THE PITTSBURGH POST RADIO BROADCASTING NEWS, WEDNESDAY, DECEMBER 10, 1924

# RADIOTORIALS

Last week's papers contained a press dispatch which said that some one in South Africa had heard plainly the radio program from America, given as a part of the International Radio Tests. So plainly was this program heard, said the dispatch, that the listener in South Africa could distinguish the barking of a dog in the United States.

Those who listened to the program of KDKA on the opening night of this International Radio Week will at once recognize the program as one played by the KDKA Little Symphony Orchestra, in which a descriptive hunting scene was given which included the barking of dogs.

Barking dogs may be heard every day, but to hear one at a distance of eight or nine thousand miles is another thing entirely. The dog with such an attenuated bark should be listed in the dog hall of fame along with such other canine immortals as may spring to our minds. Unfortunately the bark which travelled so far by radio was the only portion of the dog that was not nonexistent. This bark should take its place with the grin of the Cheshire cat in "Alice in Wonderland," which you will probably remember was the only visible portion of the cat.

The bark of the dog, however, will have a more abiding reason for eternal fame, for the accomplishment which proclaims it to the world is one of real achievement in the realm of science. The transmission of a voice, be it of man or of beast, for

such a distance, is undoubtedly one of the wonders of the age. In the early days of our country's history, the mere suggestion of such a thing would have raised the cry of witchcraft, and dire punishment would have been the result.

医胰腺素 医胆酸酶 医骨骨骨

Today we read such announcements in our morning papers,

and our credulity is not taxed in the least. Letters are being received regularly by Station KDKA reporting the successful reception of this Pittsburgh station in South Africa

This is all the more wonderful because our friends in South Africa must of necessity wait until the wee small hours of morning before they can listen to far away America. But with rare consistency, they have been losing their sleep while hearing programs from Pittsburgh, and two continents are being bound closer together by these invisible lines of communication through the air.

Perhaps some of us are slow to realize the good which may come as the result of this pioneer work in international broadcasting, and it is well to repeat as frequently as possible that every tie which binds us closer to the people of other lands is bringing us nearer to the ultimate realization of the world peace which is the dream of all our great thinkers and statesmen.

When the people of one nation understand the peoples who are their neighbors, know their ways of living and their habits of thinking; there will be small danger of bickering and quarreling. This is the same principle which governs many of our acts with those with whom we come in contact. The better we know our friends and acquaintances the more inclined we are to be lenient and forgiving when their actions do not meet our conception of right and wrong. Nearly every misunderstanding can be explained away, if the persons involved know each other well enough; and the same is true of nations.

Radio broadcasting will provide the way for such mutual understanding among the nations, and, once it has been established as an international service, we may expect it to be a veritable dove of peace to the nations of the world

So when the dog's bark from Pittsburgh, which was heard in South Africa, becomes immortal, it may be the symbol of a finer and better civilization in which radio broadcasting will occupy a very prominent position.





### The Men who know use Formica

RADIO engineers of 125 leading radio manufacturers use Formica for panels, bass-panels, terminal strips, winding tubes, transformer cases and so on. These are the men who make radio what it is. With an experies based on hundreds of sets a week, they have the best opportunity to know just what radio insulation will do.

Formica is made in the largest plan in the world devoted to the production

You can get Formica in three beautiful finishes: Gloss black, walnut and mahogany, and in any standard or special

Insist on Formica and get the tried en panel material,

THE FORMICA INSULATION CO. 422 First Ave., Pittsburgh, Pa. Hear the Formica Band every Wednesday evening from 9 to 10, Central time over WLW.





ment of Commerce this year show a decrease in the number of licensed amateur transmitting stations. The decrease in the number of stations is not large, and the number itself is not particularly important,-the significant fact is that there are less amateur stations today than there were a year ago. It would be rash, however, to conclude that the pass-ing of the amateur has begun. Instead of viewing this decrease in numbers with alarm, therefore, those who have at heart the welfare and continuing success of the American amateur should rather welcome the reduction in numbers as indicative that the weeding out process has be-

gun.

The possession of an amateur station license is a privilege which should be enjoyed only by those persons who are willing to comply with the very reasonable and generous regulations laid down by the department of commerce. Furthermore, in dur opinion, the applicant for a transmitting station license should be required to show some other purpose besides that of mere amusement before a license to transmit is granted. We, do not wish to imply that this purpose need be a very serious one. For example, the applicant may desire a station license in order that he may communicate with other sta-tions and by so doing acquire skill and experience in handling messages, or he may wish to qualify for an appointment as an official relay station of the American Radio Relay League, but whatever his purpose, it should be concerned in one way or another with the furthering of am-

ateur radio communication. Before the coming of broadcasting it did not matter much what purposes actuated the amateur transmitter. Just so he did not cause interferences with government and commercial stations, he could play with his set to his heart's content and there were only other amateurs (happily not all like himself) to say him nay. Broadcasting, however, brought about greatly changed conditions and the amateur, in order to live, had to adapt himself to the changed environment.

The serious, . no, let us call him the earnest amateur, he who renateur who is c pearing and who is responsible for the decrease in the number of li-

censed radio stations. justice, was not as black as he was friendly criticism and a helping hand were all that were needed to set him straight on the road to worthwhile listener who continues to annoy his neighbors with his oscillating receiver in spite of campaigns of edugreatest hindrance to radio today. production up to their orders.

# Du Pont Develops

After a great amount of experimenting, a radio loud speaker has vibrating material and therefore, in the broadcasting stations. so far made.

#### By JACK M. BENNETT.

INPUT FROM

DETECTOR

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With apologies to Emil Coue, the radio public is day by day in every way becoming more particular about the kind of stuff they hear over their loud speakers, and it is a lamentable but incontrovertible fact that the great majority of the stuff is of quality that wouldn't pass muster were anything better easily obtainable or etter known.

While a few commercial receivers together, nevertheless these are by no means great in number, at least when compared to the big majority express the fact.

type generally available, it is very diffcult to get through in good shape all the notes necessary for good reproduction. The primary inductance of the transformers is usually too of the secondary windings is usually

DISTORTIONLESS AMPLIFIER)

-100 V +

good enough for anyone, in fact, so resistance coupled amplifier in allgood that it is used in the speech around quality. amplifier circuits of most of the big ers and amplifiers designed to work broadcasting stations, but here again ufacturing tube ballasts, resistances we have a drawback in the cost. and leaks, have developed a kit for Such amplifiers are expensive, unbe- the construction of a three-stage lieveably so, and it takes a lot of resistance coupled amplifier that of sets that have amplifiers that transformer and tube engineering to gives excellent quality with present merely amplify and loud speakers' get the correct result. Ordinary as- day tubes, eliminates rheostats by that simply speak loud. I hope you sembled push-pull amplifiers may the substitution of ballast resiswill pardon the puns. They are ad- work all right, but the writer has ances, and overcomes the greatest mittedly in bad form, but they do never seen a particularly good one, drawback heretofore experienced at least good enough to justify the with this type- noise in the resistcost of the transformers and the ad- ances due to changing resistant valusing transformers and tubes of the ditional tube. Some other method of ues. The leaks are sealed in little -amplification must, therefore, be ob- glass tubes to make them moisturetained.

Resistance coupling in amplifiers, both radio and audio, is as old as radio. It has a lot of drawbacks, low, not enough iron is employed in but none of them seem as serious to the cores, or the distributed capacity yours only to make them take second place to the average amplifiers. too high, or a combination of these The one fact sticks out like a life faults is present. On top of this, if preserver to a drowning man-they and is somewhat less expensive than enough "pep" is obtained from the cannot distort, and this is a big step. an amplifier of equal power built amplifier on strong signals the cores Years ago, resistance coupling was with transformer coupling, even inof the amplifying transformers are considered good enough to be used in cluding the cost of the extra tube saturated and the result is a flock of the speech amplifier circuits at KDKA, and has been only recently Push-pull amplifying circuits, when replaced by a very expensive bal- There is no oscillatory circuit any- able remedy.

properly built, give quality that is anced amplifier outfit that equals the

The Daven Radio Company, manproof, insuring that the voltage drop across the tube plate and filament remain's constant at all times.

A three-stage amplifier of this character gives about the same amplification as the ordinary transformer coupled two-stage, with the capacity. These must be of the very quality of the best of the push-pulls,

where in it, and hence the familiar howl that sometimes develops in amplifiers is pleasantly absent. (This does not prevent the regenerative howl at cudio frequency, which is a function of the detector circuit and cannot be eliminated in any ampli-

It is not the policy of this department, ordinarily, to recommend any particular type of apparatus, nor do we wish to imply that good results cannot be obtained with other resist ance coupled amplifiers. The Daven resistances may be replaced with 100,000 cl m resistances (non-inductive types such as the Lavite, Ward-Leonard, etc.,) and as long as good contact is obtained at both ends of the resistors, noiseless operation assured. The amplification possible is determined by the amplification constant of the tube multiplied by the voltage drop across the tube plate and filament. Hence, the higher the resistance of the rods, the greater will be the amplification with any given tube. However, the higher the resistance of the rods, th higher must go the plate voltage. A convenient set of values is 100,000 ohm resistors and 100 volts of "B battery. The condensers across the resistences may be of .001 mfds, capacity, and the grid condensers iso lating the grids from the plate bat tery circuit may be of .0005 mfds best quality of mica obtainable.

The writer realizes that he is ope to criticism for the method in which this story is presented, but takes refuge in the known fact that the Such an amplifier, the circuit of amplifier situation at present is which is shown here, cannot squeal. acute enough to justify any reason-

# **Phenomenal Pick-Up**

The radio industry right now is had prepared for a record-breaking Heretofore such reception has been quarters in this city. season, but the season started earlier extremely difficult, and this condition cation, and appeals to his sense of than was anticipated and few manu-kept the farmer from buying radio.

covering that it does not require a few months.

that set up by the diaphragm. Its this increase in busines is that it finding it obsolete a few weeks hence. ing westward. to cut through the atmospheric dis- got started after the World war. Arctic. \*\*\*\*\*\*\*\*\*\*\*\*\*\*

Also, these high power stations will

ing to make it possible to build their lief that there would be revolutionviorating material and therefore, cannot impress a false note upon The most satisfactory feature of person buying a good set today and needle, which is believed to be swing- Palace to One Hundred and Twenty-

# difficulty in conforming to the new order of things, and in consequence he exists today and will continue to exist in increasing numbers. It is the frivolous ametaneous to diverse the second **New Arctic Expedition**

Justice, was not as black as ne was sometimes painted, and frequently a By Major Herbert H. Frost. turbances which have tended to ham-friendly criticism and a believe that the study of the compass needle, he said, would be accompanied by a further investigation of the ready planning for another trip measure the height of the aurora running away beyond all estimates make it possible for the farmer to north, according to an announcement with the assistance of radio and moamateur radio. How different, and expectations. The manufacturers receive his market and weather rethough is the case of the broadcast who had been longest in the field ports during the daylight hours. American Radio Relay League head-

Next summer the little schooner "Bowdoin" will again head into the fair play. The rights of other listen-facturers are now able to keep their At the present time probably not ice floes, this time for the purpose of more than 15 per cent of all the locating a site for a permanent mag-There are many very good reasons American and Canadian farmers netic station in order that observa-ness. Radio apparatus is better than I look for a large percentage of them the Carnegie Institute on the last ex-Loud Speaker Horn it ever was. More persons are dis- to begin buying radio within the next pedition may be continued over a period of two years. The following

is claimed to be perfect in perform- ing has improved, both in programs best engineers in the industry are north latitude, he said, and would are showing the new bearings, ance: The new loud speaker is made and in the mechanical apparatus used of the opinion that there will be no undoubtedly be equipped with appa- which, they declare, will permit a such changes. Development will be ratus for measuring on photographic mogul engine to handle a train of gradual and there is no danger of a paper variations in the magnetic cars that would reach from the

shape is the one which is best cal-probably will be permanent. I do is necessary to many who are remote of having this station located in the however, to signal from the engine by tests, it is claimed, to reproduce higher power stations, authorized at cation discovered since the first lan- nearer one goes to the pole the more is believed, is the use of radio, and Washington by Secretary Hoover, dustry in the United States will run apparatus. Variations of only one or pose without interfering with nearby recreates the message with particucompares favorably with any device high power stations it will be possible a sum for an industry which really swing of from 15 to 20 points in the exhibits bearing on radio

HARTFORD, Conn., Dec. 10-Back The study of the compass needle

#### Long Freight Trains Make Radio Signal Necessary Adjunct

With the application of ball bear-The limit number of cars that can be handled on a railroad varies from covering that it does not require a college course in electrical engineer-waiting before buying sets in the be-stall the station permanently. This observatory will be sit- sition in Grand Central Palace, De-Radio has ceased to be a fad. It He explained that the advantage 400 cars. It would be impossible, culated to eliminate distortion, it is not look for the usual drop next is necessary to many who are remote of having this station located in the however, to signal from the engine from the large centers of population. proximity of the magnetic north to the caboose with the methods at ciained. The peculial quanties of the target centers of population, proximity of the magnetic north to the caboose with the methods at pyroxylin plastic have been shown summer. By that time the new It is the greatest source of communi- pole was due to the fact that the present in use. The only remedy, it the range of tone, instrumental or vocal, with clarity and fidelity. It will be

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For the first time since the beginning of amateur radio the records of the United States Department of Commerce this year show a decrease in the number of licensed amateur transmitting stations. The decrease in the number of stations is not large, and the number itself is not particularly important,-the significant fact is that there are less amateur stations today than there were a year ago. It would be rash, however, to conclude that the passing of the amateur has begun. Instead of viewing this decrease in numbers with alarm, therefore, those who have at heart the welfare and continuing success of the American amateur should rather welcome the reduction in numbers as indicative that the weeding out process has be-

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The serious, . no, let us call him the earnest amateur, he who regarded radio as something more than a means of mere amusement, had no difficulty in conforming to the new order of things, and in consequence he exists today and will continue to exist in increasing numbers. It is the frivolous amateur who is disap pearing and who is responsible for the decrease in the number of licensed radio stations.

The frivolous amateur, to do him justice, was not as black as he was sometimes painted, and frequently a friendly criticism and a helping hand were all that were needed to set him though, is the case of the broadcast listener who continues to annov his neighbors with his oscillating reers are nothing to him. He is the

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By JACK M. BENNETT. With apologies to Emil Coue, the radio public is day by day in every way becoming more particular about the kind of stuff they hear over their loud speakers, and it is a lamentable but incontrovertible fact that the great majority of the stuff is of quality that wouldn't pass muster were anything better easily obtainable or better known.

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### DISTORTIONLESS AMPLIFIER

-100V +

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A three-stage amplifier of this character gives about the same amplification as the ordinary transformer coupled two-stage, with the quality of the best of the push-pulls. with transformer coupling, even including the cost of the extra tube

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# Radio Industry Shows Capt. MacMillan Announces **Phenomenal Pick-Up**

The radio industry right now is straight on the road to worthwhile running away beyond all estimates make it possible for the farmer to north, according to an announcement with the assistance of radio and moamateur radio. How different, and expectations. The manufacturers receive his market and weather rewho had been longest in the field ports during the daylight hours. American Radio Relay League headhad prepared for a record-breaking Heretofore such reception has been quarters in this city. ceiver in spite of campaigns of edu- season, but the season started earlier extremely difficult, and this condition cation, and appeals to his sense of than was anticipated and few manu-kept the farmer from buying radio. fair play. The rights of other listen- facturers are now able to keep their At the present time probably not lice floes, this time for the purpose of

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# **New Arctic Expedition**

from the Arctic only two months, he said, would be accompanied by a Captain Donald B. MacMillan is al-Also, these high power stations will ready planning for another trip measure the height of the aurora made during his recent visit to the tion picture cameras.

Next summer the little schooner "Bowdoin" will again head into the period of two years. The following be handled on a railroad varies from Thousands of people also have been summer Captain MacMillan will in- 25 to 60, depending on the nature

the material from which it is made own radio receiving sets. Broadcast- ary changes in receiving sets. The uated in the vicinity of 54 degree cember 1 to 6, German engineers is claimed to be perfect in perform- ing has improved, both in programs best engineers in the industry are north latitude, he said, and would are showing the new bearings, is claimed to be perfect in perform-ance. The new loud speaker is made and in the mechanical apparatus used of pyroxylin plastic which is a nongradual and there is no danger of a paper variations in the magnetic cars that would reach from the cannot impress a false note upon - The most satisfactory feature of person buying a good set today and needle, which is believed to be swing- Palace to One Hundred and Twenty-

pyroxylin plastic have been shown summer. By that time the new It is the greatest source of communi- pole was due to the fact that the present in use. The only remedy, it by tests, it is claimed, to reproduce higher power stations, authorized at cation discovered since the first lan- nearer one goes to the pole the more is believed, is the use of radio, and the range of tone, instrumental or vocal, with clarity and fidelity. It recreates the message with particular faithfulness, while in volume it will be in operation. With these close to \$400,000,000 this year, quite two degrees at the equator show a public broadcasters. Many other lar faithfulness, while in volume it will be in operation. With these close to \$400,000 this year, quite two degrees at the equator shown at the exhibits bearing on radio will be compares favorably with any device high power stations it will be possible a sum for an industry which really swing of from 15 to 20 points in the exhibits bearing on radio will be a sum for an industry which really swing of from 15 to 20 points in the exhibits bearing on radio will be a sum for an industry which really swing of from 15 to 20 points in the exhibits bearing on radio will be to cut through the atmospheric dis- gor started after the World war. Arctig

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With the application of ball bearuse for radio has come to the fore, The limit number of cars that can of the grades. At the Power Expofifth street, or approximately 350 to



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# RADIO PROGRAMS FOR THE WEEK

(Continued From Page Sig.) othy Birchard Manroney

a-WEEI (303) BOSTON, MASS.

-Boston chamber of commerce-Ad-Francis P. Garvan, alien property in QOQO, now attorney for American Roundering "From Alchemy to 7 p. m.-Boston Edison Big Brother Club. 7:30-9 p. m.-Gillette Safety Razor band.

10:30 p. m.-Dok-Eisenbourg and his Sin-11 p. m.-Dok-Eisenbourg and his Sinfonians.

1111c once as "Uncle Boh." 7 to 7:30 p. u. — Dinner concert broadcast from the Congress Hotel: Joska DeBabary's orchestra, Louis XVI room; Coon-Sander's Original Nighthawks, Pompelian room; Joska DeBabary's orchestra, Louis XVI room.

8 to 8:20 p. n. .... "Twenty Minutes of Good. eading," by Itev. C. J. Perkins, S. J., head department of English, Loyola University, " itearc. Obleage. 8:20 tg 9:15 p. m. Musical program: Lullian Hershield, seprano; Inving Schuster, tenor. Other artists will be announced by radio-

ne. 0 to 11:30 p. m.—"Excepting at Home" pro-im broadcast from KYW's studio in Hearst inre. Coon-Sander's Original Nighthawks I broadcast from the Balkon room in the

Congress Flotel at 16:45 and 11:05 p. m.

b-WLS (345) CHICAGO, ILL. 9 a. m. - Market report; weather forecast. 11 a. m. - Hog, cattle and sheep flashes; uit and vectable shanneries. Noon to 1 p. m.-Music; weather forecast; farm program. 1:30 p. m. -Complete-livestock, fruit and

estable markets; final grain market quota-lons; farm news bulletins. 3:45 to 4:45 p. m. --Honemakers' hour. 6 p. m. Sumarket duota-

6 p. m. - Sonamay livestock, grain, dairy, fruit and vegetable, poiltry and egg, hay and feed markets; farm news bulletims. 6:30 p. m. to 7:20 p. m. - Pipe organ re-cital; inllaby time; WLS theater operatta.

b-WMAQ (447) CHICAGO, ILL. . m.—Household nour, under Elizabeth O. Hiller. 4:30 p. m.-Illinois Federation of Women's"

6 p. m.-Chicago Theater organ recital-6:30 p. m.-Hotel LaSade orchestra. s. m.—Hotel LaSside orchestra.
 8 p. m.—Western Raitways commission.
 8:15 p. m.—To be announced.
 9 p. m.—Lecture from University cago.

9:15 p. m.-Program by Mr. and Mrs. Emer-

b-WMC (500) MEMPHIS, TENN. 8 p. m.-Kiddies bedrime stories by Uncle Jerry. 8:30 p. m.—Program sponsored by Mrs.

5-WHAS (406) LOUISVILLE, KY, b--WHAS (409) LOUISVILLE, KY. 4-5 p. m.-Selection by the Alamo Theater orchestra, Harry S. Curyle, conductor. Police bulletins. Weather forecast for Kentucky, In-diana and Tennossee. "Just Among Home Folks," a daily hui roux column appearing in the "Courier-Journal" Readings: Selected "Courier-Journal" and Louisville "Times" edi-torials. Late important news bulletins." 4:55 p. m.-Dical Ilvestock, produce and grain market reports. 5 p. m.-Official Central Standard time an-nounced.

nounced. 7:80-9 p. m.—Concert by "Mx" Bittegrass Berenaders, Henry L. Dixon, director. Four-minute digest of International Sunday School Jesson. Four-minute welfare talk. Late im-portant news bulletins. Official Central Stand-ord time announced et 0. eciclock time announced at 9 s'clock."

b-KSD (546) ST. LOUIS, M@. p. m.-The home hour.

b-WOC (484) DAVENPORT, IA.

10 a. m.—Opening market quotations. 10:05 a. m.—Household hints. 10:55 a. m.—Household hints. 11 a. m.—Weather and river forcast. 11:05 a. m.—Market quotations.

1:10 a. m.-Agricultural bulletins 12 noon-Ch

ing weekly report of wool market. 6:45 p. m. Sport news and weather fore- a-WJY (405) NEW YORK CITY.

rthur. 12:15 p. m. Midmight—Orchestra program one hour)—Carlisle Evans and his Cellseum

6 to 6:30 p.m.—Art Hickman's Concert tations of the New York stock exchange; fei-Orchestra from the Biltmore Hotel; Edward
Fitzpatrick, director.
6:30 to 7:30 p. m.—Children's program presenting Prof. Walter Sylvester Hertzog
7 p. m.—Savarin eusemble.
8 p. m.—Walt Steet Journal" review.
8:10 p. m.—IVU Air College; "Sociology,"
Prof. E. George Payne.
8:30 p. m.—IVU Air College; "Sociology,"
Prof. E. George Payne.
8:30 p. m.—IVU Air College; "Sociology,"
Prof. E. George Payne.
9 p. m.—Ivoy Walter's Radiolians-10 p. m.—Ivor the Bellimore Trans and Sav-the courtesy of the Hellman Trust and Sav-these Bauk, arranged by A. K. Berkland.
10 to 11 p. m.—Earl Burtnett's Biltmore Orchesträ breadcasting from the Biltmore Hotel.

### FRIDAY

Friday, December 19. Friday, December 19. a-KDKA (326) PITTSBURGH, PA 7 a. m.—Morning exercises conducted by 0. Thannon, physical director of the McKeesport Y. M. C. A. 8 a. m.—Morning exercises conducted by 0. Shannon, physical director of the McKeesport Y. M. C. A. 9 to m.—Address, "Religious Influence in Colleges," Warren O. Taylor, associate pro-fessor Civil Engineering, Unfon College. 8:15 p. m.—Dickeus! "Christmas Carol," 1 read by Edward H. Smith, assisted by WGY orchestra. Reading, Part I, "Thé Christmas Carol," Marley's Ghost, Edward H. Smith. 9:45 a. m.—"Stockman" reports of the Pitaburgh livestock markets; general markets reitw and agricultural items. Y. M. C. A. 9:45 a. m.—"Stockman" reports of the Prisburgh livestock markets; general market review and agricultural items: 11:55 a. m.—Arlington time signals.

m-WCAP (469) WASHINGTON, D. C.
slient.
a-WGBS (316) NEW YORK CITY.
10 a. m. -Timely talks with Terese.
10:10 a. m. -Lack and David Teitelbaum, planist and violinist.
10:30 a. m. -Gertrude Tucker in book teview.
10:40 a. m. -Great women of Bible, Cather H. B. Mullaly.
10:40 a. m. -Great women of Bible, Cather H. B. Mullaly.
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10:40 a. m. -Great women of Bible, Cather H. B. Mullaly.
10:40 a. m. -Great women of Bible, Cather H. B. Mullaly.
1:40:45 a. m. -Bernerd Mitchell from M. Secondar Massachusetts studio.
1:40:45 a. m. -Bernerd Mitchell from M. Bernerd Mitc planist and wiolinis

1:30-1:45 p. m. B 1:45-2 p. m.-Mildr

2.2.15 n. m. Bernard Mitchell, tenor. 2:15-2:30 m .- Mildred A. Warnock, radio 3 p. m .- Interview with Beulah Livingston

e Rose Nagel y Terese Rose Nagel. 3:10 p. m. — Marion Ross, contralto. 3:20 p. m. — Alfred G. Robyn, harmony and

amposition lessons. 3:30 p. m.—Marion Ross, contratto. 3:40 p. m.—Hattle Morse Hamburger, humor

ous readings. 3:50 p. m.-arion Ross, contralto. 6-6:30 p. m.-Nat Martin's "I'll Say She Is"

WGBS (316) NEW YORK CITY. a WGBS (310) NEW YORM CATE. 10 an n.—Timely talks with Terese. 10;10 a. m.—Agnes' MacPeake, soprano. 10:20 a. m.—Affetorial Review program. 10:30 a. m.—Agnes MacPeake, soprano. 10:40 a. m.—Pictorial Review program.

10:50 a. m.—Agnes MacPeake, soprano. -1:30-2:30 p. m.—Armand, Vecsey and His Ritz-Carlton Orchestra 3 p. m.-Interview with Harriet Underhill movie critic, by Terese Rose N 3:10 p. m.-C. Baldwin Allen baritone

3:20 n on Association 3:30 p. m.-C. Baldwin Allen, baritone. 3:40 p. m.-Mrs. Maybelle A. Burbridge,

3:40 p. m.-Mrs. mayout in Security talk. 3:50 p. m.-C. Baldwin Allen, baritone. . Uncle Geebee.

6:45 p. m.—Sport news and weather forc-cast.
7 p. m.—Sandman's visit—(Bedtime stories by Val McLaughlin).
9 p. m.—Orchestra program (one shour). The Schuster Sisters' orchestra, of the Blackhawk Hotel, Davenport, Iowa, presenting popular selections.
11 p. m.—Orchestra program (one hour)., I nois Connor and his LeClaire Hetel Orchestra, broadcasting direct from the LeClaire Hotel Winter Garden, Moitne, Ill, Song and novelty numbers by Peter Mac
9 a—WJY (405) NEW YORK CITY. 7:30 p. m.—Billy Wynne's Greenwich Y lage Ian orchestra.
8:15 p. m.—Aine Tyndall, soprano; Kei McLeod, accompanist.
8:45 p. m.—Youtlook" literary talk. 10 p. m.—Abraham & Strauss Chôral S clety concert.
a—WJZ (455) NEW YORK CITY.
10 a. m.—Housewives' League menu, Mr. 10 a. m.—Housewives' League menu, Mr.
10 a. m.—Housewives' League menu, Mr.

10:20 a. m .- "Book Review." by Grace #sad bel Colbron.

10:40 a. m.-"Arts and Decorations " Mrs Mary Hoberts. 10:50 a. m.-Eleanor Gunn's fashion talk.

c--KHJ (395) LOS ANGELES, CAL. 1 p. m.-Hotel Ambassador Trig. Henry 12:30-1:30 p. m.-Frogram of news items Vander Zanden, director. 12:30-1:30 p. m.—Program of news items vinder Zanden, director. 4 p. m.—Specialty numbers. 2:30 to 4 p. m.—Program through the cour-tery of the Pacific States Electric Co. 5:30 p. m.—State and Federal agricultural reports; farm and home reports; closing gud tations of the New York stock exchange; for-Orchestra from the Biltmore Hotel; Edward Pitranetfet director

a-WGY (380) SCHENECTADY, N. Y. 11:55 p. m.-Time signals. 12:30 p. m.-Stock market report. 12:40 p. m. Produce market report. 12:45 p. m. Weather forecast. 2 p. m. Music and health hints, by Dr. C. W. Woodall. 6 p. m. Produce and stock market quota-tions; news bulletins. 6:30 p. m. Stories for children. 7 p. m. International Sunday School les-san.

7:45 p. m.—Health talk. Selections from "Measiah." WGY orchestra. Train market reports. 5 p. m.—Official Central Standard time an-nonnced. 7:30-9 p. m.—Concert inder the auspices of the Louisville and Jefferson County Children's Home Glee Club; Miss Grace Deppe, di-rector. Late important news bulletins. Official Central Standard time announced at 9 o'clock.

of Christmas Past, Edward H. Smith: Selec-

12 m—Weather forecast. "Stockman" reports of the Pittsburgh livestock and whole lie produce markets.
 12 m—Sunday school lesson for December 21, by James C. Mace, from Y. M. C. A., Pittsburgh.
 3:30 p. m.—Closing quotations on haz, grain and feed.
 6:30 p. m.—Concert by the Hotel Schenley Meyer Davis Orchestra, Lon Chassy, director.
 7:30 p. m.—Concert by the Hotel Schenley Meyer Davis Orchestra, Lon Chassy, director.
 8:15 p. m.—Monthly book review, "Two Rear Rest and wholesale produce markets.
 8:15 p. m.—Monthly book review, "Two Rear Nets.
 8:15 p. m.—Monthly book review, "Two Rear Nets.
 9:55 p. m.—Arlöngton time signals; weather forecast.
 9:55 p. m.—Arlöngton time signals; weather forecast.
 10:50 p. m.—Produce market and Hwe stock reports.
 150 p. m.—Produce market and Hwe stock reports.
 150 p. m.—Agricultural reports.
 150 p. m.—Agricultural reports.
 3 p. m.—Agricultural reports.
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 3 p. m.—Agricultural reports.

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DAVEN RADTO

CORPORATION

Newark, N. J.

a-WGY (380) SCHENECTADY, N. Y. 11:55 a. m.-U. S. Naval Observatory th

B--WGR (319) BUFFALO, N. Y. 2:30 p. m.-Concert, courtesy Buffalo "Coun-ier and Enquirer." 4.7:30 p. m.-Hallpryd String Quartet, din

b-wLS (345) Childrato, fill.
a. m.-Market report; weather forecast.
a. m.-Hog. cattle and sheep flashes; fruit and vegetable shipments; farm news bulletins.
1:30 p. m.-Summary livestock, grain, dairy, fruit and vegetable, poultry and egg, hay and feed markets; farm news bulletins.
7 p. m. to midnight—Ford and Glenn's.
trip to Toyland; National barn dance; request and review night.

b-WMAQ (447) CHICAGO, ILL.

8 p. m.—Hofel LaSane orcnessra. 8:40 p. m.—Radio prologue, "The Holy Land," by Paul Hinkhouse. 9 p. m.—Weekly Balaban & Katz Chicago

b-WMO (509) MEMPHIS, TENN. 8 p. m.-Stories for the kiddles by Uncle

8:30 p. m.-Program erranged and sponsored

folkana and Tennessee. 'Just Among Home Folks,'' a daily humorous column appearing in the "Courier-Journal." Readings: Selected "Courier-Journal" and Louisville "Times" edi-

torials. Late important news bulletins: 4:55 p. m.-Local livestock, produce and grain market reports. 5 p. m.-Official Central Standard time au-

b-KSD (546) ST. LOUIS, MO.

8 p. m.-Christmas cantata presented: choir of Westminster Presbyterian Church.

6 p. m.—Armour Tech band. 8 p. m.—Hotel LaSalle orchestra

signals. 12:30 p. m.—Stock market report. 12:40 p. m.—Produce market report. 9:30 p. m.—Dance music by Phil Rom orchestra, from New Kennore Hotel, Al N. Y., and popular songs-

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b-WOC (484) DAVENPORT, IA.

0:55 a. m.—Time signals. 1 a. m.—Weather and river forecast. 1:05 a. m.—Market quotations.

12 non-Chines concert. 12 12 non-Chines concert. 12 135 p. m.-Weather forecast treper 2 p. m.-Closing stocks and markets.

by Val McLaughlin).

2 p. m.-Closing stocks and markets. 6:45 p. m.-Sport news and weather fore

7:20 p. m.-Educational lecture-(Under the

auspices of the Scott County Farm Bureau). "Producing Beef for Profit," by Prof. R. W.

-Sandman's visit-(Bedtime storie.

-Opening market quotations. m.-Household hints.

b-MYW (536) CHATAGE, H.L. 6:30 a. m.—Mornhug exercises. Instructions given by the physical director of the Y. M. C. A. This feature is also given by the Y. M. C. A. at 7 and 8 a. m. 9:30 a. m.—Late news and commerd market. 10:30 a. m.—Late news and commerd of the funnelial and commercial markets. 10:30 a. m.—Table table by Mis. Anna J. 2:35 to 4 p. m.—Yatternoon Frollo" broad cast from KYW studio in Hearst Square. 6:32 to 6:18 p. m.—News, financial and finand markets familiand by the Uzian Tartest Com-pany, Chleago "Journal of Commerce," anni U. S. department of agriculture. 6:35 to 7 p. m.—Children's bedtime stery tol by Watter Wilson, who is known to the 10 the Concert breadcast from the Concert breadcast 7 to 7:30 p. m.—Dinner concert breadcast from the Concert breadcast 7 to 7:30 p. m.—Dinner concert breadcast from the Concert brea

turer, from the Hotel Brunswick studio, Boston. - 9:55 p. m.—Arlington thue signals; official United States weather reports. 16 p. m.—Concert by Bossie M. O'Connell, o sopeano; William C. Kivian, planist and ac-companist, from the Hotel Brunswick studio, Boston. . 10:30 p. m.—To be announced. 10:35 p. m.—To be announced. 10:35 p. m.—John Dohertz, the man who d plays and sings, from the Hotel Brunswick studie, Boston. . 1 p. m.—Concert by the Westinghouse Philharmonic brio and Tony Mastrolanni, wio-linst; Rena Breglio, accompanist, from the linst; Rena Breglio, accompanist, Hotel Kimball studio, Springfield.

Hotel Kimball studio, Springfield.
a-WEEH (303) BOSTON, MASS.
a. WEEH (303) BOSTON, MASS.
b. B. M. - Dok-Eisenbourg and his Sin and fragment of the springer of the Scott County Farm Bureau.
b. B. M. - West State for the amber room, T. D.
Cook's, Boston.
T. D. M. - Beston Edison Big Brother Club.
T. So p. m. - Wassen Edison Big Brother Club.
T. So p. m. - Wassen Edison Big Brother Club.
T. So p. m. - Wassen Edison Big Brother Club.
T. So p. m. - Wassen Edison Big Brother Club.
T. So p. m. - Wassen Edison Big Brother Club.
T. So p. m. - Wassen Edison Big Brother Club.
T. So p. m. - Program of the state Confuge of Annal and his orchestra of Club.
T. So p. m. - Program of program of instrumental and vocal states of the States Electric Co.
B. So p. m. - John T. Connor Company predestion and Foran, clog steps.
B. D. M. - Wassen Big Brother Order M. S. Million Hullinger, flutist.
G. So do p. m. - John T. Connor Company predestion and Foran, clog steps.
B. D. M. - Wassen M. Connor Company predestion and forantic stranged by 2 hard Foran, clog steps.
B. J. So m. - Table talk by Mirs. Anna J.
P. This service is also broadcast at 7 and 8 a. m. of a markets.
G. So m. - News, financial markets.
T. So m. - News, financial stand. for the state stranged by 2. Howard Johnson.
B. C. A. This service is also broadcast at 7 and 8 a. m. of a stranged by 2. Howard Johnson.
B. So m. - Thate news and commercial markets.
G. So m. - Thate in the by Mirs. Anna J.
P. This Sorkice is also broadcast at 7 and 8 a. m. of a markets.
B. C. A. This service is also broadcast at 7 and 8 a. m. of a stranged by 2. Howard Johnson.
B. C. A. This service is also broadcast at 7 and 8 a. m. of the physical director of the Y. Million the stranged by 2. Howard Johnson.
B. D. D. Concert at mar

6:30 p. m. -G. Baldwin Allen, barltone.
 6:30 p. m. -Generating and connected markets in the physical state of the physical state

b-WLS (345) CRICAGO, ILL.
a. m.-Market report; weather forecast, fult and vegetable shipments.
b. Music; weather forecast, farm program.
i. 30 p. m.-Music; weather forecast; farm program.
i. 30 p. m.-Music; weather forecast; farm program.
i. 30 p. m.-Complete livestock, fruit and vegetable markets; farm news bulletins.
c. 6.30 p. m. -Complete livestock, grain, dairy, fruit and vegetable; poultry and egg, hay and se deer radio drama; Ford and dlean time.
b. WMAQ (447) CHICAGO, ILL.
c. 12 p. m. -A christmas play given by and seep flashes; farm mews balletins.
c. 13 p. m. -A Christmas play given by and seep flashes; farm mews balletins.
c. 14 p. m. -Weyer ball set boll balletins.
c. 15 p. m. -A Christmas play given by and seep flashes; farm mews balletins.
c. 16 p. m. -A christmas play given by and segg, hay and flean time.
c. 16 p. m. -A christmas play given by and segg, hay and flean time.

b--WMAQ (447) CHICAGO, ILL. 12:23 p. m.-Y. M. C. A. Forum. 4 p. m.-One of a series of talks on Eng-ish diction by Mrs. J. Elliott Jenkins. ber of the medical profession selected by the Philadelphia Medical Society. 8:15 p. m.-A Christmas play given by the Starlight Players under the direction of Walter Gray.

4 p. m.—A christinas pluty given by f 3 p. m.—Media plut given by f 3 p. m.—Medi

11 p. m.—Midnight Froite. b—WHAS (400) LOUISVIILE, KY. 4-5 p. m.—Selections by the Alamo Theater bulketins. Weather forecast for Kentucky, La-diana and Tennessee. 'Just Among Home Folks,'' a dafly humoreus column appearing in the ''Courier-Journal.'' Readings: Selected ''Courier-Journal'' and Louisville ''Times'- cdi-torials. Late important news bulketins. 4:55 p. m.—Local livestock, produce and grain market reports. 5 p. m.—Official Central Standard time an-orneed. orchestra. 11 p. m.-Midnight Frolic.

b-KSD (546) ST. LOUIS, MO. 8 p. m.-Recital by Edyth Myrl Carver, so-

chestra.

gram. 1:30-2:30 p. m.-Mignon Ladies' Vocal Trio.

3 p. m.-Interview with Karl Kitchen, by Teress Rose Nagel.

# **RADIO PROGRAMS FOR THE WEEK**

### (Continued From Page Five.)

by Walter Wilson, who is known to the ones as "Uncle Bob." stile once as "Uncle Bob." 7 to 7:30 p. m. —Dianer concert broadcast from the Cangress Hötel: Joska DeBabary's B rchastra, Louis XVI room; Coan-Sander's, D DeBabary's orchestra, Louis XVI room; 7:30 to 8 p. m. —Program will be broadcast from KYW's studio in the offices of the Dun-ran Sisters' Music Publishing Company; 8 to 8:30 p. m. —Musical program will be furnished by the Waither Lesgue. Artists and program in detail will be announced by T radio.

8:80 to 8:45 p. m.-...'Around the Town with CYW in Chicago'' (stage review). 8:45 to 9 p. m.-.Musical program. continued, 9:05 p. m.-.'Good Roads'' report furnished y the Chicago Motor Club. 9:10 p. m.-Talk on "Income Tax;" by H. krchibald Harris. 9:20 p. m.-Talk by Mr. E. C. Brown, treas-rer of the National Live Stock and Mest load. Subject, "Protecting Our Nation's Health."

Health." 946.to.2:30 at m.—Midnight revue. This is a WestInghouse-"Evening Amarican?" feature C broadcast from KWWs, atadio in Hearist Square, Coon-Senders Originsi Nighthawka k will broadcast from the Beilson room of the Congress Hotel at 1 p. m., I s. m., and I'45 a. m. W. Reningtan Welch, organist at McVicker's Theater, will render an or-sanlogue.

#### b-WES (345) CRECAGO, ILL.

a. m.-Harket report, weather forceast. a. m.-Hog, cattle and skeep finales; and vegetable shipments. d vegetable shipments. to 1 p. m.→Muslc; weather forecast; ns; farm news bulletins. 3:45 to 4:45 p. m. Housemakers' hour.

p. m.—Summary livestock, grain, dairy, and vegetable; poultry and egg, hay and markets; farm news bulletins. 6:30 p. m. to 10:45 p. m.---Pipe organ re-ital; lillaby time; farm program; WES heater feature; Wallace Bruce in a romance

Jniversity. 8:30 p. m.---Musical program to be an-

8:30 p. m.-Musical program to be an-nonneed. 9 p. m.-WMAQ-"play-night." 9:45 p. m.-Talk from one of the Chiesgo charities. b-WMC (500) MEMPHIS, TENN, Bilent night. b-WHAS (400) LOUISVILLE, KY. 45 p. m.-Selections by the Alamo Theater orchestrs, Harry S. Currle, conductor. Police Buildtins. Wenther foreerst for Kenkucky. In-diaga and Tennessee. "Just Armong Homes Folks," a délly humorotis column appearing is the "Courier-Journal." Readings: Solected "Courier-Journal." and Louisville. "Times" edi-

market report: 5 p. m. Official Central Standard time

and the second

7:30-9 p. m. Concert by -Keith Kannard and his Kentucky Ramblers; Keith Kannard, director, saraphone and cornet; Marty Men-nan, saxophone and clarinet; Gus French, banjo; Bill Lippy, plane; Bim Wilder, drums; Kannærd Kannard, trumpet; Warren Lane, trombone; James Horine, sousaphone. Late im-portant news bulletins. Official Ceutral Skand-ard time announced at 9 o'clock.

b-KSD (546) ST. LOUIS, MO. om KYW's studio in the offices of the Dun-in Sisters' Music Publishing Company. S to 8:30 p. m.—Kusical program will be ind brogram in detsil will be announced by did. S:30 to 8:45 p. m.—'Areund the Town with With the Character and Soprano. Sign to 8:45 p. m.—Program by Schubert Trio of Alton, III.; Fredrick Tuemmler, violin; Frances Davis, 'celle; Alkan Scovell, plano; Mary J. Magulre, director and soprano.

b-WOC (484) DAVENPORT, IA. 10 a. m. Opening market quotations. 10:55 s. m. -Household hints. 10:55 s. m. -Time signals. 11 a. m. Weather and river forecast.

11:05 a. m. --Merket quotations. 12:05 a. m. --Merket quotations. 12:15 p. m. --Weather forecast (repeated.) 2 p. m. --Closing stocks and markets. 6:45 p. m. --Sport news and weather fore-

cast. 7 p. m.—Sandman's visit—(Bedtime stories by Val McLaughtin). by Val McLaughin). 8 p. m. Organ recksi from the B. J. Pal-mer residence Erwin Swindell, organist; Evelyn Griffin, soprano.

12:30-1:30 p. m. Program presenting, Call. 9:20 p 12:30-1:30 p. m. Program presenting Abe Pennsylv Perfuss and His Rose Roam, Grehestra, cour-director, tesy of the Rose Roam, Fred C. McNabb of Aggeler & Musser Seed Company, Garden - b-1 Talk.

d vegetable shipments. to 1 p. m. --Music; weather forecast; p. m. --Complete livestock, fruit and e markets; final grain market quota-srm news bulletins. feetable; ponitry and egg, hay and rkets; farm news bulletins. f. m. to 10:45 p. m. --Pipe organ re-tillaby thme; farm program; Wils feature; Wallace Bruce in a romance nothind; on the book trail; Ford m. fime. d vegetable shipments. feetable; ponitry and egg, hay and factor of American history. Dick Winalow, streen juventie and reporter. Table. 2:30-4 p. m. --Program through the countesy of the Pacific States Electric Company, pre-senting the Immanuel Male Quartet and Sar-ophoae Club. 6:6:30 p. m. --Art Hickman's Concert Or-chestra ffom the Bitmose Hotel; Edward S. 7:30 p. m. --Children's program, pre-tillaby thme; farm program; Wils feature; Wallace Bruce in a romance nothind; on the book trail; Ford m time.

#### Thursday, December 18.

"Configuration of the second s

kets. 8 p. m.-Program arranged by the "National Stockman and Farmer

Wowowowowo K

Ware NEUTRODYNE Receivers Type T \$65.00 You See It Everywhere Look at the picture of this Ware Type T three-tube Neutrodyne --- then look at the receiver itself in the window of the next radio store that you pass. Go in and ask for a demonstration of the Ware Type T. Hear

for yourself just what it will do. Enjoy its marvelous tone, and learn how with the Ware Type T, you get extraordinary range and remarkable selectivity at a reasonable price.

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The Camera Shop, Inc., 6220 Penn Ave.
Argo-Lite Applance, Seventh and Smithfield.
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b-WSAI (309) CINCINNATI, O. 10 p. m.-The Cincinnati "Enquirer" pro-

b. With (309) CINCINNATI, O. S p. m. Ongan recital by Kurt Henkel. Songa by Frank Weight and Frank Bessinger, the Radio Franks. Tenor solos by Carl R. Comuelle; Miss Margaret Bronson, accompan-

ater feature: Wallace Bruce in a formand the northland; on the book trail; Ford Glean time. b--WMAQ (447) CHICAGO, ILL. b--WCAP (469) WASHINGTON, D. C. b--WCAP

a-WEAF (492) NEW YORK CFTS. 11-12 s. m.-Musical program and talks

A:37 D. M. -Bernhard Levindw & Lotar Control of the New York steel exchange; for male. 5:30 p. m. -Concest, courtesy Buffele "Dour-1:230 p. m. -Concest, courtesy B

The interpret and wilstead The homestead at the provider and the second state of the s

R-WGY (380) SCHENECTADY N. Y.

B.30. p. m. -Concert by the KDKA Lifting Sympony Orchestra and Medels Showy Kuing Alama and Sympony Orchestra and Medels Showy Kuing Alama and Medeline Properties Alama and Medels Showy Kuing Alama and Medels Alama and Medels

-WEZ (337) SPRINGFIELD, MASS.

11:55 a. m. - Arlington time signals; weather reports; Springfield market reports. 6 p. m.-L. S. Wiggin ensemble direct from concert. 9:35 p. m. — Frank Andersen, baritone; Keith McLeick, accompanist. 19 p. m. — 'Humor," Fred C. Keity. 10:15 p. m. — Sneehez and Wilstead. "The mestead. "At the Theaters" with A. L. S. Wood drametic editor. of the Springfeld "Union." 7:45 p. m. - Charles R. Hector with his St. James theater orchestra direct from the St. 1:40 p. m. -- Charles K. Hector with his St. James theater orbiestra direct from the St. James theater, Boston. 8:15 p. m. -- Concert by Whitman S. Brown, tenor; Edward E. Adehman, Violim: Evelys Murray, dramatic interpreter; J. R. Rouse, planist, from the Hotel Branswick studio, Roston. a.-WGY (3807 SCHLARTON ALL AND ALL AN

(Continued on Page Seven.)

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# **RADIO PROGRAMS FOR THE WEEK**

#### SUNDAY

### Sunday, December 14.

KARDIO FACUGACING FUCFUCFuchodiat Episcopal Church, South, of Wash<br/>mence W. Alamseth, pastor, will<br/>eleiver the serion.Comminity Chorus under direction of Clar-<br/>three W. Alamseth, pastor, will<br/>benew W. Alamseth, pastor, will<br/>eleiver the serion.<br/>The Astional Episcopal Church, and Felen Maning a compasiat, in compasia, in com

B-WGR (319) BUFFALO, N. Y. 3 p. m.-Vesper services, Rev. Fletcher Homan, Central Park Methodist Episcopal Church.

4 p. m.-Organ recital, ballroom, John R.

\* D. M.-Organ recital, baliroom, John R. Gunderman, Jr. organist. 7:15 p. m.-Preservice organ recital, Wil-liam Walt Whiddit, organist. 7:30 p. m.-Evening service, direct from Central-Presbyterian Church, sermon. "Wlose-some Optimism," R. J. McAlpine, D. D., min-ister.

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b-WHAS (400) LOUISVILLE, KY. 9:57 a. in.—Organ music. 10 a. ni.—Church service under the auspices of the Broadway Baptist Church, the Rev. Dr. Russell Johnson Pirkey, pastor; H. U. Good-win, organist and choir director; Mrs. O. W. Edinger, soprano; Miss Angeline McCrocklin, contraito; Charles H. Barnes, Jr., tenor; Wil-liam Cornwall, baritone. 45 p. m.—Vesper song service under the auspices of Mrs. Jane Webster Murrell.

b-WOC (484) DAVENPORT, IA. 9 a. m. Sacred Chinese concert. 1 p. m. Orchestral concert (one hour). Sacred and classical numbers by the Pal-mer School Radio orchestra; Erwin Swindell, conductor

mer School Radio orchestra; Erwin Swindell, conducto. 8 p. m.—Church service—Rev. Otis L. Bow-man, pastor Methodist Episcopal church of Hillsdale, Ill. Subject of sermon, "The Wavelength from the Soni of God." 9:30 p. m.—Musical program (two hours). The Palmer School Radio orchestra; Erwin Swindell, conductor.

c--KHJ (395) LOS ANGELES, CAL. 10 a. m.-Sermon from KHJ studio by Rev. Charles F. Hutslar, pastor of the Washington Chiration Church Charles F. Huislar, pastor of the Washington Christian Church.
10:80-12:80 p. m.—Organ recital and entire religious services from the First Methodist Episcopal Church; Arthur Blakeley, organist, and Rev. Elimer E. Helms, pastor.
6:30-7 p. m.—Art Hickman's Concert Orchestra, from the Biltmore Hotel; Edward Ritspatrick, director.
7-7:30 a. m.—Organ recital from the First Methodist Episcopal Church; Arthur Blakeley, organist.
8:10 a. m.—Program presented through the courtesy of the Martin Music Company, arranged by J. Howard Johnson.

#### MONDAY

Monday, December 15. Shannon, physical director, McKeesport Y. M.
 O. A.
 8 a. m.--Morning exercises conducted by O.
 Shannon, physical director McKeesport Y. M.
 C. A.
 9:45 a. m.-"Stockman" reports of the abile interstation State



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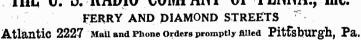




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b-WMH (309) CINCINNATI, O. 8 p. m.--The Original Blue Grass Enter-ainers, William Schoultels, director. 8:30 p. m.-Organ recital. Songs, by Trank and /Frank Bessinger,

(Continued from Page Three.)

m.-The Original, Blue Grass Enter-William Schoulteis, director. B-WCAP (469) WASHINGTON, D. C.

e--WCAP (469) WASHINGTON, D. C. 7:30-8 p. m.-To be announced. 8-8:15 p. m.-"The United States Postal Service," the first of a series of short, Inter-esting radio talks about Government activ-ities, to be delivered by H. E. Morgan of the United States civil service commission. 8:15-8:30 p. m.-Musical concert by the ad-vanced students of the Peabody Conserva-tory of Music of Baltimore. Presented by Harold Randolph, director of the faculty. This concert will be broaddast from the auditorium of the conservatory.

-WGBS (316) NEW YORK CITY.

**B**-W **G158** (316) NEW, YORK CITY. 10 a. m.—Timely talks with Terese. 10:10 a. m.—Hernine West, soprano. 10:20 a. m.—Prudence Penny, household talk. 10:30 a. m.—Mrs. T. Mortimore Lloyd on 11 Sconter.

Siri Scouts. 10:50 a. m.—Hermine West, soprano. 1:30-2:30 p. m.—Bruno Maller Concert Trio. 3 p. m.—Interview with Amelia Bingham, totress, by Torese Rose Nagel. 3:10 p. m.—John Cassidy, barltone. 3:20 p. m.—William J. Stuart in reading of

erial story. '3:30'p. m.—John Cassidy, baritone. 3:40 p. m.—Charles M. Smith on "The Future of Your Child."

3:50 p. m.—John Cassidy, baritone. 6-6:30 p. m.—Uncle Geebee. 6:30-7:30 p. m.—Bob Schafer's entertainers:

Bob Schaffer, Larry Vincent and Bobby

a-WEAF (492) NEW YORK CITY. a-WEAF (492) NEW YORK CITY. 4-55 p. m.-Tessie Bloom, planist; "Wall Street" by Henry Collins Brown. 6-11 p. m.-Dinner music by WEAF Instru-mental Quartet; musical program direct from the Strand Theater; Madge Kennedy, stage and screen star; Harry I. Marble, basso; Jane Miller Flynn, soprano; music by the A. and P. Gypsies; Midnight Sons Orchestra.

B-WJZ (455) NEW YORK CITY. 10 a.m.—Housewives League menu, Mrs. Julian Heath. 10:20 a.m.—Shoppers' Guide, Mrs. Pauline eck. 10:30 a. m.—Home Beautiful, Dorothy Ethel

Waish. m.—"Can't Talk With a Mouthful-of Tongue," John C. Cutting of the Meat Council of New York. 10:50 a. m.—Eleanor Gunn's fashion talk. 1 p. m.—Hotel Ambassador Trio, Henry Vander Zanden, director. 4 p. m.—Regalbute Sisters, planists. 4:30 p. -m.—Joseph Knecht's Waldorf As-torla tea music. toria tea music. 5:30 p. m.—State and Federal agricultural

reports; farm and home reports; closing quo-tations of the New York stock exchange; foreign exchange quotations; Evening "Post" news. 7 p. m.—Barnhard Levitow's Hotel Commo-

7 p. m.—Barmard Levitow s Hotel Commo-dore Concert Orchestra.
8 p. m.—'Wall Street Journal" review.
8:10 p. m.—NYU Air College; "Sociology,"
Prof. E. George Payne. \*:
8:30 p. m.—Piano and violin musical.
9:30 p. m.—'Philosophy of Nutrition," Al-fred W. McCann.
9:45 p. m.—Marguerite Manierre, soprano.
10:15 p. m.—Dettborn and Howard, Ha-walian sultars. wallan gultars. 10:30 p. m.-Hock and Jerome, popular

songs. 10:45 p. m.—Jacques Green and his Club Deauville Orchestra, with Clark's Hawaiians.

a-WGY (380) SCHENECTADY, N. Y. 11:55 a. m.-U. S. Naval Observatory time signals. 12:80 p. m.—Stock market report.

12:30 p.m.—Stock market report. 12:30 p.m.—Produce market report. 12:45 p.m.—Weather report. 2 p.m.—Music and talk, "Keeping the Children Well in Winter," Dr. Caroline Croas-dale, New York State College for Teachers. 6 p.m.—Produce and stock market quota-tions; news bulletins. 6:30 p.m.—Weekly sports review, by Harold Auson Bruce, director of physical training and athletics at Union College, Schenectady, N. Y.

A. Y.
N. Y.
7:45 p. m.—Program by WGY orchestra, as-issted by Walter Reagles, tenor. Selection, "Reverie," WGY orchestra. Tenor solo, "The Page," Walter Reagles, accompanied by Earl Rice. "Cello solo, "Romanza," Giovanni Trom-bini. Selection, Valse, "Palais de Danse," or-chestra. Tenor solos: a. "Mountain Volces," b. "I Sent a Song." Walter Reagles. Selec-tions, Suite for Violin and Plano, Op. 84.
a. "Moderato," b. "Allegreto," "Tempo di Mennetto," Edward A. Rice, violin; Earl Rice, plano. Selection, "Melody of Love," orchestra. Tenor solo, "Good-night," Walter Reagles. "Vision," orchestra.

a-WGR (319) BUFFALO, N. Y. 30 p. m.-Concert, courtesy Buffalo "Courer and Ensuirer." 6:30 p. m.-Vincent Lopez, Hotel Statler. 9 p. m.-Regular monthly period by the Wheat Ice Cream Company, Buffalo.

a-WBZ (337) SPRINGFIELD, MASS. 11:55 a.m.—Arlington time signals; weather reports; Springfield market report. 6 p. m.—Dinner concert by the Westing-house Philharmonic trio, from the Hotel Kim-ball studio, Springfield. 7 p. m.—Market report as furnished by the United States department of agriculture at Boston. 7:05 p. m.—Bedtime story for the kiddies. 7:15 p. m.—'Bringing the World to Amer-ics," prepared by "Our World." Late news 9-WRZ (337) SPRINGFIELD

7:05 p. m.—Bedtime story for the klddies. 7:15 p. m.—"Beringing the World to Amer-ica," prepared by "Our World." Late news from the National Industrial Conference board from the Hotel Kimball studio, Springfield. 7:30 p. m.—Lesson in a course in modern literature being given under the auspices of the commonwealth of Massachusetts depart-ment of education. Lecturer in this course, Robert Emmons Rogers, professor of English literature, from the Hotel Brunswick studio, Boston.

Boston. 8:05 p. m.—Broadcast of hockey game be-tween Boston Bruins and Ottawa direct from

tween Boston Bruins and Ottawa direct from the Boston arena. 9:45 p. m.—Concert by the Westinghouse Philharmonic trio and Fred W. Gardner, tenor; Katherine Gravelin, accompanist, from the Hotel Kimball studio, Springfield. 9:55 p. m.—Arlington time signals; official United States weather reports. 10:01 p. m.—Continuation of musical pro-gram from the Hotel Kimball studio.

a-WEEI (303) BOSTON, MASS. 6 p. m.-Jack Renard and his Mansion Inn

orchestra. 7 p. m.—Boston Edison Big Brother Club. 7:30 p. m.—''A Few Minutes With Santa Claus," courtesy of Houghton & Dutton Com-pany, Boston. 8 p. m.—Laselle Seminary Christmas con-

8:45 p. m.-"Buddy's Bostonians," from the

6:30 p.m.-Budgy a Doston, 9:30 p.m.-Musicale, 10:30 p.m.-Dance slections by Dok-Elsen-bourg and his Sinfonians, direct from the amber room, T. D. Cook's, Boston,

b---KYW (536) CHICAGO, ILL. 6:30 a. n. — Morning exercises. Instructions given by the physical director of the Y. M. O. A. This service is also broadcast at 7 

 C. A. This service is also broadcast at 7 and 8 a. m.
 10:30 a. m.—Lillian Hartigan "Grace, Poise and Charm" talk.
 9:30 p. m.—Table to "Starlor," by George and Charm" talk.

 9:30 a. m.—Lillian Hartigan "Grace, Poise and Charm" talk.
 10:30 a. m.—Lillian Hartigan "Grace, Poise and Charm" talk.
 9:30 p. m.—Table to "Starlor," by George and Charm" talk.

 11:35 a. m.—Table talk by Mrs, Anna J. Peterson of the Peoples Gas Company.
 10:30 a. m.—Minie Stern, planist.
 9:30 p. m.—Arlington time signals; official tertainers and Spirituals, Jubilees and Jazz numbers.

 6:02 to 6:18 p. m.—News, financial and final markets furnished by the Union Trust Com-pany, Chicago "Journal of Commerce," and U. S. department of arriculture.
 9 m.—Interview with Dr. John Lovejoy Elliot of Society for Ethical Culture by Terese Rose Nagel.
 9:30 p. m.—Arlington time signals; 0 m.—Jack Brown and his orchestra. 6:30 p. m.—Jack Brown and his orchestra. 73:10 f. m. Martar P."Miller, Sortance.

#### RADIO PROGRAMS FOR **b**—CENTRAL STANDARD TIME. a-EASTERN STANDARD TIME.

by Walter Wilson, who is known to the little ones as "Uncie Bob." All Chicago stations are slient on Monday from 7 p. m. to 12 p. m.

b-WLS (845) CHICAGO, ILL. b = WLS (345) CHICACO, ILL.
 B a. m.—Market report; weather forecast.
 11 a. m.—Livestock, fruit and vegetable markets; farm news bulletins.
 Noon to 1 p. m.—Music; weather forecast; farm program.
 1:30 p. m.—Complete livestock, fruit and vegetable markets; farm markets; farm news bulletins.

bulletine.
8:45 to 4:45 p. m.—Housemakers' hour.
6 p. m.—Summary livestock, grain, dairy, fruit and vegetable, poultry and egg, hay and feed markets; farm news bulletins. Silent night.

b-WMAQ (447) CHICAGO, ILL. p. m.-Mothers in Council, by 4 p. m.-Mothers in Council, by D. Frances M. Ford; one of a weekly series. 4:30 p. m.-One of the series of talks English, Mrs. J. Elliott Jenkins. 6 p. m.—Chicago Theater organ recital. 6:30 p. m.—Hotel LaSalle orchestra. Monday night---Silent night.

b-WMC (500) MEMPHIS, TENN. 8 p. m.—Bedtime stories for the kiddles by Uncle Percy. 8:30 p. m.—Regular Monday evening request program by Biggers Georgia Serenaders,

b---WHAS (400) LOUISVILLE, KY. 4-5 p. m.--Selections by the Alamo Theater orchestra, Harry S. Currie, conductor. Police bulletins. Weather forecast for Kentucky, Indiana and Tennessee. "Just Among Home Folks," a daily humorous column appearing in the "Conrier-Journal." Readings: Selected "Courier-Journal." and Louisville "Timics" edi-torials. Late important news bulletins. 4:55 p. m.-Local livestock, produce and grain market reports. ain market reports. 5 p. m.—Official Central Standard time 7:30-9 p. m .- WHAS is silent on Monday

b-KSD (546) ST. LOUIS, MO. 7 p. m.-Music and specialties direct from Missouri Theater. 9 p. m.-Music program direct from Grand Central Theater.

b--WOC (484) DAVENPORT, IA.

10 a. m.—Opening market quotations. 10:05 a. m.—Household hints. 10:55 a. m.—Time signals. 11 a. m.—Weather and river forecast.

11:10 a. m.-Weekly hay and grain review. 12 noon—Chimes concert. 12:15 p. m.-Weather forecast (repeated). 2 p. m.-Closing stocks and markets. . (1:45 p. m.-Sport 'news and weather fore-). m.-Sandman's visit.-(Bedtime stories

7 p. m.—Sandman's visit.—(Bedtime stories by Val McLaughlin).
7 :20 p. m.—Educational lecture—"Advertising," by H. E. Vedder, department of psychology, the Palmer School of Chiropractic.
8 p. m.—Musical program—(1½ hours).
Schmidt Music Company Concert orchestra.
9:30 p. m.—Educational lecture—"What a Million Miles of Travel Have Taught Me," by Major Dent Atkinson, Ph.D.
10 p. m.—Special—A three-act comedy entitled, "Not Such a Fool as He Looks," presented by the Dramatac Club of the Palmet School of Chiropractic, directed by W, Roy Van Allen.

c--KHJ (395) LOS ANGELES, CAL. 12:80-1:30 p. m.-Frogram presented through the courtesy of the Martin Music Company, arranged by J. Howard Johnson. 2:30-4 p. m.-Program through the courtesy of the Pacific States Electric Company, pre-senting the Pacific States Check Seal Trio, and Gladys Blackwell Pickering, soprano.

#### TUESDAY

Tuesday, December 16. -KDKA (208) PITTSBURGH, PA.

a-RDKA (75%) PTTTSBURGH, PA. 9:45 a. m.—"Stockman" reports of the Pitts-burgh livestock markets; general market re-view and agricultural items. 11:55 a. m.—Arlington time signals. 12 m.—Weather forecast. "Stockman" re-ports of the Pittsburgh livestock markets; 12:15 p. m.—Concert by Scalzo's Orchestra, playing at Kaufmann's dining room, Pitts-burgh. 8:30 p. m.-Closing quotations on hay, grain

and food from the "Stockman's" studio. 6:30 p. m.—Organ recital by Alexander F. Taylor, from the Million Dollar Grand Theater, Pittsburgh. 7:30 p. m.-"'Stockman'' reports of the pri-mary livestock and wholesale produce mar-

kets, 7:45 p. m.—Story time for the little folks: 8:30 p. m.—Choir Ensemble Society, Lyman Almy Perkins director, assisted by KDKA String Ensemble. Soloist: Miss Caroline Bracey, soprano; Miss Lillian Vetter, so-prano; Miss Mary Berkes, soprano; Mrs. Le-vigas McCrady, contralto; Mrs. L. Wallace

b-WSAI (309) CINCINNATI, O. 7 p. m.-Hotel Gibson Orchestra, Robert 7:30 p. m.-Chime concert; children's storles, Mrs. Behrman. 8 p. m.-Hotel Gibson Orchestra.

9 p. m.-Florence Braun, soprano; Stept ad Collins; Oliver Plunket, tenor. B-WCAP (469) WASHINGTON, D. C.

a-WGBS (316) NEW YORK CITY. 10 a. m.-Timely talks with Terese. 10:10 a. m.-Minnie Stern, planist. 10:20 a. m.-Winnie Stern, planist. 10:30 a. m.-Minnie Stern, planist. 10:40 a. m.-Lillian Hartigan "Grace, Poise and Charm" talk. 10:50 a. m.-Minnie Stern, planist. 1:30-2:30 p. m.-Ted Brown's Colored En-tertainers and Spirituals, Jubilees and Jazz numbers.

8:20 p. m.—Boys Club of Hudson Guild.
3:30 p. m.—Martha P. Miller, sograno.
8:40 p. m.—Aifred G. Robyn, plano lessons.
8:50 p. m.—Martha P. Miller, soprano. 6-6:20 p. m.—Uncle Geebee. 6:20-6:30 p. m.—Loretta Ellen Brady, Children's stories. 6:30-7:30 p. m.—Larry Funk's Orchestra. 8-8:30 p. m.—MacFadden period. 9:30-10:30 p. m.— New York Herald-Tribune'' period. 10:30-11 p. m.— Helena Bloom, Russian dramatic' sonrand

aramatic soprano. 11-12 p. m.-Vincent Rose and His Ritz-Carlton Orchestra. a-WEAF (492) NEW YORK CITY. 11-12 a. in.-Musical program; lecture under the auspices of the board of education; motion

picture forecast and weather and market re-

ports. 4.5 p. m. - Grayee Amrichm, planist; wom-en's program under. the suspices of the Women's League of the United Synagogue of Amarica Women's League of the United Symposic with America. 6-11 p. m.-Dinner music by the WEAF Instrumental Quartet; Blanch Anthony, colo-ratura soprano; Mount Royal Orchestra; Morart String Quartet; talk by the Bank of America; the Gold Dust Twins; "Eveready Hour;" "The B. F. Goodrich Rubber Company's Silvertown Card Orchestra" under the direction of Joseph Knächt.

a-WJY (405) NEW YORK CITY. 7:30 p. m.-Lew Gold's Cameo orchestra 8 p. m.-Albany Community Chorns, direct from Chancellor's Hall, Albany, N. Y., from WGY, Schenectady. 9:30 p. m.-United States Army night; ad-dress by Major-General Merritt W. Ireland, surgeon general of the United States Army; music by the United States Army band.

a-WJZ (455) NEW YORK CITY.

10 a. m.-Housewives' League menu, Mrs. Julian Heath. (ulian Heath.
10:20 a. m.—''Vogue's'' talk on etiquette.
10:50 a. m.—Eleanor Gunn's fashion talks
1 p. m.—Nathan Abas' Hotel Pennsylvania

Orchestra. 4 p. m.-George Forrest, tenor. 4:30 p. m.-Bernhard Levitow's Hotel Com-modore tea music. 5:30 p. m.-State and Federal agricultural reports; farm and home reports; closing quo-tations of the New York stock exchange; for-elgn exchange quotations; Evening "Post" news. ews. 7 p. m.—Frank Dole, "Dogs, Japanese

7:15 p. m.-Hotel Vanderbilt Orchestra.

7:16 p. m.—Hotel . Vanderbilt Orchestra.
8 p. m.—'Wall Street Journal'' review,
8:10 p. m.—NYU Air College; "Sociology,"
Prof. Z. George Payne
8:30 p. m.—Address by Frederick William.
Wile, direct from WRC, Washington.
8:45 p. m.—Concert by the New York Mozart Society; John Charles Thomas, barl-tone; Lester Hodges, accompanist; WRC will also broadcast. also broadcast. 10 p. m.-The Brunswick hour of music, direct from Brunswick Recording Labora-tory; WRC, WGY and KDKA will also

11 p. m.—Meyer Davis' Society Orchestra, direct from Le Paradis Cafe, from WRO.

a-WGY (380) SCHENECTADY, N. Y. 11:55 a. m.-U, S. Naval Observatory time

a-WGY (380) SCHENECTADY, N. Y. 11:55 a. m.-U. S. Naval Observatory fime signals. 12:30 p. m.-Stock market report. 12:40 p. m.-Produce market report. 2 p. m.-Music and talk. 'A Christmas Breakfast Party with Three,' Helen A. Bal-lard (Virginia Daré Extract Co.). 6 p. m.-Produce and stock market quota-tions; news bulletins. 8:80 p. m.-Dinner music by trio from Hotel Ten Eyck, Albany, N. Y. 7:43 p. m.-Program by Albany Community choris of 1,000 volces from Chancellor's Hell, Albany, N. Y. Ellmer A. Tidmarsh, conduc-tor. Selections, a. March, "Thunderer," b. "Faust," Y. M. C. A. orchestra, Claude J. Holding, conductor. Selections, a. "Star Spangled Banner," b. "America," Albany Community Chorus. Baritone solos, a. "Bonnie Prince Charlie," b. "Bonnie Dundee," Joseph Calhoun. Selections, a. March, Desph Calhoun. Selections, a. "Albany Dear Albany," b. 'It's a. Fine Thing to Sing," chorus. Contralto solos, a. "Albany, Dear Albany," b. 'It's a. Fine Thing to Sing," chorus. Contralto solos, a. "Monder," Joseph Calhoun. Selections, a. "Makiny, Dear Albany, Dear Cotton Wood," b. 'Love's Old Sweet Song," Mrs. John C. Cary (chorus Lorging, Mrs. Edward H. Betcher. Selections, a. "Wonder-ful One," b. "On the Road to Mandaiay," chorus. Plano solos, a. "Bany Picker," b. "The Great Red Dawn," chorus. Soprano solos, a. "Ave Maria," (violin obligato by Thomas F. O'Neil) b. "At Dawning," Mrs. Edward H. Betcher. Selections, a. "Wonder-ful One," b. "On the Road to Mandaiay," chorus. Plano solos, a. "Banjo Picker," b. "The Cat and the Mouse," Elimer A. Tidmarsh. Address, Mayor William S. Hackett. Selec-tions, a. "Academy March," b. "Sweet Little You." Albany Academy Orchestra, William Pate, leader. (Under the direction of Helen McElwee Miller). Selections, a. "Wonder, fuller March," b. "She's the Lass for Me," chorus, Guartet selections, a. "Oh, Come to Rest, F. Call Ye Lambline All" (Norwegian Foliskong), b. "The Carait, Selections, a. "Kenery, Mrs. E. H. Helcher, Miss L. Cought dena, "Chorus. Flute solos, a. "Sourentr," b. Waltz, "La Traviata," Jacob Nelson, Frances B. Poskanzer, accompanist. Selec-tions, a. "O Little Town of Bethlehem," b. "Silent Night," chorus. Selections, a. "Song of Songs," b. "What'll I Do," chorus. Violin solos, a. "Ave Maria," b. "Midnight Bells," Thomas Francis O'Nell; Joseph F. Dwyer, ac-companist. Selections, a. "A Perfect Day," b. "Au Revoir," chorus. 11:20 p. m.—Organ recital by Stephen E. Bolsclair, Proctor's Harmanus Bleeeker Hall, Albany, N. Y.

a-WGR (319) BUFFALO, N. Y. 11:30 a. m. — Address by Mrs. K. N. Britt, home demonstration agent, for the United States department of agriculture. 2:30 p. m. — Concert, courtesy Buffalo "Courer" and "Enquirer." 6-7:30 p. m.—Hallpryd String Quartet, dinner music. m.—National Carbon Company's 9-10 p. m.—National Carbon Company's everready hour, broadcast jointly with Station WEAF, New York City. 10-11 p. m.—Goodrich Silver Town Cord Or-chestra, jointly with Station WEAF, New York City.

a-WBZ (337) SPRINGFIELD, MASS. 11:55 a. m. Arlbigton time signals; weather reports; Springfield market report. 6 p. m. Leo Reisman Hotel Lenox ensemle, 6:30 p. m.—Copley Plaza orchestra under he direction of W. Edward Boyle, 7 p. m.—Market report as furnished by he United States department of agriculture the United States department of agriculture at Boston. 7:05 p. m.—Bedtime story for the kiddles from the Hotel Kimbell studio, Springfield. 7:15 p. m.—World market survey from the department of commarce at Boston from the Hotel Kimbell studio, Springfield. 7:80 p. m.—Leo Beiman and his Hotel Brunawick orchestra. 38 p. m.—Amelia Marcus, soprano, and Mar-jorie Lieperman, pianist, from the Hotel Brunawick studio, Boston. 8:30 p. m.—Program Arranged by Pauline Hammond Clark, from the Hotel Brunswick studio, Boston. studio, Boston. 9:30 p. m. Talk on "Starlore," by George Leo Patterson, from the Hotel Brunswick,

**World Radio History** 



#### THE WEEK e-PACIFIC STANDARD TIME.

#### 7:30-8:30 p. m.-Musicale: 8:30 p. m. Y. M. C. A. Glee Club concert. 9 p. m.-Program from New York Studio-Eveready hour, ordered nour. 10 p. m.—Program from New York studio— coodrich Silvertown Cord orchestra.

b-KYW (536) CHICAGO, ILL. 6:30 a. n. — Mortilng exercises. Instructions tiven by the physical director of the Y. M. C. A. This service is also broadcast at 7 and

a. m. 9:30 a. m.-Late news and comment of the

8 a. m.
9:30 a. m. Late news and comment of the financial and commercial markets.
10:30 a. m. - Warm and home service.
2:35 to 4 p. m. - "Afternoon Frolic," broadcast from KYW's studio in Hearst Square.
4 p. m. - "Bringing the World to America," furnished by the editors of "Our World."
6:02 to 6:18 p. m. - News, finahcial and final markets furnished by the Union Trust Company, Chicago "Journal of Commerce," and U. S. department of agriculture.
6:35 to 7 p. n. - Children's bedtime story fold by Waiter Wilson, who is known to the little ones as. "I ncle Bob."
7 to 7:30 p. m. - Dinner concert broadcast from the Congress Hote: Joska DeBabary's orchestra, Louis XVI room.
7:30 to 7:45 p. m. - Waround the Town with KYW in Chicago" (stage review).

7:30 to 7:45 p. m.—"Around the Town with KYW in Chicago" (stage review). 8 to 8:20 p. m.—Musical program: This program will be furnished through the courtesy of the Chicago Musical College. Artists and program in detail will be announced by radio. 8:20 to 8:45 p. m.—Speeches under the auspices of the American Farm Burean Fed-eration. — Speakers will be announced by rediumone.

radiuphone. 8:50 to 9:30 p. m.—Musical program: Helen Bickerton Cole, soprano; Lucille Long, con-traito; R. V. Thomas, bass; Irene Pierce, accompanist; Thomas B. Stephenson, tenor. Mr. Stephenson will sing any of the old time songs on request. 10 to 11:30 p. un.—"Evening at Home" pro-gram broadcast from KYW's studio in Hearst Square.

b-WLS (345) CHICAGO, ILL. 9 m. m. Market report; weather forecast. 11 m. m. Hog, cather and sheep flashes; fruit and vegetable shipments. Noon to 1 p. m. Music; weather forecast;

tarm program. 1:30 p. m. Complete livestock, Truit and regetable markets; final grain market quota

ons; farm news bulletins. 3:45 to 4:45 p. m.-Housemakers' hour. 5:45 to 4:46 p. m. --foundmarks livestra hour. 6 p. m. --Summary, livestock, grain, dairy, fruit and vegetable, poultry and egg, hay and feed markets; farm news bulletins. 6:30 p. m. to midnight---Pipe organ recital; lulaby time; farm program; Shakespeare drama; Ford and Glenn time; midnight mardi

b---WMAQ (447) CHICAGO, ILL. 12 m.-One of the weekly programs under auspices of the Illinois Manufacturers' Asso-ciation.

4 p. m.—American Red Cross home nursing talk by Miss Estelle Weltman, one of a weekly

series. 4:30 p. m.--Program from the Gunn School of Music. 5 p. m.-"The Lullaby Lady," Miss Grace

b. m.— The Janady Lady, Miss Grace Davengort.
6 p. m.—Chicago Theater, organ.
6:30 p. m.—Hortel LaSalle orchestra.
8 p. m.—Harry Hansen, literary editor of the "Daily News," book review,
8:20 p. m.—Clara E. Laughlin,
8:40 p. m.—Association of Commerce weekly talk.

8:50 p. m.—University of Chicago. 9:15 p. m.—Program of Philharmonic

b-WMC (500) MEMPHIS, TENN. 8 p. m.--Kiddies bedtime stories by Uncle Joe. 8:30 p. m.—Program sponsored by Mazda. Grotto Lodge. 11 p. m.—Midnight Frolic.

b-WHAS (400) LOUISVILLE, KY, 4.5 p. m.-Selections by the Alamo Theater orchestra, Harry S. Currie, conductor. Police bulletina. Weather forecast for Kentucky, In-John State for Cost for Actual and the formation of the format and f

grain market reports. 5 p. m.—Official Central Standard time b. p. m.—Onicial Central Standard Links amounted. '7:30-9 p. m.—Concert by Carl Zoeller's Melodists, Carl Zoeller, director and drums; Elmore Weissrock, trumpet; Aulyn Kanston, piano; Ed Reithmuth, saxophone and violin; Jerome Weissrock, trombone; Cliff Eblen, banjo and saxophone; Cecil Davis, tuba. Late important news bulletins. Official Central Standard time announced at 9 o'clock.

b---KSD (546) ST. LOUIS, MO.

4 p. m.—Home economics program. 6 p. m.—Concert by Benjamin Rader's Or-chestra, direct from Missouri Athletic Asso-ciation.

'9 p. m .--- Program to be announced.

b-WOC (484) DAVENPORT, IA.

b--WOC (484) DAVENPORT, IA.
10 s; m.-Opening market quotations.
10:05 a. m.-Household hints.
10:05 a. m.-Time signals.
11 a. m.-Weather and river forecast.
11:20 non-Chimes concert.
12:16 p. m.-Weather forecast.
2 p. m.-Closing stocks and markets.
5:45 p. m.-Chimes concert.
6 p. m.-Sport news and weather forecast.

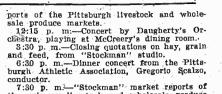
-KHJ (395) LOS ANGELES, CAL.

c--KHJ (395) LOS ANGELES, CAL. 12:30-1:30 p. m.-Program presenting Tommy Tibbets and his Rendezvous Ballroom Orchestra from the Crystal Beach. 2:30-4 p. m.-Program through the courtesy of the Pacific States Electric Company, pre-senting Jose Arias and his Mexican Orchestra. Antoinette Friend, singer and violinist. 4 p. m.-Program through the courtesy of the Southern California Music Company. 6-6:30 p. m.-Art Hickman's Concert Or-chestra from the Biltmore Hotel; Edward Fitzpatrick, director. 6:30-7:30 p. m.-Children's program pre-senting Prof. Walter Sylvéster Hertzog telling stories of American history. The weekly visit of Radio Fairies, the Sandman and Queen Titania. Louis F. Klein, Harmonica and au-toharp. 7:30 p. m.-Bertram Sanham will talk on

7:30 p. m.—Bertram Sannam will talk on "Sanna;"
8-10 p. m.—Program presented through the courtesy of the Peerless Laundry, arranged by J. Howard Johnson.
10 p. m.—Program through the courtesy of O. C., Magenheimer, president of the Sentinel Oli Company, presenting the Los Angeles Trio. 11 p. m.—Earl Burthet's Biltmore Orchestra, from the Biltmore Hotal.

### WEDNESDAY

Wednesday, December 17. a-KDKA (326) PITTSBURGH, PA.



the primary livestock and wholesale product markets. 8:15 p. m.-Evolution and Heredity talk No. V. "Experimental Evolution," by Prof. H. D. Fish, head of department of zoology, University of Pittsburgh, from the University of Pittsburgh studio. 8:30 p. m.-Program by the courtesy of the Rosenbaum Company, under the direction of Chauncey Parsons. 9:55 p. m.-Arlington time signals; weather forecast.

a-WFI (395) PHILADELPHIA. 19:15 a. m.-Produce market and stock reports. 1 p. m.-Meyer Davis Bellevue Stratford Hotel Concert Orchestra

m.—Mcger Davis Henevel Stratting Cotel Concert Orchestra.
 1:50 p. m.—Agricultural reports.
 p. m.—Report of the closing prices of ne Chicago grain market.
 3:05 p. m.—"Short Chats on Recent Nov-

3:05 p. m.—"Short Carlo by Ethel Kooker. 3:00 p. m.— Shot Ones of allowing of Johann Sebastian Bach. History of John Sebastian Bach. History of John Sebastian Bach, 'History of John Sebastian Bach, 'told by Grace Houseman. "My Heart Ever Faithful," sung by Ainy Jacque, contraito. Air for G string played by Ethel Lewis, cellist; Loretta Kerk, accompanist.

by Ethel Lewis, Censt, Loretta Atta, at companist. 6:30 p. m.—Meyer Davis Bellevue Strat-ford Hotel Concert Orchestra. 7 p. m.—"Sunny Jim—the Kilddles' Pal," assisted by Martie Faye with Margaret Morris at the piano.

b-WMH (309) CINCINNATI, O. 8 p. m.-Songs, Frank Wright and Frank Bessinger, the Radio Franks. Celio solos by Oscar Krische; Margaret Bronson, accompanist. Bass solos by Chester Markward. Vocal duets, Miss Margaret Bronson and Mrs. Ora Welf, Mrs. George Dunning, accompanist. Reading, Miss Sadie Stewart. 9:30 n. m.-Dance orchestra. 9:30 p. m.-Dance orchestra.

a-WCAP (469) WASHINGTON, D. C. a-WCAP (469) WASHINGTON, D. C. 7:30-8:30 p. m.-Concert by the United States Navy Band, Charles Benter, leader, broadcast jointly with stations WEAF, New York, and WJAR, Providence. 8:30-10 p. m.-Studio concert by "Bob" Lawrence and his musical friends. 10-11 p. m.-Special musical program un-der the auspices of the Potomac division of the Salvation Army, presenting several New York artists.

a - W(155 (316) NEW FORK CIAL 10 a.C. ... - Timely talks with Terese. 10:70 a.m. -- House furnishing review. 10:30 a.m. -- Bert Dixon, baritone. 10:40 a.m. -- Gertrude E. Tucker, "Real tomance of America." 10:50 a.m. -- Elmio Russ and Bert Dixon. 1:30-2:30 p.m. -- Mischa Bor and His Russian nn Orchestra.

nn Orchestra. 3 p. m.-Interview with Fred Fletcher, fish-3:10 p. m.—Ethel Cryder, soprano. 3:20 p. m.—Ethel Cryder, soprano.

3:20 p. m.—Dthel Rosemon, editor of Moving Pleture Stories.
3:80 p. m.—Ethel Cryder, soprano.
3:40 p. m.—Charles Le Maire "Costumes or Fancy Dress Balls."
3:50 p. m.—Ethel Cryder, soprano.
6:6:30 p. m.—Uncle Geebee.
6:30-7:10 p. m.—Van and His Collegians.
7:10-7:30 p. m.—Judge and Film Fun in Witting Human.

**a-WEAF** (492) NEW YORK CITY. 11-12:30 p. m.-Musical program and Young Mother's Program. Chapel services direct from Columbia University; market and weather re-

dots in the state of t

a-WJZ (455) NEW YORK CITY, a. m.-Housewives' League menu, Mrs. 10 a. m.-Housewives' League menu, Mrs. Julian Heath. ·10:20 a. m.-"Periodic Examination," by Visiting Nurse Service of New York, founded

Visiting Norse Service of New York, founded by Henry Street Settlement.
30:40 a. m.—"Foods, Facts and Fancies," Tribune Institute talk by Bertha Baldwin.
10:50 a. m.—Eleanor Gunn's fashion telk.
1 p. m.—Hotel Belmont luncheon music.

4 p. m.—Specialty number. 4:30 p. m.—Hotel Belmont tea room. 5:30 p. m.—State and Federal agricultural reports; farm and home reports; closing quo tations of the New York stock exchange; for eign exchange quotations; Evening "Post"

news. 7 p. m.-Bernhard Levitow's Hotel Commodore dinner concert. 8 p. m.—''Wall Street Journal'' review. 8:10 p. m.—NYU Air College: ''Sociolog

ir College; "Sociology. 8:30 p. m.-Keith McLeod, planist (request a) p. m.—"Field and Stream" talk by Har-old McCracken.
9:15-p. m.—Specialty number.
10 p. m.—Hotel St. George Trio.
10:30 p. m.—Billy Wynne's Greenwick Vil-lage Inn Orchestra.

m-WGY (380) SCHENECTADY, N. Y.
11:85 a. m.—Time signals.
12:80 p. m.—Stock market report.
12:40 p. m.—Weather report.
12:45 p. m.—Weather report.
6 p. m.—Produce and stock market quotations; news bulletins.
6:30 p. m.—'Adventure Story," (courtesy of "Youth's Companion).

a-WGR (319) BUFFALO, N. Y. 2:30 p. m.-Concert, courtesy Buffalo "Cour-ier and Enquirer." 6:30 p. m.-Vincent Lopez, Hotel Statler, dinner music. 8-8:15 p. m.-""Prehistoric Monsters of Western New York," by William L. Bryant of the Buffalo Society of Natural Sciences. 9-11 p. m.-Musical program, courtesy Hoover Suction Sweeper Company, Buffalo di-vision.

e-WBZ (337) SPRINGFIELD, MASS. 11:55 a.m.-Arlington time signals; weather reports; Springfield market report. 6 p. m.-Dinner concert by the Westing-house Philharmonio trio, from the Hotel Kim-ball studio, Springfield. 7 p. m.-Market report as furnished by the United States department of agriculture at Beston. United States department of agriculturé at Boston.
7:05 p. m.—Radio nature story by Thornton B. Burgess, from the Hotel Kimball studio, Springfield.
7:15 p. m.—Information concerning civil service examinations from the Hotel Kimball studio, Springfield.
7:30 p. m.—Concert by the Marchesi quartet, assisted by the Westinghouse Philharmonic trio, from the Hotel Kimball studio, Springfield.
8:30 p. m.—Concert arranged by Mine. Emilia Ippoitio, from the Hotel Brunswick studio, Boston.
9:30 p. m.—Marimba solos by Clarence H. Jones, accompanied by Mrs. A. Symington, a.—KDKA (326) PITTSBURGH, PA.
T.a. m.—Morning exercises conducted by O.
Shannon, physical director of the McKeesport
Y. M. C. A.
B. a. m.—Morning exercises conducted by O.
Shannon, physical director of the McKeesport
Y. M. C. A.
B. a. m.—Morning exercises conducted by O.
Shannon, physical director of the McKeesport
Y. M. C. A.
B. B. M.—Morning exercises conducted by O.
Shannon, physical director of the McKeesport
Y. M. C. A.
B. B. M.—Morning exercises conducted by O.
Shannon, physical director of the McKeesport
Pittsburgh livestock market; general market
11:55 a. m.—Atimation time signals.
J. M. Woether specess.
Stockman<sup>10</sup> ref
Stockma



Fermerly with the Western Electric Ca., and U. S. Army Instructor of Radio Technically edited by F. H. DOANS

#### 514 PAGES

THE most complete book of its kind ever published. Written, compiled and edited by practical radio experts of national reputation. Packed with concise, sound information useful to every radio fan-from beginner to veteran hard-boiled owl. Hundreds of illustrations and diagrams to make every point clear. Note this partial list of contents:

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Brunswick orchestra, 11:30 p. m.—Popular song recital. 11:45 p. m.—Leo Reisman and his Hotel Brunswick orchestra.

a-WEEI (303) BOSTON, MASS. 2 p. m.-Happy Hawkins and his orchestra. 6:80 p. m.-Dok-Eisenbourg and his or-7 p. m.—Cooking school by recognized authorities. 7:10 p. m.—Boston Edison Big Brother

1 p. m.—Fenway Theater midnight organ Ital with Lloyd G, Del Castillo at the

b--KYW (536) CHICAGO, ILL. 6:30 a. m.-Morning exercises. Instructions given by the physical director of the Y. M. O. A. This service is also broadcast at 7 and

C. A. This service is also broaders: at 7 and 8 a. m.
9:30 a. m.—Late news and comment of the financial and commercial markets.
11:35 a. m.—Table talk by Mrs. Anna J.
Peterson of Peoples Gas Company.
6:02 to 6:18 p. m.—News, financial and final markets furnished by the Union Trust Com-pany, Chicago "Journal of Commerce," and U. S. department of agriculture.
6:35 to 7 p. m.—Children's bedtime story



5



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small receiving set. This fact alone is responsible for the great interest shown by thousands of fans, who are constantlytrying to add to their great lists of stations which they have heard.

The "genus radio" may be subdivided into many classes, but there are relatively few of them that are immune to the urge for greater and greater distance. This notwithstanding the fact that generally the programs from the local stations come in the best, both in clearness and sureness. Distant stations have a bad habit of slowly fading out just at the time you are most anxious to hear what the an-. · nouncer has to say.

Let us look into this great mass of radio fans and see what they are composed of:

In the first place let it be understood that the average American man or boy has a positive genius for mechanical workings. As a rule he loves nothing better than to be able to make something with his own hands. He is a natural born mechanic, and in most cases a mighty good mechanic at that.

#### Father Is Interested.

The father will generally educate his on to like things mechanical. He will

cuse never enters his head. Father even goes so far as to have heated arguments on the train in the morning with his fellow commuters, and in some cases old friendships have been broken up over the relative merits of certain circuits.

#### Small Set Is Practical.

On the other hand there are many boys who have not had a mechanically inclined father and they have become interested, in radio through schoolmates or through, reading magazines. Many times these boys will surprise their families by what to the family will appear to be great mechanical genius.

Radio, though, has long passed through the stage of a boy's game, and it is at present being taken up by everybody. The millionaire, who has practically no interest in the workings of a set, will order an elaborate affair and then put it up to his chauffeur to keep the thing inworking order. He will like to sit down at night after dinner and listen to some good music, because radio has been developed to such a point that it is quite possible to listen to an excellent program without interference or other extraneous. sounds. A high grade machine will give everything that a fine phonograph will give, and in some cases will be even better in tone.

Unfortunately things have developed

#### A small crystal set is well within the reach of any one.

along the lines of trying to get the greatest amount of volume from a given set. Everything will be overloaded in this attempt and the result is bound to be anything but edifying to a real musical taste. It is possible to take such a radio set and tone it down just a little and as a result receive the broadcasting with the finest tonal quality, without distortion and in such a manner as to be thoroughly enjoyable.

Now let us consider the man who cannot afford to spend several hundred dollars on such an elaborate set as this. He will find that it is quite possible to install a smaller set which will give him exactly the same programs as his rich neighbor. It is true that he may not hear as many stations, but what he does hear will compensate him for his expenditure.

It is quite possible for him to start off with an extremely modest set and gradually add to it, when he can afford to do so, until he has a set fully the equal of the larger outfit. The radio set can only be developed so far, and when it reaches this point the extra cost usually goes into a better looking and more expensive cabinet. It is quite possible to buy a receiving set right now which will have all the appearances of a piece of the

tory

finest furniture. Cabinets are procurable in any "period" desired, in much the same manner that phonographs are made up. Such sets, of course, have the wiring entirely concealed, and generally the tuning is done after a hinged lid has been lifted up. This is not any more difficult to do than it is to run a phonograph.

Generally the man who builds his own set will not go in much for such elaboration as this, but the "workings" of his set may be fully as good. There are thousands of cases on record of comparatively cheap homemade sets that have picked up stations thousands of miles away. Some of these feats have been done repeatedly, night after night.

A set that will do this does not have to be any more elaborate than a set that will pick up the local broadcasting stations in good shape.

#### Long Distance Easy.

Some types of radio fans will make the remark that they will be perfectly satisfied to have a set which will pick up the local station only. If they have such a set-barring the simple crystal set, of course-they will undoubtedly be able to hear other stations many hundreds of

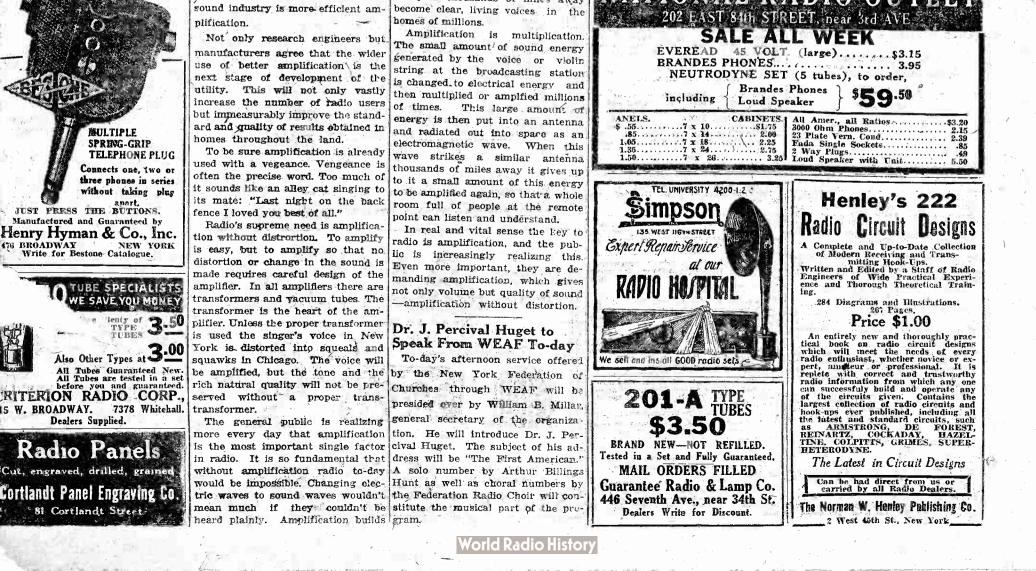
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27





#### **China Society Dinner Will** Bring Orient to WJY

The addresses which will be given broadcast by station WJY Tuesday evening, will afford a great deal of man of the American Museum of telegraph interference, unless it is Natural History, and Roy Chapman possible to increase the power of Andrews, the famed finder of the dinosaur eggs and head of the reupon the trip.

#### Swinging of Aerial Will Cause Fading

Around this time of year, as at all enjoy the program. ether times, watch your outdoor aerial to see that the ropes or other supports are not loosened by the wind, allowing the aerial; to sway. The capacity which governs wave length of an aerial depends on, among other things, its distance from is swinging and thus changing its wave length, the tuning of your set will vary from instant to instant, upsetting the operation of the set. Keep the aerial taut. If supported by a rope over a pulley, suspend a weight on the rope, to take up the slack as the pole sways .--- G: M. C.

#### Soloists at WJY Sunday Afternoon

a host of enthusiastic adherents in four channel operation was underboth the metropolitan and outlying taken in the metropolitan area. districts.

#### Frank McGlynn to Speak About Lincoln

New Jersey

in the presentation of Drinkwater's which successfully eliminates WEAF play "Abraham Lincoln," will broad- so that reception of ship wave lengths cast a talk on the Great Emanci- is possible. If this can be done within pator as a feature of WEAF'S Lin- fifty feet of the broadcasting station coln's Birthday evening program, the feat can be duplicated at greater He will give his views of the char- distances. acter of Abraham Lincoln as based upon Drinkwater's study of original the footlights.

