. J.
TUBES SENT PARCEL POST, C. O. D.



The Qurad Folding Loop Aerial



A Summer Necessity

The Qurad Folding Loop Aerial embodies the most practical and efficient methods in loop construction. It FOLDS in every sense of the word and is so constructed that the wires cannot tangle. By merely raising the arms into their proper position, leverage is brought to play which draws the wire tight insuring perfect alignment and rigidity.

It is designed for use with radio frequency receivers but can be used effectively with any circuit. Undesired stations can easily be tuned out and interference from static is greatly decreased.

It is of rugged construction, yet at-tractive in appearance and will with-stand hard usage. Finished in Walnut and strung with green silk covered wire. The Loop is mounted on a pivot base and arms are provided for shifting its direction.

Suitable for use in the finest home and especially desirable when genuine portability is required.

Price, complete, ready for use \$12.50

QUINCY RADIO LABORATORIES

Dealers are invited to write for our proposition

QUINCY, ILLINOIS

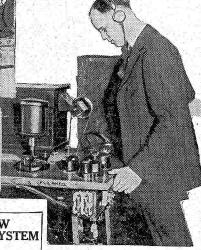
GLOBE PICK-UP PICTURES AUDIENCE

Here is the control operator at WJY-WJZ with the new double pick-up microphone half open. All of the harsh, mechanical parts are enveloped and hidden by the unique globe arrangement. The globe is about eighteen inches in diameter and stands on a mahogany pedestal



Reputed the finest and most modern station, WJY-WJZ, atop the Æolian building, New York City, has probably the most novel pictup microphone in use today. This transmitter is shown above in the Classic studio. (There is also a Jazz studio.) At the left, the pick-tup is shown closeup. The globe is really a sphere atlas and typifies the world, the invisible audience of Radio. The sensitive microphone is concealed within the thin gauze globe, painted to make it more realistic. The seasa are deep green while the continents are tanked to the continents are tanked to the continents and the continents are tanked to the contin

The heart of WJY-WJZ, an oscillograph that shows the Radie waves as they leave the antenna. This allows corrections to regulate the modulation, etc. There is an actual "monition" picture of the wave on the revolving square mirror. Operator W. E. Tesch is observing



CFCN PLANT HELPS TO CALIBRATE SETS

CANADIAN STATION SENDS ON VARIED WAVES

Announcer Begins at 10:30 O'clock and Works on Rising Scale from 200 Meters

CALGARY, ALTA.—With the object of aiding Radiophans to tune in more easily and expeditionsly on broadcasting stations on their scheduled times and wavelengths, CFCN, the broadcasting station of The W. W. Grant Radio, Ltd., at Calgary, is now conducting a service which will enable listeress, to calibrate their seiving sets.

gary, is now conducting a service which will entable listebras; to calibrate their serving sets.

One night a week the announcer at CFCN broadcasts on many different wave lengths, varying from 200 metres to 750 metres. The announcer commences at 10:30 o'clock, Mountain Standard time, and announces that CFCN is working on 200 metres, asking Radiophans who are on their air to note carefully just what position on their dials the pointers are in while signals are being received on this wave length.

Great Aid to Listeners

This is repeated every few minutes on rising wave lengths, and thus listenersin are able to record on the dials of their receiving sets the various wave lengths. This tends to allow them to tune in more quickly when they know a certain station is broadcasting on a regulation wave length at a set hour.

length at a set hour.

Many communications have been received by CFCN congratulating the management on this Radio service feature, which, judging by the number and tone of the communications received, popular and much appreciated.

Phones Repaired
Phone expert Repaired phones for U. S.
Navy. Can repair yours. Work guaranteed, rates reasonable.

RADIALL ELEC. CO., Passaic, N. J.

TWO SUPERSENSITIVE CIRCUITS

TWO SUPERSENSITIVE CIRCUITS

(Both Copyrighted)

My Highly merewed Renarts brings in all important states of the property of t

FLEWELLING ANSWERS

By E. T. Flewelling

(Editor's Note.—This department is written by Mr. Flewelling, the inventor of the famous super circuit. From the questions sent him each week care of Radio Digest, he picks the one considered most informative for all and answers it in this column.)

Use of Loop Aerial

Use of Loop Aerial

(Submitted by A. W. H., Oelvein, Iova.)

Question.—In using the Flewelling Super
on a loop should I connect the two ends of
the loop to the binding post in the regular
way or how should the loop be used?

Ansiver.—The Flewelling Super picks up so
nuch energy through its own wiring that a
loop is not of very much use. If you use a
short piece of wire, say 5 to 6 feet long and
let it hang down from your set, you will
seene as good results as you would with a
good loop. Due to this habit of picking up
its own energy, the Flewelling set robs a loop
of any attempt that it might make to show
directional effects as it does on, say, a Radio
frequency set. The writer's own personal
preference is to simply connect his set to the
nearest radiator or water pipe and "go to it."
Fully as good and generally better results are
obtained in this way as upon a regular set
with a good antenna.

They Didn't Like the Paint and He Didn't Like Radio

ana He Didn't Like Radio CHICAGO.—John P. McNamara painted the front steps of a house he owned at 1935 Taylor street recently. This did not please the tenants, Mr. and Mrs. Frank O'Connor, and to show their displeasure they walked down the newly painted steps and went out. When they returned they found the aerial of their Radio set torn down. Yesterday O'Connor obtained a warrant for McNamara charging disorderly conduct.

latest and most essential part of an efficient tube set



Variable Resistance Leaks FOR PANEL MOUNTING

Mounted on any panel in a few seconds—2 screws serving as connections behind panel.

Get stations you never heard before No pencil markings—assure unbroken range of 130 degrees. Clarifies signals—climinates hissing. Complete with either .00025 or .0005 \$1.00

Without Condenser......75c At your dealers—otherwise send purchase price and you will be supplied postpaid.

(has. Freshman 6. Inc.

106 Seventh Ave.

WJAX INSTALLS NEW LIGHT-SIGNAL SYSTEM

Announcer Can Communicate with Operator Without Speaking

CLEVELAND, O .- In order to insure the CLEVELAND, O.—In order to insure the highest class of service from WJAX, the Union Trust Co. is planning to install a soundproof telephone booth inside its studio. While the program is going on the announcer will remain within the booth and so can communicate with the operator at all times over a private telephone, even though the operator is only in the next room. room.

A system of signal lights will be in-stalled for immediate communication be-tween the announcer and the operator. These lights will be amber, green, red and white. When the announcer is ready to These lights will be amouncer, green, rea and white. When the announcer is ready to proceed with any number on the program, he will flash the amber light to the operator. That will mean, "I am ready." The operator will then flash a green light, which will mean, "The set is in operation." He will follow this with a red flash which will mean, "The microphone is ready—go ahead." The flash of a white light to either the announcer or the operator will mean, "Answer the telephone."

In this way, even while the programs are going on, the announcer can talk to the operator, arrange for the next number on the program, and so forth, without in the least interfering with the actual broadcasting.

The ringing of three silver chimes is the signal that announces programs from KFI.

MAGNAVOX TYPE R3. Latest nationally advertised models in original scaled factory car-tons. List \$35. Special introductory offer \$25. Radio Central, Dept. D, Abilenc, Kansas.

This Convict Eases His 'Time" with Receivers

Ohio Penitentiary Inmate Asks to Install His Set

COLUMBUS, OHIO.—The most rabid Radiophan in this section has been found. He is Erwin F. Kumler, an inmate of the Ohio penitentiary serving from three to five years for automobile stealing. He was returned recently to Cleveland to testify at the trial of his alleged partner and was given permission to return to his cell with his Radio outfit.

Kumler brought the set back from his trip and has installed it in the prison. The concert hours have been set from 6 to 7 P. M. and a loud speaker will be used. After these hours, Kumler will be allowed to continue his listening in with an individual headset.

VACUUM TUBES

WD-11, WD-12, UV-199, UV-201-A, \$3.50 each UV-20, \$3.00 each UV-20, \$3.00, AP Detectors 2.75 each UV-20, \$3.00 AP Detectors 2.75 each UV-2

Abalene Radio

RADIO COMPANY

291 Broadway

New York City

FLEWELLING CIRCUIT Every part complete, including book of diagrams and instruc-\$11.95

REINARTZ CIRCUIT Every part complete, including drill book of diagrams and instruc-tions

Two-stage Audio-Frequency Amplifier. Every part complete for above circuits at

	3.1	CONDE		
3	Plate	Variable; value,	. \$1.75\$1	.05
13	Plate	Variable: value.	. 2.50	:20
23	Plate	Variable: value	3.59	35
43	Plate	Variable: value.	4.50	95
13	Plate	Vernier: value	\$5.50	75
23	Plate	Vernier - value	6.00 4	00
43	Plate	Vernier: value.	6.50 4	.25
100				
No.	** in			

Honeycomb Coils, 50 turns mounted
Honeycomb Coils, 75 turns mounted 1.00.
Double Coll Mountings
Triple Coil Mountings
Reinartz Coils and Mounting
Jacks, Single Circuit; value, 65c, special at30
Double Circuit; value, 90e; special at
Multiple Point Inductance Switch with Knob
and Dial (15 Switch Points) 1.45
Lightning Arresters, approved90
Three-inch Dials, unbreakable, heat resisting
composition, high finish; special
Two-inch Dials, same design, for rheostats and
potentiometer; special at
potentiumeter, special at,

Audio Freducacy Transformer. Designed for use with W. D. II tubes; list, \$4.50; price. \$2.75 Variocouple—Litz Wire Wound Secondary; value, \$4.50; special. \$2.25 Ball-Bearing Inductance Switch; value, 75c; special. \$30 V. T. Sockets, nickeled, brass, sleeve, composi-tion base; value, \$1.00; special at.....

Every article advertised above is guaranteed by the manufacturer and by us. Mail orders filled immediately. Transportation PREPAID on all orders of \$5.00 or over east of the Mississippi River. All others include postage.

LEVIATHAN'S OUTFIT KING OF THEM ALL

TWO MOTOR-DRIVEN LIFE BOATS TO BE EQUIPPED

Huge Shipping Board Vessel's Installa-tion Will Connect Boat with Two Continents

By F. N. Hollingsworth

By F. N. Hollingsworth

BOSTON, MASS.—Surpassing even that
of the Majestic, which has hitherto been
credited with having the most powerful
and up-to-date Radio equipment of any
ship in the world, the United States Shipping Board's steamship Leviathan, now
being refitted and equipped in Boston in
the largest drydock in the world, will
have everything in Radio that is necessary to make her equipment the greatest
on earth. It will be eclipsed in importance only by her powerful machinery and
delicate controls. The contract to equip
the Leviathan, whose call letters are
WSN, with a super-power marine Radio
installation has been let and completion
of the work will give America the distinction of Radio supremacy on the high seas.

Cau Talk with Two Continents

tion of Radio supremacy on the high seas.

Can Talk with Two Continents

She will have a six kilowatt tube code transmitter. This is six times as powerful as that carried by the average great Atlantic liner, and assures uninterrupted communication with points 3,000 miles distant, or with Europe and America en voyage. In addition to the felegraph service, she will have a two kilowatt Radiotelephone installation, which will provide voice contact with other vessels and stations on both shores of the Atlantic as well.

With the increasing number of ships having Radiophone installations, it is likely that land stations will soon be erected to handle voice messages from ships at sea to points inland over the regular land wire systems. The Leviathan will have a special emergency 600-meter spark transmitter in addition to the regular installations. Several sensitive vacuum tube receivers will be installed for reception, including Radio frequency amplifiers and interference eliminating devices.

plifiers and interference eliminating devices.

Badio on Motor-Driven Lifeboats
The two big motor-driven lifeboats, the finest that marine engineering can devise, and primarily designed for towing other lifeboats in long strings, will be completely Radio equipped. Each motor lifeboat will carry a crew of eleven in charge of a second officer, and two Radio operators. One of these boats will be located on each side of the ship on the boat deck. Each is 32 feet long, unsinkable, and is propelled by a 190-horsepower standard marine engine, and by means of the main shaft drives a 4-blade towing pitch propeller.

shaft drives a 4-blade towing pitch pro-peller. Each boat is equipped with a one quar-ter kilowatt transmitting outfit and is ca-pable of sending and receiving messages a distance of at least 250 miles. The op-erators will be specially trained men, whose duty will be to see, with frequent tests, that the outfit is always in working order.

SPECIAL OFFER LIST

(Continued from page 2)

Dublier Ducon; Dublier Micadam Type 696 (.006 mfd.);

Dublier Micadon Type 610 (.01. or. 03. mfd.); Dubliler By-Pass Condenser (1 mfd.), Prenier Universal Radio Jack, Filament Control, Five Spring; CRL Variable Grid Lask, without condenser.

Class D Articles

Glass D Articles

For eight consecutive coupons and one dollar and twenty cents (\$1.20) any one of the following articles will be sent: I Carter 29-0.0m Vernice Control Ricocatz; 1 Schindler Radio Frequency Transformer; 1 Martin-Copeland 13-Penin Inductance Switch; 1 Martin-Copeland 15-Penin Inductance Switch Switch Conditions.

with Condenser.

For ien consecutively numbered coupons and c dollar and fifty cents (3.15) and converted coupons and c dollar and fifty cents (3.15) and converted collar and converted converted

Dry Battery, 4 cells 1½ volts; Dublier Variadon (1904 or 1906 mfd.) Class F Artioles

For twelve consecutively numbered compons and one dollar and class and consecutively numbered compons and one dollar and estate; 1 Acme Fot-Rhoe (potentiometer and rheestat); Ray-O-Vac No. 215; 1 B Rattery, 22½ volts; 1 Consecutively numbered coupons and two delars and forty cents (82.40) any one of the following articles will be sent; 1914 over 1914 or 1914

For sixteen consecutively numbered coupons and three dollars (83.09) and one of the following articles will be sent: 1 Federal Andlo Frequency Transformer No. 238 Will Decima 23-Plate Variable Condenser: 1 Acme quiety Transformer (18.2, 18.3, or 8.4); Walnart Variable Condenser (13-Plate vernier; Walnart Variable Condenser (13-Plate vernier); Ray-O-Vara, N. 2021 Transformer (18.2, 18.9, O-Vara, N. 2021 Volta; Dubiller Duratran (R. F. transformer); Premier Micrometer Vardocoupler with dial; Premier Variable Condenser with dial; Premier Variable Condenser with dial (9015 mid.); Premier Variable Condenser with termier (1902) mid.); Class H Articles

Largest Radio Store in America

Buying Direct—in Quantities—for Cash, and Operating on a "Small Profit—Big Sale—Quick Turn" Basis Makes Possible These Values Radio Supplies Purchased Here Are Sold Under a Positive Guarantee of Satisfaction. We Carry the Largest New Stock of First Quality New Merchandise.

Largest Radio Store in America

BUILD YOUR OWN SET!

All Panels Drilled-Results Guaranteed If You Use Our Instructions

COMPLETE PARTS FOR | COMPLETE PARTS FOR | KNOCKED-DOWN RE-CEIVING SET

\$17.95

CONSISTING OF	Reg. Price	Our Price
2 Variometers	10.00	\$3.90
1 Variocoupler		1.75
3 Bakelite Dials		.75
Remler Bakelite Socket		.45
Howard Rheostat	1.10	
Cunningham C-300		
Detector Tube	5.00	4.45
Mahogany Cabinet	4.50	2.75
Genuine Formica Panel	2.25	
8 Binding Posts	.80	.40
Switch Lever	.50	.25
12 Switch Points	-40	.20
Freshman Grid Leak and		
Condenser Combined	1.00	.65
Complete Drawing for	1.00	
Assembly and Wiring.	1.00	.50
Assembly and wiring	1.00	.00
	_	
Regular Price\$30.		

REINARTZ SETS

\$11.45

CONSISTING OF	Reg. Price	Our Price
7x18 Formica Panel	\$1.89	\$1.70
Remler Bakelite Socket. Howard Vernier Rheostat	1.00	1.35
23 Plate Variable Con-		
denser	3.30	1.45
11 Plate Cuni Variable	3.10	1.35
3 Switch Levers 2 Dozen Switch Points	. 1.50	
1 Schoonhoven Reinartz	00	.40
Coil	. 3.00	1.95
Freshman Variable Grid		
Leak and Condenser	1.32	100
Combined		.65
8 Binding Posts 25 Feet Tinned Wire	30	20
Baseboard for Mounting	50	.25
Blueprint with Comple	te	
Instructions for Assemb	ly	S 1
and Wiring	. 1.00	.50

Our Price \$11.45

COMPLETE PARTS FOR SING	LE TUBE REFLEX CIRCUIT \$32.65
CONSISTING OF Reg. Our	e CONSISTING OF Price Price
43-Plate Vernier Variable Condenser\$7.00 \$3.9	5 Howard 25 Ohm Rheostat, 1.10 1.00
Radion Loop Aerial 8.50 5.9 Cunningham C301-A Tube 9.00 5.9	5 9x101/2 Formica Panel 1.42 1.20
Grewol Glass Inclosed De- tector 2.00 1.6	5 hogany Cabinet with
Radio Frequency Transformer 4.50 3.4 All American 5 to 1 Ra-	5 Complete instructions for drilling, assembling and wiring furnished so
dio Audio Frequency Transformer 4.75 3.9	that any one with no technical knowl- edge can easily follow. Regular
2—.001 Micon Condensers .70 .5 1—.002 Micon Condenser45 .3	

Can be used to amplify Reinartz, Flewelling, Short Wave Receiver, Crystal, Ultra Audion or any Re-ceiving Set so that Loud Speaker or Phonograph can be used in place of head set.

7x10 Formica				
Other Suitable	Size	\$1.05	\$0.80	
High Ratio All-	- America:	2		
or Thordarson	Trans	10.33		
former			2 05	
Low Ratio Thor	derenn e	. 4	0.30	
All American	Trone			
former	Trano	4 50	2.95	
2 Howard Rhees	tnta.	2 20	2.55	
2 Remler Bakeli	e Socket	2 2 00	.90	
3 Double Pacent	T- les	0.00	1.50	
a Double Pacent	Jacks	. 6.00	1.50	
13 Binding Posts.		. t.30	.65	
Baseboard for M	Counting	20	.15	
Dascovard for h	tountaing.	00	.10	
		-	-	

COMPLETE PARTS FOR 2-STEP AMPLIFIER \$12.45

COMPLETE PARTS FOR FLEWELLING CIRCUIT \$12.45 \$12.45

CONSISTING OF	Reg. Price	Our
6x14 Formica Panel 23 Plate Variable Con-	.\$1.26	\$1.10
denser	3.30	1.45
Three .006 Mics Condenser	. 3 00	2.25
CRL Variable Grid Louis	1 85	1.35
Remler Grid Leak	40	.25
2 Coil Adjustable Honey		
comb Coil Mounting with		
Knobe	4 00	2.65
75 Turn Honeycomb Coil.	80	.40
2 Remler Coil Mounts with	00	.40
Straps	1.20	.80
1 Remler Bakelite Socket.	1.20	
Howard Vernier Rheostat.	1.00	.45
1 Bakelite 3" Dial	. 1.50	1111
C Dikelite a" Dial	1.00	.25
8 Binding Posts	80	.40
! Baseboard for Mounting.	30	-20
1 Blueprint with Complete	9	
Instructions for Assembly	7	
and Wiring	1.00	50
Regular Price\$22	.16 64	9 AL

COMPLETE PARTS FOR ULTRA AUDION CIRCUIT \$11.90

(ILHOWH as the Wonder Circuit)	i.
CONSISTING OF Reg. Our Price Price	,
9x101/2 Formica Panel \$1.42 \$1.20	
23-Plate Condenser 3.30 1.45	1
Bakelite Socket (Remler) . 1.00 .45	
Special Ultra Audion Coll. plain or bank wound with tape	9
1 Howard Vernier Rheostat 1.50 1.35	725
CRL Grid Leak 1.50 .95 .0005 Micon Condenser35 .25	F
2 Switch Levers	C

CONSISTING OF Reg. Our Price Price 18 Switch Points 50 .30 2 Switch Stops 6.10 .05 8 Binding Posts 5.50 .40 Genulme Solid Mahagany with hinged top. 5.50 2.95 25-ft. Hookup Wire. 20 1.00 Regular Price. \$19.37 \$11.90 Our Price.



Original Baldwin Phones

These are the Genuine Nathaniel Baldwin "Mica Diaphragm" Phones, complete with silk cord and headband. \$9.95

Diaphragm" Type "C"
Loud Speaking
Units. Special . . . \$4.65 Value Long Range

Headset \$3.65

Made in style and design proved by use and experiment to be the best. Coil wound with about 6,500 turns of No. 40 enamel coated copper wire. Direct current resistance approximately 1,600 ohms. Impedence at average music and voice frequency (800 cycles) is \$3.65

MASTER BALDWIN Type C with head hand and cord. \$6.95
Type C unit. ... 3.95
Brandes superior headset 5.75
5000 Ohm Guaranteed Headsets \$8.50
Value 2 56.95 FORMICA PANELS Cut to Any Size

SQ. IN. 11/2c We Engrave Panels at

3c a Letter We Drill Panels at 5c a Hole

All drilling or engraving or-ders must be accompanied by drawing or template

Thordarson Amplifying TRANSFORMERS Low Ratio \$2.45

HONEYCOMB COILS

	1,500 Turns, Coto-Coil\$1.	50
	1 200 Turns Coto-Coil	.5€
6	1 000 Turns	23
	750 Turns I.	JO.
	250 Turns, Coto-Coil	75
	750 Purns	.60
		50
	75 Turns	4(
		.40
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		.11
	Antenella-Use Electric Light Socket	.15
		, 1;
	22½-Volt B Batteries (stock re-	
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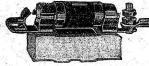
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\$7.00	value.	43 Plate Vernier \$3.9
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\$4.30	value.	43 Plate NOW 1.7
	value.	23 Plate NOW 1.4
\$3,30	value.	11 Plate NOW 1.3
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Signal Transn	Corps	Super	Sen	sitiv	e M	licro	phone	\$2.45
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The Week's Advance Broadcast Programs

Tuesday, June 12

CFCA (Eastern, Daylight Saving, 400), 8:00 P. M., Concert, The Morry Wives of Windsor," Star Or, Concert, The Morry Wives of Windsor," Star Or, Concert, Wedd, Soprano, Danweyll, Trom "La Boliene," Naomi Wedd, Soprano, Danweyll, Saving Williams, Collist, Internezzo from "Nalla", Saving Sav

Canding Aussen, "Presestra: Someware a voue a characteristic Nation Wedg, "From the South." Or chestra. Characteristic National Medical Profits of the National Medical Misister; Medical Counce, planials; Helen McKeal, whister; Vinele John': \$300.1040 P. Hour; Bedtime story, "Uncle John': \$300.1040 P. P. N., Concert, Grand RSI (Contral, 549), \$300.938 P. P. N., Concert, Grand RSI (Contral, 549), \$300.938 P. N., Concert, Grand Musical program, Agnes T. MacMockin, soprano; Estimation pluminor; Ada Weber, soprano; Estimation Pluminor, Ada Weber, soprano; Estimation, Pluminor, Ada Weber, soprano; Estimatio

O. W. Touran unuer auspiess of Lester Gunst.
WF1 (Eastern, Daylight Saving, 395). 109-2:00 P. M.,
Dinner music, Meyer Davis Bellevue Stratford Concect Urchestri; 3308-330 P. M., Musical program;
3:00 P. M., Song recital; 6:309-7:00 P. M., Safety
Edit, 6:308-8:30 P. M., Bey Scout, period; 3:304-102.
Edit, 6:308-8:30 P. M., Bey Scout, period; 3:304-102.
music, Musical program: 10:304-12:00 P. M., Dance
music, Musical program: 10:304-12:00 P. M., Dance
chestra. Representations of the control of the

P. M., Musical powering, 10.30-12.50 P. M., Dinner musics, Meyer Davis Believe Stratford Concert Organization and the property of the property

Wednesday, June 13

OFCA (Eastern, Daylight Saving, 400), 8:30 P. M., Concert; Selection from "High Jinks," Star Orchostra; The Watchman," W. R. Curry, bass: The Watchman, "W. R. Curry, bass: "Automotion of the Country Side," Orchostra, "From the Country-Side," Orchostra, "Only A Smile," W. Woods, cornelist, "Orchostra," "Only A Smile," W. Woods, cornelist, "Divictors, W. B. Curry, "Serenade," "Hiemezezo," "Hiemezezo, "Michigan," Serenade, "Hiemezezo, "Serenade," "Hiemezezo, "Hiemezezo, "Serenade," "H

Orchestra, "Only A Smitte," W. MOOIS, CHURCHES, "Indicators," W. R. CUITY, "Secended," "Internezzo," "Internezzo," W. R. CUITY, "Secended," "Internezzo, "Gasto-Tao P. M., Children's Hour, Robo-Itao P. M., Children's Hour, Robo-Itao P. M., Program presented by Overseas Location, and the Control of the Cont

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RADIO SUPPLY STORES

[71] (Eastern, Daylight Saving, 395), 1:00-2:00 P. M., member musts, Meyer Davis, Helivite Stratford Cox-cort. The second and plano research of the second and plano research of the second and plano resultant second research of the second se

b-yal-fay F. M., Children's Hour; b-yal-flow F. M., Paddotte program arranged by Dr. Edward M. Hiner-K. W. (Gentral, Daylight Saving, 345), 8:00-8:58 P. M. Twenty Mindt Englished by Lyon & Hauly Cap-cert Dopt, Mr. Twenty Mindtes of Good Reading, Rev. 9:05 P. M., Twenty Mindtes of Good Reading, Rev. U. J. Pernil, WBAP (Gentral, 478), 9:30-10:30 P. M., Bonner Square Dance. Ordinette Control of the Control of

What Time Is It?