Appreciated by Many Fans WEAF's development work in conspeakers whom Gen. J. G. Harbord, that there can be no further imthe toastmaster, will introduce will be provement in broadcasting condi-Prof. Henry Fairfield Osborn, chair- tions, particularly as regards spark

New York broadcasting stations. cent expedition to Mongolia. The volume; it reduces the ratio of teleprincipal subject of the talks will graph and static interference as to the most modest equipment in operation. The owner of a crystal receiving set receives WEAF's program with much greater volume and is consequently much better able to

Those possessing vacuum tube sets with many stages of amplification are able to operate successfully with reduced amplification, avoiding overloading of tubes and securing in consequence a much higher quality of reproduction. Sensitive receiving the ground. Therefore, if the aerial sets must, of course, be adapted by correct adjustments to receive properfy under the new conditions. Audio frequency amplifiers if overloaded by signals of too great volume do not reproduce as faithfully as they do when amplifying a current of normal volume

short distance of WEAF's transmit- on the panels are often puzzled to a sheet of expensive panelling. G ter or those not adapted to selective know, without drilling the panel, M. C. tuning may at first interfere with just how instruments will appear. satisfactory reception of other local Take a piece of heavy cardboard or Two noted soloists will be heard by broadcasting stations. However, this duplex board, cut it to panel size. WJY listeners Sunday afternoon, for is a condition which can certainly be Lay out the panel as you think you Jewel Farrington, celebrated so- corrected by simple adjustments of want it, drill the holes, attach it to prano, and Max Schwartzman, tenor, the receiving sets. It may be re- the baseboard and mount the instruwill give radio recitals from that called that when two channel broadstation. Jewel Farrington is one of casting operation was first inaugu- them temporarily. You can see how the most promising of the younger rated last year on 360 and 400 meters singers, and has achieved consider- listeners were troubled by interferable success in the few concerts ence, but by improvement in their which she has as yet given. Max sets now separate these two wave Schwartzman is one of the leading lengths without any difficulty. Simichurch singers of the city, and has lar difficulty was experienced when

An indication of the selectivity obtainable with suitable receiving apparatus is given by the fact that a 600 meter watch is maintained within a few feet of WEAF's antenna. A Frank McGlynn, famous character, short receiving antenna is employed,

One of the causes of difficulty which have frequently been noted is



#### Changes in Station List WEAF'S Increased Power

#### Keys. ·Call. New Stations, Class A Meters. at the China Society dinner, to be nection with the use of higher power WBBN-Blake, A. B., Wilmington, N. C..... 1090 has aroused the interest of radio WBBQ-Frank Crook, Pawtucket, R. I..... 1190listeners not only in the metropoli- WBBM-Fr. Atlass Produce Co., Lincoln, Ill. 1330 in, dealing as they will with the tan area but throughout the eastern WBBK-Kaufmann & Baer Co., Pittsburgh.. 1180 mysterious country of the East about half of the United States. It has WBBO-Limestone & Chem. Co., Rogers, Mich. 1200 which most Americans have only long been realized by radio engineers. WBBR-Peoples Pulpit Asso., Rossville, N. Y. 1230 hazy impressions. The two principal who have studied the situation here WEBF-Petoskey High Sch., Petoskey, Mich. 1220 KDZE-Rhodes Dept. Store, Seattle, Wash... 1110 KFJQ-Valley Radio, Div. of Elect. Constr. Co., Grand Forks, N. D..... 1070

280 TRANSFERRED, CLASS C TO CLASS A. WJAS-Pittsburgh Radio Supply House, Pittsburgh ..... 1200 250 Increased power results in greater LIST OF BROADCASTING STATIONS DELETED DURING THE

MONTH OF JANUARY, 1924. KFAV-Abbot Kinney Company, Venice, Cal. undoubtedly be the recent archaeo- compared with the broadcast pro- WJAB-American Electric Company, Lincoln, Neb. logical expedition and the fascinating gram. This improvement applies not KFIY-Brott Laboratories, Seattle, Wash. and thrilling incidents attendant only to expensive receiving sets, but KFCK-Colorado Springs Radio Co., Colorado Springs, Col. WOAJ---Ervins Electrical Company, Parsons, Kan. WDAX-First National Bank, Centerville, Ia. WABC-Fulwider-Grimes Battery Company, Anderson, Ind. KFIK-Gladbrook Electric Company, Gladbrook, Ia. WAAZ-Hollister Miller Motor Company, Emporia, Kan. KFIB-Jenkins, Franklin W., St. Louis, Mo. WBAW-Marietta College, Marietta, Ohio. KFDU-Nebraska Radio Electric Company, Lincoln, Neb. WGAY-Northwestern Radio Company, Inc., Madison, Wis. WLAN-Putnam Hardware Company, Houlton, Me. WIAT-Radio and Specialty Company, Burlington, Ia. WABJ-Radio Laboratories, South Bend, Ind. KFCD-Salem Electric Company, Salem, Ore. WKAW-Turner Cycle, Company, Beloit, Wis. KFJD-Weld County Printing and Publishing Company, Greeley, Col.

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VARIO. COUPLERS

between instruments work out. it is satisfactory use the cardboar as a template for drilling the panel Radio set builders who take pains If changes are needed you can make Receiving sets located within a to secure the best layout of material as many as needed without rulning

Frequency, Wave Ligth., Power,

275

252

226

254

250

244

246

270

Watts.

50

200

10

500

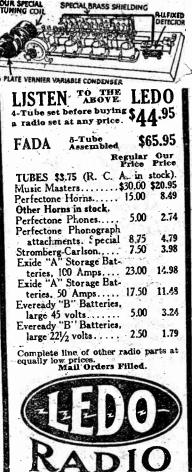
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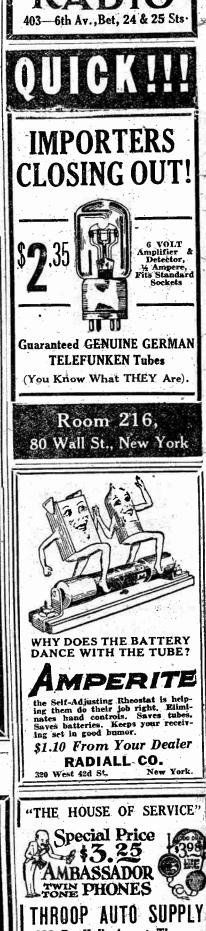


\$3.45

COCKADAY

COIL







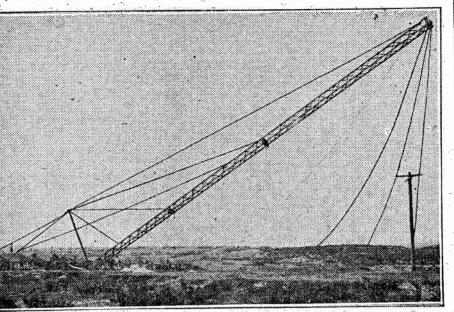
# Australia Now Has One of the World's Largest **Broadcasting Stations** "2 FC" Near Sydney Will Probably Be Heard in the United States

introduced into Australia. A scheme which is unique and which has been drafted after the experience of other countries in regard to broadcasting had been considered has been evolved. In considering the broadcasting problem in Australia difficulties which were unknown in other parts of the world presented themselves. The

subscription has been paid. Arrangements have been complete l whereby radio dealers become agents of the broadcasting companies for the issue of licenses and the collection of the subscription fees for the broadcast-

ing service. No person can purchase a wireless set unless the license has first been obtained. Most people have now thoroughly

realized that if broadcasting is to be



Raising one of the 200 foot Towers was quite a feat.

immense area of the Commonwealth, with | its almost minute and greatly scattered population, rendered it impossible for any of the systems which had been adopted in England or America to be employed in Australia. It was realized, of course, that the establishment of broadcasting should be on such a basis as to render it permanent, and with this end in view a conference of those interested was summoned by the Postmaster General, Mr. Gibson, who is the Minister responsible for the administration of the wireless telegraph act of the Commonwealth. This conference discussed the matter, and eventually evolved a scheme which at a later date was approved of by the Government and was made the subject of special Government regulations.

Under this scheme those wishing to erect stations and broadcast, after being approved of by the Government and also after providing a financial bond of £1,000 guaranteeing continuity of service for five years, are allotted a certain wave length upon which to transmit. Receivers designed to respond to the wave length of the service and sealed so as to respond only to that wave length are then available for purchase by those wishing to avail themselves of broadcasting. This system is an entirely new one, and the exact manner in which it functions is being watched with keen interest by experts- The providing of a service under it becomes similar to the providing of an ordinary telephone service, except that in the case of broadcasting a set is purchased and not hired, and also that it is a receiver only. At first sight the scheme may appear strange and complicated, but the exact manner in which it will operate becomes quite clear if the case of, say, one broadcasting company is considered.

If a company is desirous of establishing a broadcasting service after being granted the necessary approval and license a wave length is allotted to it. The company then erects its station and transmits programs of speech and music according to its own arrangements. The person desirous of receiving then purchases a set designed by experts and tuned so as to receive telephony on the wave length of the service for which it is sold. It is sealed to that wave length, and is not alterable except by deliberate tampering. The testing is done by the Government, and the seal is a Government seal applied by the manufacturer under Government permit. Must Pay for Broadcasting.

The Government fee for a receiving license is 10 shillings per annum. The broadcasting stations control the issue of these licenses, and also charge whatever subscription fee they may think fit per annum. The license can only be is-

maintained in a regular and high class manner it must be established on some basis which provides a certain measure of profit for those responsible for its maintenance. It was with this end in view that the Australian regulations were adopted.

#### Experimental Licenses.

There are, of course, many details in connection with the Australian scheme which make it elastic. For instance a genuine experimenter, after being tested by the Government authorities, is allowed perfect freedom on all wave lengths after payment of license fees only. Similarly the person who decides to receive more than one broadcasting service may have his receiver altered and resealed so as to respond to a number of wave lengths -providing, of course, that he has paid the necessary fees of the broadcasting stations using those wave lengths. Under this scheme it is expected that the Australian broadcasting movement will be a success.

Farmer & Co., Ltd., of Sydney have commenced broadcasting in a large way. This company enjoys the position of senior broadcasting station in Australia, having been allotted No. 1 license by the Government. They have erected one of the most powerful and up to date broadwhich operates on 5,000 watts power and on a wave length of 1,100 meters. When in full swing the station should cover the whole of New South Wales, portions of Victoria and Queensland, and | music which are transmitted in con-

tions in other parts of the world. Situated on the highest point of Wil-

loughby, about eight miles on the northern side of Sydney, New South Wales, the station, which is officially known as 2FC, has now commenced transmission.

The two steel towers which support the aerial system are each 200 feet high and are built in lattice fashion. The distance between these towers is 575 feet. and across this space the aerial system: is stretched. Directly beneath the aerial and almost in the center of the two towers is situated the operatng house and quarters for the staff. A large room houses the 5,000 watt set which is used for the transmission of programs and also a smaller 500 watt set. Adjoining the instrument room are the living quarters, bedrooms and bathroom for the operating staff, and situated some little distance is a large storehouse.

#### Uses Cage Aerial.

The aerial is of the cage type and consists of four wires stretched taut and kept in position by means of huge brass hoops, which are secured at regular intervals along the wire and to which the wire itself is attached. Special attention has been given to the "earth" system, which is most elaborate. No direct contact is made with earth, but a complicated earth screen has been constructed. This comprises a counterpoise arrangement, the wire used in connection with it being supported by small steel masts, each carrying heavy insulators and holding the earth screen 9 distance of about fifteen feet from the ground.

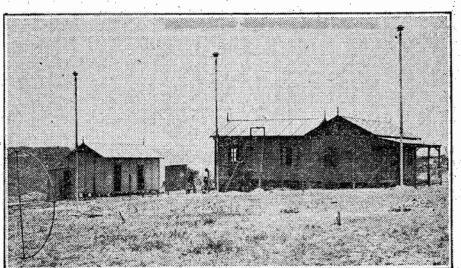
A special steel tower set in concrete is erected near the side of the operating room, and to this tower the "lead

DADIO broadcasting has now been | sued after the broadcasting company's | should also be heard under ideal condi- | nection with Farmer & Co.'s service are provided in elaborate studios which have been constructed on the roof garden of the company's big retail store in Pitt, Market and George streets, Sydney, and about eight miles from the station. A land line conveys the speech and music to Willoughby, where it is transmitted. The studios have been constructed at considerable expense from plans and specifications obtained after consultation with representatives of broadcasting interests in all parts of the world. No stone has been left unturned to insure the best results being achieved, and the studios have been planned accordingly.

Constructed in a special manner so as to be soundproof, they comprise a large and a small studio, an instrument room and a special reception room for the artists. The instrument room adjoins both studios, and the operator is able to watch the progress of the concerts being broadcast through a special double soundproof plate glass window. Walls and ceilings have been draped carefully with thick felt. All doors are double and have been constructed on soundproof principles.

Two Studios In Operation. The use of two studios results in their being very little delay, the manager of the service being able to arrange his artists in one room while the item is actually being rendered in the other. A quick change over on the part of the operator results in one item following another in rapid succession. The microphones into which the artists sing are kept in the studios, and the sound is "stepped up" before being carried by telephone wire to the station at Willoughby.

A special series of switches enables the



The Studios are located seven miles from his operating house.

tion is also made with the "lead" from the earth screen. This small tower by heavy insulators to the actual in- | station is in operation. struments.

The actual programs of speech and

### Radio's Popular Appeal

#### Continued From Second Page.

one to build at home, with the possible exception of the really mechanically inclined man. Even then he is apt to get into trouble unless he has had previous experience with smaller and less complicated sets. There are many cases of success, though, and generally it is simply a matter of time and patience.

Radio has an appeal to every one. The programs offered by the great broadcasting stations are such that there is almost sure to be some feature which will interest any taste. There are talks for the children, for women and for the men. These run from bedtime stories to talks on the financial situation or sporting events. The great leaders of politics and of the nation take advantage of radio to place their thoughts right in the homes of millions of citizens, and the home with a radio set should never lack for entertainment of some kind from the day the set is built until the last instrument has been completely worn out.

Radio is here to stay and it has reached

the status of a public necessity. Do not let any one try to convince you that it is only a passing fancy and that it cannot last, because there are vast sums of money tied up in manufacturing plants and millions of dollars have been spent

by the fans in purchasing their parts. What started as an interesting experiment has taken the public fancy by storm and it has reached such a high stage of development that it is now possible for every one to own and operate some form of set.

#### President Coolidge's Address to Be Broadcast.

The address by President Calvin Coolidge, to be given at the annual Lincoln dinner of the National Republican Club, on February 12, will be broadcast by Station WJZ of the Radio Corporation of America directly from the main ballroom of the Waldorf-Astoria Hotel. Station WJZ will commence broadcasting the proceedings of the dinner at 9 o'clock, education in the Commonwealth,

in" from the aerial is led and a connec- i operator and studio manager to control the operation of the studio with the utmost simplicity, and a series of signal casting stations in the world-a station stands upright against the house, and lamps is arranged so as to give full from it the various wires are carried warning to artists and staffs when the

One of the greatest achievements by the directors of Farmer & Co., Ltd., has been the securing of the sole broadcasting rights from J. C. Williamson, Ltd., and Messrs. J. & N. Tait, the Australian theatrical organization, of the whole of their musical and dramatic productions. For this purpose the four theaters controlled by J. C. Williamson, Ltd., and Messrs J. & N. Tait have been connected by trunk lines with Farmer's . broadcasting studios, and the productions are broadcast as they are produced direct from the theaters.

In addition Farmer & Co., Ltd., have secured the sole rights of the Sydney Morning Herald, Australia's principal morning newspaper, and the Evening News, the principal evening newspaper in Sydney, for broadcasting purposes. A regular feature of the broadcast pro- . gram will be stock exchange quotations and market reports embracing all the primary products of the country, for which purpose the cooperation of Dalgety & Co., Ltd., has been secured. The Sydney Town Hall, the headquarters of the city Municipal Council, has also been connected with Farmer's broadcasting station by a trunk line, while arrangements are being made for the connection of the New South Wales Conservatorium of Music, which is controlled by the State Government, and is the seat of musical

# **Distortion Can Be Eliminated in a Three Stage Amplifier by Careful Design**

Selection of Proper Tubes and Transformers Increases Amplification and Improves **Reproduction**.

By FRED H. CANFIELD.

RACTICALLY all persons who own radio receivers are desirous of having a distortionless amplifier that will increase the intensity of signals to any desired degree. If the word distortionless were omitted from the requirements it would be comparatively easy to construct such an amplifier; however, when more than two stages of transformer coupled audio frequency amplification are to be used the amplifier requires careful design if the distortion is to be decreased to a minimum. It will therefore be the purpose of this article to give suggestion for the construction of a multistage audio\_amplifier.

The selection of the proper audio frequency amplifying transformer is probably the most important thing to consider 1 gives the electrical characteristics of 1 tively charged the signals will be badly 1 more useful energy without being over-

### sary: however, in many cases a 5:1 transformer can be used to advantage in the first stage.

#### Selection of Proper Tube.

At the present time there is very little assortment of amplifier tubes, and as the 201A is so far superior to any other tube in general use little need be said on the subject. It should be said, however, that the value of the amplifying constant is of very little importance and that the value of the mutual conductance and the plate resistance determines the efficiency of the tube as an audio frequency amplifier. The mutual conductance of a tube should be as high as possible and the plate resistance should be low, i. e., h.ytween 6,000 and 20,000 ohms. Table 1.

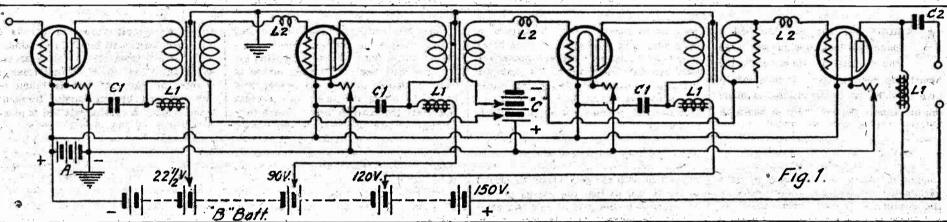
formers gave uniform amplification on 1 is to be used the output of that tube must 1 cial apparatus is not obtainable in a all frequencies this would not be neces- | be materially increased. The most satisfactory way of accomplishing this is to use a larger tube and to increase the plate voltage. A five watt power tube will answer this requirement satisfactorily and any of the available tubes namely the UV202, C302 or VT2, are suitable. When these tubes are used in the third stage a B battery voltage of

at least 150 volts should be used. If, because of improper filament supply it is impossible to use a power ube, two amplifier tubes could be connected with their elements in parallel, and fair results will be had. In the third stage a one to two megohm resistance should be connected across the secondary of the transformer to prevent the tube from being paralyzed.

If the grid of an audio frequency amplifier tube is allowed to become posiradio store it may be purchased in an electrical store. The bellringing tansformers are used all the time when wiring houses and the condensers are used in telephone work.

#### The Third Stage.

An examination of the wiring diagram will show that the wiring in the third stage is somewhat different from the first two stages. In this stage the iron core choke coil is used to pass the B battery current to the plate of the tube. and the condenser is used to prevent the plate current from passing through the windings of the loud speaker. The advantage of this arrangement is that the core of the loud speaker is not saturated by the heavy B battery current, and this makes it possible for it to carry so much



before building an amplifier, and unfortunately little information is available on this subject. It may be said, however, that the ratio between the turns on the secondary and primary windings of the transformer has a great effect upon the operation of the device.

Amplifying transformers with a high ratio between the windings have a tendency to amplify sounds with a frequency. of about 1,000 cycles to a much greater degree than sounds of lower or higher frequency and this results in had distortion. As the turn ration of the transformer is decreased the amplification becomes more uniform over a greater band of frequencles and also the voltage amplification of the transformer is decreased. The best transformer therefore is the one with the highest turn ratio that gives fairly uniform amplification on all frequencies. This desired transformer has never been produced with a ratio greater than 5 to 1.

#### Low Ratio Transformers Best.

Another argument in favor of a low ratio transformer is that the impedance of the primary winding is lower high ratio transformer than in a low ratio transformer. This is not a set rule, but at the present time the manufacturers of high ratio transformers usually decrease the turns on the primary winding in order to increase the ratio between the secondary and primary windings. This practice, of course, is not advisable as the amplification of a transformer is dependent upon the ratio between the impedance of the tube and the impedance of the transformer and if the impedance of the transformer is lower than that of the tube maximum results cannot be had.

The desirable ratio for an audio frequency transformer is affected somewhat by the tube with which it is to be used. If a tube with a high impedance is used best results will be had with a rather low ratio transformer, and a tube with a low impedance can be used successfully with a comparatively high ratio transformer. The Radio Corporation and Cunningham receiving tubes, that are used almost exclusively in the broadcast listeners' installation, al have an impedance of less than 20,000 ohms, and with these tubes the ratio of the transformer windings should never be greater than 5 to 1 and in the second and third stages a transformer with a ratio not greater than 4 to 1 will usually give best results.

Some manufacturers advise the use of transformers with different turn ratios in each stage of amplification. If the trans-

several types of amplifier tubes. Overloading of the amplifier tubes is one of the most common causes for distortion in a multi-stage audio frequency amplifier. An easy way to overcome this difficulty is to increase the output of each succeeding tube by increasing the plate potential. In the detector circuit, when a soft tube is used, a plate potential of not more than 221/2 volts will usually give best results, but if a hard tube is used a plate potential of between 30 and 45 volts is often required for satisfactory operation. The amplifler tubes are required to handle great r energy than the detector, and therefore the output of the tube must be increased by increasing the plate voltage on each

stage.

In the average broadcast receiver between 60 and 90 volts of B battery voltage is applied to the plates of the amplifier tubes. This arrangement gives fair results, but even better results could be had if a different voltage were placed on each stage. With the Radio Corporation and Cunningham receiving tubes most satisfactory results are had when 60 volts is placed on the plate of the tube in the first stage of amplification and between 90 and 120 volts on the second stage. This rule does not necessarily apply to tubes manufactured by other concerns, however, as other tubes may have different characteristics, and tubes with a high plate resistance require a higher plate voltage if the same results are desired. The AP amplifier, the Marconi amplifier and the 216-A are examples of tubes with high plate resist-

#### Tube for Third Stage.

In a well designed two stage amplifier the energy amplification is often as great as 1,500 and if the amplification were to continue at this rate the energy in the plate circuit of the tube in the third stage of amplification would be about 59,000 times as great as the energy in the plate circuit of the detector. From these figures it can be seen that if a third stage | have a capacity of 1 mfd. If this spe-

distorted. Distortion from this cause | loaded. This same arrangement could can be eliminated by the use of the proper voltage C battery, and in Table 2 will be found the value of the C battery voltage necessary for various B battery voltages. The use of the C battery not only improves the quality of reproduction but also lengthens the life of the B battery.

Practically no current is taken from the C battery in an audio frequency aniplifier, and therefore small flashlight cells may be used for this purpose. The same cells may be used for all the stages provided separate taps are taken off for the different voltages, and the C battery may be placed in the amplifier cabinet.

#### Effect of Coupling.

In a multistage amplifier a certain amount of coupling always exists between the stages, and if this coupling is present to an appreciable degree all sorts of manifestations can be expected. Growling, whistling, howling and other disagreeable sounds are the result of coupling, and if proper thought is given beforehand they may be eliminated entirely.

The wiring diagram that has been suggested in Figure 1 shows how the coupling that takes place through the B battery can be eliminated. It will be noticed that an iron core choke coilhas been placed in series with each poritive B battery lead, and that a condenser has been connected between that coil and the negative of the B battery. This wiring arrangement eliminates any coupling that might take place through the batteries and also makes it possible to use the same B battery for all stages.

The fron core choke coils that are used for this purpose should have an inductance of 30 hearys, and the primary winding of a standard bellringing transformer may be used. The condensers that are shunt between the choks coil and the negative of the B battery

TABLE 1. Amplification Mutual Plate : Resistance. Constant Conductance Mfgr. Tube. 8.0 500 6.4 345 V. 199 R. C. A. 18,500 325 W. D. 11 or 12 R. C. A.... 21,000 300 6.0 280 9:0 360 6.4 650 \* The vacuum tubes distributed by the Radio Corporation of America are also distributed by E. T. Cunningham.

be used in the first two stages of amplification, but in most cases the B battery current is not great enough to make it necessary.

In about one case out of every ten ultra high frequency oscillations are set up between the stages, and these oscillations have a detrimental effect upon the operation of the amplifier. If a radio frequency choke coil is inserted in series with each grid leak, as is illustrated in the diagram, any ultra high frequency oscillations that may exist in the amplifier will be overcome. This choke coil may be made by winding about 12 turns of No. 28 wire on a tube one inch in diameter.

The best possible cabinet for an amplifier is a long, narrow one. This is so that the parts of the amplifier may be well spaced to prevent any coupling between the stages.

The amplifying transformers and the tubes should be placed at least three inches apart, and the amplifying transformers should be placed at right angles. to each other. Another precaution might

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be to ground the core of the amplifying transformers. The iron core choke coils and the by-pass condensers should be mounted in the amplifier cabinet and arranged so that the wiring between them and the other parts of the set is as short as possible. The radio frequency choke coils should be mounted as near the grid binding post of the socket as possible.

The best method of wiring the amplifier is to keep all grid and plate wires as short as possible and separate from all other wiring or instruments. The battery wires in the amplifier should also be kept as short as possible, but parallel to each other. In all cases inductive loops in the wiring should be avoided. In wiring the amplifying transformers

greatest amplification will be had if the grid wire is connected to the outside of the secondary coil of the transformer, and the plate wire to the outside of the primary coil. The set of a set of the

∀orld Radio History

THE NEW YORK HERALD RADIO MAGAZINE, SUNDAY, FEBRUARY 10, 1924. 7 25

SCHICKERLING uietly, my man." SUPER-DXAMPLIFIER DETECTOR loped Randy on the nose.

BOY SCOUTS AND OTHERS! Tou can make real money after BOY SCOTTS AND OTHERS! Tou can make real money after school or in the evening by repre-senting The Schickerling Products Maaufacturing Co. in your town or neighborhood on part or full time. It's easy and interesting. Radiophans that use a tube set-must hare tubes. Our proposition will interest you. Experience not necessary. Write us to-day or call and let us tell you about it.

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The man halled away and wal-

surb. Both Randy and I are con- tian Endevear program? escaped from Baltimore. One thing versation is now lifted,

but lows "you had best come with me | is certain, a man with a face and a fist like that is either leaving or bound for a State prison. But, as Randy says, taken all in

When Randy got his bearings and all, the radio enlarges one's culture, could see, his quarry had gone. A widen's one's wisdom and keeps one lot of people who haven't the slight- posted. There is one other advanest iniative have tried to kid Randy tage. Suppose you have a bunch of about the insident. One of the dumbbells in on a Sunday afternoo people who live in the apartment and they won't dance to your vie house said it was a Mr. Pushin, who trola records. What is easier and conducts a clothing business on Sixth simpler than to lead them to the avenue, which is mannyfestly ab- radio console and turn on the Chrisvinced that it was the convict who For the hestess the burden of con

# Radio at the Antipodes

**Receivers Scarce and Regulations Severe on Other** Side of Earth.

#### By JAMES FRANCIS.

made in the last decade and the ticular wave length, which is deteruniversal favor which it enjoys mined by the authorities and which o-day, wireless telephony can hardly sion. be said to have emerged from the The preceding regulations interest experimental stage. It can still be the amateur radioist only in so far considered as a young, though lusty as they may affect reception. It is and vigorous infant, subject to occa- receiving set which he finds the most sional attacks of "statis" mumps and embarrassing; those which effec-'interference'" whooping cough, tively take all the joy out of radio These minor maladies, while they as it is known in America. The

may be the cause of considerable anaccurate, and remedies are daily forthcoming in the form of increased perfection in instruments of transaission and reception.

. If in America, defects of radio rethis is partly due to the fact that the legal guardian of radio has accorded the general public a very free hand struction of any apparatus for rein its development. Such is not the ceiving, provided it is impossible for case in some other countries, where any external device to be connected many precautions are taken to in- to the outside terminals and thereby sure a healthy and normal develop- effect a "loading" of the tuning apment, free from vexatious ailments, paratus, official attention being however insignificant. Certain types | mainly confined to the reaction and of receiving apparatus are prohibited the wave length to which the ren the United Kingdom, for instance, ceiver will respond, without alteraand regulations there governing broadcasting are on the whole much ore severe than in the United States. It is however, in the Antipodes that the most rigid restrictions have been imposed. In New Zealand, where the number of receiving sets in operation has been estimated at 3,000 only, Government regulations respecting broadcasting and receiving are quite liberal, and lue provision has been made to safeguard the rights of all concerned. Regenerative circuits are allowed provided the reaction coil is not coupled directly to the aerial. This practically prevents the use of anything in the nature or s three slide if the adoption of such a device to tuning coil, or the two coil regenerative circuits, which are used so passion were even suggested. The extensively on this continent. The ordinary three coil honeycomb set. the variocoupler and variometer sets. are permitted. Broadcasting by ama have already volced their dissatisteurs is not encouraged in New Zea- faction with the "sealed" receiver and land, and licenses for transmission the restriction to the one wave length issued only after examinations have been satisfactorily passed.

Australian Laws Are Drastic, The Australian Government goes much further in imposing regulations of a very precise nature, some of which are considered by the raio enthusiasts as being absolutely devoid of all human sentiment. An application for a broadcasting license by a fee of \$75, a complete description of the proposed installation and as a form of entertainment which in a circuit diagram of the transmitting and receiving instruments. The type and power of the transmitter, not likely, for the reasons outlined type of aerial and wave lengths, at the beginning of this article, that character of modulation, hours and commence within the six months fol- an indulgent Government, will heart lowing the issue of the license. Power is rated in watts measured in the high frequency generator circuit of the transmitting apparatus. The use of any power between 549 and Regarding Trick Aerial 5,000 watts may be applied for but Experiments

ength shown in the license. Further regulations control the screen, of the variety which usually operation of instruments and the covers half the window, offers intermanner of transmission with a view esting results. It has directional efto the maintenance of reasonably fects which can be made useful continuous radiation during the peri- Suspended on a string and attached ods of operation, and the elimination to a neutrodyne or radio-frequency of injurious harmonics and interfer. set it will often bring in considerable

N SPITE of the rapid progress cense is issued for the use of a parcannot be altered without permis

those which directly affect his own Australian amateur is obliged to subscribe to a broadcasting station, and novance to the nurse, do not in any this subscription must be forwarded way endanger the existence of the to the Government Radio Service, toyoungster-they, merely serve to gether with an annual license fee of stimulate research. Every symptom \$2.50. His receiving apparatus must eccives careful attention, the diag- be of a type approved by the authornoses are becoming more and more lities and stamped accordingly. His receiver must be so constructed as to respond to the wave length indicated on the official-stamp, or to any wave length not differing more than 10 per cent. from that specified ception are particularly noticeable, Response to wave lengths outside the specified limits is not permitted. No regard is paid to the method of con-

Must Subscribe to Broadcasting. American amateurs might consider hese clauses adequately restrictive Not so the Commonwealth Government. To make doubly sure of compliance with the regulations each receiving instrument, in addition to the official stamp which it carries, must also bear an approved seal with which no person except a Government official, the manufacturer o an accredited agent is allowed to interfere! The roar of wrathful in dignation which would arise from the ranks of the "station hunters" of this continent can easily be imagined confine or restrict their all-absorbing Australian enthusiasts feel that they are being deprived of a little mild and harmless excitement and they of the broadcasting station su scribed to. They naturally desire : variety of programs and to obtain this variety they ask to be permitted to subscribe to other stations. They contend, with much truth, that these regulations, by depriving amateurs of the fascination of being able to turn from one wave length to an other, as fancy may suggest, will in Australia should be accompanied prevent radio from obtaining in Australia the high degree of popularity enjoys in other countries and par ticularly in the United States. It is not likely, for the reasons outlined their demands will be acceded to i class of service, &c., must all be de- full. But there is no doubt that scribed in detail. A guaranty of American amateurs, enjoying all the \$5,000 must be given that service will privileges that can be bestowed by lly sympathize with their less fortunately situated brethren under the Line.

is accorded at the discretion of the Trying freak aerials is interesting authorities, and the station must be costs little and may develop someoperated at the power and wave thing worth while. A wire window 112 Trinity Clac, New York Cas | ence with other stations. Each li- distance. G. M. C.



set to give you as good or even better results than sets valued up to \$150. We also guarantee to make repairs free of charge for one year from

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Complete parts for the above set with drilled and beautiful engraved panel All Other Merchandise at Lowest Prices.



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### Police Reports Prove Too Much for Hubby When He Tries to Make a Capture.

Confessions of a Radio Wife

#### By ANNE COLLINS.

laughed as we said the joke was

newspapers, if they'd tell the truth,

that would have crushed him, but as

But to get back to the radio.

Randy. The arrival of the radio con-

vinced me. Because he became a

master of the radio-insides in les

age batteries, volts, aeirial wire, in-

As for me. I retain what I learn

"Why, what does this mean?

stammered the man, "Are you

man by his fingernails.

some day.

TTHEN Randy brought home a didn't care so much for that, but radio set I was furious. Randy said it was a pretty handy We had been married five Postage Stamp Collecting, and you'd

months and two days and hitherto hardly beleive how ignorant I had had lived a happy married life. He been about such a simple thing as is twenty-three and I am twenty-two stamps. Then we got WBZ-Springand we are both good looking and he field, Mass., and we heard a humerworks in a bank-it's a shame what little vision that bank has when it quite on them, as we sat at home comes to appreciating real merrit in and never had to pay to hear it and a man like Randy. Randy is really they had all the trouble. We even keeping that bank going in a way for heard the weather report. I bet the if he divvulged the things he's are scared to death that the radio earned in the Stastistical Depart- will up plant them. ment where he works, the bank would Well, we staid up so late trying

be ruined and there'd probably be a to get WWJ-Detroit-that I was run on the bank tomorrow. But right blear-eyed the next day. I Randy is a real hero and he's never had a time making out my notes. I came to some hooks and dashes that said a word to any body but me. I'm were quite meaningless and I find it a stenog in a downtown office and be- saves time to ask your boss what it lieve me, it's no joke to be a "woikin' means. So I upped and said "Mr. wife." . However I stuff twenty-two Bumpus, what does this mean?" It dollars in my stocking every week proved that the phrase was "mearly Which reminds me of why I was the irreguliarites of the proceedure." furious with Randy and the radio. Now, I ask you, what is your honest You see we being a buisness couple, and especially Randy being stuff? He was positively impertiin the banking business, agreed we nent about that and then when he should have a bank account. A made an uncalled for remark about joint account, if you get what I the "quintessence of my spelling," I mean, being as we were both con- said, "Well, Mr. Bumpus, if you will tributing to its support. Then as the lawyers say, we had further agreed der with a cigar in your mouth, you to withdraw no money without the other's knowlidge and consent. I cer- letter." If he had been a gentleman tainly had had no intimidation that he was to take any money out with I allways say, you can tell a gentlewhich to buy a radio.

I knew instantly when I got home nd found him arrived before me-I hould say I-one has simply got to perticular in such things if you're stenog for a fussy man-when I ound that Randy was home first, I new it must be mischeif. Because always lingers until he is certain hings are started in the dinner line. And then he rushes in and offers to help. This evening he was guilty looking and was whistling to keep his courage up. I knew this instinktively.

"Here's a radio," he said in a surprized sort of voice, as though it got in, like a musquito, without his aid. He fumbled industriously with the my grasp. I confess I did not learn battery or the volts or whatever you call them and whistled "When You did he, yet and all, I think there is Went Out."

I threw the delicatessen dinner I was talking something about sphahad in a paper bag on the gate leg getti and I thought he wanted spha-"I like your nerve," I said in a he didn't eat it, and I said why. Then

cold voice. "Sure you do. That's why you

married me," he retorted. I sat down in the new red velous wing chair, and because I was tired he said, "I do not like to tickler," of pounding a "Noiseless" more than when what he said was, "I do not because I was sore on the radio, I like the tickler." When I said such begun to cry on the arm. The chair a remark is in bad taste and he rm. not Randy's.

"You've destroyed my confidence said your head reminds me of a in you," I sobbed. "You took the vacuum tube. money out of the bank without tell- We are indeed radio fans. Nothing ing me. Without my knowlidge and wets our enthusim. Not even the msent.'

"Listen, Pettie----" "You ought to be ashamed! How came in one night with a spouting nuch did it cost? And you know nose, and I thought he would die, and very well I want a gold band set of that I should be a widow, and that it lishes."

"Aw, honey, listen," returned all the while another corner of my Randy, leaving the insides of the brain was remembering my first aid radio and running over to me. "Don't instructions learned from the Red you go and get all stirred up. Listen, Cross. I hastily made a torniquet, sugar, I didn't touch the bank ac- which I twisted tightly around his count. I won this in a crap game." nose, which is Roman, with enough Honest, I was so relieved. I dried room for me to get a good holt, and my eyes and we made up and kissed the result was it stopped bleeding. and then I took an interest in the As soon as he could talk, Randy told radio.

The radio was wonderful. If I got the story over the radio about must say it, Randy is clever. He got the two convicts who escaped from the thing all hitched up and never the Baltimore pennytentiary. One's ball I forget how awed and queer description was that he was tall and we felt when first we got tuned in thin, with a bald head, wearing nose and heard the Farm Report. It was glasses and a cap. At least that's WJZ and as clear as christial. Of what we understood. So just as course I don't know a thing about | Randy was about to enter our apartfarms and neither does Randy, but as ment house, which faces on the he pointed out, that's just where the street, who should he see but a tall radio makes for knowlidge. Then thin man with a bald head, glasses, we got WOR and heard the Moon cap and a villinous look? Randy, Man. He told some bed time stories couragious as a lion, stepped right and Randy said "Gee." Then, true up to him and said: to our mutuel promise to stop slang, Randy begun again. You see when The man looked so utterly surprised. one works for a bank, one simply that Randy took his silence for conmust acquire a mannor born. "Chil- sent. dren have a much better chance now than when I was a ki-a youngster," | liceman," said Randy sternly. As said Randy. "When ever I asked usual, there was not a policeman in some one to tell me a story they al- sight. ways said 'Go away and don't bother

We got KYW-Chicago-and crazy?" heard the market report as plain. I "No," said Randy in a harsh voice,

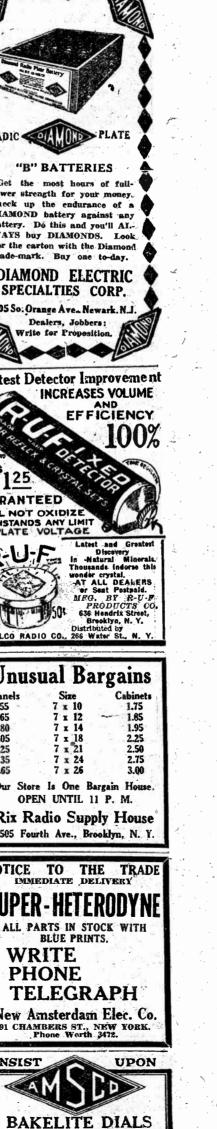


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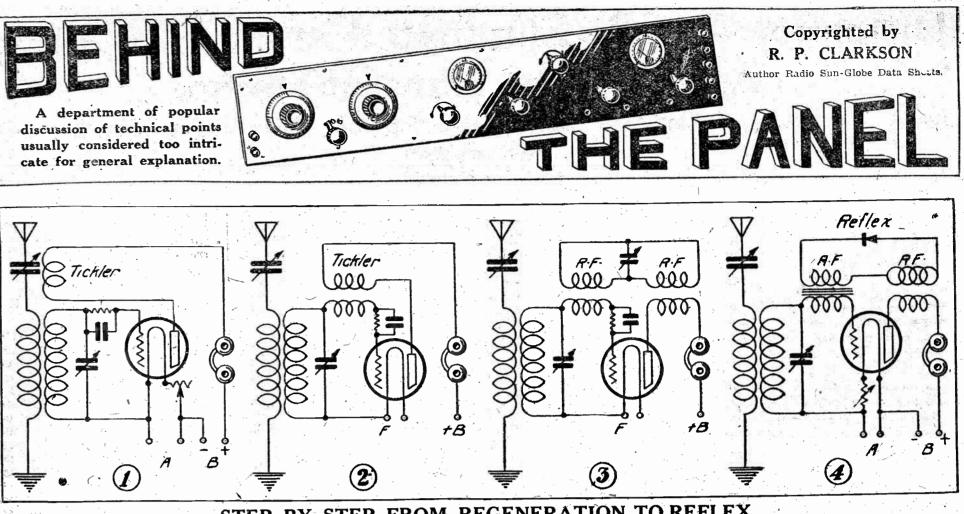
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### STEP BY STEP FROM REGENERATION TO REFLEX.

LMOST any one who has had a panel to look behind has used the "daddy of them all," the Armstrong regenerative. It is going to take a whole lot of persuasion to make the old timers believe there is anything better. There may be differences of opinion whether plate tuning or tickler feed back is to be preferred and whether the grid circuit should be tuned by a condenser across the secondary or by a variometer in the grid circuit between. the secondary and the grid condenser, but there is no difference of opinion as to whether a good old fashioned well made regenerative brings in the signal. It sure does.

Then there is the reflex, the circuit that makes a tube do double duty. It has lots of admirers and we are all its friends. Theoretically it should be the best hook-up of all from the standpoint of economy. Commercial sets using this hook-up are, on the average, more successful in bringing in distance than commercial sets using the regenerative hook-up, so far as my experience goes. Home made sets where only one tube is used are on the average more satisfying with the reflex than with regeneration. I think.

Both these circuits have a lot in common and modifications in between the two have given some surprising results. As a field for experiment and for the purpose of learning the workings of both, the four diagrams are given at the top of this page. There is no intimation here that reflex involves regeneration nor that regeneration contemplates reflex. but having the two circuits in mind it eems almost natural to pass from one to the other step by step, pausing at each step to contemplate what we are doing and what results we are getting. We'll learn the whys and wherefores of what's behind the panel and maybe find something wrong with our present set or some way of changing it to give results we prefer to have. Some want volume, some look for distance, some prefer quality, others desire easy tuning. and many just want to tinker and see what happens. The last group at least will get a lot of fun out of the process of changing from regeneration to reflex by the easy payment method shown above. The first diagram shows the usual tickler feed back regenerative circuit. If the primary and secondary coils are to have variable coupling and the tickler is to have variable coupling with the secondary, the only coils you can use with this set are those arranged for a three coil mounting. Until recently that meant either honeycomb coils or spider web coils. Now in addition we have the splendidly effective curkoids which are O. K. in every particular except the name and that may not be as bad as honeycomb since I heard a man about fifty stroll in a store last week and ask to see some "beehive" coils! Of course, the tickler may be fixed-a separate winding on the stator alongside of, but separated from, the primary. Some couplers are made that way. Another way of arranging the three circuits, and perhaps a better way, is to use the

secondary, and wind three or four turns around the tube over the new secondary and use this winding as an untuned primary. On the whole, though, the three coil mounting works out best for tickler feed back. It permits a wide range of adiustments.

As to the action of the circuit shown in (1), you know the explanation of the three-circuit hook-up. The plate circuit is coupled with the grid circuit by means of the tickler so that the energy in part is returned to the grid circuit and reinforces the current already there so as to impress an amplified signal on the grid. It's a good deal as though you hitched a hose pipe on the smoke stack of a locomotive and connected the other end of the hose to the fire box of the locomotive to increase the draft and burn up the smoke.

The tickler is coupled to the secondary normally but you can put a coll in series

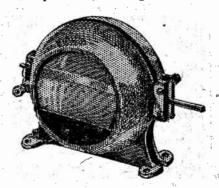
rotor as a tickler, use the primary as a | couple the tickler to that. Where you have a coupler in the set now this arrangement, using a two coil mounting for the grid coil and the tickler, makes it easy to change over to the tickler feed back. In effect you now have a radio frequency transformer with primary connected to plate and forming the tickler and secondary connected in the grid circuit and delivering energy thereto in place of to a second tube. In fact, an R. F. fixed transformer may be used here with pretty good results, if the primary is funed by a variable condenser

It is but a short step from (2) to (3). In place of coupling grid and plate circuits together directly, two couplings are used with an in-between circuit, tuned by a small variable condenser. Two coil mountings or fixed R. F. transformers may be used in each position, whichever are desired. Maybe I had an unusually effective rabbit's foot with me with the secondary as shown at (2) and | that night, but I certainly learned to re-

### STANDARD APPARATUS—Variometers

HE object of all tuning operations in the control of a radio receiver is to so adjust the circuit in which the control lies as to put that circuit in resonance with some other circuit. Without breaking connections or inserting some fixed unit this adjustment may take place by varying the electrical constants of the units in the circuit. The variation can only be in two electrical characteristics, namely, inductance and capacity. With a fixed value of either the other may be adjusted so that the circuit is in resonance with some other circuit. Both may be adjusted and it is usually desirable to adjust both unless one or the other is very small. Usually it is very important for sharp resonance to make the inductance as great as possible and the capacity as small as

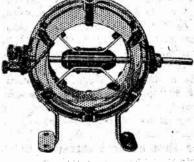
possible. The problem of making a variable



inductance is not an easy one to solve. The ordinary single slide tuner is a variable inductance, but it varies irregularly and by jumps. The tapped coil is an adjustable inductance, but just as unsatisfactory. A coil with an adjustable metal core has been used on at least one first class receiving set. Another manufacturer at one time used a fixed coil with a plate movable to and fro from

has not been suggested, and I suggest it now, is a coil wound like a spiral spring and mounted so as to be stretched and thus vary the space be tween turns. The most satisfactory form of vari-

the coil. About the only thing that



able inductance yet found is the variometer, which comprises two coils wound in series so as to form a continuous winding. One coil is fixed and the other coil relatively movable. By rotation of the one coil its magnetic field may be made to coincide or to "buck" the magnetic field of the other coil. Any adjustment between these two positions may be made. The resistance is always constant and the capacity of the coil nearly constant, at different positions of its setting. Because of the mutual inductance of the coils the total inductance of a variometer is greater than the sum of the inductance of the separate coils. The minimum is very low.

In general the main difference between standard variometers of reliable manufacture is a difference between the form. Some are moulded and some are skeleton frame. Electrically the latter are more to be desired. For strength, beauty and ruggedness the moulded type may sometimes be excused. Either will give results.

spect the circuit shown in (3) as an experimental circuit for DX reception. To change from (3) to (4) is as easy as lying. The R. F. transformer or coupler on the grid end is taken out and replaced by an audio frequency transformer. A crystal rectifier is placed somewhere in the circuit between the transformers. Try it both ways and in both legs of the circuit to satisfy yourself that you have it in the right place. If the reflex is operating, you can't take the rectifier out and get just as good results. The crystal is there for a purpose. In (3) we fed back or reflexed all radio frequency. In (4) we rectify the radio frequency in the in-between circuit so that audio frequency is impressed on the A. F. transformer in the grid circuit and through that to the

tube. The circuit shown in (1) is the standard Armstrong regenerative, three circuit hook-up. The circuit shown in (4) is the standard straight reflex giving one-step of radio frequency amplification, detection, and one step of audio frequency amplifaction with the one tube. assisted by a crystal and two transformers. There is no tickler in (4). The circuits of (2) and (3) are used here as illustrative of imaginary working from regeneration to reflex and are well worth playing with a while.

It is possible, of course, to use neither coupled coils nor fixed transformers at the various places in (3) and (4) where R. F. coupling is shown. A variometer in any of these places is exceptionally effective. Especially is this true in the circuit of (4). A variometer may be here placed in the plate lead just as if the circuit were to be plate tuned regenerative and from the terminals of the variometer leads are taken which form the connections to the crystal and the audio frequency transformer.

Any one of these circuits also forms a good starting place to begin experimenting with resistance coupled amplification. In (3) or (4), for example. in place of the radio frequency transformer in the plate side, try out reststance coupling-something of the general value of 100,000-ohms. You can buy short carbon rods of approximately that resistance at some of the stores and they will go in the usual fixed grid leak mounting or in a couple of clips.

Resistance coupling will also work out for audio frequency amplification. If you retain the coupled coils or some good radio frequency transformer in the circuit shown by diagram (4), try out resistance coupling at the other end, in the grid circuit. Maybe you will make it work well. Remember, resistance coupling does not give the volume of transformer coupling but has a clarity and freedom from distortion which is highly prized. In a circuit such as (4) no B hattery current passes through it so it cannot be attacked as wasteful of B battery current.

For the experimenter nothing offers quite the lure of using something and then using it over again. That's what reflex does. It makes the tube do double duty. Why not see if we can't make it do triple duty or even more?

# Mirrorlike Surface in Sky Reflects Distant **Radio Waves to Listener**

Interesting Article Explains in Simple Language the Causes of Fading.

By ALFRED N. GOLDSMITH,

DECULIAR things happen sometimes in the receiving of broadcast radio concerts. Every listener, as soon as he gets acquainted with a number of nearby and distant stations, finds that he is puzzled by some of the results he gets. How shall he explain such things as these:

1. Late at night he can hear stations hundreds of miles away clearly, while earlier, in the evening, or by day, he can chardly hear fifty miles.

2. He will hear some stations at night steadily, and particularly the distant ones, but some other nearer stations will "fade" in and out rapidly and in irregular fashion, all the are all the strategies

3. Still nearer stations, say twentyfive miles away, will not fade in or out at night or by day.

4. In one part of a city, station 1 in that city will be heard loudly and station 2 in that city hardly at all. In another part of the same city the reverse. will be the case. Outside the city both stations will be about equally loud.

5. A listener in the country will sometimes hear stations hundreds of miles away much better than he will hear stations in a nearby city say fifty miles. away. Charles Controls of Markets

#### The Heaviside Theory.

Radio engineers have a theory to explain these effects. It can be simply expressed, but it should be remembered that it is not a positively proven theory but only a plausible and satisfying explanation of all the puzzling effects just mentioned. It is based on a theory of Sir Oliver Heaviside, the eminent English electrician and mathematician. Heaviside pointed out that, twenty-five or fifty miles up, the air enveloping the earth becomes very rare and is therefore an electrical conductor just as is the rarefied "violet ray" tubes sold for medical purposes. So that, far up in the sky, there is a layer of conducting air which scientists have called the Heaviside layer. It is also well known that substances which conduct electricity, such as metals, are good reflectors for radio waves, so that this layer is actually a sort of curved reflector in the sky. It is therefore called the "mirror layer" in this description for the sake of simplicity.

By day the mirror layer is spoiled in several ways. In the first place the brilliant sunlight falling on it causes disturbing air currents and irregularities, so that instead of being a smooth and polished mirror it becomes a roughened irregular layer of little use as a reflector. Furthermore, sunlight has the property of converting rarefied air into a sort of "fog" which, while clear and transparent to ordinary light, does absorb radio waves vigorously. By day the mirror layer is rough and mist covered.

Probably most listeners have never speculated as to whether the radio waves which reach their receiving aerial come sweeping along the ground or whether they are shot down to the aerial wires after reflection from a mirror layer in the sky. Yet actually radio waves arrive by

heading of by-pass condensers.

.00025 and .006 mfd., with a few applica-

In regenerative tuners it is sometimes

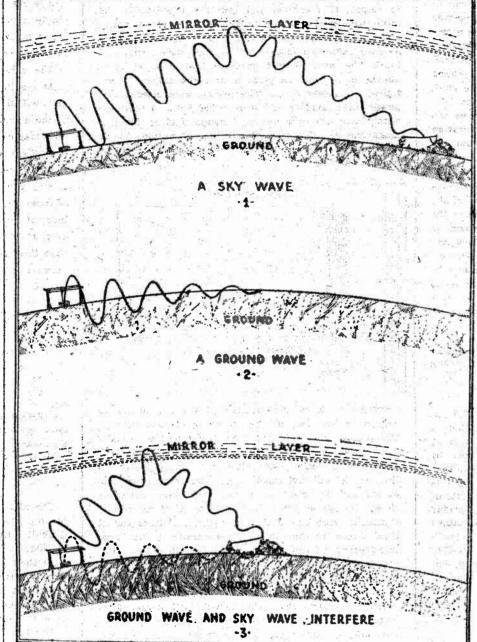
of advantage to place a large condenser

tions of a 1 or 2 mfd. condenser.

In the illustration of this article part 1 is a general sketch of a sky wave. It leaves the radio transmitting station at the left, passes obliquely up until it strikes the mirror layer far up in the air and is then reflected back again to the earth, arriving finally at the receiving station to the right. It may be mentioned that these sky waves do not die down rapidly because their path is entirely through the air and they are but little absorbed or interfered with in their mes-

(particularly those containing metal deposits) and to a less extent forests of large trees. The result is that a ground wave rapidly dies away, and this has been indicated in the diagram.

To take typical figures, which are roughly correct for an average broadcasting station in the eastern portion of the United States, the ground waves are very strong near the transmitting station for the first few miles and rapidly die down, becoming relatively quite weak at



to carry radio messages loudly over great distances, particularly at night when the mirror layer is smoothest and most effective and when the absorption of the radio. waves by the "electrical fog" caused by to the ground. They come back to the sunlight is absent.

Part 2 of the illustration is the other sort of wave which may reach a receiving station. It is a ground wave and clings closely to the earth. Naturally such a ground wave encounters all sorts of energy absorbing obstacles in its path, which rapidly reduces its power and the loudness of the signals it can produce in

sage. So that we should expect sky waves 1 a distance of a hundred miles or so. The sky waves, on the other hand, are hardly received at all near the transmitting station since their path is above the earth until after they have been reflected back ground and begin to be useful at distances of about seventy-five miles from the transmitting station, and beyond that distance they are readily received with good intensity for distances of several hundred miles. It amounts to this, to summarize: For distances up to about seventy-five miles the listener is depending almost entirely on the ground waves the receiver. Such objectionable obstacles | for his signal. From seventy-five miles

either or both of these dissimilar routes. I are steel structured buildings, mountains to about 200 miles he gets both ground waves and sky waves. Beyond 200 miles most of his reception is dependent on the sky waves

#### What Is 'Fading.'

For locations where both sky waves and ground waves are received reception may become very erratic with marked "fading effects." Part 3 of the illustration shows how this may come about. The two sets of waves, arriving at the receiving station by different paths, may help each other or they may actually annul each other. Futhermore, as the mirror layer shifts slightly from moment. to moment the ground waves may sometimes strengthen and sometimes weaken or annul the sky waves and thus cause fading. We can therefore explain the five puzzling effects mentioned at the beginning of the articles as follows:

1. Night reception over long distances is accomplished by the slightly absorbed sky waves, and these cannot exist by day because of the absence of a smooth mirror layer and the disturbing presence of sunlight "fog.". So that day reception is by ground waves, which do not reach out powerfully nearly as far as sky waves. This partly explains the superiority of night reception. 网络森北山 新聞 議会員

#### Night Reception Best.

2. Night reception from distant stations is by means of the sky waves only and is therefore comparatively steady. Night reception from stations roughly from seventy-five to 200 miles away is by a combination of sky waves and ground waves and therefore fades in and out as these two sorts of waves interfere with each other.

3. Reception from stations nearer than seventy-five miles is chiefly by ground waves only and is therefore reasonably steady.

4. Reception in a city from nearby stations is by ground waves, which are badly absorbed by the steel structures of the city. A mile or two of eity buildings will so weaken the signals from a city station, as received by a city listener, that reception may become quite poor. As a result in those parts of the city where the signals have first to plow through miles of steel to reach the listener, reception from that station will be near. In other parts of the city the reception will be excellent. Far outside the city, reception will be by the sky waves and about equally good from all comparable stations within the city.

5. A listener in the country will get signals from the city fifty miles away almost entirely on weak ground waves. but will get distant signals on the powerful sky waves. Thus the distant signals are sometimes astonishingly loud in comparison with the nearby signals.

It adds another chapter to the romance of radio to know that the concerts from distant cities have traveled up to the sky on their way to the broadcast listeners. and that an enormous mirror in the upper layers of the earth's atmosphere is chiefly responsible for the enjoyment of distant concerts.

### By-Pass Condensers Frequently Help in Radio Set

the "B" battery. condenser may be put to that the fans do not take advantage of in The most general use of by-pass conorder that the reception of concerts may densers come, however, in amplifying circuits, and these will be taken up instead be improved. All of the uses to which of the slight use in detector circuits. one may be put are classed under the Audio frequency amplification is the first

step. The capacity of a by-pass condenser will In audio frequency circuits a small condenser connected across the secondary of vary with the use, and each use will the second transformer will aid in cleartake a different capacity for various tubes, ing up raspy noises. A condenser from transformers, batteries and other details plate to filament of the last amplifier will. such as wiring, &c. Therefore, only the uses will be given, and the capacity of the also do much toward clearing up the signals. This condenser must be large. condenser will be left to the fan. However, the various sizes will be between

If a 1 or 2 mfd. condenser be placed across each set of batteries a lot of the battery noises will be eliminated, If a resistance of about 1,000 chms across the "A" battery and a resistance of about from the plate of the tube to the filament. 20,000 ohms be placed across the "B" bate 1. A good, strong condenser from the plate | fler.

HERE are many uses which a fixed 1 side of the tube that is not connected to 1 tery, these resistances will, with the condensers, clear up all battery noises.

> In radio frequency amplifiers it is important that the potentiometer be bypassed properly. There are two ways to do this. One is to take a 2 mfd. condenser and connect it from the middle leg of the potentiometer to the negative leg of the potentiometer. Or to use two .006 mfd. condensers and connect them as follows: One condenser goes from the middle leg of the notentiometer to the negative leg of the potentiometer. The other condenser connects the middle leg and the positive leg of the potentiometer together.

> A medium sized condenser connected from the "B" battery side of the radio, frequency transformer to one side of the filament-just which side will have to be found by experiment-will improve reception considerably.

of an audio amplifier to the ground will often improve the tone of the set.

#### **Transformer Hints**

In building audio frequency amplifiers always ground the cores of the transformers by running a thin wire from the transformer core to the ground binding post. This should be done even with the shielded type of transformers. Some types of transformers should be turned at right angles to each other, but many other types are not benefited by this: To be safe, the transformers should he placed as far apart as possible. The use of a low ratio transformer for the second stage is advised if clarity and quality of tone is your object rather than volume. Buy only the best materials. and transformers in building your ampli**Storage Battery Tube Proves Best** 

Operating Cost Is Lower in the Long Run With This Type of Tube.

#### By MICHAEL SAMITCA.

reaching a wise decision.

those of the Radio Corporation and radio battery. Cunningham, known as the 200, and the latter as dry cell tubes. The on storage battery. characteristics of these tubes, which Assuming a life of 70 hours for a

listed below:

Rated filament

lated filament

Source of filan

B R. F. ampl

As A. F. ampl

ESPITE the numerous articles desirable for vacuum tube operation that have appeared explain- and the storage battery is much bet-ing the proper fields for the fer suited to this use. The storage dry, cell and storage battery tubes battery, whether of lead-acid or althere still exists a need for further kall-nickel type, will furnish a steady enlightenment on this subject. Hence current, large or small, for a long this article, the purpose of which is period, continuously or intermitto assist prospective purchasers in tently, with hardly any difference in terminal voltage or ampere hour ca-The most widely used tubes are pacity. That is what we want in a

As to the economy of dry cells let 201A, 11, 12 and 199. The two former us compare the cost of running a are classed as storage battery tubes, WD on dry cells with that for a 201A

are of inferest in this discussion, are pere hour storage battery lighting a 35 cent dry cell with a single WD

<i>.</i>			WD 11, WD 12	
	UV 206	UV 201 A	OT .	UV 199
	O1,	or	от С 11	OT
	€ 200.	C 201 A.	C 12.	C 199
voltage	5.0	5.0	1.1 .	3.0 volts.
eurrent	1.0	0.25	0.25	0.06 amps.
ment current	Stor. bat.	Stor. bat.	1 dry cell.	3 dry cells
		ar 4 dry	Sec.	in series
i se sta to	and the second second	ceils in series. Good.		(30 ohm rireo).
lifier		Good.	Poor.	Excellent.
	PARCEHERU.	0000	Gibbou.	Good.
ifier	- California al	Excellent.	Fair.	Fairly good.
				a see the second second

hque, it is necessary to explain that of the others, and is really the only reception is desired.

incapable of furnishing sufficient power of the WD.

sume, but compared to the 201A fiends who insist on the very last plained. mile of distance a soft detector tube cell tubes will do.

a storage battery. Dry cells are light than with dry cells. in weight, clean to handle, require most anywhere.

nish, however, is decidedly inferior are strictly limited. to that supplied by storage batteries. Dry cells are primarily intended for open circuit work; that is, supply ing small currents for short periods of time with comparatively long rests

intervening. Under such conditions they seem to recuperate their strength during the idle intervals, and will give satisfactory service and ampere hour capacity. When used continuously, however, or for large currents or both, they are subject to rand deterioration, their voltage drops, internal resistance increases

and they become unfit for use. Interpreting this quantitatively we find that a standard 6 inch dry cell must never be called upon to deliver. more than % ampere, and should not be used at this rate for more than two or three hours a day. When so used, with a WD 11, for example, we may expect a useful life of 60 to 80 hours which is not an accurate

rent their life will be more than

doubled and, likewise, if used for more than proportionately increased, mittent service. These are not the characteristics broaden tuning -G. M. C.

Vorld Radio Histor

As these terms are somewhat the cost per hour is one-half cent. The life per charge of an 80 amas detectors there is Wide to choose 261A will be 320 hours and the cost between them, although the 200 is of recharging may vary from 5 to Nest; as radio frequency ampliflers 80 cents, depending on the method. only the 201A and 199 are suitable; &c. Let us say 40 cents, which is a but as audio amplifiers the 201A will rather high average, since the ma-

-give results infinitely superior to any jority of folks use A C chargers, constiming less than 10 cents worth of tube to use where real loud speaker juice per charge. Then the cost per hour of lighting the 201A is only It is important to note that in the 1% cent. And yet the 201A conmajority of cases dry cell tabes are sumes more than four times the

volume for dependable loud speaker If four dry cells are used for a operation on the regulation two SelA the cost per hour will be 2 stages without overloading the tube cents, compared to % cent for the and consequent distortion of the storage batery. These figures are music and shortening of filament striking and conclusive and show life. Of course, they will do much how the storage battery saves money more than their share considering for its owners, in spite of its high inithe much smaller power they con- tial cost. The saving is still more pronounced when several tubes are their results are very unsatisfactory. used for many hours each day. How-This being the case, our conclusion ever, the storage battery is heavy must be that wherever one wishes to and bulky, apt to become dirty and operate a loud speaker at full vol- requires some attention, which feaume or contemplates adding ampli- tures cause it to be passed up by fication at a later date for the same many people to whom its superiority Buffalo purpose the use of storage battery and greater satisfaction in more imtubes is advisable. Also for DX portant matters have not been ex- Schenectady

UV 199's consume so little current and storage battery is essential. For that dry cells give very efficient serpractically all other purposes the dry vice with them; they are the most economical tubes made, and for port-Now, assuming that we are satis- able sets they have no equal. But fied with the volume that dry cell many persons do not realize that a tubes produce, let us investigate the storage battery can be used to operate economy and convenience of dry these or any other low voltage tubes batteries. A dry cell costs but 35 cents, by inserting proper resistances, and compared to the \$10 to \$20 price of the current will be much steadier

For most power amplification a no attention and can be procured al- storage battery is needed; in fact The current that dry batteries fur- ate any tube, but with dry cells we

Now to summarize: The proper field of the dry tube is:

1. For portable use 2. In localities having no stor-

age battery recharging facilities. 3. Where the initial cost must be

kept down. attention it requires.

tems is employed.

In all other cases the storage bat tery is preferable and is highly recommended by the writer.

#### "Pigtails" Improve Poor Variometers and Couplers

Avoid sliding, friction or pressure contacts in condensers, variometers estimate, however, as it depends on and variocouplers. They may be many other conditions. Toward the tight when you get them, but they emi of this period it becomes neces- are bound to wear and get loose and sary to advance the rheostat more this will make them noisy. If you and more, until finally the signals buy instruments made up in that received become so weak, with all the | way use flexible wire to put a pigtail resistance ont, that the owner de- around each such contact. It's easily des to purchase a new battery. done, costs little and often makes If two cells be connected in paral- an A1 instrument out of a bargain and used to fornish the same cur- counter article .-- G. M. C.

shorter periods the useful life will be A New Use for Sealing Wax. A drop of sealing wax at the start all because of the partiality of the and finish of a coil will hold the wires dry cell to small currents and inter- firmly and make it possible to avoid use of shellac or other dopes, which

3170 Broadway

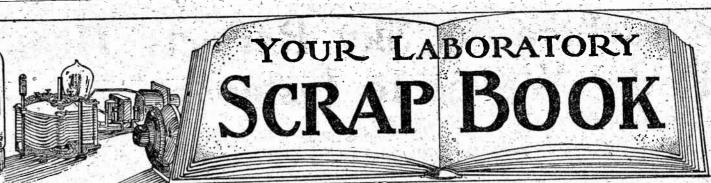


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OPEN EVENINGS AND SUNDAYS.





Q. No. 13. Do adjacent aerials affect reception? A. No. 13.

Aerial wires, although adjacent, if unconnected to the earth do not affect reception, but when connected to receivers both detrimental and beneficial effects have been noticed, these effects being dependent upon the type of receiver used and the proximity of the aerials. This is the first of several "Scraps" on this subject. Future ones will discuss it in greater detail.

Effects, as noticed by the writer while conducting some experiments, are given herewith, The receivers used consisted of one single circuit, with ticker coil in the plate circuit, and another double circuit receiver with a variometer tuned plate. The aerials were of the single wire type, fifty-five feet long, lead in forty-five feet, approximately eighty feet from the ground, parallel to each other and fourteen feet apart. Separate ground leads to the heating system of the building were used.

The receivers were approximately thirty feet apart. With this separation it was possible to detune the double circuit receiver by adjusting the regeneration control on the single circuit receiver to maximum and varying the tuning control. On the other hand it was possible to increase the intensity by the same method. The detuning effect was greater than the increase in signal intensity. By varying the primary circuit of the double circuit receiver it was possible to detune the single circuit receiver, but not to such an extent as when the single circuit reeiver tuning was varied and the double circuit maintained constant., Both the detuning and the signal increase effect were overcome by locating the aerials at an angle of 50 or more degrees of each other. This subject will be discussed in future

#### Q. No. 14.

Is a noticeable gain in signal strength obtainable by increasing the plate voltage in an amplifier utilizing UV 201As or C301As?—Fred Corlear, Jersey City.

#### A. No. 14.

The question of increasing signal strength by increasing plate voltage is an interesting one, but it cannot be definitely decided, due to the variation in tube characteristics. However, an average may be struck by noting the effects of increased plate voltage upon a certain number of tubes whose signal input is maintained constant. The following are the results of experiments conducted with the tubes you mention: Using UV 201As, with the filament voltage maintained at the proper value, the increase in signal strength when the plate voltage was increased from 45 to 671/2 was barely perceptible and not worth the outlay, but a marked increase was noted when the plate voltage was increased from 671/2 to 105 volts and a further increase when another 221/2 volts were added. The addition of another block of 221/2 volts, making a total of approximately 150 volts, this value being the limit for that tube, did not afford the increase in signal strength that would justify the outlay for that block. hence the maximum plate voltage should be approximately 120 to 125 volts.

With plate voltages up to 671/2 volts the C battery may be omitted, since the required grid bias may be obtained by properly connecting the grid return of the transformer. This lead should the negative lead of the A battery. One and a half volts proved a satisfactory value of C battery for a plate voltage up to 90 volts and from 3 to 41/2 volts for voltages up to 125 volts.

#### Q. No. 15.

Are the filaments of the various low filament cur-rent amplifying tubes critical in operation?

#### A. No. 15.

I presume reference is being made to the C301A-UV201A and the DV2. It is to be regretted that the superiority of the present day low filament current amplifying tubes over their predecessors is not visible to the radio fan. The filament is made of tungsten and has an extremely thin coating of thorium. It is this substance that affords the greatest electronic emission while the filament is maintained at a low temperaturei. e., low incandescence. The filament control of these tubes is not critical, providing the voltage and current values are maintained at or below the figures specified by the manufacturer. This value is 5 volts and .25 of an ampere for the first two tubes and 5 volts and .30 of an ampere for the DV2. The number of electrons emitted by the filament when maintained at these values is more than is required for average operation. Excellent results can be obtained with the tubes when the filament voltage is only 4 volts. This reduction of voltage and current not only increases the life of the thorium coating on the filament, but also increases the life of the A battery. To accomplish the reduction it will be necessary to use a rheostat of from 8 to. • 10 ohms in place of the regular 4 to 5 ohm rheostat, or, if one desires, a separate external rheostat may be connected into either of the leads directly at the storage battery terminal.

### Q. No. 16.

What is the best layout for an aerial when one is close to power lines and other lines that carry electric current.

#### A. No. 16.

The elimination of various kinds of induced noises. from power lines, arc lights and other such equipment has not yet been accomplished, but in many instances it has been minimized. Anyway the constructor must give the question of his aerial proper consideration if he is in proximity to any of these sources of induced interference. In the erection of aerials in cases of this kind one must forget the directional effects of the aerial in respect to reception and give his attention to the minimization of this induced interference. The simplest and most feasible method that may be followed by the average radio fan is to erect a single wire aerial and locate the wire in such position that it is at right angles, or as near as possible at right angles, to the lighting or power wires. The electric wires need not be power lines carrying 10,000 or 20,000 volts; a feed line with 110 or 220 volts flowing through it is of sufficient magnitude to cause bad interference of various kinds, such as generator hum, clicks due to sparking at the brushes. &c.

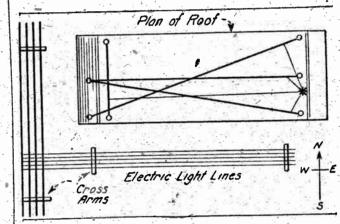


Figure 1 shows the location of various aerials in respect to two sets of lines carrying electric current. The proper location for the aerial may be theoretically determined, but it must be checked by actual experiment. Some electric lines, although running parallel to the aerial, will not cause any interference, whereas others will be extremely powerful sources. Figure 1 shows two sets of power lines. The aerial, C, as erected, is parallel with one of the two systems of lines and at right angles to the other. Theoretically it should be free from interference from the lines south of the building and strongly interfered with by the lines on the left of it. Interference was bad, and another aerial, B. at an angle to both, was erected. This minimized the interference somewhat; that which still persisted in being present seemed to come from wires on the left of the building. The aerial was therefore shifted into the location shown by A. The interference was further reduced, and finally the aerial was shifted into the position shown by D and the induced interference from the lines west was practically eliminated, but a slight hum due to the lines south was noticeable. This hum was not bothersome, but was reduced by raising the aerial wire to a height higher than the electric wires. This arrangement may not work in every case, but it is worth trying. Although interference from electric wires was reduced, that due to an X-ray machine under no circumstances could be eliminated or minimized. The same is true of sputters due to are lights. Those fans who are unfortunate enough to be annoyed by such interference must make the best of it. In some instances a loop helps, but that cannot be guaranteed.

#### Do You Know-

That the velocity of the radio wave is the same as that of light-186,000 miles a second-and that this is equivalent to 300,000,000 meters a second?

That some of the terms used in electricity and radio are parts of the names of the earlier experimenters? Examples of these are the VOLT, after Volta; the AMPERE, after Ampere; the OHM, after Ohm; the FARAD, after Faraday.

That the terms microfarad and millihenry mean exactly what the prefix denotes-microfarad, a millionth part of a farad (a farad is the unit of capacity); a millihenry, a thousandth part of a henry (a henry is the unit of inductance)? Other terms in the same category are micro-microfarad, microhenry.

That a receiver need not tune sharply in order to be selective?

That the term 80 ampere hour stamped on storage batteries does not mean that you can light the filament of four 5 volt 1/4 ampere tubes for 80 hours? It is merely a rating. Using the tubes just mentioned, the storage battery would need recharging after approximately 56 hours of service.

That the mere fact that the filament lights does not necessarily indicate that the tube is in good condition? Either the grid or plate lead within the tube may be broken or short circuited.

### Copyright by John F. Rider.

A page for the radio fan who needs the results of actual laboratory tests, but who, for lack of equipment, must shape his course from conclusions reached by others.

#### Q. No. 15.

I am obtaining satisfactory results with my receiver, but have been advised by one friend to substitute spider web coils in place of my variocoupler and by another to insert honeycomb coils. Is the change worth while? Is one type of coil really more efficient than the other?

#### A. No. 15.

When one obtains satisfactory results why net leave well enough alone? Considered from a theoretical standpoint every coil has its salient features and practically every type of winding is more efficient than the single layer arrangement used in variocouplers, but the latter is the most simple and the easiest to wind and for that reason is most popular. Further, it is doubtful if the substitution of another type of winding when good results are being obtained with the single layer coils will show a difference that would justify the outlay of the money required to effect the change. The difference may be there; but it would not be discernible to the human ear when used in this type of work.

The spider web and other types of coils which have a very low distributed capacity are excellent and are heartily recommended, but why should the change be made if the equipment on hand is satisfactory? However, if one is experimentally inclined, nothing better than these coils can be used as subjects. It is up to the person constructing the receiver to decide upon the type of coils he is to use. If it were possible to arrange the varying controls for the spider web and honeycomb coils so that they would not require more space than the ordinary variocoupler control they would be more popular.

#### O. No. 16.

I have a three tube receiving set using the small dry cell tubes and am obtaining satisfactory resultson distant reception but not enough volume on the loud speaker. I am desirous of effecting a change that would afford me greater volume on both local and % distant signals. I do not care to reconstruct the receiver. What is the method of procedure?

#### A. No. 16.

The situation as set forth above constitutes a perplexing problem for many fans, but its solution is not difficult. In accordance with the above conditions it consists in the replacement of the small dry cell tubes with their larger brothers. The first step is the determination from a standpoint of economy of the types of tubes that will be used. The filament terminal voltage and current consumption are the important factors, for upon these depends the selection of the storage battery.

The following three types of tubes are recommended as economical and excellent amplifiers and fair detectors: the UV201A, the C301A and the De Forest DV2. The filament terminal voltage for all of these tubes is five volts and all may be operated from a six volt storage battery. The filament current consumption of the last named tube is slightly greater than that of the others, but this additional drain is so small as to be negligible. In view of the small current drain the storage battery need not be larger than a 6 volt 60 ampere hour or, at maximum, an 80 ampere hour for sets using as many as five tubes. If one desires to use a detector tube in place of an amplifier as a detector either the UV200 or the C300 or, if possible and preferably so, a VT1, also known as the "J" tube, may be used.

The rheostats as contained in the receiver need not be changed, since they will function with the larger tubes. The "B" battery voltage should be increased to about 90 or 120 volts. If the owner already possesses enough batteries to supply the above mentioned plate potential they can be used and additional "B" batteries will not be necessary. With the increase in "B" battery voltage it may also be necessary to increase the value of. the "C" battery. Additional "C" batteries should not be purchased until those on hand have been fried. Very often the same value of "C" battery suffices for both types of tubes. If "C" batteries have not been used in the previous amplifier they should be incorporated with the insertion of the new tubes.

The audio frequency amplifying transformers need. not be changed. If they functioned satisfactorily with the dry cell tubes they will in all probability function as well with the larger tubes. The plate to filament impedance of the smaller tubes is practically the same as that of the larger ones. Changes in the wiring due to the insertion of the different tubes are unnecessary, for the larger tubes will operate in any circuit in which the dry cell tubes have been used. Two slight changes may be necessary-the insertion of a new grid condenser when the new detector tube is used, i. e., to increase the capacity value from .0005 mfd. to .0005 mfd. But, as in the case of the "grid bias," the one in the receiver should not be removed until it has been tried. The other change will be a new value of grid leak.

# Radio News and Developments in Pictures



-8-

C. FRANCIS JENKINS AND HIS NEW DEVICE FOR SENDING PICTURES BY RAMIN GREYSTONE

RADIO HAS AT LAST REACHED THE NICKEL-IN-THE-SLOT MACHINE STAGE.

2 and margare as a granting

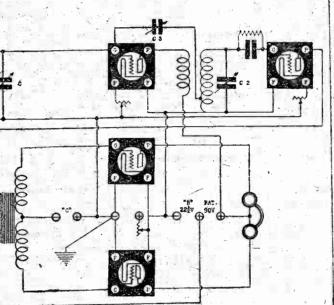
IKE Diogenes ever searching, of radio frequency amplification was as great success as met the initial mits night code practice may in- doah over his home a tool chest for an honest man we search necessary to improve upon the re-sleep instruction tests at Pensacola. crease receiving speed, but he knows crashed to the ground not more than suits that could be obtained with a One night, after sending at high it will get the students up at four twenty feet from where Mr. Lambert constantly for the perfect cirspeed to seventeen sleeping embryo bells. We wind and rewind coils, that radio frequency amplification change the capacity of fixed con- did not improve volume on local stadensers, add a touch of refinement tions, and they said that transformer densers, add a touch of rennement here and a touch there, always hop-ing that the results immediately fol-there and a touch there always hop--ERDSLER lowing the last manipulation will they can't deny it, because many of have the long desired and dreamed of them published statements to that effect. We started with a single tube effect. RADIO MESSAGE and ended with ten tubes, and in the . One Staged Tuned R. F. light of proportionate results we In the drawing you will find one were no more satisfied with the ten stage of tuned radio frequency am-CROSLEY AGAIN ASTOUNDS THE RADIO WORLD! than we were with the one. We plification, and we have borrowed learned that there were two tremen- from Mr. Hazeltine for the most Greatly Increased Production Allows Lowered Prices! dously important divisions in radio efficient method of amplifying at New Two Tube Armstrong Regenerative Receiver at \$18.50! reception-radio frequency and audio radio frequency. We use only one frequency amplifications. There is, stage, because we have found that, Ever since we started making radio apparatus it As an astounding example of the results of this

If with all our experimenting we weak ones. worth working for.

are indepted to an it is selectivity leaves that more than two stages of tuned know that its selectivity lettes nothing to be desired; it separates the stations with an ease that make it a veritable thing of beauty and a step further and state that more it a veritable thing of beauty and a joy forever. It consists of seventy turns on a 3½-inch tube, tapped every five turns for twenty turns, tical. At any rate it is unnecessary. and the remainder untapped. The The writer has found that what you and the remainder untapped. The writer has found that what you variable condenser, C1, is connected across the untapped portion of the coil, while the aerial is connected to efficient, and if that one stage is efficient another stage of tuned radio the switch lever. the switch lever. Next we come to the radio fre-quency transformer part of the cir-cuit, and therein lies an argument. They used to tell us that a single tube regenerative set was the equive clost of one stage of tube to produce regeneration is not only not a help but a hindrance, because the more controls you have in a circuit the alent of one stage of radio frequency amplification and a detector, and some even went so far as to say that it was the equal of one stage of radio The variable radio frequency frequency amplification, a detector transformer shown in the drawing and one stage of audio frequency is of the conventional neutrodyne amplification. Yea, verily, they made type and consists of fifteen turns of rash statements in those days! They said that at least three stages (Continued on following page.)

# This May Be the Ideal Set

It Has Possibilities, but Results Have Yet to Be ~ Determined.



Many fundamental circuits are incorporated in the one above.

ployed for worth while results.

oncerned. To be able to reproduce

are indebted to Mr. Reinartz for its the results obtained with the other.

of course, also rectification or detect, taking everything into consideration, tion, but it is of minor importance one stage is better than two. This when radio frequency amplification we know is a bold statement, and is employed ahead of it, and radio we will explain it later. First let us frequency amplification must be em- take up radio frequency transformer

amplification. Those who are familiar with the have not yet discovered the perfect construction of radio frequency cheuit who can say that we are not transformers know that they consist every day in every way getting of two small coils placed in inductive nearer to it? At least we know what relation to each other, one coil servwe are after, and that is half the ing to tune the plate circuit of a game. We must devise a circuit tube and the other serving to tune that will be selective to the point of the grid circuit of the succeeding tuning in distant stations to the ex- sube. Sometimes an iron core, and clusion of local ones. We must, and even an iron shell is used to broaden we will, some day devise a circuit the tuning. Now, it does not take a that is capable of getting anything Steinmetz to figure out that, as these that is in the air, no matter where coils are fixed they cannot operate it comes from, because the waves are properly on all wave lengths. They in the air all around us, but we have are bound to have one wave length not yet learned how to catch the peak on which they respond best, and all wave lengths above and be-We must devise an audio fre- low that beak must necessarily sufevency circuit that is capable of fer. A potentiometer is used to aid amplifying the signal after it is tuning and to control the oscillations cought and rectified, and it must that are set up when the antenna amplify without distortion. Less at- circuit is tuned to the lower wave tention has been paid to this part of lengths, but the function of the poradio reception than to coaxing the tentiometer is to control the grid signal out of the air, and in many bias, and if you give the grid less ways it is probably more important potential than it must have to oper in so far as music and speech are ate at maximum efficiency just to tions in the circuit 1 stop oscilla with volume all frequencies without readily be understood that his method distortion or plemish is a consumma- of radio frequency amplification tion devoutly to be wished and well leaves much to be desired in the way of efficiency. Of course we know In the accompanying drawing we that three stages of transformer hope we are a little nearer the per- coupled radio frequency amplificafect circuit. Let us analyze it step tion will produce some results, but by step and see what conclusions we it is the writer's belief that these can draw. First we have the tuning results are obtained through sheer element, and here is where our selec- force' excitation, and that one stage tivity comes in. The circuit we use of tuned radio frequency as shown is of the semi-aperiodic type, and wa in the drawing will equal or surpass

#### Army Radio Operators Wake Up by Radio

station, where radio operators are up; it's five fifty-five!" Much to his station, where radio operators are trained, the new rangled psychologi-the men awoke, and in a few min-N. J., with pieces of a tool chest cast cal method of increasing speed in utes the other fourteen rolled out, from the Shenandoah to lighten the code reception, while the partly asking what was the matter. The ship in its flight in the storm. While trained gobs sleep, is being used with flabbergasted petty officer now ad- observing the course of the Shenan-

a petty officer ended his watch with To House Radio Set At the Great Lakes Naval training the code message: "Hey gobs, get A radio set will be built soon in the

### operators, equipped in "ear muffs," Chest From Shenandoah

home of Leslie Lambert of Alton, and his family were standing.

has been our fixed policy to offer to the public the best possible receivers at the lowest possible cost. That this policy has been appreciated is proven by the fact that a shortage of Crosley radio apparatus has existed at all times, although The Crosley Radio Corporation has been producing more radio receiving sets than any other organization in the world. Heretofore constantly added improvements have forced us to maintain steady prices, but so great has been the response of the public for Crosley instruments that greatly increased production now allows us to lower the price of the entire line and stil maintain our contant research for improvements.

research, we now offer a new and wonderful two tube receiver consisting of Armstrong regenerative detector and one stage of audio frequency amplification, giving loud speaker volume on local stations at all times and on distant stations under fair receiving conditions. Otherwise head phones should be used for instant reception. This instrument, known as the Crosley Model 51, sells at the remarkably low price of \$18.50. It has been thoroughly tested in our laboratories and its satisfactory performances have even surprised us.

Other Crosley instruments are well known. Their exceptional performances have given pleasure to hundreds of thousands of people in all parts of the United States. Note the following price reductions on these well known Crosley receiving sets:

CROSLEY TYPE V, single tube Armstrong regenerative receiver, the same instrument used by Leonard Weeks in Minot, North Dakota, in his established communication with the McMillan expedition at the North Pole, THE CROSLEY TWO STAGE AUDIO FREQUENCY AMPLIFIER THE CROSLEY MODEL VI, two tube receiver incorporating radio fre-THE CROSLEY TYPE 3-B, a three tube Armstrong regenerative receiver, consisting of detector and two stages of audio frequency amplification, in a beautiful solid mahogany cabinet, formerly \$50.00......Now \$42.00 THE FAMOUS CROSLEY MODEL X-J, a four tube receiver, consisting of one stage of radio frequency amplification, detector and two stages of audio frequency amplification, probably the biggest selling radio receiver THE CROSLEY TYPE 3-C, a three tube Armstrong regenerative consolette model with built-in loud speaker, formerly \$125.00... Now \$110.00 THE CROSLEY MODEL X.L, a four tube set consisting of one stage of

radio frequency amplification, detector and two stages of audio frequency, 

It is our firm belief and hope that these new lowered prices will enable every family to enjoy the benefits in pleasure and education that only the radio can give. Take advantage of this astonishing announcement. Choose a Crosley Radio Receiver today. FOR SALE BY THE BEST DEALERS AND JOBBERS EVERYWHERE.







# Phenomenal Results May Be Secured With Low **Resistance Radio Apparatus** Methods of Winding and Mounting Inductance Will Be of Great Assistance

dreds of miles away and be selective, the fan of to-day will figure on using some form of amplification that calls for from three to eight tubes. "The more tubes the better the set" seems to be the general idea. But as this does not always come true and as a great number of radio fans in the country cannut afford so many tubes, it would be advisable for them to build an efficient regen-

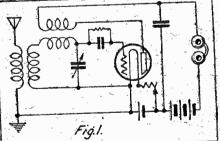
It is possible to build a one tube set that will run circles around any tuner that is on the market and that will equal in results any tuner outside of a well constructed neutrodyne or a super-heterodyne. It is even possible for a tuner such as is described in this article to equal some of the homemade neutrodynes. The factor that limits a receiving set in range and selectivity is resistance. The question will arise among those of you who have studied the theory of regeneration that the regenerative action of the tuner lowers the resistance of the secondary circuit. This is true; but regeneration does not make a poor secondary circuit a good one. In other words, the signal strength of a stationcan be brought up by regeneration but it can never be as high as it would be in a low loss secondary. Also the tuning of a poor secondary circuit is never as

sharp as the tuning of a good one. There are several things that make for a poor tuner and these will be taken up before entering into the constructural details of the set in order that the reader will understand just why certain things are done. The following information will also aid one in designing his own tuner:

#### Coil Forms Resistance.

The first form of resistance is the coil resistance. That is, the resistance of the tuning coils in the set. This is not in the wire itself, if No. 16 or larger is used. The resistance is in the parts near the wire, the tube upon which the wire is wound. the varnish on the coil and the apparatus mounted near the coil. The perfect coil would be one that has no form and is air insulated. This is impossible, but if a basket weave self-supporting coil, such as will be described is used, one will come very near the ideal. Tapping a coil also introduces a large amount of resistance in the tuning circuit. Leave out all

The next item is the condenser loss. When a poor coil is used a poor condenser may be used, but if a good coil is used



a poor condenser will make the tuner as inefficient as if both a poor coil and a poor condenser were used. There is a big difference between a poor and a good condenser. The increase in efficiency is not manifested in stronger signals but in an increase in the number of stations that are heard.

There are no set rules for a good condenser. But those having good insulation, and mighty little of that, are generally all right for a circuit in combination with a low loss tuner.

Now, if one makes a good tuner and uses a low loss condenser the entire efficiency of the set can be ruined by using a poor socket. The best socket is one that is made of porcelain and is of rugged construction. The contacts of the socket must be good and preferably make contact on the side of the tube prongs. Another way of decreasing the efficiency of a good tuner is to couple it to another circuit that is high in resistance. As the antenna circuit is one circuit that Is hard to make near perfect, that is the one that will bring resistance in through coupling.

Now to eliminate all the resistance possible, one should have a tuning coil five turns. When this number of turns

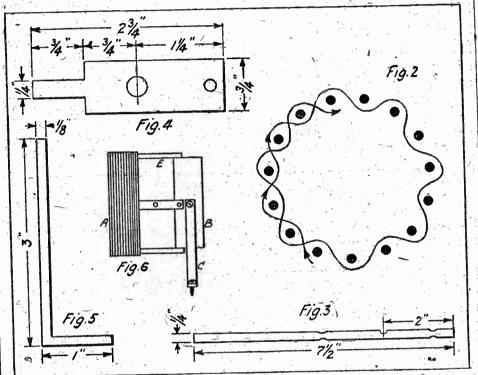
baseboard. Next use a condenser of low losses. Then a good socket must be used. For reducing the antenna resistance one should use loose coupling and a small coil. In other words, use an untuned primary coil.

#### Ordinary Circuit Good.

To make the tuner simple and one that will not radiate a strong signal, the author has chosen a two circuit regenerative tuner, with regeneration obtained in a set of coils that is not coupled to the antenna circuit. The circuit for this ] These two coils comprise the secondary.

W HEN starting to build a tuner that is self-supporting, of large wire has been wound on the coil cut the wire drilled. Then the strips are cut as shown that will bring in stations hun- and kept clear of all other parts. This and fasten it as in the beginning. Then includes the wall of the cabinet and the procure a ball of waxed twine. Cut some of this twine into lengths that will go around the width of the coil. With this twine the coil is tied firmly, as follows:

Pass one end of the twine underneath the coil and pull up over the top. Then tie both ends together tightly. The twine should be tied between each two nails, in the place where the coil is thinnest. The pegs should then be carefully pulled out of the holes and the coil removed. The pegs are then replaced and a second coil of the same number of turns is wound in the same manner as the one just finished.



tuner is given in Fig. 1. As will be seen it is a standard tuner. The list of parts of this tuner will be seen to be similar to that for any other set except for the coupler.

1 tube, UV-200, 201A, WD-12, UV-199.

1 socket and rheostat to fit tube used. 1 23 plate low loss condenser.

1½ pounds of No. 16 double sotton covered wire.

2 one inch lengths of 3½ inch composition tubing.

10 23% inch lengths of 3% inch wide composition strips. 12 inches of 1/2 inch by 1/8 inch

brass strip. 15 inches of 1/4 inch fiber tubing

for shafts. 1 composition tube, 234 inches in

diameter and 21/2 inches long. 14 pound No. 26 single cotton cov-

red wire.

1 grid leak condenser. Now to the construction of the coils: Besides the parts given in the list one will need fifteen round wooden pegs, 41/2 inches long and 3-16 inch in diameter. These may be obtained in any carpenter shop. They make up the form upon which the coil is wound.

Upon a board draw a circle 31/2 inches in diameter. Mark off on this circle fifteen equidistant points. At each of these points drill a hole into which the pegs can be fitted tightly. Then on the inside of this circle draw another one 2½ inches in diameter. Mark off fifteen equidistant points and again drill for the pegs.

#### Winding the Coils.

Push the pegs into the holes of the larger circle and place the coil of No. 16 wire so that it may be easily unwound. Fasten the end of the wire to one of the pegs by running it around one of them twice. Then wind the coil as follows, and as is shown in Fig. 2. Carry the wire around one peg on the outside, then around the next peg on the inside, from here to the third peg and around on the outside. The fourth peg is wired on the inside, and so on. This gives a coil a neat appearance and one that is highly efficient.

Be sure in winding the coil that the wire is kept taut at all times and that it is pulled tight after being carried around every third peg. Wind on this coil thirty-

After winding the second coil the pegs are placed in the holes in the smaller circle and another coil wound in a slightly different manner. When five turns have been wound on the coil stop winding and cut the fiber tube into two equal pieces. One of these pieces must be prepared according to that in Fig. 3. This is done as follows: Two inches from one end file away almost half of the tube until a big hole is obtained that leads into the inside hole of the tube.

#### The Primary Winding.

Lay this tube on the unfinished coil so that it cuts the coil exactly in half. Mark on the tube just where the wire touches it on each side and then file the, tube at these places on each side so that it looks similar to the tube shown in Fig. 3. Then place the tube on the coil, in the center, with the notches down on the wire. Continue winding and wind into the top notches on the tube. When five more turns have been wound on cut the wire and tie the coil as was done with the others. When tying around include the tube in the tying so that it will be made more solid. Remove the pegs and set completed coil aside. This is the primary coil.

The next coil to be wound is the tickler coil. This is wound on the composition tube that is 2% inches in diameter. In the center of the tube, and on each side of the tube, a hole is drilled. This should be a quarter-inch hole for the shaft to go through. This hole in the center divides the tube into two halves and on each half wind thirty-two turns of the No. 26 single cotton covered wire. This is, of course, a continued winding-that is, the thirty-third turn is the ending of the thirty-second, and the beginning of the thirty-fourth turn is three-quarters of an inch from the thirty-second.

The next step is the preparation of the composition tubes and strips for mounting. First come the strips. These are prepared as shown in Fig. 4. Drill a hole one inch and a quarter from the end; this hole should be one that will enable the fiber tube to pass through. Then in the end from which the measurement for this hole was taken drill a hole to take a 6-32 brass bolt. Drill this hole as close to the edge as possible.

The center hole, or rather the hole one and one-quarter inches from the end, is remaining four have only the end holes

ts the best instrument to use.

Then on the two tubes mark off four equal parts of the tube, on the circumference. At each mark, one-qaurter of an inch in from one edge, drill a hole to take a 6-32 bolt. Then in the center of the tubes, on each side, drill two more holes, same size, for mounting the brass strip.

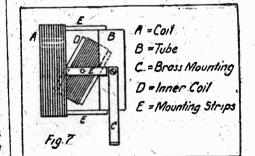
The brass strip is now divided into four three inch strips and each strip is drilled for bolt holes. Drill the holes as follows: One at each end and one-quarter of an inch from the end. Then, one inch from one end make a right angle bend as shown in Fig. 5. The tubes may then be fixed up with the brass strips and the composition strips as shown in Fig. 6that is, exclusive of the coil. When the strips are mounted and bolted down tightly the coil is put on.

#### Mounting the Parts.

Before mounting the two strips that have holes in them on one of the tubes place in the center the coil that has the fiber tube mounted in it. Then mount the strips having the hole in the center, as follows: Slip the hole over the tube and bolt. Then do the same with the other strip. This leaves the coil so that it can be rotated by turning the fiber tube (Fig. 7). ~

The second tube is mounted with all strips and then the second fiber tube is filed with the large hole as the former was and in the same place. Then the tube that is the tickler is held in position so that when the fiber tube is pushed through the holes in the strips it also passes through the holes in the composition tube. This places the coil so that it also can be rotated by turning the fiber tübe

Two fifteen inch lengths of flexible wire must be bought for flexible leads to the two rotating coils. These lengths are cut in half and two pieces are pushed through the end of the fiber tubes and out through the holes in the tube as shown in Fig. 3. This is perfectly all right for the tickler coil, but when it comes to the other coil, which is the primary, it is advisable that the flexible wire be just fastened to the ends of the coil and left to swing in midair. The leads on the primary may be pushed through the tube, but the resistance will go up so much more. However,



#### this is a point for each individual to decide.

After this has been done the next step is to mount the coils on the tubes. This is simple. Simply force the small ends of the composition strips into the open places in the coils. That is, the places where the pegs were. It will be necessary to force the coils on the strips and they will be pulled slightly at the points where the strips enter the coils, but this s perfectly all right.

After this is done the couplers are finished and the set is ready to be mounted on a panel. A 7x14 panel is the best size to use for a one tube set. If the constructor has special ways of mounting the coupler its is well to remember that the length of the brass strip is the length which controls the height of the coupler dials. But do not use a shorter length of leg, as this would bring the coils too close to the baseboard.

The wiring diagram for the set is given in Fig. 1 and should be followed to a "T." Due to the fact that the tuning of this set will be sharper than any other tuner the constructor may have had it only drilled in four of the strips. The will prove slightly unsatisfactory until one understands it.