Saving Saving Saving Saving Saving Saving

THE above clock dials are shown to clear up the misunderstanding which the various time bands and the Daylight Saving plan are creating. Although each dial registers time one hour ahead or behind of its neighbor, the exact period indicated on each dial is the same as that on every other. This chart will aid in the use of the advance programs and the schedules in the Radiophone Broadcasting Station Directory, both of which give the hours stated in the particular kind of time in use at each station. Only features are listed in the advance programs below. Much additional data and such parts of station schedules as are regular features week in and week out, will be found in the station directory which appears serially continuously on page eight.

ganist; 7:30-9:00 P. M., Concert, Courier-Journal Quartotte, Mrs. K. W. Surmen, contraito; K. W. Sur-man, tenor; Albion Cornwall, barinous; K. W. Sur-Gorawall, accompanist; Address, Capt. Amos Tra-Reading, "An Interesting Historical Episade." Pro-UK (Eastern, 360), 8:00 P. M., Concert, WHK Trio; Balson's report.

Corpwali, accompanies, and the control of the contr

Thursday, June 14

CFCA (Eastern, Daylight Saving, 480), 0-10 P. M.,
Concert; "May Day," Star Orchestra; "vision
Fugitive," Rupert Lucas, bartione, "Sonson My Modies
Star Orchestra, "Adashin, "Mally on the Shore,"
Star Orchestra, "Adashin, "Mally on the Shore,"
Lucas, "Estrance of the Boyan," Orchestra, Inc.
Lucas, "Estrance of the Boyan," Orchestra, Inc.
Control of the Control of Control of Control of Control
Lucas, "August Lucas," Wayer Lucas, "Woodland Statches," Orchestra, "Rupert Lucas," Wayer
KHJ (Pacific, 490), 2:30-3:30 P. M., Musical matines;

Positively No Body Capacity In This Circuit. Selectivity and distance be-

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Aroadia Cafe Concert Orchestra; 2:00-3:00 P. N. Musical program; 3:30-6:00 P. M. Short taller; Musical program; 3:30-6:00 P. M. Short taller; Musical program; 3:30-6:00 P. M. Short taller; WFAA (Central Arg.) cam Daddy with boys and grits, which was talled to the control of t

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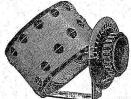
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Caroy: "Trish Lullaby." Mrs. John Wisely; "Teonpo of Minuster." Joynmond 2006. Mrs. Concert, Mary Mrd S. Control. 4007 Mrs. Concert, Mary Anderson Orchestra: Margaret Monroe, pianatt; Italy 3-80 m. Sopramo; Cifford Gorman, orranist; 7:30-30 m. Sopramo; Cifford Gorman, Organist Saving, 509, 10-20 P. M. Child Waffare Talk. S. W. McGill. 400 p. Sopramo; Sopramo; Cifford Gorman, 100 m. Sopramo; Sopramo; Cifford Wiley, 8:00-12:30 P. M. Musical Programs; Sopramo; Cifford Wiley, 8:00-12:30 P. M. Song and piano; Cifford Wiley, 8:00-12:30 P. M. Song and Diano; Cifford Concert, Norwood High, Savina, 309), 10-30 P. M. Concert, Norwood High, Savina, 409, 10-30 P.

and neuces; Source Dolls, Schemens; Alexander, Property, WMAQ (Contral, Daviller); Stemhens; Alusical program, M., Talk, Rockwell Stemhens; Alusical program, Cleavers Operatic Quintet; Talk to December 19:15-10:200 P. M., String Quartet, Paul Vorset, Stember 20:200-20

Double's Objection Quintet; Talk to Boy Scouts, Gilbect non, directle 300 P. Mr., String Quartet, Paul Verwoor, Green George, String Cartes, Paul Verwoor, Gentral, 494), 3:30 P. Mr., Edmestimal talk, Karl G. Stephan; 5:48 P. Mr., Chimes ceneert. WOO (Eastern, Daylight Saving, 509), 11:09-11:30 P. Mr., Orner redital, Mary E. Vogt; 12:300-12:55 P. Mr., Advis-5:00 promise, Wanamaker Tea Room Orchestra, 14:405-500 promise, Wanamaker Tea Room Orchestra, 17:45 P. Mr., Mr., Orner cettal, Mary E. Vogt; 7:300 WMJ (Eastern, 5:00), 8:30 P. Mr., Concert, Newy Orchestra, The Town Crier: Musical program, James E. Brown, tenor; Edith Moore; pianist; Viola Bridges, Contrallo.

Friday, June 15

CFCA (Eastern, Daylight Swing), 400), 8:00 P. M.,
Concert; Selection from "Griste Lore," Star Orchestra; "Danny Boy," "Wood Concert; Serander,
"Only a Smile," W Wood Concert, Serander,
"Only a Smile," W Wood Concert, Serander,
"Orchestra; "Contratio solo, Katb Gray," W Wood
Orchestra; "Audid Robin Gray," W Wood
Orchestra; "Audid Robin Gray," W Wood
Orchestra, "Admire Laurie," Kate Jackson; "Dreamint," "Dreamint,"

Orchestra, Annie Laurie, Arie Jacason; Drum-ing, Orchestra, 100, 2.20-3.30 P. M., Musical matines, Florence, 100, 2.20-3.30 P. M., Musical matines, Florence, 1045-726 P. M., Program arranged by Lincola Fax; High School

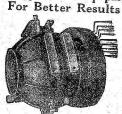
(Continued on page 9)



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Connecticut:
Bridgeport, WKAX
Greenwich, WAAQ
Hartford, WDAK
Middleton, WOAS
New Haven, WPAJ
Waterbury, WQAD

Wilmington, WHAV, WOAT District of Columbia: Washington, WABE, WDM, WEAS, WHAQ, WIL, WIAY, WJH, WJU, WJU, WJW

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Miami, WQAM
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West Palm Beach, WKAH
Winter Park, WRAF

Georgia: Atlanta, WGM, WSB College Park, WDAJ

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Boise, KFAU, KFDD, KFFB
Kellegg, KFEY
Moscow, KFAN

Illinois:
Belvidere, WOAG
Carchuse, WCAZ
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Quincy, WCAY
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Evansville, WAOU
Greeneastle, WLAX
Huntington, WHAY
La Porte, WRAF
Marion, WHAQ
Mishawaka, WOAO
Minnice, WJAF
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West Lafayette, WBAA

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Trypicka, WJAG, WPAM
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WEAB
KFHI, WAAP, WEAH.

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Medford Hillside, WGI
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Lansing, WHAL

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WRAH Moorhead, WPAU Northfield, WCAL St. Cloud, WFAM St. Paul, AV7, WAAH

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Oak, WAW, WOAL, WOAW, WOU.
RUSHVILLE, WYAL, WOAW, WOU.
Livitevisty Flace, WCAJ Nebraska:

Utica, KFGV York, KFDR Nevada: Reno, KDZK Sparks, KFFR New Hampshire: Laconia, WKAV

New Jersey: New Jersey;
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Jersey City, WNO
Morestown, WBAF
Nowark, WAAM, WRS,
N. Plainfield, WEAM
Ocean City, WIAD
Paterson, WBAN
Trenton, WMAL, WOAX

New Mexica: State Cellege, KOB

State Cellege, KOB

New York:
Albary, WN, WPAS
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Cazenovia, WMAC
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KO

WNAN
Tarrytown, WRW
Troy, WHAZ
Utica, WSL
Waterford, WFAG

North Carolina:

North Dakota: Fargo, WDAY, WPAK Grand Forks, WOAB Mayville, WRAC Wahpeton, WMAW

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Cannin. WWD
Cannin. WWD
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WEAW
WLW. WMJH. WSAJ
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Cleveland. T.DPM, WHK. WJAX
Cleveland. T.DPM, WHK. WJAX
Cleveland. WAL
WAL
Dayton. WAL
WABD, WAL
Fairfield, WID
Frenchile, WID

Norman, WNAD Okemah, WKAK Oklahoma City, WKY Okmulices, WPAC Tulsa, WGAF, WLAL Oregon:

Pennsylvania:

Pennsylvania:
Allentown, WCBA
Allentown, WCBA
Allentown, WCBA
Allentown, WCBA
Lorentown, WCBA

Rhode Island: Cranston, WKAP Edgewood, WEAG Providence, WEAN, WJAR, WRAH

South Carolina:
Charleston, WFAZ, WNAQ, WOAH
Clemson College, WSAC
Greenville, WQAY
Orangeburg, WGAM

South Dakota: Brookings, KFDY Platte, KFIJ Rapid City, WCAT Sioux Falls, WFAT Yermillion, WEAJ

Tennessee: Knoxville, WNAV Lawrenceburg, WOAN Memphis, WKN, WMC

Texas : Texas:
Abilene, WQAQ
Amarillo, WDAG, WRAU
Austin, WCM, WNAS
Beaumont, WMAM
College Station, WTAW
Dallas, KFFZ, WDAO, WFAA,
WRA Dallien KFFZ, WDAO, WFAA,

El Paso, WDAH, WPAT
Fort WOTH, WRAP, WPA
Gulvetion, WHAB, WHAA
FOR WHAB, WHAA
WHAA, WSAY
LARGO, WKAL
FOR WHAA, WSAY
FOR WHAP
FOR ARIONIO ASS, WCAR, WAOI
TYPIC, WOAD
WAD, WAAD, WKAF
WACO, WIAD, WAAF

Utah: Ogden, KFCP

Salt Lake City, KDYL, KZN Vermont: Bellows Falls, WLAK Burlington, WCAX Springfield, WQAE

Virginia: Arlington, NAA Blacksburg, WEAE Fortress Monroe, WNAW Portsmouth, WOAQ Westhampton, WQAT

Weshampton, WGAT

Washinaton:
Aberdeen, KNT
Bellingham, KDZB
Ellingham, KDZB
Everett, KFBL
Everett,

West Virginia: Clarksburg, WHAK

Wisconsin WISCORSIN:
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Kenosita, WOAR
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WHAD, WHAO
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Superior, WFAC
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Wyoming: Casper, KFCQ, KFDF Douglas, KFEV Laramie, KFBU

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(NOTE—The third and last part of the schedule list appears below. Next week the first part will appear.) WIAX (Levaland, O. 380 meters, 1,060 ml. Union Trust Co. Siogan, "The Ware From Lake Eric." Daily ox Sat pm and Sun, 9-945 am, 11-01-36, 22-435, pp., 3-436, music, financiar, propris, news. Tues, 25-436, pp., Thurs, 813-16-160 pp., entertulment.

Eastern.
WIAZ, Chicago, III. Chicago Radio Lab.
WJD, Granville, O. 229 meters. 100 mt. Denison
Univ. Fri, Sat, 5-6 pm, music, educational lectures.

WiAZ. Chicago, III. Chicago Radio Lab.
WJD, Gararrille, O. 229 meters. 100 mi. Denison Univ. Fri. Sat, 5-6 pm, music. educational lectures. WJD, Gararrille, O. 223 meters. 200 mi. White & Bower Co. Daily ex Sur, 11:36 am, erpocits; 1-2 pm, music. 100 pm, contern. 100 pm, conter Lasoff,
WKAF, Wichita Falls, Tex. 360 meters. W. S. Radio
WKAF, Wost Palm Beach, Fla. 360 meters. 200 ml.
Planet, Radio Co. Slogna, "The Heart of Florida."
Chib. "Alligator Hop." No regular schedule,
WKAK, Ökemah, Okla. 360 meters. Oktuskee County

Nove,
WAAL Orange, Tex. 366 meters. Gray & Gray. AlaWKAB. Journey Ala. 360 meters. 200 ml. AlaWKAB. Sourcement Ala. 360 meters. 200 ml. Alamusic, news. Central.
WKAP. Grandston. Kernelle, 1900 meters. 1,800 ml.
Radio Corp. of Porto Rico. 360 meters. 1,800 ml.
Radio Corp. of Porto Rico. Tues. 834 7,389-9 mj.
entertainment. Bastern.
Celliege St. Lunsing. 31th. 360 meters. Mich. Agri.
Celliege St. Lunsing. 31th.

College WKAS, Springfield, Mo. 360 meters, 100 mi. L. E. Lines Music Co. Sloran. "Queen City of the Ozarks." Mon, Frl. Sat, 8-9:15 pm, music. Central. WKAV, Laconia, N. H. 360 meters. Laconia Radio

WKAW, Beloit, Wis. 226 meters. 100 mi. Turner Cycle Co. Daily 12-12:15 pm. 7-7:30, concert.

WKAY, Bridgeport, Conn. 380 meters. 75 ml. Wm., A. Macfarlane. WKAY, Bridgeport, Conn. 380 meters. 100 ml. Brenau College. No definite schedule. College activities. Thurs, 8:30 pm, concert. Eastern. WKC. Baltimore, Md. 380 meters. 100 ml. Jos. M. Zamoiski Co. Trues. Thurs, 8:30 pm. 200 meters. WKC. Mcmphis, Tenn. 300 meters. Riechman-Croshy WK. Memphis, Tenn. 300 meters. Riechman-Croshy Ch. Mcmphis, Tenn. 300 meters. Riechman-Croshy

WKY, Oldshoma City, Olda. 360 meters, 500 mi. WKY Radio Shop. Dally er Sun, 9:45-10 am. 10:15, 11:16, 11:45, 12:15 pm. 11:5, mariest, weather; 2:20 pm. concert; 7:30 pm. sports, specials; 9 pm. weather, news Tues, Thurs, 9:1, pm. concerts, Central. WL2, Fatifield, O. 360, meters. U.S. Army, WLAC, Ralting, St. G. Mariest, V.S. Army, WLAC, Ralting, St. G. Mariest, V.S. Army, Charles, V.G. Mariest, V.G. Mari

the North." Club. "Tooth Brush." Daily ex Sun.
19:30 am, 19:30, 10:30, 11:30, 13:30 pm, 2:23, 4:20,
19:30 am, 19:30, 10:30, 11:30, 13:30 pm, 2:23, 4:20,
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WLAT, Buttington, 1a. 369 meters. Radio and Specialty Co. WLAV, Pensacola, Pla. 360 meters. 200 mir Elec. Strop, Inc. Dally ex Sun, 8-9 pm, music, entertain-Strop, Inc. Dally ex Sun, 8-9 pm, music, entertain-WLAW, New York, N. Y. 369 meters. New York Pollee Dood. WLAY, Patricascale Ind. 231 meters. Greencastle Gommany Broadcasting Station. (Putham Elec. Co. Marchard Benediction of the WLAY, Patricascale Ind. 230 meters. Northern Commonwords Co. Co. 100 ml. 248 meters. Hutton & WLAY, Patricascale Ind. 240 ml. 248 meters. Hutton & WLAY, Patricascale Ind. 240 ml. 240 ml.

Marcetin. No definite schedule.

Wald, Bock Port, Mo. 360 meters. Atchinson Counts
Mail. Dartmouth, Mass. 360 meters. Round Hills
Mail. Dartmouth, Mass. 360 meters. Round Hills
Radio Corp.

Wald, Corp.

Wald, Corp.

Wald, Corp.

Wald, Liberal, Kan. 360 meters. 75 mi. Tucker
Elec. Co. Daily ex Pri. Sun, 730-339 m, music.

Wald, Hills of Prince Control of Corp.

Wald, Hills of Prince Control of Corp.

Wald, Hills of Mot. Corp.

Wald, Kansan City, Mo. 275 meters. 105 mi. General

Temporarily discontinued.

Wald, Kansan City, Mo. 275 meters. 600 mi. Kansas

City Daily Drovers Pelegram. Daily ex Sun, 8.15

Wald, Kansan City, Mo. 275 meters. 600 mi. Normarkets, news. Central. 13 pm. 116, 215, weather

markets, news. Central.

Wald, Konsen, Corp.

Wald, Trenton, N. Y. 360 meters. 100 mi. Trenton

Holwe, Co. Slogan, "The Home of Good Music."

Mon, Tutt, 7:30-9 pm, music, lecture. Eastern Day
Wald, Trenton, N. J. 256 meters. 100 mi. Trenton

Holdwe, Co. Slogan, "The Home of Good Music."

Mon, Tutt, 7:30-9 pm, music, lecture. Eastern Day
Wald, Easton, Pa. 380 meters. 600 mi. Nor
Services. Central.

WALD, Staton, Pa. 346 meters. 600 mi. Utility Bat
Ley, Service of Control of Contro

caso Daily News (Fair Department Store) Daily ex Sun, Mon, 7-8 pm, 9:15-10. Daily ox Sut, Sun, Mon, 7-8 pm, 9:15-10. Dails ox Sut, Sun, Mon, 7-8 pm, 9:15-10. Dails ox Sut, Sun, WOAG, Lina, 0. 266 meters. Maus Radio Cás. WMAR, Waterloo, Lova. 366 meters. Waterloo Electroman Control Daily ex Sun, 11:20 an, 3:29 pm, Control Daily ex Sun, 10 an, 12 weather, markets: 7 pm, weather, Aolio Theatre, Institute, Daily ex Sun, 10 an, 12 weather, markets: 7 pm, weather, Aolio Theatre, Institute, Con, Daily, 5:49 pm, sports, news, Bri, WMAY, Wahneton, N. D. 360 meters. 30 mt. Waterloop, Control Daily, Cont

music Tues, Wed, Thur, 10:36-11 am, chaoel. Eartwith Membhis, Tenn. 50 meters, 200 nm, The
Commercial Appeal. Stogan, "Station WMC, Afrac
phils, "Down In Dike" Club, "Middinith Frolic."
Daily ox Sun, 3:36 am, 12 m, 3 pm, weather, marstation of the Commercial Commercial Commercial
WMH, Clincinnati, O. 348 meters. Precision Equipment
WMH, Clincinnati, O. 348 meters. Precision Equipment
WMH, Clincinnati, O. 348 meters. Precision Equipment
Thes, Fig. 11 pm, Midnith Frolic.
WMH, Clincinnati, O. 348 meters. Precision Equipment
Thes, Fig. 11 pm, Midnith Frolic.
WMH, Clincinnati, O. 348 meters. Precision Equipment
Thes, Fig. 10 pm, 10

Thurs, S-9, concert. Eastern.
WAAB, Dewling Green, Ky. 300 meters. 500 ml. R. D.
WAAB, Dewling Green, Ky. 300 meters. 500 ml. Shepard
Stores. Daily ex Tues. 4-5 pm. 47:30-3. muslc.
Cettral.
WAAC, Boston, Mass. 278 meters. 200 ml. Shepard
Stores. Daily ex Sun. 4-5 pm. dance muslc. Mon.
WAA, S. Hoston, Mass. 278 meters. 200 ml. Solida.
WAG, Sal. 9-41 pm. Sun. 1-12 am. 240-1 pm. 6:398
S:30-7 pm. church services. Eastern.
WAAD, Norman, Okta. 350 meters. 200 ml. Okta.
WAAL, Omaha. Neb. 360 meters. L. Rockwell.
WAAL, Omaha. Neb. 360 meters. 1,000 ml. Syraconcert, agrorams, etc. Eastern.
WAAG, Charleston. S. C. 380 meters. Charleston
WAAP, Stracuse, N. S. 286 meters. 200 ml. Wittenberg, College.

WNAR, Butler, Mo. 360 meters. C. C. Rhodes. WNAS, Austin. Tex. Tex. Radio Corp. (Austin States-WARS, AUSUID. TEX. TEX. RAUGO CUPD. CAUSTIN COURS-WART, Philadelphita, Pa. 360 meters. 500 ml. Launig Bros. Co. Daily ex Sun, 12:15-1 mn. Wed. Sat. 7:30-9:30 pm. Sun. 2:30 pm. 4:30, church serrees. Eastern, Daylight Saving. WAV. Knovzille, Tenn. 360 meters. People's Tel & WNAV, Entress Monroe, Va. 360 meters. Henry Knurmann. WNAY, Anstorman, Tell Months, S. D. 360 meters, Henry WNAY, Yanktown, S. D. 360 meters, Dakota Radio, Apparatus Co. Wed, Sat, 9-10 pm, music. Central, WNAY, Baltimore, Md. 360 meters, Shipowners Radio Service.

Service.

WNI, Albany, N. Y. 360 meters, 60 m. Shotton Radio Mfg. Co., Inc. Daily ex Sun, 10-10:15 am, market reports. Wed, 83.5 mm, concert. Eastern. WNO, Jersey City, N. J. 360 meters. Wireless Tele-Phone Co. of Tunion Co. So. Fuers. Dr. Walter Harty: WOAR, Grand Forks. No. Dak. 50 ml. 360 meters. Valley Radio, Daily ex Sun, 10-11 am, 2-2:30 mm, entertainment, reports. Sun, 3-4 mm, music. church service. Gentral.

WÖAK, Frankfor, Kr. 589 meters. Collins Hardware Collins Burdware Collins

is Aut. Billion

wants Club.

WOAR, Kenesha. Wis 860 meters. He P. Lundekow.
WOAR, Sanchaba. Wis 860 meters. He P. Lundekow.
WOAR, Sanchaba. Wis 860 meters. He P. Lundekow.
WOAR, Sanchaba. Wis 860 meters. 160 mil. Bai.
Sat. 9-12 pm. dance music. Eastern.
WOAT, Wilmington, Del. 360 meters. Boyd Martell
WOAU, Farasville, Ind. 360 meters. Sowder Bowling
Plano Co.
WOAU, Omarsville, 160 meters. 1600 mil. Fernia Nat'i
VOAU, Marsville, 160 meters. 1600 mil. Fernia Nat'i
VOAU, Marsville, 160 meters. 1600 mil. Fernia Nat'i
VOAU, Manha. Nebr. 257 meters. Woodmen of the
WOAX, Teuton, N. J. 240 meters. 300 mil. F. J. Wolf.
Intermittent schedule.
WOAX, Teuton, N. J. 240 meters. 300 mil. F. J. Wolf.
Intermittent schedule.
The Woard of the West Beslins and In the State Where the Tall Corn Grows.
WOC, Davenport, Ia. 484 meters. 1,000 mil. Palmer
Beslins and In the State Where the Tall Corn Grows.
Wo Co. Davenport, Ia. 484 meters. 1,000 mil. Palmer
Weather; 12 m. chinnes; 2 mm. markets; 330, talk;
543 chilmes, ex. Wed; 530, Sandman, sports; 7,
weather; 12 m. chinnes; 2 mm. markets; 330, mais;
543 chilmes, ex. Wed; 530, Sandman, sports; 7,
church services; 8, concert. Central.
WOK, Pine Billfi Ark. 860 meters. 500 ml. John
WOK, Pine Billfi Ark. 860 meters. 500 ml. John
WO, Dhiladelphia, Te. 800 meters. 500 ml. John
WO, Dhiladelphia, Te. 800 meters. 500 ml. John
WOS, 11:30, 12:30 pm. 2, 7:30, time signals, renorts
cent. State Order, Leastern, Daylight Sawing.
Wetter, 12-1 pm. Court of the Sandar Mon. Fri. 8-11
pm. music. concert. Eastern, Daylight Sawing.
Wetter 12-1 pm. Court of the Sandar Mon. Fri. 8-11
pm. music. concert. Eastern, Daylight Sawing.
Wetter 12-1 pm. Court of the Sandar Mon. Fri. 8-11
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pm. music. concert. Eastern, Daylight Sawing.
Wetter 12-1 pm. Court of the Sandar Mon. Fri. 8-11
pm. music. concert. Eastern, Daylight Sawing.
Wetter 12-1 pm.

June 16, 1923 STATION SCHEDULES WOS, Jefferson City, Mo. 441 meters. 1,500 mi. Misson; Stafferson City, Mo. 441 meters. 1,500 mi. Misson; Stafferson Stafferson, "Watch Out State." Daily or Sun, first 15 min of every hour from 8 am.-2 mp, markets. Daily, 5 m; music, harters, Mon, Wed, Fri, 8-9:60 pm, concert. Central. Web. 350 meters. Meteryolism Utilities. tomaha, Neb., 360 meters. R. B. Howell. Ft. Worth, Tax. 360 meters. 1,006 ml. Fort tith Record. Temporarily discontinued. A. Waco, Neb. 360 meters. Anderson & Webster Elec. Co. WPAB, State College, Pa. 360 meters. Pa. State Col. Okmulgee, Okla. 360 meters. Donaldson Ra-Chicago, Ill. 360 meters. 500 ml. W. A. Chicago, Ill. 360 sets. 500 ml. W. A. Chicago, Ill. 360 sets. 12:30-2 pm, 6:30-7 music. Tues, Wed. 8-9 pm, concert. Turs. 9-10 pm, concert. Sun, 2:30-3:30 pm. Central inthe Saving. Wretonia, Cang. Wed 8:5 pm. concert. Thurs, Fri. 9:10 pm. concert. Sun, 2:30-3:39 pm. Centert. Buylight Saving. WPAF. Council Bluffs, Ia. 360 meters. Peterson's WRAG. Council Bluffs, 1a. 360 meters. Peterson's WRAG. The WPA1, Hudpensette, and WPA1, Wanpace, Wis. 360 maters. 3,000 ml. Wisconsin Dept. of Markets. Daily ex Sun, 9:30 am, 10:30, 11:30, 21:30 pm, 2:30, 4:30, markets, weather, weather, weather, which was supported by the state of th Fargo, N. D. 360 meters. North Dakota iltural College. Columbus, O. 286 meters. Superior Radio & WPAL, Columbus, 5. 256 meters. Superior Radio & Tell. Squilp. Corran. 550 meters. Averbach & Guet WPAG, Tell. Squilp. Corran. 550 meters. Stephen & Gueta WPAG, Prothury, Md. 300 meters. General Sales & Phalimetrias Corr. 50 ml. 360 meters. General Sales & Phalimetrias Corr. 50 ml. 360 meters. R. A. Ward, Phys. Corr. 50 ml. 360 meters. R. A. Ward, Fri. 8 pm, entertainment. Sun, 11 cm, 8 pm, church services; 3 pm, music, talk. Central. 4 pm, tric Co.