# Highly Efficient Set Necessary for Proper Reception on Loop Aerial

Outside Antenna Is Generally Far Better, Especially for Distant Stations.

By WILLIAM M. HENDERSON.

TO many fans an aerial is either an | impossibility or an undesirable part of a radio set. This state of affairs is, of course, due to two things: either the landlord has an aversion to aerials or the fan himself has. In these cases it is necessary to use a loop and a special receiver to bring in the stations.

In using a loop receiving set it must be remembered that the amount of energy that is picked up on the small frame of wire is extremely small and has to have sensitive tuners to bring in stations and a sensitive arrangement of the tubes. Crystal sets cannot be used.

All loop receivers have certain limitations. The greatest of these is the fact that broadcasting of stations that are far away from the set cannot be received with any certainty. Nor can they be counted on as coming in with great volume. There are cases, of course, where loop receiving sets have done wonderful distance work, and some of it even on the loud speaker. But this article is to take up receivers as a general case, and these exceptions will therefore be ignored.

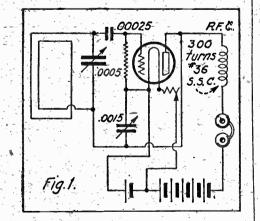
The first type to be taken up will be three receiving sets that will work on a loop for local stations. Each one is easy to build and usually will work without any playing around with special parts of the circuit. The fourth receiver is a popular reflex that, if constructed properly, will bring in stations that are fairly distant. The fifth and last is a three stage radio frequency amplifier and two stage · audio frequency amplifier. With this receiver it will be possible to do more distant work than on any of the others, but one should not count on too much, as loop reception is nothing one can guarantee.

Before entering into a description of any of the receivers there is one thing to be emphasized. That is the matter of equipment. One of the first things stated in this article was the fact that loop receivers deal with minute currents. And this is one fact that should be kept in mind when buying equipment.

#### What Makes a Good Loop.

The two units that are of great importance are the loop and the tuning condenser. The loop in all its forms is hard to make efficient, therefore one should procure one that is well insulated, has large wire and of good diameter.

The condenser should be one of extremely low losses. There are many on the market to-day and it should be easy to get one. Do not use condensers that have molded end plates or that have metal end plates that are part of the stationary plates. The end plates should be metal and be part of the rotary plates. The remaining parts of the set must be of the best-sockets, rheostats and trans-



formers. The fixed condensers must be of the best and accurate.

The diagram given in Fig. 1 is of a one tube circuit that will bring in stations within ten miles from the position of the set. The condenser across the loop is the tuning condenser, while the .0015 condenser from the plate to the filament controls the feedback of energy from the plate to grid circuit. The choke coil in the plate circuit is an absolute necessity for efficient operation. It is made of 300 turns of No. 36 single silk covered wire wound on a one inch spool. This the tube. No. 24 SCC wire is used coil keeps the radio frequency energy i throughout from coming through the phones and forces it back to the grid circuit.

results. The dry cell tubes may operate the set, but it is doubtful. For the 200 use 221/2 volts on the plate. For the 201A the plate voltage must be played with to obtain the best results.

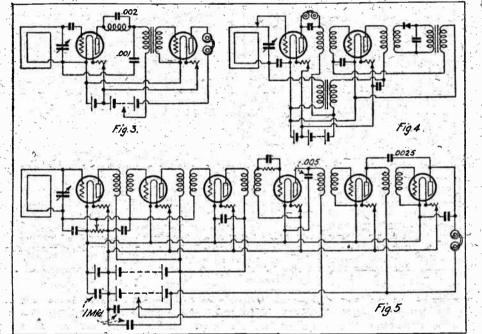
Fig. 2 shoms a more efficient tuner than that in Fig. 1. It will be possible to use this tuner a slightly greater distance from a broadcasting station. The tuning of the loop is the same as in the former set, but the amplification is obtained through the use of tuned radio frequency amplification. The variometer is used in this capacity. It is positively necessary that this variometer be one that will respond to the high wave stations, otherwise the set will only receive stations. below 450 meters

#### Must Be Efficient.

It will be nossible to substitute a variable condenser connected in shunt to a coil of about fifty turns of wire in place of the variometer, but this is not suggested because it is easier to get an efficient variometer than an efficient condenser and coil. That is, the efficiency of a variometer, if of good construction, tube circuit that will work well on local stations. This set obtains its sensitiveness through a slight superregenerative effect through the use of the honeycomb coil and the condenser across it, as shown in the plate circuit of the detector tube. The second tube is an ordinary audio amplifier.

It is extremely important that the fixed condensers in this set be good ones. The capacity of them, though given herein, might well be experimented with in order that the best values be found. There is one point to be entered into before closing this set out. That is the detector tube. It is preferable that this tube be a UV-200, and that it be one that will take more than 221/2 volts. The more plate voltage that can be placed on the tube the greater the volume.

The circuit given in Fig. 4 is a popular reflex set that has found much favor of late. This is a two tube reflex that employs a crystal detector for rectification. This is an advantage due to the fact that the crystal gives perfect reproduction of the transmitted speech or music.



will be greater than the average condenser and coil.

Following the general layout of this tuner it is possible to carry the amplifier to any number of stages. It is not wise, however, to use more than three stages. In fact two stages are more than enough to control.

The condenser connected from the middle leg of the potentiometer to the negative filament is a necessity. It is used to lower the resistance than the potentiometer offers in the circuit. Without this condenser the set will not be selective. set are critical and should be of the best

The capacities of the fixed condensers are not given, as it is a positive necessity that one find the best values for eachposition. One should start off with a neutral value of .0005 and use all the variable condensers in the house as shunt ca pacities to these. The correct working capacity can then be found and fixed condensers of the correct capacity my be put in place. This procedure should be followed in every reflex set that is built. The radio frequency transformers and rmore for this the audio frequency tr

### An Experimental Circuit

a set for any length of time to wish to try something new and difficult to get working.

The circuit given herewith is theoretically perfect and practical. The set will work with the winding data given, but it may be found that a few turns more or less will materially aid it to become more efficient.

The main part of the circuit is the tuning coil. This is somewhat similar to the four circuit tuner. The aerial coil is of forty turn coil wound on a three inch tube. It is tapped every five turns. The condenser in series with the ground and the coil is one of .001 capality, but may be eliminated without ifecting the circuit any.

The grid and plate coils are exactly the same and are wound on the same tube. The tube which is used as the form for this tuner is three inches in diameter and five inches long. Starting at one end, fifty turns are wound on

The plate coil is wound one-quarter of an inch away from the grid coil and The tube to use in this circuit would in the same direction. The two conbe either a UV-200 or a 201A for best densers that are used to tune the circuits if shifted from one side to the other.

HERE seems to be a general feeling | are both .0005 mid. in capacity. The among radio fans who have had single turn around the grid coil must be wound in the same direction as the grid coil and near the end of the coil that is connected to the grid.

> The condenser across the phones has a decided value, but it may be made a fixed condenser of .0005 mfd. capacity if a variable condenser is not handy.

The grid leak and condenser are the same as in any receiving set. As to the type tube to use, that must

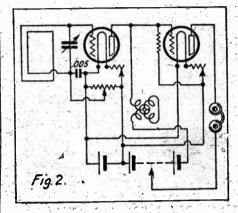
be left up to the experimenter, as the set may be built around any tube that it is desired. It is probable however. that the UV-201A tube will give good results on the small drain from the A battery, but the UV-200 will be the bes. tube to use.

In the tuning of the set, if it is found that it is not possible to bring the plate condenser up to the highest point of volume without the set howling, then a small fixed condenser connected between the plate and grid coils, will eliminate this.

Just where this condenser is to be connected will be doubtful, but the right tap on each coil will be easily found with a little experimenting. The lead to the filament of the tube is also something that might improve the set greatly

Fig. 3 is a diagram of a simple two [ Unfortunately the transformers control the working of the set. and unless matched audio-and radio transformers are used the set will not do much in the way of distant reception.

The tapped loop is a necessity. The tapping controls the amount of energy put upon the grid of the tube. This con-



trols the circuit and keeps it from oscillating. For local stations it will be found that the tap switch will be near the center of the loop, while for distant stations the tap switch will be at the outside of the loop.

Fig. 5 shows a diagram of the best three stage radio frequency amplifier that can be built outside of the superheterodyne. With this set the clearest reproduction of broadcast speech and music is possible. For distant reception it is notpossible to accurately state just what the set will do. Some sets constructed on this line have done extremely well, while others have failed to do better than 100 miles.

For efficiency the transformers should be of the best. The fixed condensers across the batteries must be of rugged construction. They are used to eliminate some of the battery noises that arise in a set of this number of tubes. The condensers across the potentiometer are also necessary for sharp tuning. The fixed condenser from the plate of the first audio amplifier to the plate of the second audio amplifier is used as a clearance condenser and is of great aid in clearing up signals. The one-quarter megohm grid leaks across the secondary of the audio transformers should be used if positive clarity is desired. These take up the small crackling noises that are so prevelant in most receivers.

#### What Tubes to Use.

The tubes that should be used in any of the above sets, except where otherwise specified, are the UV-201A or the C-301A. These tubes will give the best results as amplifiers. The UV-200 or the C-300 is

Dry cell tubes are not as efficient as radio or audio amplifiers because of their small wattage. This limits the output of each ube, and consequently the set could never be as loud or get as much distant stuff as the storage battery tubes. Of the two dry cell tubes the UV-199 or the C-299 is the better for radio frequency amplification.

Remember that the loop is one of the tuning controls and should be turned with its plane pointing toward the station to be received. In this position the greatest signal strength will be obtained. There are a few points in the construction of a radio frequency amplifier, and these hold true of every set that should be read, marked and inwardly digested. The first is to connect the condensers so that there is no hand capacity in order that one will not have to shield the panel. Second make the leads short as possible. That is, mount the instruments insuch a manner that the leads will naturally be short. Mount the transformers in such a position, i. e., at right angles. to each other, that there is no feedback coupling between them. This is necessary in order that the potentiometer may be made more negative for volume. If the transformers are mounted in a row the set will howl and be difficult to control. -

When using a loop do not use long battery leads. Long leads will detract from the directional properties of the loop and make the tuning broader. Be sure that all batteries are fully charged and well up in voltage for best results.

two more fifties.

our appreciation by obeying the law

amateurs do.

date.

Listening down near 100 meters 2 FZ seems to stick at the key recently I heard 1 MO work English each evening. At first thought 2 KF several times. While the Britthat he would not be on so much, but recently his signals are there ish boys are not as loud as the each night. By the way, OM, how's French and Dutch stations they are the radio convention coming along? quite steady. French 8 AB has the reputation, though (, of being the star Best luck with it. foreign DX station. It seems he is - 2BL seems to be doing some good work with a pair of fifty watters. reported every time he pushes the key. He started to use two tubes. Your note is good. Om. 111, located in Rhode Island, seems but recently is only using one and to be getting through fine. He has he still is very strong. We congratrebuilt his transmitter and has done ulate French 8 AB upon having a better work since tearing it down, real amateur transmitter. Only wish 1MO. is on the air, but what has I could visit him this summer. happened to 1AW? This well known 2KV must be working on station seems to be without an oper- new set again, as his signals have ator lately. How cum?

1XU certainly comes through The last time he was working he. strong at times though he is not used a 500 cycle set, which was very consistent. Who are the operators QSA (very strong). How are the at this station? - The fists are very BCLs treating you in Bronxville? familiar to me.

ole top.

200 Meters and Less

of the Second District Execu- Don't forget this tive Council will take place vania, the same as last year, but this time the council has secured the ballroom, which is more convenient than the Butterfly Room

The admission to the show is 50 program. Nearly fifty manufacturers have taken space, and the best apparatus will be on view in the different booths. On Wednesday night the banquet and hamfest tikes place. If it is anything like last year there will be fun for all, and plenty of it, too. The price of the banquet this year is \$5, which includes a season's pass. A visit to WEAF and WJZ is also included in this ticket. Many of the prominent amateur stations will be visited, also, Radio Council, 120 Liberty street. 2 VH since changing his trans- Morris? mitter is much louder. Have you increased your power as yet, Om? Heard that you intended to put in

The RAGNY of New York city new have a transmitter and use the call 2 CNR They are using at the present two five watters, DC CW. They say that 2 CHY, now that he is a code instructor, is very careful how he sends on the air. HI. Watch your step Om or some one will tr to burn you up with fast sending Plenty of fast boys on the air, MIM Notice that many stations are still above the 200 meter wave. I have an accurate wavemeter at the shack and check up on most of the boys. I am glad to see, though, that the tendency of most of the hams is to shows that the talks and lectures paigns by the different amateur. editors are having some effect. If the Government is good enough to give us the license, why not show

to the letter. What say, men? I haven't heard 2 KU on the ether in some time now, and wonder if he transmitter. What you doing now, "OM? Hope you haven't turned to be appreciated by the writer. receiving altogether, as some of the

#### 2 CEI Heard in England.

2 WC must be still tuning his OW

heard 2 RK and knows the DX It has some kick. which this well known station has

All the attention is at present on a failure. first because out Heenses call for the HI, how's that for a slam?

HE radio show and convention wave band between 150 and 200. 2ADE has been reassigned to J Morrow, 547 West Fiftleth street,

quite an affair. This is their fourth convention, and nearly every radio fan knows the crowds that it draws. er. 1 am sure that at the air. be glad to welcome him to the air. I wonder if 2CWR has been copying all the short wave stuff as well as the boys did out to Rockaway? It's a strange thing about locations sometimes. A set will work fine at

one place and when moved to a difcents, which includes a magazine ferent location, perhaps only next door, will perform in a different manner

#### 2CNO Talks Spark.

2CNO, the boy with the big five watter, again talks about putting in a spark set. Can't you see the folly of putting in a cement mixer, Om? If you want noise why not work in a boiler factory? HI and then some

2BQS has not been heard in some time now, but guess that the work Make your reservations to Executive at the amateur radio office must keep you busy. How about that

2BNL, the fone expert, is still working his set though he has little ime to be on at night. Hope they change your hours, OM, as I know you would like to do some dx work with that 100 watt transmitter.

Heard 2ATE up in Westchester recently. Too bad that you don't get more time to work that "P" tube OM. You sure come through strong. 2DJ had the good fortune to ge 900 cycle spark set and it is just he thing to run two fifties, but gues he will use only spark.

9MC is starting to come through Haven't heard him in some time and thought he had dropped out entirly. Hope you stay with us now, MC.

Remember that spark at 3FB? ertainly seems strange to hear him go below the 200 meter wave. This on the CW. The CW transmitter i very steady and I couldn't have said given by radio clubs and the cam- the same of the spark. The old rock crusher faded at every opportunity. If there is a station in and near Poughkeepsie working would be very pleased to hear from them. I have had several messages on the hook for Hudson, Poughkeepsie and nearby points. It is time that we organized a Hudson River relay line again. would shortly come back with a big How about it, fellows? Who is on n that direction? A letter would

9BP is off for a vacation, so it is a s a good chance for some other station to work WNP. MCix must hear some DX up there in the north. H Understand that 2 CEI has been is fortunate in not having some heard in England several times in single circuit dial twister near him. the last month, and all on one fifty to create QRM. If we would only watter. He seems to favor the low find some of these squawkers ! waves, as many of the prominent would be a good idea to make them take out a transmitting license.

2AGB is doing great work re transmitter, as no sign of his fa- ceiving as well as transmitting. He miliar sigs are heard on the air to uses a superheterodyne and has copied more foreign stations than Many have written to me inquir- any other amateur. Great work, ng if the call 2 RK is a reassigned OM! Have heard you doing some one. No, Kenneth Hewitt has his old real transmitting and am sure that call again. I guess every one has you will do some more with your set

#### F 8 AB Is Star Station.

disappeared from the ether again. KV had the misfortune of losing his 2BRB, only using a fifty watter, counterpoise one evening through is there with the dx work. I think the kindness of some neighbors, who we all have heard his ether buster thought they would get rid of the of a CW transmitter. FB, Glaser, transmitter. Well, I notice that 2 KV is still on the air, so the plan was

the low waves and nearly every I know a certain spark hound in night some new station is heard The Bronx that has to CQ to raise a down there. Wonder what the dif-station. This is great recommenda ference will be when all the gang tion for the cement mixer. Say, OM, try a hand at it? Here's the impor- I know a great resting place for that tant part of the testing. Get per- spark set; but the only fish who mission from the radio inspector would go after it would be a sucker.



SETS ON EASY PAYMENTS

TUBES IN STOCK

INTERNATION OF THE OWNER



# Basic Theory of Radio Dates Back to Ancient Times With the Discovery of Sparks

People Once Believed That Peculiar Actions of Amber Were Caused by Hunger By THURLOW EDSON

variable condenser you control in a scientific way a small portion of the stuff that goes to make up a thunderbolt. It is called static elec-

"I get three stations within five degrees on my dial," announces the proud owner of a DX receiver, which is good at reaching out into space and picking up Dallas, Texas; Denver, Col., or perhaps Los Angeles, Cal. He has the thing down to a science, and, weather permitting, he can turn the dial any night and pick up the three stations. His tuning is scientifically accurate.

If he built this set himself he can in all probability tell you that the condenser has one-thousandth of a microfarad capacity. This means that its forty-three plates, separated by thin layers of air, will hold a certain electrical charge rated technically as .001 mfds. His twenty-three plate condenser has a rating of .0005 mfds. and his fixed condensers are rated in a similar man-

The technical man can calculate the proper amount of capacity needed to make the set oscillate to waves of broadcasting length, and he is apparently still more scientific, but not even the most technical man can tell you just what it is that he is gauging. He knows the theory and practice of static electricity.

. It is believed that o each atom may be oo the center of a o a solar system, with a o o electrons revolving about if as the planets revolve about the sun.

but no matter how technical he may be he still wonders what is at the bottom

The best of technical men recently gave a certain amount of credit to a theory that all static electricity which is uncontrolable came from the mountains of

Such are the vague theories which go about among the millions of Americans who have suddenly turned to the highly technical subject of radio. This latest theory comes from a radio operator who had made a few trips to Mexico and had observed on each trip what he thought was an unusual crashing in his phones, caused by natural elements which interfered greatly with the reception of messages. The crashing was no doubt caused by some kind of electrical discharge in the air, such as that which takes place between clouds or between the earth and certain charged clouds during a thunderstorm; but to say that the Mexican mountains were the source of all such static noises was one of the many wrong statements which pass for scienific theories to-day.

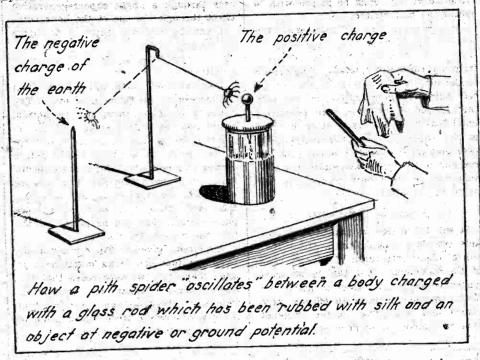
Do Not Understand Static. Static electricity is found everywhere in the world to-day. We do not yet understand it. We merely know that it will produce certain results when treated in a definite manner. It may be at the origin of the Northern Lights, at which we stand in wonder, and when we say that it makes its chief home in the Mexican mountains we are like those ancient monks of about two thousand years ago who mistook static electricity for appetite in a piece of amber.

The monks, the guardians of all learning at that time, had both forms of electricity which are necessary to radio, but they could not interpret them. They, could understand the mystery of appetite in a way, but they could not make their minds grasp the - nature of two kinds of electricity-that produced by their magnets, as described last week, and that which was attendant upon the friction of a piece of amber against a

When they rubbed the amber they noted that it attracted bits of dry leaves, and their explanation was that the amber was hungry for vegetable food. When nature forms amber she fre- tive charge.

HEN you turn the dial of your | quently entraps leaves and insects with it in such a way that they are fossilized explanation of the monks was that the piece of hard rubber is touched to a

When a body with such a charge on it touches another body of matter it may and preserved inside the amber. The communicate a part of its charge. If the

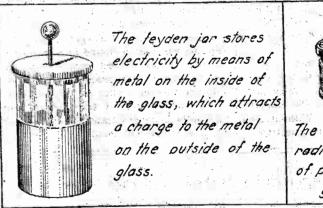


mber was digesting the insects and pith ball the ball will at once take on leaves slowly, and that when it was exercised by rubbing it became hungry for more and attracted bits of dry leaves to it.

#### Theory Is Sound.

We may be as far away from the truth in explaining the "hunger" of the amber as the monks were, but we have a theory which is sound when it is applied in many other ways. It is the electron theory, and it is broad enough to explain all such static electricity effects. In brief, it assumes that the smallest amount of matter which may be separated by chemical means, the atom, has a number of tiny bodies called electrons associated with it, and the static charge of any substance depends upon whether its atoms have their allotted number of electrons

Electrons are considered to be definite quantities of electricity which do not change, and they are said to have a negative or minus charge. As unlike charges of electricity attract each other and like charges repel, the atom is assumed to times, however, before the condenser is



through this positive charge, attracts enough electrons, of negative charge, to neutralize itself. The relation is disturbed when two objects are rubbed together, and one of the objects may acquire more than its normal amount of electrons, becoming negatively charged, while the other body will retain less than its usual amount and be positively charged,

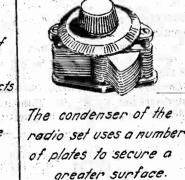
Two materials which are more comnon than the amber of long ago are hard bubber and cat's fur. The fur of the cat, no doubt, produced electrostatic sparks ages ago, but at that time man did little more than idly wonder. To-day, through observation of such apparently insignificant revelations of nature, the condenser in a radio set is. made to take on a charge like that of the cat's fur and to throw off that charge to produce the necessary oscillations of radio.

If a piece of hard rubber is rubbed, with cat's fur it takes on a negative electrostatic charge because it apparently has the power of drawing electrons away from the cat's fur in the process of rubbing. This leaves the fur with a post-Server a server of a server the addition for an use sine to the

a negative charge. It will then fly away from the rod, because its negative charge repels the negative charge of the rod. If the ball then comes in contact with an object which is positively charged, such as a glass rod which has been rubbed with silk, it assumes a positive charge, and will tend again to fly toward the Hard rubber rod.

#### What High Frequency Is.

This action of electrons in moving back and forth from a postively charged body to one which is negatively charged produces the high frequency or oscillating current necessary for radio-waves, and the radio part which helps them to perform in this manner is the condenser. The condenser consists of two plates of metal, separated usually by air or mica. One plate or set of plates has a positive charge, while the other has a negative charge, and at the proper time the electrons flow from one plate to the other in an effort to neutralize the plates. They must surge back and forth a great many



have a positive charge. The atom, | neutralized. They surge across the plates over a million times in a second, and this makes the high frequency current of radio.

The action of a condenser is demonstrated by a pith ball or similar light object, as suspended by a fine thread. If threads are attached to the ball so that they will look like the legs of a spider they can be animated by an electric charge. When suspended between two oppositely charged bottles the spider will fly from one to the other, touching its legs to the objects for an instant and then drawing them away as though the object were hot.

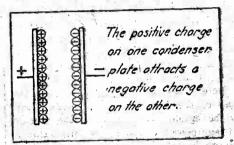
The positive body may be a glass rod, rubbed with silk, and the negative body may be any object which connects with the earth, which is assumed to have a negative charge continuously. When the spider approaches the glass rod its legs reach out toward the rod, attracted by the positive charge. The instant they touch the rod, however, they become positively charged, and the charge they then carry is repelled by the positive charge of the glass. This causes the spider to fly away from the rod toward the object which is connected to the earth, where it goes through a similar damp rag. J. L. Rifkin, denarry lives are areed to three the circuits

performance before it again returns to the rod. It will continue its antics until the charge upon the glass rod has been dissipated.

The Forerunner of Radio. It was not so long ago that such a jumping spider was as popular in a parlor in the homes of some serious minded men as the radio set is to-day. It was popular because it had something to to with the mysterious electric fluid that men were talking about.

In Europe a machine was invented which would rub a glass ball continuously by revolving it against silk pads, and the first man to be shocked by such a device was as much startled as the first to hear a radio message actually traveling through the air. Fakers went about Europe selling shocks to the ignorant country folk for so much apiece. It was not long after the discovery of the shock that men found a way of "bottling" the "electric fluid." They filled a bottle with water, corked the bottle tightly and thrust a metal rod through the cork into the water. They found then, that they could place a charge of electricity in the water by touching the metal rod with a charged body, or by connecting a wire between the metal rod and one side of the machine which produced shocks.

This bottle was the first condenser, and it survives yet in the form of the Leyden jar. The water inside the bottle served as one plate of the condenser and the table upon which it rested formed



the other. In the present day Leyden jar the plates are formed by metal sheets inside and outside of the glass,

The plate on the inside of the glass, receiving a charge of electricity attracts an opposite charge from the ground to the plate on the other side of the glass, acting as a storehouse for electrical charges.

Next week the method of making electrical charges flow along a wire will be described, together with the first discoveries of substances which act like the modern battery. The much used "volt" will be explained, together with practical hints on how to employ it in operating our radio set.

#### Mounting Condensers. If condensers are not mounted on the panel correctly the shaft will be crooked and the dial will turn unevenly, rubbing against the panel and causing microphonic noises in the tube. This condition is found in many home made sets because of the difficulty of locating the holes for the mounting screws of the condenser when drilling the panel. A few manufacturers are considerate enough to furnish cardboard or paper templates with their instruments, but the great majority of the condensers now sold are not provided with any such templates.

A simple method of locating the holes for the mounting screws after the hole for the shaft is drilled is to put the mounting screws into their holes in the condenser and cover their heads with a light colored paint or paste. The shaft of the condenser then being pushe 1 through the hole drilled for it in the panel, the condenser is firmly pressed down upon the panel in the position it is to be mounted and is then carefully removed

If this process is followed carefully little spots of the paint or paste will remain on the panel, indicating the points where the screw holes should be drilled. After the holes are drilled any. surplus paint can be wiped off with a 

### Radio Comes to the East Side

P until quite recently Mr. Abromo-

12

vitch was not exactly what you would call a radio fan. In fact, he was distinctly averse to radio.

Radio, he would declare, was a foolishment on which his son Izzie spent hard earned dollars, and for what? For speeches? Bah! you could hear all the speeches you wanted free for nothing by the speecher on the corner. Music, you tell me? Don't talk no foolishness. Even a \$3.98 phonograph gives better music than what the radio gives. And with the phonograph all you got to do is wind it up and it plays just like you want it should play. You ain't got no bother with no dials and electric lights and batteries, which you need new ones every time, and you don't got to be afraid that some other music or dit-dah-dah things will butt in like what they do in the radio. No. sir, you ain't going to see me playing around with that radio thing.

And Mr. Abromovitch would wag his beard with an air of finality and put the Second Hungarian Rhapsody on the phonograph

But he's changed. Now before he goes to work, after he comes back from work while he eats supper, after supper, and until he goes to sleep he talks radio with Izzie. He changed his family paper because another Yiddish daily had a radio column every day. Together with his son Izzie he built two stages of audio frequency. He even gave up the phonographa nd uses its sound box as a loud. speaker.

And here's what caused the whole change:

One night Izzie had crept up behind his father and put the ear phones on his head. His father had listened a while, an expression of great awe and wonderment spreading over his face Finally he had taken the phones from his ears and gazed at them long and silently. Then, waking from his temporary stupor, he had called loudly for his wife. "Hannah! Hannah! Quick come here! There's a chazan (cantor) on the radio! Come quick here!"

His wife came running up from her dishwashing, wiping her hands on her greasy apron.

"Nu, what's the matter? What's so much excitement about?" Mr. Abromovitch placed the phones

on her ears. "Listen to it!" he commanded.

She held the phones to her ears and listened, her head bent forward. A surprised smile came over her face and then abruptly disappeared.

"It's stopped already," she announced. "Listen a minute. It'll begin again soon." Izzie reassured her.

She listened, and her face lit up again as the silence in the phones was broken, Then, with an impatient exclamation, she began to take the phones from her head. "Oh, they're saying WJZ something. Who knows what they're talking about! Go already with your radio and your WJZ. I got to wash the dishes, better."

"But listen a little more, momma!" Izzie implored. "Wait till he starts singing again. You'll like it, I tell you."

Mrs. Abromovitch, still taking the phones from her head, suddenly stopped and pushed them back tightly over her ears. A wondering, delighted smile crept over her face. "Oy, oy, oy," she crooned, nodding her

head from side to side. Then she snatched the phones from her ears and extended them eagerly to her husband. "Listen, Moishe, there's a lady singing Eli-Eli! Quick, before she stops!"

She hugged Izzie to her. "Oy, such a wonderful boy I got! All by himself he makes a radio with chazans and Eli-Eli and everything!"

Mr. Abromovitch, absorbed in a new song of the cantor and his choir, motioned frantically to her to keep still. "Keep quiet yet a minute and let

me hear something, too!" During the remainder of the program Mr. and Mrs. Abromovitch took turns in listening to the cantor and his choir and to the lady who sang the Jewish songs, while Izzie sat at the set, pride and importance and happiness shining

out of his grinning face. "Nu. Hannah." Mr. Abromovitch said at the end of the program, "isn't that a miracle. A chazan sings at Fortysecond street and the whole world can hear him on the radio! Isn't it a wonder?"

And Mrs. Abromovitch agreed that it was something very unusual indeed. That is why, if you visit Mr. Abromovitch any night except Friday night, which is Sabbath eve, you will find him with Izzie deep in the plans for adding

present set. His pet dream is to hear Russia on the radio.

three stages or radio frequency to his

# British Tune In All Night Long

New York Herald Bureau, } London, Jan. 25. { LTHOUGH the first new year's A rush to renew expiring licenses has now slackened, and the excitement of hearing America has temporarily died down, interest in wireless is still as great as ever and thousands of new licenses are being taken out every month. The British Broadcasting Company, anticipating a record year in wireless development, is preparing several novel features in addition to the usual broadcasting of speeches and concerts. "We have already broadcast several wireless plays written specially for us by well known authors," an official of the broadcasting company told THE NEW YORK HEBALD yesterday, "and we shall con. tinue this feature. In a short time we expect to begin broadcasting lessons for

school children every Friday afternoonmusic, languages and other subjects will be included in the program-and several prominent educators have been enrolled for this purpose. We have now one of the largest orchestras in London and have just completed a new transmitting studio, so our musical programs ought to be better and clearer than ever.

"The Pittsburgh program which we broadcast at the end of the year did much to stimulate interest in America and probably induced many operators to take out licenses in the hope of hearing the United States."

#### May Hear Commons.

Transatlantic telephonic transmission is still pretty uncertain, even with the sytsem of reception and retransmission employed by the big companies. Capt. A. G. D. West of the British Broadcasting Company, who first heard and relayed the Pittsburgh station KDKA on December 27, spent many nights in his hut on the North Downs before he was finally successful. When the program did come through, however, it was remarkably clear and caused great excitement and enthusiasm among the many fans who heard it. The last concert from the United States came from station WGY in Schenectady. It was received on January 5 by the Metropolitan Vickers Company of Manchester and transmitted to thousands of delighted

The refusal of the Baldwin Government

ence to THE NEW YORK HERALD . to allow the King's speech to be broadcast on the ground that it was without precedent came as a great disappointment to radio fans all over the country. There is at present considerable agitation for the broadcasting of debates in the House of Commons. Exponents of the plan argue that it will make the public much more keenly alive to questions of the day if they hear them thrashed out on the floor of the House instead of merely reading about them in the newspapers. There seems to be considerable objection to the plan, and it is quite possible that the question may be cause for heated controversy.

Radio fans in North Surrey whose nightly pleasure it is to listen to the programs broadcast by the B. B. C. have been roused to fury lately by the activities of an unknown operator of the "hooligan" type. This "gentleman" has a violent dislike for any kind of music except jazz and any kind of lectures that do not contain spicy stories and jests, and whenever the program does not suit him, which is most of the time, he sets up a loud buzzing and howling from his oscillating set which drowns out everything else in the vicinity. The local radio fans would give anything to locate the unknown disturber of the peace, but so far he has been able to escape detection. Steps have been taken to track him to his lair, however. Four members of the Radio Society are now almost constantly listening for the culprit, and a motor truck equipped with receiving apparatus and frame aerial has been pressed into service. If the enemy indulges in any more lengthy howling the truck will be rushed to the amateur nearest the noise, whence it is hoped to locate the outlaw station with the frame aerial. If the howler is run down he may expect little pleasure from his meeting with the other members of the radio mad community.

The "uncles" and "aunts" who tell bedtime stories, sing funny songs and dispense homely wisdom from the Aberdeenstation are very popular with their mary nephews and nieces, if the presents they received at Christmas and New Year's can be taken as a criterion of popularity. Nineteen black cats, thirty-six pounds of candy, twenty-eight pounds of fish (from the Lord Provost of Aberdeen), eighteen pounds of shortbread, 200 calendars, three bottles of port and one of whisky were only a few of the many gifts they re-

AN IDEAL

semblers, build the Freed-Eisemann Re-

ceiver. The elaborate testing department

and equipment used during construc-

tion and the testing apparatus which

fixes the standard of performance be-

fore shipment are devoted to the most

rigid and uncompromising ideals of

Every man employed in its construc-

quality

ceived.



country?

A. C. and D. C.?

No. 27.

critical.

stage of audio

Answer-Though the push pull Answer-Inough the path it. house current to the states and the amplifier, as you wish to build it, the circuit. Therefore you might have the making two tubes will work fairly either burned out the phones, the will aid greatly Troublesome Hand Capacity. Irving Biren-I am greatly

minated?

Dan Napoli-I have constructed What "A" battery voltage? What two ariometer vario-coupler set size rheostat for this tube? and have trouble in eliminating unwanted stations. The tone and have a capacity of .00025 mfd. The quality of the reproduction cannot be leak should have a resistance of located, but the interference is an- about 4 megohms. The "B" battery noving to say the least. causes for the interference from un- voltage is three volts. To obtain this desired stations with this set. The drop across the filament it is necesfirst is the inability of the operator to tune the set properly, and the second is the size of the instruments. For the first one there is only one thing to do-learn to tune the set. For the second the best method of repairing would be to shunt the entire secondary circuit with a small fixed condenser, and also the plate variometer with a condenser of the same size.

results?

and Preserving a Good Name Our attention has been called to many cases in which imitations have Freed-Eisemann Freed-Eisemann

**PROTECTING THE PUBLIC** 

### RECEIVER

The term "Neutrostage" is registered in the U. S. Patent Office as the EXCLU-- SIVE property of the Freed-Eisemann Radio Corporation.

In addition to the patent and trademark rights, the panel design of all Freed-Eisemann apparatus is fully protected.

The practise of parties selling as "Freed-Eisemann Receivers" sets which they have built from Freed-Eisemann parts is prohibited.

Obviously, if anyone purchased cer-tain Packard parts from the Pack-ard Motor Car Co. it would be il-legal to build these parts into a motor car and sell it as a "Pack-ard."

The distinguishing marks by which the public can protect itself against imitations of the genuine "Freed-Eisemann" Receiver are here shown.

\$100.00 Reward will be paid for information furnished to us resulting in the arrest and conviction of any party making fraudulent use of the name FREED-EISEMANN.

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been sold as genuine Freed-Eisemann Receivers-and therefore-the public is cautioned to beware of spurious imitations which are being offered as Freed-Eisemann Receivers. Master Radio Craftsmen, not mere as-

enthusiasts.

The tremendous demand has caused a temporary shortage in the supply and the insistence on the part of prospective purchasers has led to imitations being offered to the public. Every genuine Freed-Eisemann Receiver has the name Freed-Eisemann engraved in white letters

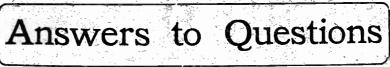
in script on the panel.

Another distinguishing feature is the seal at the lower right hand corner of the panel. Our guarantee is 100% back of every Receiver,

but if the seal is broken the guarantee does not hold. The letters F-E in script are stamped on these seals.



**BROOKLYN, NEW YORK** 



#### Indoor Aerial.

Edw. Nordman-I live in Connecticut and have put up an indoor aerial, but it does not seem to work. Is it possible that an indoor aerial cannot be used in this part of the

Answer-It is more possible that your set is not capable of operating on the small amount of current that is received on an indoor aerial. Aeriola Circuit,

Paul Jackson-I am interested in the set constructed along the line of the Aeriola senior. All hookups given for this tuner differ. Is the one shown in the radio section of Janon the panel be connected to the positive side of the filament?

Answer-The diagram given in the radio section was an efficient one and good results will be obtained from it. Do not shield the panel, Connect he parts in the proper manner. That is, reverse connections to all shaft parts if there is any capacity effect noticed.

#### A. C. on Tubes.

Ralph J. Aveta-What transformers and what tubes should be used to operate a neutrodyne circuit from

Answer-We do not recommend that you attempt to operate any receiving set from the house current, if you intend to try and construct Battery supply is much more satisfactory. Any hard tube will do.

#### R. F. on Honey Comb Set. David Geffer-Please publish a

diagram for using the honeycomb tuner with two stages of radio frequency amplification and two stages of audio frequency amplification. Answer-The diagram for which you have asked is given on this page. The tuning of the unit will be difficult at first, but perserverance will conquer that. Diagram is given in

#### Inverse Duplex Circuit.

Edwin Knaack-Please print a ceiver using UV-201A tubes. Answer-The diagram is given

herewith. Suggest that you experiment with the by-pass condensers for best results. These are very

#### Wants Wave Trap. Wm. D. Gosnell--Can the wave

trap described by Macilvain be bought in any radio store? Answer-It is not possible to buy

#### this particular type of wave trap.

Push Pull Amplifier. F. E. Sanburn-Is it necessary to push pull amplifier? I wish to add a push pull amplifier to my detector without the addition of an external

### troubled with hand capacity. Is there

any way in which this may be eli-

Answer-If you will reverse the connections to the condenser that causes the hand capacity you will probably eliminate the trouble.

#### Experiences Interference.

#### Adding a One Step.

any mileage to the present range of the set, but it will aid in making the signals now received loud enough to understand and enjoy. Suggest the UV-201A tube for loudest signals.

#### Wants a Call Book.

Fred F. Wakerly--Where may one obtain a complete list of the broadcasting stations of the United States? Answer-If you will purchase a call book in a radio store you will find most of the stations listed.

#### One Stage of Radio.

Henry R. Metzger-Please inform me whether I can put one stage of tuned radio frequency amplification uary 13 the best? Should the shield on a single circuit regenerative tuner?

Answer-There is only one way in which this may be done. Do not use a transformer, but put a ten turn coil in the plate circuit of the amplifier and place this coil in close to the primary of the tuner.

#### Superdyne Information.

S. H. Turner-Where may one obtain more information on the super dyne?

Answer-If you send 50 cents to the C. D. Tuska Company at Hartford, Conn., they will send you the latest booklet on this circuit.

#### Grounding a Battery.

A Fan-I have built the three ionevcomb coil tuner as described in the radio section a few weeks ago. the rectifier or the transformer. The set works fine, but I have a few uestions I would like to ask. First, have been told that if the negative side of the filament is grounded the set will work better; is this true?

Answer-Grounding the negative of the filament sometimes improves reception some, but it is all a case of individual operation. You might try if and see if you get any better results.

"C" Battery on WD-12 Tubes. Harold Weyser-Would I gain in

olume or distance by adding one stage of radio frequency amplification to the vario coupler, condenser variometer circuit? Is it preferable diagram for the Inverse Duplex re- to use separate batteries for the amplifler and the detector? Is a "C" battery necessary for WD-12 tube? Answer-One stage of amplification at radio frequency will not give enough volume or increased distance reception to compensate for the additional tuning controls, the added drain on the battery or the extra cost. A "C" battery is not necessary on WD-12 tubes when used as audio amplifiers

#### Burns Out a Fuse. Louis Samber-When I tried to use

the electric light socket on my cryshave a one stage amplifier before a tal set as an aerial I blew out the fuse and since then I have not been able to receive signals. What could have happened?

Answer-When you connected the crystal or the coil. Test each one for a broken section. Try a new crystal and an outside aerial.

#### Facts on the U V 199.

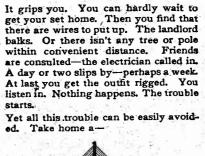
.George E. Pray-I intend building the set described by Harriman in the radio section, and wish to ask some questions about it. What is the correct capacity for the grid condenser? What resistance should the grid leak have? This for a UV-199 tube. What "B" battery voltage should be used.

Answer-The grid condenser should voltage should be varied for best re-Answer-There are only two sults from 221/2 to 45. The filament sary to use three dry cells in series. A 30 ohm rheostat should be used

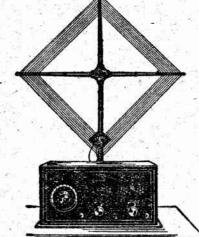
#### Changing the Single Circuit.

Harry Mayerhoff-How is a single circuit tuner changed to a double circuit tuner? Are any extra parts nec essary? Answer-If you buy a variomete

and change the hookup as follows you will have a two circuit tuner Use the secondary of the present coupler as the grid filament coil. Joseph N. Snyder-Will the addi- Place a variable condenser across it tion of a one step amplifier add to and then put the variometer in series the range of my single circuit tuner? with the plate and the phones. The If so, what tube should I use for best primary of the coupler is used to tune the aerial and has no connec-Answer-One stage of audio fre- tion with the other parts of the cir-



When You Get the Radio Fever





HOW TO CHOOSE A RADIO RECEIVING SET

+ 17

-and you can listen in to all the stations you will want to hear before you go to bed tonight.

There are no outdoor wires to put up-no ground connections. You work directly from a loop and to your ear phones or loud speaker. It takes you less than half an hour to hook up and you can hear at once.

What you hear, moreover, is much more worth hearing than any program you will ever bring in through the sets that would take you days to rig.

Volume? Sets with twice as many tubes can't give you more. Clarity and tone? There's nothing to compare with Sleeper Monotrol. Distance? Count the stations you will hear. Compare them with the stations heard by any other set in your vicinity. Ease of tuning? If other sets knocked off a dozen of their knobs they could not tune as easily. And if they added to their knobs they could not give you such a crystal-clear and interferencefree reception.

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THE MOST PERFECT RADIO SET IN AMERICA



<sup>/</sup>orld Radio History





TTELLO, everybody!

selection of our aerial music.

Almost any evening, in one jaunt across the dials of our sets, we can ment.

To most of us it is no longer a question of the mechanics of radio lafternoon services.

The program's the thing! This column will deal with music some of the high lights of harmony which we hope you, too, have heard. WOR announced a postponement. I Every one loves music. And much of the melody which flits so mysteriously out to us is worthy of repethe continuation of the kind of music we like best. What better way could our own enthusiasm to the broad-

The program's the thing! We should feel grateful, too, to the artists whose labors make our listening

As a novel way to determine just what to write about first I decided to ciose my eyes and to tell you about the very first music I turned in by brought to me the wonders of Beethoven's Symphony No. 9.

it was rendered by the New York Symphony Orchestra, conducted by Mr. Walter Damrosch. Station direct from Carnegie Hall.

#### Radio Helps Thousands.

have had the thrills of hearing the New York Symphony Orchestra. Many times that number were eager but unable to do so until radio made it possible. Look for the reappearance of this kind of music. It is a orivilege to hear it.

The Oratorio Society of New York Richard Crooks were the soloists.

short song recitals. Among other again, things she sang "Annie Laurie," emitted and her diction unusually

terfly Etude" as a solo. As I write I am listening to Vincent Lopez and his dance orchestra. This is a regular feature from WEAF. The Lopez orchestrations make symphony of jazz. Generosity in the number of dances played is Symphony Band. notable during this hour of enter-

Dance programs from WGY, Schenectady, are excellent but would be more enjoyable if they did not fade out at intervals.

For those who would trip the light fantastic through the wee sma' hours of morning more distant stations furnish good inspiration. Have succeeded in locating lively orchestras from WTAM, Cleveland, and KYW, Chicago, hearing both in quick suc-

WJY gave every one a real treat last Sunday afternoon, transmitting direct from Carnegie Hall the violin recital of Manuel Quiroga, the most eminent violinist in all of sunny

Has Interesting Experience. Body Capacity Can Be

I heard this recital in Spring Val- Reduced by Proper Wiring

Ex-President Wilson's death put We radio enthusiasts to- our great nation into deep mourning day are able to tune in on. It is most natural that the sad news should have affected the spirits of varied musical offerings. The devel- both entertainers and listeners duropment of broadcasting has given us ing the remainder of Sunday's prothe chance to discriminate in the grams. Some of the broadcasting stations quickly changed their plans and toned down the gayety of their programs to the sadness of the mo

pick up at will vocal or instrumental No music is more completely enrecitals, symphonic concerts, opera thrailing than that of the church. Sunday's programs abound with the splendors of organ and choir incidental to the morning and early

I had looked forward particulrly to the Monday evening appearance of which has been sent forth over the Cocil Aaron, mezzo-soprano and Metether. Each week we shall discuss ropolitan Opera prima donna. It was hence quite disappointing when

trust this great pleasure will not long be deferred to radio audiences Have you heard the Ever Ready Trio? WEAF can justly be proud tition. We all want to encourage of them. You'll appreciate "Puccini-ana," their own medley of the most popular Puccini arias from there be than to follow the radio "La Tosca," "Madame Butterfly" and performances closely and to convey "La Boheme." They seem to specialize in home classics. You will know and enjoy everything they play.

#### The Classic Saxophone.

The dance craze nourished the saxophone, but at the same time kept it too definitely limited to that usage.

Jascha Gurewich, saxaphonist de chance. My first air fortunes in the luxe, plays classical music. He has interest of "Broadcasting Notes" already appeared in recital and can be heard again at Acolian Hall, March 6, according to WEAF's an-This symphony is so well known nouncement. Certainly Gurewich's that it is only necessary to tell you two fifteen minute groups at WEAF were full of novelty and surprise. The famous Orientale was beautifully weird. Kreisler's "Schon Ros WEAF broadcast the whole concert marin," Brahms's Hungarian dance No. 1, and a ballet, a waltz and a tange of his own creation made up Gurewich's diversified proof that the Hundreds of thousands of people sax and the dance floor are not entirely synonymous. Ida Gurewich deserves credit for

her splendid accompaniments. They added just the right touch.

Gurewich has espoused a worthy cause. The tonic beauty of the saxophone is ample foundation for its elevation to higher musical spheres. sang the choral finale, written to His originals are pleasing, but I Schiller's "Ode to Joy.", Ruth Rod- think he should put his saxophonisgers, Mabel Ritch, Fred Patton and the art and abilities above the desire to popularize his own material. None From WOR Anna Hamlin, soprane, the less his offerings were a delight of New York city, gave a series of and I hope he will broadcast soon

Being unable, of course, to listen "Down in the Forest" and "Voices of to all the music sent out, I shall Spring," which three selections I mention each week those programs liked most. Her voice is freely which I believe should be encouraged to repeat. Not having heard them, I am assuming that they were sent paninst. She played Chopin's "But out as scheduled. It seems only right to mention them and to try to tune them in if and when they go

> WSAI, Cincinnati-Musical program by faculty and students of the Cincinnati Conservatory of Music. KDKA, Pittsburgh-Westinghouse

WOR, Newark-Zimbler Trio, Albert Sanders Bureau of Entertainers. WEAF, New York-C. F. Springer American contralto.

WJZ, New York-Mayor Hyland's People's Concert.

#### Use the Proper Rheostat.

Regardless of tube and regardless of the resistance which may be attributed to the rheostat, don't use a rheostat that will cause the tube to flash up to full operating voltage as soon as the contact arm touches the first turn of wire. It is best to use a rheostat that is half way "open" when the tube is operating at the proper operating voltage. G. M. C.

ley, N. Y. A brand new five tube Two variometer-variocoupler sets neutrodyne receiving set was enter- which howl from hand capacity can taining a family group of eight peo- be quieted by making sure that the ple, most of whom had never is- lead from the grid goes to the stator tened in before. The expressions on side of the grid variometer and that the faces in that room bore excellent the plu B battery lead goes to the witness to the enchanting powers of rotor side of the plate variometer. This is the same as the rule applied Every tone seemed perfectly regis- to condensers to connect stationary tered. Mozart's Rondo was voted by plates to grid and rotary plates to those of us present as the most ap- ground. In either case it keeps the shaft at or near ground potential,



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# Daily Broadcasting Programs for Week Ending February 16 All Schedules Eastern Standard Time

WOAN-LAWRENCEBURG-360.

WMAK-LOCKPORT-366.

6KW-TUINUCU, CUBA-332.

KFI-LOS ANGELES 469.

KMO-TACOMA, WASH.-360

M.-News, popular program

KGG-PORTLAND. ORE 368

KZN-SALT LAKE CITY, UTAH-485.

TUESDAY

WEAF-NEW YORK-492.

Town Hall, New York CUY. 150 A. M. - Consolidated market and weath-er reports by U. S. and New York State Departments of Agriculture, and Ameri-

4:45 P. M.- "Abraham Lincoln," a take of Edward S. Beach.
1:00 P. M.-Dave Harman and his orchestra.
7:30 P. M.-United daily sport talk. Talk on "Abraham Lincoln," by Frank McGiynn."
Talk, Weekly Digest, by Mr. H. V. Kalten-born. Frances Kilburn, soprano, accom-panied by Eva Nora Lyons. Bomar Cramer, concert planist. Edgar White Burrill, speaking for National Carbon Company.
9:30 P. M.-National Republican Club ban-quét direct from the Waldorf. Astoria Hotel. Speakers will be President Coolidge. Benator Nathaniel. Elsberg and Schator James W. Wadsworth.

WJZ-NEW YORK-455.

the Women's National Republican Club, rect from the Grand Ballroom of the HG Plaza. Speeches by Hon. Walter F. Bro Hon. H. Ed. Marshall and Senator Frank

3:30 P. M.-Recital by Julita Comin, soprano

accompanied by C. Allen: 3:45 P. M.-Bernard Frank, harmonica. 4:00 P. M.-Harper's Bazaar fashions. 4:15 P. M.-Recital by Julita Comin, so-prano, accompanied by C. Allen.

4:30 P. M.-Richard Douglas, songs with

100 P. M. -Joseph Shernall, hardonica. 15 P. M. -Shirley Hess," "Recitations." 5:30 P. M. -Closing reports of the New York State Department of Farms and Mar-kets; closing quotations of the New York Stock Exchange; foreign exchange quota-

tions. 7:00 P. M.—"Abraham Lincoin," a Uni-versity of the Air talk by William E.

Martin. 15 P. M.-Supper music by Paul Specht and

his Alamac Hotel Orchestra.
8:15 F. M.-American orchestral concert directly ffrom Cooper Union.
9:00 P. M.-Proceedings of the annual Lincoln dinner of the National Republican Club, direct from the Main Ballroom on the Waldorf-Astoria Hotel: speeches by President Calvin Coolidge, Senator Wadsworth and others.

WJY-NEW YORK-455.

7:30 F. M. Buildente tain by Science Page. Company.
Page. Company.
7:40 P. M. - Lincoln program under the auspices of the Abraham Lincoln Picture.
8:40 F. M. - Carlyle Straub, poems.
9:15 P. M. - China, Society dinner. Speeches by Prof. Henry Fairfield Osborn, chairman of the American Museum of Natural History and Roy Chapman Andrews; Gen. J. C. Habing instimater.

WOR-405 METERS-746 KILOCYCLES.

30 P. M. Josephine Boughan, mezzo-con traito, accompanied by Frances Hortense

M.- "The Lawyer Lincoln." Hertz, attorney. I.-Continuation of contralto solos

sey Miller and his orchestra. :30-7:00 P. M.-"Man in the Moon Stories

WOO-PHILADELPHIA-509.

WDAR-PHILADELPHIA-395.

:50 P. M .- Play review by Arnold Abbott

10:15 P."M.-Ted Weems and his Cafe L'Ai

3:30 P. M.-Meyer Davis, Bellevue-Stratfor Hotel Concert Orchestra. 8:00 P. M.-Program by the Haddenfield La dies Choral Society

James Hotel Orchestra. WFI-PHILADELPHIA-395.

10:10 P. M.-Charlie Kerr's Orchestra. WBAP-FORT WORTH-476.

:30 P M .- Concert by the old time band

Midiothian. 30 P. M.-Concert by the Floydada, Texas

WMAK-LOCKPORT-360

WJAR-PROVIDENCE-360.

WSAD-PROVIDENCE-261.

WNAC-BOSTON-278.

WGI-MEDFORD HILLSIDE-360.

WBZ-SPRINGFIELD-337.

KDKA-PITTSBURGH-326.

ADRA-FILISDIAN Last.
6:15 P. M.-Dinner concert.
7:30 P. M.-"Industry and Our Educational Institutions." Dr. William M. Davidson.
7:45 P. M.-The Children's Period.
8:15 P. M.-Special 'Lincoln': program by Alexander Dunbar.
8:30 P. M.-"Abraham Lincoln, the Great American." by L. H. Gardner.
11:30 P. M.-Special Concert by the Queen City Orchestra.

WGY-SCHENECTADY-380.

WDAP-CHICAGO-360.

9:00 P. M.-Organ concerts

M.-Music and Household Hints. M.-Dinner music. M.-Program by Turner Male Choru

'M .- Bedtime story for the kidd

1:00 P. M.-Lincoln's Birthday program

8:00 P. M.-Concert. 9:00 P. M.-Bedtime story. 9:05 P. M.-Arlington time signals

30 P. M.-Musical program continued.

M.-The Republican Club bar from the Waldorf-Astoria -

M.-Musical program. M.-Children's features by "Foster's Lady." Mrs. Bessie Archer Ander

:00 P. M .-- Popular music by Hulshof

4:45 P. M .-- Grand organ and trumpets.

M.-"Music While You Dine." Hai

WIP-PHILADELPHIA-509, M.-Popular program by the Scran

Charlie Kerr and

Hicks in a talk on

Lee, pianist. While You Dine," Hal

G Harbord, toastmast

by Josephine Boughan 3:15 P. M.-Amy Mali

sey Miller and his orc

ton Sirens. 105 P. M.-Dinner music 115 P M.-Program in

York City

8:00 P. M .- Band concert.

Emanuel Hert

:40 P. M.-Frances Lee, planist. 1:50 P. M.-"The Lawyor I.

M.-Etiquette talk by Doubleday

:00 P. M.-Joseph Sherman, harmonica.

:15 P. M .- Luncheon under the ausp

'Einstein's Theory of

Departments of Agriculture, can Agriculturist. 3:30 P. M.—Alumni service at Columbia Uni-versity Chapel, with address by Judga John Bassett Moore and organ recital. 4:45 P. M.—'Abraham Lincoln,'' a talk by Hédward S. Beach.

Baumgardt, direct from

KEFO-COLORADO SPRINGS, COL-

:30 P. M.-Phonograph selections. 0:30 P. M.-Press bulletins.

11:00 P. M .- Music, talks, stories.

10:00 P. M.-Special program.

M.-Evening Herald concert. M.-Examiner concert. M.-Cocoanut Gröve Orchestra.

WDAF-KANSAS CTTY-411.

:00 P. M.-Address, E. O. Moffatt; ad-dress, J. Frank Smith. The children's story and information period. Music.

-News, financial and final man

KYW-CHICAGO-336.

ket and sport summary. 8:10 P. M.-Clyde Doerr and his orchestra. 9:01 P. M.-Program furpished by the Ame ican Farm Eureau Federation. 9:30 P. M.-Musical program.

WRC-WASHINGTON, D. C.-469

Gode. 3:00 P. M.-Stories for children by Peggy

WWJ-DETROFT-517.

WGR BUFFALO-319,

WOAW-OMAHA-528

WMC-MEMPHIS-500

WJAZ-CHICAGO-448.

WHAS-LOUISVILLE-400.

M .- Concert. Dance program.

WSB-ATLANTA-429.

WOS-JEFFERSON CITY-441.

WFAA-DALLAS-476.

WLW-CINCINNATI-309.

KSD-ST, LOUIS-546.

KSD-ST, LOUIS-546.

WHB-KANSAS CITY-411.

WCAE-PITTSBURGH-426.

WDBC-LANCASTER, PA.-258

WQAN-SCRANTON, PA.-286.

WJAX-CLEVELAND-390.

WOAN-LAWRENCEVILLE-366

WQAE-SPRINGFIELD, VT.-275.

WQAM-MIAMI, FLA.-360.

WRR-DALLAS-360,

M.-Kiddies' stories. M.-Mount Royal Hotel concert

8:00 P. M.-Music. CKAC-MONTREAL-430

M.-Vocal numbers.

8:00 P. M .- Special talks and music

9:00 P. M .- Musical ent

15 P. M.-Orchestra.

M.-Lectures

-Dance orchestra

KFEX-MINNEAPOLIS-261.

:30 P. M .- Vocal and instrumental music

WDAG-AMARILLO, TEX.-263.

WIAO-MILWAUKEE. WIS .- 360.

WLAG-MINNEAPOLIS AND ST. PAUL-417

WHAR-JOPLIN, MO .- 283.

WMAY-ST. LOUIS. MO.-280.

WMAQ-CHICAGO-448.

9:30 P. M.-''Lincoln," by Mrs. Eleanor Gridley; the Gettysburg address. 10:15 P. M.-La Salle Hotel Dance Orchestra.

KZN-SALT LAKE CITY, UTAH-485.

KLX-OAKLAND, CAL.-509,

KFAY-MALFORD, ORE.-283.

KPO-SAN FRANCISCO-423,

M .-- Palace Hotel Dance Orche

KFI-LOS ANGELES-469.

:00 P. M.-Cocoanut Grove Orchestra :00 P. M.-Examiner concert. :00 A. M.-Movie program.

30 P. M.-Phonograph selections.

KGG-PORTLAND, ORE.--360

KMO-WACOMA, WASH.-360.

M.-News, popular program. M.-Artists' program.

KHJ-LOS ANGELES-395.

KGO-OAKLAND-312.

WEDNESDAY

WEAF-NEW YORK-492.

1:00 A. M.-Health talk; talk by Columbia University; consolidated market and weather reports by United States and New York State departments of Agriculture and American Agriculture. 2:00 Noon-Chapel services direct from Co-Jumbia University chapel, with address by Chapleic Knox and anthems by the choir.

Jumbia University chapel, with address by Chaplain Knox and anthems by the choir.
1400 P. M.-Michael Harapi, Hawalian guitar
player; Morton Sherdahl, harytone; Mar-guerite Gilbert, soprano; children's hour, stories and songs.
7:00 P. M.-Religious services under the auspices of the United Synagogue. of America; united daily sport talk: Fanny Wilson Palmer, planist; talk; under the auspices of American Agriculturist; talks; Joseph Kulmaver, wiolinst, accompanied

auspices of American Agriculturist; talks Joseph Kulmayer, violinist, accompanie by Meredith Manning; Harold Land, bary

WJZ-NEW YORK-455.

soprano. 3:45 P. M.-Recital by Adaline Cross,

M.—Francisco Sanchez, tenor. 8:00 P. M.—Recital by Adaline Cross, 8:30 P.

with assisting artists.

4:05 P. M.-Harold Dellon's popular pr

soprano. 4:09 P. M.-"Women's Wear."

M .-- Musical program.

M.-Lincoln Day program. M.-Broadcasting Art Hickman's (

10.00 P M -Vocal and instrumental music

100 P. M .- Special radio program.

1:00 P M .- Music talks, stories,

M -Studio program

M.-Educational program. M.-Regular Tuesday eve

hy E. J. Sweet

8:00 P. M.-Orpheus Male Ch

30 P. M.-Music

7:30 P. M.-Concert. 10:30 P. M.-Concert

R:00 P. M.-Music

M.-Dinner concert. M.-Uncle "Kaybee." M.-Address.

M -- Musical program

M.-Aduress.

M -Lincoln Day banquet

P. M.-Inauguration program, Line

-Popular concert.

M.—Musical recital. M.—Popular dance music program.

M .- Special Odd Fellow program.

M. Recital by Mrs. William s, soprano; address, "Weeds I icine," O. S. Ledman.

with an address or

M .- Musical program.

M .--- The Frolic.

M.--Dinner music. M.-Broadcasting of all daily

M.-Seventeenth United States

M .- Lecture by Dr. S. Parkes Cad-

0:00 ]

6:30 P.

8:30 P. M.-Con

M.-Philharmonic Quartet

5:15 P. M.-Instruction in Interna

story and information period

:30 P.

8:00 P. M.-Popular music by Hulshoff

8:36 P. M.-Music.

10:30 P. M.-Music

12:15 A

10:30 P.

#### TO-DAY

WEAF-NEW YORK-492. 2:45 P. M.-Interdenominational services un-der auspices of the New York Federation of Churches; Mr. William B. Millar, gener-

der zuspices of the New Action Policy Services of Churches; Mr. William B. Millar, gener-al secretary, will preside over the meeting; address by Dr. J. Percival Huget, pastor of the Tompkins Avenue Congregational Church, Brookyn, N. Y. Violincello solo by Stephen Somogyi-"Dedication (Popper); "Onward, Christian Soldiers" (Sullivan); "The Son of God Goes Forth to Wai" (Outler), by the Federation Radio Choir, Scripture, "I Need Thee Every Hour" (Lowry), by the Federation Choir, Prayer, "Christ in Fianders" (Stephens), by Arthur Billings Hunt, Barytone, Address by Dr. J. Perci-val Huget, pastor of the Tompkins Avenue Congregational Church, Brooklyn, N. X.; subject, "The First American." Take the Name of Jesus With You" (Doane), by the Federation Radio Choir. Benediction. "Am I a Soldier?" (Arne), by the Federation Radio Choir.

Radio Choir. 3:45 P. M.-Regular. Sunday Men's Confer-ence in the Beddord Branch Young Men's Christian Association, Brooklyn; Mr. Hal-sey Hamond, branch scretary, will preside over the meeting. Address by Dr. S. Parkes Cadman. Music by Gloria Trump-

PERFECT CAUMARY MUSIC by SHORE TRANSF eters. 7:20 P. M. —Special musical program direct from the Capitol Theater, New York city, by courteey of the Capitol Theater, man-agement and Mr. S. L. Rothafel (Roxy). The first part of the program will be taken direct from the stage of the Capitol Thea-ter and will consist of music by Grand Or-chestra and selections by the featured ar-tists. The second part of the program will consist of a special presentation by Mr. Rothafei of Capitol Theater vocal and in-strumental artists direct from the broad-Casting studio in the theater. casting studio in the theater.

WJZ-NEW YORK-455.

11:60 A. M.-Church service direct from St Thomas's Episcopal Church; sermon by Rev. Dr. E. A. Stires. [309 P. M.-"Bubble Book Stories" by Raph Rev. Dr. :00 P. M.ble Book Stories" by Ralph M.-Recital by Rose Gabriel Tobib, planist. S:00 P. M .- "The Annalist's Talk for Busi-

ness Men." 8.15 P. M.-Sunday evening concert by the Hotel Commodore Orchestra, under the per-sonal direction of Bernhard Levitow, direct from the Hotel Commodore. 10:00 P. M.-Lois Miller, soprano, accompa-nied by Mme. Clara M. Davies.

WJY-NEW YORK-455. 1:30 P. M.-Radio Bible Class; Bible address and musical program. 3:30 P. M.-Jewel Farrington, soprano. 4:00 P. M.-Max Schwartzman, tenor. 10 P. M.-Max Schwartzman, tenor.

1:0 P. M.-Max Schwartzman, tenor. 8:45 P. M.-Sunday evening concert by the Waldorf-Astoria Symphonic Orchestra, Jo-seph Knecht director, directly from the Waldorf-Astoria Hotel. 10:00 P. M.-Recital by James R. Cooley, WHN-NEW YORK-360

3:00-5:00-Christian Endeavor program. 3:00-5:15 P. M.-John D. Flynn of the Na-tional Security League in talk. 5:15-6:00 P. M.-Tempo Club Orchestra. 9:45-11:00 P. M.-Operatic program. 11:00-12:00 P. M.-Dance selections.

WQAO-NEW YORK-360. 10:30 A. M.-Church service from the Cal-vary Baptist Church. 7:45 P. M.-Chapel service. WIP-PHILADELPHIA-589.

WIX-PHILADELPHIA-589. 11-00 A. M.-Morning service from Holy Trinity Church, Rittenbouse square. 4:00 P. M.-Direct broadcast from the Ger-mantown Theater of a meeting being held under the auspices of the Germantown Y. M. C. A. WFI-PHILADELPHIA-395.

10:30 A. M. Services of the Arch Street Presbyterian Church; sermon, "The Pres-ent Crisis in the Church," by Rev. Clarence Edward Macartney, D. D: 4:30 P. M. Chapel services conducted by. ard Macartney, D. D. P. M.-Chapel services conducted by Chauncey C. Day, pastor of St. Luke's hodist Protestant Church, assisted by Methodist Protestant the octette of the chur

WDAR-PHILADELPHIA-395, .-Sunday afternoon musical program Arcadia Concert Orchestra M.-Special National Scout program WRW-TARRYTOWN-273.

8:00 P. M .- Second Reformed Church 'se WSAD-PROVIDENCE-261. 2:00 P. M.-Concert by the Rathskeller Trio.

WNAC-BOSTON-278. . M.-Entire-service, Cathedral Church of St. Paul. 2:00 P. M.-Concert program, arranged by 9:55 F. M.-Time signals and weather fore

Charles Sharp 6:45 P. M.-Service. 8:30 P. M.-Copley Plaza Cor

WGI-MEDFORD 4:00 P. M.-"Adventure Hour," Musicale. \$:30 P. M.-"World Unity," Musicale.

WBZ-SPRINGFIELD-334. \$:45 P. M.-Sunday vespers on the Spring: field Municipal Chimes.
\$30 P. M.-Church services conducted by Warren B. Grant.

KDKA-PITTSBURGH-326.

8:30 P. M.-Dinner concert. 7:45 P. M.-Services of the First Baptis WGY-SCHENECTADY-389.

8:30 P. M.-Program by WGY Symphon J:45 P. M.-Service of the Madison Aven

WDAP-CHICAGO-360.

5:00 P. M.-Organ concerts. KYW-CHICAGO-536.

7:30 P. M.-Excerpts from the New Testa-ment-an American translation by Prof. E. J. Goodspeed, read by William Ziegler Nourse. 8:00 P. M.-Chicago, Sunday Evening Club

WCAP-WASHINGTON, D. C.-469 7:20 P. M.-Capitol Theater program. 9:00 P. M.-Skinner organ company recital

WWJ-DETROIT-517. M.-St. Paul's Episcopal Cathedral M.-The Detroit News Orchestra

WOC-DAVENPORT-484. M.-Organ recital.

M.—Church servio M.—Musical prog WOAW-OMAHA-526.

M.-Bible Study Hour. M.-Musical Chapel Service.

WHAS-LOUISVILLE-400. 3:00 P. M.-Concert: WOS-JEFFERSON CITY, MO.-441.

\$:30 P. M.-First Presbyterian Church WFAA-DALLAS-476.

7:00 P. M.-Bible Class. 10:00 P. M.-Address, "Christianity, a World 11.00 P. M.-Popular dance music program. WI.W-CINCINNATI-309.

\$:45 P. M.-Services of the Church of the Covenant, Dr. Frank Stevenson minister. WCX-DETROIT-517. 4:00 P. M .- Chapel service

WHE-KANSAS CITY-411. 3:00 P. M.-Sunday afternoon musical con-cert by the Sweeney Radio Orchestra. 3:15 P. M.-Services by the Tabernacle Eap-thet Church.

7:30 P. M.-Services. CKAC-MONTREAL-430. :30 P. M.-Violin, 'cello, vocal selection WCAE-PITTSBURGH, PA.-426. 30 P. M.-Dinner concert M .- Organ recital.

WGAW-AI.TOONA, PA.-261.

WOAM-MIAMI-360. M .- Church music 10:00 F

WMAY-ST. LOUIS, MO.-280 M.-Church s WLAG-ST. PAUL-417

M.-Church service WMAY-ST. LOUIS-280.

M.-Church program. 9:00 KFDZ-MINNEAPOLIS-231. eion P. M -- Pine organ.

WTAW-COLLEGE STATIONS, TEX.-28 4:00 P. M.-Band concert

WRR-DALLAS-360. WCAL-ST. OLAF COLLEGE-360.

9:30 P. M.-Music. KGG-PORTLAND, ORE.-360. 12:00 P. M .- New phonograph re KFI-LOS ANGELES-469.

M.-Embassador Hotel concer -Examiner concert. -Theron Bennett's Packard Six

KHI-LOS ANGELES-395. 10:30 A. M.-Organ recital, Arthur Blak

6KW-TUINUCU, CUBA-332. 10:30 P. M .- Municipal program.

MONDAY

WEAF-NEW YORK-492

M.-Kittle Storms, contralto, acc by Winifred T. Barr. M.-Gertrude Bonime, planist. -Gertrude Bonime, planist.

4:30 P. M.-Kittie Storms, contraito. 4:45 P. M.-Gertrude Bonime, planist. 5:00 P. M.-Frogram for Jewish Mothers," under the auspices of the Women's League of the United Synagogue of America. Pro-gram: Hebrew song, "Hagidi Li Sa' Moch" (Ideison), by Morris Nathanson. Address by Prof. Patity Hill of Columbia University, "Importance of Childhood," "I Sing Thee Songs of Araby" (Clay), by Morris Na-thanson.

thanson. (Ciay), by Morris Na-7 F. M.-"Personality Chat" between Brooke Johns and Nanette Kutner. "13 P. M.-"Recornized hns and Nanette Kutner. P. M.—"Recognized Authority on the e of Light in Medical Treatment," by Edgar Mayer. P. M.—United Daily Sport Talk. P. M.—Ruth Chase, soprano, accompa-P. M.—Ruth Chase, soprano, "Mu-

(40 P. M.-RUIN Chasse, sopraid, accompany mied by Dorothy Longacre, Program: 'Mu-etta's Valse Song'' from 'La Boheme' (Puccini); 'A Spirit Flower'' (Campbell-Tipton); 'SI Vous l'Aviez Compris'' (Denza); 'Love's In My Heart'' (Wood-any)

1130). 750 P. M.- "Duty to Daughters," by J. Frank Birdsell. 100 P. M.- "Summary of the course.

Frank Birdsell. 3.00 P. M.- "Summary of the course. Browning's true value. How the methods of investigation used in this course may be applied to the study of posity in general," the tenth and last of a series of lectures on "Robert Browning" by Hoxie Neale Deterbud Fairchild. 1:20 P. M.-Ruth Chase, soprano. Program: "Vissi d'Arte," from "La Tosca" (Pucci-ni); "Thank God for a Garden" (Del. Rego): "The Answer" (Terry). 1:40 P. M.- "What You Should Know About P. M.-. What You Frond Albour Loost these," by Lawrence S. Mayers. P. M.-Faculty concert. Program: ing trio, "Divertisemento?" (Mozart); mnet Petrarka" (Liot); "Rigoletto"

fantasie Iantzsie (Liot).
9:30 P. M.-Taik in connection with "Anniversary Week". of Boy Scouts of America, by Dr. John H. Finley.
9:40 P. M.-Faculty concert, continued.

WJZ-NEW YORK-455. WJZ-NEW YORK-455. 3:30 P. M. Second Children's Concert by the American Orchestral Society, composed of picked members of the New York Philhar-monic Orchestra, direct from Aeolian Hall, 5:30 P. M.-Closing reports of the New York State Department of Farms and Markets; closing quotations of the New York, Stock Exchange; foreign exchange quotations; National Industrial Conference Heard re-ports.

00 P. M.- "The Story Book Lady" will m.—"The Story Book Lady" will a Bedtime Story.
 M.—Fairchild Chapel Quartet.
 M.—Fairchild Chapel Quartet.
 M.—Fairchild Chapel Quartet.
 M.—Fairchild Chapel Quartet.
 M.—Firchild Chapel Quartet.
 M.—Fired And Stream Sport.talk.
 M.—Gotham National Bank Quartet rt.

station NAA at Arlington. cert: Orchestra: 10:00 P. M.-Dinner of the Grand Street Boys n. direct fi of the Hote ernor Al Smith, Senator James A. W Theodore Roosevelt and Senator R.

#### WHN-NEW YORK-360.

land.

:15 P. M.-Musical program. :30-8:00 P. M.-Sam Lannin's Roselan Dance Orchestra. 8:45-8:55 P. M.-Dorothy Wallace Portingall, 8:20 saxophone and vocal solos. 25-10:00 P. M.—"Broadway Melodies," playing dance music. 0:15-10:45 P. M.-"Original Ideal Novelty. Five," Eddie Di Lalla, leader. 1:30-11:45 P. M.-Richard Douglas, tenor.

WOR-NEWARK-465 2:30 P. M. M.-Joseph Lord, tenor. M.-Muriel E. Williams, M.-Talk and song recit:

Storf. M. Joseph Lord, tenor.
3:30 P. M. Joseph Lord, tenor.
3:45 P. M. Williams, planist.
6:15 P. M. Williams, williams, planist.
6:15 P. M. Williams, williams, planist.
6:16 P. M. Williams, williams, planist.
8:00 P. M. Williams, planist.
9:00 P. M. Willia 8:15 P. M.-Arthur Gordon Huson, baryto

8:15 P. M.—Arthur Gordon Hüson, barytone, concert artist and recitalist, accompanied by James R. Fhilipson.
8:30 P. M.—'Jolly Bill Steinke" in his week; ly lesson on "Radio Cartooning."
8:45 P. M.—Arthur Gordon Huson, barytone, acompanied by James R. Philipson.
9:00 P. M.—Senator Frank W. Willis, speak-ing on "Lincoln."
9:30 P. M.—Mme. Josephine Schaeffer Bet-tingti, soorano. tinetti, soprano. 145 P. M.-Alice Durell Stueck of the Na. 151 tional Society. United States Daughters of 1812, speaking on 'The Significance of Out

1512, speaking on 'The Significance of Our National Banner.'' 10:00 P. M.-Concert by Marks's War Vet-erans' Band of New York, under direction of Lieut. E. P. Resseguie, assisted by Helen Watson Huking, soprano. WOO-PHILADELPHIA-509

M.—Dinner music. M.—J. W. C. I. Band. M.—Fox Theater Grand Orchestra. M.—Grand organ recital.

WFI-PHILADELPHIA-395. 1:30 P. M.-Meyer Davis concert orchestra. 1:00 P. M.-The Hon. W. Freeland Kendrick Mayor of Philadelphia, will address mem-bers of the Strawbridge & Clothier Relie:

WDAR-PHILADELPHIA-395. 9:00 P. M.-Artist recital. 10:10 P. M.-Howard Lanin's Dance

WIP-PHILADELPHIA-509. 3:00 P. M.-Recital by the Haydn String. Quariet. 4:00 P. M.-"The Perfect Tribute," a reading by Mary Edith Lessig in honor of Lin-coln's birthday.

WBAP-FORT WORTH-476 M.-Concert, Guy Pitner, planist? M.-Concert by the Texas Woman's WIAR-PROVIDENCE-360 8:00 P. M.-The annual meeting and dinn of the Brown Club of Providence. WRW\_TARRYTOWN-273.

7:35 P. M.-Children's stories 8:15 P. M.-Late news flashes 8:45 P. M.-Dance music by 10:15 P. M.-Dance music.

WNAC-BOSTON-278 M.-W. N. A. C. dinner dance WGI-MEDFORD HILLSIDE, MASS .-- 360. 6:00 P. M.-"Just Boy." 6:15 P. M.-Code lesson

WR7\_SPRINGFIELD-337.

6:00 P. M.-Dinner concert. 7:00 P. M.-This week in history: 7:30 P. M.-Bedtime story for the kiddles. 8:00 P. M.-Concert by the WBZ Trio and Werner Josten, pianist; Margaret Farnam

soprane. 9:90 P. M. Bedtime story for grown-ups by Orison S. Marden. KDKA-PITTSBURGH-328.

7:30 P. M.-Radio Girl Scout meeting, con-ductéd by Laura Hölland. 3:15 P. M.- Activities of the Public Department," Mrs. Charles Hutchison, represent-ing the Congress of Women's Clubs. 8:30 P. M.-Concert by the KDKA Little Symphony Orchestra, Victor Saudek, di-rector; assisted by Chester Humphreys, tenor; Ernest C. Schultz, barytone. :55 P. M.-Arlington time signals, weather forecast.

WGY-SCHENECTADY-380, M.-Music and address, "The Stor Valentine," Mrs. Katherine V. Steer WHAZ-TROY-380.

M .- Musical program. KYW-CHICAGO-536.

30 A. M.-Late news and comment of the financial and commercial markets. 1:35 A. M. Table talk by Mrs. Anna J. Peterson, :30 P. M.-News, financial and final marke

and sport summary. WRC-WASHINGTON, D. C.-469. 3:15 P. M.—Beatrice Wainwright, soprano. 8:30 P. M.—"Abraham Lincoln," by the Ho

8:45 P. M.-Piano recital 9:00 P. M.-The Political Situati

Washington." 9:15 P. M.-Concert by Trio. 0:00 P. M.-Song recital 0:15 P. M.-Dance prog

WGR-BUFFALO-319. M.-Dinner music. M.-Digest of the day's news M.-Discourse on "The C a.-Discourse on "The (onitor Peace\_Plan." -Musical program, -Supper music. Chri

1:00 I WWJ-DETROIT-517

M .- The Detroit News Orchestra WOC-DAVENPORT-484.

M.-Sandman's visit. M.-Educational lecture

ing Lincoln in Chicago 9:00 P. M.-9:00 P. M.-Musical program. 1:00 A. M.-The P. S. C. Orchestra. WOAW-OMAHA-528.

L-Dinner program, M.-Progra

WMC-MEMPHIS-500. M.-Gayoso Hotel Orchestra WSB-ATLANTA, GA.-429.

1.—Popular concert. M.—Transcontinental Enterta WCBD-710N, ILL,--345.

:00 P. M.-Concert. WOS-JRFFERSON CITY, MO.-440. 9:00 P. M.-Music, lectures, addresses. WFAA-DALLAS-176.

:30 P. M .- Musical recital WEW-CINCINNATI-309.

10 P. M .-- Concert arranged by Miss Minni Tracey. 10:00 P. M.—Theatrical Review, followed by the Reger Hill Dance Orchestra. KSD-ST. LOUIS-540.

30 P. M .- Vocal and instrumental specia WDAF-KANSAS CITY-411. P. M.-Address from the University insas; the Children's story and Infor

tion period; music. 9:00 P. M.—Popular program 12:45 A. M.—Novelty Dance Orchestra; pipe

organ WHB-KANSAS CITY-411. sical and Popular Music. 900 P. M.-Educational program especially for the younger folks, given by Miss Lenore M -Ladies' Hour Program

WPAB-STATE COLLEGE, PA.-283. 00 P. M.-Student Dance Orchestra 20 P. M.-Agricultural talks. M.-Agricultural talks. M.-State Student Orchestra program

WDBC-LANCASTER, PA.-258.

WCAE-PITTSBURGH-4%.

WABL-STORRS, CONN.-283.

WCAO-BALTIMORE-360.

WQAE-SPRINGFIELD, VT.-275.

WHAZ-TROY-380.

9:00 P. M. Scotch concert, Troy Burns Club. Address by representative of New York State Conservation commission. Midnight program of popular music by the Campus Serenaders and Rensselaer Polytechnic, In-stitute Students' Glee Club.

WPAK-FARGO, N. D.-360.

WJAM-CEDAR RAPIDS, IA.-268.

WIAO-MILWAUKEE, WIS.-369.

WOAG-NEW ORLEANS, LA .- 268.

WQAM-MIAMI, FLA.-360.

WRR-DALLAS-360.

KPO-SAN FRANCISCO-123.

:00 P. M.-Organ recital.

0:30 P. M .- Lincoln's Birthday program.

KFAE-PULLMAN, WASH.-330.

WPAH-WAUPACA, WIS .-- 360

KOB-STATE COLLEGE, N. M.-485,

7:30 P. M.-Concerts, lectures and informa

:00 P. M.-St. Charles Hotel Orchestra.

P. M.-Educational addresses.

:00 P. M -Special talks and musi

:30 P. M.-Arthur Pryor's Band.

WSAC-CLEMSON COLLEGE, S.

:00 P. M .- Educational addr

9:00 P. M.-Special program.

O P M --- Regular - program

:00 P. M.-Music

M .- "In the Air with Henry

M.-Dinner concert. M.-Uncle Kaybes. M.-Dancing lesson. M.-Musical program.

M,-Market reports.

7:30 P. M.-Music.

00 P. M.-Concert.

30 P. M. Concert.

Friedman Entertainers. 30 P. M.-- "Man in the Moon Stories for the 1:45 P. M.-Foreign Policy Association luncheon direct from Hotel Astor, New

leader:

children, :00-7:30 P. M.-"'Music While You Dine" by Ben Friedman Evitertainers, augmented by George Perry's Singing Orchestra.

WOO-PHILADELPHIA-509.

WDAR-PHILADELPHIA-395.

30 P. M .-- Program of dance music, by 1

WIP-PHILADELPHIA-509.

WJAR-PROVIDENCE-509.

WBAP-FORT WORTH-476.

WRW-TARRYTOWN-273.

9:05 P. M.-Victor Wilbur in request popu

3.10 F. M. -WKW TTIO.
9.30 P. M. -Boy Scout Activities.
9.45 P. M. -Flute solos by Norman Hastings.
10:00 P. M. -Victor Wilbur in popular songs.

WSAD-PROVIDENCE-261.

6:30 P. M.-Musical program continued,

6:30 P. M.-WNAC dinner dance. 8:00 P. M.-Concert program. To be nounced by radiophone.

WNAC-BOSTON-278.

WGI-MEDFORD HILLSIDE-360.

30 P. M.-Verses; health talk; musicale. 15 P. M.-Boy Scout oath.

WBZ-SPRINGFIELD-337.

KDKA-PITTSBURGH-326.

WGY-SCHENECTADY-380.

WDAP-CHICAGO-369.

KYW-CHICAGO-536.

WRC-WASHINGTON, D. C .- 469

WGR-BUFFALO-319.

WWJ-DETROIT-517.

WOC-DAVENPORT-484.

WOAW-OMAHA-526.

WMC-MEMPHIS-500.

WJAZ-CHICAGO-448.

WHAS-LOUISVILLE-400.

WSB-ATLANTA-429.

WOS-JEFFERSON CITY-441.

WFAA-DALLAS-476,

KSD-ST. LOUIS-546.

00 P. M .- The children's story and

WHB-KANSAS CITY-411.

KZN-SALT LAKE CITY-485.

CKAC-MONTREAL-425.

WMAQ-CHICAGO-448.

KHJ-LOS ANGELES-395.

Thompson, soprano. ;00 A. M.-Broadcasting Art Hickman

HTS OAKLAND-360.

WRR-DALLAS-360.

KFI-LOS ANGELES 469

M.-Evening Herald concert. M.-Examiner concert.

P. M.-Examiner concert. M.-Examiner concert. M.-Vocal and instrumental c. M.-Coceanut Grove Orchestra.

KFAY-MEDFORD, ORE,-283.

WPAB-STATE COLLEGE, PA.-283

KEX-OAKLAND-509.

M.—Studio program, WHK—CLEVELAND—360.

KMO-TACOMA-360.

WOAN-SCRANTON-280

WLAG-MINN, AND ST. PAUL-417.

REGC-BATON ROUGE. LA.-254

9:00 P. M .- Debate. L. S. U. Band.

A.-Popular program.

M.-Concert and dance music

00 P. M.-Musical program. 15 P. M.-Educational falks.

(0:00 E

:00 P. M.-Concert

1:30 P. M.-Lecture. 0:30 P. M.-Concerts

M.-Musical entertainment

P. M .- Program arranged by Floryane

M .-- Weather, news, stock repor M .-- Mount Royal Hotel Dance

-"Wide Awake" Club program

1.-Music memory contest. I.-La Salle Hotel Dance Orchestra

rvatory of Music

Homes'; talks from

and the last talk

WANSAS CITY-411.

9:00 P. M .- Concert by Civic Orchestra.

m P. M .- Piano solos and songs

M P M -- Music, talk, stories.

8:30 P. M. Concert given by students Louisville Conservatory of Music.

1 :00 P. M.-Musical program

9:00 P. M.-Popular music. 11:45 P. M.-Transcontinental

M.-Concert

formation period; music. 100 P. M.—Classical program. 12:45 A. M.—Novelty singing of

nartment of Agriculture

M.-Music

9:30-Musical variet

-Dinner program. -Independent Order B'nai B'rith

-Miss Gladys Sarber. --Burl Grant's entertainers

M.-Sandman's visit. M.-Sunday school lesson. M.-Musical program.

30 P. M.-Dinner music. 30 P. M.-Digest of the day's news.

8:30 P. M .- The Detroit News Orch

-A talk on the Coast Guard.

M.-Piano recital. M.-A talk on the navy by Admiral

Eberle. M,-Concert by the United States

M.-Dinner concert, M.-Midnight revue

M .- Song recital

M.-Dinner concert. M.-Bedtime story for the kiddles thook review by H. A. MacDonald

-Organ recital. -Radio Boy Scout meeting.

WSAD-FROM M.-Musical program. M.-Children's features by "Foster's M.-Children's features by Archer Ander-

115 P. M.-WRW Trio

6:00 P. 6:13 P. Story

story

11:00 P. M

Navy Band.

8:45 F

WGY Player

1:00 P. M.-Organ concerts

Band. M.-Concert of novelty nature.

WFI-PHILADELPHIA-509.

M.—Ted Gibbs, tenor soloist. M.—All American Legion night

9:10 P. M.-Howard Lanin's Dance Or-

-Artist recital -Dinner music by the Jordan nee Orchestra.

contralto, accom+ Recital by George

SATURDAY

WEAE-NEW YORK-492.

York city. :00 P. M.-Dance program by the Caro-

Inians Orchestra; Helen Albus, soprano.
 30 P. M.-W. C. Fields, comedian monolog-ist; David Franklin, planist, and Tom Butler, barytone; "The Chiclet Trio," Myra.

Buller, barytone: "The Chiclet Trio," Myra Burtis Bindenberger, contraito, accom-panied by George Vause. Recital by George Vause, planist; Bernard Ahrens, barytone, Vincent Lopez and his orchestra, direct from the Grill of the Hotel Pennsylvania.

WJZ-NEW YORK-455.

leader; direct from the balcony of the 1-Room of the Hotel-Belmont. :00 P. M.-Famous Fain Orchestra. :30 P. M.-Closing reports of the New Yor State Department of Farms and Markets farm and home reports: closing guidation of the New York Stock Exchange, foreign

eport. 00 P. M.- Uncle Wiggily Stories," by

Howard Garis, 8:00°P. M.-"The Asset Value of the Ocean Liner to a Port," by Emerson E. Parvin, 8:40 P. M.-Dr. Alfred N. Goldsmith, dj-rector of Research of the Radio Corpora-tion of America; "Applying the Golden Rule in Radio"; one of the "Highlights of, Modern Radio Broadcasting" series of talks

talks. 15 P. M.-"In a' Persian Garden" (quat-

tet), accompanied by Creighton Allen, 9:45 P. M.-Harold Lieberman, violinist, ac companied by C. Allen, 9:55 P. M.-Time signals and weather fore-cast retransmitted from the Government.

55 P. M.—Interstants and weather fore cast retransmitted from the Governmen station NAA at Arlington. :00 P. M.—Harold Lieberman, violinist

coompanied by C. Allen. 20 P. M.—"English Folk Songs," Kenneth

K. Wheeler. 6:45 P. M.-Recital by Alphonse Bohrer, planist, directly from Acolian Hall.

WOR-NEWARK-405.

2:30 P. M.-Froadcasting from Radio Ex-position, L. Bamberger & Co. 2:30 P. M.-Frank Dailey's Meadowbrock

Zi G F. M. Erank Dalley's Argadovorous.
 Dance Orchestra.
 Si D P. M. Baroness Leja: de Torinoff in a short talk on "The Russian Revolution" from a Woman's Viewpoint." Talk to be followed by a group of Russian folk songs.
 P. M. Frank Dalley's Meadbwbrock.

5.30 P. M.-Frank Dalley's Meadbworook, Dance Orchestra,
8:15 P. M.-"'Music While You Dine." Paul. Van Loan and Itis Cinderella Dance Or-chestra of New York, Fred J. Bendel hy his weekly talk on "Sporting News-Up-to-the-Minute."
8:00 P. M.-Gene Ingraham and his Bell. Becom Orchestra of News Sporting News-Up-to-

9:00 P. M.-Second talk on the Law and

Income Tax by John Armstrong. 9:15 P. M J. Bernard Walker speaking on

"What America Owes Europe." 9:45 P. M.-Joint program by Miss Mary

WOO-PHILADELPHIA-505.

WDAR-PHILADELPHIA-395.

4:30 P. M.-Bobbie Lee and his Cotton

1:30 P. M .- Dream Daddy with the boys and

WSAD-PROVIDENCE-261.

WFI-PHILADELPHIA-509. 6:30 P. M.-Bellevue-Stratford Hotel Concert

WIP-PHILADELPHIA-508

Village Serenaders 10:15 P. M.-Ted Weems and his Cafe L'Alg.

WJAR-PROVIDENCE-509.

WBAP-FORT WORTH-476. M. - Interdenominational 8:00 P. M. Interdenominational school lesson and radio Bible cla

WNAC-BOSTON-278.

6:30 P. M.-WNAC dinner dance. 8:00 P. M.-Program to be announced by

WGI-MEDFORD HILLSIDE-360.

7:30 P. M.-Ballroom dancing lesson; must

WBZ-SPRINGFIELD-377.

7:00 P. M.-Dinner concert. 8:00 P. M.-Concert by Harry Knight, same

KDKA-PITTSBURGH-326

for Small Incomes," Robert D. Ayars. 8:30 P. M.-Concert by the Westinghouse

WGY-SCHENECTADY-380.

9:30 P. M.-Dance music, by Jack Symonds'

WDAP-CHICAGO-360.

WRC-WASHINGTON, D. C.-469.

WGR-BUFFALO-319

WOC-DAVENPORT-484

Educational lecture

-Orchestra program

WJAZ-CHICAGO-448

WHAS-LOUISVILLE-400

WSB-ATLANTA-129.

WTAM-CLEVELAND-396.

:00 P. M .- Recital by Southern Methods

KSD-ST, LOUIS-546.

0:00 P. M .- Orchestra concert, organ rece cital, vocal and instrumental specialties,

WDAF-KANSAS CITY-411.

:00 P. M.-Address, Edgar A. Linton, write and lecturer; the children's story and to formation period; music, 2:45 A; M.-Novely Singing Orchestra.

WOAE-SPRINGFIELD, VT.-275.

WGAW-ALTOONA, PA.-261.

WCAE-PITTSBURGH-426.

M.-Dinner concert. M.-Uncle "Kaybee."

M --- Musical program

M.-Dance music. WFAA-DALLAS-476

1:00 P. M .- Musical program, by Origin

WMC-MEMPHIS-500

M.-Old Time selections.

4.-Sandman's Visit.

:00 P. M .- Stories for Children, by Perry

.00, P. M.-Dinner concert. :00, P. M.-Musical-program. 1 P. M.-Midnight revue.

3:30 P. M .- Dinner music

8:30 P. M .- Classical concert.

:00 P. M.-Music. 1:45 P. M.-Late entertainment

2:00 M .- Dance music program

30 P. M.-Concert.

:00 P. M .- Program.

1:00 P. M.-Concert. 1:00 P. M.-Late program.

M.—Organ concert; popular musica KYW—CHICAGO—536.

M.-Dinner concert. M.-Peature. M.-'Personal Income Tax Returns

Sinday

Orchestra. 10:10 P. M.-Charlie Kerr's Orchestra.

3:00 P. M.-Paut Whiteman Orchestra 6:05 P. M.-Dinner music by the Gre

-Nagel's Provide

9:00 P. M.-Dance music

phone and clarine

Dell Dowman, soprano; Lorraino man, violinist; International Trio,

4:45 P. M.-Grand organ and trumpets.

girls

1:05 P. A

cale.

6:00 P. M.-Dance

M.-Tea concert by the Hotel Stringed Ensemble, Harry Ler ; direct from the balcony of the

:00 P. M.-Charles Phillips, planist. .30 P. M.-Charles Phillips, planist.

### WGAW-ALTOONA, PA.--261. M-Musical program by the Con Musical Clubs of Lafayette Colle 0.00 P. M.-Program Eastern Pennsylvania. P. M.- 'Music While You Dine,'' Ben

modore orchestra, under the personal rection of Bernhard Levitow, direct fro rection of Bernhard Leviuw, the Hotel Commodore. :30 P. M.-Closing reports of the New York :30 and Department of Farms and Markets; State Department of Farms and Markets; Closing quotations

State Department of reports; closing quotations of the New York Stock Exchange; foreign exchange quotations; steel and iron report. '30 P. M.-"Under the Coccanut Tree," a shadowland story, by Florence Smith Vin-Sent. 7:35 P. M.-Dance program by Irving Selzer and his Cafe Boulevard Orchestra. 7:45 P. M.-"The Progress of the World." a "Review of Reviews" talk. 9:00 P. M.-Dance program by Irving Selzer and his Cafe Boulevard Orchestra. nis Cafe Boulevard Orchestra. P. M.-A. city officials series talk by Frank J. Monaghan. Committee talk by b) F. H. A. Life of the set of the beam of the begartment of Health.
8:45 P. M. -Recital by Irving Oblo, tenor, accompanied by Mrs. Oblo.
9:00 P. M. -Withing Gelating for Health and Pleasure, by Anne Lewis Pierce.

M.-U. S. army night. M.-T. S. Rowe, director general the Pan-American Union. 0:45 P. M.-Recital by Jean Smith, planist. WHN-NEW YORK-360 30 to 5:00 P. M. Popular songs. 30 to 12:00 Mid. Popular concer WOR-NEWARK-405.

M.-Musical program. M.-Concert. M.-Musical program. M.-Dance music. WAAM-NEWARK-263. :00 to 10:30 P. M .- Popular concer-WOO-PHILADELPHIA-509.

M.-Dinner music. M.-Tom Daly, poet. M.-Orchestra. M.-Grand organ recital. WDAR-PHILADELPHIA-395. M.-Recital from studio. M.-Talk by Mr. Samuel Lacier;

chestra, Victor H. Clark, director. 10.10 P. M. Howard Lanin's Dance On WBAP-FORT WORTH-476. 30 P. M. Concert by B. U. Taylor,

0:30 P. M.-Concert by George Freeman's WFI-PHILADELPHIA-395. 30 P. M .- Meyer, Davis, Bellevue-Stratfor WIP-PHILADELPHIA-509.

-Dinner mus

WRW-TARRYTOWN-273. :05 P. M .- Warren Minnerly, popular selections. 9:45 P. M.-Richard W. Douglas. 10:00 P. M.-Warren Minnerly, 1 nianist WEDNESDAY, FEBRUARY 13.

WNAC-BOSTON-278. M.-WNAC dinner dance. M.-Harvard Glee Club Quartet an WGI-MEDFORD HILLSIDE, MASS.-360.

M.-"Science Up to Date." M.-Drama, "The Sea Guil." WB7-SPRINGFIELD-337. 11:00 P. M .- Program of chamber music. KDKA-FITTSBURGH-325. -Dinner concert.

M.-"What Constitutes Vision." M.-"Why You Should Visit Euro Summer," Charles Latus. WGY-SCHENECTADY-380 6:30 P. M .- "Adventure Story." WDPA-CHICAGO-360. 11:00 P. M.-Organ concert. KYW-CHICAGO-536.

M.-Musical program. M.-Midnight revue. WCAP-WASHINGTON-469 M .- Concert program. WRC-WASHINGTON, D. C.-469. 1:15 P. M.-A talk on touring by the man-ager of Touring and Transportation of the American Automobile Association. :30 P. M.-Concert by the Ral ish Hotel M.-Concert by the Raligh Hote. orchestra under the direction of Roy Value 8:45 P. M.-Song recital by T. he direction of Roy Laing. recital by Hazel C. Arth,

:00 P. M.-Song recital by Mabel C. Lat imer, soprano. 15 P. M.-Duets by Elizabeth Lindsay Dayton and Margaret Callahan. :30 P. M.-Concert by the Interstate Com-merce Band.

WGR-BUFFALO-319. 8:45 P. M.-Ballroom banquet. 9:30 P. M.-Musical program. WWJ-DETROIT-517. 8:30 P. M .-- Banjo-violin duet.

WOC-DAVENPORT-484 8:00 P. M.-Educational lecture. 9:00 P. M.-Musical program. 11:00 P. M.-Musical program.

th Pole

9:00 P. M.---11:45 P. 1

10:30 1

10:15 P. M.-Miss

10:30 P. M.-O

/orld Radio History

WJAZ-CHICAGO-44 1:00 P. M.-Musical program.

WHAS-LOUISVILLE-100 :30 P. M.-Special concert. WSB-ATLANTA-429.

M.-Transcontinental WTAM-CLEVELAND-390. 1:00 P. M .- Glassical music.

WOS-JEFFERSON CITY-441. 9:00 P. M.-Dance program by string trio, WLW-CINCINNATI-309. 9:00 P. M.-The Tenth Infantry Ba Fort Thomas, directed by Ernest G. I

KSD-ST. LOUIS-546. 8:00 P. M.-Abergh's concert ensemble 10:00 P. M.-Bong program. WCAE-PITTSBURGH-426 6:30 P. M.-Dinner concert. 7:30 P. M.-Popular songs. 8:30 P. M.-Musical program

WDAF-KANSAS CITY-411. :00 P. M.-Address, weekly health talk Program by faculty of the Kansas Cit

University. 12:45 A. M.-Novelty-Singing Orchestra. WLAG-ST. PAUL-417. M.-Orchestra

KFI-LOS ANGELES-469. M .- Evening Herald concert. M.—Concert :00 A. M.-Hollywood Community Orch

-Lectures

00 A. M.-Cocoanut Grove Orchestra WJAM-CEDAR RAPIDS, IA.-968. 1:00 P. M.-Regular program.

WPAB-STATE COLLEGE, PA.-283. M.-Student Dance Orchestra KZN-SALT LAKE CITY, UTAH-485. 10:00 P. M.-Music, talks. stories.

WMAQ-CHICAGO-148. -Stories for the children. -Lecture from Northwestern Un Vander Meer

KFAE-PULIMAN, WASH.-320. tra numbers, group song

WSAC-CLEMSON COLLEG7, S. C.-360. M.-Educational addre WABL-STORRS, CONN.-283.

P. M .- Market reports WBL-ANTHONY, KAN.-261.

CKAC-MONTREAL-130. M.-Music WCAO-BALTIMORE-360.

M.-Concert. M.-Program of popular music KMO-TACOMA, WASH -- 360. 15 P. M.-Artists' program. WQAE-SPRINGFIELD, VT.-275.

KHJ-LOS ANGELES-395.

M .- Program presented by Orpheus M. Broadcasting Art Hickmans' Or WFAV-LINCOLN, NEB .- 275.

KOB-STATE COLLEGE, N. M.-485. 30 P. M.-Concerts, lectures and information

WOAN-LAWRENCEBURG-360. 30 P. M.-Music WHA-UNIVERSITY OF WISCONSIN-380 8:30 P. M. Educational and agricultural

WTAW-COLLEGE STATION, TEX.-280 KPO-SAN FRANCISCO-423. 11:00 P. M.-E. Max Bradfield's W. Band.

KGG-PORTLAND, ORE.-360. 8:30 P. M.-Prionograph selections: 10:30 P. M.-Press bulletins. 12:00 M.-Talks.

WPAK-FARGO, N. D.-360. 8:30 P. M .-- Edu KIX-OAKLAND, CAL.-509

11 AO P. M.-Educational KFFQ-COLORADO SPRINGS, COL.-360 00 A. M.-International concer

#### THURSDAY

WEAF-NEW YORK-492. A. M.-Popular Thursday morning with Consolidated Market and her reports by U. S. and N. Y. State riments of Agriculture and American Agriculturist. 60 P. M.-Vernice Gay, planist, and Mary Coules Cale, violinist; Rose Ferris, 80\* 100 P. M.-Vernice Gay, planist, and mary Louise Gale, violinist; Rose Ferris, so: prano; Billy Cripps, tehor. 100 P. M.-Midweek service under the au-spices of the New York Federation of Churches; United Daily Sport talk. Lillie-belle Barton, soprano, and Shérman Small, barytone; talk; Concert by the Thrane Trio direct from Hunter College. "Co-lumbia Recorders." Old Nashloned South-ern Minstrel by the Eveready Entertainers. Trible by prominent person in connection. by prominent person in connection "Father and Son". week. Vincent z and his oroliestra from the grill e Hotel Pennsylvania.

WJZ-NEW YORK-455. B: 00 P. M.-Afternoon Auditorium Concer direct from the Wanamaker Auditorium.
 Constraints of the New York
 Constraints of the New York 30 P. M.-Closing reports of the New York State Department of Farms and Markets. Farm and Home reports; closing quota-tions of the New York Stock Exchange, those on the new York Stock Exchange.

foreign exchange quotations. 00 P. M.-"Jack Rabbit Stories" by David

Cory. 7:30 P. M.-Song recital by Capt. R. D. Jones, barytone, of the S. S. Berengaria, Cunard Line. 7:45 P. M.-The world's work. 8:00 P. M.-Song recital by Capt. R. D. Jones, barytone, of the S. S. Berengaria. 8:15 P. M.-Evening organ recital on the Auditorium organ, direct. from the Wanaor the S. S. Derengaria: ing organ recital on the i, direct from the Wanaum organ, Auditorium organization in a second s

retransmitted from ...... ion NAA at Arlington. P: M.-Recital by Greighton Allen, planist. 0:30 P. M.-Dance program by the Hotel modore Orchestra, under the personal WJY-NEW YORK-455.

7:30 P. M.-Program by the New York School of Music. 8:30 P. M.-"Golf," by Innis Brown. 8:45 P. M.-Emerson program direct from the Emerson Recording Laboratories. 10:00 P. M.-"Home Building," by William Hormon Recre.

M.-Estelle Fuerstenberg, M.-Charlotte Woodruff, I

 M.—Charlotte Woodruff, prima soprano of "Artists and Models."
 M.—Louis John Bartels.
 M.—Continuation toprano solo

lotte Woodruff. tenberg, violinist. by Charlotte Wolderstenberg, violinist. 3:35 P. M.-Betelle Fuerstenberg, violinist. 3:45 P. M.-Helen Lowell. 6:15 P. M.-St, Valentine's Day readings for children by Constance Irwin. 6:30 P. M.-'Music While You Dine," feat-ured by Tom Cooper's Country Club Or-

chestra

WOO-PHILADELPHIA-509. 2:00 M .-- Luncheon music by the Tea Room Orchestra. 4:45 P. M.-Grand organ and trumpets.

WDAR-PHILADELPHIA-395. P. M.-Artist recital. P. M.-Dream Daddy with the boys and

WIP-PHILADELPHIA-509. 6:05 P. M.-Dinner music by Frank Wine gar's Pennsylvanians, 8:15 P. M.-Direct broadcast from the Manu-

facturers' Club. 11:15 P. M.-Ted Weems and his Cafe L'Aig-WFI-PHILADELPHIA-509.

tra. 8:00 P. M.-Boy Scout Corps program. 9:15 P. M.-College Players in "Julius Cae-

WBAP-FORT WORTH-476. M -Concert by the Fort Worth High M.-Concert by the North Side Man-On Cadet Band. M.-Concert by the North Side Man-Club Orchestra. 10:30 P. WSAD-PROVIDENCE-261

M.—Musical program. M.—Children's features, by "Foster Lady," Mrs. Bessie Archer Ander 8:15 P. M.-Concert by the String Orchestra of the Women's College in Brown Uni-

WNAC-BOSTON-278. M .- WNAC dinner dance. M.-Organ recital. M.-Concert program.

WGI-MEDFORD HILLSIDE-366. on P. M.-Concert. WBZ-SPRINGFIELD-337.

WEZ-Srinkford of Federal Inconfe \$:30 P. M.-Program by the Brow Orchestra. Two Bestirns," by Thomas Stokers. Stop P. M.-Concert by the Springfield from 9:00 P. M.-'Father and Son." 9:00 P. M.-Concert by the Springfield from 9:00 P. M.-'Father and Son." Male Quarter. servatory 9:00 P. M.-Male Quarter. . Bedtime story for grownups, by 10:00 P. M.-Pepular program by Norden. .

8:15 P. M. Dinner concert. 8:30 P. M. Concert by the KDKA Little Symphony Orchestra. 11:30 P. M. Special late concert.

WGY-SCHENECTADY-380. :30 P. M .-- Dinner music by Romano's Or chestra. 7:45 P. M.-Musical program. Address, Few Moments with New Books.'

WDAP-CHICAGO-360 1:00 ¥ M.-Organ concerts.

KWY-CHICAGO-536.

M.—Dinner concert. M.—Musical program. P. M.—Program. Speakers 9(20 P. M.-Musicar 10:15 P. M.-Program. announced by radiophy

WOU-FHILLADELK HL4-000.
7:30 P. M.-Dinner music. ally Fit."
8:00 P. M.-"Keeping Physically Fit."
8:15 P. M.-Musical setting of Longfellow?:
"King Robert of Sicily."
8:30 P. M.-Grand orgân recital.
10:03 P. M.-Kentucky Kernels Dance Or Chester WRC-WASHINGTON, D. C.-469. 5:15 P. M.-Instruction in international code 6:00 P. M.-Stories for children, by Pegg

WGR-BUFFALO-319. 6:30 P. M.-Dinner music. 7:30 P. M.-Digest of the day's news. I dustrial employment bulletin. The Ame

ican Boy Story. WWJ-DETROFT\_517 M .- The Detroit News Orcchestra

M.-Dance music. M.-The Detroit News Orchestra. WOC-DAVENPORT-484. -Sandman's visit. --Musical program.

WOAW-OMAHA-528 .-Dinner program.

WMC-MEMPHIS-500 M .- Chisca Philharmonic Orel

WIAZ-CHICAGO-448 M .- Musical program WHAS-LOUISVILLE-496

—Concert program. Dance musi WSB—ATLANTA—429.

9:00 P. M.-Music. 11:45 P. M.-Special program for WFAA-DALLAS-476.

9:30 P. M.-Musical program. WLW-CINCINNATI-309.

M.-First radio beauty contest. M.-Popular program; midnigi

KSD-ST LOUIS-546 :00 P. M .- Glee Club of Shurtleff College WDAF-KANSAS CITY-411

:00 P. M.-Address: the children's story information period; music, 2:45 A. M.—Novelty Singing Orchestra; pipe organ recital by Miss Norma Mannering. WHB-KANSAS CITY-411.

P. M.-Popular dance program by the Frank R. Marks Orchestra and the Sweenev Radio Orchestra. WCAE-PITTSBURGH-426

Dinner concert M .- Uncle "Kaybee" Talk. M:-Musical program

WDBC-LANCASTER-258 30 P. M.-Music

WRAW-READING, PA.-238 M.-Mu

WJAX-CLEVELAND-399 M.-Special program; Strubinski; nfant prodigy acc WOAE-SPRINGFIELD, VT.-275.

M.—Concert. WEAO-COLUMBES-369.

M .--- Educational talks, concerts, CKAC-MONTREAL-425. 30 P. M.-Canadian Pacific Railway chestra; talk. 10:30 P. M.-Jos. C. Smith and his Mo Royal Hotel Dance Orchestra.

WMAQ-CHICAGO-448.

7:30 P: M.-Boy Scouts Weekly Talk. 8:30 P. M.-La Salle Hotel Dance Orchestra 9:15 P. M.-Acollan Male Quartet. WLAG-MINN. AND ST. PAUL-417. M.-Orchestra.

WRR-DALLAS-360 M .--- Music

KPO-SAN FRANCISCO-423. M.—Organ. M.—May Bradfield's dance orchest

KFI-LOS ANGELES 469. M.-Ambassador Hotel concert. M.-"Examiner" concert.

KGO-OAKLAND-312.

M .- Musical progr KHJ-LOS ANGELES-395.

1:00 A. M:-Program arranged by Harry Knox, flutist, broadcasting Art Hickma Orchestra.

### FRIDAY

WEAF-NEW YORK-492. :00 A. M.-Lecture by Dr. Walter rosch. direct from Town Hall, New city. 150 A. M.-Consolidated market 11:00 A. M.—Consolution instant and weather reports by the United States an New York State departments of agriculture 4:00 P. M.—Marguerité Eckenroth, soprana accompanied by Katherine Eckenroth. Re cital by the Banjo Trio. Children's Hou circular and sonray stories and songs. 15 P. M.-Beatrice Lilly and Jack Bu-chanan, singing comedians. United daily sport talk; Ted Schmidt and Harry Regan, neuroscient sciences. Battery Instruction Talk Tall

sport talk; Ted Schmidt and Harry Regs popular singers; Battery Instruction Ta by George Furness. "The Happiness Boys Billy Jones and Ernest Hare; music by t World Mutual Instrument Trio, and a ta cn the "Care and Safe Operation of A tomobiles" by Major A. A. Stewart; Fischer, Dance Orchestra. W.IZ-NEW YORK-455. 12:15 P. M.-Noon Hour of Music from 12:15 P. M.-Noon Hour of Music from the Brick Presbyterian Church. 3:00. P: M.-Organ recital played by Leo Riggs on the Hotel Astor organ. 5:60 P. M.-"The. Larger Aspect of World Affairs." by the International Interpreter. 5:30. P. M.-"Closing Reports of the New York State Department of Farms and Markets; farm and home reports; closing: quotations of the New York Stock Exchange; foreign exchange quotations; "The Condition of the Leading Businesses." 7:60 P. M.-MacDowell program, under the atisplees of the Music Study Club of New-ark.

ark. 30 P. M.-Burr McIntosh, the Cheerfu

Philosopher. 1:50 P. M.-MacDowell program, under th auspices of the Music Study Chib of New

ark 8:15 P. M.-Looseleaf Current Topics. 8:30 P. M.-Concert by the Amherst College Musical Clubs, direct from the Grand Ball-room of the Ritz-Carlton Hotel. 16:30 P. M.-Dance program by Paul Specht and his Alamac Hotel Orchestra, direct from the Congo Room of the Alamac Hotel.

WJY-NEW YORK-455.

Orchestra. 8:15 P. M.—The Honorable Julius Berg, "The Work of the New York Assembly." 8:30 P. M.—Program by the Brooklyn Edison

M.-Frank Shevitt, "Income Taxes M.-Program by the Brooklyn Edis

### A Device for Measuring the **Per-Stage Audio Amplification**

With Simple Apparatus It Is Possible to Approximate the Effectiveness of the Audio Amplifier of Any Set Using Jacks

#### By Zeh Bouck

Engineer, Amsco Products, Inc. T IS often desirable for experi-signal I found 150 ohms to be suffi-

mental purposes or personal sat- cient.) stage amplification of an audio fre. gests a neat and efficient way of arquency amplifier. The "experimental ranging the rheostats. The terminals purpose" to which this measurement of the open circuit jack are wired to purpose to which this measurement the two binding posts, and the five wave rectifying system. The differison of various tubes or transformer, the jack. If the telephone receivers in the characteristic of the output and theoretical complexities, the ob- for amplification tests. ticle are easily made on any amplifier equipped with jacks and with auxil-iary apparatus no more involved than a pair of telephone receivers and a bank of five-thirty-ohm rheostats. The method to be described is not a precision test, several elements of error it provides an approximation adequate for its purpose.

If a more accurate determination be necessary to measure carefully the various constants of the tube and circuit and to calculate according to amplification formulas-a complete operation far more involved than the simple system to be outlined. Voltage Amplification

The average fan is interested in

alternating or equivalent currents of which is the expression R-E/I, o

isfaction to measure the per The accompanying illustration sug-

We shall measure the amplification amplifier we are testing.

the voltage or current amplification first stage output, which, in this par-(the same thing) of his amplifier. ticular set, the shunt resistance is can be omitted. Many fans believe Therefore, if the effective alternating 20 ohms. For greater accuracy these that the reason for the filter circuit currents in the plate circuits of two lower values should be measured. is because half-wave rectification is adjacent amplifying stages (detector (The resistance of any circuit is al- used. The output of all such rectiand first stage or first and second ways equal to the voltage divided by fiers must be filtered if satisfactory stages) can be determined, the com- the current or R-E/I. The resistance D. C. is desired. The ordinary out parison of one over the other will of the shunt may easily be determined put of a rectifying system is not indicate the amount of amplification. in accordance with this expression of D. C. but pulsating D. C., which cur-By the theory of shunt circuits it ohm's law, as already suggested. The rent if applied to the plates of the is possible to state the relative resistors are disconnected from the various tubes in a receiving system values of alternating currents in two receivers, the phone plug removed would be entirely useless as D. C. or more circuits in terms of a unit and the rheostats wired in series with plate potential. Hence filter circuits common to each without actually a new dry cell and a milliameter. are essential if D. C. is desired, irremeasuring the current in amperes. The current reading is noted. In this spective of the type of rectification Let us assume two circuits in which particular instance it is .075 amperes, being employed.

Some Data on Radio 'B' Battery Eliminators

A large number of radio fans are under the impression that a full wave "B" battery eliminator supplies an output current twice that of a half wave unit. This idea is especially prevalent among fans who use two ectifying tubes in a full wave rectifying system and only one tube in a half-wave rectifier.

That impression, however, is erroneous. A full wave rectifying system does not produce an output twice the value obtained with a half suggests itself in the radio life of rheostats in series connected across ence between the two systems lies resistor and impedance coupled are now plugged into the jack and the stages. While most laboratory measurements are fraught with mechanical plug, this simple apparatus is ready the total output current with a full that obtainable with a half-wave ticle are easily made on any amplifier of the first stage of a three-step re-

the rheostats adjusted until a signal The reason for the non-doubling of minimum audibility is heard. The of the output of the full wave rectiresistors should be adjusted again and fier is in the phenomena that each again to accustom the ear exactly to half of the full wave is rectified entering into the system. However, again to accuston the car charge be alternately. At no time do both servation the detector tube should be units in a full wave rectifying sysoscillating, giving a low beat note on tem function simultaneously. Hence an incoming signal.) The resistance at any moment the approximate value of intensification is desired it will of the shunt is now noted. This can of the output current is that of only be measured with a milliammeter and one tube. So we see that a halfa dry cell if desired, or, with good wave rectifier will supply almost as rheostats, merely observed. If four much current as a full wave unit, rheostats are all the way in, and the but the output current of a full wave fifth two-thirds in, the resistance will rectifier is much smoother and more be 140 ohms, as was the case in the closely approximates the desired D.C. Now, with respect to filters, the

A similar reading 1s made on the use of a full wave rectification does J. R.

#### Peerless Male Quartet in

Twentieth Birthday Program The Peerless Male Quartet, comoosed of Albert Campbell, first tenor; Henry Moeller, second tenor; John Meyer, barytone, and Frank Croxton, basso, will celebrate its twentieth birthday since its organization with an anniversary program from WFBH co-morrow at 6 p. m.

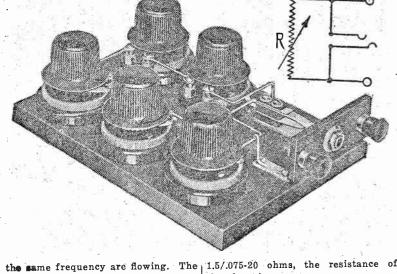
Albert Campbell is the originator of the group, having organized it wenty years ago, while John Meyer follows with fifteen years' connection with the quartet, and Frank Croxton, twelve. The quartet has been recording for Victor, Brunswick, Columbia and other companies for the last fifteen years, Their program to-night will include 'Come Where My Love Lies Dreamng," "O, Suzanna," "Old Black Joe," "Camptown Races," a medley of Stephen Foster songs and Victor Herbert's "Gypsy Love Song," a bass

solo by Frank Croxton

"Andante," First Time Here position which the orchestra will play intense the current is in one circuit The amplification is, of course, the at that time will be the Symphony in series at the stadium and Willem It is analogous to the instance of The same procedure is followed out van Hoogstraten will wield the con-







current in the first circuit is weaker the shunt.) plugged into the respective circuits. The formula is I-Ip(R1+R2)/R2, Philharmonic to Play Novelty are able to calculate how much more Ip.

fast as the other.

#### Appliing the Idea

The variable resistance for the pur-

than the current in circuit No. 2. We now have sufficient data to cal-The difference in current strength | culate the amount of amplification in |

The sound in one case will be louder where I is the effective alternating than in the other. Now, if we shunt plate current, Ip the portion of I A novelty will be introduced into the telephone receivers with a vari- passing through the telephone receiv- the program of the New York Philable resistance we can in each cir- ers, R1 the resistance of the phones, harmonic Orchestra's concert from cuit reduce the current through the and R2 the value of the shunt re- the Lewisohn Stadium to be broadreceivers until the sound is just au- sistor. The resistance of the tele- cast by station WJZ at 8:30 Wednesdible. Quite naturally, we shall cut phone receivers used by the author day night. The name of this compoless resistance into the second circuit was 2,000 ohms. Therefore, in the sition is "Andante," a selection writthan into the first in reducing to this detector circuit I-Ip(R1+R2)/R2-Ip ten by Roy Harris, and this will be minimum signal intensity. Then, by (2,000+140)/140-2,1401p/140-15.31p. the first time that the work has been a comparison of the various known In the first amplifying stages we rendered by the Philharmonic Orchesresistance values in each circuit, we have I-Ip(R1+R2)/R2-2,020Ip/20-101 tra in New York City. Another com-

than in the other without actually current in the second circuit of the D minor of Cesar Franck. This will knowing the amperage flowing in current in the first circuit, or 101Ip/ be the third concert of the 1926 15.3-6.6.

two moving bodies-automobiles per- in comparing other stages. However, ductor's baton. haps-one of which covers a given in measuring the higher steps of amdistance in half the time required by plification, the input should be rethe other. It is obvious, regardless duced by detuning until a minimum of their actual speeds in miles per signal is obtained, on the lower of hour, that one car is moving twice as the stages to be compared, with a shunt resistance of over 130 ohms.

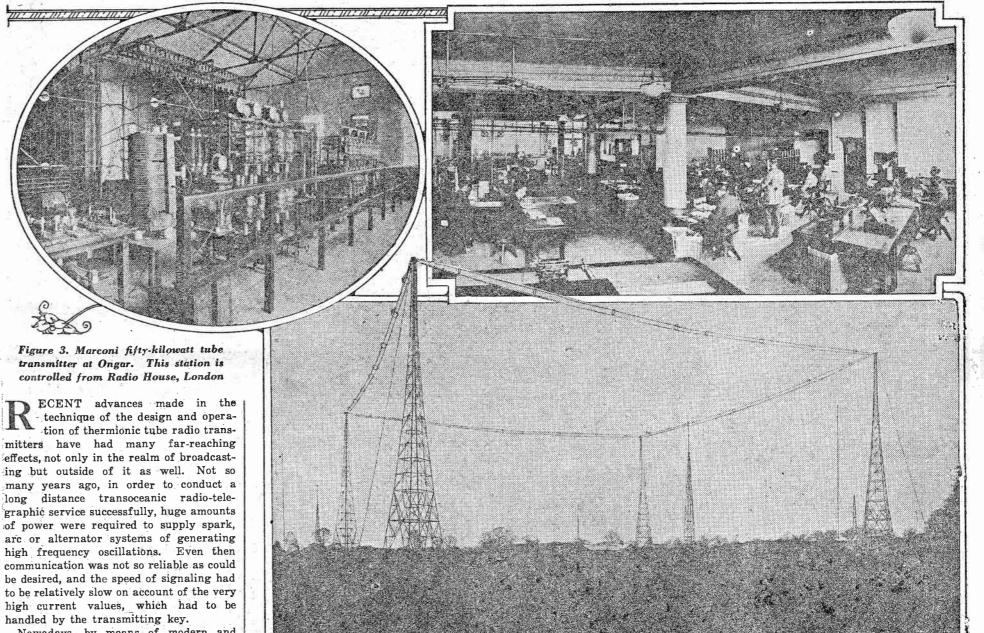
"Side-Cutters" Handy Tool pose of the fan may conveniently be There is a tool known as "sidefive or more rheostats connected in cutters" which looks very much like series. Rheostats having accurate a pair of pliers, except that instead values will facilitate measurements. of having flat gripping noses the two The author chose five 30-ohm theo- jaws are sharpened to cutting edges stats manufactured by the Amsco and taper together to a half round Products, Inc. (If it is impossible to front. It is designed entirely for obtain adequate signal adjustment on wire cutting, and is more convenient the detector striput, more rheostats than a regular pair of pliers with can be added I wever, on a good the cutting blades below the nose.



# Britain Has High Speed Radio Telegraph Service With Continent

Automatic Transmitters Make Possible Sending Messages at a Rate of 100 Words a Minute

By A. DINSDALE



Nowadays, by means of modern and highly efficient tube transmitters, much more reliable communication may be maintained over a given distance with the expenditure of much less power. By introducing the signaling key into appropriate circuits where low current values prevail, exceedingly high signaling speeds can be attained, thus enabling the stations to handle more traffic and conferring upon the service a measure of secrecy.

Turkey.

which is located in the heart of the city

of London, and as new services are opened

these also will be controlled from the same

office. This policy of centralization has

also been carried out in the case of the

actual transmitting and receiving stations,

the former being located at Ongar and the

latter at Brentwood, both of which places

are about thirty miles from London in a

Land lines connect both Ongar and

Brentwood with Radio House, over which

all outgoing and incoming traffic is re-

laved to and from the transmitting and re-

ceiving stations. The relative positions of

Radio House, Brentwood and Ongar are

shown on the map accompanying this

article, while the other diagram illus-

trates the manner in which the three

centers are linked together, but for the

sake of simplicity the land lines required

for operating one service only are shown.

northeasterly direction.

Probably one of the most extensive, fastest and highly developed and organized networks of radio telegraph communication in the world is that at present in operation between Great Britain and Continental Europe. This network has grown up within the last few years, and is steadily expanding. It is operated and controlled from London by the Marconi Company, and at the various European terminal stations by associates of that company, which also controls from London a high speed trans-Atlantic service, operated and controlled on this side of the Atlantic by the Radio Corporation of America.

#### The Nerve Center

There are at present five European services in operation between London and the following capitals: Paris, Berne, Madrid, Barcelona and Vienna, and a license has been granted for the extension of the service to include direct communication | The land line between the control office and | and may be considered as standard control

Portugal, Russia, Jugoslavia, Sweden and over this line are relayed the incoming the control room in Radio House, showing signals, while the control of the transmitter is effected through a simplex ex-All the existing services, including the tension from the receiving station to the trans-Atlantic, are entirely operated from transmitting station. one central office, known as Radio House,

ceiving station at Brentwood, Essex. The four main towers carry the Trans-Atlanticwaerial system.

Figure 2, above-Panoramic view of the central telegraph office at Radio House. Figure 4, below-The Marconi re-

#### **Control Apparatus**

The method employed requires close cooperation between the transmitting and receiving operators at the control center, which is facilitated by the arrangement on a common table of the automatic transmitting and receiving apparatus under their charge. Provision is also made for immediate communication between these operators and the attendants at the transmitting and receiving stations. The receiving operator can thus, through the transmitting operator, control the speed of operation of the distant transmitter, while the cause of defective signals may be promptly located and remedied.

The automatic transmitting and receiving apparatus for each service is located. on a separate control table fitted with an indicator of the particular service being carried out. These tables are identical

with Bulgaria, Denmark, Finland, Greece, | the receiving station is worked duplex and | units. Figure 2 is a panoramic view of the European circuits on the right and the trans-Atlantic circuits on the left.

> The system utilizes the international (Continental) Morse code and consists essentially of the perforator for the preparation of the paper tape which controls the signals sent out, and the transmitter, which sends out signals in accordance with the perforated tape.

Electrically operated keyboard perforators are employed which permit of the tape being prepared at speeds up to eighty words per minute. This perforator utilizes a standard typewriter keyboard, but perforates paper tape with the Morso characters it is desired to transmit, instead of printing the familiar typewritter characters on a sheet of paper. The tape is then passed through a Wheatstone transmitter, the output impulses of which operate the relay of the transmitting apparatus.

The speed of the tape through the transmitter is controlled by means of the electric driving motor, which permits of

Continued on page five

Additional Radio News Will Be Found in Another Section of To-day's Herald Tribune

# Improving the Appearance of the Radio **B** Battery Eliminator

### Mounting the B-Power Unit in an Auto Tool Box Makes It Look Like a Commercial Product

HE comparatively new B-gower unit | wood base was carefully fitted inside and or battery eliminator, taking ordinary house alternating current and delivering rectified direct current suitable for radio sets, is proving satisfactory to its many users. The majority of construction articles on the B-power units have been of the laboratory type or board style of apparatus. It is probably simpler. to construct a piece of apparatus where all parts are readily accessible; and there is no doubt that an instrument so built is as effective as a more compact one. This article departs from the usual practice by presenting the details of making a Bunit which will compete in looks, as well as in performance, with the commercial product.

If you intend to experiment with the B unit it is perhaps advisable to put it on a board at first; it will then be easier to try the effect of larger condensers, different chokes, etc. But if you are making a B unit from instructions given by the manufacturers of the component parts, or have already a board model of a unit which is giving satisfaction, the present article will show a simple and easy way of improving the appearance of the B unit. so that one may feel justified in placing it in a conspicuous place on the radio table, and not feel that it should be hidden from view because of its unfinished appearance.

The illustrations, Figures 1 and 2, show how the B-power unit may be mounted in a storage battery box, automobile runningboard style, and its appearance compares favorably with the factory-built units. The baked enamel finish is easy to keep clean, certainly much easier than trying to keep a board type of instrument free from dust.

#### **Tool Box Suitable**

A pressed steel auto tool box would also prove suitable for housing a B unit, and the dimensions of the apparatus involved will determine the size and type of box which is secured. If the eliminator is long and narrow, the tool box might be preferable; but if you desire the unit to be more compact, the construction of Fig. 4, using a sub-base, may be employed. For the unit shown in the illustration the auto battery box was found to be deeper than was necessary, and the first opera tion was to cut off three inches from the lower part of the box. This is perhaps the hardest part of the whole business, and if you do not want to bother with the cutting down, the box may be used with its original depth.

However, by scratching a guide line accurately around the box and using a long hack-saw blade in a wide frame it will be found that with a little care and time the sheet steel can be cut neatly. It is unlikely that tin shears would provide a satisfactory job, as the sheet metal would bend and the enamel would be cracked off in places.

secured by heavy round-head (blued) wood screws, three on each side and two 'cn each end. Four "domes of silence," or rubber bumpers, were pounded into the four corners of the wood base to prevent scratching by the cut metal, thus completing the base

#### Switches

The switches, shown on the end of the box in Fig. 1, are of standard types, and may be purchased at any elctrical store. Some B units will require only the "off-on" switch, so do not buy both switches until you make sure that both are required for your particular unit. The battery eliminator described here employs the Acme full wave transformer which has two taps on the house current side, one for high and one for low voltage; so a switch was necessary to change from one to the other of these connections. A regular three-way switch is the proper one to use for connecting either of two taps. The three-way switch has, as one would expect from its name, three terminals. The end that has only one terminal is the place to connect the wire going to the "off-on" switch (see Fig. 3), and the other two terminals connect to the high and low taps on the transformer, T. By carefully inspecting the switch mechanism it can be found which connection should go to the "high" and which to the "low" ap, and the switch buttons marked appro-

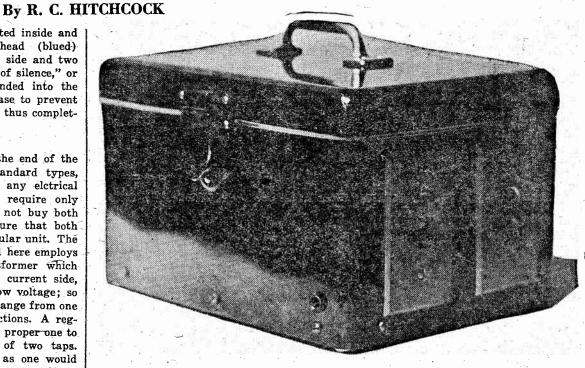


Figure 1. An external view of the B battery eliminator, housed in an auto mobile tool box, described in this article

"on" are engraved in white on the tog- | which are resistors in this case, R 1 and gle lever, the position of the switch at any R 3 of Fig. 3 are shown in Fig. 4. The time can be noted at a glance. Flush type switches, such as these two

are, ordinarily are mounted in wall outlet boxes made of sheet iron with round "knockouts" for the wires to enter and priately, or the switch plate could be en- | leave. These can be installed if the builder |

style of binding posts recommended is one which has the name engraved in white on the cap and whose tops do not come off. This latter feature makes it impossible for the caps to become interchanged, and perhaps applying the amplifier voltage to

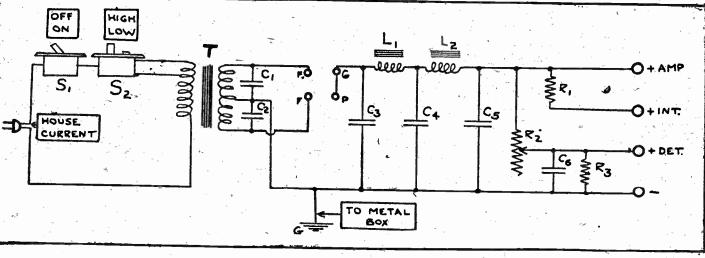


Figure 3. The wiring diagram of the raytheon B battery eliminator circuit employed in the construction of this device

set was as follows: When the higher voltage was wanted, the upper button was pressed, and when the lower voltage was wanted the lower button was pressed.

#### The "On-Off" Switch

The "off-on" switch was purposely "high-low" switch, to prevent possible confusion about which switch should be operated to turn off the B unit. A toggle switch was the style chosen for the "off-After cutting the bottom off the box, a on" switch, and as the words "off" and

graved. The arrangement on the writer's | so desires. However, as the whole box is | a detector\_tube, with disastrous results if of sturdy sheet meal, the outlet boxes may be dispensed with and holes cut in the metal box just large enough for the porcelain part of the switches and the mechanism bolted to the box. This is done by marking lines about one-eighth of an inch larger than the porcelain part of the chosen to be of a different type from the switch, boring several small holes on the line, then inserting a hacksaw to cut the lest of the straight portion. The horizontal cuts will have to be bored along their entire length unless a hacksaw with a wide frame is available and the blade set at right angles to the frame. After cutting these holes for the switches it is a good plan to smooth off with a file the sharp edges left by the drilled holes. The variable resistance, shown by R 2

of Fig. 3, may be mounted on the outside of the box, but in the model shown it was put inside the box between the two choke coils.

#### Mounting Insulated Bushings

A small hole to let in the wires which connect to the house current is drilled near the edge of the box. In this hole is inserted a small insulating bushing, such as is used for drop cord lamp sockets. The hole may be drilled small and tapped with a one-eighth-inch pipe tap to fit the bushing thread, or it may simply be drilled large enough for the bushing to pass through freely, and then rubber cement or shellac applied to keep it in place.

The outlets for the direct current to pass out of the container to the radio set are similar to that which lets in the house current just described. The outfit has four binding posts: (1) Amplifier plus, (2) intermediate (90 volts) plus, (3) detector (22 volts variable) plus, and (4) the common negative lead. These connections and the mounting of the grid leaks,

a soft detector tube was being used.

#### Wiring

The complete wiring diagram showing the switch connections is given in Fig. 3. This is the regular wiring scheme using the Raytheon tube and the Acme transformer, with the addition of the connecbox housing the B unit. Also-and this is important-a portion of the containers of the condensers and chokes should be scraped clean and bright and a wire soldered to each, all these wires being connected together to the common negative terminal. These wires were omitted from Fig. 3 in simplifying it as much as possible.

In wiring the general precautions of regular radio practice should be observed, especially that of keeping wires far apart; remember that some of the wires carry over 200 volts of direct current. Use rosin flux for soldering and tinned bus wire for connections. Spaghetti need not be used on the negative terminal, but it is wise to use it on the higher voltage wires to insure proper insulation. Spaghetti also may be used on all wires to improve the general appearance of the unit, using red for positive wires and black for the common negative lead.

#### **Necessary Parts**

One Auto battery or tool box. ne toggle "off-on" switch and plate (S1). One three-way switch and plate (S2). One Raytheon tube and socket. One Acme full-way transformer (T). Six Tube filter condensers of the following ca-pacities: C1, 0.1 mfd:: C2, 0.1 mfd: C3, 2 mfds.; C4, 2 mfds.; C5, 8 mfds.; C6, 1 mfd. (Not: A B block may be used instead of separate condensers for C 3, 4, 5. Two Acme 30 henry choke coils (L1, L2). Two Bradley unit resistances (R1, 15,000; R3, 10,000). One 15,000 to 100,000 ohm Bradley variable re-sistor (R2). One hard rubber binding post panel.

istor (H2). One hard rubber binding post panel. Four marked binding posts. Five insulating bushings, lamp socket **type.** Wire, spaghetti, screws, etc.

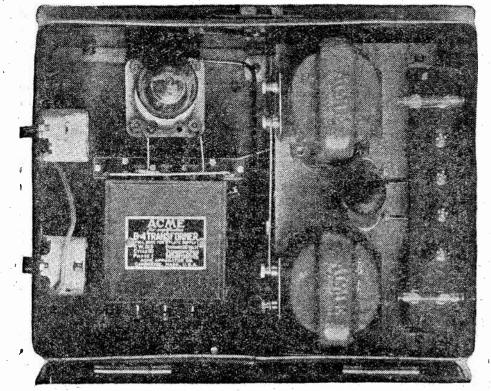


Figure 2. This picture shows how the apparatus used in the construction of the B battery eliminator may be arranged inside the automobile tool box

### **Public Utilities Utilize Radio Broadcasting to Advantage**

Good Will Publicity, Which May Be Included in **Carefully Selected Programs, Is a Good Type** of Advertising for Firms of This Class

#### By Martin P. Rice

Director of Broadcasting, Advertising and Publicity, General Electric Company

The following are abstracts of an address delivered before the utility section of the Associated Advertising Clubs of the World during a recent convention at Philadelphia.

HE early days of public utility companies were necessarily occupied largely with problems of the production and distribution of gas and electricity or the operation of cars. Central station with its customers. It is endeavoring men went diligently about their business-financing, improved genera- to maintain these friendly relations tion of power and light, better methods of distribution and greater by giving good service. reliability and increased safety. The number of customers increased rapidly, and personal acquaintance, which results in mutual understanding, became more and more difficult. The public did not enjoy the utility companies' full confidence, and an unfriendly feeling began to entertainment is a friendly feeling develop. Even an announcement of plans designed to render improved for this company. Our prosperity service was likely to be received with suspicion as to the real motive. is dependent upon this relationship, to play against the Radio Corpora- duty" battery is recommended, and Those were the days when people spoke of "soulless corporations."

vast audiences directly or indirectly.

Radio in Advertising

The last two decades have wit-> nessed no greater accomplishment town of, say, 1,000 inhabitants. will dependent upon our prosperity." than the building up of friendly rela- transmit an item of interest to that

lic utility slogan.

#### 3. Complete publicity.

policy.

4. Customer ownership.

principles; namely, complete pub- the art is really too new to warrant ever had." tions must be maintained.

Two New Agencies for Publicity

reaching great masses of people. ously. This new medium already has tomer in the early days." With its aid the great structure of been used widely for entertainment, to render service all expressed in ployed successfully in institutional Association, said: broadcasting.

Broadcasting is an example of one an entirely new medium. it has personality.

ers, the best electric service within our power.

"In order to help you realize we are real human beings we are planning, through this new radio station, to have the friendly voice of Edison Light as well as the friendly glow of our electric service reach you regularly through the week. If you get pleasure from the programs which we shall broadcast, if our voice coming to you nightly through the air has a cheery tone, as we mean that it shall, we shall have accomplished our purpose. A happy human voice can often spread more happiness and and radio. With the gradeon the sufficient volume without tube distorsunshine than a friendly light. We have no other motive in the establish- pass through the electric vacuum With the production of power tubes ment of this new broaccasting station than that of humanizing ourselves to-day must humanize itself in order phonograph and radio. As with the tion the inadequacy of the 90 to 130 to continue big. A big public service corporation like the Boston Edison company wants friendly relations

"It intends through this new broadcasting station to give you good entertainment, and the price we hope you will be willing to pay for this and the continued growth of this tion of America baseball aggregation the negative terminal should always great community is in a measure on Tuesday afternoon at 5:45 at be connected to the plus side of the

This address was given in Septemtions and mutual confidence between town so effectively that within ber, 1924, and its expectations have splendid showing in its effort to is used the extra battery should be public utility companies and the pub- twenty-four hours every one will undoubtedly been fulfilled, for in a obtain leadership in the Industrial wired in series with the plus lead lic, whom they serve. This accom- know of it. It is unreasonable to recent statement of J. B. Groco, head League of the metropolitan district, to the amplifier. When the amplifier plishment was brought about by the suppose that the entire population of the public relations bureau, he of which they are members. The is transformer or impedance coupled adoption of a few fundamental prin- hears the message directly from the speaks of how strongly the station team is under the management of it is more economical and quite effifew receiving sets, and therefore we has established itself in the life of Jack Zatulove. 1. Absolute honesty as the only must assume that gossip spreads the the community and he refers to thou. It is expected that a large crowd news. In any event it is generally sands of letters from customers and will witness the game, as both teams speaker. 2. "Service to Customers," the pub- admitted that broadcasting reaches listeners expressing their apprecia- have a large following. tion. He says, "I think you will agree with me that the broadcasting station has been the greatest builder This article is concerned chiefly The use of broadcasting in adver- of good will for the Edison company announced a new alkali vapor tube, with the third of these fundamental tising has been widely discussed, but in our large territory which we have the Cunningham CX300A, specially

to point out that in a business which casting will probably not be employed President Arthur Williams of the leased by the company they say: "In expands so rapidly as the public in direct selling until some plan is New York Edison Company, which sensitivity the new tube fully excels utility business, there are always new provided by which such advertising in broadcasting. "We do not look when the latter tube is critically customers with whom friendly rela- other programs. One point seems to upon broadcasting as an advertising adjusted. In the CX300A extreme have been overlooked in some of the medium," he says, "but rather as an sensitivity is obtained without crit-discussions on broadcasting in adver-Two New Agencies for Publicity In times past the printing press has furnished the only method of

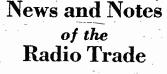
#### A Third Instance

up, and it has been employed ef- the presentation of political opinions, broadcasting by public utilities is cuit design is necessary. But some fectively by public utilities in telling the extension of church services, found in Canada. Sir Henry Thorn- slight improvement in performance their story. In modern public util- financial, market and stock reports ton, president of the Canadian Na- will be noticed if the grid return is ity advertising we find sincerity, and detailed accounts of athletic tional Railways, addressing members changed and connected to the negafrankness, and a conscientious desire events. It already has been em- of the Canadian National Railways tive filament lead.

a friendly fashion which invites ac- or good-will advertising. Many of "It is about three years since we quaintance and inspires confidence. the applications for broadcasting sta- went into the broadcasting business. Science and inventive genius have re- tions now pending in Washington un- Three years ago it was thought to be the radio receiver donated by the cently contributed two new agencies doubtedly arose from the desire to a mild form of madness from which Freed-Eisemann Radio Corporation as for reaching the public, so that in employ broadcasting in this way. The I, the president, was suffering. Suf- first prize in the music appreciation addition to the printing press we extent to which broadcasting may be fice it to say that the Canadian Na- contest held in the schools of New and the radio receiving equipment on a new eight-tube receiver, the Fada

carried on a truly remarkable system pressing personality, and it reaches twenty-two public utility companies turers, but will not replace a single of communication. When the radio- the customers of a public utility in as well as officials of the government item, since every model now being phone came into existence, doing their homes when they are at leisure made appropriate addresses on this made will be continued throughout

nearly every home. Every one is fa- vidual when he has a real or fancied broadcasting is presented as a submiliar with the characteristics which grievance as doing business with an stitute for older forms of advertising Radio broadcasting is instantaneous; impossible to conceive of such an warrant for such assumption. Broadit travels almost everywhere, know- organization as having human sympa- casting is a new agency which has ing no inaccessibility; it is free, and thies and understanding. Successful been received into millions of Amermodern corporations have created ican homes, and it has inherent perpersonality for themselves. The char- sonality. The public has not been acteristics which they display in their educated to believe that it should pay Five years ago broadcasting sta- dealings are usually those of their the cost of broadcast programs any tions were almost unknown. To-day president or managing officer, or at more than it expects to pay the cost THE GREATEST QUALITY BUY TO-DAY



### Combines Phonograph and Radio

a loud speaker is the gradeon, an inremarkable tone depth and volume. soft and low or loud and can be regulated to play slowly or rapidly, as with the phonograph.

This instrument is the invention of department of David Grimes, Inc., 151 pedient suggesting itself as a substi-Bay Street, Jersey City, makers of tute for a high-voltage eliminator is Grimes radio receiving sets.

#### Rival Radio Teams to Clash

The Freshman Masterpiece nine is Recreation Park, Springfield, L. I.

The former team is making

#### New Detector Tube

E. T. Cunningham, Inc., have just designed for service only as a delicity, and it should be unnecessary definite or final conclusions. Broad- A similar view is expressed by Vice- tector tube. In the statement re noises.'

Another advantage of the tube is modern advertising has been built education, the dissemination of news, A third instance of the use of that no change in the wiring or cir-

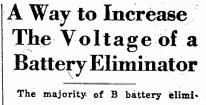
#### Winner of Radio Receiver

Public School 23 is the winner

#### Fada 1927 Models

F. A. D. Andrea, Inc., has announced 8. as their contribution to the radio

the year.



• 11

nators or "line power" devices in In exact antithesis to the familiar use to-day were not designed to sunadio attachments which enable one ply voltages sufficiently high for adeto use the horn of a phonograph as quate power amplification. By "adestrument that combines phonograph quate power amplication" is meant tones from the phonograph records tion to fill the average living room. tubes of the radio and emerge with requiring from 150 to 180 volts on It includes the advantages of both the plate for the most efficient operaradio, the music can be played either volt line power devices is emphasized.

However, the discarding of the old equipment and the purchasing of new design is a proposition unattractive E. O. Thompson, head of the research financially. A simple and efficient example

to connect a 45-volt B battery in series with the plate supply. This will add the voltage of the battery to the plate potential. A "heavy line power arrangement.

If a resistance coupled amplifier cient merely to place the battery in series with the output or loud



#### Rate, 40 cents a line. Ads. accepted until 12 o'clock noon Friday. PHONE PENNSYLVANIA 4000

#### Parts and Equipment

The number of receiving sets in a small
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Parts and Equipment



away with the necessity of code, and their minds are receptive. Noth- occasion. broadcasting became popular in ing proves so discouraging to an indi- It is hoped that no one infers that resulted in this unparalleled interest. impersonal corporation. He finds it and publicity. There seems to be no

#### Growth of the Industry

now have two other important factors utilized in advertising will depend tional was the first in this field, just York City. in influencing public opinion. They ultimately upon the facilities avail- as it has been and will be the first in are the motion picture film and radio able and on the adaptability and in- everything. The people of Canada genuity of advertisers to make use of appreciate our broadcasting stations of the few ideas that did not have to In the field of public utility adver- our trains." . . be sold to the public. From the time tising broadcasting seems to be par- On October 21, 1925 eighteen broad- art of 1927. that C. Q. D. messages were flashed ticularly valuable. Aside from the casting stations participated in the This set is of the totally shielded from the steamship Republic and fact that it is a development of the celebration of "Electric Night" to type. This means that there is full resulted in the dramatic rescue of a electrical industry which underlies commemorate the forty-sixth anni- shielding of the tubes and coils and shipload of passengers, every one has the operation of most of our public versary of the incandescent lamp and on the audio stages. been interested in radio. Boys con- utilities to-day and therefore seems to pay tribute to Thomas A. Edison The new model, along with another structed home-made transmitting and to be an appropriate agent to employ, for this his greatest contribution to new set, the Fada 6, will supplement receiving sets, learned the code and it has the peculiar advantage of ex- mankind. Executive officers of the present line of those manufac-

**Battery Removal** 

**Aids Appearance** 

**Of Installation** 

### **Ten Commandments for the Radio Broadcast Listener**

Best Long Distance Records Made in Winter; Fans Should Be Reasonable and Should Get the Best There Is During All Seasons

#### By Alred N. Goldsmith

Chief Broadcast Engineer, the Radio Corporation of America HILE excellent radio reception is frequently possible during The electrical operation of the outfit the summer months, yet the best long distance records is not affected by this separation, come in the winter. Signals are not quite so loud in the but the general appearance of the summer, and electrical disturbances are naturally more common in the summer and interfere occasionally with concerts, particularly those received from distant points. A reasonable attitude will help the listener here. He should remember that he cannot expect every act in even the best vaudeville performance to be tremendously amusing and just what he wants, nor can he expect the weather every day ers of private houses frequently drill to be clear and pleasant.

summer storm may interfere with the occasion of the most severe sional inspection they require. both picnics and radio. The listener your audience will be disappointed. necessary for the extension, two for will prevent corrosion. get the best there is in radio during evening among static-battered sigall seasons, and, above all, he should nals from weak distant stations. be reasonable The Distant Listener

If the listener lives rather far away even on the lawn, using an approfrom all radio broadcasting stations priately longer cord to connect the is also available, but it is much heavof a power of a few kilowatts or less which he wants to hear there are several things he can do. He can lengthen his aerial wires and increase cast listeners: their height from the ground. Both of these measures make the signals louder, as a general rule. He can good programs from the nearer staadd an audio amplifier, unless, of tions most of the time. course, he already has this instru- 2. Do not be disappointed if an ocment. He can also increase the volt- casional disobliging storm interferes age of his B battery, or plate battery. up to 90, 112 or even 135 volts. He can use a more sensitive loud speaker or content himself with head-set operation. He should also tune more carefully, so as to get the very loudof giving. If there is a tickler adest signal which his set is capable justment on his set he should learn speakers and more careful tickler and how to use it so as to get full volume of signals. And he should remember get are going to be even better results in the winter.

#### The Nearby Listeney

If the listener is very near a powerful broadcasting station he may get generally less pleasant than moderate The thin, Christmas tree wire is sugexcessively loud signals from that signals, particularly during the gested for this purpose. R. H. station and have difficulty in picking summer. up other stations when the nearby 5. If your local station comes in

antenna having a length of between some people than to oth a few feet and, say, 30 to 50 feet. A 6. In selecting your evening's profixed condenser of five ten-thou- that they do. sandths of a microfarad (0.0005 mfd.) 7. A little patience in learning to an outdoor antenna. Or he may use set and how it works. a large antenna and add to his set any of the better wave traps now avail- radio column of a newspaper or a able which will greatly aid in cutting good radio magazine or two: It helps out an undesired station.

until he gets the best signals and the Information of this sort is an aid greatest ease of choice of one station or another. A little patience is re-9. Ask your radio dealer for advice; quired to get the desired results in he probably can tell you what you some cases. It should be remembered want to know and will be glad to that no one ever learned in five min- do so. The manufacturer of your utes to run an automobile skillfuily set also is willing to help you get the through heavy traffic. Sometimes the "traffic" in the ether is heavy, and it 10. Do not throw away the direcmay not be easy at first to pilot the tion sheets or booklet that came with desired signals through the receiver. Paderewski took quite a little time to hat it was worth while. So is time spent in mas- which are given. If you have lost toring the capabilities of the receiv- the direction sheets write to the

#### **Miscellaneous** Hints

lightning storm this summer, and A total of four or five wires

Sometimes delightful summertime the loudspeaker out on the porch or from appropriate surroundings.

Advice to Broadcast listeners There are ten good rules for broad-

1. Do not try to hear ordinary broadcasting from Australia in midsummer. Be satisfied to enjoy the

with your summer radio evenings. There are many fine concerts coming. You cannot expect to find a pearl in every oyster nor to receive a recordbreaking concert every night.

3. If you want louder signals use a longer aerial, more tubes, higher receiver adjustment. 4. A pleasant signal-filling a mod-

to give satisfaction. Musically such a signal is ideal. It is not worth while producing signals which deafen be extended by means of a flexible the neighbors. It is wasteful to in-

station is in operation, particularly if too loudly and drowns others out a his receiver is not very selective. In smaller aerial will help in tuning extreme cases it is not possible to get him out, with a small condenser conthe distant station at all under such nected between aerial and ground. circumstances any more than it is Or a simple wave trap may do the possible to hear a whisper from a trick. And if all measures to get distance when some one else is shout- rid of the local station fail why no. ing nearby. Still a good deal can be enjoy his concerts? He is working accomplished by some of the follow- hard for you, and it is nobody's fault ing measures which should be tried. that you are so close to him that The listener can cut down the size you are bound to hear him. Broadof his antenna or use a small indoor cast stations have to be closer to

few trials may be necessary to find gram try for the higher-powered the best length of indoor antenna in broadcasting stations. They were desuch cases. When an antenna less signed to give better summer-time than 30 feet in length is used, a small service, and you generally will find

should be connected between the handle your receiver yields rich reaerial and ground binding posts or turns in satisfaction from fine sigterminals of his set. This will per- nals. Remember that "Rome wasn't mit the reception of signals of the built in a day" and keep on getting same wave length as is possible with more and more familiar with your 8. It is a good idea to read the

you to know how your set works The listener should experiment and keeps you up to date in radio.

learn to play the piano, but it was then and follow the suggestions dealer or manufacturer for another copy. The direction sheets answer

First of all, it is not wise to invite most of the questions which have a large group of critical people to a been puzzling you and preventing you party at your home some definite from getting the best out of your set.

for most radio receivers need not be kept directly beneath the table holding the set, but may be hidden behind some convenient piece of furniture in the room and then connected properly by means of flexible extension wires.

installation is improved considerably. Favorite places for the batteries are behind lounges or couches ar-

ranged diagonally across a corner and hear them holes through the floor and drop the Similarly, he must not expect every night next week with the promise wires directly to the cellar, where system.

should become acquainted with his During the summer radio listeners the A current and two or three for local stations or with the nearest should be prepared to take "pot luck." the B. For the A cable standard part of the entenna system, should them during the summer, and be sat- concentrate summertime reception on as it is plenty heavy enough electriisfied with the long-distance records the higher power stations or those cally and easily handled mechanically. nearest to you. It is best to take One wire of such double cord has aerial itself. A cold water pipe is he has made or will make in the their programs and which come to a red marker string running through generally considered a good ground winter. In other words, he should you clearly rather than to "fish" all it, which acts as an indicator; this connection. However, it is possible wire should be regarded as the A the ground clamp which connects the WJZ's Transmitting Towers

wire to the pipe has become loose. For the B circuit the flexible wire reception can be secured by taking sold for Christmas tree fixtures is In such instances the clamp should best, as it is thin and does not occupy be replaced with a new one. much space. Single flexible lamp cord receiving set. Radio concerts gain ier than the other material and forms ground connection it might also be addition to supporting the six-wire a rather bulky cable if several strands a good plan to attach a connection to "T" type cage antenna used in broadare bunched together.

prevent accidental short circuits con- the ground post of the radio set. nect the ends of the wires to the them afterward.

Lamp cord is obtainable in dozens of different colors of insulation, and if you visit a large supply store you may be able to select some wire to match your woodwork exactly. Apply the color scheme to the aerial and of signals. And he should remember erate-sized room should be enough should use the ugly black wires usuleads; there is no reason why you

system-now the receiver itself.

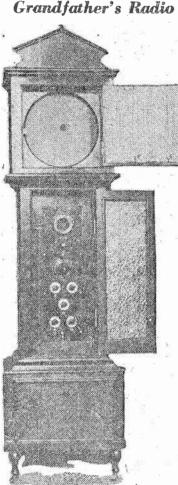
insulator. These may be cleaned with

perative

a nail file.

hreak.

wire and located wherever it happens sist on tremendous signals, which are to look best or give the best results.



Henry S. Gruger, of Lancaster, Pa.. a cabinetmaker and radio fan, has produced this unique radio set which is housed in a grandfather's clock. It is a big improvement on Longfellow's "Clock on the Stair," whose vocabulary was limited to "Forever\_Never."

### Summer Is the Ideal Time to Fix Up the Radio Set for Fall

Examined, Tested and Repaired to Assure **Satisfactory Operation** 

#### By Elmer M. Wakefield

YOW that the warm days of summer are upon us it seems a fitting time for radio fans to improve their radio receiving apparatus. The radio receiver, like every other mechanical appliance for it is an electrical machine needs a thorough overhauling about once a year.

The coming fall and winter has many things in store for the radio fan. There are to be tests, excellent programs and hosts of other things which will make the ardent fan burn with desire to

A good plan to follow for the over- often become noisy when they drop hauling is to start with the antenna below 17 volts and 47-volt batteries If the aerial wire is badly at 37 volts.

day to be just right for long-distance that they will positively hear a cer- the batteries are out of sight but corroded it should be replaced with battery whether it needs it or not. It is a good plan to replace the C radio reception. Now and then a tain program. That evening may be still readily accessible for the occa- new. Enameled wire is always de- The usual life of this latter battery sirable because the coated surface is about a year. Its cost is small, and after replacing it one may rest assured that he will not need another The ground, which is, by the way, for at least year.

In the above the writer has at. "super-power" stations and enjoy You will also find it a good idea to double flexible lamp cord is ideal, be thoroughly examined. The earth tempted to present a general outline connection is as important as the to follow for overhauling a radio receiver. These suggestions apply to both home-made and factory-built receivers.

**Guide Mail Flyers to Field** The 300-foot antenna towers of station WJZ's transmission plant at While experimenting with the Bound Brook are doubly useful. In other grounded objects, such as vent casting from this station, they also The wires should be tied together pipe, stove, etc. If possible buried serve as towers of light to guide the with pieces of string every foot or wire or copper strip, should be tried. United States air mail flyers to their so and fastened in place along the In other words, everything that is landing field, which is only a few edge of the floor by means of U- connected to the earth in any manner miles distant from the transmitter. shaped tacks known as "staples." To whatsoever should be connected to Before the erection of the transmitter at Bound Brook, the officials of The additional ground connections | Hadly Air Mail Field were forced to receiver binding posts first and secure may not make any noticeable differ. use makeshift guide posts to lead the ends at the batteries later. Tag ence on the reception of local sta- the planes "home," but as soon as the various wires properly before tions. By local stations we mean they discovered the two 300-foot bunching them together, so that you those within a radius of about 100 structural steel towers rising into the will have no difficulty in identifying miles. The improved ground connec- atmosphere, they immediately artion may make a great difference, ranged to convert a possible air however, on the reception of distant menace into a guide pylon by day stations. So much for the antenna and an aerial lighthouse by night.

There were certain difficulties The logical way to start is to rewhich had to be overcome. The move all signs of dust which may towers are of steel and to prevent have collected during the preceding absorption are insulated at the base. ground wires as well as to the battery winter. This may be done with a They acquire a heavy charge of radio camel haired paint brush. Dust is frequency currents when the station apt to have a disastrous effect on the is in operation. This charge is so efficiency of the apparatus. When it great that even when the base (the dust) becomes moist it becomes insulators are shorted to "ground" a conductor of radio frequency cur- the towers, a severe high frequency rents. This naturally reduces the burn can be received by touching efficiency of the set. In some in- them. The task of placing markers stances it has been known to cause to distinguish the towers in daylight a short circuit, rendering the set in- was simple, but no lights or wiring could be placed upon the structures The next step is to clean all me- to light them at night. Red reflectchanical connections, such as binding ors were placed in such a manner on posts and clips. Sandpaper is very each tower to reflect the beam of effective for this purpose. Also the searchlights located on the ground prongs of the vacuum tubes should sending rays of red light into the be cleaned. The solder on the tips evening heavens. is corrosive. The black corrosion

which forms on them is a fairly good Monterey Society Orchestra **Opens First Shore** Season

In a setting that breathes the air The dust which collects between the plates in a variable condenser of the sea, the Marine Arts Room of also should be removed. A pipe the New Monterey Hotel, Asbury cleaner may be used for this purpose. Park, N. J., the Monterey Society If contact to the rotary plates of Orchestra, which has just opened its the variable condenser is made first shore season, will broadcast to through a sliding bushing the bush- thousands of WOR fans throughout ing should be cleaned as an insurance the East during the warm summer

a "pigtail" connection is used for By tuning in to WOR on Monday at this purpose it should be examined 10 p. m., Wednesday at 9:45 p. m. to see whether or not it is making and Saturday nights at 10:30 p. m., the necessary connection. One point this organization may be heard with to remember in this connection is its lilting dance tunes.

never to use oil for lubricating the Elmer Cook, who conducts the bushings of a variable condenser. Oil orchestra in this atmospheric setting, takes the form of an insulating film is extremely popular among the colon the contact surfaces, spacing them legiste set. His orchestra was one a fraction of an inch apart. Although of the first choices among Princeton this distance is not very great, never- or the hist choices among a time on the bist of the students at a recent "frat" dance, and theless it insulates the two points he has helped make enjoyable many "hops" at universities and colleges throughout the East. It was likewise this orchestra which played at the inaugural ball when Governor A. Harry Moore took the reins of the State of New Jersey.

Novel Lead-In Arrangement Those who do not want to deface copper wire in such a way that it their houses by drilling a hold causes it to corrode. The chemical through the window sill for the leadaction which takes place makes the in will find that a board may be set wire brittle and often causes it to in the sill under the sash. A piece of wood the width of the window and If dry-cell B batteries are used about three inches high will answer they should be tested with a volt- the purpose admirably well. As many meter. Poor B batteries are often holes may be drilled in such a board the cause of many queer noises in for the insulators as desired without a radio set; 221/2-volt B batteries defacing the house.



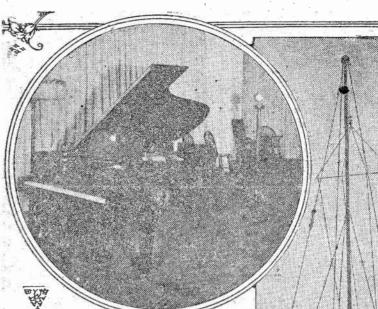
Vorld Radio Histor

The A and B batteries required Once Every Year a Receiver Should Be Thoroughly

# WCAP, at Age of Four Years, Has Memory of Many Events of National Interest

A List of This Station's Programs Includes the Most Important Broadcasts in History of Radio

**By JAMES E. CARTIER** 



A corner of the studio of Station WCAP, Washington, D. C. Right-The antenna of the station, located on the top of the Chesapeake & Potomac Telephone Company's building

OR an infant three years of age, broadcasting station WCAP at Washington has performed many notable achievements. Since making its debut on July 4, 1923, its performance has reached huge proportions and its voice has been far-reaching. This station, located in the shadow of the Capitol, has engaged in a nation-wide service, not only by broadcasting nationally known programs, but in picking up and transmitting to other stations features of outstanding activities on the part of the President, his Cabinet and other high officials of the government.

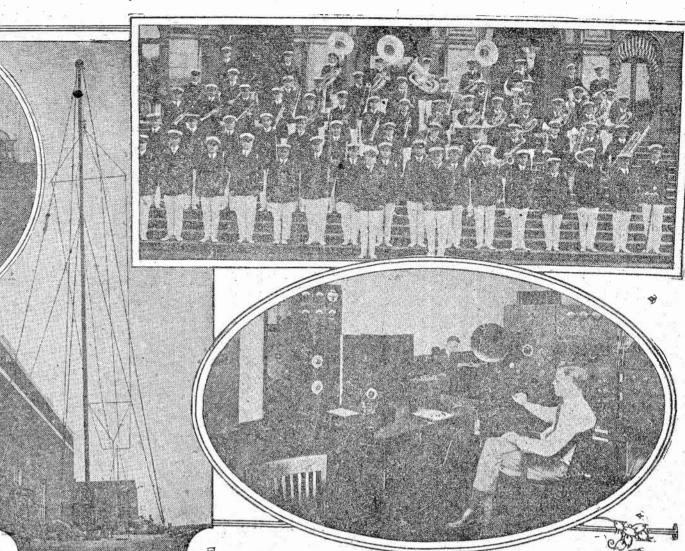
The first lusty output of WCAP was the broadcasting of a joint Fourth of July program with its sister Bell operating station WEAF, New York. Since that time it has been on its own for many important performances, while in other cases it has been on the air jointly with stations located from coast to coast and border to border throughout the United States.

Its first hook-up of national importance was the broadcasting of the President's message to Congress, December 6, 1923, when WCAP, in conjunction with WEAF. New York; WJAR, Providence; WDAF, Kansas City; WFAA, Dallas, and ESD, St. Louis, connected by long distance telephone lines, carried the voice of the President to millions of people scattered from the Atlantic Coast to the Rocky Mountains. With the broadcasting of this message to Congress, a new era in communi-- cations was established. The President spoke into the microphone of WCAP in the House of Representatives at Washington and his voice was picked up and carried over telephone circuits to the radio stations in various sections of the country where it was broadcast simultaneously to the people of the country at large.

#### Another Big Hook-Up

The next national hook-up in which WCAP participated occurred February 28, 1924, when California and Cuba were tied in by long distance telephone lines and a program, arranged for and presided over by General John J. Carty, vice-president of the American Telephone and Telegraph Company, New York, called the foll of radio stations, extending from Havana to San Francisco, was broadcast over the Western Hemisphere.

WCAP has had the distinct privilege of broadcasting the addresses of the President of the United States on numerous occasions, while two former Presidents have made a number of talks before its microphone. The voice of President Coolidge has undoubtedly been heard by more people-due entirely to the radio and its telephone connections-than any other one man in the history of the world. His talks from Washington are generally broadcast by other stations connected by long distance lines with WCAP.



Above-The United States Navy Band, which is frequently broadcast by Station WCAP. Below-The station room of WCAP, showing transmitting equipment

Among the principal addresses of national importance made by the President have been the mid-year meetings of the Chamber of Commerce of the United States, the annual conventions of the American National Red Cross and the annual and semi-annual meetings of the Bureau of the Budget. At the latter meetings, General H. M. Lord, Director of the Budget, has also talked, discussing the affairs of the business organization of the government for the edification of the public generally.

#### Wilson's Last Appearance

Former President Wilson made his last public appearance at the Armistice Day celebration in the Arlington National Cemetery, November 11, 1923. This address, picked up and broadcast by WCAP and other stations, was heard far and wide, judging from the hundreds and hundreds of letters of appreciation and commendation on this memorial message to the American people by the war President which have been received by the management of WCAP.

The funeral service of former President Woodrow Wilson, held February 5, 1924, in the Washington Cathedral, as well as the funeral service of President Harding, were broadcast by WCAP.

Chief Justice and former President Taft has also talked before the microphone of WCAP on a number of occasions. Notable among the outstanding events was the ceremony incident to the laying of the cornerstone of the George Washington Masonic Memorial at Alexandria, Va., November 1, 1923, and the dedication of the United States Chamber of Commerce at Washington, May 20, 1925.

The National Defense Day programs of September 12, 1924, and July 4, 1925, were picked up by WCAP and transmitted by long distance telephone circuits to other broadcasting stations throughout the country, making it possible for millions and millions of people to hear these patriotic programs.

#### **Nominees Speak Frequently**

In 1924, when the political campaign was warming up and at its height, the nominees for President and Vice-President made frequent addresses from WCAP. President Coolidge, John W. Davis, Democratic nominee, and Senator La Follette. running on an independent ticket, as well as General Dawes and Senator Wheeler, | President has delivered the principal adtalked frequently from this station. The program incident to the inauguration, March 4, 1925, was picked up by WCAP and transmitted to a chain of stations that broadcast this national event to every section of the country.

Outstanding sports, including the world series ball games, football games of national interest and hundreds of other features, have been put on the air for the entertainment and edification of the people of the North American Continent.

One of the features of universal importance broadcast by WCAP was the proram of the National Holy Name convenion held at the Monument Grounds, Washington, September 21, 1924. The estimated attendance at the ceremony was 125,000 persons. President Coolidge addressed the assembly. He was followed by his eminence, Cardinal O'Connell, of Boston. legate of the Holy Father, and the Rev. Michael J. Curley, Archbishop of Balti more.

The Lincoln Day program of February 12, 1926, brought together many extraordinary features. It was the first time in history that so great a number of notable statesmen had been brought together in the studio of any broadcasting station.

Among the speakers who eulogized the great war President were Herbert Hoover, Secretary of Commerce; William M. Jardine, Secretary of Agriculture; Herbert Work. Secretary of the Interior; Theodore Douglas Robinson, Assistant Secretary of the Navy; John Barton Payne, chairman of the American National Red Cross and formerly Secretary of the Interior; James E. Watson. United States Senator from Indiana; the Hon. C. W. Ramsmeyer, of Iowa; Mrs. Anthony Wayne Cook, president general Daughters of the American Revolution, and Mrs. John D. Sherman, president of the American Federation of Women's Clubs.

#### U. S. Army Orchestra Plays

An added feature of the program was music of the time of Lincoln by the United States Army Music School Orchestra. The ceremony was opened by the grand march Germania," which was one of the numbers played at the inaugural bail of President Lincoln, March 5, 1861.

The Memorial Day services from the Arlington National Cemetery, at which the people.

dress during 1924, 1925 and 1926, have also been broadcast by WCAP and other stations. In addition the Maine Memorial exercises have also been put on the air for three successive years by this station.

The Educational Week program of February 21, 1926, as well as the oratorical contests of 1925 and 1926, in which high school students from every section of the United States have met in competitive orations, have been put on the air by WCAP.

The Kentucky Derbies, as announced by the sports editor of "The Washington Post," of 1925 and 1926 have also broadcast from the studio of WCAP. On May 13, 1925, the program of the National Conference on State Parks, at which Judge John Barton Payne was the principal speaker, was put on the air from this station.

Other outstanding features have innationally known organizations as the United States Marine Band, Captain William H. Santleman. leader; the United States Army Band, Captain R. G. Sherman, commanding, and Captain William J. Stannard, leader, and the United States Navy Band, Lieutenant Charles Benter, leader.

#### **Civic Programs Broadcast**

In addition to the above features, national and otherwise, station WCAP has had the distinct privilege of picking up and transmitting from its studio or in the field all civic programs that would be and have been of general interest to the public.

During the present session of Congress "matters before the House" have been discussed almost weekly by members of Congress, while other officials of the government have talked on various and sundry subjects of interest to the people of the country at large.

Each Sunday at 11 o'clock this station broadcasts the service from a Washington Church and at 4 o'clock Sunday afternoon it puts on the air the service of the Washington Cathedral. In addition, through an arrangement with WEAF of the Broadcasting Company of America, New York. it puts on the air the program of the Capitol Theater, New York City, and the Atwater Kent radio hour, outstanding musical features that have brought pleasure and entertaizment to millions of

# New Circuit With Uniform Energy Transfer on All Waves Solves Important Problem

Combination of Electromagnetic and Electrostatic Couplings Works Out to Advantage in Radio

VER since the first multi-tube tuned | the capacity of the internal elements of | audio-frequency amplification. It is a | radio-frequency broadcast receiver was placed on the market one of the biggest engineering problems facing the radio industry has been the development of a circuit which would have a uniform energy transfer characteristic throughout the entire wave band of 200 to 600 meters. As the exact meaning of the last phrase in the above sentence may not be appreciated by the non-technical reader of this article, an attempt will be made to explain and illustrate its importance and significance. Also, a new curcuit. which, it is claimed, overcomes many of the undesirable characteristics present in most tuned radio-frequency curcuits, will be described.

Before discussing the question any further it might be wise to explain, so that home builders who may contemplate the construction of a receiver using this circuit will not be disappointed, that no attempt will be made in this article to give detailed directions for making a set of the type to be described. At the present it is the writer's sole purpose to give data on a development in radio which may in time effect an improvement in radio receivers. The fundamental circuit of the receiver, however, will be found on this page, and those who are experimentally inclined will find sufficient information to enable them to investigate the possibilities of the circuit and design a set employing it.

To explain the undesirable effect of ununiform energy transfer in a radio receiver, the simplest type of tuned radiofrequency set will be considered, i. e., the type of circuit which employs two or more stages of tuned radio-frequency amplification in cascade where each stage consists of a three-element vacuum tube and an inductively coupled transformer with a fixed primary winding and a capacity tuned secondary winding, and where stabilization is maintained by a "losser," such as a high resistance in the grid circuit. When operating this type of set one of two things will be discovered: either the set will not oscillate on any wave length, but will give best results on the low waves, or the set will oscillate easily and will be very hard to control on the low waves. In the first case the set is not efficient and for this reason will not produce satisfactory results. In the second case the receiver is efficient but unstable, and as a result the signal may be distorted by too much regeneration, the set will be found more difficult to tune and it is apt to cause interference in nearby receiving sets due to its radiating oharacteristics. All of the objectionable features mentioned above may be traced to one fundamental cause, namely, the energy trans- is possible to construct a single control of the more salient of our observations fer, and therefore the efficiency, is greater set employing as many as three stages of during these investigations; as well as higher waves. To make the efficiency equal on all waves some kind of a compensator is inserted in the circuit and this variable control causes instability.

In addition to the type of radio-frequency circuit mentioned above there are also circuits in which oscillations and instability are prevented by a fixed balanced circuit. In properly adjusted receivers of this type oscillations will not occur, but the set is most efficient on the wave length to which it was balanced, and on the other wave lengths a certain amount of regeneration is present, which might cause distortion. Two other disadvantages of receivers of this type are: first, the wave length range must necessarily be very-limited, and, second, to obtain highest efficiency the set must be balanced for the particular tube with which it is to be used.

A circuit without the objectionable characteristics mentioned above has recently been announced by Edward H. Loftin, a consulting engineer of New York City. Six important claims are made for this circuit, which are as follows:

1. It, may be constructed so that the energy transfer throughout the entire broadcast wave band is uniform rather than greatest on the high frequencies and falling off as the frequency is decreased. 2. The tendency to oscillate as a result of the coupling through the tubes is overcome by a method that is independent of

#### **By FULTON H. CRAWFORD**

the tubes used in the radio-frequency three stages of tuned radio-frequency amstages

3. The possible wave length range of the receiver is greatly increased, without increasing the maximum capacity of the variable tuning condenser or inductance of the coil, by the form of coupling employed, which decreases the distributed capacity of the circuit.

4. The quality of reproduction is improved by the complete elimination of regeneration and oscillations.

5. Positive interstage regenerative couplings that may be produced in the construction of the receiver may be overcome by the production negative regeneration through the tube capacities.

plification, a detector and two stages of batteries, in a cabinet measuring only 16 in. by 8¾ in. by 6 in. The set employs one control set and aside from the wave any desired fraction of this voltage may length tuning dial there are only three rheostat knobs and a battery switch or resulting in a voltage EL, which increases the front of the panel. The set is also so in value with the number of turns in the designed that it may be operated with either dry cell or storage battery tubes. For a technical description of the circuit no more authoritative data could be obtained than that presented by the in- C2. Assuming a resonant condition, the ventor. The following are abstracts of a voltage developed across C2 will be in= entitled "Combined Electromagpaper netic and Electrostatic Coupling and Some | For example, if C1 and C2 are equal, then Uses of the Combination," which was read the voltage EC2 will be just half the im-

"Starting in an elementary way, let us consider the various voltages existing in the oscillatory circuit shown in Figure 1. With an impressed voltage E1 across both the inductive leg and the capacitive leg, be obtained by tapping the inductive leg, tapped portion of the inductance. Similarly, the capacity leg may be tapped by dividing its capacity into two series portions, as is shown by condensers C1 and versely proportional to its ratio with C1.

៤ខ្ល -00 -1111111 -C1000L2 -C20 JULLIUL G₽ minn AND C1+ C2 = Ecz  $C_2 \neq E_{C_2}$ 1 1 (2)3 R "3 R ara araiter FC18 ÉC1 +C2 **(4)** 5 6

Six diagrams used in describing the new circuit discussed on this page

for use with one set of tubes it may be used with any other set of tubes without making any further adjustments. This makes it possible for a manufacturer to provide a receiver which will operate efficiently with all available tubes and it enables the owner to use either dry cell or storage battery tubes, as he desires.

In addition to the advantages just enumerated, there are other interesting features of the circuit from the manufacturer's and also from the broadcast fan's viewpoint. The circuit adapts itself excellently to single wave length control operation, which is very desirable in these days of simplified tuning. Also because of the unusual stability of the circuit it

Hartman Electrical Manufacturing Company, Mansfield, Ohio, provides an excellent example of how simple a six-tube receiver of this type may appear. This set, which is shown in the accompanying halfception of the loud speaker, antenna and | desired manner with frequency.

6. After the receiver has been stabilized | at a meeting of the Institute of Radio En- | pressed voltage E1. If C2 is larger than gineers by Edward H. Loftin and S. Young White on June 30, 1926:

> "The energy transfer characteristic of the normal forms of coupling employed in radio receivers is well known to all of us and in the usual forms transfers energy more readily at higher frequency than lower. This characteristic makes for higher efficiency and consequently greater tendency toward instability of commercial vacuum tube receivers on the high-frequency portion of the broadcast band.

"Our investigations of the combination of electromagnetic and electrostatic couplings were for the purpose of removing this objectionable characteristic, and we undertake in this article to outline some some uses made of the combination. One A commercial receiver employing this of these features is the use of a coupling circuit, namely, the Hartman Single-Six | means which has its frequency character-Compact, which is manufactured by the istic reversed in that its most efficient energy transfer takes place at the lowest frequency. By suitably combining this coupling means with a coupling having the usual characteristic we are enabled to so design the combined coupling that tone, is completely housed, with the ex- the total energy transfer will vary in any

C1 it will have proportionally less voltage across it, and vice versa. "Keeping these voltage relations in

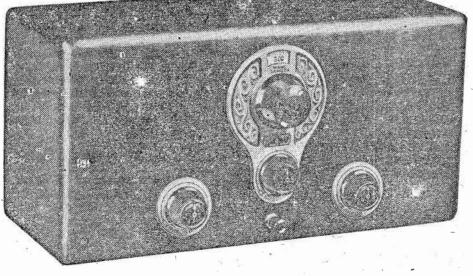
mind, let us examine Figure 2. In this circuit C1 has been made variable, while C2 remains fixed. It is evident that C1has now become the variable tuning condenser for the system. However, in varying C1 we find that we continuously vary its ratio with C2. The larger C1 becomes in its relation to C2, the higher will be the voltage EC2. However, when C1 is maximum, the frequency to which the system is resonant is minimum, and we have the condition that the voltage EC2 is maximum when the frequency is minimum, and this voltage can be made any desired portion of E1 by adjusting the capacity ratio of C2 and C1.

One practical application is shown in Figure 3, where the arrangement of Figure 2 is used as a portion of an interstage coupling for a three-electrode vacuum tube amplifier system of the so-called tuned radio-frequency type. The principal addition lies in the use of a coil L1, through which the output of the tube passes before reaching the branch. point of the two condensers C1-C2. The energy transfer due to L1 has the normal characteristic of increasing with an increase of frequency, while the coupling due to the varying reactance of C2 with variations of tuning condenser C1 has the reverse characteristic.

"It is obvious that the electromagnetic coupling, due to L1, may be combined with the electrostatic coupling due to -C2 in either an opposing or an aiding phase. If they are combined in an opposing phase there will be some point in the frequency band where they will be equal, and since they oppose, a balance will obtain at this point and no energy transfer will take place. It is, therefore, obvious that an adjustment of this kind would be of no value in receivers.

"To satisfy the requirements of receivers that must cover wide ranges of frequencies, such as broadcast receivers covering the broadcast band, we have found that by combining electromagnetic and electrostatic couplings to transfer

Continued on page five



Spanning the world in a single second, taking pictures, voice and music through the air with the speed of light, radio tocay has changed our very mode of living. The first radio program was broadcast in Pittsburgh about 1920. To-day there are about 600 broadcasting stations in the United States alone. In 1920, when broadcasting just started, there were only seven manufacturers of radio equipment; there are probably over 3,000 to-day. There are about 10,000,000 completely equipped receiving outfits in daily use in the United States.

Radio has grown at a terrific pace, yet who will deny that there is still plenty of room for improvement and expansion? More likely than not it is this restless activity of a new and fast moving industry that attracts large numbers of young men to the radio engineering profession.

One cannot deny that real opportunities exist in the radio engineering profession and that radio to-day is urgently in need of trained radio experts. But one cannot fit himself quickly for success in this new field, and one must have an aptitude for mathematical and physical sciences and a taste for mechanical and electrical contrivances and devices if one expects to succeed at all. It must be noted in this connection that the greatest obstacle to success experienced by the youth who has the ability to fight his way upward from the levels of a trade position is usually the meager nature of his general educa-

tion.

work.

# Radio as a Profession for the Young and Old Men of America

One Must Have a Keen Ear, a Quick Eye and Skill at Manipulation to Qualify as an Engineer

HERE is no doubt that large numbers of boys and young men are at this very time considering "radio" as a profession., Many of these have just left grade and high schools and are trying to find a place for themselves in the world-a place which would offer the opportunities that youth well deserves. What is it that prompts the average young American to turn his attention to radio as a profession?

It took the automobile industry fifteen years, the talking machine industry twenty-five years, to cover the same ground of industrial development that the radio industry has covered within the last five years. Within this short period of time radio has grown from a \$2,000,000 a year industry to one in which probably not less than \$500,000,000 is spent yearly. There are over two score magazines devoted exclusively to the subject of radio.

#### Young Read Advertisements

Young people read advertisements of various radio correspondence schools, some good, some not so good, in which the enterprising publicity and advertising managers of the respective institutions make it a point to misinform the reader and prospective student that radio offers any young (or old) man who takes their course (at \$5 down and \$5 a month) the opportunity of making money easier than he ever made it in his life.

"Why," the "educators" exclaim in a paroxysm of prospective business, "it is easy to make big money in radio-\$50 to \$250 a week. \$3,000 to \$10,000 a year." and when the stunned yet conscious youth inquires "What Price Glory?" he will be cheerfully informed that the only prerequisite knowledge for taking the "radio expert's" course is just the ability to read and write and that if he carefully studies their easy-to-learn-big-pay-course he should within less than a year (why, many radio expert, a master of not one but every branch of radio.

In other words, the whole process of becoming a radio expert in all branches is reduced to a formula as simple as A B C; simply "tune in" on a big pay radio job-choose any position you want! Ridiculous!

#### <sup>a</sup> Radio Engineering

Radio engineering consists of a large number of very important phases; any one who knows anything about engineering at all will tell you that no one engineer can hope to attain success in all its branches, since every branch requires a great-amount of specialized knowledge, as well as great amounts of minute detail

Dr. Alfred N. Goldsmith, chief broad- | reading the best journals which he can i less than one hundred telegraph and telecast engineer of the Radio Corporation of America and editor in chief of "The Proceedings of the Institute of Radio Engineers" and who is by far one of America's most prominent radio engineers, in a statement to this writer had the following to say in the form of advice to young men who aspire to take up radio as their life's work:

"Before entering the radio field a young man should ask himself these questions: Have I a keen ear, a quick eye and some skill at manipulation? Do I quickly grasp scientific facts about machinery and electrical devices? Am I willing to study nights? Am I prepared to spend several years working my way up from the bottom in a radio factory, a broadcasting station or a trans-oceanic or marine station? And will I be at home in an engineering profession

"If he can answer all of these questions sincerely and positively in the affirmative he may consider radio as a profession. There are two ways to get into the radio field. One of them is to study electrical engineering and finally concentrating on radio engineering. He can then enter a radio company in an assistant engineering capacity and work his way up.

"The other method largely involves selftuition. It is a harder way and a longer way and requires real grit and unusual aptitude. The prospective radio engineer must study at home the best available books on elementary and advanced physics, algebra, some trigonometry, some good books on direct and alternating current machinery, and a succession of radio engineering textbooks, starting with the more elementary and ending up with the most advanced books which he can find. At the same time, or shortly thereafter, he will do well first to assemble a number of radio sets himself at his home, and then to get a job in the assembly of radio sets or in the test or serving of sets with a reliable and up-to-date radio concern. By sticking to this job and keeping his eyes and ears open there is no reason why he should not within a few years secure a fairly responsible engineering position in the radio field.

"He should also keep in touch with other engineers and attend meetings of engineering societies, at the same time

### By BORIS S. NAIMARK

secure. It is only in this way that he can keep up to date in the radio art.

"Radio engineering is a splendid profession for a moderate number of ambitious young Americans, but it has no place for the man who is waiting for life to hand him its rewards on a gold platter. He will have to learn his job and stick to it to make a success in radio."

During his teaching years Dr. Goldsmith has inspired and instructed some of the best known radio engineers of today. At the College of the City of New York he gave the first regulation engineering course in this country, and, judging by the caliber of the engineers that he has turned out it was one of the best anywhere.

Pressure of professional and other responsibilities have prevented the continuation of these radio engineering classes five years after their inception in 1913. At the time Dr. Goldsmith gave up teaching entirely---this was at the end of 1924 -he was an associate professor, in charge of the Department of Electrical Engineering at the College of the City of New York.

Dr. Goldsmith is a charter member and one of the founders of the Institute of Radio Engineers, and in addition to being editor of the "Proceedings" since 1912 he has also been the secretary of the instituté since 1918.

When one considers the fact that the doctor is only thirty-eight years young, one cannot help but be inspired to greater heights.

#### **College Education Not Necessary**

Dr. Donald McNicol, president of the Institute of Radio Engineers, author of American Telegraph Practice," the standard textbook on telegraphy, and inventor of several telegraph and telephone devices, is, like Dr. Goldsmith, of the opinion that college training, while desirable, is not absolutely necessary to succeed in the art, especially where there is a capacity for learning, ambition and facilities for experimentation.

Dr. McNicol's statement to this writer in full follows: "In judging the employment future for radio engineers and radio technicians it is helpful to recall that twenty-five years ago there were perhaps

phone engineers employed in this country. It was stated then that electric communication did not offer a field for more than very limited number of engineers. But to-day there are more than two thousand communication engineers employed in New York City alone.

"Radio is a profession which I believe will offer to the student and engineer a useful future at rates of income comparing very favorably with other lines of engineering.

"The colleges are now giving thorough instruction in radio science, and from this source will likely come the men who will excel in research work.

"Of course, the fellow who is not in a position to secure a college training may still make good progress in the art. Systematic study of radio books and journals, together with as much experimentation as can be carried on, paves the way to position and salary."

#### **Required Technical Knowledge**

It is this writer's opinion that the amount of technical knowledge required by one to have a chance to succeed in radio will depend largely upon what branch of the radio industry one has chosen to specialize in. College training is more important to one who expects to specialize in radio research and engineering; it is of less importance to the operator, manufacturer and publisher, and sometimes has very little, if any, value to the radio salesman whose main qualification is the ability to sell. The latter statement does not, of course, apply to the salesman who has to cater to the engineering fraternity.

The idea that radio offers a short cut to wealth to all, irrespective of ability, knowledge or amount of work, should be dismissed at once by all who seriously consider radio as a vocation. This is the warning that Dr. J. H. Dellinger, chief of radio laboratory of the Bureau of Standards, issues to the radio student. Dr. Dellinger says: "In each of its branches no one should expect great returns from radio unless he has some aptitude or some service to put into it.'

It has been the writer's experience that entirely too often young people select radio as their life's work without due deliberation and without a thorough analysis of their "personal equation" as well as of the opportunities that radio may or may not offer as compared with the opportunities presented by other professions. One must have more than a liking for radio to succeed in it professionally, and one must bear in mind that "radio as a vocation is very different from radio as an avocation."

Dr. Dellinger says: "Radio is an estabned industry, or set of industries, and the frequency, and can be adjusted to pre- its future growth is inevitable. The person who seriously considers it as a vocacaution should be taken that R does not | tion must weigh both the service which he can render it and the satisfaction it can return to him. We are living in a whizzing age, and radio is taken as the most conspicuous example of the rapidity of our times. Many a young man who wants to keep up with the times concludes, therefore, that radio is the line for him. It is certainly worth while coolly to pause and examine what returns you are likely to get, and perhaps even more worth while to consider what service you can render." To illustrate that radio is not a field where one may at will get rich over night,-Dr. Dellinger says: "I am told (I do not vouch for it) that only one in a thousand of the radio patents that are filed are of any value to radio, and only a fraction of that fraction brings returns to their inventors."

> To sum up, if you are seriously considring radio as a profession von must sweep aside the mere glamour that radio derives from its newness and its patent narvels." Before making any final decision read some books relative to engineering as a profession; this will help you to determine if you will be at home in an engineering profession, such as is radio. And, above all, remember that "radio has no place for the man who is waiting for life to hand him its rewards on a gold platter."

### New Circuit With Uniform Energy Transfer

Continued from page five

in a positive phase. The variable resist- cuit is sufficiently reactive to allow of osance R controls the amount of feedback. | cillation throughout the frequency band, This form of coupling is also used between stages of a radio-frequency amplifier where it is necessary to ground the con- | damping action of R will increase with denser C1 for single control receivers and the like.

"The phenomena so far discussed allow designing circuits which will permit a vacuum tube amplifier or detector type of receiving set to oscillate at the upper or lower or at all dial settings. Figure 6 shows an arrangement which allows oscillation at any one intermediate dial setting.

"As we have observed before, the point between the two capacities C1, C2 is at a potential difference to the grounded side of the system, which is determined by the ratio of C1 to C2. Whatever value this voltage has we can also always find a point T on the inductance of exactly the same votential to ground. If we join these points with a resistance R of any value no current will flow through R, since both points are at equal potential to ground. If we now vary C1, as in tuning, we find that a potential difference develops across R, since point T remains at substantially the same voltage, while the potential across C2 varies. This potential difference Lecomes greater as we vary C1 either up or down from the value at which we balanced the system. If we balance midway of the dial reading of C1, we find that to be the only spot where the absorbing action of R has no effect, and if this Figure 6 arrangement is placed across the input of a vacuum tube whose plate cir- | musical abilities.

R can be so adjusted as to stop oscillation at all points except the balance point. If we balance at the lowest frequency, the vent oscillation throughout the band. Prereach a sufficiently low value to allow the portion of the inductance below T to form

"While we have investigated and used numerous other applications of the above, those we have outlined are considered sufficient to illustrate the principles involved."

#### Joseph Richter to Play on **200-Year-Old Seidel Violin**

Those who listen in at station WHN tomorrow from 4:30 to 4:50 p.m. will hear the strains of a 200-year-old Seidel violin, played by Joseph Richter, accompanied on the piano by Arthur Kuester. Richter is a native of Bohemia and has been here for twenty years. He has studied under Krakan and Zolynsky in Poland, and for years was concert master in the Austrian army. His violin was passed down to him from ancestors who played it before many members of European royal families. Once he left it in the hallway of his home, and on awakening in the morning was shocked to find it missing from its customary place. His wife had put it safely away, however. Both men are well known in German circles around the city for their

a resonant circuit with C2.

~

# "Lead-In" Wire Forms Part of

erroneous, as the vertical wire acts metal affects this directional prop- ful proadcasters he undoubtedly will down to their windows, and if the the duil back edge has less of a gust as much like an "aerial" in pick- erty, but in general the rule holds experience some interference, the se- drop is equal to fifty feet or more tendency to pare the soft copper wire riousness of which will depend on they will have excellent pick-up sys- than the keen one has.

determining the overall dimensions eration is responsible for many com- of the receiver. The first factor he of tuned radio frequency receivers of the system.

the horizontal one in the respect that a nice horizontal wire about sixty remedy for the trouble is a trimming

660k-WJZ-NEW YORK-455m

660k-WJZ-NEW TOIM AND p. m.—Ambassador Trio. p. m.—Weather; news service. 4:4:35, 5:30, 7 p. m.—News service. 4 p. m.—"Your Daily Menu." 1:5 p. m.—"They Are Wearing"— 4:25 p. m.—"Solving, Candy Problems. 5:32 p. m.—Market quotations. 5:35 p. m.—Financial summary.

9 p. m.—Sundial Shoe Serenaders a Bonnie Laddies.
 10:30 p. m.—Harold Stern's Orchestra.
 950k—WGES—NEW YORK—316m

1:30 p. m.—Scripture reading. 1:35 p. m.—Program of sacred music. 1:45 p. m.—Walter Croft, barytone.

7:20 p. m.—Blues Chasers. 1250k—WHAP—NEW YORK—240m 3:30 p. m.—Holmes String Ensemble. 7:20 p. m.—Kitty Cheatham, recital.

of God." 9 p. m.—John Ingram String Quartet. 9:25 p. m.—Franklin Ford, "Roman

1100k-WFBH-NEW YORK-273m 4 p. m.-"Care of the Hair and Skin." 4:30 p. m.-Black Diamond Serenaders.

4 p. m.—"Care of the Hair and Skin." 4:30 p. m.—Black Diamond Serenaders. 5 p. m.—Mother Stoner's hour. 5:45 p. m.—Movie chat, Michael L. Sim

mons. 3 p. m.—Majestic String Ensemble. 9 p. m.—Radio Ramblers. 3:30 p. m.—Horace J. Taylor, reader. 3:45 p. m.—Troubadour's Tavern

chestra. 10:30 p. m.—George Quicci, pianist. 11 p. m.—Billy Day, popular ballada. 11:30 p. m.—Connie's Inn Orchestra.

830k-WHN-NEW XORK-361m 215 p. m.-Bob Schaefer, songs. 2:25 p. m.-Gertrude Baker, songs and

plano. :35 p. m. Edw. Browne's Orchestra.

2:35 p.m.—Edw. Browne's Orchestra.
8 p.m.—Prince Pioti, entertainer.
3:10 p.m.—News, racing and baseball.
3:45 p.m.—Al. Wikon's Playmates.
4:10 p.m.—Arabelle Merrifreed, contralito; Samuel Shankman, planist.
4:30 p.m.—Uncle Robert's Pais.
5 p.m.—News, racing and baseball.
5:10 p.m.—Piola Reed, soprano.
5:25 p.m.—Uncle Robert's chat.
5:30 p.m.—Uncle Robert's chat.
5:30 p.m.—Uncle Robert's chat.

5:25 p.m.—News, facing and second 7:30 p.m.—Uncle Robert's chat. 7:35 p.m.—Kay Slaters, singers. 7:50 p.m.—Charles Toblas, composer. 8 p.m.—Treasureland Ensemble. 8:30 p.m.—Schenck Brothers' Orchestra. 9 p.m.—Loew's Theater Orchestra. 9:30 p.m.—Corey Island Stadium houts. 11 p.m.—Strand Roof Orchestra. 11:30 p.m.—Roseland Dance Orchestra. 12 midnight—Silver Silpper Orchestra.