WPAT, El Paso, Tex. 360 meters, Saint Patrick's Cathedral.

WPAU, Moorhead, Minn. 360 meters. Concordia Col-WPAZ, Bangor, Me. 360 meters. Bangor Radio Lab. WPAZ, Charleston, W. Va. 273 meters. Dr. John R. WPAZ, Charleston, W. Va. 273 meters. Dr. John H. Koch, w. Lebanon, O. 300 meters. L.500 mi. Nus-Koch, w. Lebanon, O. 300 meters. L.500 mi. Nus-What Markett Ma Gish.

WQAD, Waterbury, Conn. 242 meters. 30 ml. The
Wintfall Elec. Co. Mon, Wed, Fri, 5:30-5:45 pm,
music, Boy Scout news. Eastern.

WQAF, Sandusky, O. 240 meters. Sandusky Register.

WQAF, Sandusky, O. 240 meters. Sandusky Register.

Elect. Eng. Co.

Elect. Eng. Co.

Times News. Arbor, Mich. 360 meters. Ann Arbor
Times News.

WQAK, Dubuque, Ia. 360 meters. Appel-Highey Elec.
Co. CO.
WQAL, Mattoon, Ill. 360 meters. 100 mi. Coles County
Tel & Telg. Co. Slogan, "The Buckle on the Corn
Belt." Tues, Thurs, 9-11 pm, music, lectures. Central.

WQAM, Miami, Fla. 360 meters. 500 mi. Electrical
Equip. Co. Slogan, "It is Always June in Miami."
Tues, Thurs, 8 pm, music. Sun, 9-11 pm, music.
Factor. WOAM, Minm, File. 360 meters 560 m. Electronic Bould, Co. Stogan, The Alary 21 m. music. Eastern Day, 280 meters. 360 m. Section, 110 m. music. Eastern Day, 280 meters. 360 m. Section, 110 m. music. Day, 280 meters. 360 m. Section, 110 m. music. Day, 280 m. M. Section, 110 m. music. Day, 280 m. M. Section, 110 m. Sec

School.
WRAD, Marjon, Kans. 360 meters. Taylor Radio Shop.
Daily, 5:15-5:45, markets, weather. Mon. Thurs, 8
pm. concert. Sun, 5-6 pm. Central,
WRAF, La Forte, Ind. 224 meters. Radio Club. Inc.
WRAP, Frovidence, R. I. 506 meters. Stanley N.

WRAK, Escanaba, Mich. 360 meters. Economy Light WRAL, Escansos, Airch. 900 meters. Economy Light
WRAL, St. Croix Falls, Wis. 248 meters. Northern
States Power Co.
WRAM, Wastrolo, Ia. 200 meters. 100 ml. Black
Hawk Electrical Co.
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Hawk Co.
Hawk Co.
Hawk Co.
Hawk Electrical Co.
Hawk Co

WRAU, Amarillo, Tex. 360 meters. 50 mi. Amarillo Daily News. Tues, Thurs, 8:00-9:00 pm, music.

Central New Yellow Spring, O. 360 meters. Antioch ColWRAV, Yellow Spring, O. 360 meters. 100 mi. Radio
Sales Corp. Dally ex Sun. 11 am, music; 12 m.
reports; 3:30-5:30 pm, reports, music; 7. bedtime,
Sales Corp. Dally ex Sun. 11 am, music; 17 m.
reports; 3:30-5:30 pm, reports, music; 7. bedtime,
Sales Corp. Dally ex Sun. 1 pm, chapel. Bastern.
WRK. Hamilton. O. 360 meters. 1,000 mi. Deron
WRK. Hamilton. O. 360 meters. 1,000 mi. Deron
WRK. Scheinctday, N. Y. 800 meters. Union College
WRK. Scheinctday, N. Y. 800 meters. 200 mi. Univ. of
WRK. Scheinctday, N. Y. 800 meters. 255 mf. Federal
Hill. Mon. Taurs, 8:30-8:35 pm, 9-5:30, Univ. news.
Like, music. Central
WRK. Dallas, Tex. 360 meters. 250 mi. Federal
Hills, of Radio, Telege, T-rills, police news; 8-8:30,
music. Sun, 11 am, church service 7:5 pm, police
WRK. Scheincher Scheincher Scheinsteller, 1,000 ml. Tarrytown Radio & Research Laboratory. Slogan, "Everything in Radio, Telege, Wed, Till Spholis 120 mi. Sun,
WRK. Scheinsen College, S. C. 360 meters. Southeast
WRAC, Clereson College, S. C. 360 meters. Clemson
WRAL, Calcennet, O. 309 meters. United States
WRAL, Cleronnet, O. 309 meters. United States Central. WRAV, Yellow Spring, O. 360 meters. Antioch Col-

2.3

WSAH, Chicago, III. 248 meters. A. G. Leonard, Jr. Daliy ex Sun, 5:30-6:30 pm. Frl, 8:45-10. Central Darlight Saving. WSAI, Cincinnati, O. 309 meters. United States Playing Card Co. WSAI, Grove City, Pa. 369 meters. 700 ml. Gorce City College, Citylege activities. No definite schedule. WSAL, Browley Lind. 246 meters. Franklin Else.

WSAP, New York, N. Y. 360 meters. Seventh Day Adventist Church, Fri, 7:30-9:30 pm. Sat, 10:45-12:45 am. Sun, 7:30-9:30 pm. Eastern Dayligh Saying WSAV, Houston, Tex. 360 meters. Clifford W. Vick. Temporarily discontinued.

WORD, WESTERLEY SON meters. 15.00 ml. Sanger Brow. Daily ex Sun, 11 ann, weather; 1.300 pon. entertainment. Wed, Saf, 8 pm, music, entertainment. Wed, Saf, 8 pm, music, entertainment. Wed, Saf, 8 pm, music, entertainment. Weight, Inc.
WHAY, Lardo, Tex. 360 meters. 150 ml. Wormser Bross. Daily ex Sun, 4:30-5:30 pm, music. Mon. WMAY, Chicago, Ill. 360 meters. Margold Gardens. WWB, Canton, O. 360 meters. 300 ml. Daily News Frinting Co. Tues, Thurs, S-3 pm. Dastern. Prof. Word Co. Wed, 8-10 pm, music, lectures. Eastern. WWI, Detroit, Mich. 517 meters. 15:00 ml. The Detroit News. Daily ex Sun, 3:36-3:5 nm, household 11:55-12 (mrs, 12:06-12:45 pm, 3:3-3), music, 13:30-3:56, weather; 3:36-4:15, market; 6-4, sports. April 22, and every other week, 8:30-10 pm, concert, 7:30, church services. Effill in weeks, 7:4-3:50 pm, concert; Sun, 11 am, 5:30, church services. Eastern. WML, New Orleans, La. 360 meters. Loyola Unit. The first part will appear again next week.

ADVANCE PROGRAMS

(Continued from page 7) (Central, 546), 8:00 P. M., Opera, "The Fencing

KSD (Central, 540), 8:00 P. M., Opera, "The Fencing Master," Master, Master, Master, Marchander, Control of the Control of the

cert Orchestra; 3:00 P. M., Concert; 4:30 P. M., Alusical program; 6:30,7-00 P. M., More Davis Consistance and Consistance and

director; 9:45-10:55 P. M., Organ recital, Clarence E. Bawdon.
WWJ (Eastern, 580), 7:50 P. M., Concert, News Orchestra; The Town Crier; Musical program, Althea
Bird., soprano; Dennis Taylor, bartiono; Florence
Adams, pianist; Percival Peters, teror.

Saturday, June 16

GFCA (Eastern, Daylight Saving, 400), 8:90 P. M., Concert; "Mirella," Star Orchestra; "We Red-Coat Soldiers, "Alfred Butler, baritone; "Vimness Mel-ody, "Mannie Roth, violinist; "To Thee," Orchestra: Baritone Solo, Alfred Butler, "La Berceuse," Woods, ecrastist: Selection from "San Toy" Or-chestra; "Meditation" from "Bais," Harry Adashin

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3/6" THICK 2 PER SQ INCH
1/4" THICK 2 1/2 PER SQ INCH
1/4" THICK 4 PER SQ INCH
1/2" THICK 5 1/4 PER SQ INCH

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violinist, Baritone solo, Alfred Butler; Intermesco violinist, Baritone solo, Alfred Butler; Intermesco KH II or Cartalleda Rangana P On establistica Managana P On Marita Managana P On State Managana P On P Managana P On Managana P On Managana P On P Managana P N Managana P P Manag

Unclo Wip; 8:00 P. M., Short tanks and musical program. (MAR Central, Daylight Saving, 447), 7:30-8:00 P. M. Alton the Red Cross, Captain Hist; Arthur Mich Central, 400, 8:30 P. M., Concet, Washington Syncostors, H. H. Guinett, director.

WOC (Central, 480), 3:30 P. M., Educational talk, C. C. Alti, 5:45 P. M. Chines concers, 1:1:30-1:1:30 A. M., Organ recital, Mary E. Vogt; 12:00-12:35 P. M., Luncheon music, Wannaker Tea Room Orchestra; 4:445-5:50 P. M., Organ recital, Mary E. Vogt, 19. Vogt.

Sunday, June 17

Sunday, June 17

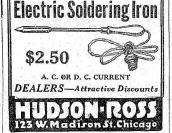
WEAP (Central, 478), [1:00 A. M., Church services, Pirst Methodist Church, Rev. J. W. Bergin, pastor. Will Foster, organist.

WDAR (Eastern, Daylight Saving, 395), 1:00 P. M., Organ receits, William Kaise, organist.

WDAR (Eastern, Daylight Saving, 395), 1:00 P. M., Organ receits, William Kaise, organist of First Presbyterian Church, Dallas; 9:30-10:00 P. M., Organ receits, William Kaise, organist of First Presbyterian Church, Dallas; 9:30-10:00 P. M., Scored concert, Singer from Baskell Avenue Methods, W. M. Sacred concert, June 10:11:100 M., Concert, Lose Star Five Orchestra.

WEI (Eastern, Daylight Saving, 995), 10:435 A. M., Charcinge Edward, Macastroy, Juniniar, 4:30 P. M., Charcinge Edward, Macastroy, Juniniar, 4:30 P. M., Charcinge, Starter, Suljight Saving, 360), 4:50 P. M., Charch services, 9:30 P. M., Cogan recital.

WGI (Eastern, Daylight Saving, 360), 4:50 P. M., Charch Saving, Saving



Monday, June 18

WBAP (Central, 476), 9:30-10:30 P. M., Concert. West

WSAP. (Central, 476), 9:30-10:30 P. M., Concert, West Taxas Orchestra.

"DAR (Eastern, Daylight Saving, 395), 12:00-12:54 P. M., Organ rectinal, Stanley Theatre; Associated Carlo Manager and C

British Broadcasters Number 260

British Broadcasters Number Zou MANCHESTER, ENG.—About 260 Radio manufacturing firms have become members of the British Broadcasting Company, states Sir W. Joynson-Hicks in Parliamentary Debates. The number of types of broadcasting receiving apparatus approvade by the Fost Office is 1,450. The number of Radio licenses at present issued is approximately 115,000, of which about 80,000 are in receipt of receiving sets bearing are in receipt of receiving sets bearing the trade mark of the British Broadcast-ing Company.

Recruit Reserves by Air CHICAGO.—Recruiting by Radio has recently accomplished marvelous results for the Illinois Naval Reserve. The Zenth-Edgewater Beach hotel station, WJAZ, has broadcast several talks by Capt. E. A. Evers, commandant of the reserve. Practically the entire quota has been filled as a result.



Standard, threaded rubber, Willard's specially adapted for use with WD-11 Tubes. Supply current at 2 voits to one WD-11 Tube for 210 hours on a single charge. Rechargeable. Braud new, size 4x5½x7 inches—Chi-Rad guaranteed.

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These same Willards can be adapted to deliver 8 volts for pure D. C. for C. W. Transmitters. Better than a generator because no filter is necessary. Much less expensive.

In lots of 40 (320 volts) . \$160.00 (Better prices on larger quantity) Specify dry or charged when ordering

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Vol. V

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PUB

Future Possibilities

Future Possibilities

Applicable to Business and Social Life

FUTURE possibilities of Radio are inconceivable.