1100k-WEBJ-NEW YORK-273m p. m.-Elue Bell Serenaders. 30 p. m.-Luna's Knickerbocker Grif

Orchestra. p. m.—Al Becker, ragtime banjoist. 15 p. m.—Isabel Henderson, soprano 30 p. m.—Luna's Marine Band.

1160k-WENY-NEW YORK-258m

15 p. m.-Pauline McDonald, sopra:

12:30 p. m.—Raunne McDonald, sopranc 12:35 p. m.—Bob McDonald, ukulele. 12:45 p. m.—Edison Man, "Electrifying the Cellar." 7 p. m.—Sport rays. 7:10 p. m.—Commercial digest. 7:36 p. m.—Helen Halprin, pianist. 7:45 p. m.—Herald Square Quartet. 8:30 p. m.—Helene Rubinstein, "Birds-eye View of the History of Beauty Cul-ture."

'ture." :45 p. m.-''Voice Sounds in Radio."

Sylvan Harris. p. m.—Odierno Quartet. 30 p. m.—Starlight Park novelty. 45 p. m.—Czech program with Jose

Checkova. 0:15 p. m. Novelty night, "Punch and Judy Show."

Judy Show." **880k--WMCA--NEW YORK--341m** 10:30, 11:30 a. m., 12:30, 1:30, 2:30 and 3:30 p. m.--Market reports. 11 a. m.-Food Bureau program. 1 p. m.--Oloc Vall's String Ensemble. 2 p. m.--Odierno Ladies' Trio. 3 p. m.--Minnie Weil, planist. 4 p. m.--Book review. 4:45 p. m.--W. Curtis Nicholson, "The Right Word." 5:45 and 7-p. m.--Employment oppor-tunitiess.

tunitiesa. p. m.—Shelburne Orchestra. 30 p. m.—Ernie Golden's Orchestra. 30 p. m.—Alfred Orner, tenor. 45 p. m.—Elliot Pfiomm, bass-barytone

7:45 p. m.—Elliot Pflomm, bass-barytone
8 p. m.—Elliot Pflomm, bass-barytone.
8:15 p. m.—Elliot Pflomm, barytone.
8:40 p. m.—Talk, T. R. Weyant.
8:50 p. m.—Bradway Association talk.
9 p. m.—Paul Whiteman's Players.
9:30 p. m.—Klein's Serenading Shoemak

7:55 p. m.—Baseball results. 3:15 p. m.—Harry-Pates, Frank Pop

o boys m.—"How the District Attorney's Operates," John E. McGeehan.

and Americanism Contrasted." 9:45 p. m.-WHAP mixed quartet.

7:55 p. m.—News digest. 8:15 p. m.—John String Quartet. 8:40 p. m.—Kitty Cheatham, "The Grace of God."

m.—Cotton quotations. . m.—Farm market reports. . m.—George Olsen's Orchestra. I.—Sanford Florida sunshine hour. m.—Sundial Shoe Serenaders and

Most radio fans are accustomed to it is non-directional and receives or seventy feet long on his roof and of the aerial. thinking of the radio "aerial" as the equally well from all directions; a will then drop a lead-in of about Residents of the lower floors of tall thinking of the radio aerial as the equally well from an directions; a will then drop a lead-in of about Residents of the lower floors of tall In cleaning copper wire from which horizontal wire stretched on the roof flat-top aerial with the lead-in flas- sixty feet, down to his apartment houses really need not worry about the insulation has been stripped tened at one extreme end, as is usu- window, making a total length of at installing wires on the roof at all, scrape with the back of a knife blade, ally done, receives markedly better least 120 feet or more, depending on especially if the building exceeds not with the sharp cutting edge. If tical connecting section, the "lead-in," any cone, receives markedly better least 140 leet or more, depending on especially if the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. It is the building exceeds not with the sharp cutoing eage. as a separate part of the antenna in end points than from any other house. If he lives in the city near do is to hang single vertical wires good edge and at the same time makas a separate part of the antenna in end points than from any other nouse. If he lives in the city hear do is to hang single vertical wires good edge and at the same time man-system. This impression is entirely The proximity of large bodies of any one of the dozen or more power- over the side of the roof directly ing a better job of the cleaning, for system. This impression is entirely the proximity of large boales of any one of the dozen or more power- over the side of the root directly ing a better job of the cleaning, for erroneous, as the vertical wire acts metal affects this directional prop- ful broadcasters he undoubtedly will down to their windows, and if the the dull back edge has less of a

flat top portion, and its length must The failure of set owners to take his exact location, the total stretch tems. Such aerials may seem rather be added to that of the latter in the length of the lead-in into consid- of the aerial wires and the selectivity short, but with any standard types plaints of broad tuning. A man liv- cannot control at all, and the third they provide entirely satisfactory re-As a matter of fact, the vertical ing on the second floor, for instance, is dependent to a not inconsiderable ception with a minimum of inter-Antenna System As a matter of fact; the vertical ing on the second hoor, for instance, is dependent to a not inconsiderable for the second, so the simplest ference.

Use Back of Knife In cleaning copper wire from which

11 p. m.—Ernie Golden and McAlpin Orchestra. 11:30 p. m.—Food Show announcement. 11:40 p. m.—Ernie Golden's Orchestra. 12 (midnight)—McAlpin Entertainers. 22 (midnight)—McAlpin Entertainers.

570k-WNYC-NEW YORK-526m

7 p. m.-Piano selections. 7 p. m.-Anita Gribbon, soprano. 7:30 p. m.-Police alarms. 7:35 p. m.-Fitzpatrick Brothers, "Old-Time Songs." 7:55 p. m.-Baseball results. 8. p. m.-Gertrude and Harry Dudley. bormony duo.

p. m:-Gertruus harmony duo. 15 b. m.-Band concert from Central

1100k-WBBR-STATEN ISLAND-273m 8 p. m.-Professor Charles Rohner, vio-

Inist. 8:10 p. m.—Fred Twaroschk, tenor. 8:25 p. m.—Bible questions and abswers. 8:45 p. m.—Professor Charles Rohner,

950k-WAHG-RICHMOND HILL-\$16m

2 noon-International Trio. 2:30 p.m.-Ralph DeStefani's Orchestra. p.m.-Ralph DeStefani's Orchestra, 2. midnight-Midnight variety program.

12 midnight—Midnight variety prograt 740k—WOR—NEWARK—405m
6:45-7:15-7:45 a. m.—Gym Class.
2:30 p. m.—Frances Breck, pianist.
2:45 p. m.—Mercedes Fehley, soprano.
3 p. m.—Frances Breck, pianist.
1:15 p. m.—Mercedes Fehley, soprano.
1:30 p. m.—Berkley-Cartaret Concert Quintet.

1130 p. m. —Berkley-Cartaret Concert
130 p. m. —Berkley-Cartaret Concert
Quintet.
135 p. m. —Jacques Jacobs's Ensemble.
15 p. m. —Bill Wathey. "Sports."
15 p. m. —Jacques Jacobs's Ensemble.
15 p. m. —Jacques Jacobs's Ensemble.
15 p. m. —Generate's Queensland Or-chestra.
Madeleine Hulsizer, soprano;

7:30 p. m.—Orestes Gueenstein Grano; chestra.
8 p. m.—Madeleine Hulsizer, soprano; William Lockwood, violinist.
8:30 p. m.—Arthur Pryor's Band.
8:15 p. m.—Casino Orchestra.
9:15 p. m.—Berkeley-Cartaret Concert Orchestra.
10:15 p. m.—Berkeley-Cartaret.
10:15 p. m.—Montery Society Orchestra.
11:30 p. m.—Montery Society Orchestra.
11:90k—WGCP\_NEWARK\_252m
1:30 n. m.—Piano récital.

8:30 p. m.—Piano recital. 8:45 p. m.—Harold Fries, barytone. 9 p. m.—Whitehead and Everiss, piano

duo. :15 p. m.—Alice Laurie, soprano. :30 p. m.—Whitehead and Everiss, piano

duo. 9:45 p. m.—Alice Laurie, soprano. 10 p. m.—Mary Speedie, contraito. 10:15 p. m.—Paramount Mixed Quartet. 10:45 p. m.—Certrude Conrad, pianist. 11 p. m.—Llewellyn(and Browne, harmony

p. m.-Dorn-Bauer Orchestra. :30 p. m.-''Where Shali We Spend Our

Vacation?" 8:35 p. m.-Dorn-Bauer Orchestra. 7 p. m.-Sport talk by Lieutenant Joe

p. m.-Walter Setting, Quartet

8:30 p. m.—Slik Cly ried Quartet. 9 p. m.—Orpheus Mized Quartet. 9:30 p. m.—Cydne Vida, soprano; Gustav Bischoff, planist. 10 p. m.—Four Towers Orchestra. 1340k—WODA—PATERSON—224m

noon—Dance music. :20 p. m.—News flashes; songs. :45 p. m.—Dance music.

11:30 p. m.—Studio program. 1140k—WAAM—NEWARK—263m

Kunze. 15 p. m.—To be announced. 15 p. m.—Walter Seltman, talk.

reels. 10:30 p. m.-Police alarms; weather.

p. m.-The Kelly Trio, jigs and

# Additional Herald Tribune Radio Programs for the Week Ending July 17 8:30 p. m.—The Wandering Minstrels. 9 p. m.—La France Orchestra. 9:30 p. m.—Musical program. 10 p. m.—Whittall Anglo-Persians. 10:30 p. m.—Jack Albin's Orchestra. 11-12 p. m.—Pelham Heath Inn Orchestra.

Continued from preceding page Continued from preceding pass-590k-WIP-PHILADELPHIA-508m a. m.-Setting-up exercises. p. m.-Luncheon music. p. m.-Studio program. 105 p. m.-Dinner music. p. m.—Studio protasic.
 6:55 p. m.—Department of Agriculture.
 6:56 p. m.—Department of Agriculture.
 7 p. m.—Roll Call and Birthday List.
 8 p. m.—Ambassador Orchestra.
 9 p. m.—Ambassador Concert Orchestra.
 9:30 p. m.—Taymore Concert Orchestra.
 9 p. m.—Ted Weems' Novelty Dance Orchestra. Orchestra. 10:30 p. m.-Johnny Hamp's Kentuckians. 11 p. m.—Shelburne Dance Orchestra. 11:30 p. m.—Silver Slipper Dance Orchestra. 1080k-WCAU-PHILADELPHIA-278m 6:30 p. m.—Billy Hays's Orchestra. 7:30 p. m.—Snellenburg Symphony Or p. m.-Josh Saddler's Serenaders.

62

8 p. m.—Josh Saddler's Serenaders.
8:30 p. m.—Clifton's Anglers.
8:45 p. m.—Dick Jackson, Margaret Ellis; radio sweethearts.
9 p. m.—Barry O'Moore, tenor.
9:30 p. m.—The Musical Chefs.
9:45 p. m.—Professor Doolittie.
10 p. m.—Frank Worthington, barytone.
10 p. m.—Eddie Campbell's Orchestra. 1:45 p. m.—Walter Croft, barytone.
1:55 p. m.—Radio gym class.
2:15 p. m.—Radio gym class.
2:15 p. m.—Walter Croft, barytone.
3:0 p. m.—Cousin Eleanor's New York Evening World Kiddle Klub program.
3:20 p. m.—Gerald Goldwater, barytone.
3:40 p. m.—Gerald Goldwater, barytone.
5:50 p. m.—Gerald Geldwater, barytone. 10 p. m.—Frank worthington, Sarytonet 10:30 p. m.—Eddie Campbell's Orchestra. 1090k—WHAR—ATLANTIC CITY—275m 1090k-WHAN 2 p. m.-Seaside Trio. 7:30 p. m.-Lecture period. 8 p. m.-Seaside Trio. 8 p. m.-Seaside Trio.

n.—-Studio concert. p. m.—Follies Bergere Dance Orchestra 10k.—WPG—ATLANTIC CITY-300m 3:50 p.m.—Gerald Goldwater, purplet, and purplet, and purplet Geebee.
6:30 p.m.—Joe Gross's Blues Chasers.
7 p.m.—Herman Bernard, "What's Youn Radio Problem?"
7:10 p.m.—Blues Chasers.
7:20 p.m.—Blues Chasers.
7:20 p.m.—Blues Chasers.
7:20 p.m.—Blues Chasers.
7:20 p.m.—Blues Chasers. talk 6:15 p. m.—Sports tall. 6:45 p. m.—Organ recital. 7 p. m.—Morton dinner

dinner music. Anibassador dinn 7:45—Annoassadoi unite 8:30—Dance orchestra. 9 p. m.—Ambassador Concert Orchestra 9:30 p. m.—Traymore Concert Orchestra 10 p. m.—Ted Weems's Dante Orchestra 10:30 p. m.—Johnny Hamp's Kentuck

ians. 11 p. m.—Shelburne Dance Orchestra. 11:30 p. m.—Silver Club Dance Orches 790k-WGY-SCHENECTADY-380m 12:30 p. m.--Reports. 2 p. m.--Music; fashion talk, Robert

Smith. 6 p. m.—Stock reports. 6:30 p. m.—Program by Jack Denny's

6:30 p. m.-Hassball scores. 7:25 p. m.-Baseball scores. 7:25 p. m.-WGY Book Chat," L. L. Hopkins. 7:45 p. m.-WGY Orchéstra. 7:45 p. m.-Marine Band program. 8:30 p. m.-Marine BufFALO-319m 940k-WGR-BUFFALO-319m

a. m.—"The Meaning Health," Helen Monsch. '0 p. m.—Dinner music.

Health, <sup>6</sup> Heien monorus 6:30 p. m.—Dinner music. 8:11 p. m.—Jointly with Station WEAF. 1460k.—WIBX.—UTICA.—205m 11:45. a. m.—Stock market reports. 6:30-7:30 p. m.—Dinner trio. 9-10 p. m.—Vocal soloists. 9-10 p. m.—Vocal soloists. 1080k.—WIAM\_BOCHESTER.—278m 1080k.—WIAM\_BOCHESTER. Orchestra.

10005 W. Eastman Theater Orches 530 p. m. Eastman Theater Organ. 5 p. m. Baseball scores, weather. 7:25 p. m. WGY book talk. 7:30 p. m. WGY book talk. m.-Program from studio 7:30 p. 7:45 p. WGY. m .--- Dance program.

10 p. m.—Dance precitai. 11:30 p. m.—Organ recitai. 630k—WTIC—HARTFORD—476m 630k—WTIC—HARTFORD 8 pim.—"Scottie" Millar.
 9 p. m.—For-an-to Melody Makers; Man-chester Male Quartet.
 10 p. m.—Emil Heimberger's Dance Or-10 p. m GOL-WEEL-BOSTON-349m

isola -- WHEEL-BOSTON-343M
10:15 a. m.--Anne Bradford.
10:45 a. m.--Events of the Day.
12:45 p. m.--Events of the day.
2 p. m.--Events of the day.
4 p. m.--Eugene's Singing Orchestra.
5:45 p. m.--Market, business news.
5:55 p. m.--Lost and found.
6 p. m.--Keith's radio review.
6:10 p. m.--Musicale.
7:45 p. m.--Musicale.
7:46 p. m.--Musicale.
7:47 p. m.--Kimball Tito.
7:48 p. Market.
7:48 p. Market.
7:48 p. m.--Kimball Tito.

7 p. m.-Kimball Trio. 7 7:33 p. m.-Lenox Ensemble. 7:45 p. m.-'Mental and Health," Dr. Frank Stanton. Physica 9 p. m.—Organ recital. 9:30 p. m.—Program by the Studios

Studios. 10 p. m.—Liberty Drum Corps. 10:30 p. m.—Dance orchestra. 10:70k.—WNAC—BOSTON—280m 1070k.—WNAC—BOSTON—280m 1 p. m.—Luncheon concert. 4 p. m.—Shepard Colonial tea dance. 4:20 p. m.—Vocal selections.

4 p. m.—Vocal selection... 6 p. m.—Vocal selection... 6 p. m.—The Smilers. 6:30 p. m.—Dinner darce. 7 p. m.—What's Going On To-night." 7 m.— What's Going On To-night." 7 a. m.—The Going On To-night." 7 p. m.—The Going Constants. 7:45 p. m.—The Going Question Box. 8 p. m.—Program arranged by Jul' 8 p. m.—Program arranged by Jul'

m.-Dance music. -WRC-WASHINGTON-469m

640k-Wid-WASHINGTON 2 p. m.-Mayflower Orchestra. 8 p. m.-Radio movie presentation. 8:30 p. m.-U. S. Marine Band. 10 p. m.-The Royal Salon Orchestra. 10:30 p. m.-The WRC Players. 11:30 p. m.-Meyer Davis's Swanee Syn 11:30 p. m.-Meyer Davis's Swanee Syn copators. 1220k-WBAL-BALTIMORE-246m

7 p. m.—WBAL Sandman Circle, 7 a. m.—WBAL Sandman Circle, 7:30 p. m.—WBAL Dinner Orchestra, 8:30 p. m.—WBAL Mized Quartet, 9 p. m.—WBAL Trio, John Wilbourt

tenor. 10 p. m.—WBAL Dance Orchestra. 970k—KDKA—PITTSBURGH—309m 6:30 p. m.—Dinner concert. 8:40 p. m.—Special farm program. 9 p. m.—Stockman Farmer news.

p.m.-Stockman Farmer news.
 p.m.-Symphony Players; Ward Whitney, barytone.
 11:05 p. m.-Flittsburgh Fost dance pro-

FRIDAY

9:30 p. m.— Norman Pearce, readings.
10 p. m.—Norman Pearce, readings.
11:30 p. m.—Jack Denny's Orchestra.
11:30 p. m.—Brighton Orchestra.
12 p. m.—McAlpin Entertainers.
12 p. m.—Work.\_SZ6m 570k-WNYC-NEW YORK-526m 610k—WEAT—NEW YORK—192m 6:45, 7, 7:20 a. m.—Health exercises. 7:45-8 a. m.—Morning prayer services. 11 a. m.—Music. 11:15 a. m.—''Hints to Housekeepers, 5 p. m.—Plano selections. 6:10 p. m.—Market high spotš. 6:20 p. m.—Plano selections. 6:30 p. m.—Elementary French lessons. 7: p. m.—Advanced French lessons. 7:30 p. m.—Police alarms. 7:35 p. m.—Juliet Bartlett, soprano. 7:50 p. m.—'Timely Summer He Hints''. 11 a. m.—Music. 11:15 a. m.—"Hin Elizabeth Condit. blizabeth Condit. 11:45 a. m.—Talk. 12 noon—Market and weather reports. 12:15-1:15 p. m.—Rolfe's Palais d'Or

Orchestra. h. m.—Marentze Nielson; soprano. 15. p. m.—Lucille Blabe, planist. 130 p. m.—'Interpretation of Standard Song: Literature;" Professor H. L.

Builer. — William Stearns, tenor. 4:46 p. m.—William Stearns, tenor. 5 p. m.—New Yorkers' Dance Orchestra. 6 p. m.—Baseball scores. 7 p. m.—Gene Ingraham's Orchestra. 7:30 p. m.—Bernard Ahrens, barytone. 7:45 p. m.—Winged Enemies of Man," Dr. I. Goldston. 8 p. m.—The Happiness Iova.

 p. m.—Piano selections.
 9:15 p. m.—Talk, "Know Your City."
 9:30 p. m.—Manhattan Double Quartet
 10:15 p. m.—Piano selections.
 10:30 p. m.—Police alarms; weather. 950k-WAHG-RICHMOND HILL-316m 12:00 non-Musical program. 1:00 p. m.-Musical program. 7:30 p. m.-Sylvia Solow, violinist.

:45 p. m.—"How t Office Operates,"

7:45 p. m .--- George Wooley, saxophone Roloist. 8:00\_p. m.—Helen Morris, soprano. 8:30 p. m.—Orpheus Mixed Qartet. 9:00 p. m.—Montclair Harmony Four. 10:00 p. m.—Montclair Harmony Four. 10:00 p. m.—Shell Beach Trio. 10:20 p. m.—Duke Donaldson's Orchestra. 1:02 p. m.-Duke Donaldson's Orches-1230h-WGBB-FREEPORT-244 1230k-WGBB-FREEPORT-2014 8:00 p. m.-Shirly Fulton, planist. 8:15 p. m.-Milton Aronson, violinist. 8:36 p. m.-Rev. Henry Medd. songs. 8:45 p. m.-Dorothy Sakes, soprano. 9:00 p. m.-Cooper Boyd, violinist. 9:15 p. m.-Daul Hoffman, entertainers. 8:30 p. m.-Paul Hoffman, entertainers.

m.—Antoinette Marino, soprano. . m.—George Comer, basso. . m.—Orchestra. m.—Lesser's Nite Owls. 1390k-WRST-BAY SHORE-216m 7:00 p. m.-Brewster Theater Hour. 3:30 p. m.-Rexford's Original Orche 740k-WOR-NEWARK-405m

7:15-7:45 a. m.—Gym class. p. m.—Theo Alban, tenor. p. m.—Edward Swayze, pianist p. m.—Edward Swayze, planist. p. m.—Theo Alban, tenor. p. m.—Arthur Pryor's Band. p. m.—News bulletin. p. m.—Bill Wathey, "Sports." p. m.—Bretton Hall String Quar

1190k-WNJ-NEWARK-252m 0 p. m.—Tivoli Symphony Orches 0 p. m.—Vincent Lopez Orchestra. 1190k—WGCP—NEWARK—252m :00 p. m.—Terrace Club Orchestra. :00 p. m.—Week End Motor Trip.

p. m.—Mae Ensenat, contraito. 1140k—WAAM—NEWARK—263m Happy Hour Program. 10:30 a. m.-Happy Hour Program. 11:00 p. m.-Public service cooking son. 11:30 p.m.—Happy Hour program. 3:00 p.m.—Freddie O'Brien's Orchestra 7:00 p.m.—Review of sports, Lieutenan Joe Kunze. 115 p. m.—Shark River Island Joy Boys. 100 p. m.—Roger Murphy, tenor. 30 p. m.—Organ recital through C. of

C 9:00 p: m.—C. of C. music hour. 10:30 p. m.—Wallie Osborne's Orchestra 1340k.—WODA\_PATERSON.—224m 12 noon—Dance music. 12:20 p. m.—New's flashes. 12:30 p. m.—Vacat selections. 12:45 p. m.—Dance music. 12:45 p. m.—Dance music.

5 p. m.—News of the day. 5:30 p. m.—News of the day. 5:50 p. m.—Sport talk. 6 p. m.—Dinner music. 8:45 p. m.—Mildred Feltman, Grace Mey

er, sopranos. 9:15 p. m.-Christian Harmonic Orches 10 p. m.—The Meyers Sisters, duets. 10:30 p. m.—Entertoi

0:30 p. m.-Entertainment. 1:39 p. m.-Clifford Lodge Frolic. 760k-WFI-PHILADELPHIA-395m 1:09 p. m.—Tea room ensemble. 3 p. m.—Program from studio of Sesqui-centennial Exposition.

6:40 p. m.-Baseball scores. WLIT-PHILADELPHIA-395m 12:40 p. m.-Religious service. 2 p. m.-Arcadia Concert Orchestra. p. m.—Artist recital. p. m.—Baseball scores; sports

sults. 7:30 p. m.—Dream Daddy. 8 p. m.—Studio program. 8:15 p. m.—Pioneer Storage Battery Com-

8:15 p. m.—Proneer Storage Battery Contraction pany entertainers.
9 p. m.—Shickerkling Artists.
10 p. m.—Arcadia Cafe Dance Orchestra.
10:30 p. m.—Rruss and Rastus.
11 p. m.—Freshman Masterpiece Radio University. L p. m.—Fresningh masses Hour. 590k—WIP—PHILADELPHIA—508m

m.—Setting-up exercises. m.—Luncheon music. -Studio program.

. m.—Bedtime Story: roll call. DK—WCAU—PHILADELPHIA—278m As p. m.—Clarence Seaman's Orchestra
 30 p. m.—Snellenburg Instrumenta
 Tric; Stephen Knopf; Pauline Waters
 soprano; Clyde Dengler, tenor.
 p. m.—Enrico Aresoni, tenor.

m --- Singing Groundhog "Poet m .- Dwight Strickland,

) p. m.—Regina Crooners. ):15 p. m.—Nasco. ):45 p. m.—Jack and Juki, songs. (0 p. m.—Archie Lloyd, Irene Setzler. songs. 10:30 p. m.-Jack Myers' Musical Archi-10:30 p. m.-Astor Roof Orchestra.

tects. 090k-WHAR-ATLANTIC CITY-275m 2 p. m.—Seaside Trio. 7:45 p. m.—Billy Baxter, "Horticultural Oussilon Box" p. m. Seaside Trio. 1000k-WPG-ATLANTIC CITY-300m

130 p. m.—Morton luncheon music. 145 p. m.—Organ recital. 7 p. m.—Ambassador dinner music. 745 m. m.—Shelburne dinner music. 340 p. m.—Organ rectal.
745 p. m.—Ambassador dinner music.
745 p. m.—Shelburne dinner music.
815 p. m.—Organ and vocal recital.
9 p. m.—Ambassador concert orchestra.
830 p. m.—Traymore concert orchestra.
10 p. m.—Dance orchestra.
10 p. m.—Traymore Grill dance orchestra.

orchestra. 11 p. m.—Olson's Dance Orchestra. 11:30 p. m.—Organ recital. 790k.—WGY.—SCHENECTADY.—380m 12:30 p. m.—Reports. 2 p. m.—Asia Club Orchestra. 2:30 p. m.—Music; one-act play by WGY Mathice Blowers.

 p. m.—Asia Club Orcnestra.
 são p. m.—Music: one-act play by WGY Matinee Players.
 p. m.—Stock reports, news, scores.
 Sö p. m.—International Sunday School m.—Dinner program. 5 p. m.—Başeball score m .--- WGY Orchestra.

p. m.-Two one-act mor ob," by Colin Clements, Sacrifice." 10:30 p. m.—Plano recital by Lillian Snock and J. Austin Springer. 940k—WGR—BUFFALO—319m 9 p. m.—Jointiy with station WEAF.

p. m.—Jointly with station WEAF. :30 p. m.—Recital. 0 p. m.—Jointly with station WEAF. p. m.-1 a. m.—Supper music. 1130k—WMAK—BUFFALO—266m

 30 p. m.—Dinner music.
 30 p. m.—Musical WGY Orchestra.
 15-10:30 p. m.—WGY Players.
 1880k—WHAM—ROCHESTER—273m 1000a within Theater Orchestra, p. m.—Eastman Theater organ. :8048:30 p. m.—Dinner concert. :15 p. m.—Two one-act plays given by

 15 p. m.—Two one-act plays given
 WGY Players.
 630k—WTIC—HARTFORD—476m 

8:30 p. m.—Colt Park Municipal Dance Orchestra.
9:30 p. m.—First Presbyterian Church Quartet.
10:30 p. m.—WTIC's Mail Bag.
10:45 p. m.—"Debutants" period.

10:30 a. m .--- Women's Club talks; news; music. 1 p. m.—Luncheon concert. 4 p. m.—Tea dance. 4 20 p. m.—Vocal and plano selections. 6 p. m.—Kiddies' Klub. 6 30 p. m.—Shepard Colonial dinner dance. 7 p. m.—''Vacations in New England.'' 7 p. m.—''Vacations in New England.''

 j. m. Dok Eisenbourg's Sinfonlans.
 j. m. – Victor's Band of New York.
 j. m. – Musical program.
 j. m. – Concert by St. Joseph's Band.
 j. m. – Dance nusic. 860k-WEEI-BOSTON-349m

10:45 a. m. Events of the Day. 12:45 p. m. Market reports. 3 p. m. — Events of the Day. 4 p. m. — Roy Philips's Orchestra. 5:45 p. m. — Stock market and b

news. 5:55 p. m.—Lost and Found. 6 p. n.—Keith's Radio Review. 7:30 p. m.—Hiram and the Dairy Maio p. m.-Neapolitan Dutch Girls'

uintet. m.—La France Orchestra. p. m.—The Musical Chef. p. m.—Whittall Anglo-Persians. 30 p. m.—Ed Andrews's Orchestra. 900k-WBZ-SPRINGFIELD-333m

7 p. m.—Lenox Ensemble. 7.33 p. m.—Kimball Trio. 9 p. m.—Tuesday Morning Music Club. 10 p. m.—"Preludinoff." planist. 10:80 p. m.—Brunswick Orchestra. 640k-WRC-WASHINGTON-469m p. m.—Organ recital. p. m.—Meyer Davis's Orchestra. 145 p. m.—Book Reviews, Mrs. Nina

Heed. 640k-WCAP-WASHINGTON-469m 5 a. m.—"Tower Health Exercises. 5 p. m.—Baseball news of the day. -Market summaries. p. m. William announced. 130 p. m. To be announced. 1220k-WBAL-BALTIMORE-246m

n. — WBAL Sandman Circle. 30 p. m. — WBAL Dinner Orchestra. 30 p. m. — Organ recital. p. m. — Lillan Mann, contraito; Mar-ian Smith, pianist - Evelyn Upp, violin-

1st. 0 p. m.—City Park Orchestra. 970k—KDKA—PITTSBURGH—309m 6:30 p. m.—Dinner concert. 7:15 p. m.—Baseball scores. 9 p. m.—Stockman Farmer news. 9:30 p. m.—Concert by faculty of Pitts-burgh Musical Institute.

### SATURDAY

610k-WEAF-NEW YORK-492m :45, 7 and 7:20 a. m.-Health exercises. :45-8 a. m.-Morning prayer service. 2:15-1:15 p. m.-Waldorf-Astoria Or-chestre.

ehestra. 4-5 p. m.-Elmer Grosso's Orchestra. 5-6 p. m.-New Yorkers Dance Orchestra. 6 p. m.-Dinner music. 6:55 p. m.-Basball scores. 7 p. m.-Leo J. F. Bartunique, barytone. Dorr Quitantos visnist. 7 p. m.—Leo J. F. Bartunique, Barytone, 7.15 p. m.—Dora Gutentos, pianist.
7:30 p. m.—Musical comedy hits by the WEAF Musical Comedy Troupe.
8:30 p. m.—Goldman Band concert, Wagner program; Olive Cornell, soprano.
10:15 p. m.—Ben' Bernie's Orchestra.
11-12 p. m.—Rolfe's Palais. d'Or Orchestra.

chestra.
1100k—WFBH—NEW YORK—273m
4 p. m.—Bob Fleming's Orchestra.
4:30 p. m.—May Singhi Breen; Peter DeKose—uke and songs.
5:30 p. m.—Bob Fleming's. Orchestra.
6:15 p. m.—Majestic String Ensemble.
7:15 p. m.—Wm. McMann—Investments: questions and answers.
9 p. m.—Peerless Male Ourcett

660k-WJZ-NEW YORK-455m

2 p. m.—Weather; news service. 4. 4:35, 5:30, 7 p. m.—Baseball reports.

5.35 p. m.—Market quotations.
5.35 p. m.—Financial summary.
5.35 p. m.—Financial summary.
5.40 p. m.—Cotton quotations.
5.50 p. m.—State and Federal marke reports.
7.06 p. m.—Waldorf-Astoria Orchestra.
8.25 p. m.—Stadium Philharmonic con-

950k-WGBS-NEW YORK-816m m.-Union Settlement -Dance music.

b. m.—Dance music,
p. m.—Uncle Geebee.
30. p. m.—Uncle Geebee.
31. p. m.—Uncent Sorey's Concert Trio.
35. p. m.—Baseball and news items,
New York Herald Tribune.
30. p. m.—J. A. Mendler, soprano.
30. p. m.—W. H. Black, "Outline of Travels."
7:45 p. m.—George Hall's Arcadians.
8:45 p. m.—Cifford Cheasley, "Philosa philosa"
9 p. m.—William Chosnyk's music mer

p. m.—William Chorner ory violin recital. 15 p. m.—WGBS String Ensemble. 15 p. m.—WGBS Ladies' Vocal Trio -Odierno Ladies

9:30 p. m.—Odierno Ladies' Vocal 1110, Jacob Forstat, cellist.
10 p. m.—Alexander Kadison, "Women of History."
10:15 p. m.—Paula Passler-Fuchs, pian-iste; Sadie Rosen, soprano.
10:30 p. m.—Arrowhead Dance Orchestra.
10:30 p. M.—YOPKU-258m

130 p. m.—Arrownead Dance Orchestr
 1160k—WRNY—NEW YORK—258m (noon)—MacDowell Sisters.
 135 p. m.—John von Aspe, tenor.
 330 p. m.—MacDowell Sisters.
 345 p. m.—Hulberge Floreberger

30 p. m.—MacDowell Sisters.
45 p. m.—Lillian Flosbach, soprano.
p. m.—Sport Rays.
10 p. m.—Commercial Digest.
15 p. m.—'Your Name," Ephrain Tross 30 p. m.-Orlando's Concert Orchest

b m.—Len Saxon, tenor. 15 p. m.—Artists' debut hour. 15 p. m.—Totman and Gallant,

joists. 9 p. m.—Diwing room players, Tschal-kowsky. 9:30 p. m.—Schulman's national stage children. children. 10 p. m.—Leon Carson, tenor. 10:15 p. m.—Constance Carr, soprano.

880k-WMCA-NEW YORK-341m 0:30, 11:30 a. m., 12:30, 1:30, 2:30 an 3:30 p. m.-Market reports. 11 a. m.—Music. 1 p. m.—Olcott Vail's String Ensemble 5:45-6:30 p. m.—Employment opportu

ties. :40 p. m.—Ruth Jackson, soprano. 7 p. m.—Tappen's Orchestra. 7 30 p. m.—Billy King, songs. 745 p. m.—Music. 8 30 p. m.—Music. 8 30 p. m.—Orchestra. 9 30 p. m.—Hanson and Howard, ent

8 p. m.-To be announced. 8:30 p. m.-Stadium concert by the New York Philharmonic Oreffestra. 11 p. m.-Kitt Hour of Music. 11 p. m.--Ritt Hour of Music. 12 midnight-Organ recital. 970k--KDKA--PITT9BURGH--305m 6:30 p. m. - Westinghouse Employe Band...

Band. 5 p. m.—Baseball scores. Concert by the Westinghouse 9:30 p. m.-Co Employees 9:45 p. m.-Jimmy Clarke, pianist. 10 p. m.-WMCA Trio. oncert Band. World Radio History

p. m.-String ensemble. 30 p. m.-News; sport talk. p. m.—Episodic drama, "Freedom," from the Sesquicentennial Exposition. 590k—WIP—PHILADELPHIA—508m a. m. Setting-up exercises. 0:30 a. m. Reducing exercises. p. m. Organ recital. p. m.—Organ rectain
p. m.—Concert.
3:05 p. m.—Department of Agriculture.
y p. m.—Bedtime story and roll call.
g p. m.—Sports corner.
8:15 p. m.—Ambassador Orchestra.
8:30 p. m.—Marine studio.
p. m.—Hotel Traymore Orchestra.

8:30 p. m.—Marine studio. 9 p. m.—Hotel Traymore Orchestra. 1:45 p. m.—Emmett Welch's Minstrels.

15 p. m.—Dance Orchestra. 45 p. m.—Ted Weems's Novelty Dance Orchestra. 11:30 p. m.—Shelbourne Dance Orchestra. 1090k—WHAR—ATLANTIC CITY-275m

2 p. m.—Seaside Trio. 7:30 p. m.—Lecture period. 5 p. m.—Seaside Trio. 1000k.—WPG—ATLANTIC CITY—300m

1000k-WPG-ATLATIAC OTT - 501 6:45 p. m.—Organ recital. 7:30 p. m.—Shelburne dinner music. 8 p. m.—Ambassador dinner concert. 8:30 p. m.—Studio program. 9 p. m.—Traymoré Concert Orchestra. 9:45 p. m.—Emmett Weich's Minstrels. 10:45 p. m.—Dance orchestra.

9:40 p. m. — Emmett weich's Minstreis. 10:15 p. m. — Dance orchestra. 10:45 p. m. — Ted Weems's Novelty Dance Orchestra. 1:30 p. m.—Shelburne Dance Orchestra. 790k—WGY—SCHENECTADY-380m

2:30 p. m.—Reports. :30 p. m.—Onondaga Orchestra. :30 p. m.—Buffalo Theater and WMAK studio programs. 0:30 p. m.—Dance program. 940k—WGR—BUFFALO—319m 8:30-10 p. m.-Joint broadcasting with station WEAF, Goldman Band concer 1080k-WHAM-ROCHESTER-273m

1000 m.—Eastman Theater Orchestra. p. m.—Eastman. Theater Orchestra. p. m.—Dinner concert. :30 p. m.—Program from Shea's The-

ater. 8:30 p. m.—Baseball scores: weather 1130k—WMAK—BUFFALO—266m

1130K-WMAR BUT AND A LOT A LOT

p. m.—Theater Orchestra. p. m.—Musical program. 30 p. m.—Max Krulee's Orchestra

b. m. Musical program.
 b. n. Musical program.
 b. N. WNAC-BOSTON-280m
 c. p. m. The Smilers.
 c. B. 30 p. m. Dinner dance.
 c. m. What's Going on To-night.

Rogers-songs. p. m.-Musical program. :05 p. m.-Dance music. 640k.-WRC-WASHINGTON-469m

m.-Concert program

m.—Organ recital. m.—Mayflower Orchestra.

3:30 p. m. Vocal select 8:45 p. m. Irving

speeds of transmission varying between 10 and 150 words a minute. A speedometer calibrated in words a minute is fitted to the Wheatstone for the purpose of indicating to the operator the speed at which he is transmitting.

The high speed receiving apparatus, apart from the purely radio reception apparatus, consists of a Creed receiver, which perforates a tape with a replica of the Wheatstone tape in use at the distant transmitter, and the Creed printer, which prints the received message on a strip of tape in plain type and at the speed at which the messages are received. The printed slip is then drawn through an automatic gumming machine and affixed in suitable lengths to a form ready for delivery to the addressee.

In addition to this printing apparatus, each table is equipped with an undulator, or trailing syphon recorder. This instrument is connected in parallel with the receiving perforator and consists essentially of a relay carrying a light ink syphon in addition to the usual tongue, the latter being used to operate a sounder in the local circuit. Paper tape is fed steadily forward by a motor driving through a continuously variable gear, permitting the speed of the tape to be adjusted in accordance with the speed of the incoming signals.

The undulator is capable of recording signals at speeds up to 200 words per minute and is used to replace the printing apparatus when atmospheric conditions cause mutilation of signals. The record of signals takes the shape of a wavy line, the waves of which take the form of the Morse code. This record is subsequently transcribed by typist-telegraphists.

A "hand speed" telegraph key is also fitted to the control table to enable the receiving operator to "break in" with short service remarks. A second key and sounder are used for communicating with-Ongar and Brentwood over a land line reserved for that specific purpose. The Transmitting Center

There are at present four transmitters located at Ongar, the general equipment of which may be taken as representative of that used at all the other terminal

stations. There is room on the site for ruture additions to the service. The aerial systems closely resemble one another and consist generally of one or two circular cages of four wires, each suspended from two or three 300 foot selfsupporting lattice towers. These aerials are not directly grounded, but are connected to counterpoise systems comprising a number of insulated wires supported on a thirty-foot lattice masts. These counterpoises are arranged parallel to and extending beyond the horizontal portion of their appropriate aerials. This system has been found to give more efficient results than the more usual buried ground

system. With modern methods of radio frequency and audio frequency tuning, the efficacy of a transmitting station and the legibility of the signals under bad atmospheric conditions depend largely upon the steadiness of the transmitted wave. In this connection it is worthy of note that the receiving apparatus installed at Berne has tuning and filter circuits so selective that a change of only two meters in a wave length of 3,000 meters used by the English-

receiver to approximately one-fourth. It will be realized, therefore, that constancy of the transmitted wave is of primary importance if the receiving station is to utilize efficiently the means available for reducing atmospheric disturbances and special precautions are taken at the Ongar transmitters to keep the emitted waves constant. While the circuits of the four Ongar

station reduces the output energy of the 1 nected across the coupling coil in the grid circuit of the oscillation generator. As a comparatively light relay suffices for this purpose speeds of over 100 words per

minute can easily be attained. The independent drive, or master oscillator circuit, when set in oscillation with the signaling key contacts open, introduces an oscillating current of a predetermined frequency into the regeneration coil of the main oscillator, and thus forces the main

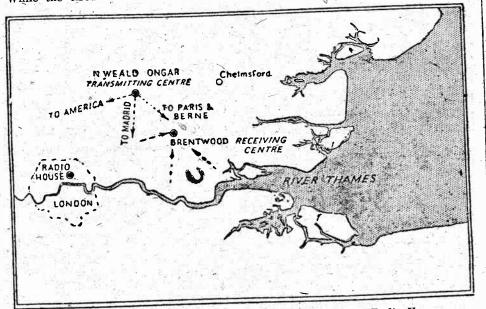


Figure 1. Map showing positions of Ongar, Brentwood and Radio House

transmitters and the auxiliary apparatus are identical, there is a difference in the size and number of tubes used in each set, but the following remarks are applicable to each transmitter.

The Transmitting Apparatus

An outstanding feature of each transmitter is the "independent drive," or master oscillator system, which, besides other advantages mentioned later, simplifies the high speed signaling apparatus by dispensing with heavy contacts and blowers for cooling purposes. As is well known, the fundamental principle of this system is to control the main oscillatory amplifier system through the medium of a separate low power oscillation generator adjusted to the required wave length.

In Figure 3 the left hand tube panel is the master oscillator, the panel on the extreme right being the power amplifier. The two units are inductively coupled together by means of variometers which can be seen in the illustration. This system permits of great constancy

of radiated wave length, as the wave length is unaffected by alteration of capacity due to any swaying movement of

the aerial system. A high speed signaling switch is con-

oscillating system to oscillate at the same frequency as the drive unit.

In order to prevent undue rise of poten tial on the smoothing condenser of the main oscillator, and thus forces the main the intervals the drive coupling coil is short-circuited by the signaling key, a power absorbing unit is connected as a shunt across the terminals of the condenser

The main oscillation panel for the Paris service utilizes four tubes for rectifying purposes and four tubes as oscillators. The high tension plate potential for the tubes is applied at 10,000 volts. The power supplied to the plate circuit is approximately three kilowatt and the antenna current is about twenty-five amperes.

The main oscillation panel for the Berne service utilizes four tubes for rectifying purposes and six tubes as oscillators, the tubes being of the same size as those of the Paris transmitter. The power in this case is about six kilowatt, and the aerial current about thirty-six amperes.

In the case of the Madrid transmitter. there are ten rectifying tubes and ten oscillator tubes, both sorts of tubes being somewhat larger than those used for the

plied to the plates of the oscillators is fourteen kilowatt and the aerial current approximately eighty amperes.

The fourth transmitter, for the Vienna service, is of fifty kilowatt rating, and has an aerial extended over three 300 foot towers. A single cage antenna is used. as against a double cage for the other services, and the wires are spaced round spreaders twenty-five feet in diameter.

It is this 50 kilowatt transmitter which is illustrated in Fig. 3, and besides communicating with Austria, it is also used to work Glace Bay, Canada.

#### **Power Arrangement**

The generating plant for the supply of power to these various transmitters and their auxiliary apparatus is installed in a separate building, each transmitting station being connected to the generating station by underground cables.

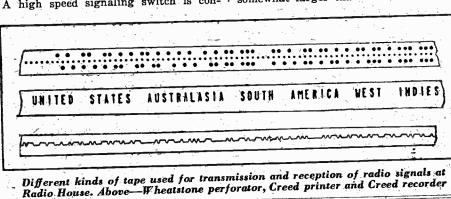
The prime movers consist of three sets of semi-Diesel oil engines direct coupled to 50 kilowatt 220 volt direct current generators. A battery of 1,600 amperehours capacity is connected across the busbars of a direct current switchboard. and constancy of potential on the busbars is maintained by means of an automatic reversible booster controlled by an automatic pressure regulator.

Eight motor alternator sets are installed for the supply of power to the outlying stations, these taking their power from the 220-volt direct current main busbars. They generate single-phase alternating current at 1,000 volts 350 cycles. Four cf these sets, each rated at 25 kilowatts are provided to supply power to the tubes of all the main oscillation generators, or power amplifiers. The remaining four sets, each rated at 15 kilowatts are provided to supply power to the tubes of the independent drive, and also current for the filaments of all the tubes in each transmitting station, the potential being transformed down to the required voltage.

Under normal working conditions the large storage battery is connected to "float" across the direct current busbars. and the current for running the motor alternators is supplied by two only of the direct current generators. Generally, three only of each set of four motor alternator sets are in use at one time, one set being spare for main amplifier supply, and one set for the independent drives and filament lighting.

Such is the equipment of the Ongar transmitting center as it is to-day, but it is constantly being added to as new services are opened, so that it bids fair one day to be the transmitting center for one of the most extensive networks of radiotelegraph communication in the world.

The only other transmitting center operated by the Marconi Company is the station at Carnarvon, in Wales, and this is also controlled and operated from Radio House, London. There are two transmitters at Carnarvon, both high power tube transmitters, one being used for commercial radiotelegraphic communication with this country. The other transmitter is occupied with the newly instiservice tuted photoradiogram London and New York, and is at present kept quite busy transmitting photographs and pictures of all sorts across the Atlantic.



# New Circuit With Uniform Energy Transfer on All Waves Solves Problem

due to extreme loose coupling at the highest frequencies.

"A commercial application of the coupling is shown in Figure 4, and it will be noted that the system is similar to that described in Figure 3, with the exception of condenser C3.

"The principal cause of oscillation in a radio-frequency amplifier system is feedback through the capacity between electrodes of the tube. It is necessary that this feedback energy be in phase with the impressed grid voltage in order to produce regeneration and oscillation. It has been found that this positive feedback occurs only when the plate circuit is predominantly inductively reactive. If the plate circuit reactance is predominantly capacitive energy will also be fed back through the tube capacity, but in a negative phase. However, if the inductive and capacitive reactances of the plate circuit are equal they create a non-reactive condition, leaving only a resistive plate circuit, which will not feed back through the tube ca-

"When this non-reactive condition exists the plate circuit becomes quite independent of the tube characteristics, since no feedback can occur through the tube capacity. In actual practice commercial models are designed for this condition, so that tubes of any type or make can be used with no tendency toward regeneration or oscillation.

"In Figure 4 the condenser C3 is in series with the plate to provide the required capacity reactance to balance the inductive reactance due to the coupling means. Since the capacity of C3 is fixed, its reactance varies inversely with the frequency, so it is necessary to design the coupling to provide an inductive reaction which also varies inversely as the frequency, and to the same degree. This is accomplished by properly proportioning the couplings and values of C1, C2, C3, L1 and L2. In actual practice, it is occasionally found desirable to leave the plate circuit with slight predominance of capacitive reactance, since under these conditions a slight negative feedback will ex-

ist in the tube, which will oppose any stray positive interstage feedbacks. In other words, the relative values of C1, C2, C3, L1 and L2 vary in different styles of assemblies.

"The automatic variation of the anenna coupling is also employed. This allows the coupling at the highest frequency to be quite loose, which is found to widen the frequency band covered by the tuned circuit associated with the antenna. The so-called absorption hump, which occurs when the antenna tune falls in the reception band, is also much reduced in effect.

"A variation of the circuit is shown in Figure 5, where it is used to couple the plate circuit of a regenerative detector directly to the grid circuit, to produce either regeneration or oscillation throughout the band. If a coupling similar to that previously discussed is used, it is found that the instantaneous polarity of the fedback energy is in a negative sense, which necessitates the rearrangement'shown, which allows direct capacitative feedback

energy in phase, and using at the same time the reverse characteristics of these two couplings properly adjusted, most satisfactory results are obtained in the production of a total energy transfer, which will, if desired and by proper adjustment, increase with frequency increase, decrease with frequency increase, or remain substantially constant throughout the frequency band.

"Again considering Figure 3, we find that by judicious proportioning of constants we can so adjust the coupling that at any point throughout the frequency range there is the correct amount of inductive reactance in the plate circuit to maintain the tube in a condition of critical regeneration. The tube can also be made to oscillate or to regenerate slightly throughout the band, as desired. It will be noted that the plate circuit is energized through a radio-frequency choke. Any actual design of this type of receiver must take into consideration the amount and phasing of stray feedbacks, if operation with extreme regeneration is required. The frequency band covered by this combination is quite large, larger than usual, pacity in either sense.

# Continued from page four



-90-

# Data on the Construction of a One-Control **Five-Tube Radio Receiver**

This Set Employs Two Stages of Efficient Tuned Radio-Frequency Amplification

ESPITE the off-trail steps taken in the forward trend of receiver design the final achievement, single control, has never been lost sight of. Coincident with the improvement in quality, part design and circuit advancement there has been a consistent reduction of the number of tuning controls.

The introduction of the gang condenser in which two, three and more variable condenser units are mounted on one shaft has placed before the experimenter a means of building his own single control receiver. Such an accomplishment has heretofore been impossible because of thedifficulty encountered in getting proper gears or pulleys to couple several condensers together.

The gang condenser solves for the constructor the problem of getting similar condensers to tune the various circuits. It must be remembered here that positive single control is not possible unless the complete set be made so sensitive that a. small coil can be used as an energy collector.

Aerials and loops will not permit of the design of a receiver without some compensating member to take care of the wave length variations inherent in these collectors with a change in tuning. But one compensating control that operates in such a manner that its setting is regular with the change in main dial setting is far from objectionable.

The single control receiver described here has one main tuning control with a small compensating condenser that has a regular increase of capacity change with the tuning of the triple condenser unit to the higher wave stations.

#### **Parts Required**

Such accomplishments no doubt fill the bill, and we can now get on to the actual constructional data on the set. The first is the list of parts. .The following is the apparatus used by the writer in his receiver:

 General Instrument triple condenser (each section .00035 mfd. straight line frequency type).
 Set of three General Instrument radio frequency Set of three General Instrument radio free transformers.
 Precise audio frequency transformers.
 Electrad resistance, 250,000 ohms.
 Daven grid leak mounting.
 Hammarlund midget condenser.
 General Instrument 20-ohm rheestats.
 Radion UX-type sockets.
 Dubilier 1 mfd. by-pass condenser.
 Dubilier .0055 mfd. fired condenser.
 Baseboard 23x8x ½ inches.
 BMS single circuit jack.
 Radion dial.

1 Radion dial. 1 Radion binding post strip. 8 Eby Binding posts.

#### **Triple Condensers Used**

The construction of single control receivers using double or triple condensers has been greatly hampered by the general impression that balancing of the circuits would be an impossibility for the average individual to accomplish. This is an erroneous opinion and should be discarded. The balancing of the second stage and the detector circuit in this particular set will not take more than fifteen minutes at the most; that is, providing the coils are made carefully in as far as keeping even tension on the wire while winding and using the correct number of turns.

As it is usual to enumerate the various

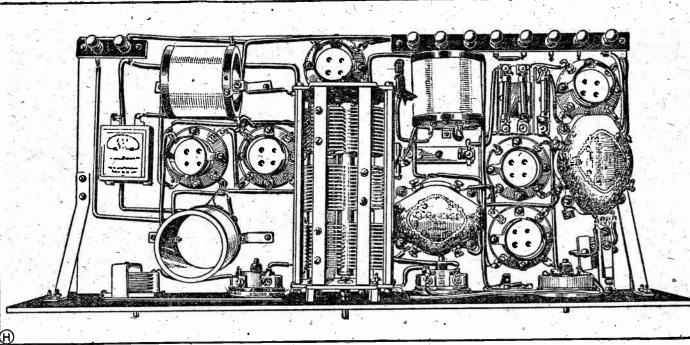
the author finds it incumbent upon him to do so also. There are no glaring headlines to be written about this particular set. It is simple to build, works well, gets plenty of distance, and gives good quality and to this may be added, the decided advantage of having single control tuning. Could anything more be desired?

The radio-frequency transformers, of which there are two, are both wound the

By WILLIAM M. HENDERSON of being described in a radio magazine, input so that there will be no interference. I noticed that all leads are down on the This coil has one single layer winding The antenna tap is taken off at the fifteenth turn, counting from the filament end of the coil.

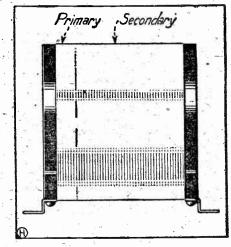
In all three of these coils it will be found advantageous to drill the ends of the forms to take small 6-32 machine screws and make the coil terminals secure to lugs. Use two lugs for each terminal, be made by the constructor.

baseboard and are covered with cambric of seventy turns of No. 26 D. C. C. wire. | tuning. This is far from essential, but as a neater appearance is presented when the cabinet cover is raised this system of wiring was used. It is much easier, however, to leave off the insulating tubing and to separate the low potential leads more. The operation of the set will not be effected by any change in wiring that may



Drawing showing how the parts of the writer's one-control receiver are arranged on the subbase panel

same. The secondary coil is wound adjacent to the primary and in the same direction. The primary coil consists of ten wire space wound; that is. turns of separated by about half the thickness of the wire. The secondary coil consists of seventy-six turns. No. 26 D. C. C. wire s used for both coils. The end of the secondary that is over the primary is the



#### Coil construction details

filament end of the coil. The start of the primary is the "B" terminal and the end the plate connection. They are wound on a tube 21/2 inches in diameter.

The antenna coil does not have a separate primary coil. A tap connection on the grid coil is employed in this circuit because of the increased signal strength obtained. The rest of the set; that is, the two stages of amplification, are selecfeatures of a set undergoing the operation | tive enough to take care of the broad

one for the coil ends and the other for connecting to the circuit. If one lug is used for both purposes there is a possibility of the coil end coming loose when making the circuit connection. With the coils wound, the next thing to

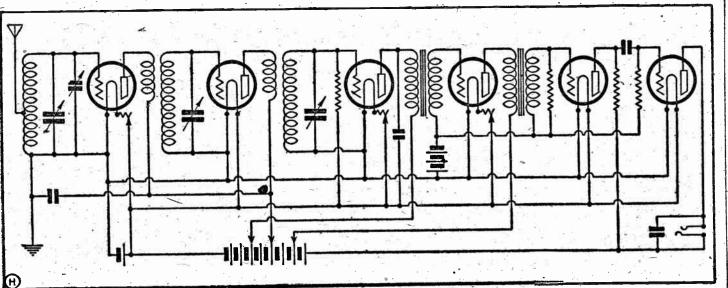
do is drill the panel. The layout is probably best shown in the drawings given on this page. The multiple condenser is mounted in the center of the panel and four inches from the bottom.

The midget condenser and the detector rheostat are mounted 41/2 inches from the edges and three inches from the top, the left end for the midget and the right end for the rheostat.

The radio-frequency rheostat and the audio-frequency rheostat are mounted two inches from the bottom and seven inches from the left and right ends of the panel. respectively. The jack is mounted two inches from the bottom of the panel and two inches from the right end.

After the original model was built it was found that the detector rheostat and audio-amplifier rheostat were unnecessary and could be eliminated. To control the filaments of these tubes any of the automatic resistances can be used, one rheostat can control them all.

The baseboard layout that is shown in another drawing should be followed. Changes can be made if necessary, but this arrangement of apparatus gives the most direct leads. With the parts all mounted and the panel secured to the baseboard by means of brackets, as shown in the drawings, the set can be wired according to the diagram given in Figure 1. In the set shown in drawings, it will be



The wiring diagram of the fre-tube, one-control tuned radio frequency rover constructed by the writer

One hint in wiring the tuning circuits that should be remembered is that one lead to the rotor plates, or frame, of the condenser is all that is necessary, and that should connect to the negative filament. Then the filament ends of the coils can be wired directly to the negative side of the tube socket.

When the set has been wired and the batteries connected and the tubes placed in their respective sockets a local station should first be tuned in. If the coils have been made as per specifications and the wiring is correct no trouble should be encountered in getting several stations before any attempt at balancing is done.

If by any possibility no stations are received and the set sounds alive, connect he aerial directly to the grid terminal of the detector coil. If a signal is picked up then, change the aerial to the plate terminal of that transformer.

By successively changing this lead from the detector to the aerial post in the above manner poor connections or a bad tube will be located. The next step is the matching of circuits. This may and may not be necessary, depending upon the care taken in winding the coils and the quality of the multiple condenser used.

To match the detector and second stage circuits it will be necessary to first obtain a large coil form and wind fifteen turns of wire on it. A fifteen turn basket-weave coil is admirable for this purpose. The coil should be connected to the aerial and ground leads, which are, of course, not connected to the set.

#### Matching the Coils

This antenna coil is placed about seven inches from the detector tube coil and the two radio-frequency tubes are turned out. Tune in any station that is operating and record the dial setting.

Then take the first radio-frequency amplifying tube out of its socket and light the other one. The antenna coil should now be placed exactly the same distance from this coil as it was from the detector coil; the separation is not critical as long as the same distance is maintained in both instances.

Tune in the same station again. If the station has two peaks, that is, has two loud points, then one or the other of the coils is out of tune. Pick one of them as a standard. Remebering the detector dial setting it will be found that the second setting giving the second peak signal will be that for the amplifier.

If this amplifier setting is above that of

(Continued on page five)

about one-half inch idea of this.

the upright.

any time.

desired:

#### Novel Radio Coils Made

With Jars and Bottles Small, smooth, round glass bottles and jars used to hold jam, mayonnaise, olives, pickles and cosmetics of various sorts make excellent experimental coil forms, being highly efficient electrically and absolutely non-shrinkable mechanically. The ends of the wire wound on them can be held down with a few drops of sealing or candle wax.

The "pickle-bottle" shape of winding, which is merely hexagonal in outline, derived its name from the exploit of an experimenter in winding a coil around an actual pickle

#### **Constructing a Sound Board Cone Speaker**

#### (Continued from page one)

wood and should measure about 8x61/2 antenna. x1 inch. For the sake of appearance it is well to beyel the upper edges. Cut a slot in the upper face of this block to accommodate the upright. It

Assembling the Come

edges of this upright may also be the charger. justing screw. This will allow a screwdriver to be inserted through it

and through the similar hole in the

in the base block. A soft cork or rubber button is attached to the front of the upright

cone speaker upon its stand, which might tend to warp the upright. The assembly of the speaker is washers on both sides of the upright

a mahogany stain applied and several world-the Orient. If the work has been carefully done, coats of lacquer applied and well

erably an orchestra selection, and, inoperating point.

#### List of Parts

actually selected by the writer and the Philippines. in this article may be substituted if said in part:



#### New Electric Set

attaching the unit pin to the point this week in exhibition room No. 4 of the cone. Form your cone, glue of the Hotel Pennsylvania and repreit and put a weight on the glued strip sentatives of the press and the radio while it is drying. Then fit the con- trade were invited to attend. nection, mentioned above, into the The new sets are being placed on

point of the cone and tighten it into the market in two models, the "Universal Electric," a four-tube, single-Now, with a pair of seissors, make control receiver, and the "Standard planning to go after foreign radio Wilfred Glenn, basso. one-half-inch cuts in the edge of Electric," a four-tube, two-control.re- trade I should like to issue this warninches. Then bend forward these operated direct from the standard 110- abroad." three-inch pieces a trifle, so that volt, 60-cycle, house supply without they will follow around the edge of the use of batteries. The plate curwide may be cut from the parchment these are heated with a three-volt Broadway, a consulting engineer. left over when the large cone was alternating current, which is ob- The set comprises two stages of thumb tacks spaced about three said to employ a one-stage of tuned, designer. 5. The base is cut from some heavy designed for use with an outdoor

#### Power and Charger Switch

should be one-half inch wide, one- Company, of Minerva, Ohio, have two same cabinet with the receiving aphalf inch deep and 2¼ inches long, interesting pieces of radio apparatus paratus. and it is located toward the back of in their "full automatic" line. They the clock, as shown in Fig. 4. The are the "Full-Automatic" Trickle reason for this should be quite ap- Charger Switch and the "Full-Autoparent, as the enture weight of the matic" Power Switch. The trickler cone speaker is located in front of charger switch is connected in series cient, method of controlling the volwith the set and storage battery. ume of a radie receiver is accominches and may be rounded slightly trickle charger. When the set is aerial lead wires to the set. Maxiat the top if you so desire. The turned off, it automatically cuts in mum reading on the dial will give

drilled near the top. Two are for the eliminator and trickle charger change characteristics of the set, machine screws projecting from the either or both. When it is snapped which would be apt to destroy the back of the mounting block and on it automatically turns on the B quality of reproduction. should be sized and spaced accord- eliminator and cuts off the trickle ingly. The third hole, three-eighths charger; when the set is turned on inch, should be placed so that it will the trickle charger is again connected be directly in the rear of the unit ad- and the B eliminator is turned off.

#### Radio and Foreign Trade

The F. A. D. Andrea Company have soundboard and the unit adjusted at been working for two years to sell Now put glue on the last, one-half foreign markets and now have repreinch at the bottom of this upright, the Far East and all over the world and force it into place in the slot cut down to New Zealand and South

Africa. They started with Canada, where they opened a branch factory near the bottom of the soundboard thoroughly covering the Dominion. In for it to lean against. This will re- London a branch takes care of the lieve the strain of the rather heavy British and Continental radio trade. When Fada radio was established in Mexico, Cuba and South America by The assembly of the speaker is shown in Fig. 4. It is well to place the farthest trading posts in the washers on both sides of the upright when bolting to the mounting block. Argentine, this company turned their attention to the other side of the

The ambassador selected for the Panel, dial coats of lacquer applied and well rubbed down the instrument will be decidedly attractive in appearance. After connecting the speaker to your set tune in a strong signal, pref-areby an orchestra selection, and, inthan twice around the world in mileing screw, adjust the unit to the beat age, with 139 days of actual travel, and will keep him away for about direct. a year. The high spots of his itin-

employed in the construction of the R. M. Klein, general manager of soundboard cone loud speaker. Vari- F. A. D. Andrea, Inc., in discussing ous other parts of the type described the foreign policy, of his company

"While our policy of sending direct desired: 1 DDH 86-in. parchment for cone. 1 DDH adjustable attachment for con-necting parchment cone to unit. 1 DDH cone speaker unit. 1 hardwood baseboard, 8 in. x 6½ in. x 1 in.  $x^{1}$  in.  $x^{2}$  in.  $x^{2}$  in.  $x^{2}$  to the entire industry, to the nation 1 hardwood mounting block, 2% in x at large, and, indeed, to international 1% in. % in. 1½ in. ½ in. high close, 24 in. square and not more than ¼ in. thick.
1 cory or rubber busson.
26 brass thumb tacks.
27 in. machine screws 1½ in. long with 4 nuts to fit.

The Greater Atlantic and Pacific them and accessories that go with Bat" by Strauss; "The First Move-Radio Corporation of New York City them. Another is that of blazing a ment" of Beethoven's, "Fifth Symhave just announced a new line of trail in many instances for the indus- phony," the "Spring Song," by Menelectric radio receivers. A demon- try by opening up new avenues of delssohn, and "Gems From Babes in stration of the new sets was held trade. From the standpoint of the Toyland," by Victor Herbert, are the national good there is the building best known. Max Jacobs, the conducup and strengthening of American tor of the orchestra, and a gifted viocommerce over the Seven Seas and linist, will be heard in two instruthe establishment of a firmer and mental solos, one, "Romance," by more friendly foreign relationship, Wieniawski, and the other, the Air which latter touches and explains the for the G string, by Bach. The reference to international good will. Eveready vocal soloist who will be

your cone, spaced about every three ceiver. Both of the sets may be ing: Do not dump obsolete models

#### Another Batteryless Set

the soundboard. The pin from the rent for the tubes is supplied by a A new batteryless radio receiver, unit should now project through the B battery eliminator, employing a which derives its power from the alconnection at the point of the cone UX-213 rectifier, which is contained in ternating house current lighting the cabinet. McCullough A.-C. re- mains, was announced last week by A circular strip about one-half inch ceiving tubes are used in the set and its designer, Francis R. Hoyt, of 1841

cut down. This strip is to be fitted tained from a step-down transformer, tuned radio, detector and two stages around the cone to cover up the cut which is also contained in the cabi- of audio-frequency amplification. It edge and held in place by brass net. The circuit used in the set is has been named "Perpetuel" by its

inches apart. Fig. 2 will give you an transformer-coupled, radio-frequency All the tube filaments are operated amplifier, a detector and a two-stage directly from alternating current, a A suitable stand must now be con- of transformer coupled audio-fre- balancing resistance being employed structed. It is shown in Figs. 4 and quency amplifier. The set has been to balance out the sixty-cycle "hum." The power for the plates of the tubes is derived from a B battery eliminator of usual design. A therimonic rectifying tube is used giving half-wave rectification. The elimi-The Liberty Bell Manufacturing nating apparatus is included in the

#### A Simple Volume Control

The simplest, and what is said by radio engineers to be the most effi-When the switch on the set is snapped plished by inserting an ordinary The upright measures 1/2x21/2x15 on it automatically cuts off the variable condenser in series with the the greatest volume, and minimum the beveled. Three holes are to be The power switch controls the B least. Such an arrangement does not

#### Rheostat Connection

A filament rheostat should be connected in the negative lead of the A hattery wire to the tube.



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#### NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, JUNE 20, 1926.

# How Broadcasting Is Spreading less, was when a debate was carried on last May between the teams rep-The Gospel Throughout World resenting Holy Cross and Boston Col-lege. This "duel of brains" was virtually staged on a platform forty-

The Catholic Church Has Many Stations in the WEAN, the Shepard studio at Provi-U. S.; WWL, Said To Be the Pioneer of the South; WLWL the Largest With 1,000 Watts

#### By Peter J. Dolin, S. J.

HERE was a school debate, some twenty years ago, in which "we of the affirmative" maintained that "Nowadays, Oratory 1,300 ballots thus received, from exercises a greater force for good than Journalism." One of the cogent arguments of the gentlemen of the negative which palpably confronted us in our preparation, and almost overwhelmingly in the rebuttal, was that the efforts of an orator were necessarily circumscribed. He could reach only the limited few who came within the sound of his voice, while the field of the journalist was practically unlimited, his influence for good as far-reaching, as the world that runs and reads.

the protagonists of the forum won given on some current topic by the New York City. The station, with its the debate not, of course, without Rev. Edward G. Garesché, S. J. Each twin towers 225 feet high, is equipped a struggle. But, were we to assemble day at 11 a. m. and 4 p. m. the "Jour- to use 5,000 watts, and represents an to-night on that same college stage nal" studio broadcasts music, news, investment of over \$160,000. Its inand re-enact the scene, the victory market reports and talks by promi- stallation was directed by the Rev. would be ours, hands down. The op- nent individuals. The "programs of James F. Cronin, C. S. P., who is in ponents of oratory who in this modern day of radio would intimate that columns of the "Journal" and have sponsible for the refined and varied the written word can carry further elicited acknowledgments from liaten- programs that have been broadcast, than "the throbbing, pulsating plea ers in every state in the Union, and beginning with the evening when, acof the orator" would be leaving altogether out of consideration the microphone, the transmitter, the aerial tower and the hundred and one other elements that have combined to revo-Intionize the transmission of the

#### Hadio Has Changed the Earth

earth. It has opened up possibilities operate was forthwith granted, and Choristers, whose efficiency as radio which even a generation ago would that same evening Louisianians who artists is attributed to the skill of have been deemed as ridiculous as possessed radio sets heard the first their director, the Rev. William J were the prophecies of Mother Ship- radio concert ever given in the Southton. I suppose that in the usual or- land. When the university launched the Rev. James M. Gillis, C. S. P. der of things the Catholic Church, its building campaign to raise conducts a "question box" hour, supas the undying foe of scientific prog- \$1,500,000, the appeal which was made plemented by a discussion of civic or ress in general, has been cited here by wireless brought valuable results. and there as an adversary of the Later the station enabled Loyola to is set apart for treatment of literaradio in particular. Yet in the at- open a radio school. Completely re- ture, public affairs and the arts. Remosphere in which were reared the built and brought up to date, WWL ports have been forthcoming from all famous Ampere, a devout Catholic; broadcasts regularly once a week, parts of the United States and from Galvani, a Tertiary of St. Francis; furnishing musical programs and in- various provinces of Canada of the Ohm. a teacher in a Jesuit college, cidental educational talks. and Volta, a man who began each day The Benedictine Fathers in charge and of the grateful delight with by hearing mass and ended it, after of St. Martin's College, Lacey, Weshby saying his rosary, one would be the sea," received in April, 1923, a be written of the widespread use of Catholic, and that it is serving as radio telegraph station installed by rangement with stations purely secua veritable handmaid of the Catholic Father Stanislaus Ruth, O. S. B., lar in their management, for the of Catholic teaching.

tions in the United States-that a varied program is broadcast, with was listened to, not merely by the which is now known as WEW-was installed at St. Louis University in citals and college news in variety. before whom His Eminence appeared 1910 by Brother George Rueppel, S. J. Although until very recently only a in his cathedral, but by the thousands Its pioneer efforts were only sus- five-watt station-it is now operating to whom "The Chicago Tribune" pended with the entrance of the country into the war, when the government utilized its facilities in the training of radio operators for the United States Signal Corps. With the removal of war-time restrictions the station in 1919 resumed its for- with supplementary explanations and ture from KYW, a Westinghouse mer programs, and in April, 1921, the scope of its usefulness was extended by the introduction of a radiotelephone for the transmission of the United States Weather Bureau reports, market and crop estimates. In made." March, 1924, WEW began to broadeast Sunday afternoon lectures on doctrinal subjects. The divine origin of the Church, the marks of the giate radio activity was Holy Cross day the complete vespers' service Church, the infallibility of the Pope, College, Worcester, Mass., which be the sacraments, the priesthood, con- gan broadcasting in the fall of 1924, fession, the Holy Eucharist, marriage, first with the news of football games. ste, were among the topics which Through the provision of its owner, have been explained. Every Sunday Theodore T. Ellis, a generous beneafternoon at 2 o'clock answers are factor of Holy Cross, "The Worcesgiven to the difficulties submitted by ter Telegram and Gazette" utilized University, Omaha, Neb., was broadlisteners. Thanks to the generosity its station, WCTS (now WTAG) for cast through WOAW, the local of the Catholic Laymen's Association the football program and later pro-station of the Woodmen of the World. of Missouri, which has appropriated vided connections with the college Drama, fiction, athletics, public speak-\$25,000 for the purpose, it is an auditorium and students' memorial ing, law, dentistry, medicine, sciences, nounced that WEW, heretofore a 100- chapel. Thus the radio audience was etc., are to be treated from the popuwatt station, is now to have a 1;000- enabled to enjoy all the lectures, lar viewpoint. watt transmitter.

aremer, S. J., nead of the department dergraduates' benefit. The following continues to grow in efficiency and of physics at Marquette University, Milwaukee, outfitted, largely with Rev. Daniel H. Sullivan, S. J., various undreamed-of encouragement to those equipment of his own making, a 100-watt station at the university. Under his manipulation programs were broadcast once a week until a little over a year ago, when the power was Manufacturing Company, the facil- even greater reason than did the inincreased to 1,000 watts and "The Manufacturing Company, the fact even greater reason than did the in-ities of its stations at Springfield and Wilwaukee Journal" combined with Boston, WBZ and WBZA, were achievement for one to exclaim: Marquette in operating the station. placed at the disposal of Holy Cross. "What hath God wrought!"-It is located in the tower of the new Since last November the college has "America." Science and Administration Building broadcast one Sunday night each of the university, but remote control month a full evening's program programs can be broadcast from the through WBZ, which will transmit, new \$2,000,000 plant of "The Journal" during the present month, "Twelfth as well as from several other points Night," the Shakespearian play schedthroughout the city. WHAD operates uled for production this year. It is on a wave length of 275 meters, and said that this is the first time that. with few changes could be readily in- Shakespeare had been thus broadcreased to 1,000 watts. The Mar- cast. And what again was claimed quette studio is on the air only on by press critics to, be the first time Monday nights, when, in addition to such use has been made of the wire-

I may mention, incidentally, that musical and other features, a talk is quality" are advertised through the charge of the plant and largely refrom points as remote as the Tahiti cording to press comments, an

Pioneer Station of the South

human voice and of artificial sounda longs to Loyola University, New The Sunday program is a purely rement authorities April 2, 1922, for a public the incidental opportunity of

he had visited the Blessed Sacrament, ington, "out where the cedars meet An altogether distinct article might disappointed not to find that the radio broadcasting license for station the radio which has been made, here has its place in circles professedly KGY, the outgrowth of an amateur and there about the country, by ar religion in aiding the dissemination eight years previously and inter- broadcasting of Catholic interests. rupted only by the restrictions of Thus in Chicago on the second Sun-One of the first broadcasting sta- wartime. Three evenings each week day of January Cardinal Mundelein concerts, debates, plays, lectures, re- members of the Holy Name Society on fifty watts twenty-three differ- broadcast the services through its ent states have been heard from in station WGN. In the same city for appreciation of the programs of the last several years the Rev. Claude KGY, with particular praise for the Pernin, S. J., professor of homiletics renditions of operas, etc., produced in the Archdiocesan Seminary, has through the use of Victor records, been giving weekly readings in literadescriptions. In this form of broad-station. casting the fathers at St. Mary's were pioneers. Their unique station is housed in a log cabin, which, like al! of the apparatus used, was "home-

#### The Holy Cross Station

organ recitals, glee club and orches-

two miles wide, for the Worcester boys spoke into the microphone at dence, R. I., while the Boston College debaters radiocast their arguments through WNAC, the Shepard studio in Boston. The decision was rendered only after the listening public had submitted its vote by telegram, telephone or letter. A total of over Bontreal. Washington, Cincinnat and practically every city in New England, was significant of the widespread interest excited by the nove! competition.

Newer than all the foregoing, and second to none in its equipment, is station WLWL, opened last October by the Paulist Fathers at their headquarters, West Fifty-ninth Street, Islands, 6,000 miles from Milwaukee. audience of at least one million listened to the opening address of His Credit for establishing the pioneer Eminence, Cardinal Hayes. WLWL is broadcasting station of the South be- on the air three evenings each week. Orleans, which applied to the govern- ligious one, affording the listening Radio has changed the face of the broadcasting license. Authority to hearing the world-renowned Paulist Finn, C. S. P. On Monday evenings spiritual interest. Thursday evening efficiency of WLWL's broadcasting

Over the General Electric Com pany's station KOA, at Denver, January 31, the pontifical mass cele brated by Bishop Tihen in the Cathedral of the Immaculate Conception, the sermon by the rector, an after-The next center to develop colle- noon organ recital and later in the were sent out on the air.

> On February 6 the first of a series of half-hour lectures to be given every Saturday night by teachers in the various faculties of Creighton

And so this thoroughly modern. In the fall of 1921 the Rev. John B. tra concerts, intercollegiate debates, vehicle for the carrying of truth and In the Iall of 1921 the Kev. John B. etc., intended primarily for the un- enlightenment and spiritual cheer

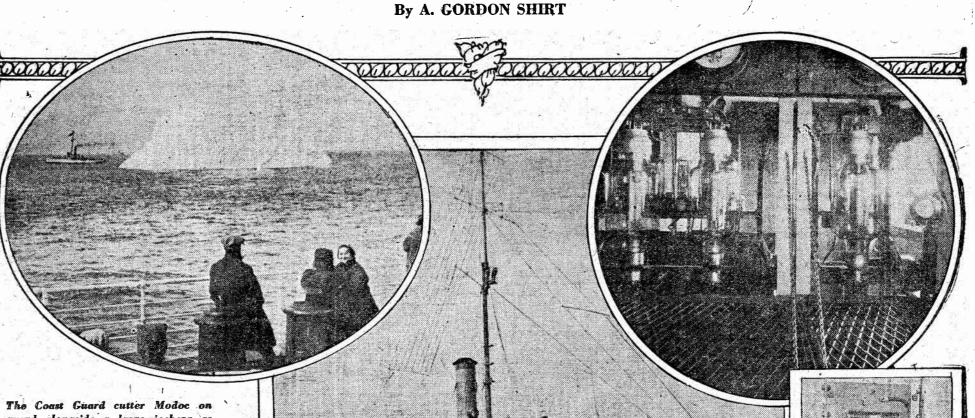




by days.

# How Radio Helps the U.S. Coast Guard Keep **Tabs on the Ice Menace**

Cutters Are Well Equipped With Wireless Apparatus; Positions of Icebergs Charted Regularly



guard alongside a large iceberg as seen from the decks of the S. S. Tuscania

HROUGH May and June the yearly ice patrol kept by the United States Coast Guard along the north Atlantic steamship lanes has been and will continue to perform its arduous task. A glimpse into the daily routine of the officers and men upon the ships designated for the purpose reveals that radio plays the major part in the work. In fact, were it not for radio, the service would be practically impossible.

The cruising cutters of the Coast Guard are well equipped with radio. The nature of their work compels them to be, else how could they receive information of shipwreck and danger in time to be of practical assistance? And they find constant use for all that they have. At sea, the vessels of the Coast Guard send in their daily noon position to headquarters, and keep a constant and vigilant radio watch for orders rushing them to spots along the coast to aid in the relief work of some disaster.

The cutters likewise put their radio compass to good use. In the first place, it is possible for them to navigate in the thickest fogs with a considerable degree of safety. Instances are on record where Coast Guard vessels in ports along the coast have been enabled to proceed to sea in dense fogs and to locate stranded vessels by means of the radio compass, especially if the distressed craft is a steamship equipped with radio. The disable vessel lying still and sending out radio impulses is readily located by the cutters and the work of rescue facilitated sometimes

#### **Radio Routine Strict**

The radio routine as outlined in orders from headquarters is exceedingly strict. Before even a glint of the morning sun warms the backs of the playful seals on the plateaus of the icebergs, a complete diagnosis of the icy regions must go forward by radio to the hydrographic office. Not to the main office in Washington, although the message finally arrives there for publication in the daily memorandum, but to the branch office in New York City. so that the big shipper, the controlling stockholder, and the members of the Maritime Exchange may know the moment they come to their desks the extent of the ice menace out there on the Banks. Furthermore, the station at Arlington broadcasts this report-known to the service as the 4 a. m.-and doubtless reaches vessels that somehow or other would have entered the ice field unguided.

Just before the darkness intensifies the dread of the Newfoundland fogs, there is broadcast from the patrol ships a general ice report. It contains all the information secured that day with reference

The U. S. S. Tampa, the first electric Coast Guard cutter. (Insert.) A view of

the radio transmitter used on the U.S. Coast Guard cutters. Right-The radio telephone attachment used in connection with the radio transmitter, Photos Courtesy, General Electrical Company

situation. for the benefit of ships who are | west, adding that it was not responsive to listening in for the first time. This evening report is sent out on a 600-meter wave length, and is repeated twice, with an interval of two minutes between the messages. East coast amateurs listening in at 6 p. m. during the months of the ice visitation may intercept the report, and if they are ambitious enough to spot the icebergs on a school map they will have in duplicate the problem of the trans-Atlantic navigator that night, minus the anxiety and the worry. Many a cautious skipper has been enabled to give his whole attention to the fog on the radio assurance from the ice patrol that no icebergs lie in his path for the next eight hours.

#### All Ships Asked to Give Aid

In addition to these general reports, a reach asking them to report their positions, courses and speed, water temperatures and general ice information to the cutter. This request goes out every four hours. It brings in the greatest volume of business; in fact, the responses make up the bulk of the radio work of the cutter.

Upon the receipt of this request, which is a way of informing vessels that there is skilled protection to be had for the asking, all ships who wish to take advantage of it send in their name, geographical position, their course and speed. On board the Coast Guard cutter, the positions are plotted on the commander's chart, and the courses are laid down and examined to see whether or not they are clear. After a week or so of work, this chart comes to be a moving diagram of ocean shipping, as more and more ships send in their positions and indicate the direction in which they are going, and as more and more dots are hourly brought forward on the chart.

The constant reports of these vessels constitute considerable radio traffic in themselves. In 1923, over 945 vessels reported themselves 2.646 times. The steamship Strathearn, for example, to take at random one of the hundred ships that performed similar services in late years, reported the presence of a large to the positions of bergs and ice fields, to- berg in latitude 42 degrees 10 minutes

the fog whistle and therefore particularly dangerous to navigation.

When this information, was received aboard the cutter it was not only made the subject of a specially broadcast warning, but was examined with reference to the score or more ships following in the wake of the Strathearn. If it was apparent that any one or more of them were heading into danger, that vessel or vessels were made the recipients of a special direct report.

#### Routine of the Work

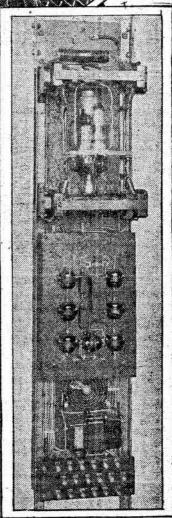
The routine of the work, as it might be expected, has lost its thrill for the active chief of the ice patrol. He dispenses with warnings and information as methodically as though he were laying down his course for home. He awaits developments in the most dangerous of situations with a calmness that would have done credit to Napoleon. But in spite of his uncomplaining exterior, he is often supremely tired. This work taxes a man to the limit. Two days of dismal nose-poking into a whirling fog, blasting constantly on the nerve-racking whistle and coming so close to what they were looking for that at times only a prompt shift of helm averted a crash and a cold, cold grave.

He looks at the radio officer, who has silently appeared in the doorway. Another man who has not rested for days.

"The master of the S. S. Noord would like to know if a straight course from latitude 41 degrees 44 minutes north, longitude 46 degrees 43 minutes west, could be laid toward Cape Breton, or would it be advisable to round Sable Island and proceed from the west."

"Tell him to proceed with caution," replies the commander." "He cannot make Cape Breton without meeting ice on either course he mentions. Give him position of the nearest bergs . . . here, numbers five and seven . . . with their approximate drift. Ask him to give us his position and water temperatures every four hours. Another?"

"Yes, sir. Steamship Yamahill reports large iceberg in 41 degrees 12 minutes north, 53 degrees 34 minutes west in shape like a broken tooth. It is 400 feet | danger, for the present year at least, it gether with a complete summary of the north, longitude 46 degrees 53 minutes long and 100 feet high, with a broad over.



plateau at one end, on which seals are sun ning themselves."

"Ummm, let's see. That's there," making a dot on the chart at the reported latitude and longitude. "That is to be numbered 15. It has a probable set to the southeast of five-tenths of a mile per hour-Make the usual broadcast warning, Mr. K.; notify the hydrographic office at New York in the 4 a. m. report, and get in touch directly with the ships Senweild and Bethelridge, advising a change of course to the southward and warning them to proceed with caution."

"Yes, sir." "And, Mr. K."

Q

"Sir?"

"Thank the Yamahill."

And so the work goes on . . either the radio operators nor the ship'a navigating officers getting an overdose of sleep. While the battle with the ice field is taking place, the trans-Atlantic steamship lanes are shifted to the southward one degree. This change takes steamers below the southernmost edge of the ice field. During these months the Coast Guard cutters keep constant watch over the field, following and marking its southern limits, and tracking like sleuths the paths of individual and isolated bergs. June is the receding period, when the field goes back to the northward, and around about the last days of June or the first week in July the steamship lanes are again freed from the menace, the ships are withdrawn from the patrol, and the

# For the Love of Mike----A Radio Romance Involving a Greek Exam and an Old Flame

The Announcer Leaves His Microphone Open, With Interesting Results

By HILLIARD BOOTH

# T is Stella?"

"Sh!" Albert Gaines, professor of Greek at Biltwell College, motioned his elderly sister to silence as he adjusted the dials of his radio receiver. "They're broadcasting the Biltwell-Brown football game."

"This is the end of the second period," came the announcer's voice through the loud speaker. "The feature of the first half was the brilliant playing of Buck Rogers, of Biltwell. I'll let you listen to the band during the intermission, while I go out for a drink of-nothing stronger than black coffee, I as-

sure you. Please stand

"Stella?" The youngish professor turned to his sister. "Why,

Stella went to see you, Rachel." "Um!" Rachel shrugged. "Our niece

has probably gone to the football game." "No, I forbade her to go. I'm trying to

get this Buck Rogers out of her head. I hope Mr. Rogers will be as brilliant in his Greek examination to-morrow as he is on the gridiron this afternoon!"

"Small hope!"

"Exactly! But where is Stella?" As if in answer to his question Stella's voice sounded loud and clear through the loud speaker of the radio.

"Here's a quiet place, Buck. Oh, you were wonderful!" "I only have a moment, Stella." The

deep voice which came to them over the air was that of Buck Rogers. "Gee, but you look good !'

on your dresser?'

to answer the door.

room with three telegrams.

Maria must be dead!"

Gaines opened the other.

what bonds have you?""

and read:

it mean?"

again.

The telephone and door-bell, ringing

simultaneously, saved Gaines from a re-

ply. He took up the 'phone as Rachel went

Gaines. You are who? . . . Tootsie

La Rue, of the Follies? You'll-what?

come is big enough? Ha!" He banged

up the receiver as Rachel entered the

"Three wires for you, Albert! Cousin

Gaines tore open one of the telegrams

"'New York. Oh, you sugar daddy!

Wait for mamma! Am leaving on the

5:03." The paper fell from the profes-

sor's nerveless hands. "Rachel, what does

"Mean? It means that Stella and Buck

broadcast your name and the fact that

you are an eligible bachelor. The wires

are all addressed to Biltwell College, Open

the others." She tore one open herself as

widowed state for bonds of matrimony, or

"'Rochester,' he read; 'will exchange

"This is from Chicago," said Rachel.

'Don't be a crab. Shoot Buck through

his Greek. I have an extra pair of bell-

bottoms. What size does Rachel wear?"

She tore the paper to bits. "Abominable!"

The door-bell and the 'phone both rang

"Hello!" Gaines spoke into the 'phone.

"What color is my hair? . . . Do I

object to cats? No; this is not Professor

Gaines! He's not home-he won't be

home to-night!" He put down the re-

Make a human being out of me if my i

"Hello! . . Yes; I'm Professor

"It's Stella at the football game!" gasped Gaines, "with Buck Rogers!" "And broadcasting over the radio!"

"Oh, we're right in front of the microphone!" came Stella's voice, "you don't suppose it's open, do you?"

"Not a chance of it," Buck's voice reached them. "Mike is mute during the intermission

"They're on the air and don't know it!" exclaimed Gaines. "Stella is speaking again," warned

Rachel. "Sh!"

"Listen, Buck. If you don't pass your Greek exam to-morrow you won't be allowed to play in the big game with Stafford. Uncle Albert's found out you care for me and he's furious. He'll flunk you if he can."

"Won't your Aunt Rachel help us out by pleading with him?"

"Mixed pickles! Aunt Rachel went sour on everything in plus-fours since she failed to land a pair of bell-bottoms for herself."

Rachel shook her fist at the loud speaker. "This is abominable!" "What's your uncle got against me?"

came Rogers's voice. "He's sore on the love game, too. Some girl by the name of Alice turned him down. He keeps her picture on his dresser. Uncle has an independent income. I wish some girl would grab him and make a human being out of him!"

"I have it!" boomed Rogers's voice. "We'll announce our engagement and Professor Gaines can't flunk me. If he does, every one will say he did it out of spite!"

The sound that followed and filled the quiet room was unmistakably that of a giver, but left it off the hook. Rachel rekiss. The voices died away and the strains trened from the front, door with both

NOOD afternoon, Albert. Where of a brass band filled the loud speaker. | hands full of telegrams. The professor | "They've gone!" Rachel shut off the radio. "Wait till I get my hands on Stella !"

> "Wait till I mark Rogers's exam paper!" The professor's voice was grim. "Do you mean to tell me, Albert Gaines,

"'New Orleans,' " read Rachel, "'your love is just my wave-length. Marry Stella off to Buck and I'll take care of your in-

"Baltimore," read Gaines. "Tell Rachel she can have my plus-fours if

Buck passes his Greek exam." "Flunk him on the examination!" cried

groaned as they started to open them. noon!" She went out and slammed the "'Kansas City. Hot Saphho, give Buck door after her. "Uncle dear,"---- began Stella. Rogers 100 per cent on that kiss, Profes-"Not another word!"

A smile broke over Buck Rogers's face as he opened one of the telegrams. "Listen to this one, professor."

everything in plus-fours! Good after-

"I don't wish to listen to it. I've heard enough of those atrocious wires. Tear it up!"

"All right. But it's signed 'Alice Deering.'

"Alice Deering?" The professor, excited, snatched it out of Rogers's hands and read it quickly.

"Why, it's Alice Deering's picture which

you keep on your dresser," said Stella. "Listen, Stella!" The professor's voice trembled with excitement as he read the message. "'Heard Stella and Rogers over radio. Is it true you keep my picture on your dresser? Yours is on mine. If you

SIRBANIK-

answered my last letter I never got it. Alice Deering.'

"She still loves you, Uncle Albert!" cried Stella.

"I did answer her letter. It must have been lost. It's like a miracle. Where's my hat?" The professor searched for it frantically. "I'll go send her a wire at once. I'm the happiest man in the world." "Just a minute, professor," Rogers detained him, "don't you think there's any

chance of my passing that Greek exam. to-morrow?' "Greek exam? Ah-eh-yes-just so!"

Gaines beamed on Rogers. "If you know any Greek at all, certainly you'll pass it! Why, if it hadn't been for you and Stella I wouldn't have found Alice! Heaven bless you both!" He hurried out of the room and was gone.

"You'll pass the exam and be allowed to play in the big game with Stafford,"

"It was my love for you that brought it all about," said Buck.

"Nonsense!. It wasn't your love for me, it was the microphone!'

"For the love o' Mike!" Buck took Stella in his arms.

#### How to Locate Losses Due to **Poor Dielectric**

Dielectric losses refer to the power dissipated in insulating material and which evidences itself as heat. (Of course, only in extreme cases is a temperature rise appreciable.) Such losses occur in panels, cabinets, baseboards, winding forms, supports-in fact, in any insulating material included in electric fields

In some materials the losses are greater than in others. The phenomenon of dielectric losses and a comparison of the dielectric efficiency of different insulating materials may be demonstrated by any fan possessing a loosely coupled receiver. By loosely coupled reference is had to the space between any two radio frequency circuits across which energy is transformed.

The substance to be tested, a sheet of pasteboard, or perhaps a panel, is placed between the two adjacent coils. Note should be made of any variation in signal strength. If the dielectric is highly efficient, the interposition of the material will have no appreciable effect upon the

# "Here's a quiet place, Buck. Oh, you were wonderful!"

that you still keep Alice Deering's picture | Rachel, as the door-bell rang again.

"I will," snapped the professor. By the time Stella returned home the table was piled high with telegrams, many of them still unopened. On either side of the table sat the professor and his

sister, grimly waiting. "Hello, Aunt Rachel!" cried Stella gayly as she ran into the room, followed diffi- | cried Stella, jubilant. dently by Buck Rogers; "what are all the telegrams about?"

"Many of them," replied the Professor sternly as he looked from Stella to Rogers, "are about the kiss which you and Mr. Rogers shot around the world this afternoon, some are offers of bell-bottoms to your Aunt Rachel, and most of them are proposals of marriage to me! The microphone in front of which you discussed love, Greek and your family this afternoon was open."

"The mike open? Great heavens!" "For the love o' Mike!" exclaimed Rogers, startled.

"This message is for you, Mr. Rogers." Gaines handed it to Buck. "'St. Louis,'" read Buck. "'Use a crib

for your exam.' "How vulgar," cried Stella, "but that

reminds me, Uncle, Buck and I have something to tell you. We're engaged to be married!"

"Engaged so I can't flunk Mr. Rogers in his Greek exam. Yes, together with about half the country, I heard you mention the fact. But I can assure you, Mr. Rogers"-the professor's tone was emphatic—"that unless your Greek paper is of a high order of excellence, I will flunk you, and with a great deal of satisfaction!"

"Aunt Rachel," cried Stella, "you plead with Uncle."

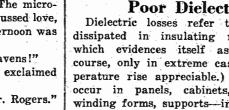
"Mixed pickles!" exclaimed Rachel sharply. "You forget I've gone sour on | signal-Z. B.

energy as possible.

receiving set. dously.

### on the receiver.

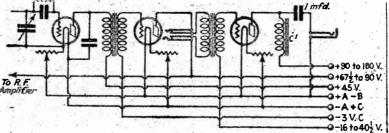
To understand this action thor oughly, try it out on your own set. Tune in a good station and retard the volume control (this control should be on the R. F. end of the set ahead of the detector-usually the R. F. rheostat). Start with the signal barely audible, and then increase the volume slowly. If you have a high quality audio amplifier in your set and a good speaker, your reproduction will be excellent until you reach a certain point-the point where





# Use of Power Tubes and Why Needed in Audio Amplifiers with the ordinary filament and plate voltages.

Most of the attention of laboratory @



ume, but to Withstand High Currents and **Thereby Prevent Distortion** 

#### By A. J. Haynes

Haynes-Griffin Radio Service, Inc.

URING the last eight or nine months noteworthy progress has for various plate potentials are as been made in the development of "special purpose" tubes for follows: use in specific parts of the radio receiver. Special detector tubes of improved design, radio frequency tubes with greater amplification, and power tubes for use in the last audio stage of the set-all these have come within a period of less than a year, and as a result the set owner has been able to improve the range, volume and tone quality of his receiver by replacing his old type tubes with new and improved ones as the old ones became inoperative or as he felt the Bureau of Standards desire to make the small investment required.

workers and tube experts has been your final output tube begins to overis familiar with vacuum tube theory That clean-cut natural quality will

and operation, the necessity of a be lost, and the louder the signal is special tube for the output or final made, the worse this condition will audio stage is perfectly apparent. become. What is actually happening is that By far, the greatest single source

The popular conception of a power the grid. tube seems to be a tube which is deprovide a comfortable and reasonable degree of volume without blasting or distortion. However, this requirement is not as simple as it sounds. The vacuum tube is a voltage operated device with the grid as the controlling element. When properly connected in an amplifying circuit it converts any voltage impulse, im-

electrical power in its plate circuit. It is then the function of the sofrequency or audio frequency am- plate circuits.

not amplify, but an actual and appreciable amount of energy is always lost and dissipated in the transformer. The best we can do is to use an efficient transformer and lose as little

The point to remember is that the only parts of a radio set that do any amplifying are the tubes themselves. When the signal is intercepted by the antenna and delivered to the radio receiver, it is in the form of a very weak voltage surge, having almost no power behind it. This initial voltage is amplified as it passes through the succeeding tubes of the

By the time the signal has reached the final tube in the receiver it has been built up and amplified tremen-

We find that the actual voltage of this signal when it is passed to the last tube is usually in the neighborhood of fifteen volts for just an average comfortable signal response in the loud speaker. To fill a large room it is often necessary to increase this voltage to twenty-five or thirty volts. This is regulated, of course, with the tuning and volume control

#### **Try This Test**

use of a high "C" battery voltage

Several such tubes have recently been placed on the market, one of super power tube, type CTX 171. The characteristics of this new ube are as follows:

Filament volts .....5.0 Plate voltage ......90-180 Negative grid volts, 16<sup>1/2</sup>-40<sup>1/2</sup>

The proper negative grid voltages

	Plate	Negative
	Volts	Grid Volts
	90	16½
	135	
	1571/2	
	180	40 1/2
-		

devoted to the perfecting of power load. Beyond this point, the quality ards is considering the termination of improving the apparatus for re- propagation along the earth's magtubes for use in the last audio stage. will begin to disappear. The re- of standard frequency transmissions, ceiving the broadcast programs. The netic field and double refraction for There is a very good reason for this production will become raspy and according to the "Radio Service Bulconcentrated effort. To any one who blurred. Speech will be muffled. letin" of the Department of Commerce.

> Sincé March, 1923, the bureau has radio signals of definitely announced fornia.

The reason for discontinuing this standard frequency transmissions settled. were inaugurated. -

The standard frequency transmistending through June, will be carried out. The Bureau of Standards is now announcing the possible termination ble mysteries. There are some noteof the service after that date in order

called amplifying transformer to con- portionately larger filament voltage of broadcast signals. A short, low high radio frequencies. vert this electrical power surge into and current to operate it. It is far aerial will not be as acceptable to To be sure, the explanations cover a higher voltage which, in turn, is from being an economical arrange- static noises as a larger one. Dur- a relatively small part of what is passed on to the grid of the succeed-ment and requires special power ing the summer an aerial about fifty known, for as the explanations de-(either radio or andio) not only does which operates at reasonable battery tions as readily as a larger one.

**Dance Charleston to Radio Music** 

# potentials, but which has a specially constructed grid which will allow the Behavior of Radio Waves Is Chief Problem to Solve

Such Tubes Are Not Designed to Give Greater Vol. which is known as the Cleartron Attracting Wide Attention of Scientists; First Problem of Radio Dealt With Apparatus; Waves Suffer Changes Which Cause Fading

#### By Dr. J. H. Dillinger

Chief, Radio Division, United States Bureau of Standards

NTIL recently the problems and difficulties of radio were wrapped up with apparatus and currents. Now the chief limitation on progress is the erratic behavior of the waves. And because of this, radio-wave behavior is attracting widespread attention, for it is the unsolved problem, the difficult job, the frontier of conquest, which challenges people's interest. The history of radio in our day?

turns on three major problems. The description of the accepted theory: themselves to radio's problems was The cat is now out of the bag and the development of receiving sets we have only to fill in details. with which programs could be re- In a sense we know much less been transmitting, twice a month, ceived with the full volume and qual- about the actual behavior of radio

#### Second Problem

The second great problem of radio service is that other means for ob- is to-day's problem of how to con- understanding radio wave action just taining standard frequencies have be- trol or circumvent the vagaries of come increasingly available. The radio waves and the improvement of other means referred to are the use of piezo oscillators, and the wide lem, that of yesterday, was a probavailability of reliable standards and lem solved by the engineer. To-day's tions, meeting no obstacles or changes by far, the greatest single source what is actually approved is over-of distortion in radio reproduction the grid of the last tube is over-testing service from a number of problem of the radio-wave vagaries until arrival at a point where they these means were available when the sure I don't know that it will not be readily be predetermined by theoret-

The subject of radio-wave vagaries sion schedule already announced, ex-timeliness, but because noteworthy is of interest not only because of its progress is being made in the understanding of their hitherto inexplicathat persons who depend upon the tance of this problem. For instance, worthy manifestations of the impor-There are two methods of meeting service in any special way may in-the unfavorable reception conditions this requirement. First: A tube sim- form the bureau of any objection to of the last winter were notorious and stimulated universal inquiry. Some tremely high plate voltage with a cor- Use Small Antenna in Summer of the mysteries how are being cleared up, and the scientific radio To Reduce Volume of Static world is as excited now over the de-Static, which is frequently heard veloping explanations of radio-wave the waves spread out farther and bein radio receiving sets this time of behavior as the practical radio world year, may be greatly reduced by was two years ago over the newly using a shorter aerial for reception discovered potentialities of the very

ing tube. This action is the same equipment to furnish the necessary feet in length and suspended about velop the complexity and extent of whether the tube is used as a radio high voltages for its filament and twenty feet above the earth will be known radio phenomena increase still excellent for receiving local sta- faster. A flood of theory and expla-The second method by which dis- tions. However, it must be remem- nations is appearing in current radio lustrated by the following complete

first was the problem of five years The magneto-ionic hypotheses ago, when broadcasting began, and it whereby the electronic phase velocity May Discontinue Signals had to do with apparatus and cir- is so modified that there is a rotation The United States Bureau of Stand- cuits. Every one felt the crying need of the plane of polarization for ideal and goal of those who devoted transmission at right angles thereto.

ity of the original, by the mere waves now than we did ten years ago. frequencies for use by the public in touching of a single control, without We then had a comfortable explanastandardizing frequency meters (wave unsightly antennas or batteries, dials, tion of the known phenomena in meters) and transmitting and re- wires, complications, static and in- terms of wave motion in the ether, ceiving apparatus. The signals are terference of all kinds. By and large, The ether is a strictly homogeneous transmitted by the bureau Station this ideal has been realized. Appa- something filling all space, and its WWV, Washington, and from Sta-tion 6XBM, Stanford University, Cali-tions is now available. some other scientists declare that the ether doesn't exist, but the idea the same.

Since the ether is entirely uniform, it was supposed that the waves of distortion in radio reproduction the grid of the last tube is over a arises from an overloaded grid at the loading and we no longer obtain an accurate duplication, in the plate cir-finel and in tube. It is one for whose investigation we were received. The character of this must look to the scientist; and I am beautifully simple transmission could be theoret. ical calculation. Unfortunately, we now know that the waves suffer a great many changes and variations due, not to the ether, but to many things with which the ether is filled, including the air and the earth. The atmosphere is by no means uniform. electrically speaking, but contains electrical particles of varied character and distribution, all in a turbulent state of motion. The clear and perfect kind of radio transmission which was formerly expected is found only for rather short distances from the transmitting station. As come weaker they are more and more subject to the various sorts of varia-

#### Vagaries of Reception The vagaries to which radio recepion are subject include: (1) intensity variation; (2) fading, or fluctuation of received signal; (3) atmospherics, or static; (4) variation of wave direction and polarization; (5)

interference of various kinds. The chief practical question that arises out of all this is the question Mark Twain asked about the weather, "What are you going to do about it?" The only answer is that radio wave agaries, like the weather, are phenomena of nature, and since we cannot remove them we only can go ound them. Each proved fact the sure answer to the problem it alses, for it thereby determines a fixed element of calculation. The hitherto elusive problems of radio waves are now being clarified and solved through experimental determination of the facts and through their interpretation by a reasonable heory.

#### 'The Big Brother and the

Children's Court" by Boyle "The Big Brother and the Chiliren's Court" will be the subject of an address delivered before WEAF'S microphone by Judge Edward F. Boyle, of the Children's Court of New York City, on Saturday evening at 7:15 o'clock.

Judge Boyle has been for some time Justice in the Children's Court and has given particular attention to juvenile cases. He is known as a popular and accomplished speaker.

#### 'Lucia di Lammermoor" by

WEAF Grand Opera Co. At 10:30, instead of 10 o'clock, as is usually the case, the weekly tabloid grand opera by the WEAF Grand Opera Company will be broadcast through WEAF, WOO, WCAP. WTAG. KSD, WTIC and WSAI to-morrow evening. The presentation of the evening, which will be under the customary direction of Cesare Sodero, will be the famous opera by Donizetti, "Lucia di Lammermoor."



The members of the Kittredge Foundation for Girls at their Bear Mountain summer camp have become proficient in dancing the Charleston by utilizing the dance music broadcast by New York City radio stations for practicing on every possible occasion

The term "amplifying transformer" tortion in the final output stage can bered that a short antenna is not literaure. The way our ignorance is is an unfortunate one. A transformer be eliminated is by designing a tube capable of picking up distant sta- camouflaged may be handsomely il-

tions which are being delivered to In order to overcome this condition signed to give great volume. This is it is necessary to use a higher value not necessarily true. An overwhelm- of "C" battery voltage between the ing volume of sound from a radio grid and filament of the final tube set is seldom needed or desirable. All than the signal voltage which is bewe ask of a good power tube is to ing impressed on it. How the Problem Is Solved

ilar to the 201A type may be used its termination, says the bulletin. which is built to withstand an ex-

The 210 type tube is an example of this. It operates at a plate potenpressed on its grid, into a surge of tial of 425 volts and a grid bias of 35 volts. Such a tube is merely a large edition of a 210A and requires a pro-

# Additional Radio Programs for the Week 940k-WGE-BUFFALO-S19m 6:30 p. m.-Bernice Riggs, planist. 7 p. m.-Winger's Creacent Park Ena tertainers. 8:15 p. m.-Reading, "Lavinsky at the Wedding," Mrs. J. Belanger. 8:30 p. m.-Ethyold McMullen and friends.

Continued from preceding page 570k—WNYC—NEW YORK—526m 10 p. m.—"Keeping Fit," Joe Ruddy, 10 p. m.—Minnle Elias, planist. 10 p. m.—Market high spots.

.--Songs, m.-John .Fish, flutist.

7:15 p. m.—John Fish, Indist. 7:30 p. m.—Police alarms. 7:35 p. m.—Talk by Winter Russell. 7:55 p. m.—Violin solo. 8:10 p. m.—Baseball results. 8:15 p. m.—Instrumental program. 10:15 p. m.—Police alarms; weather.

1430-WBNY-NEW YORK-210r

m.—Trio. m.—Orchestra. ) p. m.—J. Vincent Moore, Ro isher.

Fisher. 8:45 p. m.—Milton Yokeman, tenor. 9 p. m.—Orchestra. 9:30 p. m.—Sliver-volced tenor. 9:45 p. m.—Lauretta Reynolds, tongs. 10 p. m.—Studio program. 10:45 p. m.—Milton Yökeman, tenor.

1100k-WBBR-STATEN ISLAND-2781 8 p. m.—Joseph Bonaccorso, violinist. 8:10 p. m.—Walter Stoll, tenor. 3:20 p. m.—Bible lecture, R. S. Sekle

mian. 8:40 p. m.—Walter Stoll, tenor. 8:50 p. m.—Joseph Bonaccorso, violinist 950k-WHAG-RICHMOND HILL-316m

2 noon-Grebe Matinee Trio. 02 p. m. Grebe Matinee Trio. 1390k-WRST-BAY SHORE-216m p. m.-Fred Baumeister, guitar,

harmonica. 8:30 p. m.—Billy Sternau, pianist.

740k-WOR-NEWARK-405m 6:45, 7:15, 7:45 a. m.—Gym class. 2:30 p. m.—Harold Cutler, violinist. 2:45 p. m.—''The Ruby,'' Dr. George

1140k-WAAM-NEWARK-263m m.—Happy hour program. m.—Ernie Krickett's Orchestra.

7 p. m.-Sport review. 1190k-WGCP-NEWARK-252m 8:30 p. m.-Walt Riggin's Orchestra 9:30 p. m.-Rivera Park program.

1340k-WODA-PATERSON-224m

1340k-WODA-PATERSON-224m 12 noon-Dance music. 12:30 p. m.-Popular songs. 5:30 p. m.-News; sport talk. 6 p. m.-Pat Cristello's N.ght Owls. 8 p. m.-St. George's School Choir. 8:45 p. m.-Tare You'a Jay Walker?" 9 p. m.-Lena Hempstead, contraito. 9:15 p. m.-Fred Méyer, tenor. 9:45 p. m.-Reven Jay Wildman, songs. 9:45 p. m.-Colonial Inn Entertainers.

760k-WLIT-PHILADELPHIA-395m 12:02 p. m.—Organ recital. 12:20 p. m.—Religious sarvice. 12:35 p. m.—Benjantin Franklin Conc

Orchestra. 2 p. m.—Arcadia Concert Orchestra 7:30 p. m.—Benjamin Franklin Co Orchestra

590k-WIP-PHILADELPHIA-508m

m.—Sétting-up exercises.
m.—Luncheon music.
p. m.—Dinner music.
o. m.—Department of Agriculture.
m.—Roll call and birthday list.
m.—Ambassador Orchestra.

3.30 p. m.—Studio program. 3.46 p. m.—Creatore and his band. 9:30 p. m.—Traymore Concert Orchestra 10 p. m.—Traymore Grill Dance Orches

10:30 p. m.--Weish Male Chorus. 11:30 p. m.--Kddie McKnight's Danc

chestra. k-WCAU-PHILADELPHIA-278n 3:30 p. m.—Billy Hays's Orchestra. 1:30 p. m.—Snellenburg Symphony Or

8 p. m.-Saddler's plantation Serenaders

p. m.—Saddler's plantation Serenade
8:30 p. m.—Clifton's Anglera,
8:45 p. m.—Earry O'Moore, tenor,
9 p. m.—Hae Musical Chefs.
9:45 p. m.—Comedy Lesson, Professor,
Deolittle.

10 p. m.-Dick Jackson, Margaret Ellis 760k-WFI-PHILADELPHIA-395m :00 p. m.-Tea Room Ensemble 760k-WFI-PHILADELPHIA-395m
1:40 p. m.-Tea Room Ensemble.
1:40 p. m.-Tea Room Ensemble.
8 p. m.-Instrumental Quartette.
6:45 p. m.-Dace Orchestra.
7:15 p. m.-Keystone: Automobile Club feature.
8 p. m.-Program from WEAF.
8:15 p. m.-Hire's Harvesters.
9 n. m-Clicguot Club Eakimos

5:10 p. m.—Hire's Harvesters.
9 p. m.—Clicquot Club Eskimos.
10 p. m.—Silvertown Cord Orchestrunder the direction of Joseph Knech 1090k-WHAR-ATLANTIC CITY-275m

2 p. m.—Seaside Trio. 8 p. m.—Seaside Trio. 9 p. m.—Studio cencert. 11 p. m.—Folies Bergere Dance Orches-1000k-WPG-ATLANTIC CITY-300

1000k WPG-ATLANIA CATT-300m 6:15 p. m.—Organ recital. 7.20 p. m.—Anrbassador dinner music. 7:20 p. m.—Ambassador dinner music. 8: p. m.—Address by W. H. Fulweiler. 8: 10 p. m.—Traymore dinner music. 8: 20 p. m.—Musical pageant, "America." 8: sequicentennial. Chorus of 5,000

-Dance O

11 p. m. --Dance Orchestra. 790k--WGY-SCHENECTADY--380m 12:30 p. m. --Reports. 2 p. m. --Music; Cornell talk. 6 p. m. --Stock reports. 6:30 p. m. --Jack Denny's Orchestra. 7:25 p. m. --WGY Orchestra. 1:45 p. m. --WGY Orchestra.

8:30 p. m.—WGI Orchestra. 8:30 p. m.—Marine Band. 9:30 p. m.—Royal Salon Orch 10:30 p. m.—WGY Orchestra; dale, tenor. m.—Organ recital.

940k-WGR-BUFFALO-319n 11 a. m.—Lecture from the Ne State College. 6:30 p. m.—Dinner music. 8-11 p. m.—Jointly with WEAF.

1080k-WHAM-ROCHESTER-278m

 8:30 p. m.—Eastman Theater\_Orches
 5 p. m.—Eastman Theater organ.
 7:30 p. m.—Outdoor talk.
 7:45 p. m.—Program from studio
 WGY. 11:30 p. m.—Organ recital. 1460k—WIBX—UTICA—205m

6:30 p. m.-Dinner dance music. 7:30 p. m.-Talks. 7:30 p. m.—Talks. 9-10 p. m.—Studio program; soloists 980k—WJAR—PROVIDENCE—366:

1:05 p. m.—Studio program. 7:45 p. m.—Talk; scores. 8 p. m.—Hudson-Esser Orchestra.

9-11 p. m.—Program from WEAF. 630k—WTIC—HARTFORD—476n

o. m.—Arlene Schrier, contraito. 5 p. m.—Medical taik. 10 p. m.—Van Maasdyk and orchestra. 5 m.—For-an-to Melody Makers; male quartet. 10 p. m.—Emil Heimberger's dance or

lestra. 1070k-WNAC-BOSTON-280m 1670k—WNAC—BOSTON--23 10:30 a. m.--Women's Club; songs; news; 1 p. m.-Luncheon concert. 4 p. m.-Tea dance, 4:20 p. m.-Vocal selections. 6 p. m.-The Smilers. 6:30 p. m.-Dinner dance. 7:35 p. m.-Associated Pharme Messechusjatts. talks

7:35 p. m.—Associated Pharmacists Massachusietts.
7:45 p. m.—The Golf Question Box.
8 p. m.—Concert program.
9 p. m.—Victory's Band.
9:15 p. m.—Dok Eisenbourg's Sinfonis
10:05 p. m.—Dok Eisenbourg's Sinfonis
10:05 p. M.—Dok Eisenbourg's Association (Stranger Stranger Stran

360k—WEEI—BOSTON—349m
10:15 a. m.—Anne Bradford.
12 noon—Keith's Radio Review.
3:45 p. m.—Mickey Alpert, songs.
4 p. m.—Eugene's Singing Orchestra
5 p. m.—Eliot, Daniet, pianist.
6 p. m.—Keitl's Radio Review.
6:45 p. m.—Etwy. Brother Club.
7:30 p. m.—Atw. Jecale.
8-11 p. m.—Pist sam from WEAF:

900k-WBZ-SPBING'D, MASS.-333m p. m.-Bob Patterson's Trio. :33 p. m.-Hotel Lenox Ensemble. 45 p. m.—"Mental and Physical Health," by Frank Stanton. 9 p. m.—Spalding Sextet. 10:30 p. m.—Freited Instrument Quartet. 1120k.—WTAG—WORCESTER—268m 12:05 p. m.—Musical selections; health talk.

talk. 4:30 p. m.—WTAG Indoor Sports Club. 5:15 p. m.—Story teller. 8 p. m.—To be announced. 9-11 p. m.—From WEAF. 640k.—WHC—WASHINGTON—469m

a m. — Organ recital,
p. m. — Organ recital,
p. m. — Mayflower Orchestra,
p. m. — Play-by-play account Wash-ington-Philadelphia baseball game.
p. m. — Radio "movie" presentation.
8:30 p. m. — Concert by U. S. Marine Band, The Revel Solon Orchestra.

Band. 10 p. m.—The Royal Salon Orchestra. 10:30 p. m.—The WRC Players. 11:30 p. m.—Meyer Davis Swanee Synco

pators. 1220k-WBAL-BALTIMORE-246m

m.-WBAL Sandman Circle. p. m.—Organ recital. :30 p. m.—WBAL Mixed Quartet.

p.-m.-WBAL Trio. 970k-KDKA-PITTSBURGH-309m

6:30 p. m.—Dinner concert. 8:40 p. m.—Special farm program. 9:30 p. m.—Love songs of the world and nphony players. m.—Concert by the Symphony play

ers. p. m:—Pittsburgh Post Dance program. 650k-WCAE-PITTSBURGH-461m

6:30 p. m,-Dinner concert. 7:30 p. m.-Address. 8:15-11 p. m.-Program from WEAF

#### FRIDAY

660k—WJZ—NEW YORK—455m p. m.—Ambassador Trio. p. m.—News service and weather. 4.35, 7:30, p. m.—Baseball reports. 4.4:35, 7:30, 10:30 p. m.—News service. 4. m.—'Your Daily Meou." 4:15 p. m.—'They Are Wearing''-----4:25 p. m.—'Bolying Candy Problems." 4:35 p. m.—Market Quotations. 5:32 p. m.—Market quotations. 5:35 p. m.—Cotten quotations. 5:36 p. m.—Cotten quotations. 5:50 p. m.—Cotten quotations. 5:50 p. m.—Cotten Quotations. 5:50 p. m.—Cotten Guestions. 5:50 p. m.—Binancial Summary. 5:30 p. m.—Bonnie Laddies. 9 p. m.—Sunider's hour. 10:30 p. m.—Harold Stern's Orchestra. 610k—WEAF—NEW YORK—492m 660k-WJZ-NEW YORK-455m 8:10 p. m.—Baseball results. 8:15 p. m.—Dramatic reading, Weens linist. 9 p. m.—Selma Slotkin, pianist. 9:30 p. m.—WNYC Quartet. 10:30 p. m.—Police alarms; weather. 1430k.—WBNY.—NEW YORK—210m

610k-WEAF-NEW YORK-492n 3:45, 7; 7:20 a. m.-Health exercises.

(45, 7, 7:20 a.m.—Health exercises.
(45, 7, 7:20 a.m.—Prayer services.
(45 a.m.—Dora Gutentog, planist,
(115 a.m.—'Shoes to Match Your Costume," Lucy. Park.
(1:30 a.m.—Dora Gutentog, planist.
(1:40 a.m.—Dora Gutentog, planist.
(1:40 a.m.—Dora Gutentog, planist.
(2:10 a.m.—Dora Gutentog, planist.
(2:10 a.m.—Dora Gutentog, planist.
(2:10 a.m.—Dora Gutentog, planist.
(2:10 a.m.—Rolfe's. Palata D'Or Orchestra.

Orchestra. p. m.—Louise Smith, contralto. 15 p. m.—Barbara Haverman, pianist 30 p. m.—"Latest Trend in Dress,"

 50 p. m.— Lates
 Zayda Ysuff.
 45 p. m.— Warren Scofield, barytone.
 p. m.— New Yorkers' Dance Orchestra
 p. m.— New Torkers' Dance Orchestra p. m.—New Forkers Danks Order
p. m.—Dinner music.
p. m.—Aristocrats' Dance Orchestra.
p. m.—Veb Lawnhürzt, planist.
p. m.—Diekens cornef.
p. m.—Beatrice Oliver's Symphon

estra.

Orchestra. 30 p. m.—Goldman Band concert Waino Kauppi, cornet soloist. p. m.—La France Orchestra. p. m.—La France Orchestra. 30 p. m.—"Sweethearts," by WEAL

Players. 10 p. m.—Whittail Anglo-Persians. 10:30 p. m.—Jack Albin's Bossert Or

chestra. 1-12 midnight---Pelham Heath Inn Orchestra. **950h**—WGBS—NEW YOEK—316m 10 a. m.—Housekceping on a big ship. 10:10 a. m.—Jaseph Rodin, baryione. 10:15 a. m.—Ratio gym class; solos. 10:35 a. m.—"Fashion Review"; songs. 10:50 a. m.—"Housefurnishing Review." 1:36 p. m.—Scripture reading. 1:35 p. m.—Bob Nielsen, Eddle Woods,

as p. m.—Bob Alexa, Later Songs.
 p. m.—Special program for Roslyn schools.
 p. m.—Robert Chanlers "Decorative Art."
 a. m.—Hebron Treble Clef Trio.

Art." 10 p. m.—Hebron Treble Clef Trio. 20 p. m.—Interview with Arthur Crisp. 30 p. m.—Hebron Treble Clef Trio. 40 p. m.—Plano lessons; trio. 50 p. m.—Uncie Geebee. 50 p. m.—Swance River Orchestra. 50 p. m.—Swance River Orchestra. 15 p. m.—N. Y. Herard Tribune news builteins.

bulletins. 1,100k-WERJ-NEW YORK-273m 7 p. m.-Bienheim, Theater Ensemble. 1:30 p. m.-Luna's Knickerbocker. Or-chestra. 9. m.-'A Valala Funeral in Darkest Africa." Carl von Hoffman. 1:10 p. m.-J. Bocco and G. Levey, uku-lele and guitar duets. 1:30 p. m.-Luna's Marine Band. 2:30 p. M.-VERV VORL 201-

:30 p. m.-Luna's Marine Band. 830k-WHN-NEW YORK-361m

D. m.—Olar. Pincula, songs. p. m.—Elytra Geiger, planist. p. m.—Paquita Cortez, songs. p. m.—Pence Piotti, entertainer. p. m.—News, racing, baseball. p. m.—Jamek Curits, songs. m.—News, racing, baseball. p. m.—Lanek Curits, songs. m.—News, racing, baseball. p. m.—Edna Fries, child planist p. m.—Uncie Robert's Pals. m.—News, racing resulta. p. m.—Knoll and Lang, maido tinnie.

110 p. m.—Knoll and Lang, mahdoli and tipple. 125 p. m.—News, racing, baseball. p. m.—Charm Club Orchestra. 130 p. m.—Uncle Robert's chat. 135 p. m.—Frank H. Ochs, tenor. p. m.—Treasureland Ensemble. 136 p. m.—Louse Ramese, accordion. p. m.—Louse's Coney Island Theate Orchestra.

p. m.—Loew's Coney Island Theater Orchestra.
 p. m.—Coney Island Stadium bouts.
 p. m.—Palisades Amusement Park Orchestra.

Orchestra. 11 p. m.—Strand Roof Orchestra. 11:30 p. m.—Roseland Dance Orchestr. 12:30 p. M.—Roseland Dance Orchestr. 12:30 p. Sliver Slipper Orchestr. 14:50 a. m.—Electrical talk, Edison man 145° a. m.—Blectrical talk, Edison ma (noon)—Ralph Christman, planist, 15° p. m.—Bob McDonald, ukułele, 30° p. m.—Pauline McDonald, ukułele, 45° p. m.—Bob McDonald, ukułele.

[2:45] D. m.—Bob McDonald, ukulele.
p. m.—Sport rays.
p. m.—Commercial digest.
p. m.—Minna Krakowsky, violinist (30 p. m.—Pilsa Clement, children)

30 p. m.—Elsa Clement, childre songs. 45 p. m.—Alfred McCann, "Foods." 3 p. m.—Gordon Hampson Ensemble 3:45 p. m.—"Science at the Philadelp Sesquicentennial."

sesquicentennial." 9 p. m.—Graffman Violin Studio. 9:30 p. m.—Graffman Violin Studio. Dorothy Barbour. 9:45 p. m.—Constantino Ensemble. 10:15 p. m.—Novelty Night—Czecho-slovak Night.

1250k-WHAP-NEW YORK-240m

1250k-WHAP-NEW YORK-240m :30 p. m.-Holmes's String Ensemble. :10 p. m.-Mary Pinney, planist. :25 p. m.-Kitty Cheatham. :55 p. m.-News digest. :15 p. m.-Norwegian Christian Male Cheave 790k-W.J. Market repur. 12:30 p. m.-Market repur. 2 p. m.-Asia Orchestra. 2:30 p. m.-Music; one-act play, "The 3:30 p. m.-Music; one-act play, "The Game," by Lloyd Thanhauser, Game," by Lloyd Thanhauser, Stock reports; news. Chorus. 8:40 p. m.—M. Winter, "A Liberated Mexico." 6 p. m.—Stock reports; news. 6:30 p. m.—International Sunday

Mexico." p. m.—Norwegian Christian Male Chorus. 20 p. m.—Franklin Ford, "American-20 p. m.—Franklin Ford, Americaa (19)
ism vs. Romanism."
9:40 p. m.—WHAP Mixed Quartet,
9:40 p. m.—WHAP Mixed Quartet,
10 p. m.—WHAP Mixed Rustim"—Dorothy Hoyle, violinist; Ruth Montgonkits p. m.—Comed Kitty." by Lee Sv ery, soprano; C. Allen, Darl Behmann, 10:30 p. m.—Rice S
barytone. 8:15 p. m.—Cornedy, "The Arrival of Kitty," by Lee Swartout. 10:30 p. m.—Rice String Quarte; Casper

880k-WMCA-NEW YORK-341m 10:15 a. m.-Employment opportunities. 10:30 a. m.-3:30 p. m.-Hourly market reports. 11 a. m.—Food Bureau program. 12 (noon)—Olcott Vall's String Ense

ble. 2 p. m.—Odierno Ladies' Trio. 3 p. m.—Minnie Weil's pupils. 4 p. m.—Book review... 4:45 p. m.—W. Curtis Nicholson, "The Right Word." 5 p. m.—Entertainers. 6:30 p. m.—Ernie Golden's Orchestra. 5:35; 7 p. m.—Employment opportuni-ties.

ties. 7:10 p. m.—Ernie Golden's Orchestra. 7:30 p. m.—Sachs Quality Boys. 8 p. m.—Alfred Orner, tenor. 8:30 p. m.—Cousin's Shoe Style talk. 8:40 p. m.—"Muscle Shoals."

p. m.—Paul Whiteman's Piccadil
 Players.
 9:30 p. m.—Klein's Serenading Sho

makers. 10 p. m.—Norman Pearce, readings. 10:30 p. m.—Helen Parisi, soprano. 11 p. m.—Jack Denny's Orchestra. 11:30 p. m.—Billy Day, songs. 11:45 p. m.—Jack Cohen, planist. 12:45 p. m.—Jack Cohen, planist.

1100k-WFBH-NEW YORK-273m

chai. 6 p. m.—Katherine Kent, soprano. 6:15 p. m.—Judge Clarise M. Baright. 6:30 p. m.—Talk, Nérvo-Rumat. 6:35 p. m.—Cupit Dance Orchestra. 11:30 p. m.—Connie's Orchestra.

570k-WNYC-NEW YORK-526m

570k—WNYC—NEW YORK—526m 6 p. m.—Herman Neuman, planist. 6:10 p. m.—Market high spots. 6:30 p. m.—Elementary French lessons. 7 p. m.—Advanced French lessons. 7:30 p. m.—Police alarms. 7:35 p. m.—Hida Reich, soprano. 7:35 p. m.—'Books," Prof. J. G. Carter

.-Drama review.

13 p. m.—Jack Davis, barytone. 130 p. m.—Jessie Borock, songs. 9 p. m.—Sioux City Siz. 130 p. m.—Martha Kovacs, violinist.

1230k---WGBB--FREEPORT-244m ). m.--Shirley Fulton, planist. 5 p. m.--Rev. Henry Medd, songs. 10 p. m.--May Velton, entertainer. 15 p. m.--Cooper Boyd, violinist. p. m.--Dorothy Sakes, soprano. 15 p. m.--South Shore Revelers. 80 p. m.--Sudi Shore Revelers. 80 p. m.--Lenser's Orchestra. p. m.-Lenser's Nite Owls. 9 m.--Lenser's Nite Owls.

1890-WEST-BAY SHORE-216m

m.—Brewster Theater hour. m.—First Congregational Churc

m.—Crystal Palace Orchestra,
 m.—News bulletin.
 m.—Bill Wathy, "Sports."
 m.—Bretton Hall String Quarte

m.-Shark River Island Jo

30 a m.—Happy hour program. a m.—Public Service Cooking Scho 30 a. m.—Happy hour program. p. m.—Tom Cooper's Orchestra. p. m.—Sport islk.

1998. m.—Monroe Calculating Company. m.—Four Towers Orchestra. p. m.—Wallie Osborne's Orchestra. 11908.—WGCP.—NEWARK.—252m

p. m.—Harry Winner's Orchestra. p. m.—Jack and Jill from Radio Hi 15 p. m.—Josephine Levandoski, s

1340k-WODA-PATERSON-224m

ncon—Dance music. :30 p. m.—Concert selections. p. m.—Studio program.

m.—Sport talk. —Frankie Pope's music

1:30 p. m.—Clifford Lodge Frolic, 590k—WIP—PHILADELPHIA—508m

-Bedtime story, roll call," birth

ay list. 760k-WLIT-PHILADELPHIA-395m

12 nooh-Organ recital. 2 p. m.-Cohcert orchestra. 4:35 p. m.-Artiliat recital. 7:30 p. m.-Dream Daddy. 8 p. m.-The Pioneer Entertainers. 9 p. m.-Schickerling Artists. 10 p. m.-Arcadia Cafe Orchestra. 10:30 p. m.-Freshman masterpiece radia

11 p. m.—Freshman masterpiece radit 1080k—WCAU—PHILADELPHIA—278m 6:45 p. m.—Clarence Seaman's Orchestra. 7:15 p. m.—Peter Rabbit. 1:30 p. m.—Snellenburg Instrumental Trio.

-Sullivan Brothers, ukuleles.

15 p. m.—Nasco Johny Four. 45 p. m.—Jack and Jill, songs. p. m.—Archie Lloyd, Tillis Shapiro

1:30 p. m.-Jack Myers' Musical A

760k-WFI-PHILADELPHIA-395m

m.—Tea room ensemple. m.—Sesquicentennial Internation

-WHAR-ATLANTIC CITY-275

p. m.—Seaside Trio. :45 p. m.—Jimmy Baxter, "Horticul-tural Question Box." p. m.—Seaside Trio.

00k-WPG-ATLANTIC CITY-300m

p. m.—Morton luncheon n p. m.—Organ-recital. m.—Morton dinner music.

:30 p. m.-Ambassador Concert Orch

tra. p. m.—Ted Weems's Dance Orchestra 0:30 p. m.—Dance orchestra: 0:30 p. m.—Organ recital. 790k.—WGY.—SCHENECTADY.—380m

:30 p. m.—Traymore dinner :45 p. m.—Creatore's Band.

m Dinner program.

:30 p. m.—Health talk. :35 p. m.—WGY Orchestra.

8:15 p. m.—Enrico Aresoni, tenor. 8:30 p. m.—The Singing Groundhog. 8:45 p. m.—Dwight Strickland, "Poe

p. m.—.The Regina Crooners.

Exposition: 45 p. m.—Dance Orchestra

Kathryn Jordan

m .--- New

p. m.—Setting-up exerci p. m.—Luncheon music. p. m.—Studio program

m.-Dinner mu

50 p. m.--Depa

Ukulel

organ recital. 30. n. m.—Rexford's Original Villa

740k—WOR—NFWARK—405m -7:15-7:45 a. m.—Gym class. p. m.—Aristonian's Orchestra. p. m.—S. S. Windrow, Uk

n.—Aristonian's Orchestra.

1140k-WAAM-NEWARK-

p. m.-Rexi

1230k-WGBB-FREEPORT-244m

noon--Musical program. ) p. m.-Studio program. m.-Edwin Seder, organist. m.-Orpheus Mixed Quartet. p. m.-The Gondoliers.

1:50 p. m.—The Gondollers. 10 p. m.—Montelair Harmony Four. 10:20 p. m.—Duke Donaldson's Orch 11:02 p. m.—Duke Donaldson's Orch

m.-Abraham Samilowitz, vic

8:35 p. linist.

a.—Orchestra. n.—Studio program. p. m.—Sam A. Perry, plano. n.—Eddie Woods, barytone. p. m.—Jeanne A'Dair, composer. p. m.—Joe Davis, songs. p. m.—Michael Simmons, \*movi

-Broadway Association talk. Paul Whiteman's Piccadill

friends. 9 p. m.—Jointly with Station WEAF. 9:30 p. m.—Solow's Soloists. 10 p. m.—Jointly with WEAF. 10:30 p. m.—Mrs. Albert Messersmith, pianist; Mrs. Harriett Shire, soprano. 11 p. m.-1, a. m.—Vincent Lopez's Dance Orchestra

1080k-WHAM-BOCHESTER-278m

30 p. m.—Eastman Theater Orchestra.
p. m.—Eastman Theater organ.
35 p. m.—WGY Orchestra.
15 p. m.—Comedy, "The Arrival of View".

1130k-WMAK-BUFFALO-266m

30 p. m.—Dinner music. 30-10:30 p. m.—Musical program.

2-1 p. m.—Olympic Theater organ. 30 p. m.—Dinner music. 15-10:15 p. m.—Olympic Theater Or chestre

chestra. 9:15 p. m.—Soloists and entertainers. 9:05 p. m.—Arthur and Jack Ballou. 1:05 p. m.—Musical program. 0 p. m.—From WEAF. 1 p. m.—Biltmore Dance Orchestra.

630k-WFIC-HARTFORD-476m

:30 p :35 p

(noon)—Travelers Orchestra. 0 p. m.—Emil Heimberger's Trio. 5 p. m.—Safety talk, William Bro-

smith. 750 p.m.—Piano recital, Laura Gaudet. 8:30 p.m.—Colt's Park Dance Orchestra. 0:30 p.m.—Shelton Post, American Legion program. 10:30 p.m.—WTIC's Mail Bag. 10:35 p.m.—The Debutants.

860k-WEEI-BOSTON-349m (noon)-Keith's Radio Review. 15 p. m.-George Joy, Nell Ca

songs. 4 p. m.—Ray McKittrick's Orchestra. 6 p. m.—Keith's Radio Review. 6:10 p. m.—Evenis of the day. 6:45 p. m.—Big Brothar Club. 7:30 p. m.—Whiting's Four Merry Mill

8:30 p. m.—Neapolitan Girls Quint 9 p. m.—The Musical Chef. 9:30 p. m.—La France Orchestra. 9:30 p. m.—Whittall Anglo Persians. 10 p. m.—Whittall Anglo Persians. 10 p. m.—Whittall Anglo Persians.

10:30 a. m. — Women's Club tatas, fines, news. 1 p. m. — Luncheon concert. 4 p. m. — Tea Dance. 4 p. m. — Vocal and piano selections. 6 p. m. — Kiddies Klub. 6:30 p. m. — Sam Blum's Orchestra. 7 p. m. — Dok Eisenbourg's Sinfonians. 7 355 p. m. — Victory's Band. 8 p. m. — Concert, program. 8:30 p. m. — Chamber of Commerce Res-taurant.

1:05 p. m.—Dance music. 900k—WBZ—SPRINGFIELD—333m

10 p. m.—Maude Murray, contraito, with sassisting artists. 10:80 p. m.—Brunswick Orchestra. 1:120k WTAG-WORCESTER-263m 12:05 p. m.—Musical selections. 2 p. m.—Daily news. 7:15 p. m.—Puzzle Corner Editor. 8:15 p. m.—Puzzle Corner Editor. 10 p. m.—Whitall Anglo-Persians. 610k WRC-WASHINGTON-469m 1 rf m.—Organ recital.

s, m.—Organ recital. p. m.—Meyer Davis's Orchestra. 5 p. m.—Book reviews by Mrs.

Reed. 640k—WCAP—WASHINGTON—469m 6:45-7:45 a. m.—"Tower Health Exer

s-10 p. m.—Baseball News of the Day; market summaries.

10 p. m. Whittall Anglo-Perstans. 10:30 p. m. Studio program. 12:20k-WBAL BALTIMORE-246m

a 100 p.m. - WBAL Sandman Circle.
b p.m. - MUBAL Sandman Circle.
p m. - Municipal Band of Baltimore.
970k - KDKA - PITTSBUBGH - 3097a
6:30 p. m. - Dinner concert.
p p. m. - Concert by the Edgar Thomson Minstrels.
6:50k - WCA E - PITTSBURGH - 461 m
6:30 p. m. - Children's period.
7:45 p. m. - Address.
8 p. m. - Paul West's Collegiate Acces.
10 p. m. - Whittall Angio Fersians.

SATURDAY

610k-WEAF-NEW YORK-492m noon-Raiph Christman, pianist.

610k-WEAF-NEW YOBK-492m 12 noon-Ralph Christman, planist. 12:15 p. m.-Alfred Hall, barytone. 12:30 p. m.-Doris Tauber, planist. 12:45 p. m.-Alfred Hall, barytone. 7 p. m.-Sport Rays. 7:16 p. m.-Commercial Digest. 7:15 p. m.-Charles Premmady tenor. 7:38 p. m.-Charles Premmady tenor. 7:38 p. m.-Charles Premmady tenor. 8:15 p. m.-Heina Rubinstein: "Your Face." 8:15 p. m.-Giuseppe Adami, violinist. 9:45 p. m.-Drawing Room Players.

m .--- Isabelle Austin's

chestra. to 5 p. m.-Dance music. to 6 p. m.-The New Yorkers,

m.—Dinner music. p. m.—Baseball scores

610k-WEAF-NEW YORK-6100m

:45 a. m.—Prayer services. 2:45 to 1:45 p. m.—Waldorf-Astoria Or

55 p. m.—Baseball scores.
p. m.—John Allegra, barytone.
15 p. m.—'Typical Cases in the Children's Court," Judge Boyle.
30 p. m.—Musical comedy hits by WEAF Musical Comedy Troupe.
30 p. m.—Goldman Band concert;

:30 p. m.-Goldman Band concern grand opera program; Emily Day, se

660k-WJZ-NEW YORK-455m

660k-WJZ-NEW YORK-455m 2 p. m.-Weather; news service. 4, 4:30 and 7:30 p. m.-Baseball reports 4, 4:30, 7:30 and 11 p. m.-News service 5:35 p. m.-Flaancial summary.-5:40 p. m.-Conton'quotationa. 5:50 p..m.-Farm market.reports. 7 p. m.-Madison Concert Orchestra. 8 p. m.-Congressional forum from WRC 10:30 p. m.-The Record Boys. 11 p. m.-Mayflower Dance Orchestra. 2000 WORK WEW WORK 2000-

950k-WGBS-NEW YORK-316n

t. m.—Kathen Ellis, readings. m.—Scripture readings. m.—Alice Harper, soprano. m.—Charlotte Lindner, planist. m.—Isamu Naguchi, "Sculpture m.—Alice Harper, soprano.

3 p. m.—Charlotte Lindner.
3 p. m.—Central Boys' Division Branch of the Y. M. C. A.
6 p. m.—Uncle Geebee.
6:30 p. m.—incent Sorey Concert Trio.
7:15 p. m.—New York Herald Tribune news bulletins.
:30 p. m.—William Black, "Outline of Travels."

Travels." 7:45 p. m.—William C. Pike's Orchestra. 8:45 p. m.—Clifford Cheasley, "Numer-

9 p. m.—winiam Choshya's music hids ory recital. 9:30 p. m.—Lola Fruzzetti, soprano. 9:40 p. m.—Hindu play, "Sakuntala

9:40 p. m.-Hindu play, "Sakuntala" native music on Hindu instruments singing by the Jack and Jill Club. 10:15 p. m.-Alice Ambrookian, planist. 10:30 p. m.-Arrowhead Dance Orches-tra.

15

p. m.—William Chosnyk's music mem

prano. 0 p. m.—Ben Bernie's Orchestra. 1 to 12 p. m.—Vincent Lopez's Orch

0:15 p. m.—Orchestra. -2 a. m.—DX Hound Hour.

7 and 7:20 a. m.

7:30 p. m.—WBAL Dinner Orchestra. 8:30 p. m.—WBAL Sandman Circle. 9 p. m.—Musical program.

Whittall Anglo-Perstans.

900k—WBZ—SFRINGFIELD—S3 7 p. m.—Lenox Ensemble. 7:30 p. m.—Baseball results. 7:33 p. m.—Bob Patterson's Trio. 9 p. m.—Bert Dolan's Orchestra. 10 p. m.—Mande Murray, contralto, contracting actistic

-Whittridge Radio-Motor Club.

program.

10:30 a. m.-Women's Club talks

n. m.—Garden talk.

30 p. m.-Musical

Canto

Girls Quintet.

1460k-WIBX-UTICA-

ties. 3:40 p. m.—Belle Brooks. 7. p. m.—Tappen's Orchestra. 7:80 p. m.—Mansen and Howard. 7:85 p. m.—Madeline Hulsizer, soprand. 3 p. m.—Musical program. 3:30 p. m.—Time-O-Stat musical pro-

gram. 9 p. m.—Debate, Senator W. L. Love and Warden Lawes, "Capital Punishment." 10 p. m.—Anne Lucille, soprano. 10:15 p. m.—Edward Morris, pianist. 10:30 p. m.—Stauch's Orchestra. 11 p. m.—Ernie Golden's Orchestra. 12 midnight—McAlpin Entertainers. 1100k—WFBH—NEW YORK—\$73m 2 n. m.—Studio program.

1100k-WFBH-NEW YORK--X73m p. m.-Studio program. p. m.-Studio program. p. m.-Marion Harfman, sopraho. 130 p. m.-Bert Johnson, songs. 130 p. m.-Ed Berlin's Orchestra. 130 p. m.-Rab Fjeming's Orchestra. 130 p. m.-Belle Osborne, songs. 135 p. m.-Grace Horan, planist. 130 p. m.-Majestic String Ensemble. 145 p. m.-Majestic String Ensemble. 155 p. m.-Investment questions <sup>e</sup> an answers.

570k-WNYC-NEW YORK-526m

m.—Herman Neuman, planist. p. m.—Fred Ehrenberg, musical saw, p. m.—Police alarms. p. m.—Concert program by colored

7:35 p. m.—Concert program by colored artists. 8:10 p. m.—Baseball results. 8:15 p. m.—Jacobs Chamber Symphody Orchestra. 9:30 p. m.—Max Wechsler, violinist. 10 p. m.—Police Entertainers. 10:15 p. m.—Haroid Fowler, tenor, 10:30 p. m.—Haroid Fowler, tenor, 10:35 p. m.—Louis Rubin, ptanist. 1100k—WBBR—STATEN ISLAND—275m 8 p. m.—Dr. Hans Haag, violipist.

8 p. m. Dr. Hans Haag, violinist. 8:20 p. m. Bible questions and answers. 8:45 p. m. Fred Twaroschk, tenor.

950k-WAHG-RICH. HILL, N. Y.-S16m

12 noon—International Trio. 12:30 p. m.—Ralph De Stefani's Orchestra. 1:02 p. m.—Ralph De Stefani's Orchestra.

midnight-Variety progr

30 p. m. —Nicolas Globatcheff Virginia Richards, soprano. 3:15 p. m. —Casino Orchestra. 4:45 p. m. —Berkeley - Carteret Orchestra.

12 midnight—Variety program. 740k—WOB—NEWARK—405m 6:45, 7:15, 7:45 a. m.—Gym Class. 2:30 p. m.—La Savole Orchestra. 6:30 p. m.—Ben Bernie's Orchestra. 6:15 p. m.—Jacques Jacobs's Ensemble. 6:45 p. m.—Bill Wathdy, "Sports." 7 p. m.—Jacques Jacobs's Ensemble. 7 p. m.—Oreste's Queensland Orchestra. 9 p. m.—Nicolas Globatcheff, basso; Virginia Richards. soorano.

a) b. m.—Berkeley Carlot Constra.
b) chestra.
c) chestra.
c) c) b. m.—Brass quartet.
c) c) b. m.—Monterey Society Orchestra.
c) c) chestra.
c) c) chestra.
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p. m.—Dorn-Bauer Orchestra. p. m.—Sport review, Major Tate. 15 p. m.—Norma Tucker, soprano. 30 p. m.—Roy Churchill, Bob Rutan,

30 p.m.-Roy Churchill, BOD m. banjoistá. 45 p.m.-Norma Tucker, soprano. p.m.-Ophélia Tirico, violinist. 13 p.m.-Elite Quartet. 45, p.m.-Ophélia Tirico, violinist.

p. m.—Chamber of Commerce. 1190k—WGCP—NEWARK—252m :30 p. m.—Whitehead and Everiss, pi

p. m.—Paramount Trio. :15 p. m.—Studio program. :30 p. m.—Paramount Mixed Quartet.

p. m.—Orchestra. 1340k—WODA—PATERSON—224m

:30 p. m.—News; sport talk. p. m.—Dinner music. 590k—WIP—PHILADELPHIA—508m

100k-WFI-FILIPELT IN-COM 1 p. m. — Tea Room Ensemble. 3 p. m. — WFI Instrumental Trio. 6:45 p. m. — Dance orchestra. 8 p. m. — Sesquicentennial International Exhibition. 1990k-WHAR-ATLANTIC CITY-275m

8 p. m.—Seasan
1000k.—WPG—ATLAN rational
16:45 p. m.—Organ recital.
7 p. m.—Morton dinner music.
7 r.20 p. m.—Emmett Welch's Minstrela
8 n. m.—Ambassador dinner music.
Marine Studio.
and His Band, S

799K-WGX-SCHENFULADI-3001 12:30 p. m.-Stock market report. 6:30 p. m.-Dinner program. 7:30-p. m.-Program from Buffalo. 10:30 p. m.-Dance program. 11:30K-WMAK-BUFFALO-266m

30 p. m.—Eastman Theater Orch p. m.—Eastman Theatef organ.

7:30 p. m.—Dinner concert. 8:30 p. m.—Baseball scores. 1460k—WIBX—UTICA—205m

1305-WMAR-BUFFALO-200 7:15 p. m.-Daily news items. 7:30-10 p. m.-Musical program. 1080k-WHAM-ROCHESTER-278m

6:30-7:30 p. m.-Dinner dance music. 11 p. m.-1 a. m.--WIBX Funfest and

1:05 p. m.—Musical program. **360k—WEEL—BOSTON—349m** 12 noon—Keith's radio review. 3:15 p. m.—Musicale. 3:10 p. m.—Events; scores. 7:40 p. m.—Lucerne-in-Maine Quintet.

8:10 p. m.—Pops concert.
 1070k—WNAC—BOSTON—280m
 10:30 a. m.—Women's club talks; songs;

a. m.— Wonnen's Club taiks; sor news.
p. m.—Luncheon concert.
15 p. m.—Vocal selections.
p. m.—Shepard Colonial tea dance.
p. m.—Th§ Smilers.
30 p. m.—Dinner dance.
p. m.—Concert program.
p. m.—Musical program.
0.05 p. m.—Dance music.

p. m.—Dance music. ):05 p. m.—Dance music. Mok—WBZ—SP'GFJELD, MASS—333m

p. m.—Capitol Theater Orchestra. 130 p. m.—Max I, Krulee's Orchestra. 10 p. m.—Mildred Abbey Johnson, sc

10 p. m.—shured Abbey Johnson, si prano. 10:15 p. m.—Fred Conant, planist. 1120k—WTAG—WORCESTER—268m. 12:05 p. m.—Musical selections. 2 p. m.—Daily news. 5:15 p. m.—Story teller. 640k—WRC—WASHINGTON—469m

p. m.—Mayflower Orchestra p. m.—"The Work of Congress." :30 p. m.—Kitt Hour of Music.

10 p. m.—Dance program. 12 p. m.—Dance program. 13 p. m.—Dance program. 14 midnight—Organ recital. 970k—KDKA—PITTSBURGH—309m 6:30 p. m.—Dinner concert. 9:30 p. m.—Westinghouse-Band. 6:50k-WCAK—PITTSBURGH—461m

World Radio History

7:30 p. m.—Sunshine Girl. 8:15 p. m.—Studio program

-WJAR-PROVIDENCE-306m

45 p. m.-Creatore and His Band, Steel

m.—Dance orchestra, Garden Pier. p. m.—Dance orchestra. p. m.—Elks Home Dance Orchestra. K—WGY.—SCHENECTADY.—380m

Garden Pier

p. m.—Seaside Trio. 30 p. m.—Lecture period.

:30 p. m.---Dance orchestra.

p. m.—Dance music; songs. p. m.—Entertainment. 30 p. m.—News; sport talk.

a. m.—Setting-up exercises. 0:30 a. m.—Reducing exercises. p. m.—Studio program.

-Piano duò. m.-Wm. Eichelsdoerfer, violinist. m.-Mary Speedle, contraito. m.-Esther Krom, pianist.

45 p. m.—Alice Laurie, soprano.

answers. 30 p. m.—Studio program.

# **Electric Power Company Uses Radio Set To Detect Periods of Darkness**

A Receiver Designed to Pick Up Static Increases Efficiency of Lighting Station

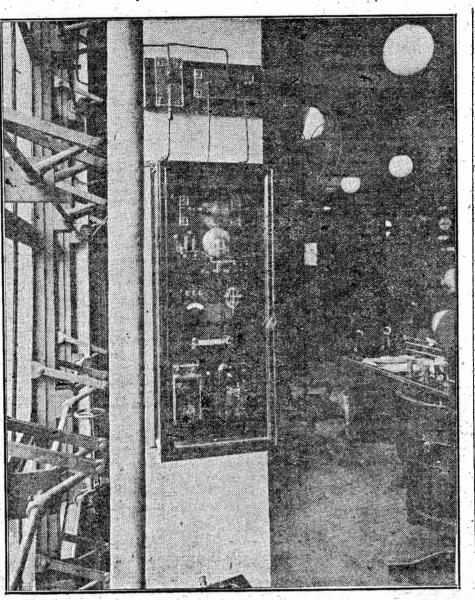
T SEEMS that static, which has been glorified. by tradition as the bugaboo of radio, has been fooling us for many years, and really performs some function other than that of producing strange growling, scratching and sizzling disturbances in loud speakers. A recent bulletin issued by the Department of Agriculture contains the information that the Forest Service is finding static useful in predicting thunder storms and in forecasting periods of low humidity, while investigation in local engineering circles discloses the fact that the Edison Company in New York has for years been using a unique storm detector, depending entirely on static for its operation in anticipating spells of darkness over the city and subsequent increased demands for electric

power.

It has been discovered that while radio engineers sprout gray hairs in efforts to keep static out of radio receivers, the electrical engineers of the immense Waterside power generating station, at Thirtyeighth Street and the East River, welcome it with open arms and embrace it as a friend. For the last fifteen years they have, almost unknown to the outside world, been employing a special radio set whose sole object is to pick up static and to make a noise. They have swung an aerial 400 feet long between the big black chimneys of the power house, which stand 350 feet high, and they don't care a bit about DX or tone quality or selectivity as long as they can pick up static and static only. Radio listeners may stand aghast at this strange perference, but there is a good reason for it.

Electricity in such quantities as are required in New York City cannot be stored and made available for instant use any time in the future, but must be generated as it is required. The demand for current may be doubled within a few minutes during a sudden period of darkness in business hours, for 1,000,000 people may at the same moment press buttons for electric light. The power generating station must be ready for such sudden loads long before they occur, because the huge turbo-generators, which convert

#### **By ROBERT HERTZBERG**



Above is pictured the storm detector (static receiver) employed by the Edison Electric Light and Power Company to foretell periods of darkness which accompany storms of electrical character

and to be ready for service. The storm detector is the device which enables the station engineers to forecast the demand by warning them of the approach of a storm hours before it actually hits the city.

A heavy storm is invariably preceded by atmospheric electrical disturbancesin other words, static-which affect a radio receiver many miles in advance of the squall. A storm headed for New York steam energy into electrical energy, re- and still fifty miles away causes the wire-

mittently and somewhat quietly, at which signal the engineer in charge of the control room passes word along to the boiler and generating room crews so that they may prepare to put more generating equipment into service. As the storm sweeps closer to the city the detector rings more loudly and steadily, and the engineer, or "system operator," as he is known, orders more boilers and generators put into use. By the time the black clouds descend on New York the power house is like a friend and thanks it for the invalu-

amount of current for all the lights that will be switched on.

The Waterside system operator is connected by land telephone to numerous observors at sub-stations scattered around the metropolitan district, who report to him local conditions and influences. Sometimes the storm detector will register on a strong storm that will merely skirt the city and affect some suburban section, and unless its direction is checked by the outlying observors in co-operation with the Waterside operator, expensive and entirely unnecessary preparations will be made in the Waterside boiler rooms.

The storm detector itself is a rather simple device. It consists of short circuiting switch, which grounds the aerial and thereby protects it from lightning discharges when a storm breaks overhead; a spark gap; a coherer; a relay and battery, and a bell. The coherer is a rather ancient type of detector, corresponding to the crystals and bulbs used in broadcast receivers, but is used because it is permanent, requires practically no adjustment, and largely because a bell is involved in its operation. The latter is the only indicating device of the affair, there being no earphones or loud speaker.

The antenna, being freely exposed, is susceptible to static discharges. If a storm is near by, the wires will accumulate a charge of static, the atmospheric conditions which produce static being the same that cause the storm. The charge must be fairly strong, for it must leap a short break in the receiving circuit at the spark gap before it can affect the coherer, or detector. A direct connection between the aerial and the latter is not employed, because then slight static charges caused by distant storms which never reach New York would operate the device and cause a false alarm.

The action of the static electricity on the coherer causes a bell to ring. The bell serves the double purpose of agitating the coherer slightly so as to restore it to operating condition after a static impulse has gone through it, and to warn the system operator that all is not quiet up in the sky. That vigilant individual judges the nearness of the storm by the violence of the ringing and prepares for the emergency load which will follow shortly. Radio fans may be saying unprintable things about the static, but he treats it

# Directions for Building a Five-Tube Set

the detector a turn or two will have to be removed from the amplifier input coil. If it is below the detector dial setting it would be best to remove a turn or two from the detector coil instead of winding more wire on the amplifier coil.

When these two coils have been matched up, the next thing to do is to find out whether the antenna used is affecting the aerial coil. Tune in any station with the aerial and ground connected in their proper posts and notice the setting of the midget condenser for loudest response.

If a long-wave station is being received and the midget condenser is either all the way in, all the way out, or is at about half setting it will be necessary to change the inductance of the antenna coil. In the first case, unless the station being received is at the top of the broadcast band, the antenna coil will have to be cut down until the midget condenser plates are about in the same position as the main tuning condenser plates.

#### **Adjusting Antenna Coil**

In every case it will be necessary to change the aerial coil until the midget condenser moves with a change in wave length so that the two condensers are almost identical with respect to the position of the rotor plates. That is, the midget condenser rotor plates should be half engaged when the multiple condenser rotors are, and so on throughout the tuning range of the receiver. In a few cases it will be found that the setting of the midget con- | As a general rule it will be found that this denser is erratic with changes in wave length.

This is caused by the aerial and not by the set. In such cases two things can be done-the first is to change the aerial, and the second to remember the position of erraticism and just make the antenna coil so that the midget condenser will take care of all antenna changes over the entire band.

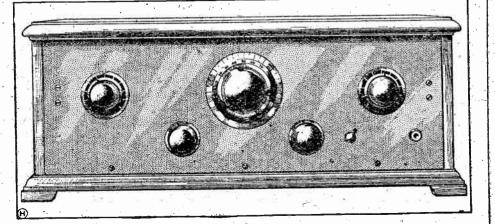
This is easier to do if the operator will take a little time and tune over the entire hand before starting to change the coil.

guire approximately an hour to warm up less detector at Waterside to ring inter- fully prepared to supply the increased able assistance it has rendered him.--R. H.

(Continued from page two)

uneven setting of the midget condenser will in no way affect the efficiency of the set if it is once adjusted as explained above for regular locations.

Once the circuits have been matched there should be no difficulty in getting the same results from the set as one would from a three-dial set. In fact, it will be found that distant stations are easier to pick up because of the single-dial control. This set was specifically designed for loud-speaker operation; that is the reason for the last stage of audio, and therefore



This drawing shows how the apparatus should be arranged on the front panel of the one-control receiver described in this article

no detector jack is necessary. On three dial sets it is sometimes necessary to use head phones to tune in out-of-town stations because of the possibility of passing the station by moving one dial too far. Such a thing cannot happen with this receiver. A detector jack can be inserted, however, if desired.

#### A Horn and Cone Speaker Combination

While a good cone type speaker is distinctly superior to the average horn. there is no reason why the latter should be discarded upon the acquisition of the cone.

The predominant contrast between a cone and a horn is the efficiency with which the former reproduces the low notes and the manner in which the horn emphasizes the higher frequencies. And it is also true that the average good cone loses somewhat on the high notes. An appreciation of these facts suggests a combination of the two speakers for reproduction superior to the individual capability of either speaker

As a matter of fact, the connection of two such loudspeakers in series (positive of the first to the negative of the second and the positive of the second to the B battery, when polarities are indicated) will generally improve reproduction to an extent immediately appreciable to the discriminating ear.

S. 4 S. -

#### NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, JUNE 20, 1926 The Herald Tribune Daily Broadcasting Programs for Week Ending June 26 1070k—WNAC—BOSTON--280m 0:55 a. m.—Morning service. 1:35 p. m.—Baseball results. 1:45 p. in.-Evening service. 570k-WNYC-NEW YORK-526m 1090k-WHAR-ATLANTIC CITY-275m b) (BC—WNYC—NEW YORK—328m b) m.—Herman Neuman, planist. 10 p. m.—Plano selection. 30 p. m.—Plano selection. 30 p. m.—Elementary German lessons. 50 p. m.—Police alarms. 35 p. m.—Baseball results. 15 p. m.—Baseball results. 15 p. m.—Address by Judge Pet Schmuck. 50 p. m.—Joseph Davles, barytone. 20 p. m.—Richmond Versatile Orchesti **Daylight Saving Time** 2 p. m.—Seaside Hotel Trio. 7:30 p. m.—Book review, Frances McMul-TO-DAY 5 p. in.-Evening service. 900k-WBZ-SPRINGFIELD, MASS.len. 8:30 p. m.—Seaside Trio. 11 p. m.—Follies Bergere Dance Orchestra 610k-WEAF-NEW YORK-492m 333m 10:50 a. m.—Trinity Church Services. 8 p. m.—Copley Plaza Concert. 8:30 p. m.—Colden Rule Hour. 9:30 p. m.—Concert by the Sacred Hear Obdi K-kilocycles 790k-WGY-SCHENECTADY---380m 2:30 p, m.-Reports. p. m.—Interdenominational services; Idress and musical program. 30 p. m.—Instrument program of sa- m.—Reports. m.—Asia Club Orchestra. p. m.—Music; Cornell talk. m.—Stock report; news. p. m.—Dinner orchestra. p. m.—Negro spirituals by the addr 4-4:30 cred music. 4:30-5:30 p. m.—Musical vespers by the Federation Mixed Quartet. . 5:30 p. m.—Louis Edin, violinist; Mathilde Harding, pianist. 6 p. m.—Orchestral concert! Giuseppe Di Benedetto, tenor; Frances Sobel, soprano. 7:20 p. m.—Capitol Theater family. 9:15 p. m.—Atwater Kent hour; Allen McOubac tenor; and orchestra. 610k---WEAF---NEW YORK--492m Cholr. 1120k-WTAG-WORCESTER-265m :20-9:15 p. m.- "Capitol Family." :15-10:15 p. m.- From WEAF, Goldman 6:45-7-7:20 a.m.—Health exercise. 7:45 a.m.—Morning: prayer services. 11 a.m.—Wanda Norman, planist. 11:10 a.m.—"Holland," Mrs. Annie Ba 16-10:15 p. m.—From WEAF, Goldman Band. 640k.—WCAP.—WASHINGTON.—469m (noon).—Service from Rhode Island Avenue M. P. Church. p. m.—Service at the Peace Cross. ;20-9:15 p. m.—Capitol Theater Family. ;16 p. m.—'Atwater Kent Radio Hour." ;18 p. m.—'Yesper Hour of Music." 1220H.—WBAL.—BALTMORE.\_246m 8:30 p. m.—WBAL Concert Orchestra. 20 p. m.-Richmond Versatile Orc :30 p. m.-Police alarms: weather. nouw. nouw. 11:25 a. m.—Monaud. Mrs. Annie Bar-nouw. 11:25 a. m.—Monda Norman, planist. 12:16 p. m.—Wanda Norman, planist. 12:16 p. m.—Wanda Norman, planist. 12:25 p. m.—Hilda White Kay, contraito. 12:45-1:45 p. m.—Wadorf-Astoria Or-chestra Or-1040k-WLWL-NEW b. m.-Question box. 6 p. m.-Plorine Trio. 0 p. m.-Outer Le Fonienzy, soprano; Philippe Coudert, barytone. p. m.-Study Club. 1:35 p. m.-Grinne Ray, violinist. 3:25 p. m.-Henry Condon, tenor. 0:40 p. m.-St. Cecilia Ensemble. 1250k-WHAP-NEW YORK-240m 1:30 -p. m.-Holmes String Ensemble. 1:30 -p. m.-Holmes String Ensemble. 1040k-WLWL-NEW YORK-288m M. Lord, 1130k-WMAK-BUFFALO-266m 6:18-7:15 p. m.-Dinner music. 7:30-8:15 p. m.-Mrs. Harry Roberts and friends. McQuhae, tenor, and orchestra. 9:45-10:15 p. m.—Goldman Band concert, New York University campus; Waino Kauppl, cornetist. chestra. 4 p. m.-Warren Lee Terry, tenor. 5 p. m.-Musical pragram. 4:30 p. m.-Women's League. 5 p. m.-Bertha Weber, planist; Blanche friends. 8:15-9 p. m.—Agricultural program. 9-9:30 p. m.—Russian String Trio. 9:30-10 p. m.—Oral Thomas, Ralph Stew att and friends. 10-11 p. m.—Beaver hour. 940k—WGR—BUFFALO—S19m 6:50 n. m.—Dioner music 660k-WJZ-NEW YORK-455m n.—Children's hour, m.—Charles Yoder, barytone, m.—Park Avenue Baptist Churc p. m.—Park Avenue Baptar. Carillon. 7:20 p. m.—Pennsylvania concert orchestra. 8 p. m.—Leon Simon, barytone; Wyman Miller, cellist; Louis Lane, pianist: 8:30 p. m.—Madison concert orchestra. 9:30 p. m.—Godfry Ludlow, violinist. 9:30 p. m.—New YORK—316m 30 p. m.—Holmes String Ensemble 15 p. m.—John Erb, organ recital. n.--Church Service. ---Crean recital. m.--Vesper service. m.--Baseball scores. m.--Chimes: Church Service. k---WCAE---PITTSBURGH---461m m.--Chimes concent b. m.—Bertha Weber, planist; Blancne Fink, soprano. 5:30 p. m.—May Breen, Peter de Rose, banjo and plano. c. m.—Dinner music. c. m.—Baseball scores. p. m.—Justin Lawrie, tenor. 7:10 p. m.—Columbia University French lecture. 7:40 p. m.—News digest. p. m.—Darl Bethmann, barytone, 3:15 p. m.—Mary Price, "Air Que 940k-WGR-BUFFALO-319m 6:80 p. m.-Dinner music. 8 p. m.-Tom Thomas, cornetist; voc sololat. 8:30 p. m.-Jointly with WEAF. 10:30 p. m.-Supper music. 10:80k-WHAM-BOCHESTER-278m 10 a. m.-Compercement exercises of 1 (20 p. m.—Chimes: Church Service. 650k.—WCAE.—PITTSBURGH.—461 6:30 p. m.—Dinner concert. 7:20 p. m.—Capitol Theater Family. naire," si5 p. m.—Ruth Montgomery, soprano. 8:5 p. m.—Sibyl Marvin Huse, speaker, 9:15 p. m.—Sylvan String Trio. 9:30 p. m.—James P. Hyndman, "American System of Measures." 9:50 p. m.—Ruth Montgomery, soprano. men's quartet; Dorothy Hoyle, violinist Vida Milholland, soprano; Steel Jamison, 950k-WGBS-NEW YORK-316m 950k-WGBS-NEW YORK-316m p. m.—Arrowhead Inn tea orchestra. 30 p. m.—Moscow Art Musical Studio En-semble; violin recital with sixteen as-sisting vocalists; folk music symphonic accompaniment. Nonetta collect :30 p. m.-Salon concert; Devora Mad-MONDAY 1080k-WHAM-ROCHESTER-278m 10 a. m.—Commencement exercises of the University of Rochester; Eastman Or-ohestra; address by Dr. Shaller Mathewa. 3:30 p. m.—Eastman Theater Orchestra. 5 p. m.—Eastman Theater organ. 7:50 p. m.—'Radio Four.'' 8:15 p. m.—Agricultural program. 790k-WHAZ-TROY, N. X.-380m 9:30 p. m.—Old-Thime Melodies by Trorado Quartet and artists; harmonica solos. 980k-WJAR-PROVIDENCE-306m 1:05 p. m.—Studio program. worney. 8 p. m.—The Grand Prize Eurekas. 8:30 p. m.—The Gold Dust Twins. 9 p. m.—Eveready Hour. 10 p. m.—Variety half hour. 10:36 p. m.—Jack Albin's Bossert Or-chestra. 11:30-12 p. m.—The Buffalodians Dance Orchestra. 660k-WJZ-NEW YORK-455m 10:30 p. m.—Jacob Forstat, cellist. 10:45 p. m.—Daca, cowboy singer Down - Meyer Davis Orchestra. m. - Weather; news service. 4:35, 5:30, 7, 11 p. m. - Baseball reports. 4:35, 5:30, 7, 11 p. m. - News service. p. m. - "Your Daily Menu," Mrs. Julia Heath tenor. 2 midnight—Classical hour: Christian Thaulow, Violinist; Darl Bethmann 830k-WHN--NEW YORK-361m 11:30-12:30 p. m.-Calvary morning arytone; Steel Jamison, tenor, 1100k-WFBH-NEW YORK-273m ices. 12:30-1 p. m.-Loew's Theater organ rep. m.—"Your Daily Menu," Heath. 15 p. m.—Dennison's talk. 25 p. m.—"Shopping Service. 35 p. m.—Kinancial summary 40 p. m.—Cotton quotations. 660k-WJZ-NEW YORK-455m m.-Orchestra. m.-Studio program. p. m.-Bert Johnston, songs. p. m.-Jeanne A'Dair, composer, p. m.-Jack Cohen, planist, p. m.-Jaurette E. Adams, songs. p. m.-Greystone Trio. m.-American Legion news 1 p. m.—Pennsylvania luncheon music. 2 p. m.—Weather; news service. 4.4:30-7:30 p. m.—Baseball reports. 4.4:30-7:30-10:45 p. m.—News service. 4 p. m.—"Your Daily Menu," Mrs. Julian Heath m .--- Queens County Christian En-1:05 p. m.—Studio program. 8:05 p. m.—Musical program. 9 p. m.—"A. and P. Gypsies." deavor program. deavor program. 4:30 p. m.—Inspiration hour. 4:30-4:40 p. m.—News flashes, racing, baseball. 5:30-5:40 p. m.—Roseland dance orchestra. 5:30-5:40 p. m.—News, racing, baseball. 9:30-9:45 p. m.—Calvary Baptist Church. evening services. 4.1:30-7:30-10:45 p. m.-News service. 4 p. m.-"Your Daily Menu," Mrs. Julian Heath. 4:15 p. m.-"A Beautiful Skin." 4:25 p. m.-Olive Hyde Foster. 5:32 p. m.-Financial summary. 5:40 p. m.-Cotton quotations. 5:50 p. m.-Frank Dole, of the New York 7 p. m.-Frank Dole, of the New York 7 Herald Tribune, "Dogs." 7:15 p. m.-Harold Leonard's Orchestra. 8:50 p. m.-The Dettah Pearl hour, "Gems of Romance." 10 p. m.-William Ballyn, "Sea Songs." 10:45 p. m.-George Olsen's Orchestra. 8:50 p. m.-William Ballyn, "Sea Songs." 140 p. m.—Cotton quotations, 150 p. m.—Farm market reports, 150 p. m.—Madison Dinner Concert, 155 p. m.—John B. Kennedy, p. m.—Maxwell House 'Ensemble, p. m.—Annual budget talk by Presiden Coolidge and General Lord. 0 p. m.—Reading Railroad Revelers, 1 p. m.—Waldorf-Astoria Roof Orchestra 10 p. m. Grand opera hour. 630k-WTIC-HARTFORD-4761 12 noom-Travelers' Club. Orchestra. 6:30 p. m.-Hub Trio. 8:15 p. m.-Yale Glee and Banjo Clubs j.m.—American Legion news. j.m.—American Legion news. j.m.—Volley Endriss, contraito. j.m.—Cornie's Four. j.m.—Connie's Orchestra. j.m.—NEW YORK—210m evening services. 10:45-11:15 p. m.-Janssen's Hofbrau or 8:15 p. m.—Yale Glee and Banjo Clubs' commencement concert. 9:45 p. m.—Mrs. W. C. Sisson, soprano. 10 p. m.—Grand opera hour. 11 p. m.—Capitol Theater organ. 10:30 a. m.—Women's Club talks; songs; news. 1 p. m.—Luncheon concert. 3:10 p. m.—Broadcast from Braves' Field, Braves vs. Brooklyn. 1430k—WBNY—NEW YORK—210m 7 p. m.—Trio. 8 p. m.—Trio. 8 p. m.—Drawing Room Players. 8:45 p. m.—Ona Welsh, songs. 9 p. m.—Billy Days, "Carneo Record Boy. 9:15 p. m.—Bilue Crest Collegians. 9:45 p. m.—Laure Crest Collegians. 10 p. (m.—Ona Welsh, songs. 10:5 p. m.—Diaue Crest Collegians. 10:45 p. m.—Elauretta Reynolds, planist. 1100k—WBBR—STATEN ISLAND—273m 9 p. m.—Irene Kleinpater, sonrano. 880k-WMCA-NEW YORK-341m 380k-WMCA-AEW YORK-341m 10:45 a. m.-Employment opportunities. 11 a. m.-Services, Seventh Church Christ Scientist. 7 p. m.-Ernie Golden's orchestra. 7:30 p. m.-Reginald Erskine, barytone. 8 p. m.-Talk by H. L. Stratton. 8:30 p. m.-Munie Weil, pianist. 8:30 p. m.-Jewish Forward hour. 1250k-WHAP-NEW YORK-240m 2:30 p. m.-Sections from Bible. "Science" 11 p. m. — WEAGOT-ASIOTIA HOOT OFCHESTR 610k — WEAF — NEW YORK — 610m 6:45, 7 and 7:20 a. m. — Health exercises, 7:45 a. m. — Prayer services, 11 a. m. — Warren Scofield, barytone, 11 j. B. a. m. — 'Good Manners for Children, 11:10 a. m.— "Good Manners for Children Elsis Meade. 11:30 a. m.— Warren Scofield, barytone. 11:40 p. m.— "Hooked Rugs." 12:100n— Market and weather reports. 12:15-1:15 p. m.— Rolfe's Palais d'Or Constant raves ys. Brooklyn. . m.—Kiddies' Klub. 0 p. m.—Sam Blum's Orchestra. 2. m.—Dinner dance. 950k-WGBS-NEW YORK-316m B. m.—HEBN—SIATEA ISLAND—213M B. m.—Heen Kleinpeter, soprano. B:25 p. m.—Irene Kleinpeter, Fred Twar-oschk, duets. B:36 p. m.—Bible instruction. S:45 p. m.—Fred Twaroschk, tenor. 950k—WAHG—RICH. HILL, N. Y.—316m p. m.—Dinner dance. p. m.—Metropolitan Theater studio. p. m.—Theater—Stage presentations and musical accompaniment. 10:20 p. m.—Dance music; vocal selec-tiona. 11:30 p. m.—Theater organ recital. 560k—WEEI-BOSTON-S49m 950k-WGBS-NEW TOTA-510 10 a. m.—Ship Week Program. 10:15 a. m.—Gym class; plano. 10:35 a. m.—Recipes; plano solos. 1:30 pf m.—Scripture Reading. 1:35 p. m.—Ray Lev, planist. 1:35 p. m.—Ray Lev, planist. 1:30 p. m.—'Art,'' Murdock Pemberton. 3:0 p. m.—Clara Edwards' compositions. 1:10 p. m.—Clara Edwards' compositions. 1:20 p. m.—Placement Talks for [Wome] 1:30 p. m.—Vera Ross. contralto. 0 p. m.—Selections from Bible, "Science nd Health." p. m.—Concert of sacred music, choir chestra. 4 p. m.—Seville String Ensemble. 4:30 p. m.—"Current Art Exhibitions, p. m.—Conc and soloists. Rose Berry. 45 p. m.—Seville String Ensemble. 1100k-WFBH-NEW YORK-273m 2 noon-Grebe Matinee Trio. 20 p. m.-Grebe Matinee Trio. 20 p. m.-Walter looss, pianist. 20 p. m.-Hazel Kent, soprano. 21 p. m.-Hazel Kent, soprano. 22 p. m.-Major Dent Atkinson, lecturer. 21 p. m.-Laurence Ballou, barytone; 23 Walter Johnson, tenor; Edna.Zitzmann, pianist. 5 p. m.—Lyons Concert Entertainers. 5:30 p. m.—Franklin Four. 6 p. n.—World Masonic news. 6:15 p. m.—Eddie Woods, barytone. p. m.—Blanche Fink, soprano. p. m.—Blanche Fink, soprano. p. m.—Esther Ostroff, planist. p. m.—Jonas, Butenas, barytone. p. m.—Dinner music. 860k—WEEL-BOSTON-349m 10:15 a.m.—From Houghton & Dutto Studio. 12 noon—Keith's Radio Review. 2:45 n.m.—Telk noon-Keitn's Radio Review. 5 p. m.--Raibow Stars. p. m.--Raibow Stars. p. m.--Keith's Radio Review. 20 p. m.--Taiks from the Book Shop. 545 p. m.--Big Brother Club. 530 p. m.-Biget Bureau program; U. S Army Band; speech by President Cool idge; Brigadier General Lord. 1030 p. m.--Ed Andrew's Dance Or chestra. 6:30 p. m.—Talk, Walter & Co. 7 p. m.—Libby entertainment. -Vera Ross, contralto p. m.—Dinner music. 55 p. m.—Baseball scores. p. m.—Raymond Mgher, barytone. 15 p. m.—Joseph Auslander, author, p. m.—Vera Ross, Contrarto p. m.—Children's story p. m.—Lois Bennett. m.—Uncle Geebee. p. m.—Scholastic sports, Ted Granik p. m.—Paul Eldridge, "The Week'r oblem." 1430k-WBNY-NEW YORK-210m 7:15 p. m.—Joseph Auslander, autnor, "The Knockout." 7:30 p. m.—Walter Chapman, planist, 7:45 p. m.—Elaine Horton, contraito, 8 p. m.—Meyer Davis Orchestra. 8:30 p. m.—Semi-annual meeting of the Bureau of the Budget; music by the U. S. Navy Band; address by Calvin Cool-idge; report on "The National Budget," by Brigadier General H. M. Lord, 10:30 p. m.—Grand opera, "Lucia di Lammerter" watter Johnson, end Harry Diehl, zither, plano duets. 10 p. m.—The Two Bobs: a 10:20 p. m.—Frank Tremer's Orionites. 11:02 p. m.—Frank Tremer's Orionites. 12:30 a. m.—Ferucci's Radio/Raiders. 12:30 a. m.—FREEPORT.—244m 9 m.—Arthur Sydam, planist. p. m.—Bamby Breadwinners p. m.—Orchestra. p. m.—Milton Yokeman, tenor. p. m.—Martin Miller, zither. Problem." p. m.—Arrowhead Concert Orchestra. :15 p. m.—N. Y. Herald Tribune News 8:30 p. m.—Martin Miller, zither. 8:45 p. m.—Charlotte Salisbury, compos 4 p. m.—Lauretta Reynolds, songs. 4:15 p. m.—Harmony Boys. 4:30 p. m.—Silver-Voiced Tenor. 4:45 p. m.—Law Attell, songs. 5:15 p. m.—Lew Attell, songs. 5:15 p. m.—Original Harmony Boys. 6:15 p. m.—Original Harmony Boys. bulletins. p. m.—Play: "The Maker of Dreams," by Oliphant Down. Charlynne Court-land, Albert Hyde and Rexford Kendrick; sook-WBZ-SPRINGFIELD-333m —Arthur Sydam, pianist. m.—Margaret Marsh, contralto. m.—Lenox Ensemble. 5. m.—Bob Patterson's Trio. 1.—Capitol Theater Orchestra music. 8:30 p. m.—Jon Dunbar, tenor; Leonard Lonquist, planist. 9 p. m.—'Teeftallow," T. S. Stribling. 9:10 p. m.—Anita Hayward, musical im-personations. 9:30 p. m.—Corradetti Vocal Studio Enmermoor. 11:30-12 midnight-Rolfe's Palais d'Or Orm .- John Craemer, xylophone p. m.—Corplate recital. p. m.—Drgan recital. p. m.—Budget talk by President Cool-idge and General Lord. p. m.—The Eighteenth Century Sym-phony. Orchestra. m.-Lawson and Hor 1100k-WBBR-STATEN ISLAND-273 5 p. m.-McGinn-Bluett, fecifal o. m.-Baerenklau-Hart serenaders, 10 p. m.-Shelde's Serenaders, 30 p. m.-Koreans Dance Orchestra, 1390k-WEST-BAY SHORE-216m 950k-WGBS-NEW YORK-316m 950k-WGBS-NEW YORK.-316m 10 a. m.-Ship Week program: "Hous keeping on a Big Ship." 10:16 a. m.-Jack Cohen, planist. 10:15 a. m.-Radio Gym Class; planist. 10:35 a. m.-Fashion talk; planist. 1:36 p. m.-Scripture reading. 1:35 p. m.-Hob Brandes, singer. 1:35 p. m.-Hob Brandes, singer. 1:35 p. m.-Willette Wilbourne, planist. 2:15 p. m.-Mole Trides. 2:25 p. m.-Mole Trides. 2:25 p. m.-Mele Trides. 2:35 p. m.-Mele Trides. 2:35 p. m.-Mele Trides. 10 a. m.—Watchtower Trio. 10:20 a. m.—L. Marion Brown, soprano. 10:30 a. m.—Bible lecture, S. M. V Sipma. 11 a. m.—Choral singers. phony Orchestra. 1120k-WTAG-WORCESTER-268m 9:30 p. m.-Corradetti Vocal Studio Linesemble. 10 P. M.-Floressee Cathcart, "Weaving." 10:10 p. m.-Willard Robison, "The Voice From the South." 10:30 P. M.-Arrowhead Dance Orchestra. 1160k-WRNY-NEW YORK-258m 12:15 p. m.-Esvelyn Hirsch, planist. 12:30 p. m.-Joseph Bueh, violinist. 12:45 p. m.-Sport Rays. 7:10 p. m.-Commercial. Digest. 7:15 p. m.-Lawrence Gardner, xylophone. 7:30 p. m.-Human Form Beautiful, Dorothy Knapp. p. m.-Musical p. m.—Brewster Theater hour. 45 p. m.—Percy's Country Club Orches 12:05 p. m.—Musical Sciections; near talk. 1:30 p. m.—Chester Gaylord, planist. 7:15 p. m.—Twilight Scouts. 8 p. m.—"Preservation of Raspberries." 8 p. m.—WTAG Entertainers. 9 p. m.—The Gaylords. 9:30 p. m.—Program to be announced. 10 p. m.—From WEAF, grand opera. 640k-WRC-WASHINGTON-469m 1 p. m.—Organ recital. 15 a. m .--- Watchtower Trio. 11:25 a. m.-Watchtower 1710. 11:25 a. m.-Sunday school lesson. 11:40 a. m.-Choral singers; trio. 2 p. m.-Watchtower Orchestra. 2:20 p. m.-L. Marion Brown, soprano. 2:30 p. m.-L. Marion Brown, soprano. 3 p. m.-L. Marion Brown, soprano. 3:10 p. m.-Bible instruction, John Daw-740 p. m.—refers a country club Ort tra. 740k.—WOR.—NEWARK.—405m 6:45-7:15-7:45 a. m.—Gym class. 2:30 p. m.—Hotsy Totsy Boys. 2:45 p. m.—Turely food tople. 3 p. m.—Hotsy Totsy Boys. 3:15 p. m.—2acques Jacobs's Ensemble. 6:45 p. m.—Bill Wathey. "Sports." 7 p. m.—Jacques Jacobs's Ensemble. 7:80 p. m.—Brooklyn Daily Eagle gram. 900 - Organ recital. p. m. - Organ recital. p. m. - Raleigh Hotel Orchestra. -7:30 p. m. - United States Navy Band. 640k - WCAP - WASHINGTON - 469m p. m.-Interview with Edith Carlie Phelps. S:10 p. m.-Betty Chandler, singer. 3:20 p. m.-Lillian Eichler, "Well-Bred English." Botty Chandler. singer. son. 8:25 p. m.—L. Marion Brown, soprano. 8:40 p. m.—Watchtower Orchestra. 9 p. m.—Watchtower Violin Choir. 9:25 p. m.—Bible questions and answers. 7:30 m m.-Human Form Beautiful, Dot-othy Knapp. 7:45 p. m.-Orlando's Concert Orchestra. 8:15 p. m.-'How News and Photos are Transmitted to Newspapers," H. Win-field Secor. 8:30 p. m.-New York Edison hour. 9:30 p. m. -- Michel Barroy, Gypsy songs with cutter. :45-7:45 a. m.-Tower health exer p. m.---Newark Philharmonic Concert :30 p. m.—Betty Chandler, singer. :40 p. m.—M. Post, "Equipping an Ocean 1230k-WGBB-FREEPORT, N. Y.-244m 10:40 a. m.-Freeport Methodist Church .m.—Basevan itudio program. 20-10:30 p.m.—Meeting of business or-Band. 545 p. m.—Helen Schafmeister, planist; Feland Gannon, barytone. 10:30 p. m.—Five Messner Brothers. 1140k—WAAM—NEWARK—263m Liner." 50 p. m.—Betty Chandler. p. m.—Uncle Geebee. :30-10:30 p. m 1390k-WRST-BAY SHORE-216m States Navy Band. States Navy Band.< p. m.—Uncle Geebee. () 30 p. m.—Starlight Park Military Band. 50 p. m.—Gladys Mathew, soprano. 7 p. m.—Joseph T. Shipley, "The Electric Age in Poetry." 7 n.—Starlight Park Band. 7 10 p. m.—N, Y. Herald Tribune news 1149k-WAAM-NEWARK-263m p. m.-Wallie Osborne's Orchestra, p. m.-Review of sports. 150 p. m.-Jo Davis, songs. 140 p. m.-Mayor of Holly Park, p. m.-String Trio. 130 p. m.-Turner Male Quartet. p. m.-Joe Bröwn's Orchestra. 140 p. m.-Four Towers Orchestra. 1190k-WGCP-NEWARK-252m p. m.-Perist and Tedesco. violin 1140k—WAAM—NEWARK—263m a. m.—Services of the Second Presby-erlan Church. 1190k—WGCP—NEWARK—252m 1,100k-WEBJ-NEW YORK-273m p. m.-Raymond Orchestra. 7:30 p. m.-Luna's Knickerbocker Ormermoor." 1220k-WBAL-BALTIMORE-246m 11:45 p. m.—Elgy Mayer, soprano. 2 p. m.—Marinello Lady. 2:15 p. m.—Malatesta hour. m.—WBAL Dinner Orchestra. m.—WBAL Sandman Circle. m.—Marinello Lady. p. m.,—Malatesta hodr. p. m.—Frances Handler, violinist. p. m.—Grace Woydich; soprano. m.—Pilgrim String Ensemble. p. m.—Wm. Eichelsdoerfer, voilini m.—Etta Helies, contraito. m.—Mother Goose Girl. 880k-WMCA-NEW YORK-341zn 9.50 p. m.—Organ recital. 9:30 p. m.—Organ recital. 9:30 p. m.—TWBAL Male Quartet. 10 p. m.—Talk by Robert Garland. 10:15 p. m.—WBAL Trio; Edward Jendrek. chestra. p. m.—Railroad talk, Garrew T. Geer. :10 p. m.—Sal Angarola, songs. :20 p. m.—Henryetta Turner, Ukulel 10:15 a, m.-Employment opportunities. 10:30 a, m.-3:30 p. m.-Hourly market ports. 11 a. m.—Jack Cohen, planist. 12 nooh.—Olcott Vall's String Ensemble. 2 p. m.—Harrison Stevens, planist. 4 p. m.—Harrison Stevens, planist. 4 p. m.—Book review. 4:30 p. m.—Ukulele Bob. McDonald. 4:40 p. m.—Radio Shöpper. 5 p. m.—Direct to Consumer Entertainefr .p. m.-Perisi and Tedesco, violi 8:30 p. m .--- Luna's Marine Band. 970k—KDKA—PITTŠBURGH---309m 5:15 p. m.—Wall Street news. 6:15 p. m.—Fischer Dough Boys. 8:30 p. m.—Fischer Dough Boys. 8:30 p. m.—Betty Chandler, soprano. 8:45 p. m.—Howard Shirley's Orchestra. 9:45 p. m.—Studio program. 10 p. m.—Havoid Polk, barytone. 10:15 p. m.—Kathryn Dwyer, soprapo. 10:30 n. m.—Gaerge Babery teopor. 8306-WHN--NEW YORK.-361m 12:30 p. m.-Loew's Theater Organ Recital. 2 p. m.-Overture and Vaudeville. 3:10 p. m.-News, racing, baseball. 3:20 p. m.-Loew's Theater Orchestra. 4 p. m.-News, racing, baseball. 5:10 p. m.-Meivin Chapman, barytone. 5:25 p. m. Nawe racing baseball. 30 p. m.-Dinner concert. p. m.-Stockman-farmer news. m.—Jimmie Shearer. m.—Gustave Bischoff, planist. ) p. m.—Concert. 650k—WCAE—PITTSBUBGH—461m m.—Arline Felker, sopr .—Irene Branin, harpist. ano. m.—Same Coslow, songs. m.—Employment opportunities. m.—Ernic Golden's Orchestra. m.—Ernic By H. L. Stratton. m.—Employment opportunities. p. m.—Paramount Trio. 1340k—WODA—PATERSON—224m 5.25 p. m.—Meivin Chapman, barytone 5.25 p. m.—News, racing, baseball. 6:30 p. m.—Everglades Orchestra. 7 p. m.—Isabelle Henderson, soprano. 7:45 p. m.—Farone and Varicke, accord duets. 1:30 p. m.—Treasureland Horr Orchestra. 0:30 p. m.—George Bahery, tenor. 0:45 p. m.—Terrace Orchestra. 1340—WODA—PATERSON—224m p. m.—Meeting of Bureau of Budget, with address by President Coolidge. 10:30 a. m.—First Baptist Church servic 590k—WIP—PHILADELPHIA—508m 4:15 p. m.-Community vocal instrume m.—Employment opportunities. m.—Ernie Golden's Orchestra. ..—Lecture, Mrs. Nelvia E. Ritc TUESDAY 7:15 p. m. --- Evening service.

0 p. m.—Amoresaux. 15 p. m.—Concert. 760k—WFI—PHILADELPHIA—395m from Arch Stree 7:30 p. m.—Service from Arch Street Presbyterian Church. 1080k—WCAU—PHILADELPHIA—278m 1080K-WCAU-FIRMAPPIN And State II a: m.-First Unitarian Church services, 5 p. m.-Recital; Radio Church srevices, Rev. John W. Stockwell, 6:45 p. m.-Clarence Seaman's Orchestra, 7:45 p. m.-Cathay.Concert Orchestra, 8:30 p. m.-Barry O'Moore; Bonwit Teller 1000k-WPG-ATLANTIC CITY-300m 15 p. m.—Organ recital. 15 p. m.—Community vocal and instr mental recital. p. m.—News flashes and scores. 15 p. m.—Traymore Concert Orchesti 45 p. m.—Concert program. 10:30 p. m.—Organ and vocal recital. 1090k—WHAR—ATLANTIC CITY—275m 5 a. m.—Morning service. 5 p. m.—Short sacred recital. 5 p. m.—Sermon by the Rev.

7:50 p. m.—Evening service. 9 p. m.—An hour with the classics, Se b Ensemble. bk-WGY-SCHENECTADY-380m -Service of St. George's Epis a. m.-Service of St. George's Epis-copal Church.
 p. m.-Service of St. George's Epis-copal Church.
 p. m.-Madison Orchestra.

9 p. m.—Madison Orchestra.
9:30 p. m.—Miscellaneous program.
10 p. m.—Violin recital by Gódfrey Lud 1130k-WMAK-BUFFALO-266m m.-Evening service, Churchill Tabe 7 p. n 940k-WGR-BUFFALO-319m

10:45 a. m.-Morning service. 7:45 p. m.-Evening service. 9:15-9:45 p. m.-Jointly with WEAF. 460k-WIBX-UTICA-205m 4-5 p. m.-Chamber music. 980k-WJAR-PROVIDENCE-306m

7:20 p. m.—Capitol Family. 630k—WTIC—HARTFORD—476m 630k-WTIC-HARTFORD-476m 5 p. m.-Organ recital, Yale University. 860k-WEEI-BOSTON-349m 6 p. m.-Jordan Marsh Company's Spark ling Diamonds. 7:20 p. m.-Capitol Family. 9:15 p. m.-Atwater Kent, Radio Hour. 9:45 p. m.—Goldman Band concert. 10:15 p. m.—Keith's Radio Review.

m.-Hardman Hour of Music. 0:15 p. m.—Esther Adie, soprano. 0:30 p. m.—Woodmansion Orchestra. 1 p. m.—Jack Denny's Orchestra. 1:30 p. m.—Manhattan Serenaders. 2 midnight-McAlpin Entertainers. 2:15 a. m.—Stauch's Orchestrs.

p. m.-"Storage

12 n.on-Len

30 p. m.—"'George's Surprise." p. m.—Leverich Three and ' Great."

1340-WODA-PATERSON-12 noon-WODA Trio: 2:30 p. m.—String Ensemble. 5 p. m.—Studio program. 5:30 p. m.—News; sport talk. 3 p. m.—Bill Walsh's Orchestra. 5:15 p. m.—Plays Worth While. 5:30 p. m.—Entertainment. 5:45 p. m.—Entertainment. m.-Rheinhardt Newhauser tina. 9:30 p. m.—M. E. K.'s Gang, 10 p. m.—Dance music. 10:30 p. m.—Selegsen Sisters, Sam Cohe 830k-WHN-NEW YORK-361m m.—Pasqualino Sciarrillo, tenor...
 m.—Max Shrebnik, whistler.
 m.—Helen Zalu, songs.
 m.—Consuelo Rivero, piano solos.
 m.—Charke's Entertainers. songs. 760k-WLIT-PHILADELEHIA-395m (OUR-WLIT-PHILADEL\$HIA-395m
5 p. m.-Peirce School talk.
5:15 p. m.-Sesquicentennial program.
5:50 p. m.-Sport flashes.
7:30 p. m.-Dream Daddy.
8 p. m.-Short Aero-Waves.
3:30 p. m.-Starr Piano Company Artists.
1 p. m.-Stain Data Dance Orchestra.
0:30 p. m.-Vaudeville.
0:45 p. m.-Starr Piano 5 p. m.—Jimmy Clarke's Entertainers.
5:10 p. m.—News, 'racing, baseball.
5:45 p. m.—Laurie Fisher, tenor.
4 p. m.—News, racing, baseball.
6:10 p. m.—Haines Good News Party.
6:30 p. m.—Sylvia Schatz, pianist.
6:40 p. m.—Nan Warner, Florence Henke nonular, ballada. 140 p. m. — Nan Warner, Florence Henke popular ballads.
5 p. m. — News flashes, racing, baseball.
5 10 p. m. — Beauty Talk," Mme. Polly.
5 15 p. m. — Eddle Gillis, barytone.
6:30 p. m. — WHN Radio Movie Club.
7:30 p. m. — Joe Ward's Swanee Entertainers. m.—Setting-up exercises. m.—Luncheon music. m.—Studio program. m.—Market Hints to Housewives. p. m.—"Home Gardening," Charles tainers, 5 p. m.—Roseland Dance Orchestra, 5:25 p. m.—"Storage Batteries." F Hollowell.
p. m.—Department of Agriculture.
p. m.—Roll call; birthday list; piane solo. 1080k—WCAU—PHILADELPHIA—278m "Peter Great." --- Loew's Theater Orchestra, 10 p. m.--- Loew's Theater Orchestra, 10 p. m.--- Palisades Amusement Park O. 10:30 p. m.--- Leroy Smith's Orchestra; 11:30 p. m.--- Alabam Orchestra; 130 p. m.—Recital.
p. m.—Carolyn Thomas, soprano.
130 p. m.—The Hood Boys.
135 p. m.—The Merry Minstrels.
136 p. m.—Roy Tracy, tenor.
145 p. m.—Madrigal Mixed Quartet.
760k.—WFI.—PHILA.DELPHIA.\_S95m
p. m.—Teas Room Ensemble. 30 p. m.—Alabam Orchestra, midnight—Silver Slipper Orchestra, 1160k—WRNY—NEW, YORK—258m Saxon and Harry Squire 100k—WFI-FHILADELFHIA-395M p. m.—Tea Room Ensemble. p. m.—Artists' recital. 155 p. m.—Orane orchestra. 1000k—WFG—ATLANTIC CITY--300m 145 p. m.—Organ recital. p. m.—Morton dinner music. 50 p. m.—Tak by Arthur Eldred. p. m.—Traymore dinner music. 12 n.on-len Saxon and Harry Squires, songs.
12:15 p. m.-Eunice Howard, planist.
12:30 p. m.-Frene Ayers, soprano.
12:45 p. m.-Eunice Howard, planist.
7 p. m.-Sport rays.
7:10 p. m.-Commercial digest.
7:15 p. m.-Dick Hughes, ukulele.
7:36 p. m.-Orlando's Concert Orchestra.
8 p. m.-Frances Paper. soprano. p. m.—Traymore dinner music. 30 p. m.—Piano recital. 45 p. m.—Safety dialogue, "Helen and Wallace." 139 p. m.—Orlando's Concert Orchestra.
p. m.—Frances Peper, soprano.
15 p. m.—Ben Bernie's Orchestra.
p. H.—"Scientific Paradoxes," H. Gernsback.
15 p. m.—H. Merle, violín.
30 p. m.—Florence Gerringer, piano.
45 p. m.—Judith Roth, soprano.
0 p. m.—Billy Martin's Orchestra. Waliace." 9 p. m.—Ambassador Concert Orchestra. 9:30 p. m.—Traymore Concert Orchestra. 10 p. m.—Ted Weems's Dance Orchestra Steel Pier. 10:30 p. m.—Studio program. 11 p. m.—Silver Sipper Dance Orchestra

570k-WNYC-NEW YORK-526m IL-WNYC-NEW IORN-Som m.-Herman Neuman, planist. m.-Market high spots. m.-Christopher Meehan, tenor, m.-Civil Service announcemer, m.-Cimino Instrumental Trio. m.-Police alarms. m.—Songs. m.—Talk by Dr. Shirley W. Wynne.