Various principles which will make it more applicable to business and social life are having considerable research. The supreme inventive genius of the country, the greatest organizing ability and the most powerful resources at hand are now at the service of the new art, with the result that Radio has made greater strides in the past two years than in twenty years previous.

Receiving Sets in Camp

Broadcast Concerts Much in Favor by Vacationists

O'NE feature of vacationing this summer in out-ofthe way places where mail and train service is
infrequent but Radio instant is the fact that farmers
throughout the country who cater to summer boarder
trade are installing Radio sets. Of course countless
farm homes in the land are already equipped with
sets, many of which are high powered ones, which
have been in use the year around. Now other farmers
realize that in order to get the vacation boarder trade
this year he must add Radio to his other attractions.
Radio baseball fans who feel they cannot exist
without at least being in touch with the results of
the game by wire and who begrudge taking a few
weeks' rest in the country because of the delays in
receiving returns, rejoice in the news that even though
they are buried in forest's depths, a few turns of the
dalas will give them not only baseball returns but the
latest market reports and news.

There is practically no limit of localities where
Radio can be brought in by portable sets. Sets can
also be put in motorboats, cances and rowboats with
equal success and, as tests show, these sets receive
as well as any shore station.
Confirmed Radio bugs who had begun to fear they
could not play with the dials if they took a vacation
this summer have changed their minds and are now
actively engaged in preparing to enjoy their "off to
the country" period with the knowledge that they can
sit around the eamp fire after a day's pleasure and
listen to the best entertainment programs.

Radio to Outdo the Wires
Cables Are Becoming Obsolete, Seemingly
The success of the Radio talk across the Atlantic
is a distinct step toward a complete globe girdling
system of Radio. A distance of 3,400 miles across
land and sea was bridged by a Radio conversation.
The demonstration is vivid and dramatic proof of the
giant strides being made in the improvement of Radio
communication. Indeed, so rapid is this progress tha
laymen find it hard to appreciate its full significance.
It is planned in the near future to have President
Harding and King George engage in a little transatlantic chat in the interests of science. The outlook
is that telegraph wires and submarine cables must
eventually give way to the more practical and less
expensive system of long distance communication without wires.

Valvel transatientic Radio communication is still

expensive system of long distance communication without wires.
Verbal transatlantic Radio communication is still more distant, in view of the fact that the number of available wave lengths is so limited. Now, only a few conversations can be carried simultaneously over the same wave length. The danger of "crowding" the air with messages is very apparent and the government is taking steps to regulate Radio communication. However, land and sea Radio telegraph companies are feverishly striving to produce apparatus which will insure a round-the-world, 24-hours-a-day service. No one can doubt, in view of recent improvement, that these difficulties will eventually be overcome.

come.

At the present time not only do the land and sea telegraphs circle the globe, but Radio does likewise. However, only messages involving the dash-and-dot signals can be transmitted around the earth—Radio telephony has yet to be perfected to a degree permitting a message to be telephoned around the world. Yet Radio as a whole is affecting geography by linking up the continents with ether waves and thus bringing people nearer together. The days of the land and sea telegraph seem numbered—their wires are doomed. At some future day a new generation may recover a disarded cable from the depths of the ocean and smile to think that how crude were our methods of communication in the old days. cation in the old days.

RADIO INDI-GEST

WALLA WALLA INDIGEST STATION ANNOUNCES FIRST NIGHT PROGRAM

WALLA WALLA.—Positively unique in all respects is the opening program of Indigest's brand new slightly used broadcaster recently erected here when it was built. The program, it was reported to a special indigest reporter in an especially arranged interview, will be held on the many program of the state of the state

In Quest of the Kanoofis Part I-The Search Begins



A Kanoofis is a funny thing, and very hard to find. (Look, look)
There are only three in the whole wide world so bear this fact in mind. (Isn't it terrible?)
Found first in the fork of a goofer tree not far from old Madrid, (Who did?)
Where for years and years this little thing was tucked away and hid. (Now, you find me.)

I'll tell you a tale of a Radiophan who tried to build a set.

(Go on.)

He hunted high and low for parts but there's one he couldn't get. (How sad!)

This part was called a Kanoofis and he tried and tried in vain. (Oh, ma.)

Until one day he heard someone say that one could be found in Spain. (Yes, we have no strawberries.)

So he left one day in June, la, la, for the land of the Matador. (Sailing, sailing, over the bounding main.)

Resolved to get what he wanted, if it cost a fortune or more. (Change a hundred?)

more. (Change a hundred?)
On reaching Spain this Radiophan went straight to the Onion King. (A horse, a horse, or a bicycle.)
Who promised to give them help of the Kanoon's or anything. (The tradest king.)
The King was a mighty more than the tradest king.)
The King was a mighty more than the tradest king. The tradest had been a mighty more than the forestope mails.)
In fact he was the inast type of onion in the land. (Sliced So with the help and such however much, they started on their quest. (Forward, march!)
First going North, then going South, then East; last going West. (Directional I would say.)



After many days of travel, they stopped near a Russian river. (Shushwash.)

Because these boys were famished, and had to eat their liver. (Blah, Blah.)

Then on again went the searching train, till they came to a forest great. (Wood, wood.)

"Tis here," said one, "where we'll see some fun, or else we'll know our fate." (Oh, lady, lady.)

ROZEE. —ROZEE.

(Search to be continued.)

Moral: Always Wear Your Headset

deer endy: 1 hav bekum such a konfirmed radeeo fan that I allus wear my hedset 2 bed with me, last night i broke the durn thing and konsequentially had to leve it off. my wife saw me without it fur the furst lime in 8 mo, and lambasted me with a reeling pen acct. The function of thinking I wux a stranger that had broken to our domicycle.

Oh Yes!-He Gave It To Flew Himself

Dear Indigest: Methuselah ate no Skookum apples every day, did not walk a mile for a Camel, never read the Saturday Evening Post, did not chew Wrigleys, nor did he have his iron every day and yet he lived to the ripe old age of nine hundred years. I would like to know it he had a Flewelling Flivver.

—IMP.

Slecping here is Dan Casey Al Zapp. He stuck his head In a rotary-gap.

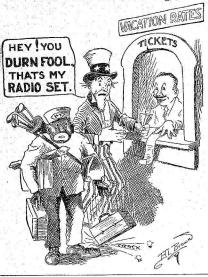
We Haven't Tried the Hook-Up Yet, but Wait-

My Dear Sir Indi: The writer was passing the time away with a number of congenial friends at the Marigold Gardens and the conversation was, as the poet said, "of women and other things." While tuning in on the latter we drifted to Radio. . . . The andience with few exceptions was plainly bored. Then one Radiophan happended was youngering the word of the said of th

Looking Ahead

A.B.C Lessons for Indigest Beginners will start with the next issue of Indigest. The novel style of describing what the various parts are, and why if so, will no doubt aid those wishing to tear their sets to piecess. Buy Indigest for Indigestion next week from your most dyspeptic newsdealer—10c.

Sam Takes His Set Along



Condensed

By DIELECTRIC

You don't often hear of a broadcasting station de-liberately setting up a competitor right in the same town and donating call letters in the bargain. Well, it seems that that is exactly what a popular station in Atlanta did (in a way). WSB lengthened its call into Winnifred Susan Beatrice at the request of Mrs. Color whose baby will transmit compass signals under that call until further notice—years hence.

Now turn your loop due north and you'll catch a new wrinkle from Calgary, Canada, where it is contrary to Radio law for two stations to communicate with each other directly, via the ether, some other means must be found, and this CFCN did. Wishing to hear from the station at Telegraph Hill, in San Francisco, regarding the reception of their test program, they had the latter play certain music which would indicate whether it came through well or otherwise. Announcers are elever, sometimes!

I should like to think that the letter written to our consul in Calgary, Canada, from someone in Philadelphia, was really intended for printing in the column to your left. Indeed there are parts of the Dominion of Canada which compare with most anything we can show in the States, and, come of their hotels would make you step, around to find their equal here. Furthermore, broadcasting stations in that part of America are right up to the minute. I was a Philadelphian—once!

Since the broadcasting station in the famous Eiffel Tower in Paris was put out of commission through its antenna being struck and destroyed by lightning, it is probable that the neighborly Germans are making merry over the fact. They complained that their own programs were interfered with by some disturbance originating in France. For the rest of Europe, however, this will be a distinct loss, as they were in the habit of tuning in this station for special news service.

We may look for an additional South American country to have its own Radio stations before very long, if reports coming from Chile are true. The interest in this fascinating adjunct to a happy home is decidedly on the increase among the Chileans, who are buying receiving sets in anticipation of the coming of broadcasting stations. At the present time they have to rely on picking up the programs from other more fortunate countries. This will make them expert in tuning later.

Transatiantic ship service is subject to very disagreeable surprises in the summer months due to the ice that floats across this international highway. We have not forgotten the tragedy which befell the Titanic a few years ago. Two coast guard cutters are to patrol the danger zone and warn ships twice daily via Radio of any danger.

When the President finally reaches Alaska he will find how vitally Radio affects the everyday life of those living in remote sections of the world. Remote from large centers of population with their telegraph and telephone lines giving easy access to intercommunication he will find Radio really essential for sending and receiving advice. There is but one cable from Sitka to Seattle, which sometimes breaks and when it does, nothing is left but to use the other.

It was suggested at the time that Station WEAF made its test in transmitting a full program from New York to WNAC in Boston that this would lead to a series of toll stations over the country. The new station in Washington, which is practically a duplicate of WEAF, may perhaps be so utilized when occasion warrants it. This is owned by a member of the Bell system and may indicate the beginning of such a policy.

First Steps for Beginners in Radio

Chapter V—Tuners and Tuning

By Thomas W. Benson, A. M. I. R. E.

A TUNER is simply an arrangement of inductances and capacities cathese devices being adjustable, of being put in resonance with a current of a given frequency. We have learned from the previous chapter how condensers and capacities function to control the length of time it takes for a current to flow or oscillate in a circuit. late in a circuit.

late in a circuit.

When a circuit contains both inductance and capacity we can increase the length of time for one complete oscillation by increasing either of these factors. Now it is reasonable to assume and in fact it is found that the time constant of the circuit or the period remains constant if we increase one factor and decrease the other the proper amount.

Without going deaply into the contained as th

BEGINNERS will find the accompanying series by Mr. Benson very helpful in learning the rudiments of the popular science of Radiophony. The articles yet to appear are:

tector.

Chapter IX—Radio Frequency Amblification.

Chapter XIII—About Headsets and Loud Speakers.

Chapter VI.—About Crystal Detectors. Chapter XI.—How Super Regeneration

anu Operation. Chapter XII—Reflex Circuit Operatector.

plification.

Chapter X.—Audio Frequency Am- Chapter XIV—Batteries Used in Radiophony.

aerial tuning when Radio frequency amplification is employed.

Double Circuit
We come now to double circuit, nonregenerative tuners. As the name implies
two circuits are used, means being provided for controlling the coupling between them. The advantage of using a
second circuit lies in the fact that we can
construct this circuit with low registerace.

second circuit lies in the fact that we can construct this circuit with low resistance, with both capacity and inductance under control, thus enabling the oscillatory currents to build up to their maximum value without hindrance.

creasing either or these factors. Now it is reasonable to assume and in fact it is found that the time constant of the circuit or the period remains constant if we increase one factor and decrease the other the proper amount.

Without going deeply into the mathematics of Radio we find that so long as will give the condenser is connected in ductance to increase the wave length.

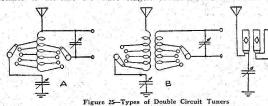


Figure 24-Various Tuning Devices for Single Circuit Tuners

the wave length it will respond to remains the same.

Tuners in Two General Classes
Returning to tuners, we can put them in two general classes, non-regenerative and regenerative. The former can be used with either crystal or tube detectors but the latter type can only be used with a three electrode tube. Non-regenerative tuners can be further divided into single and double circuit tuners. Regenerative tuners are also built in three circuit types. A single circuit tuner is one in which but one circuit, the aerial, is tuned. In the chapter on aerials it was seen that the aerial itself accounts for half the wave length of the station to be received. The other half is made up by inserting inductance in the aerial lead and providing some means of adjusting the circuit to resonance. In Figure 24 are shown several methods of tuning the aerial circuit, the detective device being usually shunted agross the inductance to indicate the presence of currents.

Fixed Inductance

Fixed Inductance

At A in the illustration is shown a fixed inductance, usually a honeycomb coil, with a condenser in series to tune the circuit. The effect of connecting the condenser in series with the circuit is to make the wave length shorter than if the inductance was used alone. The reason for this is that the tuning condenser in series with the aerial, also a condenser, is to reduce the total capacity in the circuit as we learned when considering condensers in series.

Figure 24-Various Tuning Devices for Single Circuit Tuners
the square root of the product of the inductance and capacity remain constant
the period of the circuit and consequently
the wave length it will respond to remains
the same.