10 p. m.—Baseball results.
15 p. m.—Instrumental program.
10:15 p. m.—Helen Laufenburg, soprano.
10:30 p. m.—Police alarms; weather.

semble. 3:30 p. m.—"A Few Moments With the Poets." :45 p. m.—Prince Piotti, entertainer, p. m.—O'Brien Brothers, mandolin

9 p. m.—O'Brien Brothers, mandolin an guitar.
9:15 p. m.—Frank Mansfield, tenor.
9:30 p. m.—Loew's Theater Orchestra.
10 p. m.—Universal Trio.
10:20 p. m.—Perry Bradford's Enter tainers. tainers. 10:30 p. m.—Strand Roof Orchestra. 12 midnight—Charm Club Orchestra.

# **Dance Orchestras for This Week**

,	TO DAT	TUESDAY, JUNE 22	10:4	5 WBNY 210			•	
<i>′</i>	TO-DAY		111.19		Dance music	9:00 WEAF	492	La France
Time	Wave	7:30 WEBJ 273 Luna's K	nicker 11-1		Vincent Lopez's	9:30 WEEI	. 349	Menkin's
		8:15 WODA 224 Jerry La	Salle's 11.10		Dance music	9:30 WGBB	244	Arcadia Cafe
P. M.	Station length Orchestra	9:00 WGY 380 WGY Ord	hestra 11:30		Pelham Heath	10:00 WLIT	395	Dance music
10:45	WHN 361 Janssen's	9:15 WBNY 210 Savoy	11.30		Connie's	10-11 WPG	300	Duke Donaldson'
	the second se	10:00 WBAL 246 City Park		WIIN 801	Silver Slipper	10:20 WAHG	316	Ed Andrews's
	MONDAY, JUNE 21	10:05 WNAC 280 Dance mt	ste.	THURSDAY,	JUNE 24	10:30 WEEI	349	Jack Albin's
· ·		10:30 WHN 361 Strand, Ro	l l		000 A4	10:30 WEAF	492	Harold Stein's
7:45	WRST 216 Percey's C. Club	10:30 WFI 395 Dance mu			Meyer Davis's	10:30 WJZ	455	Vincent Lopez's
8:00	WEAF 492 Meyer Davis's	10:30 WCAU 278 Billy Hay			Ben Bernie's	11-1 WGR	810	Jack Denny's
8:00	WHN 361 Roseland	10:30 WGBS 316 Arrowhea			Hudson-Essex	11:00 WMCA		Biltmore
8:15	WRNY 258 Ben Bernie's	10:45 WJZ 455 George Ol			Walt Riggins's	11:00 WJAR	806	Dance music
8:45	WGCP 252 Howard Shirley's	11:00 WODA 224 Dance mu			Dance music 🛛 ~~	11-12:30 WHN	361	Connie's
9:00	WAAM 263 Joe Brown's	11:00 WMCA 341 E. Golden			Woodmansten	11:30 WFBH	273	
9:20	WNYC 526 Rich. Versatile	11-12 WIP 508 Dance mu			E. Heimberger's	SATU	RDAY.	JUNE 26
10:00	WODA 224 Dance music	11-12 WPG 300 Dance mu			Traymore Grill	7:30 WOR		
10:00	WPG 300 Ted Weems's	11:30-12 WEAF 492 Buffalodi			Dance music	8:30 WRC	405	O. Queensland
10:00	WLIT 395 Arcadia Cafe	12:00 WHN 361 Charm Cl	ab 10:15		Wm. C. Pike's	8:80 WBZ	333	Washington
10:00	WRNY 258 Billy Martin's	WEDNESDAY, JUNE 23	10:30		WGY Orchestra	9:15 WOR	405	Max I. Krulee's
10:20	WNAC 280 Dance music	WEDNESDAL, JUNE 23		0-12 WHEN 361	Dance music	9:30-11 WIP	508	Casino Dance music
10:30	WEEI 849 Ed Andrews's	-8:00 WRST 210 Briarcliff	11-12		Buffalodians	10:00 WEAF	492	Ben Bernie's
10:30	WMCA 341 Woodmansten	8:00 WEBJ 273 Ed Berlin	11:00		E. Golden's	10:05 WNAC	280	Dance music
10:30	WGBB 244 Korean	8:10 WCAU 278 Clar. Sear	an's 11:00		Swance	10:15 WRNY	258	Dance music
10:45	WLIT 895 El Patio	8:15 WOR 405 Dance mu	nia 11:00		Silver Slipper	10:30 WMCA	233	Dance music
10:45	WPG 300 Terrace	9:00 WAAM 263 Wallie Os	borne's 11:00		Follies Bergere	10:30 WGY	380	Dance music
11:00	WJZ 453 Waldorf-Astoria	10:00 WLIT 395 Arcadia	11:30	WRC 469	Meyer Davis's	10:30 WGBS	316	Arrowhead Inn
11:00	WPG 300 Silver Slipper	10:00 WTIC 476 Carroll's	E	FRIDAY, J	UNE 25	10:30 WOR	405	Monterey Society
11:00	WHAR 275 Follies Bergere	10:00 WGBB 244 Dance mu	sic	AMIDAL, 4	UNE 25	11:00 WRC	469	Dance music
11:30	WFBH 273 Conniels	10:00 WHN 361 Roseland	7:00	WEAF 493	Aristocrats	11-12 WEAF	492	Vincent Lopez's
11:30	WEAF 492 Rolfe's Pal. D'or	10:20 WAHG 316 Dance mu	sic 7:30	•WEBJ 273	Luna's Knicker.	11:00 WJZ	455	. Mayflower
11:30	WHN 361 Dance music	10:30 WMCA 341 Dance mut	sic 7:35	WGY 380	WGY Orchestra	11-1 WIBX	205	Dance music
12:15	WMCA 341 Stauch's	10:30 WJZ 455 Astor Ro	of : 8:30		Colt's Park	11:00 WGCP	- 252	Dance music
			. \ .		and a second second second	and the last sector and	564 X	= mee musio
	to record the state of the solution of the second state of the sec	100 C	* /	6.1				

-Music

World Radio Histor



8:15 p. m.—Radio Bobs, entertainment.
8:30 p. m.—Rover Reciter.
8:45 p. m.—Isabel Henderson, songs.
9 p. m.—Andy Razof and Paul Dennik,
9:30 p. m.—Iraik Galiasi, artist.
10 p. m.—Orchestra.
10:30 p. m.—U. Kirsh, songs.
10:45 p. m.—Orchestra. 1250k-WHAP-NEW YORK-240m 6:30 p. m.-Holmes String Ensemble. 7:10 p. m.-Winifred Bauer, "Piano M [7] 10 p. m. — Winifed Bauer, Frank and Frierreices,"
[7] 40 p. m. —News digest.
[8] p. m. —WHAP Madrigal Singers.
[8] 8.15 p. m. —Vida Milholland, "Mental 97 Drugs."
[8] 8.35 p. m. —Lillian Fuchs, violinist; Marion 7. Kerner, soprano; Steel Jamison, tenor.
[9] 10 p. m. —Hickman Price, speaker.
[9] 30 p. m. —Augusta E. Stetson, reading.
[10] p. m. —Mary Pinney, organ recital.
[10] D. m. —Mary Pinney, organ recital.
[10] Tuchs, violinist; Marion Kener, soprano;
[10] Lari Bethmann, barytone.
[10] 100k —WFBH—NEW YORK—273m

1430k-WBNY-NEW YORK-210m

p. m.—Irio. p. m.—Leroy Montesanto, tenor. :15 p. m.—Radio Bobs, entertainment.

1100k-WFBH-NEW YORK-273m

11002-WIBH-WICHA-2:03 p. m.-Black Diamond Serenaders. 30 p. m.-The Hour of Meditation, p. m.-Studio program. p. m.-Evelyn Lewenthal, soprano. 15 p. m.-Tracy and Dougherty. 30 p. m.-Bello Osborne, songs. m.—Big Brother Movement. —Local Merchants' Hour. 6 p. m.—Local Merchants nou. 6:06 p. m.—Orchestra. 6:45 p. m.—Beauty talk, Ervin Weiss. 7 p. m.—Majestic String Ensemble. 7:30 p. m.—Talk on Nervo-Rumat. 7:35 p. m.—Wm. Freeman's Orchestra 11:30 p. m.—Connie's Orchestra.

c. Caestra.
Scok-WEEL-BOSTON-349m
10.15 a. m.—Anne Bradford.
12 m.—Keith's radio review.
2:45 p. m.—Mental hygiene talk.
3:15 p. m.—Mesicale.
6 p. m.—Events of the day.
6:45 p. m.—Musicale.
7:45 p. m.—Musicale.
7:45 p. m.—Program from WEAF.
1900k-WBZ-SPEINGFIELD, MASS-335
7 p. m.—Joly half hour, Musical Mirti Makers.
7:45 p. m.—M. A. C. radio forum.
8:30 p. m.—Radio Nature Beague.
9 p. m.—Mar I. Krulee's Orchestra.
9:30 p. m.—Jimmie Buckner, comedian Jock Carbon, piper.

860k-WEEI-BOSPON-\$49m

Lindal

k Carson, piper Jock Carson, piper. p. m.—Almanzoe Gosselin, soprano. 15 p. m.—Joseph Clements, vocalist. 30 p. m.—Organ recital. 1120k.—WTAG.—WORCESTER.—268m p. m.—Musical selections; talk.
 p. m.—Interesting talk, Robert Shaw
 m.—Astronomy talk, Fred Aldrich.

7 p. m.—Astronomy tais, Free Autrica. 7:15 p. m.—Story teller. 7:40 p. m.—To be announced. 8 p. m.—The Shinolas. 8:30 p. m.—Davis's Saxophone Octet. 10 p. m.—WEAF Light Opera Company. 640k.—WRG—WASHINGTON—469m

book—WRC—WASHINGTON—469m
 p. m.—Organ recital.
 p. m.—Irving Boernstein's Orchestra.
 p. m.—Play-by-piáy account of the Washington-Philadelphia basebáll game.
 7:30 p. m.—United States Marine Band.

a. noon.—Orotet vall's string thereme ble.
1 p. m.—Le Roy Montesanto, tenor.
4 p. m.—Le Roy Montesanto, tenor.
4 p. m.—Happy Girl,
5 p. m.—Entertainers.
5:45-6:30 p. m.—Employment opportee nities 6:45-6:30 p. m.—Employment openant.
nitles.
6:40 p. m.—Harvey Brown, pianist.
7 p. m.—Hofbrau Haus Entertainers.
7:30 p. m.—Helen Koster, contraito.
8 p. m.—Roemars Homers.
9 p. m.—Solow Soloists.
9:30 p. m.—Columbia Park Entertainers.
10:30 p. m.—Musical program.
11 p. m.—Ernie Golden's Orchestra.
12 midnight.—Broadway Night.
12 Midnight.—WORK.—273m

3:30 p. m. 11:10 a. m.—Radio shopper. 12 noon.—Olcott Vail's String Ensema

1100k-WFBH-NEW YORK-273m 2 p. m.—Orchestra. 3 p. m.—Orchestra. 4:30 p. m.—Murray Schwartz, plane. 5 p. m.—Eddie Gillis, barytone. 5:15 p. m.—William Hirschmann. 5:30 p. m.—Martin Wallach, plano. 6 p. m.—Dotty McLean and Leo Ford. 6:15 p. m.—Automobile route, H. Maples.

Maples. 1:30 p. m.—Majestic String Ensemble. 7 p. m.—Yorkville Radio Eentertainer

 m.—Yorkville Radio Eentertainers.
 1040k.—WLWL.—NEW YORK.—288m
 9. m.—McEnery's Entertainers.
 9. m.—Question box.
 130 p. m.—William Lawlor, barytone.
 140 p. m.—Harding String Ensemble.
 10 p. m.—Harding String Ensemble.
 10 p. m.—Grace Stevensch, harpist;
 Charles Schwyler, tenor. Continued on next page

**Elementary Information** For the Radio Novice Broadcast Program

Interference in Radio Receivers Is Very Often **Caused by Some Household Appliance; Static** Is Not as Bad as It Has Been Painted

This is the twenty-second of a series of twenty-four lectures for the radio layman, which are being broadcast through KDKA, the Westinghouse Electric and Manufacturing Company's station at East Pittsburgh, Pa.

#### By James W. H. Weir

Technical Editor, "The National Stockman and Farmer" HERE it is again, that scratching, frying, clicking, grinding noise ada was more or less of an experithat is forever marring radio reception. Interference it surely is ment. The artists were not at all of some type or another and the average radio user classifies sure how they would like it, or how this particular difficulty as "static." By the way, how many of you it would affect their other plans, but are familiar with what the word "static" really stands for? The word they were eager to have a part in self is a short term used to express "static electricity." In truth the making the best music available to static electricity or the small deposits of static electrical charges on the antenna causes but a very small portion of the interference we are

forever complaining about. some of you that this so-called cause it is nothing more or less than October 4 and ending April 25. These "static" may be the product of man's a waste of their power. Generators concerts have been heard through fifown creation and that many devices and motors also may cause interfer- teen broadcasting stations as far of electrical nature are responsible ence even though in perfect operat- West as Minneapolis, Davenport and in whole or in part for that great ing condition. This is due to the St. Louis, and as far East as Washbugbear "interference." This is pre- sparking in the commutator or slip- ington, New York and Boston. It is cisely the truth.

#### Man-made Interference

pieces of electrical equipment in in- electrical energy. In some cases with undoubtedly runs into the millions. dustrial and domestic use to-day trans- direct current machinery these intermitters of electrical waves, and these ferences can be stopped by putting a have gone over the network of fifteen waves are the very things that are large choke coil in the wires con- stations, several concerts have been causing the trouble. Such interfer- necting the machine to the power given through broadcasting stations enca, if located, can often be elim- circuit. These must be put in at the in parts of the United States and inated, while that produced by the machine terminals. In some other Canada not reached by the network. seatic charges of nature, as far as is cases the connecting of large conknown at present, cannot be cured. densers directly across the terminals artists who have been particularly Let me give you a list of the things of the machine will eliminate to some enthusiastic about the results of here that may be causing you extent the interference produced. - their broadcasting in the Atwater trouble in your neighborhoods. First take power circuits, including lines, other instances are the variable week after the close of the scheduled including lines, contacts in the heating elements of insulators, lightning arrestors, transformers, generators and motors. Sec- when they become hot and thus proondly the industrial appliances, in- duce radio interference. Domestic cluding arc lights, telephone and tele- and industrial appliances as mengraph lines, telephone ringers, street tioned earlier in this text all are apt cars and electric railroads, factory to cause the greater or lesser amount motors, store motors and barber shop of interference noises and mar radio appliances, smoke and dust precipitators and electric sign flashers. Third, domestic appliances including door rectly in the receiving set itself. This bells, light switches, sewing ma-is especially true in home-made sets tralto; Kathayn Meisle, contralto; chines, vacuum cleaners, flat irons, where bad contacts, poor or no solder- Allen McQuhae, tenor; John Powell, electric refrigerators, dish washing machines, kitchen mixers, violet ray teries and a sulphated A battery are outfits and heater pads, and lastly, a to be found. miscellaneous group including X-ray machines, storage battery chargers, electric elevators, annunciator systems, automobiles, stationary gas engines, tickers and dentists' motors. With interference, dis to discover These are but a few of the direct causes of interference, and doubtless there are many others of similar nature that are equally as bad. There is not the slightest doubt but that is not the slightest doubt but that if all the electric circuits and in-stallations were kept in perfect order trick prevents any voltages in the an-trick prevents any voltages in the anstallations were kept in perfect order trick prevents any voltages in the and the singers of this great organization. there would be very little radio in-tenna from actuating the receiving The first of the artists to appear terference from such sources.

#### Sparks Cause Trouble 1.7

The electric power line for in-stance, in itself is not the cause of just named in close proximity to your cast through the forewing eight stainterference with radio, but fre- set dence.

Perhaps it has already occurred to elimination of this interference be-It is an absolute fact that many acts as an antenna and radiates the and other signs of interest the total

> Other instances are the variable a heating pad. These may spark reception. Again, sometimes the source of interference originates diing, broken down wires, weak B bat-

#### How to Locate Interference

When you begin to be troubled with interference, about the first whether or not the interference originates in the set itself. To test for this connect the antenna and ground Kent has made arrangements with terminals of the receiver together the Metropolitan Opera Company set. If your noises still continue it under this arrangement is . Mme. is safe to assume that the interfer- Frances Alda, who sang the night of Naturally there are exceptions to ence you are getting originates within Sunday, April 18, through WEAF and every rule and there are some causes the set. If, on the other hand, the fourteen other stations. of interference that may not be elim-receiver is in good condition, perfect For the season of 1926-1927, beinated even though the installation silence in the head set or loud ginning in October, Mr. Kent is planand the apparatus are perfect. Among speaker will be had. If the noise ning a series of Sunday evening conthese may be included lightning ar- ceases with this test the next thing certs to include not only most of the restors on power lines, telephone to do is to make an observation of artists who have appeared this searingers, some types of motors, smoke the electric power devices used in son, but additional distinguished artand dust precipitators, door bells, your neighborhood, especially those ists from the Metropolitan. and dust precipitations, available of motor-light switches, a variety of motor-driven devices, violet ray outfits. from the power line in the vicinity. from the power line in the vicinity. from the power line in the vicinity. X-ray machines, storage battery Such devices as violet ray machines, somewhat lighter type through the chargers, annunciator systems and coffee and tea percolators, electric summer. So, with the closing of the chargers, annunciator systems and gas engines with electric ignition. All such devices mentioned in the above may be said to cause inter-above may be said to cause interference even when in perfect oper-ating condition. source and interference will be found tion of the Irish-American tenor, The electric power line for in- to originate from a device such as Allen McQuhae. These will be broad-

quently in some parts of the power Probably the best way to find this ton; WSAI, Cincinnati; WCAP, Washsystem there develops a poor contact out is to engage the service of a ington; WCCO, Minneapolis-St. Paul; which produces a spark. These number of your friends in different WGN, Chicago; WGR, Buffalo; WWJ, sparks may be very minute, but parts of the community and at speci- Detroit. nevertheless create considerable dis- fied times make tests to find out Allen McQuhae, well known as an turbance. The remedy of course, is whether they get the same type of oratorio singer and also for his rento locate the spark and repair the interference at the same time. By dition of Irish ballads and other folk condition which causes its produc- the proces of elimination you may songs, has had an extraordinary tion. This source of disturbance de- gradually find out the location or career. He was a ranchman, a Klonvelops in the power line through source of trouble and from this point dike miner, an engine wiper and a "leaky" insulators, or in other words, on it may be run down by means vaudeville and cabaret singer before insulators that do not permit a per- of a small loop receiver and head undertaking a musical career. He fect insulation, but allow the power set. From letters received regarding was singing in a cabaret in Cleveland to creep off in small jumps. Some- interference troubles it has been when Felix Hughes, the barytone and times when the power line touches found that based on 100 reports about teacher, heard him and persuaded tree branches, interference is also 25 per cent of the interference comes him to study. Within two years he noted. Other sources of trouble may from telephone bell ringers. Gas was appearing as soloist with leading be found in the transformer in the engine plants run a close second with orchestras and had more oratorio enracinity of your home, these often 21 per cent. In the country these gagements than he could fill. Then being located on poles near your resi- two features are most troublesome, he went to war as a private, won a

companies are anxious to aid in the their own lighting plants.

A. Atwater Kent to

The broadcasting of noted singers and instru matalists has proved so popular with the public and so successful from the standpoint of the artists themselves that A. Atwater Kent, the radio manufacturer, has decided to continue his broadcasting plans on an even greater scale in the future.

Last fall, when the present series of concerts known as the Atwater Kent, Radio Hour was started, the idea of broadcasting famous artists over an area comprising the greater part of the United States and Can-

Mr. Kent was convinced that the public wanted music of this type when he scheduled thirty consecutive Sunday evening concerts, beginning rings. In fact, any spark of this na- impossible to say how many people ture produces a high frequency cur- have listened to them, but judging rent, while the wire in the circuit from the number of letters received In addition to the concerts which A few weeks ago, several of the would be in the nature of a gala evening. This concert will be heard over the network of fifteen stations on Sunday evening, May 2. It will begin at the usual time, 9:15 Eastern time, 8:15 Central time, but will last an hour and a half instead of an hour. Those who will participate are Frances Alda, soprano; Josef Hofmann, pianist; Louise Homer, conpianist, and Albert Spalding, violinist This will perhaps be the most distinguished group of artists ever assembled in a broadcasting studio. The concert will be specially appropriate at this time, for May 2 marks the beginning of Music Week.

The public having signified its appreciation of the appearance of the finest artists in radio concerts, Mr.

tions: WEAF, New York; WEEI, Bos-

as the bell ringer telephone is still commission and two citations and re-It is only natural that the power in use and many of the farmers have turned to the United States to re sume his concert work.



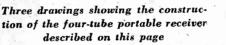




# This Season's First Portable Set

The Four-Tube Receiver Discussed Is Housed in a Small Carrying Case, Which Also Holds the Batteries and Loud Speaker; It Weighs Twenty-two Pounds

By ZEH BOUCK



O SAY that spring is here, that shortly we shall be motoring and camping, and therefore shall have use for a portable wireless receiver, is to expound a simple engineering truth. And if we qualify the idea, elaborate on the requirements of such a set in the same simple logic, we shall have achieved an end and a moral recommended to the attention of many "designing engineers."

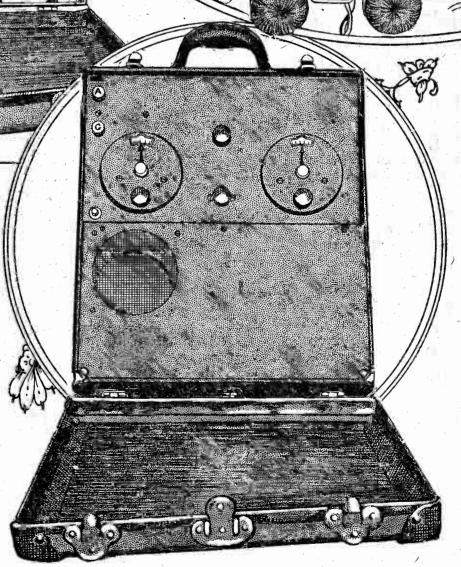
There are two systems-two ways of making portable receivers. One is to mount a handle, wheels or skis-depending more or less on geographical conveniences on your present receiver, and the other is deliberately to design a set with the exigencies of portability in mind. I, personally, recommend the latter system, and should go about it somewhat as follows:

To be portable within the most convenient possibilities of the word, everything essential to operation-batteries, loud speaker, antenna wire and the receiver proper-must be carried within a single case or container, and this last must not exceed reasonable dimensions or weight. Considering the accessories, certainly not more than half of the available space can be devoted to the receiver proper-the coils, tube sockets, transformers, and so on.

#### Four-Tube Set Best

World Radio Histor

These considerations will generally cation. eliminate the five-fube two-stage tuned r. f. arrangements. For passable effi-



These drawings were made from photographs of the receiver described

spaces between components. Four tubes, therefore, are as high as we can efficiently go in the average portable equipment, and it remains to make the most of the four tubes to which we are limited. These are one radio-frequency tube, the detector and two stages of audio amplifi-

Two transformer coupled stages imme-

spread out with comparatively large | amplifier. In passing we note mentally the desirability of small transformers. Continuing our inverse order, but progressing from the obvious to the more abstruse, we come to the detector circuit. By employing regeneration we shall make the most of our possible detecting efficiency, and by achieving this desirable feed-back by means of the conventional rotating tickler coil the mechanical probdiately satisfy the conditions of high elec- | lem resolves itself into the buying of one ciency such systems must as a rule be trical efficiency in the audio-frequency of several efficient ready-made units.

The radio-frequency tube remains to be considered. It must be stabilized by some system of introducing effective losses, for broadcast reception is practically impossible with an oscillating tube. Stabilization is nothing more than a control of regeneration. Regeneration, of course, is a feed-back between grid and plate circuits which, within certain degrees, adds greatly to the amplifying action of the tube. Most stabilization systems are permanently adjusted to hold the tube within this efficient limit (just under the oscillation point) on the short waves, which adjustment, however, due to changing conditions, is far below the oscillation point on higher waves-ignoring the advantages of regeneration on these frequencies. Thus, in stabilizing by variable regeneration control we sho be enabled to operate the first tube at its highest efficiency over the entire tuning range. A variable by-passed resistance, such as the Electrad Royalty Type C or the Centralab, in the plate circuit of the r. f. tube will effect this desirable condition. The choice of this system of stabilization again simplifies matters by making possible the use of any standard r. f. primary and secondary coils.

And so, quite logically, we arrive at the electrical system diagramed in Figure 1. Running from right to left, T1 is a standard antenna coupler, T2 a three-circuit tuner, T3 and T4 audio-frequency amplifving transformers. R1 is the regeneration control resistance in the plate circuit of the r. f. tube. The remaining parts are self explanatory or labeled.

Throughout the design and construction of the receiver compactness and the concomitant necessity for small parts should be kept in mind. This consideration leads the writer to recommend such parts as Amsco sockets and S. L. F. condensers, Amperites at R2, R3, R4 and R5 in place of rheostats, Hedgehog audiofrequency transformers and Bruno coils.

This circuit is the starting point of an efficient portable receiver. Though the

(Continued on page four)

# A Four-Tube, Single-Control Set Using **Two Stages of Tuned Radio Frequency**

The Compensated Triple Condenser Employed Tunes Three Circuits Simultaneo usly

#### By JAMES E. CARTIER

panel. That is to say, the larger the panel and the more knobs and dials the better the set. Nowadays things are The resistance coupling units are small different and the real fan is more likely to | and compact to fit in on the lay-out with boast of his set because of its compactness and efficiency than ever before. Super-heterodyne sets were formerly measured off by the yard, now a two-foot panel is plenty.

Of course, the panel manufacturers aren't making as much money, but look at what the relief amounts to on the fan's pocketbook. Right at the start, then, this set was laid out to use the smallest convenient panel possible without stretching the lay-out too much toward the rear. The result was a seven by fifteen inch panel, without the slightest crowding of the controls

#### Wave Length Range

The next question that came up in the design and lay-out was the problem of wave length range. So far the tuning range of a coil and a variable condenser has been sufficient to cover the ordinary broadcasting band. There is this difficulty. however, that the same efficiency and selectivity are not obtained over the lower wave length range. In addition, there is a decided trend for lower wave lengths which are beyond the range of the ordinary set. A number of fans would like to listen in to the low wave experimental stuff.

To take care of these conditions, interchangeable coils are used. This means that for the regular wave length band one set of coils is sufficient, but if lower wave lengths are to be received, different coils are simply plugged in on the coil mounts without any rewiring or changing of the circuit. This has been done without any sacrifice of any sort, but, on the contrary, adds considerably to the advantages of the set.

#### The Circuit

The circuit is standard and simple. Two stages of tuned radio frequency, detector and three stages of resistance coupling combine to guarantee selectivity; volume and quality. The three secondary circuits are tuned with a single rotor triple condenser that has two small side knobs for compensation adjustments This condenser has the standard semi-circular plates, but the use of a straight line frequency dial separates the lower wave lengths for the dial settings and simplifies the tuning and logging problem. The two radio frequency tubes are controlled with one ten ohm rheostat, the detector with a twenty ohm rheostat and the three resistance coupled stages have the filaments controlled with another ten ohm rheostat. A variable grid leak is used to control proper potential on the grid of the de- the base mounts as used in the set. The tector. The resistance coupling furnishes compensated multiple condenser should maximum volume with the best tone have a capacity of .00035 microfarad in

HERE was a time when radio sets | selected for efficiency and compactness in | tuning and the separation of the stations | sibility for using the soldering iron. No usually firm contact with the tube prongs. the minimum possible space requirements.

#### List of Parts Required

One front panel 3-16x7x15 inches. One subpanel or baseboard 5% x10% x14 inches

One binding post strip 3-16x1x14 inches. Three general radio coils, Type 277-D. Three general radio bases with jacks, Туре 274-В.

Twelve general radio contact plugs, Type 274-P.

One U. S. L. compensated multiple condenser.00035 mfd.

One Radiall Tune-Rite dial.

Six C. R. C. four-twin sockets No. 310. Three U. S. L. rheostadts, two 10 ohms and one 20 ohms.

One electrad resistance coupled kit No.

One electrad variohm-base mount. One electrad grid condenser, Type VS .00025 mfd.

One electrad fixed condenser 0005 mfd.

Seven binding posts, Eby. Fifty feet black flexible celatsite wire. One Carter battery switch.

One Carter open circuit jack,

One cabinet to suit.

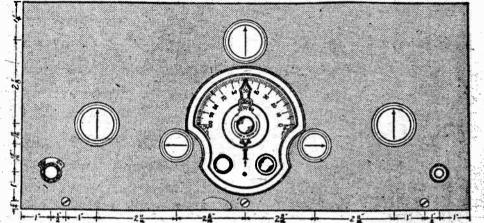
Miscellaneous nuts, lugs, screws, etc. The question of the selection of apparatus to be used is one that should not be neglected. The performance of any cir-

were judged by the size of the assembly. Even the tube sockets have the on the dial, a straight line frequency con- dimensions are given, since this would double feature of spring mounting and un- verter dial is necessary. The dial named only make a confused picture. With the above just fits in and allows room for thecompensator knob on each side.

The resistance coupled amplifier consists of three units, each with its condenser, two resistances and mounting, and

units all in the proper place, take a sharp, long pointed pencil and mark all the mounting holes on the baseboard.

A mahogany baseboard was used in the original set and with a hard wood of this



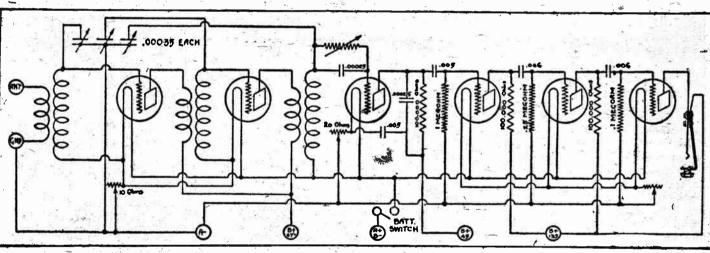
A suggested panel layout for the receiver herein described

#### The Panel Layout

The layout of the front panel is shown in Figure 2. This shows the simplicity of arrangement and emphasizes the ease of tuning. The battery switch and the plug-in jack are in the two lower cor- | connect the lugs to the terminals as shown ners, where they are out of the way in the picture in the upper right hand

also the extra .00025 mfd. condenser and | sort, it was necessary to drill small holes mounting clip. These units are compact, for the wood screws in order to get them efficient and make the wiring a simple mat- started and to avoid splitting the board. Don't put the coils into the mounts, as they are only in the way.

> The four contact plugs have to be mounted in the four holes in the base of each of the coupling coils. The terminal lugs that are furnished with the plugs should be on the inside of the coils. Then



The wiring diagram of the six-tube tuned radio-frequency receiver constructed by the author

apparatus that is used in the set. Theresure to select equally efficient substitutes. for these extra coils. They will fit into quality possible. All the parts have been | each section. In order to get the vernier

The rheostats are placed so that they | tap at the center of the secondary windconvenient for adjustment when it is deaudio tubes.

The knob on the right of the dial/con-

The dimensions of the centerlines for the shafts of units are given along the left and lower edges of the panel. The three rheostats are of the single mounting hole type. With each of the multiple condensers there is furnished a drilling template which can be used for locating the three extra holes for mounting the condenser, as well as the main shaft and the two compensator shafts holes. Two sevensixteenths holes are drilled for the jack and switch. Three countersunk holes sholud be drilled, as indicated, for fastening the baseboard to the panel.

#### **Baseboard Assembly**

Before starting on the baseboard assembly, as pictured in Figure 3, it would be advisable to lay the units on the baseboard in the positions shown. This should be done with the front panel in place and the apparatus mounted on the panel. Keep all the terminals in the position indicated. but see that there is ample room for running the wiring and sufficient acces-

the look of the cost and the third and

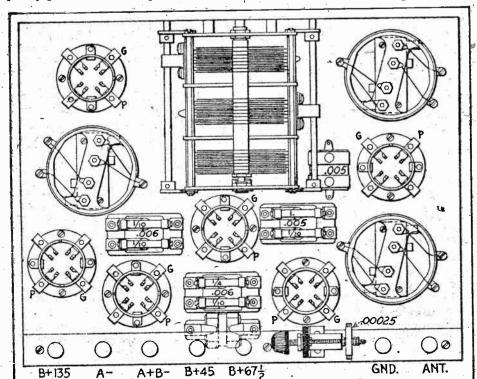
ing is not used, so just disregard it. All three coils are connected the same way. to indicate which way the coils should face. If they are put in wrong it would simply mean the primary and secondary are interchanged and reception would be weak and limited to very low wave lengths. The two terminals on the coil in a straight vertical line, or above one another, should always face toward the variable condenser.

#### Wiring Instructions

After the apparatus on the baseboard has been screwed down and the panel mounted, the wiring of the set is to be considered. Study the hook-up, Figure 1.

First put in all the negative "A" leads, as these branch out to more terminals than any of the others. Note that the rotor terminal of the condenser is connected to this. The ground post is also connected to the negative "A." The next step is to make the connections from the three rheostats to the respective tubes. Note that the grid returns of the secondary of each of the first two coupling coils is connected inside the rheostat (tube side) of the negative filament.

Now connect the A plus and B minus binding post to the battery switch, then make all the A plus connections from the other side of the battery switch. The grid return of the secondary of the third coupling coil is made to this A plus lead. The connections from the antenna and



The above diagram shows how the parts should be arranged on the baseboard

- search structure can all character it was a structure in the second s second sec

cuit is dependent on the quality of the | of the hands when turning the receiver. | corner of the baseboard, Figure 3. The fore, if the parts named are not used be do not interfere with the tuning, still are For wave lengths from 100 to 300 sired to cut down the volume or clear up In order to avoid putting in the coils. meters the coupling coils type 277-D1/2 | reception. The one on the left controls | facing the wrong way (no harm would be should be used, and if a range from 50 to the radio-frequency tubes, the one in the done), it would be advisable to pursome A jack and a battery switch complete the 150 meters is desired the type 277-D14 center on top is the detector rheostat, and mark on the baseboard or the mounting units that are mounted on the front panel. | can be used. Plug jacks will be required | the right hand one takes care of the three

trols the compensating adjustment of the first tuning stage of the condenser. The left one takes care of the adjustment on the tuning of the second stage. The dial has a small knob on the right side that controls the rotation of the condenser shaft and the movement of the pointer in front

### News and Notes of the Radio Trade

By-pass Condenser The Polymet Manufacturing Cor- cal and electrical contact. poration, 599 Broadway, New York City, has recently announced their new line of by-pass condensers, which are now in production on a latest, most improved apparatus, in capacities from 1 to 4 microfarads. A special impregnation process assures



maximum durability and long life and absolutely prevents leakage. These condensers are made in spe cial sizes for manufacturers according to specifications submitted. They are put up in standard cans, for distributors and dealers.

#### Loop and Battery Cable

The Becker Loop Lead is a new radio product designed to obviate the loss of efficiency to loop sets direction without affecting the spac- of the detector rheostat. ing of the wires. The cables are of copper and the rubber casing makes cord to be used as a battery cable.

the market.

#### Re-enters Radio Field

cable.

season

radio shop in New York City two nal on the detector tube. years ago, are again active in the radio field. They now have a large plant at Ely and Payntar Avenues,

**Resistance** Coupling Unit

SINGLE and SIAMESE Amsco Products, Inc.

416 Broome Street

Service Organization

large scale. Polymet by-pass con-densers are manufactured with the sixteen months, is at present plansupply sales people with a service and ground connections, plug in the to listen to. including installations and main- loud speaker on the jack and have Distortion Approximately one hundred men, customed to the set and give it a fully conversant with actual service chance. ompany has not yet béen decided.

#### A Four-Tube Single Control Set

#### Continued from page two ground binding posts to the first coil

mount can now be made. There are three B plus binding guarter of an inch apart. It can, therefore, be moved in any possible B plus 45 lead to the A minus inside A Holf House of M-The next step is to put in all of

the grid and plate leads. These must the lead acid proof, which is an ad- be kept short as possible. Make sure vantage when the lead is likely to that each terminal is well tightened come in contact with the storage bat- down and that every joint is firmly tery. There is also a five conductor soldered with a good electrical connection. A poor joint introduces re-These leads are very compact, the sistance into the circuit, which means loop lead being only three-sixteenth of that tuning will be broad and selecan inch thick, permitting it to be tivity poor. Check up the conneceasily slipped into the cabinet under tions to the fixed plates of each of the cover or through a hole smaller the sections of the multiple congram, so as to get the proper arconnect to the grid circuit of the first tube. The last section, farthest away circuit. The lower terminal on the

#### Checking Up

After the wiring has been complet-Long Island City, for the manufac- ed it is best to check over to see that

light. If so, there is a wrong connection and wiring should be checked up. Remove the positive battery lead ufacture, into a permanent mechani- from the A plus 45 and try the same thing when connected to the B plus 671/2 and also the 135 binding posts. This gives an accurate check without a radio receiver has a far greater transformer to one of the proper A. W. Gruno, who has been in danger of blowing out the tubes, as effect on the quality of reproduction ratio, the trouble can be corrected charge of all factory activities of the might be the case if the B battery Tuning In

knob on the dial slowly until reception is heard. Rotate back and forth until maximum volume is reached. Now try turning the left compensator knob until a new maximum point of volume is reached. If the volume is too great, just turn down the left rheostat knob. Do the same thing with the right compensator. posts, one for 45 volts for the de- Keep the approximate setting of the tector plate circuit, another of 671/2 compensators in mind, as they will volts for the radio-frequency plate not alter much for the various wave circuit, and a third, 135 volts, for the lengths. These having been rdjusted, connecting the loop with the set. It resistance coupled audio amplifier then the main dial knob can be stages. These connections should all turned for farther reception, making bedded in rubber and spaced one- be added in now. Then wire in the any little adjustments of the com-

#### A Half Hour of Music of

The Far East on Friday On Friday evening the radio audience of WEAF's chain will again be for at the hour of 10 o'clock, Eastern Daylight Saving Time, the Whittall Anglo-Persians will be heard in their WTAG, WCAE, WOC, WDAF, WCCO, tubes. WWJ, KSD, WEAR and WGN. This thap would be necessary for a round denser with the picture wiring dia-The Ralph Becker Company, of rangement. The first section of direction of Louis Katzman, an ex-Cleveland, has placed these leads on fixed plates, nearest the front panel, pert in the rendition of music of the Far East. The program will include the selections "In the Sudan" by Sefrom the panel, is the detector grid bek, "Loves Dream After the Ball" by Czibulka, "My Little Persian Rose" Harold Herbert, Inc., owners of a Variohm connects to the grid termi- by Friendland and "Under the Leaves" by Thomas.

#### 'Macbeth' Last Shakespeare

Play Presented by WEAF Murder, intrigue and the ultimate ture of radio receivers. Mr. Herbert all connections have been correctly triumph of right over wrong are all is the designer of the Whitestone and made. A simple way of doing this is woven into Shakespeare's immortal. Kismet sets and was also production to put six tubes in the sockets and play, "Macbeth," which will be premanager for G. Boissonault Company. then connect the A battery to the sented in tabloid form under the di-The officers of the company are Har- proper binding posts. Now, without rection of Katherine Emmet this old Herbert; president; William adding any B battery, turn the bat- evening, as the farewell performance Schatzkin, treasurer and vice-presi- tery switch on. Turn on the left of the WEAF Shakespearean Players. dent and N. H. Herbert, secretary. rheostat knob and see if the two beginning at 6 o'clock, Eastern Day-Mr. Herbert states that plans are radio-frequency tubes light up. If light Saving Time, and to be heard under way for the production of 20,- the other knobs are turned off no from WEAF, WGR, WFI and WSAI. 000 five-tube receivers for the new other tubes should light. Then turn These weekly tabloid productions. the knob of the center rheostat and formerly a Saturday evening feature see that the detector lights up. Last at WEAF, have met with great favor turn the right or audio rheostat from radio listeners. Outstanding

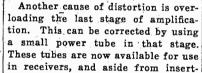
### and the positive side to the B plus How to Eliminate **Distortion** in the Audio Amplifier Rasping sounds in receivers are frequently caused by the use of high

taking measurements, etc., as well. try for distance right away, get ac-classes, that which is caused by the In some extreme cases it will be poor design of the amplifier "itself, found necessary to use both the reand that which is caused by the im- sistance and condenser in order to work, have been enrolled for this Tune in a local station first. Keep organization already, and in addition the little compensator knobs turned them, there will also be inside as shown in the panel view. The distorted music, the owner should repair men and two laboratory tech- radio-frequency, rheostat should be not attempt to correct the design of. nicians. The location of the new turned about three-quarters on, the the amplifier, as in most cases this detector half way and the audio three-quarters way. Now turn the ceiver. However, in most instances, it will be found that a factory built set be featured in particular by the apwill give satisfactory reproduction when the audio amplifier is properly Council, Junior Order of American operated.

Improper battery voltage is one of

quaint, mystic cities of the Far East, vance, and these must be found by son at the Bedford Branch." experimentation. The reason for this is that such things as the degree of vacuum in the tube and the resisthalf hour concert through WEAF, ance of the audio transformers can WCAP, WJAR, WOO, WGR, WEEI, change the voltage required by the

It should be remembered, however, that in all cases where 90 volts or Whittall Anglo-Persians, is under the more of B battery is used on the plates of the audio frequency amplifier tubes, a C battery must be employed if quality of reproduction is desired. This battery consists o n series with the grid circuit with the negative potential applied to the grid. The voltage of this battery should be varied with the B batery potential.



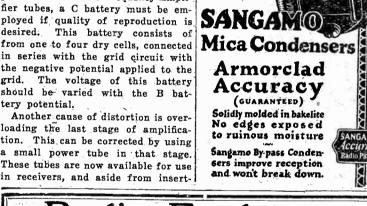
ing the new tube and using a slightly higher B and C battery voltage on that stage no other change need be made in that stage.

\* 11

ratio audio frequency transformers. The audio frequency amplifier of If it is not desired to change the to some extent by connecting a small than many persons realize. If this fixed condenser across the primary part of the set is efficient, it will winding of the transformer or by make a good program very enjoyable, shunting the secondary winding with ning a service organization. This After all the checking is com-organization is intended not only to pleted make all the battery, antenna organization is intended not only to pleted make all the battery, antenna the same program almost impossible should have a capacity of approximately .002 mfd., or if the resistance tenance but a laboratory service for the set ready for operation. Don't amplifier may be divided into two leak will answer the requirements. Distortion in an audio frequency is used, a one or two megohm grid

#### **Delegations to Attend Last** Session of Men's Conference

The last session of the Men's Conference at the Bedford Branch Y. M. Mechanics, of Kearny, N. J. In adthe chief causes of poor reproduction. altion there will be a strong the Didition there will be a delegation of A single cell in citizer the in over dis- vine Star Loage, no. cooper. Load battery that has been over dis- M., of New York City. Practically charged, may cause noises and howl- the entire proceedings of the confering sounds to be heard in the re-ence will be broadcast by WEAF, tery having insufficient voltage will WTAF, beginning at 4 o'clock Eastresult in a lack of volume and poor ern daylight saving time. The The voltage required to heat the Rev. Dr. S. Parkes Cadman, pastor filament of a vacuum tube, is printed on the box in which the tube is sold, Brooklyn, president of the Federal and in operating a receiver it is es- Council of Churches of Christ in sential that the tube be operated at America and a nationally known this voltage. The required voltage preacher. Dr. Cadman's subject for for the "B" and "C" batteries can- the closing session of the conference dience of WEAF's chain will again be wafted upon the magic rug to the not be determined accurately in ad-will be "A Review of the Radio Sea-



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9

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RADIO

How Radio 'Tubes Are Made in Germany

nounced for broadcasting. You instruct your wife to prepare a colla- whisker" used to make contact with pense of trickle chargers in most cases is too great. tion, to be served when the guests show signs of hunger or thirst. This the mineral is usually a light tension Here is an automatic A. C. filament may occur anywhere from ten to twenty minutes after their arrival, The honored guests, Mr. Grumble -Smith, Mrs. Wordy Smith, and their pect of forcing a stalemate. Black little son, Nuisance, will arrive at 8 retreats to the queen's row, fencing is found in many parts of the United faintest trace of hum or noise. While while trickle chargers are constantly o'clock promptly, just when Galli- for time. White's pawn attacks States. Different specimens vary a battery is used the battery acts charging when the set is turned off. Curci begins to sing. The exchange black's bishop, threatening the castle widely in sensitiveness, even when only as a regulator of the current While no harm will result from of greetings, remarks anent the at the same time, but black's knight taken from the same mine. In fact, flow, assuming the same duty as a more current than is necessary, beweather and removing of hats and leaps the barriers and rescues the a single piece of the mineral varies condenser in a B battery eliminator. cause the excess current will be abcoats will render this prize number fainting queen from this scene of greatly in sensitiveness at different Because it is not possible to regulate sorbed by the battery, nevertheless, of the week null and void, so that, for havoc. I predict checkmate in three points on its surface. It is, there- the current flow at such a low volt- by adjusting the flow to the exact all intents and purposes, so far as moves.' you are concerned, Galli-Curci did This impending crisis, which you to determine its suitability for radio battery, being of six-volt capacity, and battery life greatly increased. not sing at all, but merely emitted want to follow, play by play, at least reception. This mineral does, how- stores the current and permits a reg- The cost of operation of this new a few poorly timed shrieks.

sugar?

but was cut off.

Another Catastrophe

"This Shakespeare is pretty good,

here modern fellows try to beat him,

every time. He's deep. He's learned.

"They don't give you good pro

with Galli

"What's

the

Court. Congressman"----

process. radio grand?"

eyes.

#### Mounting and Aging

When finally exhausted the thin tube

connecting the valve to the pumps is

off. This process leaves the tube with the

The tube is now ready for mounting in its base. After the leads from the tube have been soldered to the pins the base is sealed to the bulb by means of a special compound, which is supplied from a heater.

This glow indicates to the operator in

In the final stages, in the case of dull-

emitters, the exhaustion process is some-

times hastened by means of magnesium.

A small piece of this substance, previous-

ly welded to the plate of the tube, is

marked and wondered about.

the foot.

a rough-and-ready fashion how much gas

still is left in the tubes.

The next process is that of aging the tube. This process consists simply of running the tube under its normal operating conditions in order that it may settle down and attain stability. For this purpose the tubes are put into large racks.

The final operation in the manufacturing process is that of testing. In the factory herein described every tube is tested before being sent out to insure that each and every one of them shall possess the required standard characteristics.

The Radioroehrenfabrik factory in Hamburg employs 150 persons, and the writer was informed that each tube during the entire manufacturing process passes through the hands of thirty operatives.

volt blocks are used to supply the plate

Three volt and four and a half volt

flashlight batteries require less room

than the standard C batteries and can be

placed in the set compartment if the

Two 100-foot coils of insulated wire are-

recommended as a pick-up system for the

portable receiver. One wire should be

stretched in the usual fashion as an an-

tenna. It may be run from the receiver

utilizes the highest available point.

to the top of a tree or in any fashion that

The second coil should be connected to

the ground post and unrolled on the

ground underneath the antenna. It is

neither necessary nor desirable that this

second wire be grounded. The experi

enced fan is familiar with this use of a

If more convenient, the receiver may be

grounded in the usual way-to a fence, a

rod driven into the ground or to tin cans

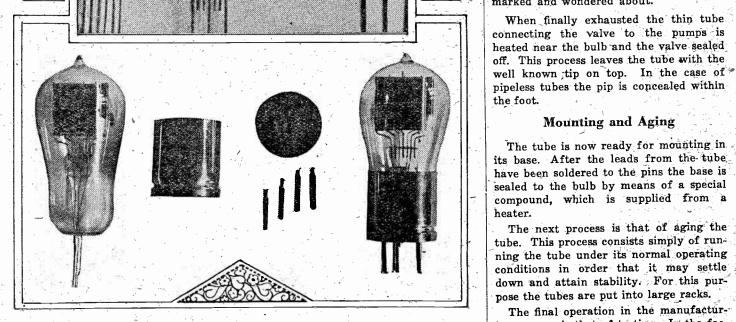
thrown into a well or lake.

space thus saved is consequential.

potentials.

counterpoise.

volatilized by increasing the power of the high-frequency currents in the heating coils till the temperature of the plate is raised sufficiently to cause this to happen. The sudden volatilization of the magnesium consumes the last remaining mi nute quantity of gas within the bulb, and in so doing the volatilized magnesium is deposited in a thin film over the inside of the glass bulb. This is the explanation of that silvery appearance of many tubes. which readers undoubtedly will have re-



#### Vacuum tubes in several stages of completion

lem is to inclose the tube to be exhausted | charged rod. This rod has an insulated within coils of wire, through which are handle to protect the user from shocks sent powerful high-frequency currents. In and is fed from an induction coil. On this way the elements are heated by in- | coming into contact with the glass tubes duced eddy currents and can be raised to | leading to the valves under exhaustion a a temperature sufficient for the purpose. the degree of vacuum by bringing into with neon or Geissler tubes.

One satisfactory solution to the prob- | contact with the glass feed tubes a highly glow occurs within them, such as is fa-From time to time the operator tests | miliar to those who have experimented

### This Season's First Portable Receiver

#### (Continued from page one)

As suggested, the actual building of , place by brackets to the condensers, are mounted the sockets, amplifying trans-

Figure 4 is a photograph of the portable set mounted and ready to carry away. Antenna and ground posts are provided on the front of the tuning panel. The use of small knobs and flat dials provides for greater room behind the panel. The weight of the set completely equipped

The portable set described is, of course, designed for operation from dry cell

Standard dry cells are the preferred A

9 Holes & Drill Anones 27 Drill & C.Sinn



(Continued from page three)

Different manufacturers adopt various means of obtaining the very degree of vacuum necessary in a thermionic tube, but in principle the methods are all very much alike.

In the plant under review bright emitters and dull emitters are dealt with in different ways, for reasons which will be explained.

To do this the gas jets are trained on a spot just below the pinch, while the thin tubing to be attached is introduced inside the foot. Within a short space of time sufficient heat is brought to bear to cause fusion between the tube and the foot, and in order to clear an air passage through this point a blast of compressed air is blown up through the thin tubing. This air blast blows a\_small hole through the semi-molten glass at the point of fusion. The constituent parts of the foot nd.

the completed article for both tip and tipless valves are illustrated in Fig. 2. The final process in the manufacture of

the foot is when the operator bends the filament, grid and plate supporting wires to the correct angles and then cuts them off to exactly the required length by means of a special machine.

In the case of bright-emitters, when the vacuum has reached a certain degree of hardness the filaments are heated to a high temperature and a high voltage is applied to the grid and plate, which are temporarily connected. The high voltage is adjusted to such a value that a powerful electronic bombardment of the grid and plate is set up, so these elements are raised in temperature to a dull red heat. This bombardment is kept up for some time till all the occluded gas within the metal of the electrodes is expelled and the vacuum of the tube arrives at the required degree of hardness.

In the case of dull-emitters, however, such a process would be harmful to the fine wire filament, so the elements of this class of tube have to be heated by other means. One method which immediately suggests itself is by inclosing the tube in some kind of furnace, but any such method also would heat up the glass bulb and cause it to collapse, so some other. method which will only affect the metallic elements of the tube must be found.

actual building of the receiver must necessarily vary in individual cases, a list of the exact electrical parts used in the receiver designed by the author will be of assistance to the enthusiast desiring to build a receiver similar to it.

List of Parts

Two Hedgehog audio-frequency 1:5 -transformers at \$3.50......\$7.00 One Bruno antenna coupler..... 3.00 One Bruno three-circuit unit..... 5.00 Two Amsco .0005 mfd. S. L. F. allocating condensers at \$4.25..... 8.50

Three Amsco Universal sockets at One Amsco "floating" socket (for

C ..... 1.50 Four Amperites for UX199 tubes at \$1 ..... 4.00-

One Polymat grid condenser with One by-pass condenser, .0025 mfd. . .40

One Baldwin unit..... 6.40

the receiver must vary somewhat in individual sets, the changes in design being formers and filament resistors. occasioned mostly by variations in carrying cases. The writer can at best designate the major points in the construction of his particular set.

The carrying case measured 15¼ inches high, 13% inches wide and 6 inches deep. A partition divides the interior into equal compartments, one reserved for the set proper and the other for the batteries and loud speaker. A Baldwin unit A small Radion horn serves as a resoing the battery compartment.

Figure 2 shows the simple tuning panel layout. The exact size of the panel will, 221/2-volt C battery, a UX 120 tube may of course, vary with the dimensions of the suitcase.

The back of panel construction may be observed in photograph, Figure 3, which also illustrates the compartment arrange- | as the Eveready 771, connected in paralment of the case. On the subpanel, 121/2 | lel, may be used.

is twenty-two pounds. tubes, preferably the UX199. (However, if the receiver is to be transported condetector tube) ..... 1.00 nance chamber. A four-inch circle, the sistently by car, arrangements can be One Electrad Royalty resistor, Type size of the bell, is cut in the panel cover- made for the lighting of six-volt tubes from the starting battery.) If there is room in the battery compartment for a be used in the output stage.

battery. However, if justified by the economy of space, three C batteries, such

Needless to say, the smallest 221/2 or 45

And thus do we in the spring divert the young man's fancy from its rhymed and fabled pursuit.

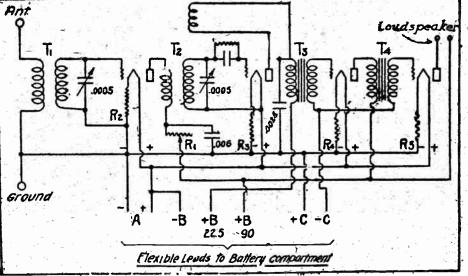


Figure 1-The wiring diagram of the four-tube portable receiver described in this

### The Right Way to Listen In; **Compendium on Radio Etiquette**

First Important Principle Is to Invite Several Guests, Selecting the Evening Having Had the Best Programs Announced

#### By Charles Roland

HERE are several ways of listening in over the radio, but there materials are also often used for is only one right way, just as there is only one right way of doing the detection of radio signals. anything. The writer will endeavor to set down a few rules Galena is generally found to be wireless eitquette

donnas is that they do not know how | into the discard when your own wife, adjust.

"I was just talking about the World

"Certainly will listen. Comes over trousers. The little Smith boy, aptly named for justice, and you take it good nagood, don't it.

Mrs. Smith's New Hat

describing the latest mode in Span- quently celebrated. John Barrymore ish hats, introduced so fetchingly by is going to read portions from Ham-Raquel Meller. Unfortunately Mrs. Smith does not have the eyes that Mlle. Meller brought with her from Juliet. Paris, but the hat is a wonderful thing if one does have wonderful isn't he?" Mr. Smith asks. "These,

"My husband was telling me only but they don't measure up nohow, do he'd flirt with me if he was a strange smart Aleck, eh? And Eugene man. But, of course, he couldn't-Ha, ha, ha!"

You laugh with Mrs. Smith, not That man certainly knew the English hilariously, but politely enough to language. These here modern probing "I'm a Motherless Child."

repeated this information eleven times.

can sing circles around him."

"I don't agree with you." tune in on something else?"

this, however. Young Nuisance has You know my cousin's daughter-in- his anatomy. måde himself at home on the floor, law, don't you? Wears those red hats The moral of this recital is quite regardless of size. the Smith heir bumps into the table of beauty, so-called, to wear." full force. The receiving set lands tunately, only a little.

Mr. Smith lectures his son vocifer- Jones family so far as the frequency of a radio room. quired a nasal quality and a surrep- set. It doesn't work right."

titious squawk. clearly, with his exciting, warm voice, knocked it over. describing a wildly exhilarating chess game between "Kid" Rubenstein and "radio ain't so good." "Knockout" Lombozzi. You grip your chair tensely as MacNamee shouts, grams." "White checks black, with every pros-

### Interesting Facts **About Properties** Of Radio Crystals

terial is used as the detector in many radio receiving sets. The most common and important crystalline ma terials used for this purpose are galena and pyrite (iron pyrites). Carborundum, silicon, sincite, molybdenite and many other crystalline

spring, and the slightest jar is likely power supply for tube filament that into the power supply from the light

to learn whether white mated black, ever, have a great many sensitive plar flow at this low voltage. The trouble with many prima or vice versa, is thrown altogether "spots" and is one of the easiest to

demands of the conversation. Galli- sation, reminding the guests hos- in general, much more sensitive than receiver being used, it is never dis- assemble this new A. C. current sup-Curci having left the microphone at pitably that the sandwiches are ready the dulled, somewhat copper-colored charged; hence there is no need of ply, and the total cost, it is esti-8:15 and your guests now being Will Young Nuisance please pass the pyrite. Not like galena, differences seated, you tune in on the station cookies, hold the cup of tea on his in place of origin have not been broadcasting an address on the World lap, and help himself to lemon and known to give characteristic differences in sensitivity. Pyrite with minute crystals scattered throughout "It seems there were a Senator and a The lemon falls on the chair, the the current of the curren sugar settles over the rug, the cup in a number of fixed crystal detec-This never was much of a world special metal of low melting tem-

It is highly important that the Nuisance, has meanwhile stolen over turedly as you, the long suffering crystal detector be kept perfectly to the receiving set and twisted the one, hear the denunciatory exclama-dials. There is a groan, a splutter tions poured on your head by Nuiand four shrieks as the kaleidescopic sance Smith, Mr. Grumble Smith, Mrs. destroy its sensitiveness. If under cross-section of radio activities hits Wordy Smith, and even your wife, any circumstances it should come in the ear. Nuisance is so well pleased who seems to have deserted into the contact with some oily substance and with the result that he repeats the enemy's camp. Whatever came of loose its sensitiveness, it should be rocess. "Mother, listen," he shouts. "Ain't Namee knows, and he tried to tell, If gelene constant

If galena crystals become badly Ah, well, the luncheon is over. The difficult to find, it may be chipped so scratched and the "sensitive spot" is radio piece de resistance soon will Mrs. Smith nods beamingly and come over the air. Shakespeare's that a new surface is exposed. This new surface will be found to have a continues her report to the hostess, birthday is being widely and elo-

Mountings for the crystals should cover a large area of the mineral. It let and Macbeth, while Jane Cowl is evident that the mounting should recites the affectionate lines given to come in contact with a sensitive point as well as the "catwhisker."

Electric Storms Cause Static Static disturbances usually are caused by electrical charges and disyesterday," Mrs. Smith laughed, "that they? This here Bernard Shaw, a charges in clouds. These cause numerous cracks in the receivers or O'Neill gives me the creeps. Too loud speaker and are most common in it's not a lady, it's only his wife. much sad stuff. Give me Shakespeare the spring and summer when electric storms frequent this territory.

hilariously, but politely enough to hanguage. These here mouth prove prove you are with her. Meanwhile a little patient tuning restores the broadcasting station, now featuring broadcasting station, now featuring maintain shence. This unexpected And besides, what do you think which is optional and need not be courtesy on her part wins your And besides, what do you think which is optional and need not be heartfelt admiration. Alas! you they're going to do about prohibition? used unless desired, and item C is g "I'm a Motherless Unild." used unless desired, and item C is "That's Robeson, is it?"'Mr. Smith quickly discover she demanded si- Any chance of amending the amend- the Kodel filtering choke, which froms "That's Robeson, is it?" Mr. Smith quickly discover she demanded si-inquires, after the announcer has lence only to get the floor for herself. ment? It's bad one way and worse out all irregularities before the cur-"It was so strange," she reports to the other. I can't make any sense rent passes on to the radio receiver. broadcast transmission was reported your wife. "So unlike him. And yet out of it."

"I don't know. Rosamond Johnson was heartbreaking. I did what I thus far, you take a fierce delight in not necessary, accessories. Inasmuch could to make them see the light, ruining it to the last bitter drop. as the A battery acts only as a regubut you know how these things are. You agree with Mr. Smith, persistent- lator and the charger operates only Schenectady. Calcolim, signer of the "Well, anyway, I never did care Why, my cousin's daughter-in-law ly, flatter Mrs. Wordy Smith ma- while the set is in operation the bat- cable, reported reception at 7:15

Putting the Set Together Again in silence rather than betray them to drawing room, dining room or bar- out transformer hum. While you pick up the pieces, the this self-same Smith family, which room feel they violate no social laws Current leaving the light socket is arctic Circle.

> bothers to meet the exigencies of the as a fully charged battery. cargo as one may find.

### How to Make an Automatic A.C. **Filament Power Supply Unit**

A small piece of crystalline ma- This Device Is Said to Give Constant Supply to the Receiver Without Hum; May Be Assembled in the Home at Low Cost

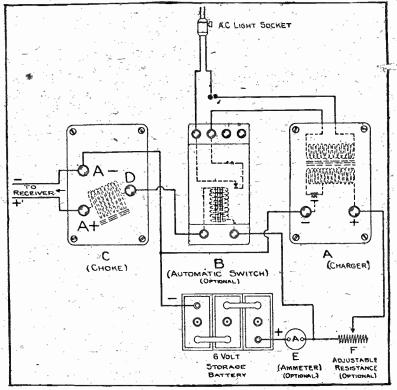
#### By Perry V. Ogden

THE demand that current for the operation of any radio receiver be taken direct from the light socket without depending upon trickle chargers to keep A batteries charged is universal whergoverning the right way to listen in, issuing a sort of compendium on the most sensitive. However, this ever radio is known. Many power units using trickle chargers have been mineral, in spite of its sensitiveness, offered to radio set owners and builders, but the fan-demands that curdoes not maintain its adjustment for rent be sent directly from the light socket to the receiver. Trickle home, selecting an evening in which the very best programs are anlargely due to the fact that the "cat- operation is continuous whenever the set is not in operation. the ex-

> to throw it off the sensitive spot. is in no way a trickle charger and socket. This facilitates leaving the Galena is a very common ore and gives perfect reception without the light socket permanently connected, fore, necessary to test each fragment age as 6 volts with a condenser, the current necessary, current is saved

the rectified current properly ad- hour the set is operated. to arrange their songs to meet the not Mrs. Smith, takes up the conver- Silver or nickel colored pyrite is, justed to the requirements of the Only a screw driver is needed to

power supply is between one-half and Once the battery is charged and three-quarters of a cent for every



#### Necessary Apparatus

wife goes to the kitchen for the eats might be known as the Brown or by disregarding the social obligations rectified by the A. C. bulb, but still has irregularities which would pro- General Joyce to Speak on ously, and Mrs. Wordy Smith advises of this type of listener is concerned. Just why this should be is not yet duce objectionable noises going diyou on the technique of putting a And still you are not relieved of determined. The fact has been es- rectly into the radio receiver. The Americanization Day at WEAF

is turned off and no current comes ance of Americanization Day.

leaving this new automatic A. C. mated, will be less than \$25. The filament supply on the line, because life of this new device, however, as the current flows direct from the has been pointed out, is almost forlight socket to the tube filament and ever and the operating cost is less the battery always remains the same. than a trickle charger or charging with a battery charger, because current is consumed only when the set In the illustration, units A B and C is in operation, and it is not necesare simply hooked up with your pres- sary to store current at any timesent six-volt A storage battery as in- Similar devices, already assembled. dicated. A is a standard 21/2-ampere will undoubtedly be offered to the Curci and Graham MacNamee and Crescent or Eclipse charger; item B radio public this summer, but at

In Australia, 11,498 Miles What is believed to be a record An animeter (E) and regulating by cable letter to the General Elecimes. "Yes. He's wonderful, isn't he?" he wouldn't marry the girl. It really thus for you take a form delight in the for you take a form delight in ern Australia. 11,498 miles from "Well, anyway, i never and care with a part of a never and care with a part young Nuisance on tery neither charges nor discharges. o'clock the morning of April 13 of a true in on something else?" threatened to divorce her husband, the head with a palm that itches to the battery, therefore, is fifteen-minute program of ZXAF, it There, is no necessity for doing but that didn't make any difference. administer a panning elsewhere on almost everlasting. Any kind of a broadcast at 6:15 o'clock the evening battery with three cells may be used, of April 12 on 32.79 meters wave length. The time difference between playing with Baby, the French poodle. and earrings-smart effect although, immoral. If you want to hear a This power supply may be built Schenectady and Perth is thirteen In the pursuit of Baby by Nuisance, heaven knows, it's not for her type good radio program betake your around any bulb or electrolytic-type hours east and eleven hours west. self to the woods and shut out charger. However, the new Kodel, The shortest path from Schenectady Abruptly you turn off the radio for all neighbors, friends, relations and Crescent or Eclipse type bulb charg- to Perth would carry the signal on the floor, hurting Nuisance, unfor- the night. John Barrymore and Jane acquaintances. -Persons who have ers have been designed especially for through the Arctic Circle. If the Cowl notwithstanding, you will suffer the most elegant manners in the this type of work and operate with- signal followed the path of darkness the soute would be through the Ant-

set together. By adopting opposite the tragedy of the evening. The tablished, however, that etiquette filtering choke levels all irregulari Americanization Day will be apmeasures you do, luckily, get the set heaviest blow comes when Mr. Smith not having been authoritatively ties until the current is a smooth. proprietily observed by WEAF at 7 working again, although it has ac- tells you, "I don't think much of your established in this field, no one even flow, producing the same results o'clock, Eastern daylight saving time. Tuesday, when General Walter Irving It would work right, you remind occasion. If you needs must invite If desired, the automatic series Joyce, the founder of the National Despite these handicaps, Graham him, if his duplicate personality, some one to a radio evening invite switch designed for this power sup- Americanization Committee - of the MacNamee comes across the ether young Nuisance, would not have your enemies, not your friends, and, ply may be used. This switch auto- Veterans of Foreign Wars of the preferably, invite the dumbest of the matically turns on the power supply United States, is heard in a short ad "But, anyway," says Mr. Smith, enemies. Perhaps you'll have a as soon as the set is turned on. All dress. It will be remembered by the chance to hear the ether unload its operations are automatic, directly radio audience of WEAF that Gencargo of music, oratory and jazz, from the switch and on the set. The eral Joyce spoke through WEAF last which, after all, is as enjoyable a instant the set is turned off the power year on the occasion of the observNEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, / APRIL 25, 1926

# will be replaced by your dealer at any time if it has not given satisfactory results." hat is the Cleartron Guarantee. It leans exactly what it says. The only valification is that the tube must light. TYPE CTX 201 BF \$2:50

() CLEARTRON ()

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England's Long-Distance R. F. Tube

Compare a Cleartron R. F. Tube with the tubes you are using in the radio frequency stages of your set.

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GREENHUTS "Ine Radio Hub of New York" Selling Radio -since 1919 Ropers Peet **6 Warren Street** 0 LATEST PARAGON FOUR A New Circuit ! Paragon engineers have discov-red a new circuit that gives clear, strong reception without radia-tion. Licensed under Armstrong patents. Range unlimited; employs Paradyne circuit; good volume and distance; NOW single dial control, Com-pact. Will tune from 185 14.99 to 595 meters. Rog. \$85. **NEW PARAGON TWO** tube regenerative set NOW good volume; single 5.99 control. Reg. \$27.50...5.99

EROSLEY SETS

\$60 Special Super-Trirdyn \$21.99 345 Reg. Super Trirdyn . 16.50 3.75 \$9.75. "P U P"..... Erfectore Speaker with adj, unit 2.49 2.99 eg. \$15.00 S Reg. \$25.00 12.99 Think of it-a 5 tube nationally advertised T.R.F. receiver with an inexcelled record for performancebeautiful in appearance and with a double guarantee.



### **Amateurs** Invite **Radio Public to Share Their Joys** That the American radio amateur

has extended the hand of welcome to his cousin, the broadcast listener-experimenter, and is undertaking to how him how easy it is to engage two-way telegraphic communication with the far distant places of the earth, is shown in a statement just issued by Hiram Percy Maxim, president of the American Radio Relay League, the national association of amateurs and experimenters.

Commenting upon the tribute paid he American amateur by Judge Steohen B. Davis, of the Department of commerce, recently, Mr. Maxim said: "Judge Davis's very splendid tribte comes at a time when the amateur is more than ever in the public eye. At this moment three separate Arctic expeditions are in the Far North depending almost entirely upon amateur contact via short-wave radio elegraphy for their communication with civilization. The success of two successive MacMillan expeditions with amateur communication has con vinced explorers generally that no other type of communication is so certain or so effective.

is not so. No class of people is more words a complete amplifier is housed contain two double grid units. This service will be at an end. representative of your true Ameri- inside a vacuum tube. retired manufacturer; the other a quency amplificaton. nechanic, but class is no barrier. and again.

"Pernaps the explanation of the cast receivers.

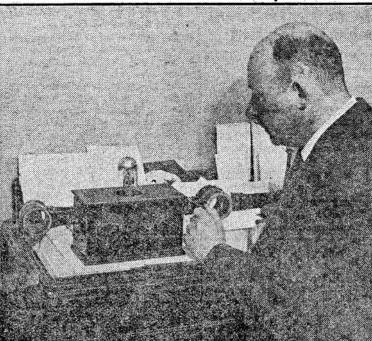
published in the April issue of "QST" \$25, but capable of effecting communication over many hundreds of miles. This was written primarily Simultaneous Musicale To to demonstrate that such a set required no extraordinary skill in conhad no idea that it would bring the April 27, at 8 p. m. huge response it did. A manufac- At that time the organ, playing mission have been granted in foreign should rest in one of the executive

tion of being able to effect two-way classical music. ier the heading of local work.

than that made recently by one of chestra. nightly communication? Never!'-

private two-way telegraphic com- vice versa, joined in harmony. munication is to-day quietly working owship."

German Radio Engineer Visits Hoover Discusses The U.S. to Demonstrate Tube



David L. Loewe, of Berlin, demonstrating a receiver employing his new vacuum tube

"The average citizen, hearing of the Loewe, has just arrived in the United continuous load and .5 watt inter- incursion by the others and any stamportant tasks which the amateur States with a phenominal radio tube mittingly. Mr. Loewe stated only fion may be attacked by its neighbor has undertaken, no doubt visualizes which is really three tubes and the after this type of resistance had If stations proceed to select their a class of clannish, serious workers other apparatus necessary for an been developed was it possible to own wave lengths and choose their wrapped up in their hobby to the ex- audio or radio frequency amplifier build the new multi-element tube. own time, considering only their own clusion of outside interests, but this contained within a vacuum. In other The radio frequency amplifier tubes selfish advantage; effective public

gives a low internal ohmic resistance can; no organization is more demo- These tubes are made in two types. which makes possible the use of re- the needed authority. The White bill cratic in spirit and operation than One contains a detector, a stage of sistance coupled radio frequency am-the amateur's organization, the Amer-audio amplification and a stage of plification. Furthermore, due to the passed the House, gives the power. ican Radio Relay League. At our power amplification. Resistance fact that the elements are located There have been suggestions that this amateur conventions it is not an un- coupled audio amplification is em- inside the tube, the connecting wires authority should be administered encommon sight to see the eighteen- ployed. The resistance and necessary are as short as possible, which re- tirely outside of the Department of year-old schoolboy in heated argu- condensers are contained inside the duces capacity effect to a minimum, Commerce by a special commission ment with a fifty-year-old business tube. All that is necessary for a The mica coupling condensers are set up for the purpose. man. Two men at the same conven-tion will hail each other with the fa-tube are the tuning elements for such has been so treated that it will have tions which must be performed by miliarity of old friends-which in- a circuit. The other tube is termed no effect on the vacuum of the tube. some Government agency. The first deed they are although they may a "radio frequency amplifer." This The resistance coupled amplifier is the determination of who may never have seen each other before. Latter tube contains the necessary tube is desired to amplify include the broadcast. This is a discretionary or never have seen each other before. latter tube contains the necessary tube is designed to amplify signals One of them may be a wealthy and elements for two stages of radio fre-retired manufacturari the schere at a stage of radio fre-Mr. Loewe claims that the tubes interesting feature is that the tubes

Such incidents are duplicated time are non-microphonic, absolutely may be connected to any detector of the thouse the determination are non-microphonic, absolutely may be connected to any detector noiseless and will last indefinitely. circuit allowing the amplification of be in the hands of any one person but The underlying basic element in signals to a great degree. remendous growth in amateur two- the new multiple tube is the Loewe The first tube mentioned, the deway communication lately is that high vacuum resistances. These con- tector and audio frequency amplifier, different sections of the United people are learning that there is sist of rods coated with a deposit of will amplify 1,500 times on frequen- States, wholly independent of the nothing difficult about the game; no fine metallic compound film, which cies between 50 and 10,000 cycles.

than that already possessed by the element is enclosed in the glass part this country is to attempt to induce the approval of the Senate, is proaverage home-constructor of broad- of the tube which is highly evacu- some American tube manufacturer to vided for in the White bill. This ated. "In this connection we recently The resistance is said to be free these multiple tubes. At the present ous session and will imply but little from capacity and will therefore not time the only manufacturer of these expense.

description of a low-power amateur retain any electrical charge. It is tubes is the Loewe-Audione Company transmitter, costing approximately also said that it will not vary with of Berlin.

struction or operation. We expected synchronized air musicale ever broad inventions of Professor L. A. Hazel the listeners and of the industry. amateur radio communication, but we cast will come from WRNY Tuesday, tine relating to the neutrodyne These last two functions are essen-

turer who has undertaken to supply parts for this set reports that he has been literally overwhelmed by orders. The that time the organ, playing from the West Side Unitarian Church; 550 Cathedral Parkway, and Orlando's Combardia Countries, according to a statement in the annual report of the Hazeltine Corporation. "The radio public is just beginning Orchestra, playing from the palm The report further states that in able additional expense. Moreover, to realize what has long been the room of the Hotel Roosevelt, Madison continuation of its policy to secure boards and commissions, by their dikeynote of amateur radio's popular- Avenue and Forty-fifth Street, will world-wide protection for neutrodyne vided authority have always been a

the earth, and this on apparatus of attempted, and every precaution will icas, Europe, Asia, Africa and Aus- agencies whose administrative funcone's own construction. To-day the be taken by the engineers of WRNY tralasia. In addition to the inven- tions are outside the control of the amateur can truthfully say that there to have a perfect balance of volume tions of Professor Hazeltine, the re- President, is I believe, thoroughly

cate. The antipodes have been linked put" of the WRNY speech amplifiers patent in Great Britain and corre- vice in development of the radio art innumerable times, and transcontin must be fed by direct line to the sponding patents in the United States and developing the method of control mental communication now comes un- organist at the church, who will and Canada. These patents were ac- and regulation in a new field. So far monitor both his own program and quired directly from the inventor, as the Department of Commerce is "With international communication also that of the Orlando Orchestra. John Scott Taggart. matter of nightly occurrence, ama- Another direct line to the palm The report also discloses that the ties and conflicts in the situation are teur radio stands to-day as one of the room feeds the amplifier output of Hazelting. Corporation owns 80 per such that we will be well satisfied to most powerful forces working for the organ to the orchestra director, cent of the capital stock of the La- see radio administered by any other world peace. In this connection, who, by wearing headphones, moni- tour Corporation. The latter in turn department which can probably un-

our menibers, a retired Army officer. Herbert Soman, conductor of Or- Professor Marius C. A. Latour; of 'Do you think, he said, 'that any poli- lando's Concert Orchestra, and Rock France, so far as the United States tician can stampede me into declar- Ferriss, organist, will wear head and Cuba are concerned., These in- The artist to be heard in WEAF's ing war on my friends in other coun- phones that will enable them to play ventions are covered by sixteen is salon concert on Wednesday at 7:30

"As the telephone, the railroad and will play are arranged for short solos. priority dates as far back as 1915." | standing contralto, who was formerly the automobile have brought some At this time, if Mr. Ferriss's organ An analysis of the foreign patents a member of the WEAF Grand Opera national understanding that to-day is thundering forth in a triumphal covering the neutrodyne inventions Company and is now a member of the makes another civil war a virtual im- outburst instantly Mr. Soman's or- shows that five each have issued in Chicago Civic Opera Company but possibility in these United States, so chestra will pick up the music and Great Britain, Italy and Mexico; four singing at WEAF in the tabloid

international understanding and fel- All shielding in radio receivers in Australia, Brazil and Czechoale- promise and has occupied major roles should be grounded.

# Situation Created **By Court Decision**

The following statement relative to he wave length piracy case in which, the United States government sued the Zenith Radio Corporation of Chicago for not complying with the stipulations made in its license was issued by Secretary Hoover upon his eturn to Washington last Tuesday:

"I have now (upon my return to Washington) had an opportunity to discuss the situation created in radio by the decision of Judge Wilkerson n the Zenith radio case.

"The court has refused to impose a penalty upon a concern which adnittedly was operating at a time and upon a wave length not authorized under its license. While the holding is in conflict with an earlier ruling n the District of Columbia, it is apparent that under the present law of 1912, as now construed, no one has authority to protect the listening public against utter chaos in the service upon which it has come to rely. The Chicago decision denies the authority of the Secretary of Commerce to assign either wave lengths or time of operation. It does not affect broadcasting alone, but is David Loewe, of Berlin, brother of the temperature. The resistance equally applicable to the amateurs, the famous scientist, Dr. Sigmund units will withstand .1 watt under and any of these services are open to

"Congress has full power to confer

length as high as desired. Another wave lengths is the use of public should be placed in the hands of a Commission, representative of the demand for skill or knowledge other serve as the resisting element. This The purpose of Mr. Loewe's visit to be appointed by the President with Department. Such a Commission. to take out a license to manufacture board will not need to be in continu-

"The second important function lies in the administration of the decisions of this commission and the minimizing of interference 'from Be Broadcast From WRNY What is believed to be the first Granted in Foreign Countries the furthering of devel-opment of the art in the interest of method of radio reception and trans- tially administrative, and in my view ity-that is, the tremendous fascina- be heard in a half hour program of apparatus, components and auxiliaries failure in administration; they are more than 250 applications for let- desirable for discretionary or judiconversations with other individuals This will be the first time that ters patent have been filed in foreign cial determinations. The tendency to scattered the length and breadth of air synchronization has ever been countries located in both of the Amer- create in the government independent concerned the extraordinary difficul-

#### **Devora Nadworney to Sing**

In WEAF's Salon Concert Zealand and South Africa; three in permission of the Chicago Civic Opera in many of the outstanding operas.







The first operation in connection with the bulbs, as received from the glassblower, is to wash them in water to free them from accumulated dust and dirt. The next operation is to reduce or extend the opening into which the foot is inserted till it is of the correct size. This could, of course, be done by the glassblower at the time of manufacture, but to insure that every bulb shall be blown to just the exact size would prove too expensive a matter, and the process of correcting irregularly shaped bulbs is a simple one.

rođ. Meanwhile the tubing for the foot is being cut up into lengths about two and one-half inches long. These lengths are then mounted in the machine pictured above, which slowly rotates the tube while the end projects into the concentrated flame of the six gas jets. When the correct temperature has been reached the operator then bells out the end to the correct size for entering the bulb opening by holding against it a curved metal rod. The process is similar to metal turning in a lathe, only instead of the work being cut to size and shape it is pressed while in a semi-molten state. The next step is the insertion and sealing into the foot of the connecting wires and, in the case of tipless tubes, the thin glass tube used for sealing the completed tube on the pumps.

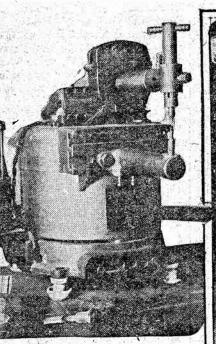
s no earthly distance over which it in the different instruments. port states, "Your company is also bad. I believe the staff of the Des not possible for him to communi- To accomplish this feat the "out- the owner of the John Scott Taggart partment has performed a great ser-

43 of Hazeltine's Patents

there is no more significant statement tors the organ and directs his or- owns "the entire right, title and in- dertake its regulation." terest in and to the inventions of tries-friends with whom I hold the same notes at the same time. sued patents and seventy applica- o'clock Eastern daylight saving time Songs of the classical numbers they tions, some of which have effective will be Devora Nadworney, an outeach in Belgium, Canada, France, New grand opera productions by special oward world peace by bringing about Shielding Should Be Grounded Spain, two in Argentina and one each Company. She is an artist of great vakia.

# How Vacuum Tubes Are Manufactured in a German Radio Factory

Each Valve Goes Through More Than a Score of Hands Before It Is Completed



LTHOUGH the general principles of thermionic tube manufacture are much the same everywhere, the individual methods and processes of the different makers vary considerably. It is thought, therefore, that the writer's tour of a foreign factory may be of interest to American readers.

The factory visited was that of the Radioroehrenfabrik G. m. b. H., of Hamburg, Germany, the parent firm of which has been established for many years in the manufacture of X-ray tubes and associated apparatus. They are at present engaged in the production of seven different types of radio receiving tubes for all purposes, and also of transmitting tubes of various powers up to 500 watts.

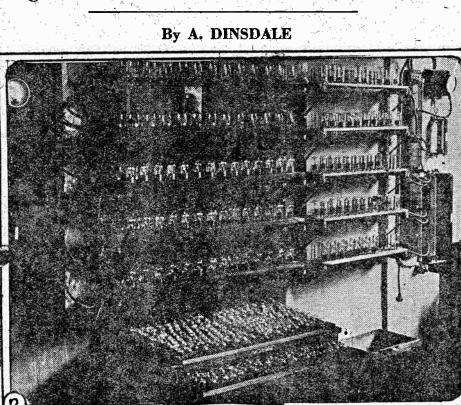
In all cases, but particularly in the case of the transmitting tubes, the writer was struck by the extraordinary neatness,

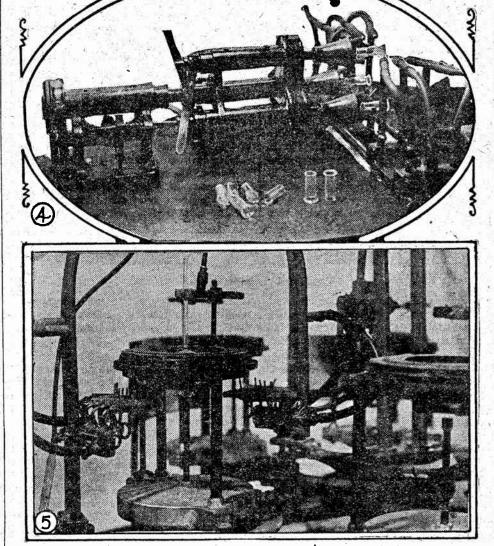
strength and regularity of construction. In the case of receiving tubes, these are all of the tipless variety, with the sole exception of the loud speaker power tube, thus making them particularly attractive in appearance and less liable to damage. The necessary glassware is supplied to the factory in three forms-the bulbs, blown approximately to required size and shape; long lengths of tubing about five-eighths of an inch in diameter, for making the "foot," and lengths of quarter-inch tubing

for sealing the bulbs to the pumps. Lead glass is used throughout and it is annealed after each heat process.

#### Preparing the Glassware

The bulb is mounted in a kind of lathe, and while the foot opening is being heated in a gas flame the bulb is slowly rotated, and the operator either distends or coneither the inside or outside with a metal





These pictures show the apparatus used in the manufacture of vacuum tubes. 1-The electric welding machine used for welding the grids and plates to their supports. 2-The aging racks where the tubes are run under normal operating conditions for stabilizing purposes. 3-The apparatus which supplies the compound for sealing the base to the tube. 4-The machine for shaping the fout. 5-The device used for fitting the bulb to the foot.

table, about eight feet in diameter, round tracts the opening by pressing against short distance and then stops for about a number of turns has been wound. minute or less. These movements are under the control of the operator in charge.

Around the edge of the machine are regularly spaced holders, or jigs, which accommodate the glass tubes and connecting wires. As they regularly revolve from one series of fixed gas jets to another the tubes become heated, shaped and finally pinched into the completed foot, with the wires all properly arranged and sealed in. In the case of tipless valves, the attachment of the exhausting tube is the final process performed by this machine.\_

#### **Making Grids and Plates**

The plates for the various tubes made in this German factory are either cylindrical or rectangular, and in each case they are stamped from the sheet nickel and rolled to shape.

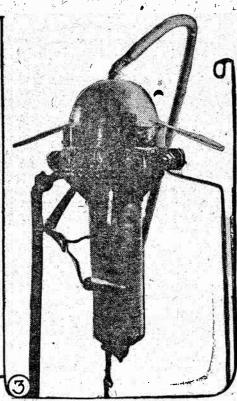
The grids also are either cylindrical or rectangular, but in each case the method | ing the foot pedal the top electrode comes

The machine used for this purpose is | of winding is the same. The requisite extremely interesting. It is a circular number of turns is wound upon a former, cylindrical or rectangular, as the case may which sit three operators. Part of the be, the winding machine being arrranged table revolves at regular intervals for a to stop automatically when the required

> The spacing is arranged for by feeding the nickel wire from the bobbin through a slot in a block, which moves along a threaded revolving rod, the threads of which are arranged to give the requisite spacing.

Before the wire is cut and the tension relieved the strengthening rib or ribs are laid along the winding and welded to each turn separately. The former, by a special arrangement, is then slightly contracted in diameter and the completed grid slipped off.

At the assembly benches the filaments and completed grids and plates are then welded to their supports by means of the electric welding machine shown in Fig. 4. This machine is foot operated, so that the operator may have both hands free to arrange the parts in their proper position on the lower welding electrode. On press-



down and the joint is instantly welded.

**Dull-Emitter Filaments** The method of introducing the filament into dull-emitter tubes is unusually simple and interesting. The dull-emitters made by the Radioroehrenfabrik have grids and plates of the cylindrical type, and these two elements are fitted to the foot first; the introduction of the filament is the last operation. Readers will appreciate the necessity for this and for the great care and special methods required in the handling of the flament when it is remembered that dull-emitter filament wire is of the order of .015 millimeter thick.

The end of this extremely fragile wire is kept threaded through a thin steel tube, in appearance more like an oversize darning needle. The tube is introduced into the space inclosed by the grid, and by means of it the projecting end of filament wire is held in contact with the left-hand filament support. The operator then depresses the foot pedal and that end of the filament is welded to its support.

The steel tube is then withdrawn, sliding along the filament wire until the latter can be brought into contact with the right-hand support and welded. The wire is then cut off close to the support, but in such a manner as to leave a short length projecting ready for the next operation.

#### Welding the Foot

We now come to the last operation in connection with the glasswork-that of introducing the foot, complete with filament, grid and plate, into the bulb and welding the two together.

The foot is slipped over the central iron rod and the bulb placed over it and held there in a jig which grips the exhausting tube. In the tipless type of tube the central iron rod carrying the foot takes the form of a tube, into which the glass exhausting tube is inserted to protect it from the heat, while the bulb is held by a different form of jig.

When the parts are in position the table is moved round so that gas jets play on the bulb at the point where fusion is to take place. There are eight such jigs on this machine, and as they are loaded up with tubes the table rotates them from one set of gas jets to another until by the time they have nearly completed one revolution the glass has been sufficiently heated to cause fusion between the belled out portion of the foot and the encircling lower edge of the bulb.

While still in a semi-molten state an operator pulls away the surplus glass with a thin iron rod, and thus the joint is left clean and free from jagged edges.

#### The Exhausting Process

The completed tubes are now ready for exhaustion and are passed on to the pumping room. Here the thin exhausting tubes are sealed on to the pump mains and pumping is commenced.

(Continued on page four)

#### ा छ ः म

NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, APRIL 25, 1926

**Dance Orchestras fo** 

2:55 p. in.—Play by play reports, Braves
8:30 p. m.—Krazy Kat Kiddies' Club.
6:30 p. m.—Krazy Kat Kiddies' Club.
8: m.—Kennore Five Thousand Quartet.
8: m.—Kennore Five Thousand Quartet.
9: m.—Metropolitan Theater studio concert.
9 p. m.—Metropolitan Grand Orchestra.
10 p. m.—The Associated Press in Formation of the theorem of theorem of the theorem of the theorem of the theorem of the theorem of

San

World Radio History



1090k-WHAR-ATLANTIC CITY-275m

1000k-WPG-ATLANTIC CITY-300m

) p. m.—Vocal recital. 1:15 p. m.—Tall Cedars of Lebanon

790k-WHAZ-TROY, N. Y.-380m
9 p. m.-Concert by Students' Band.
9:30 p. m.-Address, Professor F. Abbul.
9:45 p. m.-R. P. I. Glee Club.
10 p. m.-Symphony Orchestra.
11 p. m.-Campus Serenaders.

p. m.—Campus Serenaders,
 790k.—WGY.—SCHENECTADY.—380m
 12:30 p. m.—Reports,
 p. m.—Asia Orchestra,
 2:30 p. m.—Music; "Cooking Lesson";
 Cornell talk.
 p. m.—Stock reports; news,
 30 p. m.—Dinner program,
 30 p. m.—Baseball scores,
 35 p. m.—Mary Krause; WGY Orchestra,
 35 p. m.—WGY agricultural program,
 p. m.—WGY orchestra,

p. m.-WGY agricultural program.
 p. m.-WGY Orchestra.
 1130k-WMAK-BUFFALO-266m
 15 p. m.-Daily uews.
 30 to S p. m.-Murray Whiteman's Sere produces.

naders. to 9 p. m.—S. Kinney and friends.to 11 p. m.—Musical program. 940k—WGR—BUFFALO—319m

940k-WOR-BUFFALO-SIJM 6:30 p. m.-Dinner music. 8 p. m.-Buffalo State Normal Schoo musical organizations. 9 p. m.-Musical program. 10 p. m.-Temple Beth Zion choir. 11 p. m.-1 a. m.-Vincent Lopez's Orches

tra. 1080k---WHAM--ROCHESTER-278m

980k—WJAR—PROVIDENCE—306n

105 p. m.—Musical program. 145 p. m.—Musical program. p. m.—A. and P. Gypsies. 0 p. m.—Grand Opera Hour. 630k-WTIC—HARTR'ORD—476m

6:50 p. m.—The children's entertaine) 6:50 p. m.—Hub Trio. 8:15 p. m.—Solos, George Harvey. 8:30 p. m.—Capitol Theater Orchestra. 8:45 p. m.—"Running Your Farm Profit."

Profit." Profit." p. m.—Selections from opera, "Patience." high school students. 9:30 p. m.—Emil Heinberger's Dance Or-chestra. 10 p. m.—Grand Opera Hour. 11 p. m.—Travelers Symphonic Ensemble. 10:30 a. m.—WNAC-BOSTON—280m 10:30 m. m.—Woman's Club talker. music.

10:30 a. m .--- Women's Club talks; music; news. 12:15 p.m.—Organ recital. 1 p.m.—Luncheon concert. 2:55 p. in.—Play by play reports, Braves

concert. 9 p. m.—Metropolitan Grand Orchestra. 10 p. m.—''The Associated Press in For-eign Fielda,'' F. E. Williamson. 11:30 p. m.—Orran recital. 860k.—WEKI.—BOSTON—349m

m.—Events of the day. p. m.—Bert Arnold's Orchestra. m.—Rainbow Ramblers.

m.—Ralnbow Ramblers.
p. m.—Ralnbow Ramblers.
p. m.—Ralnbow Ramblers.
p. m.—Lost and found.
p. m.—Big Brother Club.
p. m.—Big Brother Club.
p. m.—Poetic Walker.
p. m.—Poetic Walker.
p. m.—Joe Rinee's Orchestra.
O. p. m.—E. B. Rideout, "meteorolog
900k—WBZ\_SPRINCFIELD—333m
p. m.—Lenöx Ensemble.
p. m.—Inheartical Gossip," S

p. m.—Capitol Theater Orchestra.

9 p. m.—Organ recital.
9 p. m.—First of a series of playlets.
9:30 p. m.—Whiting and Davis Compa

anniversary. 10:30 p. m.—Leo Reisman's Orchestra. 1120k—WTAG—WORCESTER—268m

1120K-WTAG-WORLESTER-200m 10:30 a. m.-Musical selections; talk. 12:05-2 p. m.-Luncheon music. 7 p. m.-Science talk. 7:10 p. m.-"Twilight Scouts." 7:45-p. m.-Official Boy Scout. 8:30-9 p. m.-Program to be announced. 9:10 p. m.-"Robin Hoood" hour of music. 10:11 m. m.-Crand. onera

9-10 p. m.—'Robin Hoood' hour of mus. 10-11 p. m.—Grand opera. 640k.—WRC.—WASHINGTON.—469m 12 noon—''Fifty Farm Flashes.'' 12:30 p. m.—Organ recital. 1 p. m.—Raleigh Orchestra. 5:45 p. m.—'Things Talked About.'' 640k.—WCAP.—WASHINGTON.—469m 7.450

640k-WCAP-WASHINGTON-469m 145 a.m.-Tower health exercises. 140 11 p.m.-Program from studio; pr gram from WEAF. 1220-WBAL BALTIMORE-246m p.m.-WBAL Sandman Circle. 130-7:30 p.m.-Dinner orchestra. 130 to 8 p.m.-Organ recital. to 9 p.m.-Musical program by artist to 9:10 p.m.-Musical program. 10 to 10 p.m.-Musical program.

to 10 p. m.—Musical program. 550k—WCAE—PITTSBURGH—461m

TO-DAY

WINCA 341 Twin Oaks

MONDAY, APRIL 26

361 Janssen's

Astor Norman Strutt's V. Lopez Capitol WGY Orchestra Heimberger's Arcadia Sofferman's Vanity Leroy.Smith Paul Specht's Leo Reisman's H. Leonard's/ Hofbrau Ben Bernie's V. Lopez Adelphia Berger's

Bergere's Fifth Avenue Hiawatha Dance music Jack Denny's

Time Wave P. M. Station length Orchestra

30 p. m.—Dinner concert 30 p. m.—Sunshine Girl. p. m.—Studio concerts,

9:00 10:45

8:00 8:15 8:15 8:30 9:00 9:30 10:00 10:00 10:30 10:30 10:45 10:45 10:45

11:00 11:00 11:15 11:15 11:15 11:30 11:30

19 p. m.—Grand opera. 11:05 p. m.—Dance orchestra.