Tuners in Two General Classes
Returning to tuners, we can put them
in two general classes, non-regenerative
and regenerative. The former can be
used with either crystal or tube detectors
but the latter type can only be used with

Tapped Inductance

Tapped Inductance
Considering the other circuits shown in
Figure 24 we find at B a tapped inductance
used with a variable condenser. This
gives a wider range of tuning and is to
be preferred to a large fixed inductance.
With this arrangement the tuning is sharpand is as selective as can be obtained
with a single circuit tuner. Here also the
condenser can be shunted across the inductance but the series arrangement is
preferable.

At C a variometer is used for tuning

At C a variometer is used for tuning without a condenser. This arrangement is not so selective and is improved by the addition of a variable condenser. At D

PHANTOM-CIRCUIT

Build Your Own. This marvel of mystery, usine no loop, no serial and the ground, brings in mustic in-stead of interference. We have heard stations 960 miles distant on one tube. By using WD-11 tube set can be entirely-self, contained. Very easy to build from our instructions. The contained of the build from our instructions, or action of the con-page of the contained of the contained of the super regenerative. Only one tuning control. Com-plete instructions, with hookup and photo of circuit mailed to you for 60 cents. Stamps accepted. VESCO RADIO SNOP, BOS D-204, Vaccuitle, Calif.

FLEWELLING CIRCUIT

REINARTZ CIRCUIT

WESTERN ELECTRIC

Hard Rubber Bakelite .\$1.65 \$2.45 . i.85 2.75 . 2.15 3.25

Phones. None better made. List \$12.00. Our price....

Complete parts, Including PANEL, Mounting and 2 Heneycomb Coils, Mounted. ONLY Standard Equipment Used. \$11.95

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Transformer used. PANELS—3/16" Thick

7x10...\$0.95 7x12....1.25 7x14....1.40

59 Cortland St., NEW YORK CITY

\$7.95

The tapped inductance and stator of the variometer are all one winding, tapped about every 12 turns, and the rotor has 15 turns of wire. Thus with the switch on the first point only the small variometer is in the circuit. More inductance is then cut in with the switch as needed. This arrangement is selective and simple to handle.

In using these tuners it is always to an advantage to use as much inductance as possible and as little capacity as will give sharp tuning. The circuits shown are all non-regenerative and suitable for use with either crystal or tube detectors or for two circuits, one from the aerial through the inductance and condenser to ground, (Continued on page 14)

We Live In Kansas

-but we receive programs from Atlanta, Min-neapolis, Davenport, Fort Worth, Madison, Los Angeles, Dalles, Kansas Giry, St. usido Danver and San Antonio on Corptain them thatteries. Your street was a superior of the street of the corp Speed steam for further information or \$1.00 for copyrighted drawings and instructions. Everything explained. Shtisfaction guaranteed.

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PERFECTION RADIO CORPORATION,

Variations in Flewelling Circuit

Maker Claims Set Gets More Music, Less Noise

The two circuits shown are modifica-tions of the Flewelling that have given the writer excellent results. The diagrams are self-explanatory. The top hook-up is

WORKSHOP KINKS? EARN A DOLLAR-

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

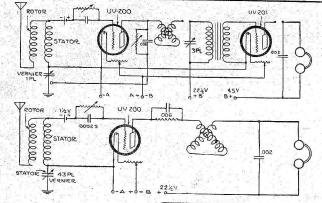
RADIO KINKS DEPARTMENT, Radio Digest

Radio Digest 123 West Madison St., Chicago, Ill.

the Flewelling variation with one step of audio frequency amplification. The bortom hook-up is the same variation practically with the exception that the stage of audio frequency has been removed. The binding posts are shown in the top diagram to explain how the step of amplification can be cut out.

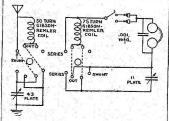
The upper diagram shows a .006 mfd. condenser with a variable grid leak across it. Those who have had trouble with the critical Flewelling whistle can use this hook-up. It has volume galore, but for the person who has found the whistle a stumbling block let him use the second diagram. The volume produced by this hook-up is almost as good, with the added advantage of having the critical whistle eliminated. The lower hook-up is my favorite set, sometimes using one stage

ONE AND TWO TUBE CIRCUITS



Crystal Hook-up

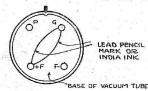
The hook-up here given has proven very selective and effective on long distance reception for a crystal set. Some of the



many stations heard are WEAF, WOC, WLAG and WSB: A two-wire 65 feet in length aerial was used on the set.—Neill H. Martin, Wilmette. Ill.

Lines for Grid Leak on **Bottom of Triode Tube**

In operating vacuum tube receiving sets I have found that no two detector tubes are alike when it comes to the amount of current consumed and the resistance of the grid leaks which each requires. For the amateur who cannot afford to purchase several tubular grid leaks of different values, this kind which I have been using myself will prove quite a help. Trace back from the tube socket and find which filament terminal of the tube is connected to the positive side of the A battery. After determining this, draw



with a soft lead pencil or a pen full of india ink, a line, or perhaps two lines, between this particular terminal and the grid terminal of the vacuum tube, as is shown in the accompanying illustration. The leak may be regulated by making the lines heavy or light as the case may be, and once adjusted it will always remain the same. Thus a separate grid leak may be had for each different tube used without changing any of the apparatus within the machine.

The one-caution which must be observed is in determining the respective grid and positive filament terminals.—Howard R. Ackerman, Prairie City, Ill.

Use 25-ohm rheostats on 116-volt tubes.

CARTER RESISTANCE UNIT

By placing this Resistance Unit in the Rhec circuit, regular 6 ohm Rheostats will pro-operate the new No. 201-A and No. 199 Tubes Code No. 15-A, 15 ohm, for No. 201-A Tubes, 6 Code No. 25-A, 25 ohm, for No. 199 Tube...50e Write for bulletins on this and other Carter products CARTER RADIO COMPANY 209 South State Street, Chicago

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			Cotton	Silk	Silk	Enamel	Enamel.
18	200	196	189	201	199	196	202
19	253	246	237	255	252	242	248
20	320	311	298	324	319	307	315
21	404	387	370	400	389	380	394
22	509	. 488	401	501	493	479	497
23	642	612	584	632	631	600	622
24	810	763	745	799	779	750	781
25	1019	953	903	1008	966	933	982
26	1286	1201	1118	1263	1202	1166	1232
27	1620	1500	1422	1584	1543	1457	
28	2042	1860	1759	1988	1917	1824	1548
29	2570	2370	2207	2520	2485		1946
30	3218	2860	2529	3165	3009	2288	2433
3.1	4082	3482	2768	3933		2810	3031
32	5132	4234	3737		3683	3473	3793
33	6445	5141	4697	4913	4654	4267	4737
34	8093			6129	5689	5267	5956
35		6317	6168	7646	7111	6461	7427
	10197	7755	6737	9680	8856	7835	9207
36	12890	9511	7877	12162	10869	9437	11485

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structure the effective height is very nearly the actual height. The only pur-pose of the horizontal top element of a re-

celving antenna is to give a greater e fective height for a given actual height. The filament posts in 1½-volt tubes are diagonally opposite, while in the 6-volt tubes they are adjacent.

WITH TWO GOOD CONDENSERS AND A **B-T VERNIER TUNER**

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Regenerative Radio Receivers

Will Work Wonderfully All Summer

Great progress has been made in Radio in the last year.



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The belief that "Radio won't work in hot weather" is now largely dispelled as far as "Michigan" Regenerative Receivers are concerned.

Regeneration, Amplification, Se-lective Tuning and other special features worked out by us during the past year largely eliminate static and other disturbances.

"Michigan" Regenerative Re-ceivers give superior results when used with any of the dry battery tubes now available.

Take a Michigan Receiver Along With You on Your Summer Vacation Trip. Set One Up on Your Front Porch at Home.

Add this long-distance wonderworker to your other summer pleasures and make the summer of '23 the happiest of your life.

Send for circular describing the wonderful Michigan "Senior" and "Junior" Regenerative Receivers, licensed under Armstrongs U. S. Patent No. 1,113,149 and pending letters patent 807,388 covering the fullest development of regeneration.

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GRAND RAPIDS MICHIGAN

of amplification. However, it gives won-derful results with the detector tube only

derful results with the detector tube only as shown.

It is important not to use plate voltage above the amount stated in each case, except where 45 volts is indicated. This may be increased to 67½ volts, but I find 45 volts quite sufficient. In fact it will give results on one stage of amplification with 22½ volts.

Allow me to emphasize that connecting the variocoupler in this way saves one variable condenser. I have tried several variocoupler hock-ups and they will work but when it comes to loud signals, mine seems to be best. The 1½-volt grid bias battery on the detector tube is not an absolute necessity, but it helps to increase signals.

Stress should be laid on the little rubber covered levers that I attach to my dials. These are better than tinfoil and othermethods of shielding from body capacity. It is often impossible to tune without some means to turn the dial at a distance. It

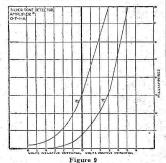
SOMETHING NEW

B-Metal Refining Co. BREMER-TULLY MFG. CO. 532 S. Canal St

Characteristics of Some New Vacuum Tubes

Part III—Curves for Five More Triodes; Conclusion

By H. J. Marx



same tubes were obtained from average dealer stock, if possible, and were tested to substantiate the curves given. In one or two cases, however, only one tube was available and time was lacking to send for more. This is mentioned in the remarks referring to these particular curves.

unves. Undoubtedly there will be many cases where occasional tubes will show much better curves—also some much worse. The curves given are presented as average values. Slight variations in filament voltages will usually make but little differences in the curves. As the plate voltage is increased the critical point of grid potential moves back further and the grid requires a more negative value.

"Bumpy" Curves

A "bumpy" or uneven curve, if very marked, makes the tube impractical for use. The uneven sections of the curve create an uneven plate flow, producing distorted reception. A tube of this type is very apt to be rather noisy in addition. If the flament of a tube lights unevenly, that is, shows brighter in some spots

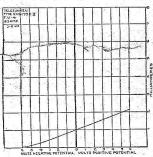


Figure 10

than others, then the chances are its life will be short. The bright spots are the thin or weak spots and will burn out rapidly. If uniformly lighted the filament resistance is uniformly distributed and gives much longer service. Later on those characteristics of

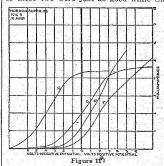
Later on those characteristics of vacuum tubes which effect the methods of



SINCE the first part of this series was written, a multitude of tubes have been tested. Often three and four of one type have been required in order to get the average value. Where unusual curves were discovered a number of the balance of the apparatus used. The insurant of the continuous of the particular types of tubes were discovered a number of the transformers must be so designed as to work best with the particular types of tubes used. Most of the present transformers are not balanced well with the many new tubes that have been introduced. It is anticipated that quite a number of new tubes will be introduced in the Fall and also the Spring of next year. This naturally will necessitate numerous new transformers to work with these tubes.

This tube has aroused considerable interest because of several unusual characteristics. It operates on a filament voltage of 3 and consumes but .15 amperes. It has a standard base and fits the regular socket. A 6-ohm rheostat can be used if the storage battery is tapped at two cells. If three dry cells are used it is best to connect a fixed resistance of about 6 ohms in series in order to get the proper range of operation.

The first tube tested showed a remarkably good curve—so four were obtained—of these two were just as good while the



other two were rather mediocre but by no means bad. The three good ones were tried out in the Refex De Luxe and the reception was exceptionally good although the tube was very microphonic, that is any mechanical disturbance or knock created an unpleasant clatter in the reception. It is understood that because of limited manufacturing facilities quite a few were made that do not show up so

BOOKO Reinaliza Reflex Reflex Pording

many others, simple and elaborate, fully diagrammed and explained. Used continuously by thousands of Radio fans, both amateurs and professionals. The greatest book ever published for experimenting. Keep this valuable little book before you at all times. Send your check or money-order for one dollar and the book will be mailed to you. Forty-seven hook-ups, all different. Send your order today. The edition is limited.

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woits, when this was changed to 45 the curve B was worked out.

Telefunken Tube

The opportunity of testing an old type German tube was presented and taken advantage of for general interest. The date on this tube was March 6, 1920. The fillament voltage was 4 and the current consumption was 63 amperes. The tube required a special socket. Only one plate voltage curve (85) was taken and is shown in Figure 10. Variations made but little difference. The curve is very uniform but its efficiency is low compared to the latest developed tubes.

Murdon Super 08.

Murdon Super 08. Its curves are given Figure 11. This tube uses a fillament voltage of three and consumes only it ampere. The curves are fairly uniform and good results should be anticipated from a tube of this type. No reception tests were made due to lack of time. Further details will be furnished later. Curve A was taken with a plate voltage of 21; B with 29; C, 45; and D, 87.

This tube has a standard base and fits the regular socket. The same rheostat conditions hold true for this tube as for the Silvertone. When the plate voltage runs above 80 a grid blasing battery is necessary.

Mercury Tube

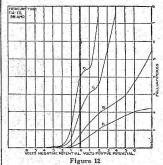
Mercury Tube

Another tube, considerably advertised, is the Mercury 1½-volt tube. The current consumption of .98 ampere is rather high. If dry cells are used for filament lighting, about 3 should be connected in parallel, not in series. This tube has a standard base. The ordinary 6-ohm rheostat will give sufficient regulation of the filament current.

The curves are shown in Figure 12, A giving the walues with 15 volts on the plate, B, C'and D with 18, 21 and 22½, respectively. While the higher plate voltages show excellent curves yet the decided "bumps" in each curve is detrimental. If the grid potential is so ad-

well, but it is also said that these difficulties have now been overcome.

The curves of this tube, type OTIA, are shown in Figure 9. Curve A was developed with a plate potential of 22½ avalable for test, it could not be confirmed curve B was worked out.



type would have similar characteristics.

type would have similar characteristics. Undoubtedly there may be many such tubes. Although the curve may be more regular, yet they may not all show as efficient as the first would indicate.

Philips Amplifier
In the curves presented in Part II of this series was a set of a Dutch Detector (Continued on page 14)

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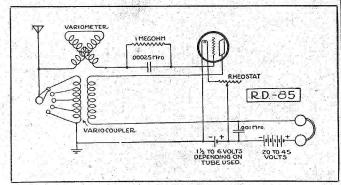


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R.D.-85 IS ANOTHER GOOD PORTABLE



SINGLE tube hook-ups for portable sets are in popular demand. R. D.-85 is another circuit that combines selectivity and volume with the use of a dry

cell tube.

A variocoupler is used, with the rotor acting as a tickler. The antenna circuit is tuned by means of the tap switch on the primary. The grid circuit is controlled by means of a variometer. This circuit permits strong volume and at the same time permits very good selectivity.

A variable grid leak can be substituted as the opportunity of grid adjustment will permit better results with any change in tubes used. The filament battery can be

made up of dry cells connected for the voltage required.

voltage required.

Any small suit case makes a convenient cabinet for a portable set. Half the space should be divided off for panel and instruments, while the other half should be laid out for battery cells and receivers. Apparatus preferably should be panel mounted—and the panel should be removable so that all apparatus is accessible. Tube sockets should be mounted on some form of cushion base in order to reduce the possibility of jars and shocks to a minimum, thus avoiding damage to tubes. This will also reduce the microphonic tendency of peanut tubes.

FIRST STEPS IN RADIO

(Continued from page 11)

the other comprising part of the induc-tance and the second variable condenser. Currents in the aerial circuit would induce a current in this second circuit and by tuning both circuits an increase in signal strength would be noted due to the low resistance of the second tuned circuit.

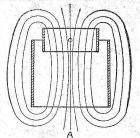


Figure 26A-Rotor of Coupler Lies Parallel to the Stator

However, the coupling between the two circuits in a double slide tuner is fixed so the second circuit cannot oscillate freely because some of its energy would be returned to the aerial circuit. To overcome this retransfer of energy two separate coils are employed as shown at B Figure 25.

These coils are usually wound on tubes of such a size that the secondary winding will slide into the primary or aerial circuit winding. By sliding the secondary in and out the coupling, or the number of magnetic lines of force from the primary coil acting on the secondary is varied. With this arrangement, known as the loose coupler, the secondary can oscillate freely and the amount of energy retransferred to the aerial circuit kept at a minimum.

Honevcomb Colls as Tuner minimum.

Honeycomb Coils as Tuner

Honeycomb Colls as Tuner
Two honeycomb colls mounted in a twocoil mount with variable condensers for
tuning is another form taken by two circuit tuners suitable for use with crystal
detectors. As a rule a 43-plate condenser
having a capacity of .001 mfd. is used in
the primary circuit while nothing larger
than a 23-plate or .005 mfd. variable condenser should be used in the secondary
circuit. The use of a larger, condenser
will reduce the signal strength by reducing the voltage applied to the detecting
device.

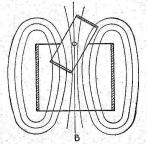
ing the voltage applied to the detecting device.

The more modern form of the double circuit tuner utilizes a variocoupler, turning the secondary winding at an angle with the primary to vary the coupling instead of sliding the secondary out of the primary as was done in the loose coupler. The action taking place in a variocoupler is shown in Figure 26.

In Figure 26A the rotor is shown lying parallel to the stator in which position the lines of magnetic force from the primary moving at right angles to the turns on the rotor induce a maximum amount of current in the rotor or secondary circuit. This means the energy transfer is the greatest when the rotor is in this position.

When the rotor is turned at an angle (Figure 26B) the lines of force do not cut

the coil at right angles and the transfer of energy to the rotor is much less, thus the coupling between the circuits is loose. In a plain two circuit tuner using a variometer, a condenser is connected across the rotor to tune the secondary circuit or a variable inductance such as a variometer is added in series to tune the circuit. With the average variocoupler the inductance of the secondary is so low that a large variable condenser is required to tune the circuit which has the effect of weakening the signals so an additional inductance is usually necessary. It is not necessary, that the primary of a double circuit tuner be tuned as sharp as the secondary and for that reason use



Fgure 26B,—Reducing Energy by Turning Rotor Nearer Right Angles

is often made of single taps for fine tun-ing. This will usually be found sharp enough for most conditions and the vari-able condenser can then be eliminated in

the primary circuit.

The three circuit tuner mentioned previously is not suitable, in fact, cannot be used with a crystal detector and is of the



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regenerative type and will be taken up in detail later. All the tuners described in this chapter can be used with a crystal defector, and with modifications to be covered later, are used with regenerative tube detectors.

Selection of a Tuner

In selecting a type of tuner it is well to bear in mind the following:

A single circuit tuner gives the loudest signals, is easier to tune and simpler in construction. However, it is not as selective as a double circuit tuner and is more subject to interference from spark sets, static, etc. On the other hand the double circuit tuner is more selective and works more consistently over long distances and will work through heavy interference where a single circuit tuners were depractically useless. It is interesting to note that single circuit tuners were declared unsuitable for long range work back in 1912 and more than ten years later we find them the most generally useless. later we used type.

Methods of employing regeneration with these tuners will be taken up in the chapter on regeneration while the next chapter will cover crystal detectors and give instructions for obtaining the best results with these instruments.

(TO BE CONTINUED)

CURVES OF NEW TUBES

(Continued from page 13)

Tube. The amplifier of the same make known as Type D11, has a similar filament voltage of 3.5 and current consumption of .5 ampere. Like the detector bulb it has a standard socket base.

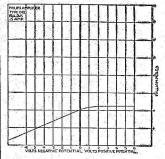


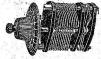
Figure 13

Figure Is

The characteristic curves are given in Figure 12. Variation in plate voltage made but little difference in plate current so only one set of readings for the curve were taken, leaving the plate voltage at 75. It might be stated that on previous tests of this type of tube the curves were very much more efficient. No other tubes were immediately available, however.

This concludes the series on tube characteristics. As new tubes are placed on the market they also will be tested and the curves and full details will be given.

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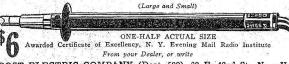
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Questions and Answers

Sim Tube Circuit

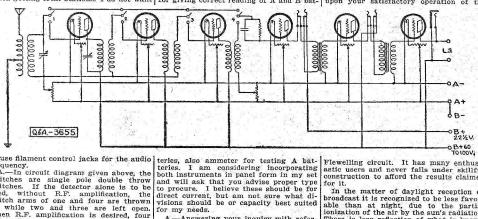
Six Tube Circuit
(3655) CH, Chicago, Ill.
Can you show me how to put switches on my set which I am using, having three stages of Radio frequency, detector and two of audio? I want to cut out the Radio amplification by means of switches when setting local stations. I do not want

advise me how I may determine the condition of the batteries as a whole or in part. I find that a hydrometer cannot be used satisfactorily for this.

Since you recommend the use of a volt-meter I am obliged to ask that you advise further as to type of voltmeter required for giving correct reading of A and B bat-

I have been unable so far to receive anything during the daylight broadcasting hours, and would appreciate any information you could give me in regard to what to do in order to receive daylight broadcasting.

A.—We are glad to congratulate you upon your satisfactory operation of the



for my needs.

A.—Answering your inquiry with reference to testing B batteries will advise that a voltmeter should be placed across them while set is in operation. If a 22½-volt battery tests lower than 18 volts it is ready for the ash can! This test must be made while set is in operation as batteries will almost immediately resume their rated voltage otherwise. This method may also be applied to A batteries, although a hydrometer will more nearly determine actual condition.

Any standard D. C. voltmeter with scale

Any standard D. C. voltmeter with scale reading from 0 to 25 or 50 will serve.

Daylight Reception

I have been a reader of your Radio Digest for the last five or six months, and wish to congratulate you on publishing one of the most wonderful pieces of Radio literature in the Radio field.

Through the information and recommendation of your paper I ordered one of the famous Flewelling circuits. This circuit has just been completed and placed in operation, and has proven to be a most wonderful receiver.

wonderful receiver.

For an illustration, the Friday midnight concert broadcast by Station KYW of your city was brought in as clear as if the music was in the room. Station WWJ, Detroit, Michigan, also came in very loud and as clear as any station brought in that is not over two or three hundred mlies distant.

(2894) GWD, Laurel, Miss.

to use filament control jacks for the audio

to use filament control jacks for the audio frequency.

A.—In circuit diagram given above, the switches are single pole double throw switches. If the detector alone is to be used, without R.F. amplification, the switch arms of one and four are thrown up while two and three are left open. When R.F. amplification is desired, four and one are both thrown down, then the position of two and three can be set for the number of stages desired.

The audio frequency jack system is standard and requires no explanation. The condenser in the primary of the first R.F. transformer is a variable with a capacity of about .00025 mfd.

Condenser Capacity
(2854) ILH, Long Branch, Ontario.

I have a good number of copies of your paper and keep them on file for the valuable information they contain. However, I have had some trouble in calculating the capacity of a condenser by the formulae given by P. J. M. Clute in September 2, 1922 issue, page 11. In the formula

- Mr. Clute says S is $4 \times 3.1416 \times D$

the area of one plate. According to this acondenser with one plate would have the same capacity as one with 100 plates. Is not something wrong with this formula?

Even with a two plate condenser it seems to talk nonsense. Is it intended that this formula should apply to all types of condensers?

I have pade several condensers out of brass tutling, one tube sliding inside the other, with wax paper for dielectric. Length, 5 inches; inside diameter of larger tute, 1½ inches; outside diameter small tube, 1½ inches, Please tell me as nearly as possible the capacity of this condenser, using wax paper, and also mica as dielectric?

A.—Answering your inquiry with ref-

A.—Answering your inquiry with reference to formulae for computing capacity of condensers, as appearing in Radio Digest will advise that it is correct for a condenser of two plates. For additional, multiply by the increased number.

I would estimate the capacity of condenser described as approximately ,0005 mid. The difference in thickness of the waxed paper and mica is not stated, so it would be impossible to estimate the capacity of condenser described as approximately.

B Batteries
(2896) CIW, Washburn, N. Dak,
I have recently purchased storage B
batteries and I am obliged to ask that you

10c

distant.

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In the matter of daylight reception of broadcast it is recognized to be less favorable than at night, due to the partial ionization of the air by the sun's radiation. There is less reflection of what is known as space wave in the daytime consequently guided wave (electromagnetic) will not be assisted materially by any reflected or refracted part of the space wave. At night, however, when the upper boundary is more sharply defined, there is more reflection of the space wave, and in general signals received at night are stronger than in the daytime.

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R.D.-73

(2281) ABB, Fond du Lac, Wis.

I wish to build Hook-up Diagram R.D.73. Please explain coils Ll, L2 and L3,
also other coil in middle left of diagram.
I wish to use set for 360 and 400 meters.
Can the new type C-301A Cunningham amplifier tubes be used in this set?
A.—Referring to Radio Digest diagram 73, the descriptive details accompany diagram as does also table for computing wave length values of honeycomb coils to be used if chosen; variocoupler or loss coupler may be employed if preferred.
Further details will appear shortly giving constructional data, panel layout, etc.

The new Cunningham 301A tube will work to perfection in this circuit.

Glass Panel

(3478) GAL, Olustee, Okla.

I am making a Flewelling set on a glass panel. Have all the holes bored and about all installed. I have had Radiophans tell me that glass will not work for a panel, and that it is not a good insulator. Please advise me, as I have always thought that glass was as near 100 per cent as any material.

A A a present

material.

A.—Answering your inquiry with reference to the properties of glass used as a panel for Radio receiving set, we are advising that it makes a wonderful panel, being one of the best insulators known.

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