WHN

WJZ 455 WODA 224 WNYC 526 WTIC 476 WLIT 395 WRIZ 258 WOKO 233 WHN 361 WMSG 213 WEZ 900 WJZ 455 WOR 405 WEAF 492 WGR 319 WOA 405 WGR 405 WGR 405 WGR 405 WGR 405 WGR 405 WGR 405

15 a. m.—Medical talk. 25 a. m.—Violin solos, Beatrcie Torgan. 30 a. m.—WTIC's Housewives' Forum. 05 p. m.—Travelers Orchestra. 0 p. m.—The children's entertainer.

p. m.—Eastman Theater org m.—Eastman Theater organ.

band concert and frolic. :15 p. m.-Eddie McKnight's Dance

p. m.—Seaside Trio.
30 p. m.—Book review.
45 p. m.—Industrial talk.
p. m.—Seaside Trio.
1 p. m.—Bergere Dance Orchestra.

1410k-WMSG-NEW YORK-213m

-Dance Orchestra

#### **TO-DAY**

610k-WEAF-NEW YORK-492m p. m.-Sunday Radio Services; addr by the Rev. Avery Shaw; musical p

660k-WJZ-NEW YORK-455m 6608-WJZ-NEW YORA-455m a. m.-Children's Hour. 230 p. m.-St. Thomas's Episcopal Church. 230 p. m.-Sunday Symphonic Society. 30 p. m.-Unday Radio Forum. 30 p. m.-Viado Kolitsch's Orchestra. 55 p. m.-St. George's Vesper Service. p. m.-Pennsylvania Concert Orchestra. Teller."

 D p. m.—Commodore Concert Orchestra.
 10 p. m.—Godfrey Ludlow, violinist; L lita Cabrera Gainsborg, planist. 950k-WGBS-NEW YORK-\$16m

8:30 p. m.-Arrowhead Tea Dance Orchestra. 9:80. p. m.—Play: Dramatic biography of Ludwig von Beethoven, with symphonic orchestra; music of the master, with professional cast, including Maida Crai-

gen. 10:30 p.m.—Tosti and Denza; melodies; Vincenzo Paladino, mandolin; Maria Luna, piano; Sisto Luna, voice.

830k-WHN-NEW YORK-361m 11:30 a. m.-12:30 p. m.-Calvary morning

service.
12:30 p. m.—Loew's organ recital.
2-3 p. m.—Christian Endeavor program.
3-4:30 p. m.—Radio Bible Class.
5-5:30 p. m.—Koseland Dance Orchestra.
7:30-9:45 p. m.—Calvary evening service.
10:45 p. m.—Janssen's Orchestra.
12 midnight—Sophie Tucker's Playground.

12 midnight—Sophie Tucker's Playground.
 880k—WMCA—NEW YORK—341m
 11 a. m.—Christian Science service.
 2:50 p. m.—News items.
 3 p. m.—Minot Simons.
 3:30 p. m.—Deald Flamm's Frolickers.
 5 p. m.—News items.
 5:30 p. m.—Halpert & Fryxell Buck-A-Neers.

5:30 p. m.—Raipert & Fryach Bata in Neers.
6 p. m.—Romer's Homers.
7 p. m.—Ernie Golden's Orchestra.
7 p. m.—California Rambiers.
8 p. m.—California Rambiers.
9 p. m.—Twin Oaks Orchestra.
9:80 p. m.—Boxing Writers' Association banquet; Mayor Walker; Boxing Commissions; Broadway theatrical and cabaret stars. 1250k-WHAP-NEW YORK-240m 0 n. m. Concert of sacred music; c. music: choir

2:30 p. m.—Concert of sacred music; cnd and soloists. 3:45 p. m.—Mary Pinney, organ recital.

3:45 p. m.—Mary Pinney, organ recitat, 1000k—WFBH—NEW YORK—273m
5 p. m.—Savoy Ballroom Orchestra.
5:30 p. m.—Franklin Four.
6:30 p. m.—Ferfection Pete's Pals.
7 p. m.—World Masonic news. 7 p. m.—World Masonic 7:15 p. m.—Melody Aces.

10 p. m.—Meiody Aces, 1160k.—WRNY—NEW YORK.—258m to 2 a. m.—DX Hound Hour, 50 p. m.—Bar Mitzvah—Jewish Con-dirmation, Rabbi Joseph Hoffman and

choir. 8:30 p. m.—Odierno Quartet. 4 p. m.—Christian Reisner's Hour of Religion. 5 p. m.—Corradetti Verdi Hour.

1040k-WLWL-NEW YORK-288m 8 p. m.—Paulist Choristers; sermon Rev. Elliott Ross. 1430k-WBNY-NEW YORK-210m

1430k—WBNY—NEW YORK—210m 2:30 p. m.—Blue Crest Collegians. 2:45 p. m.—Consuelo Rivero, pianist. 3 p. m.—Milton Yokeman, 'tenor. 3:20 p. m.—Harmonica Trio. 3:30 p. m.—Barmby Breadwinners. 3:40 p. m.—Blue Crest Collegians. 4 p. m.—Miss Consuelo Rivero, pianist. 4:10 p. m.—Ceclia L. Rivero; soprano. 4:30 p. m.—Collegians; Harmony Boys. 5:30 p. m.—Clive May, "Sunshine Girl." 4:45 p. m.—Collegians; Harmony Boys. 5:30 p. m.—Olive May. 5:40 p. m.—Olive May. 5:40 p. m.—Olive May. 5:50 p. m.—Olive May. 5:50 p. m.—Miton Yokeman. tenor. 1290k—WOKO—NEW XORK—233m 1 a. m.—Services from Cheisea Methodike

1 a. m.—Services from Cheisea Methodist Episcopal Church. 7:30 p. m.—Services from Cheisea M. E. Church. Church 100k—WBBR—STATEN ISLAND—273m

1100k-WBBR-STATEN ISLAND-273m 10 a. m.-Watchtower Trio. 10:15 a. m.-L. Marion Brown, soprano. 10:25 a. m.-Sunday School lesson. 10:45 p. m.-Watchtower Trio. 10:50 a. m.-Choral Singers. 11 a. m.-Bible lecture, R. S. Elmery. 11:30 a. m.-Choral Singers; Trio. 2 p. m.-Watchtower Orchestra. 2:20 p. m.-L. Marion Brown, soprano. 2:30 p. m.-Bible Lecture, R. S. Elmery. 3 p. m.-L. Marion Brown, soprano. 3:10 p. m.-Chile Lecture, R. S. Elmery. 3 p. m.-Bible Instruction, Martin Hart-man; L. Marion Prown, soprano. 3:45 p. m.-Watchtower Trio. 9:20 p. m.-Watchtower Trio. 9:20 p. m.-Watchtower Trio. 9:20 p. m.-Bible questions and answers. 1140k-WAAM-NEWAKK-263m 11 a. m.-Services of the Second Presby-

vices of the Second Presby-190k-WGCP-NEWARK-252m

noon-Elgy Mayer, soprano. 15 p. m.-Jimmy Farrell's Orchestra 5 p. m.-Jimmy Farrell's Trio. m.--'Care of the Skin.'' 2 p. m.—"Care of the Skin." 2:15 p. m.—Frank von Neer Artists' Hour. 3:15 p. m.—Gertrude Hale Artists' Hour. 4:15 p. m.—Paramount Vocal Trio. 4:45 p. m.—James Prescott, tenor. 5 p. m.—Walter A. Cobb, organist. 7 p. m.—Jimmy Shearer, songs. 8 p. m.—Marinello Entertainers. 8 2:30 n. m.—Newin Clark tenor.

b. m.—Marineno Entertainers.
8:30 p. m.—Nevin Clark, tenor.
8:45 p. m.—Wm. Eichelsdoerfer, violinist.
9 p. m.—Eether Krohn, planist.
6:15 p. m.—Paramount Vocal Trio.
1150k.—WEAM.—PLAINFIELD—261m 7 p. m.—Special hymn service; Epworth League chorus. 1340k—WODA—PATERSON—224m

10:30 a. m.—Communion breakfast. 1:30 p. m.—Market Street M. E. Church service. 760k—WLIT—PHILADELPHIA—395m

o. m.—Concert orchestra. 760k—WFI-—PHILADELPHIA—395m 230 p. m.—Chapel service. p. m.—Shakespeare Hour, "Macbeth." P. m.—Shakespeare Hour, \_\_\_\_
 D. m.—Service.
 S. D. m.—Atwater Kent Radio Hour.
 S. D. M. PHILADELPHIA—508m
 S. D. M. MUP.—PHILADELPHIA—508m

1 chestra. 590k—WOO—PHILADELPHIA—508m

10:45 a.m.—Morning services. 2:30 p.m.—Musical exercises. 6 p.m.—Sacred recital. 1000k—WPG—ATLANTIC CITY—300m 8:15 p. m.—Organ recital. 4:15 p. m.—Community vocal and instrumental recital. p. m.—Last-minute news flashes. 15 p. m.—Traymore Concert Orchestra.

10:15 p. m.—Organ recital.
10:05 p. m.—Organ recital.
10:05 a. m.—Morning service.
2:15 p. m.—Sernon, Rev. Harold G. Gaunt.
7:50 p. m.—Evening service.
9 p. m.—'An Hour With the Classics."

p. m.—"An Hour With the Classics." Seaside ensemble.
 790k.—WGY.—SCHENECTADY.—380m
 11:30 a. m.—Service of First Baptist Church.

Church. 12:30 p. m.—Symphony Society Concert. 4 p. m.—Musical program. 8:30 p. m.—Service of First Baptist Church. 10-11 p. m.—Godfrey Ludlow, violuinst. 940k.—WGR.—BUFFALO.—319m 10:45 a. m.—Morring service. 6-7:30 p. m.—Shakespearean program. 7:45 p. m.—Evening service. 9:15-10:15 p. m.—Jointly with WEAF.

1130k—WMAK—BUFFALO—266m 10:25 a. m.—Morning service 7:30 p. m.—Evening service: 1080k-WHAM-ROCHESTER-278m 3:30 p. m.-Chapel service; program fro WFBL. 9:30 p. m.-L'asical program. by the Rev. Avery Shaw; musical pro-gram. 8 p. m.—Young People's Conference; ad-dress by Dr. Daniel Poling. 4 p. m.—Men's Conference at the Y. 'M. C. A; address by Dr. S. Parkes Cadman; music by Gioria Trumpeters, George Betts, Mr. and Mrs. Howard Kimsey. 5:30 p. m.—Norman Curtis, planist. 6 p. m.—Atwater Kent Hour; 9:15-10:15 p. m.—Atwater Kent Hour; 9:15 p. m.—Sager's Hour of Hospitality

recital. 6:30 p. m.—News bulletins. 6:45 p. m.—Evening service. 860k.—WEEL—BOSTON—349m 2 p. m.—Sager's Hour of Hospitality. 3 p. m.—Musicale. 4 p. m.—Dr. S. Parkes Cadman. 5:30 p. m.—Musicale. 7:20 p. m.—Capitol Theater Family. 9:15 p. m.—Muster Kent Hour.

(20 p. m.—Capitol Theater Family. (15 p. m.—Atwater Kent Hour. 900k.—WBZ—SPRINGFIELD—333m 050 a. m.—Community Church. p. m.—Golden Rule hour of music. p. m.—Sunday evening dinner concert. p. m.—Combined musical clubs of Hol Cross College. 1120k-WTAG-WORCESTER-268m :30 p. m.-Program to be supported

1120k-WIAG-WOLCLEINE ZOR 5:30 p. m.—Program to be announced 120 p. m.—Program same as WEAF. 12 p. m.—Program same as WEAF. 12 ok—WBAL—BALTIMORE—246m 130-7:30 p. m.—WBAL concert orchestr 130-8:30 p. m.—Artists' recttal. 640k—WCAP—WASHINGTON—469m 1 a m.—Church service.

a.m.-Church service. b.m.-Church service. 0.9:15 p.m.-Capitol Theater family. 0.9:05 p.m.-'Atwater Keht Radio Hour 970k--KDKA--PITTSIURGH-309m

970k—KDKA—PITTSBURGH—3 1 a. m.—Church service. p. m.—Organ recital. 145 p. m.—Vesper service. 10 p. m.—Children's period. 130 p. m.—Children's period. 135 p. m.—Chines from the Episcopal Church. 145 p. m.—Church service. p. m.—Eund licht opera hour. Calv

7:40 p. m.—Church service.
9 p. m.—Rund light opera hour.
650k—WCAE—PITTSBUKGH—461r
4 p. n.—Dr. S. P. Cadman.
6:30 p. m.—Dinner concert.
7:20 p. m.—Capitol Theater family.
9:15 p. m.—Atwater Kent.

MONDAY

610k-WEAF-NEW YORK-492m 6:45, 7, 7:20 a.m.-Health exercises. 7:45 a.m.-Prayer services. 10:45 a.m.-"Hoine Service Talk." 11:05 a.m.-Benea Duffey, planist. 11:05 a.m.-"Garden Talk," by Leon

11:15 a. m.— Garden Taik, by Leonar Barron.
11:30 a. m.— Benea Duffey, pianist..
11:30 a. m.—Columbia University lecture.
12 noon—Market and weather reports.
14 p. m.—Marle Murray, soprano.
15 p. m.—Eita Kabram, Pauline Sterricht, piano duo.
130 p. m.—Earl Little, basso.
14:36 p. m.—Talk by Mrs. Clarence\_1
Hyde.

n.---Vincent Lopez's Orchestra.

p. m.—Dinner music.
p. m.—Columbia University lecture.
:20 p. m.—Marie Davis, pianist.
:30 p. m.—The Lullaby Lady."
p. m.—Renee Schleber, soprano, Blanch

Peris. 8:15 p. m.—Leonora Speyer, poetess. 8:30 p. m.—Rosella Sheiner, violinist. 8:45 p. m.—Musical program. 9 p. m.—'A. and P. Gypsies.'' 10 p. m.—Grand Opera, ''Martha,'' by WEAF Grand Opera Company. 11-12 p. m.—Ben Bernie's Orchestra.

660k-WJZ-NEW YORK-455m m.-Meyer Davis Orchestra

p. m.—Meyer Davis Orchestra.
p. m.—Weather; news service.
p. m.—"Your Daily Menu," Mrs. Julia Heath.
13 p. m.—Flower-making course.
125 p. m.—"Shopping Service," Mrs. Gra.
1411. Hill. 4:30, 5:30, 7:30, 10:30 p. m.—News. 4:35 p. m.—Commodore Content News.

4:35 p. m.—Commodore Concert Orchestra.
5:32 p. m.—Market quotations.
5:35 p. m.—Farm market reports.
7 p. m.—Contodre dinner concert.
7:55 p. m.—John B. Kennedy.
8 p. m.—Astor Orchestra.

p. m.—Astor Ordrestra.
 p. m.—Reading Seashore Band.
 0 p. m.—Mooriand Hour. Sasha Culberison and String Quartet.
 0:45 p. m.—Harry Leonard's Orchestra.

son and String Quartet.
10:45 p. m.—Harry Leonard's Orchestra.
950k—WGBS—NEW YORK—Stöm
10 a. m.—Timely Talks with Terese.
10:16 a. m.—Weinlrfed Gordon, soprano.
10:16 a. m.—Pertumes and Personality.
10:40 a. m.—Fashion talk.
1:35 p. m.—Scripture reading.
1:40 p. m.—Mercedes Fehley, isoprano; George Schwiler, Abe Samellowitz, violin duets.
2:30 p. m.—Educational Camp Exhibition.
3:0 p. m.—Lillian Elchler, "Well-bred English."

p. m.-nglish.''

m.—Uncle Geebee. p. m.—Uncle Geebee.
i30 p. m.—Association of Reformed Rabbis. Simon R. Cohen, Cantor Fine.
p. m.—Rollo Lloyd.
i03 p. m.—Music.
i15 p. m.—Educational Camp Exhibition Series: Capt. Fercy Creed.

830k-WHN-NEW YORK-361m p. m.-Al Wilson's Playmates.

2:15 p. m.—Al Wilson's Playmates.
2:30 p. m.—Laura Binder, planist.
2:40 p. m.—Mune. Claire De Leon, soprano.
2:50 p. m.—Wolff Kaufman, musical saw.
3 p. m.—Jimmy Clarke's Entertainers.
3:45 p. m.—Haines Good News Party.
4:15 p. m.—Belle Osborne, contraito.
4:30 p. m.—Belle Osborne, contraito.
4:30 p. m.—Haines Good News Party.
4:15 p. m.—Belle Osborne, contraito.
5:05 p. m.—Haines Good News Party.
5:05 p. m.—Heauty Talk," Mme. Polly.
5:05 p. m.—Eddie Gillis, baritone.
7 p..m.—Max Genesin, tenor.
7:15 p. m.—Betty Morris, songs.
7:30 p. m.—George's Surprise.
9 p. m.—George's Surprise.
9 p. m.—'The Two Bills," songs.
9:15 p. m.—Thetrone and Ferone, mandolin 5 p. m. -- Petrone and Ferone, mandol

and violin. 9:30 p. m. Loew's New York Orchestra. 10 p. m. —Olive May, soprano. 10:15 p. m.—Griffin and Morgan, songs. 10:30 p. m.—Leroy Smith's Orchestra. 11 p. m.—Dance orchestra. 12 midnight—Dance orchestra.

880k—WMCA—NEW YORK—341m
130 a. m.—N. Y Stock Exchange
130 a. m.—Market reports (hourin).
2 non—United States Department of Agriculture.
15 p. m.—Olcott Vail's String Ensemble.
p. m.—Entertainers. Theo Alban. tenor

12 noon-United States Department of Agriculture.
1:15 p. m.-Olcott Vail's String Ensemble.
2 p. m.-Entertainers, Theo Alban. tenor.
3 p. m.-Nam Coslow, songs.
3:10 p. m.-News items.
3:20 p. m.-Entertainers.
4:08 p. m.-Jost and found department.
4:30 p. m.-News items.
5-5:25 p. m.-News items.
6 p. m.-Olcott Vail's String Ensemble.
6 p. m.-Olcott Vail's String Ensemble.
6 p. m.-Olcott Vail's String Ensemble.
6 m.-Christian Science lecture.
10:15 p. m.--McAlpin News Editor.
11 p. m.-Musical program.
11:30 p. m.--Chamber music.
9 p. m.-Chamber music.
9 m.-Question Box.
9 sido p. m.-Schickerling concert.
10 p. m.-Schickerling concert.
11 p. m.-Sudy Club.
12:30 p. m.-E. F. O'Connor, barytone.
12:30 p. m.-Schickerling concert.
10 p. m.-Schickerling concert.
10 p. m.-Schickerling concert.
11 p. m.-Mustical Zimbler, celloist.
9 p. m.-Mathida Zimbler, celloist.
9 p. m.-Wantity Orchestra.

1080k-WCAU-PHILALELPHIA-278m 7:30 p. m.—Recital by artists. 8 p. m.—Carolyn Thomas, soprano. 8:30 p. m.—The Hood Boys. 8:45 p. m.—Enright's Gems. 9 p. m.—The Merry Minstreis. 5: 9:30 p. m.—Jackson and Ellis. radio sweethearts. 10 p. m.—Madrigal Mixed Quartet. 10 p. m.—Madrigal Mixed Quartet. 7:30 p. m.-Dance Orchestra. 8 p. m.-Dance Orchestra. 8 j. m.-Charles Band and Orchestri 9 p. m.-Carmen Dale, songs. 9:30 p. m.-Bernard Frank, harmonica. 9:45 p. m.-Gerlick and Nill, saxophone 10:13 p. m.-Gerlick and Nill. 10:30 p. m.-Paul Specht's Orchestra. 10:30. p. m. — Paul Specht's Orchestra.
570k — WNYC — NEW YORK — 526m
6:10 p. m. — Market High Spots.
6:20 p. m. — Piano selections.
6:30 p. m. — Bienentary German lessons.
7 p. m. — Advanced German lessons.
7:35 p. m. — Male quartet.
8 p. m. — Piaseball, John B. Foster.
8:15 p. m. — Mule quartet.
9 p. m. — Ohio Society dinner; speakers: Mayor James H. Walker, Elbert H. Gary, Richard F. Grant.
11 p. m. — Holmes's String Ensemble.
1250k — WHAP — NEW YORK — 240m
6:30 p. m. — Lucile. Wilkin; Scandanavian Piano Composers.
7:40 p. m. — Ways digest. ) p. m.—News digest. . m.—Vida Milholland, soprano; Steel amison, tenor. 5 p. m.—Hickman Price, "Air Questionnaire." 1:30 p. m.—Soprano and tenor solo. 1:45 p. m.—Sibyl Huse, speaker. 1:55 p. m.—Silvan String Trio. 1:30 p. m.—Talk, James P. B. Hyndman. 1:40 p. m.—Sylvan String Trio. 1:55 p. m.—WHAP men's quartet. 10:10 p. m.—Listener's variety; Lucile Wilkin, Dorothy Hoyle. Darl Bethnann. Phyllis Kraeuter, Ruth Monigomery. 1:000 NDNY, NYW, WORK ass. 1160k-WRNY-NEW YORK-258m 11:15 a. m.-Musical Corrier says:
11:15 a. m.-Husical Corrier says:
11:35 a. m.-Flucho artist.
12:15 p. m.-Harvey Schloeman, songs.
12:30 p. m.-Betty Lang, soprano.
12:45 p. m.-Jaek Fuid, planologues.
12:30 p. m.-Jaek Fuid, planologues.
12:30 p. m.-Jaek Fuid, planologues.
12:30 p. m.-Jaek Fuid, planologues.
13 p. m.-Haskell Propper, saxophone.
13 p. m.-Mino Cooper, soprano.
13 p. m.-Judith Roth, soprano.
14 p. m.-Sofferman's Milo Orchestra.
11 p. m.-Sade Theater Players.
1100k-WFBH-NEW YORK-273m
2 p. m.-Jack Onnesorg's Orchestra.
3 p. m.-Jack D. P. Sulfer. 5 a. m.—Musical Courier says: m.—Jack Onnesory's Orchestra. m.—Alonzo D. P. Bellis. .p. m.—Interior decorating, Edith Deane. 45 p. m.—Frank Ramph, barytone. p. m.—Red Lion Orchestra. p. m.—Warner Theater Hour. p. m.—American Legion news. 15 p. m.—Ehris Meehan, tendr; Holstein. Holstein. :45 p.m.—Nita Nadine. 1:30 p.m.—Twin Oaks Orchestra. 2 midnight—Alvin E. Hauser, at home party. 1430k-WBNY-NEW YORK-210m p. m.—1710. 55 p. m.—Movie Talk. p. m.—U. S. Army Hour. m.-U. S. Army Hour.
 m.-Harmony Boys.
 9.15 p. m.-Drawing Room Players.
 9:45 p. m.-Evelyn Langwell, pianist.
 10 p. m.-Orchestra.
 10:15 p. m.-Dlouis Bring Entertainers.
 10:30 p. m.-Blue Bird Songsters.
 1100k-WBBE-STATEN ISLAND-273m 1100K-WHERE-STATEN ISLAND-273m 5 p. m.-Irene Kleinpeter, soprano. 5:10 p. m.-George Twaroschk, pianist, 5:20 p. m.-'Radio in the Treatment of Disease,'' Dr. Mae Work, 5:40 p. m.-George Twaroschk, pianist, 5:50 p. m.-Irene Kleinpeter, soprano. 950K-WAHG-RICHMOND HILL-316m 12:02 p. m.-Grabe Matimes Tuice 300x-WARG-RICHMOND HILL-316m
21:02 p. m. — Grebe Matinee Trio.
7:30 p. m. — Walter Iooss, planist.
7:45 p. m. — Martha Brauninger, soprano.
9 p. m. — Synchrophase Hour.
9 p. m. — Abroad with Major Dent Atkin-sopration. son. 15 p. m.—Walter Leary, barytone p. m.—"Current Topics" lecture, 14.
Kaltenborn,
330 p. m.—Gloria Gordon, songs,
3:45 p. m.—Boatmen Balalaika Orchestre
p. m.—Louis Chartler, barytone,
9:30 p. m.—Louis Chartler, barytone,
9:45 p. m.—Louis Chartler, barytone,

 m.—S. S. Lituania Orchestra.
 5 D. m.—Hofbrau Haus Orchestra.
 6 p. m.—News bulletins.
 5 p. m.—Fifth Avenue Orchestra.
 1140k—WAAM—NEWARK—263m 1140k-WAAM-NEWARK-263m 11 a. m.-Happy Hour program. 6 p. m.-Ben Goldfarb's Orchestra. 7 p. m.-Resume of sports. 7 j. m.-Resumshine Assembly. 8 p. m.-Rev. MacPherson's Fellowship Hour. 9 p. m.-Chamber of Commerce. 10 p. m.-Joa Brown's Orchestra. 1190k-WGCP-NEWARK-252m 6 p. m.-Daniel Patrone violinia

11908-WGCP--NEWARK-252m 6 p. m.-Daniel Patrone, violinist. 6:15 p. m.-"Making Ice Cream at Home." 6:30 p. m.-Plano duetists. 8:30 p. m.-Vesuvian Four. 9 p. m.-Ray Baylor's Orchestra. 10 p. m.-Bradley and Blackwell, songs. 10:15 p. m.-Bradley and Blackwell, noveities.

noveities. 10:45 p. m.-Betty Nemerson, soprano. 11 p. m.-Llewellyn and Browne, harmon boys. 11:15 p. m.—Hiawatha Orchestra. 1340k—WODA—PATERSON—224m

1340K-WODA-PATERSON-2 12 noon-Studio trio; concert mus 5 p. m.-Populaf songs; news, 150 p. m.-Stanley Todd's Orchestra. 5 p. m.-"Plays Worth While," Gilbert.

illert. m.—Madoc Association; talk. p. m.—Norman Strutt's Orchestra p. m.—Dance music. p. m.—The Volstead act; talk. p. m.—M. E. K.'s gang. m.—M. E. K.'s gang.

10 p. m.—Popular songs. 760k.—WLIT.—PHILADKIPHIA—395m 13:06 p. m.—Organ recital; religious service.

a. m.—Grand organ. (noon)—Luncheon music.

. m.—Luncheon music. . m.—Violin recital. . m.—Market hints

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service. 12:35 p. m.—Concert Orchestra. 2 p. m.—Concert Orchestra. 2:30 p. m.—Heart talk; news. 4:35 p. m.—Artist recital. 5 p. m.—Talk, auspices Peirce School. 5:15 p. m.—Sassublecterseit.

5 p. m.—Talk, auspices Peirce School.
5 p. m.—Talk, auspices Peirce School.
7:30 p. m.—Dream Daddy.
8 p. m.—Scaquelcentential program.
7:80 p. m.—Arcadia Concert Orchestra.
9 p. m.—Arcadia Dance Orchestra.
10:45 p. m.—Eratio Dance Orchestra.
500k.—WOO\_PHILADELPHIA.~508m

145 p. m.—Grand organ and trumpets, 130 p. m.—Dinner music.

7.30 p. m.—Dinner music. 8 p. m.—Grand organ recital. 8:30 p. m.—Address, the Rev. Forest Dager. 9 p. m.—Music by Gypsies. 10 p. m.—Grand opera. "Martha." 599k.—WIP.—PHILADELPHIA.—508m 1 p. m.-Luncheon music

p. m.-Market hints,
 f. p. m.-"Home Gardening,"
 6:05 p. m.-Dinner music,
 p. m.-Roll call and dancing lesson,
 760k-WFI-PHILADELPHIA-395m
 10:30 a. m.-Civic Pride Association,
 10:40 a. m.-Home service talk,
 1 p. m.-Josh Saddler's Screnaders,
 6:30 p. m.-Concert Orchestra,
 7 p. m.-Dance orchestra,

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Daylight Saving Time	760k-WLIT-PHILADELPHIA-395m 11 a. m.—Organ recital. 12:20 p. m.—Religious service. 12:35 p. m.—Orchestra.	970k—KDKA—PITTSBURGH—309m 6:30 p. m.—Dinner concert. 8 p. m.—Stockman-farmer news. 8:15 p. n.—University of Pittsburgh ad-	1100k-WEBJ-NEW YORK-273m 8 p. m.—Original Cambria Serenaders. 8:30 p. m.—Phil Phillips, Sam Ward, en- tertainers.	860k-WEFI-BOSTON-349m 4 p. mRed Top Serenaders. 5:50 p. mStock market, business news.
M-meters K-kilocycles	2 p. m.—Concert orchestra. 2:30 p. m.—"Household Hints." 4:30 p. m.—Republican news flashes.	dress. 8:30 p. m.—Sacred songs by quartet. 11:35 p. m.—Grand Theater concert.	8: 45 p. m.—Jules de Vorzon, violinist. 9 p. m.—''Community Civics.'' 9:10 p. m.—Robert Soffer, pianologue.	6:13 p. m.—Joe Rines's Orchestra. 6:45 p. m.—Big Brother Club. 7:30 p. m.—Peerless Tours, Joe Toye.
	4:35 p. m.—Women of Pennsylvania; re- cital. 7:30 p. m.—Dream Daddy.	650k-WCAE-PITTSBURGH-461m 6:30 p. mDinner concert. 8 to 11 p. mProgram from WEAF.	9:20 p. m.—Al Peaches, solos; Joseph Moglie, guitar. 9:30 p. m.—Original Melville Five.	8-11 p. m.—Program same as WEAF. 900k—WBZ—SPRINGFIELD—33m 7 p. m.—Kimball Trio. 7:15 p. m.—Lenox Ensemble.
970k-KDKA-PITTSBURGH-809m 6'30 p. mDinner concert. 8 p. mNews and market period. 8:15 p. mUniversity of Pittsburgh ad- 9:30 p. mPremier Male Quartette.	7:50 p. m.—Plays reviewed. 760k—WFI—PHILADELPHIA—395m 1 p. m.—Tea Room Ensemble.	11:05 p. mKenyon Theater.	1100k-WFBH-NEW YORK-273m 2 p. mOrchestra. 3 p. mVolly Endriss, contralto.	<ul> <li>7:30 p. m.— The Music Mirth Makers."</li> <li>8 p. m.—Radio Nature League.</li> <li>8:30 p. m.—WBZ Concert Company.</li> </ul>
dress. 9:45 p. m.—Edith Fay, soprano. 10 p. m.—"Timely Topics", Rev. James M. Gillis.	3 p. m.—Studio program. 6:30 p. m.—Concert orchestra. 7 p. m.—Dance orchestra.	WEDNESDAY	3:15 p. m.—Mae Sims, songs. 3:30 p. m.—"The Hour of Meditation." 4 p. m.—Natzy Marino's Orchestra.	9:30 p. m.—"The Holyoke Hour." 10:30 p. m.—To be announced. 1120k—WTAG—WOZCESTER—268m
TUESDAY 10:35 p. m.—The Commonweal. 10:35 p. m.—The Commonweal. 10:45 p. m.—Sara Dunn, soprano.	8 to 11 p. m.—Program from WEAF. 590k—WOO-PHILADELPHIA-508m 11 a. m.—Grand organ. 12 (noon)—Luncheon music.	610kWEAFNEW XORK	5 p. m.—Warner Theater Hour. 6 p. m.—Haisey Mohr, composer. 6:15 p. m.—Radio Ramblers. 6:45 p. m.—Beauty talk, Ervin Weiss.	10:30 a. m.—Musical selections; talk, 12:05-2 p. m.—Noon day luncheon music, 4:45 p. m.—Talk, Robert K. Shaw,
660k-WJZ-NEW YORK 455m 1 p. mPennsylvania luncheon music. 1 p. mPennsylvania luncheon music.	4:45 p. m.—Grand organ and trumpets. 7:30 p. m.—Philadelphia Sesquicentennial. 8100k—WCAU—PHILADELPHIA—278m	11:05 a. m.—Irving Cresse, planist.	7 p. m.—Twin Oaks Orchestra. 7:30 p. m.—Majestic String Ensemble. 11:30 p. m.—Savoy Ballroom Orchestra.	7:15 p. m.—Twinkle Twinkle Story Teller. 7:40 p. m.—To be announced. 8-11 p. m.—Program same as WEAF.
2 p. m.—News service. 4:30, 5:30, 7:30, 10:30 p. m.—News service. 11:30 a. m.—Market reports (hourly to 3:30 p. m.	6:30 p. m.—The Parodians. 7:30 p. m.—Shellenburg Instrumental Trio. 8 p. m.—The Theater Digest.	11:40 a. m.—Columbia University lecture.	1430k-WBNY-NEW YORK-210m 7 p. mTrio. 8 p. mLeroy Montesanto, tenor.	640k-WRC-WASHINGTON-469m 12 (noon)- "Fifty Farm Flashes." 12:20 p. mOrgan recital.
<ul> <li>4.15 p. m.—"A Beautiful Skin;" Elizabeth</li> <li>4.15 p. m.—"A Beautiful Skin;" Elizabeth</li> <li>4.25 p. m.—"Vines, Hardy and Tender,"</li> <li>4.25 p. m.—Uppartment of Agriculture.</li> <li>4.25 p. m.—Olcott Vail's String Ensemble.</li> <li>2 p. m.—Sherman and Neale, songs.</li> </ul>	8:10 p. m.—The Three Brothers. 8:25 p. m.—Peter Ricci, barytone. 8:45 p. m.—Charles Higgins, Joe Burke,	12 (noon)—Market and weather reports. 1:15 p. m.—Advertising Club luncheon; speaker, Colonel Theodore Roosevelt. 4 p. m.—Parnassus String Trio.	<ul> <li>[8:15 p. m.—Studio program.</li> <li>[8:45 p. m.—The Rover reciter.</li> <li>[9 p. m.—Andy Razof, Paul Denniker.</li> </ul>	1 p. mLee House Trio. 4:15 p. mMeyer Davis's Band. 5 p. m"Housekeepers' Half Hour."
4:35 p. m.—Commodore tea coacert. 5:32 p. m.—Market quotations.	songs. 9 p. m.—The Blind Gospel Singer. 9:30 p. m.—Esther Lawrence's Players.	4:30 p. m.—Elizabeth Smyth, soprano. 4:45 p. m.—New York Public Library story	9:45 p. m.—Bob Brandes, songs. 10-p. m.—Orchestra selections.	5:20 p. m.—Organ recital. 640k—WCAP—WASHINGTON—469m 6:45 a. m.—"Tower Health Exercises."
5:40 p. m.—Prices and quotations. 5:50 p. m.—Farm marker reports. 5:50 p. m.—To be announced.	<ul> <li>10 p. m.—Eddie Malle, Danny Dougherty, songs.</li> <li>10:30 p. m.—Billy Hays's Orchestra.</li> <li>590k—WIP—PHILADELPHIA—508m</li> </ul>	5 p. mVincent Lopez's Orchestra. 6 p. mDinner music. 7 p. mSynagogue services: talk, Charles	10:30 p. m.—Bob Brandes, songs. 1040k—WLWL—NEW YORK—288m 0 p. m.—''Economics and Finance;'' K. of C.	6:30-11 p. m.—"Matters Before the House"; program from WEAF. 970k—KDKA—PITTSBURGH—309m
Herald Tribune, "Manchester and Bell- ington Terrjers." Solo p. m.—Sach's Quality Boys. 8:20 p. m.—Palmer, Pen Lesson.	1 p. m.—Organ recital. 3 p. m.—'Victory Over Death.'' 3:15 p. m.—Velvetone Saxophone Sextet.	Hoffman; Manuel Comtinsky, violinist. 7:30 p. m.—Chamber musicale: 8 p. m.—"The Shinola Merrymakers and	<ul> <li>1:15 p. m.—Chamber music.</li> <li>1:45 p. m.—McEvoy's concert.</li> <li>10:15 p. m.—John Marshall, cellist.</li> <li>10:25 p. m.—Regina Clark, soprano.</li> </ul>	6:30 p. m.—Dinner concert. 8 p. m.—"Stockman-Farmer" news. 8:15 p. m.—University of Pittsburgh ad- dress.
<ul> <li>7.30 p. m.—U. S. Maine Band.</li> <li>8.30 p. m.—The Deltah Pearl Hour, "Aqua- marine."</li> <li>9 p. m.—Musical program.</li> <li>9 p. m.—Harry T. Rainess, "How to Drive."</li> </ul>	6:05 p. m.—Monte Cross, "Oldtimer." 6:15 p. m.—S. S. Leviathan Orchestra. 7 p. n.—Piano solo.	Gentleman of the 2 in 1." 8:30 p. m.—Davis Saxophine Octet. 9 p. m.—Ipana Troubadours. 10 p. m.—"Madame Angot," WEAF Light	10:35 p. m.—Castleton Instrumental Trio. 10:50 p. m.—Alfred Grainger, barytone.	8:30 p. m. — Mary Redmond, violinist; Gladys Landefeid, soprano; David Ewing; barytone: Adalaine Merrill Biddle;
Ireland." 10:45 p. m.—George Olsen's Orckestra. 610k—WEAF—NEW YORK—492m 10 p. m.—Misical program. 10:80 p. m.—Tango Garden Orchestra. 11 p. m.—Enge Golden's Orchestra. 12 p. dialect. M. Golden's Orchestra.	<ul> <li>8 p. m.—Dramatic reviews.</li> <li>8:15 p. m.—University of Pennsylvania Orchestra.</li> <li>9:15 p. m.—Schmidt String Quartet.</li> </ul>		<ul> <li>12:02 p. m.—Musical program.</li> <li>17:30 p. m.—Margie Make-believe.</li> <li>17:45 p. m.—Adeline Blermann, soprano.</li> </ul>	6:30 p. in — Dipper concert
6:45, 7, 7:20 a. m.—Health exercises. 7:45 a. m.—Prayer services. 7:30 p. m.—Dance orchestra. 7:30 p. m.—Dance orchestra.	10:05 p. m.— 'Emo's Movie Broadcast." 10:30 p. m.— Little Jack Little. 11 p. m.—El Patio Orchestra.	2 p. m.—Madison Concert Orchestra. 2 p. m.—American News Service. 4 p. m.—Your Daily Menu.	8 p. m.—Beatrice Anthony, pianiste. 3:15 p. m.—Serenaders Plectrum Quintet. 3:55 p. m.—Old-fashioned quartet; Albert	8 p. m.—Sinola Boys. 8-30 p. m.—Davis Saxaphone Octet. 9 p. m.—Studio concert. 10 p. m.—Kramer's Orchestra.
11. a. m.—"My Job," Winter Russell. 11.25 a. m.—Eleanor Greene, soprano. 8:15 p. m.—Dorothy Chapman, soprano. 8:30 p. m.—Theo Alban, tenor.	1090k-WHAR-ATLANTIC CITY-275m 2 p. mSeaside Trio. 7:30 p. m'Gilmpses Through the Stage	4:15 p. m.—Butterick Fashion Talk. 4:25 p. m.—Health Speakers' Lureau. 4:35 p. m.—Waldorf-Astoria concert.	Reiss, soloist. 9:30 p. m.—Alfred Werthelm, violinist; Eva Nora Lyon, pianiste. 10:02 p. m.—John von Aspe, tenor.	
11:50 a. m.—Eleanor Greene, soprano. 12 (noon)—Market and weather reports. 4 p. m.—Forst Hills Chaerable' . 20 p. m.—Jayne and Kathryn Donovan. 9:15 p. m.—Dorothy Chapman, soprano.	Door." 8 p. m.—Seaside Trio. 1000k—WPG—ATLANTIC CITY—300m	5:32 p. m.—Market quotations. 5:35 p. m.—Financial summary. 5:40 p. m.—Cotton quotations.	10:30 p. m.—Utopia Dance Orchestra. 740k—WOR—NEWARK—405m 6:45-7:15-7:45 a. m.—Gym class.	THURSDAY
<ul> <li>a. Synagogue of America.</li> <li>b. mVincent Lopez's Orchestra.</li> <li>c. mVincent Lopez's Orchestra.</li> </ul>	1:30 p. m.—Luncheon music. 6:45 p. m.—Organ recital. 7 p. m.—Traymore dinner music.	5:50 p. m.—Farm market reports. 7 p. m.—New York University. 7:30 p. m.—Markel's Orchestra.	2:30 p. m.—Janet Winters, soprano. 2:45 p. m.—Bob Schafer, Artie Dunn, songs. 3 p. m.—Janet Winters, soprano.	610k—WEAF NEW YORK 492m 6:45-7:20 a. m.—Health exercises. 7:45 a. m.—Prayer services.
6:50 p. m.—Marion Cara, soprano. 7 p. m.—'Americanization Day,'' Walter Jourse J. Market High Spots. 6:55 p. m.—Piano selections. 7:05 p. m.—''Americanization'' Herman	7:45 p. m.—Fashion fiashes. 8 p. m.—Flaza artists. 9 p. m.—Hall Dual Trio. 10 p. m.—Dance orchestra.	<ul> <li>8 p. m.—Imperial Imps.</li> <li>8:30 p. m.—Lewisohn Free Chamber Music concert.</li> <li>9:50 p. m.—"Associated Press," H. W</li> </ul>	3:15 p. m.—Oreste's Queensland Orchestra. w:15 p. m.—Bill Wathey, "Sports." w:30 p. m.—Jacques Jacobs's Ensemble.	11 a. m.—Emilie Underhill, soprano. 11:10 a. m.—''A. New Dress for Spring Fish.'' 11:20 a. m.—''Margarine,'' by Esther L
7:10 p. m.—Columbia University French course. 7:15 p. m.—E. Ahlers, soprano. 7:30 p. m.—Police alarma	10:30 p. m.—Piano recital. 11 p. m.—Eddie McKnight's Dance Or- chestra.	Blakesee.	<ul> <li>7:30 p. m.—Zit's Orchestra.</li> <li>8 p. m.—"Topics of the Day," Spencer Armstrong.</li> <li>8:16 p. m.—Gedney and Magee, banjoists</li> </ul>	11:30 a. m.—Emilie Underhill, soprano.
artists. 8 p. m.— "The Grand Prize Eurekas." 7:35 p. m.— "Music." Winter Russell. 8 p. m.— "The Grand Prize Eurekas." 7:50 p. m.— Baseball results	11:30 p. m.—Traymore Dance Orchestra. 790k—WGY—SCHENECTADY—380m 12:30 p. m.—Reports.	10:10 a. m.—Louise Rice Women's Hour Willette Wilburn, singer. 1:35 p. m.—Scripture reading.	8:35 p. m.—Edward Rechlin, organist. 9:05 p. m.—Gertner's String Quartet. 9:35 p. m.—S. S. Paris Onchestra.	4 p. m.—Felice String Quartet.
9 p. m.—"Enveready Hour." 10 p. m.—"Variety Hait-Hour." 10:30 p. m.—Cantor Calman Slotkin. S:30 p. m.—Cantor Calman Slotkin. S:30 p. m.—Cantor Calman Slotkin. S:30 p. m.—Tano recital, Seima Slotkin. S:30 p. m.—Tano recital, Seima Slotkin. S:30 p. m.—Tano recital, Seima Slotkin.	<ol> <li>p. m.—Music; one-act play.</li> <li>p. m.—Organ recital.</li> <li>p. m.—Stock reports; news.</li> <li>6:30 p. m.—Vah Curler Orchestra.</li> </ol>	1:40 pm.—Patricia Mason, soprano. 1:50 p. m.—Fred Osborne, tenor. 2 p. m.—Frank Galassi, uke and songs	10:30 p. m.—News bulletin. 10:35 p. m.—Ballin and Race, plano duo. 10:50 p. m.—Horace Taylor, reader.	4:30 p. m.—Felice String Quartet. 4:45 p. m.—Talk. 5 p. m.—Vincent Lopez's Orchestra
950k-WGBS-NEW YORK-310m 10 a. m.—Timely Talks with Terese, 10 10 a. m.—Laure Remsberg, soprano. 10:15 a. m.—Reinsberg, soprano.	7.90 m m Beachall scores	<ul> <li>2:10 p. m.—Patricia. Mason and Fred Osborne.</li> <li>2:30 p. m.—Educational Camp exhibition.</li> <li>3. p. m.—Interview with Charles Le Maire</li> </ul>	11:05 p. m.—Fifth Avenue Orchestra. 1,140k—WAAM—NEWARK—263m 11 a. m.—Happy Hour program.	6 p. m.—Dinner music. 7 p. m.—Mid-week hymn sing. 7:30 p. m.—Dance music. 8 p. m.—Sally Caskin, planist.
10:35 a. m.—Salads and sandwiches; songs. 1160k—WRNY—NEW VORK—958m	7:45 p. m.—Marine Band. 8:30 p. m.—Deltah hour of romance, "Aquamarine."	3:10 p. m.—Roxano Erb, contraito. 3:20 p. m.—Interview with Howard Young.	7 p. m.—Resume of sports. 7:10 p. m.—Violinist.	8:15 p. m.—'Hires's Harvesters." 9 p. m.— 'Clicquot Club Eskimos." 10 p. m.—Silvertown Cord Orchestra.
1:40 p. m.—Hrving Rose, songs. 1:50 p. m.—Hansen & Howard, duets. 2:10 p. m.—Hansen and Howard, songs. 1:12 noon.—Organ recital.	<ol> <li>p. m.—WGY Orchestra; Isabelle Lenz, soprano.</li> <li>p. m.—"Grand Tour—Northern Ire-</li> </ol>	6 p. m.—Uncle Geebee.	7:40 p. m.—George Brown, tenor. 8 p. m.—Busy Beavers. 9 p. mVerdure lawn and garden talk. 9:10 p. m.—Weille Osborne's Orchestra.	<ol> <li>p. m.—Vincent Lopez's Orchestra.</li> <li>660k—WJZ—NEW YORK—455m</li> <li>p. m.—Pennsylvania Luncheon Or-</li> </ol>
2:30 p. m.—Educational camp exhibition. 3 p. m.—William Carroll, "Young Men in 7 p. m.—Sports, commerce. 7:20 p. m.—Wolfe Kauffman—musical saw	land," from WJZ. 1130k-WMAK-BUFFALO-366m 6:15 p. mDinner' music.	Africa." 7:10 p. m.—Williams Savoy-Orchestra. 7:20 p. m.—Al Rosenberg, "Marathon Run-	10 p. m.—Bill McWalters, songs. 1,190k—WGCP—NEWARK—252m	chestra. 2 p. mWeather balloon news. 4:30-5:30-7:30-10:30 p. mNews service.
7:30 p. m.—Margaret Mayer, singer. 3:20 p. m.—French lessons; songs. 3:40 p. m.—Incle Geebee	7:15 p. m.—Daily news. 7:30 p. m.—Sunday school council. 7:45 p. m.—Lecture at First Church of Christ Scientist.	ners." 830k-WHN-NEW YORK-361m 1:30-3 p. mLoew's Metropolitan over-	8 p. m.—Béatrice Boehm, songs. 8:15 p. m.—Marion P. Duren, mezzo soprano.	3:30 p. m.—Orchestral Closing Concert. 5 p. m.—Commodore teà music. 5:32 p. m.—Market quotations.
6:30 p. m.—Theo Alban, tenor. 6:45 p. m.—Educational camp exhibition. 6:45 p. m.—Educational camp exhibition.	940k-WGR-BUFFALO-319m 11 a. mHome economics talk. 6:30 p. mDinner music.	ture and vaudeville. 3:45 p. m.—Leon Berger's Orchestra. 4:10 p. m.—James Curtis, songs.	1,340kWODAPATERSON224m 12 noonDance musie. 12:30 p. mConcert selections.	5:35 p. m.—Financial summary. 5:40 p. m.—Cotton quotations. 5:50 p. m.—Farm market reports. 7 p. m.—Vanderbilt Orchestra.
8 p. m.—Play, "Pauline Pavlovna." 8:30 p. m.—Josephine Evans Mixed quar- tet. 8:45 p. m.—Oscar Saenger Opera Com-	8-11 p. m.—Jointly with WEAF. 1080k—WHAM—ROCHESTER—278m 3:30 p. m.—Eastman Theater organ.	4 <sup>5</sup> 20 p. m.—Miriam Davis, soprano. 4:30 p. m.—Uncie Robert's Pals. 5 p. m.—Ely Well, violinist.	5 p. m.—Studio program. 5:30 p. m.—News; sport talk. 6 p. m.—The Arcadians.	7:30 p. m.—Judge jr. 7:45 p. m.—"Political Situation in Wash- ington," Frederick Wile.
9 p. mWilliam Chosnyk, violinist. 9:30 p. mLoretta Hurley, "One Girl Show."	5 p. m.—Recital. 6:45 p. m.—Baseball scores. 7 p. m.—Dinner concert. 8 p. m.—Baseball scores.	7 p. m.—Klt Kat Entertainers. 7:30 p. n.—Loew's organ recital. 8 p. m.—Entertainers. 9 p. m.—Loew's New York Orchestra.	760k—WLIT—PHILADELPHIA—395m 12:20 p. m.—Religious service. 12:35 p. m.—Organ recital.	8:30 p. m.— "Voice of the Silent Drama," "The Greater Glory."
sephine Smith, pianist. 10 p. m.—Up and Down Broadway.	980k-WJAR-PROVIDENCE-306m 1:05 p. m. Concert ensemble. 7:30 p. m.Musical program.	9:30 p. m.—Knoll and Lang, mandolin and tipple. 9:45 p. m.—Mr. and Mrs. Leo Wood, songs,	4:35 p. mTalk: artist recital.	9 p. m.—Royal Salon Orchestra. 10 p. m.—The Record Boys. 10:30 p. m.—Freddie Rich's Orchestra.
10:30 p. m.—Arrowhead Dance Orchestra. 830k—WHN—NEW YORK—361m 12:30 p. m.—Loew's Organ Recital. 1480k—WBNY—NEW YORK—210m 7 p. m.—Trio. 8 p. m.—Joseck "Himself."	8-10 p. m.—Program from WEAF. 1070k—WNAC—BOSTON—280m 10:30 a. m.—Women's Club talks; music;	10 p. m.—Roseland Dance Orchestra.	8 p. m.—Drouglas MacFarlan. 8:30 p. m.—Regulation artists. 9 p. m.—Marguerite Barr Quartet.	12 p. m.—Weather, balloon news, 950k—WGBS—NEW YORK—316m 10 a. m.—Timely talks with Terese, 10:10 a. m.—Rose Elias, soprano.
2-3:15 p. m.—Overture and vaudeville from [8:15 p. m.—Babe Adler, songs. Loew's State Theater. [8:30 p. m.—Dagmar Dance Orchestra.] 3:15-4:30 p. m.—Loew's Lexington Orchestra	12:15 p. nrNoon service. 1 p. mShepard Colonial luncheon con-	1160k-WRNY-NEW YORK-258m 11 a. mArts and Decoration. 11:15 a. mMelledge's Women's Hour.	10 p. m.—Arcadia Dance Orchestra. 760k—WFI—PHILADELPHIA—395m 10:30 a. m.—Music; home service.	10:15 a. m.—Radio gym class; soprano solos. 10:35 a. m.—'Better Homes and Gar-
chestra. 6:15 p. m.—Leona Hogarth, singing. 6:30 p. m.—Everglades Orchestra. 9:10 p. m.—Ruth Jackson, soprano. 9:30 p. m.—Degmar Orchestra.	cert. 4 p. m.—Broadcast from Metropolitan The- ater. 6 p. m.—The Smilers.	12: noon-Bob Schaeffer, songs. 12:15 p. mPollack & Dorn, songs. 12:30 p. mClifford Odets, reader.	<ol> <li>p. m.—Tea room ensemble.</li> <li>p. m.—Studio program; Presbyterian. Training School.</li> <li>p. m.—Concert orchestra.</li> </ol>	dens." 1:30 p. m.—Scripture reading. 1:35 p. m.—Manhattan String Trio.
7 p. m.—Vincent Lopez Iceland Orchestra. 7:30 p. m.—Wilf Oakland's Chatheau. 8 p. m.—Traszure Neighbors. 8:30 p. m.—Eva Rothenberg, planist. 9:45 p. m.—Babe Adler, songs. 9:50 p. m.—Chagmar Orchestra. 10:30 p. m.—Consuelo Rivero. 10:45 p. m.—Babe Adler, songs. 9:50 p. m.—Consuelo Rivero. 10:45 p. m.—Babe Adler, songs. 9:50 p. m.—Consuelo Rivero.	6:30 p. m.—Dinner dance. 8 p. m.—The Radiant Ensemble. 9 p. m.—Musical program.	12:45 p. m.—Mac & Lennie, songs. 6:30 p. m.—Al Lacks Dance Orchestra. 7:15 p. m.—Radio Theater Index. 7:20 p. m.—Viola Blanchey, soprano.	7 p. m.—Dance orchestra. 590k—WOO—PHILADELPHIA—508m 11 a. m.—Grand organ.	2:30 p. m.—Educational Camp Exhibi- tion. 3 p. m.—Woman in the Home program.
8:45 p. m.—Prince Piotti, songs. 9 p. m.—Loew's Eighty-third Street Or- chestra.	2 p. m.—Ernie Andrews's Troubadours. 4 p. m.—Joe Herlihy's collegians.~	7:30 p. m.—Norman Secon, planist. 7:45 p. m.—Rose Laurent, American songstress.	12 noon—Luncheon music. 4:45 p. m.—Grand organ; trumpets. 7:30 p. m.—Dinner dance music.	6 p. m.—Uncle Geebee. 6:30 p. m.—Arcadia Orchestra. 7 p. m.—''What the World Is oDing.'' 7:15 p. m.—Irene Weir; B. F. A.; Yale
<ul> <li>b. of p. m. — Giles O'Connor, ukule!</li> <li>b. m. — O'Brien Brothers, mandolin and</li> <li>c. m. — O'Brien Brothers, mandolin and</li> <li>c. m. — O'Brien Brothers, mandolin and</li> </ul>	5:50 p. m.—Market and business news. 6:10 p. m.—George Joy, Nell Cantor, songs. 6:45 p. m.—Big Brother Club. 7:30 p. m.—Pettingeil's musical news' re-	<ul> <li>8 p. m.—John Kallengger, concertina.</li> <li>8:15 p. m.—Charles D: Isaacson's Concert.</li> <li>8:30 p. m.—Operatic program.</li> </ul>	8 p. m.—''Mystery Merrymakers.'' 8:30 p. m.—Davis Saxophone Octet. 9 p. m.—Ipana hour. 10 p. m.—Fox Theater studio program.	University; "Good Taste." 7:25 p. m.—Music. 7:30 p. m.—Educational Camp Exhib!-
10:15 p. m.—Frances Sper, contralto. 10:30 p. m.—Anatol Friedland. 3:30 p. m.—Bill Wathey, "Sports."	view. 8-11 p. m.—Program from WEAF. 900k.—WBZ—SPRINGFIELD—333m	<ul> <li>9:15 p. m.—Face to face with Chopin.</li> <li>9:30 p. m.—American composers' Night.</li> <li>9:35 p. m.—Cecil Cowles, planist.</li> </ul>	10:30 p. m.—Dance music. 590k.—WIP_PHILADELPHIA—508m [] a. m.—Setting-up exercises.	tion 7:45 p. m.—'I Interview Myself,'' Kil- bourne Gordon.
11 p. m.—Loew's Lexington Organ Récital. 11:30 p. m.—Sophie Tucker's Playground. 12 midnight—Harry Richman's Enter- tainers. 11 a. m.—Gooking school.	7 p. m.—Farm Flashes. 7:15 p. m.—Kimball Trio. 7:30 p. m.—Course in journalism.	9:50 p. m.—Mrs. Ira Richards, soprano. 10:05 p. m.—George McLaughlin, barytone. 10:20 p. m.—Gordon Hampson, planist.	10:30 a. m.—Reducing exercises. 1 p. m.—Luncheon music. 3 p. m.—Artist recitat.	<ol> <li>m.—William Mullaly "Jiggs and Reels on the Concertina.""</li> <li>8:10 p. m.—Charles MacMillan, bag pipe</li> </ol>
1100k-WEBJ-NEW YORK-273m BOYS' WEEK PROGRAM 7 D. M. Sport talk Major Tata	8 p. m.—Deerfield Academy Glee Club. 8:30 p. m.—"The Goldosi Trio," Goldie Shour, violin; Signey Sandstrom, cello.	880k-WMCA-NEW YORK-341m 10:15 a. mMorning news letter; market reports. 11 a. mHousewife period.	6:05 p. m.—Concert orchestra. 6:35 p. m.—''The Farm Boy Makes Good.'' 7 p. m.—Roll call: songs.	8:20 p. m.—John Cassidy, barytone. 8:30 p. m.—'Footlight and Lamplight."
7:15 p. m.— The Boy in His Home and Church." Si34 p. m.—James MacDonald, barytone.	9 p. m.—Radio Movie Club, 10 p. m.—To be announced. 1120kWTAGWORCESTER-268m	11:30 a. m.—Market reports (hourly to 3 p. m.) 12 noon—Musical program.	1080k—WCAU PHILADELPHIA—278m 7:80 p. m.—Recital by artists. 8 p. m.—Health talk. 8:10 p. m.—The three brothers.	<ul> <li>9:30 p. m.—Male choir of St. Mary's.</li> <li>9:30 p. m.—''Investment Trusts in Amer- ica."</li> <li>9:40 p. m.—Chefleigh and Swenson.</li> </ul>
7:25 p. m.—Edward Feldbauer, violin solo. 7:30 p. m.—Double quartette of clubs. Affairs." The Place of Trees in Men's Affairs."	12.00 to 2 p. m Huncheon music.	12:15 p. m.—Department of Agriculture. 1:15 p. m.—Olcott Vail's String Ensemble. 2 p. m.—Ralph Odierno, barytone, and	8:30 p. m.—Clarence Seaman's Orchestra.	10 p. In-Gerirude Krantz, soprano; Eliz- abeth Nanda, contralto; Francis Par- sons, planist; vocal duets.
7:50 p. m.—Frank Trautman, entertainer, 8 p. m.—Constanza De Salvo, cornet sold, 8:06 p. m.—UBoy and His Recreation." 9 J. m.—Red Naught's Collegians, 1190k.—WGCP.—NEWARK.—252m 7 p. m.—Chyrlie McKichael, Sopremo	5:15 p. m.—Story teller, 8-8:30 p. m.—The Grand Prize Eurekas, 8 to 8:30 p. m.—Selected topics from United States History by H. Allan Dickie,	3 p. m.—Carl Smith, fenor. 3:10 p. m.—News items.	9:45 p. m.—Topics of the day. 10 p. m.—Harry Bortman's Trio. 10:15 p. m.—Maurice Patton, tenor; Harry	10:10 a. m.—Adeline Bierman. 10:20 p. m.—Vocal duets. 10:30 p. m.—Arcadia Orchestra.
8:15 p. m.—'The Boy in Citizenship and 7:30 p. m.—Mucy West, planiste, His Work.''	9 to 11 p. m.—Program same as WEAF. 640k—WRC—WASHINGTON—469m 1 p. m.—Washington Orchestra.	4:10 p. m.—Music. 4:15 p. m.—Lost and Found Department. 5-5:25 p. m.—News items.	Reudy, baritone. 10:30 p. m.—Carl Zoehrns, Lou Hirscher. songs. 10:45 p. m.—Frank Cook, songs.	830k—WHN—NEW YORK—361m 12:30 p. m.—Organ recital. 3:15-4:30 p. m.—Loew's Lexington or- chestra.
riment and melody, 8:30 p. mLeonard O'Hara, vocal solo. 8 p. mGene Sneden, songs. 8:15 p. mMay Engenst	7 p. m.—Radio School of International Relations. 7:30 p. m.—United States Marine Band	6 p. m.—Olcott Vail's Ensemble. 6:30 p. m.—Ernie Golden's Orchestra. 8 p. m.—Musical program.	11 p. m.—King Cheerio, Artie Bittong and his two hours of cheer. 790k—WGY—SCHENECTADY—380m	6:30 p. m.—Leon Berger's orchestra. 7 p. m.—Vincent Lopez's orchestra. 7:30 p. m.—Health talk, Dr. Percival.
8:45 p. m.—Boys band. 1100k—WFBH—NEW YORK—273m 2 p. m.—Orchestra. 2 p. m.—A. B. C. period.	Orchestra. 8:30 p. m.—"Gems of Romance."	9 p. m.—Mamaroneck Night. 10 p. m.—Tango Garden Orchestra. 10:30 p. m.—Tango Palace Orchestra. 11 p. m.—Hofbrau Haus Entertainers.	12:30 p. m.—Reports. 6 p. m.—Stock report; news. 6:30 p. m.—Children's bed-time story. 6:50 p. m.—''Keeping History Up to Date,''	7:45 p. m.—Chappy O Donnell, contralta, 8 p. m.—Will Oakland's chatheau. 8:30 p. m.—Al Herman's entertainment
<ol> <li>p. m.—Housekeepers' half hour.</li> <li>p. m.—Local happenings; talk.</li> <li>p. m.—Local happenings; talk.</li> <li>p. m.—Local happenings; talk.</li> <li>p. m.—Litizens Trust Company</li> </ol>	10:30 p. mW. Spencer Tupman Orches- tra. 1220k-WBAL-BALTIMORE-245m	<ul> <li>11 30 p. m.—Holbrau Haus Entertainers.</li> <li>11 30 p. m.—Jack Denny's Orchestra.</li> <li>12 p. m.—McAlpin Entertainers.</li> <li>1410k—WMSG—NEW YORK—213m</li> </ul>	<ul> <li>6:50 p. m.—"Keeping History Up to Date," Russell Hathaway.</li> <li>7 p. m.—"Book of Knowledge."</li> <li>7:30 p. m.—Baseball scores.</li> </ul>	bureau. 9 p. m.—Henri Duval, vlolinist. 9:15 p. m.—Frank Galassi, songs an <b>d</b> ukuléle.
5 p. m.—Warier Theatre hour. 6 p. m.—Katherine Connelly, songs. 9:30 p. m.—Seligson Sisters, Sam Cohen,	6:30 to 7:30 p. m.—Dinner orchestra. 7:30 to 8 p. m.—WBAL Male Quartet. 8 to 9 p. m.—Celia Brace, violinist; James	7:30 p. m.—Dance Orchestra. 8 p. m.—Sport talk. 8:15 p. m.—Almon and Bower, violin recital	7:35 p. m.—Onondaga Orchestra. 8:30 p. m.—Program from Eastman Theatre.	9:30 p. m.—Loew's orchestra. 10 p. m.—Martin and Schwartz, songs. 10:15 p. m.—Leon Goldman, violinist.
6:15 p. m.—Radio talk, Bill Schudt. 6:30 p. m.—Majestic String Ensemble. 11:30 p. m.—Connies' Inn Orchestra. 11 p. m.—Clifford Lodge Frolic.	<ul> <li>Wilkinson, barytone.</li> <li>9 to 10 p. m.—United States Naval Academy Band.</li> </ul>	8:43 p. m.—Mona Morgan, excerpts of Shakespeare. 9:30 p. m.—Vitali Koretzky tenor	9:05 p. m.—Musical program. 1130k—WMAK—BUFFALO—266m 7:15 p. m.—Dally news.	10:30 p. m.—Leroy Smith's orchestra. 11 p. m.—Joe Ward's Swanee Entertain
0 1 0 000		10:30 p. m.—Specht's Dance Orchesira.	7:30-10:30 p., m.—Musical. 940k—WGR—BUFFALO—319m 6:30 p. m.—Dinner music. 5:50 p. m.—Dinter music.	11:30 p. m.—Everglades orchestra. 12 mid.—Sophie Tucker's playground. 1160k—WRNY—NEW YORK—256
e Orchestras for This	Week	4:30 p. m.—Commenwealth Quartet. 5 p. m.—Instrumental program. 5:30 p. m.—Songs.	8 to 10 p.m.—Jointly with WEAF. 10 p.m.—Paricia Boyle, planist. 11 to 12 midnight.—Murray Whiteman's Serenaders.	11 a. m.—Art appreciation. 11:15 a. m.—Kudisch string quartetts 12 noom—Bernice Hardy. 12:30 p. m.—Frances Peper, soprano.
TUESDAY, APRIL 27 10:45 WJZ 455 George Olsen's	10:00 WHN 361 Roseland	5:55 p. m.—"Alfred Noyes," Alex. <b>duP</b> . Coleman. 6:10 p. m.—Market High Spots. 6:20 p. m.—Piano selections.	1080k-WHAM-ROCHESTER 278m 3:30 p. mTheater organ. 7:20 p. mBaseball scores.	12:45 p. m.—Violin solo. 6:45 p. m.—Chick Winter's orchestra. 7:30 p. m.—Catholic circle.
8:15 WODA 224 Jerry La Salle's 11:05 WOR 405 Fifth Avenue 9:00 WGY 380 WGY Orchestra 11:30 WFBH 273 Savoy	10:30 WJZ 455 Lorraine Grill 10:30 WAHG 316 Southland 10:30 WMSG 213 Paul Specht's	6:30 p. m.—Elementary Spanish lessons, 7 p. m.—Advanced Spanish lessons, 7:30 'p. m.—Police alarms.	7:25, p. m.—Weather forecast. 7:30 p. m.—Eastman Theater Orchestra. 8:05 p. m.—American composers' concert. Address by Dr. Howard Hanson.	7:45 p. m.—Ben Bernie's orchestra. 8:15 p. m.—Radio questions and answe <b>re</b> 8:30 p. m.—Rock Ferris's organ recit <b>al</b> .
10:00 WAAM 263 Naught's 10:30 WEAFA 492 V. Lopez 10:30 WCAFZ 492 V. Lopez 10:30 WCAU 278 Billy Hay's THURSDAY, APRIL 29	10:45 WHAM 263 Cance mult 11:12 WEAF 492 Ben Denser 11:00 WCAP 469 Dance must 11:00 WJAR 306 Biltmore	7:35 p. m.—Max Kalfus, tenor. 8 p. m.—Baseball results. 8:05 p. m.—Fishing, John J. Brawley.	980k—WJAR—PROVIDENCE—306m 1:05 p. m.—Al Billincoff's Orchestra. 7:30 p. m.—Chamber musical.	<ul> <li>9 p. nn.—Paullne Watson, 'violinist.</li> <li>9:15 p. nn.—Lorna Lea, love song girl.</li> <li>9:30 p. nn.—Frances Callow, Anita Seta harp and voice.</li> </ul>
10:30 WGBS 316 Arrowhead Inn 7:30 WEAF 492 Dance music 10:30 WFI 395 V. Lopez 7:30 WOO 508 Adelphia	11:00 WGY 380 WGY Orchestra 11:15 WRNY 258 Acolian 11:30 WFBH 273 Connies'	8:45 p. m.—Civil Service Announcements. 9 p. m.—Flute, John A. Biggs. 9:20 p. m.—Pegel Miller, sopropo	8 p. m2-and-1 Man and the Shinola Boys. 8:30 p. mDavis's Saxophone Octette.	10:30 p.m.—Lancellotti's song series. 11 p.m.—Win Unger's entertainers. 1410k—WMSG—NEW YORK—213m
10:30     WMSG     213     `Paul Specht's     7:45     WRNY     258     Ben Bernie's       10:35     WNYC     528     Dance music     8:00     WPG     300     Dance music       10:45     WJZ     455     George Oisen's     8:00     WJAR     306     Robert Powers	11:30 WMCA 341 Jack Denny's	9:35 p. m.—St. George Society Orchestra. 10:10 p. m.—"Trend of the Times," S. N. Ussher.	530K-WTIC-HAKTFORD-476m	7:30 p. m.—Dance orchestra. 8 p. m.—Sport talk. 8:15 p. m.—Willard Robinson, voice.
11:00         WPG         300         E. McKnight's         10:00         WOKO         233         Vanity           11:00         WIP         508         El Patio         10:30         WMSG         213         Paul Specht's           11:12         WEAF         492         Ross Gorman's         10:30         WJZ         455         Freddie Rich's           11:30         WPG         300         Traymore         10:30         WGBS         316         Arcadia	SATURDAY, MAY 1 7:30 WPG 300 Dance music 7:30 WGBS 316 Arcadia	10:30 p. m.—Police alarms; weather fore- casts. 10:35 p. m.—St. George Society Orchestra.		8:45 p. m.—Harry Hershfield. 9 p. m.—Mme. Eugenie Bauman, so- prano; Henry Bauman, barvtone.
11:30         WFBH         273         Connies'         10:30         WHN         361         Leroy Smith           WEDNESDAY, APRIL         28         11:00         WEAF         492         V. Lopez           11:00         WEMP         508         Levisthan         11:00         WIF         508         Levisthan	7:30 WFBH 273 Cosey 7:30 WOO 508 Adelphia 8:15 WRNY 258 Ben Bernie's	3:30 p. m.—Holmes String Ensemble. 7:15 p. m.—Winifred Bauer, pianist.	1070k—WNAC—BOSTON—280m 1070k—WOMEN's Club talks: news:	9:45 p. m.—Charles Wold, musical glasses. 10 p. m.—Mm Holoua's Royal Hawalians. 10:80 p. m.—Paul Specht's dance orches-
7:10 WGBS 316 Savoy II:00 WMCA 341 E. Golden's 7:80 WJZ 455 Markel's II:00 WHAR 275 Bergere's 7:30 WOR 405 Zit's II:00 WHAR 361 Everglades	10:00         WPG         300         Dance music           10:00         WOKO         233         Vanity           10:05         WIP         508         Dance music	7:40 p. mVida Milholland, "Spiritual	music. 12:15 p. m.—Noon service. 1 p. m.—Luncheon concert.	tra. 1430k
9:10 WAAM 263 Osborne's 9:30 WEBJ 273 Melville Five 9:35 WNYC 526 St. George's 7:00 WEAF 492 Markel's	10:30 WTIC 476 Carroll's 10:30 WJZ 455 Vanderbilt 10:30 WGBS 316 Arrowhead Inn	8:35 p. m.—Marion Kener, soprano. 8:50 p. m.—Hickman Price, "Overcoming Fear."	6:30 n m -Dinner dance	8 p. m.—Colonial Orchestra. 8:45 p. m.—Colonial Club Orchestra. 9 p. m.—Milton Yokeman, tenor.
10:00         WHN         361         Rogeland         7:45         WOO         508         Dance music           10:00         WLIT         395         Arcadia         8:25         WEBJ         273         Blue Bell           10:00         WMCA         341         Dance music         8:30         WPG         300         Dance music	10:30         WMSG         213         Paul Specht's           10:30-12 WGY         380         Dance music           11:00         WMCA         341         E. Golden's	<ul> <li>9:10 p. m.—Phyllis Kraeuter, 'cellist; Darl Bethmann, barytone.</li> <li>9:30 p. m.—Augusta Stetson, reading.</li> </ul>	7:30 p. m.—"Care of the Hair." 7:40 p. m.—Greater Boston Federation of Churches.	9:15 p. m.—Colonial Club Orchestra. 9:45 p. m.—Milton Yokeman, tenor. 10 p. m.—Lauretta Reynolds, songs,
10:30 WAHG 316 Utopia 10:30 WMSG 213 Paul Specht's 10:00 WLT 395 Arcadia 10:00 WPG 300 Dance music	11:00 WGCP 252 De Vita's	10 p. m.—Mary Pinney, organ recital. 10:15 p. m.—John Warren Erb, planist; Bbullin Krouten koulitet in Janist;	8 n m - The Hearthside Harmonizans	10:15 p. m.—Orchestra. 10:30 p. m.—Bob Brandes, songs. 10:40 p. m.—Orchestra.

1250k—NEW YORK—240m
130 p. m.—Organ recital.
10:30 p. m.—Organ recital.
10:30 p. m.—Women's Club talks; news;
10:30 a. m.—Women's Club talks; news;
10:30 n. —Women's Club talks; news;
10:30 n. —Noon service.
10 m.—Luncheon concert.
10 m.—Shepard Colonial toa dance.
12 n. —Vocal and plano selections.
130 p. m.—Kiddies' Klub.
130 p. m.—Mary binney, organ recital.
10 p. m.—Mary Pinney, organ recital.
10 p. m.—Mary Pinney, organ recital.
10 p. m.—Mary Pinney, organ recital.
10 p. m.—John Warren Erb. planist:
11 p. m.—The Hearthside Harmonizers.
12 p. m.—John Warren Erb. planist (s 30 p. m.—Playlet, "The One Woman," Phyllis Kraeuter, 'cellist; Marion C. WNAC Players.
11 p. m.—Wax Concert Orchestra. Adelphia Ben Bernie's Dance music Vanity Dance music Raderman's Carroll's Carroll's Vanderbilt Arrowhead Inn Paul Specht's Dance music E. Golden's De Vita's

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1430k-WBNY-NEW YORK-210m 7 p. m.-Hy Smith's Orchestra. 8 p. m.-Colonial Orchestra. 8 p. m.-Colonial Club Orchestra. 9 p. m.-Milton Yokeman, tenor. 9:15 p. m.-Colonial Club Orchestra. 9:45 p. m.-Milton Yokeman, tenor. 10 p. m.-Lauretta Reynolds, songs. 10:15 p. m.-Orchestra. 10:30 p. m.-Orchestra. 10:40 p. m.-Orchestra. (Continued on next page)

# Additional Radio Programs for the Week

(Continued from preceding page) 880k-WMCA-NEW YORK-341m

8806-WHOA-ALW ISHINGTON 10:15 a. m.-News letter; market report 11 a. m.-Housewife period. 11:15 a. m.-Gardening. 11:20 a. m.-Market reports (hourly t 3:30 p. m.) 12 noon-Elizabeth Bohn, food bureau.

12 noon-Elizabeth Bohn, food bureau 12:30 p. m.-Market reports. 1 p. m.-Dept. of Agriculture. 1:15 p. m.-Olcott Vall's string ensemble 2 p. m.-Entertainers. 3 p. m.-Musical program. 3:10-4 p. m.-News items. 4:15 p. m.-Charles Furcell, tenor. 5:04 p. m.-Dat Items.

534 p. m.—News items. 8 p. m.—Olcott Vall's string ensemble. 7 p. m.—Twin Oaks orchestra. 7:30 p. m.—Klein's Serenading Shoe

makers. 8 p. m.—Pace Institute program. 8:05 p. m.—Musical program. 9 p. m.—Musical program. 9 p. m.—Mathan Straus Serenaders. 10 p. m.—Tango Palace Orchestra. 10:30 p. m.—California Ramblers. 11 p.m.—Ernie Golden's Orchestra. 12 p. m.—Eroadway Night.

570k-WNYC-NEW YOBK-526m

570k-WNYC-NEW YORK-526m 570k-WNYC-NEW YORK-526m 570k-WNYC-NEW YORK-526m 5710 p. m.-Rostil's Sister Helen," Lewis Mott. 5715 p. m.-Flano selections. 5715 p. m.-Flano selections. 5715 p. m.-Police alarms. 530 p. m.-Resume of Meeting of the Board of Estimate. 8 p. m.-Baseball results. 8:30 p. m.-Anaual Concert of Edison Glee Club. Soloists: William Lock-wood, violinist; Alma Filstead, so-prano.

prano. 10 p. m.—Piano selections. 10:10 p. m.—"Algeria." 10:30 p. m.—Police alarms.

1100k-WFBH-NEW YORK-273m

m.—Orchestra. m.—Studio program. p. m.—Eddie Gilles, barytona. p. m.—Jeanee A'Dair, songs. m.—Radioviews, Mrs. Owen Kildar 4 p. m.—Radioviews, Mrs. Owen Kildar 4:15 p. m.Jey Fassett, barytone. 4:30 p. m.—Educational talk, J. Spenc

Miller. 4:45 p. m.—Eddie Woods, songs. 6 p. m.—Warner Theater Hour. 8 p. m.—Dotty McLean, Leo Ford, songs 5:15 p. m.—Automobile Routes, H. K. Napies.

Naples. 30 p. m.—Majestic String Ensemble. 345 p. m.—Lela Longtin, tenor. p. m.—Yorkville Radio Entertainers

7 p. m.—Yorkville Radio Entertainers.
1040k.—WLWL.—NEW WORK.—288m
8:30 p. m.—McEnery's Entertainers.
9 p. m.—Muestion box.
9:30 p. m.—Harold Noble, tenor.
10 p. m.—'Books," Walter V. Gavigan.
10:15 p. m.—Margaret Lyons, contraito, Gerard Dunn, violinist.
40:30 p. m.—Organ recital, Eugene Sul-sifiven.

1290k-WOKO-NEW YORK-233m 12906.—WORD-REW JOHNSTON 8 p. m.—Frank Galassi, Songstef. 8:15 p. m.—Dorothy Elsenstadt, soprano 8:55 p. m.—Washington Heights Players 8:50 p. m.—Jerry Alexander, songs. 9:05 p. m.—Helen Parisi, soprano. 9:20 p. m.—August Plazza, violinist. 9:40 p. m.—Corbestra.

) p. m.--Orchestra. 1100k-WBBR-STATEN ISLAND-273

B. m.—Jubilee Trumpeters.
B:10 p. m.—Walter Stoll, tenor.
B:20 p. m.—Bible lecture.
B:40 p. m.—Walter Stoll, tenor.
B:50 p. m.—Jubilee Trumpeters.

8:50 p. m. Jubilee Trumpeters
8:50 p. m. Jubilee Trumpeters
8:50 m. Harden State State

1140k-WAAM-NEWARK-263m n. m.—Happy hour program. . m.—Ernie Krickett's Artists. . m.—Talk on sports by Major Tate

1190k-WGCP-NEWABK-252m 1998 WGCT - How And Walk and Strate 8:80 p. m. - Night Owl Orchestra. 9:30 p. m. - Colvoy Male Quartet. 10 p. m. - Irving Rudman, pianist. 10:16 p. m. - Novelty entertainers. 12:midnight - Llewelly and Browne. 12:30 p. m. - Lyric Orchestra.

1340k-WODA-PATERSON-224m

590k-WIP-PHILADELPHIA-508m

m.—Setting-up exercises.
 m.—Luncheon music.
 m.—Lansdale Conservatory of Music.
 g. m.—Franklin Concert Orchestra.
 g. m.—Uncle Wip's plano solo.
 p. m.—Uncle Sequicentennial."
 8:15. p. m.—United Synagogues of

America. 8:45 p. m.--Concert from Institute of Mu-

BIGELART. 10:10 p.m.—A talk by Elder Roberts. 10:30 p.m.—Little Jack Little. 11 p.m.—Leviathan Orchestra.

12:05 p. m.—Organ recital. 12:20 p. m.—Religious service. 12:35 p. m.—Ben Franklin Concert Or

chestra. 2 p. m.—Arcadia Concert Orchestra. 4:30 p. m.—News flashes; artist re 7:30 p. m.—Dream Daddy.

7:30. p. m.—Dream Daddy.
760k.—WFI.—PHILADELPHIA.—395m
15 m.—Tea Room Ensemble.
140 p. m.—Tea Room Ensemble.
140 p. m.—Concert orchestra.
15 p. m.—Concert orchestra.
7 p. m.—Dance orchestra.
7 p. m.—Sally Caskin, planist.
6:15 p. m.—Program from WEAF.

500k—WOO—PHILADELPHIA—508m 1 a. m.—Grand organ. 2 noon—Luncheon music.

12 noon—Luncheon music. 4:45 p. m.—Grand organ, trumpets. 7:30 p. m.—Dinner dance music. 7:30 p. m.—Dinner dance music.
1080k.—WCAU.—PHILA.~PHIA.—273m
8:30 p. m.—Billy Hays's Orchestra.
7:30 p. m.—Snellenburg Symphony Orch.
9 p. m.—The Eight Bright Shoe Boys.
8:30 p. m.—Norman Barr, barytone.
8:45 p. m.—The Kandy Kids.
9 p. m.—TBarry O'Moore, tenor.
9:30 p. m.—Comedy lesson, Prof. Doo-little.

10 p. m.-Sesquicentennial Hour. 11 p. m.-Parodian's Orchestra. 11:30 p. m.-Madrid Revue.

100k-WPG-ATLANTIC CITY-300m \$15 p. m.-Sports talk; news flashes an baseball scores; Press-Union Publish

baseball scores; Press-Union Publish ing Company.
6:45 p. m.—Organ recital.
7 p. m.—Dinner music.
8 p. m.—Dance orchestra.
8:80 p. m.—Auction Bridge game.
9 p. m.—Traymore Concert Orchestra.
10 p. m.—Million Dollar Piér Orchestra.
10 s. m. — Tarymore Dance Orchestra.

10:3 p. m.—Traymore Dance Orchestr 790k—WGY—SCHENECTADY—380m 10:3 p. m.—Reports. 2 p. m.—Music; talk, "Why Eat Eggs?" 6 p. m.—Busic; talk, "Why Eat Eggs?" 7 m.—Stock reports; news. 330 p. m.—Dinner program. 7:30 p. m.—Buseball scores. 7:35 p. m.—"WGY Book Chat." L. L

Hopkins. 7:45 p. m.—Syra use University program. 9 p.m.—Royal Salon-Orchestra. 10 p. m.—'A Night in the Country Store With the Corn Huskers Orghestra.'' 11:30 v. m.—Organ recital.

940k-WGR-BEFFALO-319m 6:30 p. m.-Dinner music 8 to 11 p. m.-Jointly with WEAF. 1080k-WHAM-ROCHESTER-278m 3:30 p. m.—Eastman Theater organ,
6:35 p. m.—ook chat from WGY,
6:45 p. m.—Program from WFBL.
8 p. m.—Baseball scores. 980k-WJAR-PROVIDENCE-306m

10:30 a. m .- Priscilla of the Mayflowe Stores. — The number of the Markowski Stores.
 1:05 p. m.—Studio program; talk.
 8 p. m.—Robert Powers's Orchestra.
 9-11 p. m.—Program from WEAF.
 1070k—WANC—BOSTON—280m

10:30 a. m.--Women's Club talks;

10:30 a. m.—Women's club tarks, news, music. 12:15 p. m.—Noon service. 1 p. m.—Luncheon concert. 2:55 p. m.—Play by play report, Braves vs. New York Glants. 6:30 p. m.—Talk, J. D. Mitchell. 7:30 p. m.—Talk, J. D. Mitchell. 7:40 p. m.—Talk, J. D. Mitchell. 7:40 p. m.—The Golf Question Box. 8 p. m.—Concert program. 9:30 p. m.—Varied program. 9:30 p. m.—Udo Venice dinner dance. seou-wEEL\_MOSTON-349m.

10 p. m.—Lido Venice dinner dance.
860k.—WEEL.—BOSTON.—349m.
10:15 a. m.—Anne Bradford.
12:45 p. m.—Boston Farmers' Report.
2 p. m.—Earl Cummings's Orchestra.
3 p. m.—Events of the Day.
4 p. m.—Events of the Day.
5:00 p. m.—Stock market; news.
6 p. m.—Lost and Found.
6:05 p. m.—Lost and Found.
6:45 p. m.—Big Brother Club.
7:30 p. m.—Program same as WEAF.
900k.—WBZ.—SPRINGFIELD.—333m

900k-WBZ-SPRINGFIELD-333m m.-Kimball Trio. p. m.-A lesson in magic. p. m.-Lenox Ensemble.

7:30 p. m.—Lenox Ensemble. 8 p. m.—Musical program. 9 p. m.—Gertrude Goldberg, violinist; Nora Gladden Winton, contralto. 9:30 p. m.—Organ recital. 10:30 p. m.—Edward McEnelly's Orchestra.

640k-WRC-WASHINGTON-469m 2 noon—Fifty farm flashes. 2.20 p. m.—Organ recital. p. m.—Mayflower Orchestra. B. m.—New York-Washington

game. p. m.—New Willard Orchestra. 45 p. m.—"The Political Situat

Washington." :05 p. m.-To be announced.

B. M. -- Radio-movie present from W JZ.
 9 p. m. -- Royal Salon Orchestra.
 10 p. m. -- The Record Boys.
 10:30 p. m. -- Meyer Davis's Band.

10:50 p. m.—Meyer Davis's Band.
970k.—KDKA.—FITTSBURGH...309m
6:30 p. m.—Dinner concert.
8 p. m...—Stockman-farmer news.
8:15 p. m...—Farm program.
8:30 p. m...—Joseph Haydn, composer, and KDKA Little Symphony Orchestra.
9 p. m...—Joseph Haydn music, with oratorio quartet, Symphony Orchestra.
11 p. m...—Concert from "Post" studio.

1 p. m.p. m.-Concert from "Post" studio. 650k-WCAE-PITTSBURGH-461m

650k WCAE-FIT SBCRUM-161 6:30 p. m.-Dinner concert. 7:30 p. m.-Children's period. 8 p. m.-Concert. 8:30 p. m.-Hire's Harvesters. 9 p. m.-Cliquot Eskimos. 10 p. m.-Silvertown Cord Orchestra.

FRIDAY

610k-WEAF-NEW YORK-492m :45-7-7:20 a.m.—Health exercises. :45 a.m.—Prayer services. 0:45 a.m.—Home.Service talk. 1:05 a.m.—Raymond Maher, baryton 13 p. m.—Talk.
13 p. m.—Talk.
130 a. m.—Raymond Maher, barytone.
140 p. m.—Columbia University lecture noon—Market and weather reports. noon-Market and weather reports p. m.-Aletta Crump, entertainer. [5 p. m.-Raymond Trundy, planist. 30 p. m.-John Butler jr., tenor. 15 p. m.-Talk. p. m.-Vincent Lopez's Orchestra. p. m.-Minchael Markel's Society (

p. m. — Michael .... chestra. 7:30 p. m. — Story 'Teller. 7:45 p. m. — "Dickens Corner." 7:45 p. m. — "Dickens Boys. 8:30 p. m. — Kapiness Boys. 8:30 p. m. — Kapinether Boys. 9 p. m. — "Robin Hood's Forest," Wir b. m.—"Robin Hood's Forest," Wirt Barkitz.
b. m.—Madeleine Southworth, con-traito; William Detlef, planist.
b. M.—"A Tale of Chinatown." Sax Rohmer. Rohmer. 10 p. m.—Whittall Anglo-Persians. 10 30 p. m.—May Singhi Breen, banjoist; Peter De Rose, planist. 11-12 p. m.—Ben Bernie's Orchestra.

11-12 p. m.—Ben Bernie's Orcaestra-660L—WJZ—NEW YORK—455m
1 p. m.—Ambassador Trio,
2 p. m.—Weather and balloon news,
4 p. m.—'Your Dally Monu," Mrs. Julian Heath.
4:15 p. m.—"They Are Wearing," Suzanne Brown, Suzanne Brown, Suzanne 4:15 p. m.—"They Are Wearing. Suzanic Brown.
4:25 p. m.—"Solving Candy Problems."
4:25 p. m.—Market Contenstra.
5:32 p. m.—Market quotations.
5:35 p. m.—Financial summary.
5:40 p. m.—Conton quotations.
5:50 p. m.—Farm market reports.
7 p. m.—Commodore Concert Orchestra.
8:30 p. m.—Bornie Laddies.
8:30 p. m.—Lorraine Grill Orchestra.
10:30 p. m.—Lorraine Grill Orchestra.
11:31 ph.—Weather and balloon news.
acoh\_WGBS-NEW YORK—316m

950k-WGBS-NEW YORK-316m

10 a. m.—Timely talks with Terese. 10:10 a. m.—Adeline Bierman, soprano. 10:15 a. m.—Radio gym class. 10:25 a. m.—United Women's Wear 10:25 a. m.—United Wohlen 2 League talk. 10:35 a. m.—Adeline Bierman, songs. 10:45 a. m.—Housefurnishing Review.

:30 p. m.—Scripture reading. :40 p. m.—Carl Smith, tenor; Andy Boyle

1:40 p. m.—Gart binner, terminal boyle.
Boyle.
by m.—Henrietta Mayer, soprano.
p. m.—Program for Roslyn, L. I. public schools.
1:30 p. m.—E. F. Massey, tenor.
1:50 p. m.—Henrietta Mayer, soprano.
p. m.—Hinrietta Gruber, soprano.
p. m.—Iris Gruber, soprano.
p. m. —Iris Gruber.
soprano.
p. m. — Iris Gruber.

p. m.—Swimming tober p. m.—Iris Gruber. p. m.—Theory lessons; music. m.—Uncle Geebee. m.—Uncle Geebee.
 p. m.—Orpheus Ensemble.
 p. m.—'What's Your Radio Problem
 p. m.—Education camp exhibition.

15 p. m

15 p. m.—Education camp exhibition.
570k—WNYC—NEW YORK—526m
5:10 p. m.—Market high spots.
1:30 p. m.—Elementary lessons.
1:30 p. m.—Police Alarms.
1:35 p. m.—Matthew Arnold," Prof. J
G. Troop.

35 p. m.— Matthew Arnors,
G. Troop.
55 p. m.—Plano selections.
p. m.—Baseball results.
55 p. m.—Rudolph Joskowitz, violinist.
30 p. m.—Joseph Wohlman, pianist.
p. m.—"Only a Chair," Dr. Frank H.

9 p. m.—"Only a Chair, Di. Trunc — Vizetelly.
 9:15 p. m.—Hjalmar Kober, pianist;
 Charles Werner, barytone.
 10:10 p. m.—Instrumentál program.
 10:30 p. m.—Police Alarms; weather.
 10:30 p. m.—Velice Alarms; weather.

10:10 p. m.—Pinar difference Profiles of the second seco

tainers. 15 p. m.—Frank H. Ochs, Morris Pearlman. 9:30 p. m. --Loew's Organ Recital. 10 p. m. --Roseland Dance Occhestra. 10:30 p. m. --Aratol Friedland. 11:30, p. m. --Kit Kat Entertainers. 12 midnight--Dance orchestra.

6

880k-WMCA-NEW YORK-341m 10:15. p. m.-News letter; market reports 11:30 a. m.-Housewife Period. 11:30 a. m.-Market reports (hourly to 3:30 p. m.). 590k-WIP-PHILADELPHIA-508m 6:45 a. m.-"Start the day right." 3 p. m.-"The Permanent Court of Inter-national Justice," Roland S. Morris. 6:05 p. m.-Dinner music. 11 a. m.—Housewite Period. 11:30 a. m.—Market reports (hourly to 3:30 p. m.). 12 noon—Musical program. 1 p. m.—Department of Agriculture. 1:15 p. m.—Olcott Vall's String Ensemble 2 p. m.—Musical program. 3 p. m.—Musical program. 3 p. m.—Musical program. 4:10 p. m.—News itema. 4:10 p. m.—Lost and Found Department. 4:13 p. m.—Music. 5-5:25 p. m.—Olcott Vail's String En-semble. 6:05 p. m.—Dinner music. 6:50 p. m.—Market reports. 7 p. m.—Bedtime story; songs.

1000k-WPG-ATLANTIC CITY-300m

790k-WGY-SCHERTA 12:30 p. m.-Reports. 2 p. m.-Asia Orchestra. 2:30 p. m.-Music; "Health Notes." 6 p. m.-Stock reports; news. 6:30 p. m.-Stock reports; news. 6:30 p. m.-Vanday school lesson. 7 p. m.-Van Curler Orchestra. 7 p. m.-Baseball scores; health talk.

acts. 10 p. m.—Vassar Alumnæ Association. 11 p. m.—WYG Orchestra.

940k-WGR-BUFFALO-319m

6:30 p. m.—Dinner.music. 7:30 p. m.—Jointly with WEAF. 8 p. m.—Audubon Terrace Meadow Larks. 8:30 p. m.—'The Joint Charities and Community Fund." 9 p. m.—Winger's Crescent Entertainers. 9:30 p. m.—Violin, vocal and piano re-

cital. 10 p. m.-Whittall Anglo-Persians. 10:30 p. m.-Hewitt Humorists. 11 p. m.-1 a. m.-Vincent Lopez's Dance

S80k-WJAR-PROVIDENCE-306m

105 p. m.—Howard & Harris. 8 p. m.—Howard & Harris. 8:20 p. m.—Health talk. 8:30 p. m.—Gorman's Jolly Bakers. 9 p. m.—Musical program. 10 p. m.—Whittall's Anglo-Persians. 11 p. m.—Biltmore Dance Orchestra.

1070k-WNAC-BOSTON-280m 10:30 a. m.-Women's Club talks; music

p. m.—Luncheon concert. p. m.—Tea dance. 5 p. m.—Kiddies' Klub. 130 p. m.—Dinner dance. 130 p. m.—Boston Better Business Com-

mission. 8 p. m.—The Kitchen Canaries. 8:30 p. m.—Radio Skit. 9 p. m.—Concert. 10 p. m.—Dance music; popular selec-tions.

tions. 860k-WEEI-BOSTON-349m p. m.-Brighton High School senior play, "Thank You." p. m.-Events of the Day. 3:10 p. m.-George Joy, Nell Cantor,

3:10 p. m.—George JJJ, Ven Cartessongs.
4 p. m.—Trueman Carewe's Orchestra.
5:50 p. m.—Business news.
6:13 p. m.—Joe Rines's Orchestra.
6:45 p. m.—Big Brother Club.
7:30 p. m.—Whiting program.
8:30 p. m.—Neapolitan program.
9 p. m.—Musicale.
9:30 p. m.—Whittail Anglo Persians.
10 p. m.—Whittail Anglo Persians.

900k-WBZ-SPRINGFIELD-333m

p. m.—Kimball Trio. 30 p. m.—Lenox Ensemble. 35 p. m.—Course in Economics. 15 p. m.—Edward J. McEnelly's Or

chestra. 145 p. m.—Program arranged by Rus-sel Burbank. 15 p. m.—Quartet of the Second Church. 0:15 p. m.—To be announced. 640k.—WRC.—WASHINGTON.—469m.

m.—Play-by-play, New York-Wash-Ington baseball game.
 m.—U. S. Marine Band Orchestra.
 m.—W. Spencer Tupman's Orchestra.
 m.—W. Spencer Tupman's Orchestra.
 m.—Book reviews, Mrs. Nina Reed.
 640k.—WCAP.—WASHINGTON.—469m
 645 a. m.— Tower Health Exercises."
 f.11 p. m.—Mozart String Quintet, story teller; market summaries; playlet; music and popular science talk; pro-gram from WEAF.
 p. m.—Dance music.
 970k.—KDKA.—PITTSBURGH.—309m
 g. p. m.—Dinner concert.
 B. p. m.—Stockman-farmer news.

ersity of Pittsburbh ad

7, 7:20 a. m.—Health exercises a. m.—Prayer services. 11 p. m.—De Vita's Orchestra. 1140k—WAAM—NEWARK—263m 6 p. m.—Danner Music. 7 p. m.—Carl Smith, tenor. 7 m.—'The Moscow Stage Revival;" 9. m.—Helené Hoffman, plano-10 p. m.—Orpheus Mixed Quartefte, 10 p. m.—Orpheus Mixed Quartefte,

p. m.-Organ

6:30 p. m.—Dinner concert. 8 p. m.—Stockman-farmer news. 8:15 p. m.—University of Fittsbur dress, healt htalk.

dress, healt htalk. 8:30 p. m.—Westinghouse Band. 9:55 p. m.—Time signals; weather 40:05 p. m.—Teaberry time:

SATURDAY

610k-WEAF-NEW YORK-492m 45, 7, 7:20 a. m.-Health exercises. 45 a. m.-Prayer services.

7110 p. m.—Heitele Honman, plate-logue.
730 p. m.—Heitele Honman, plate-risto p. m.—Pattison Coates, barytone.
8:15 p. m.—Pattison Coates, barytone.
8:30 p. m.—Boy Scout program from D. A. R. Continental Memorial Hall; music by the United States Marine Band; addresses by President Calvin Cool-idge, Sir Robert Baden-Powell; service medals presentation.
70:15 p. m.—Lou Raderman's Orchestra.
11:15-12 p. m.—Vincent Lopez's Orchest-tra.

a. 660k—WJZ—NEW YORK—455m

4:30-5:30-7:30-8:0:30 p. m. - How Service 5:32 p. ... - Market quotations.
5:33 p. m. - Financiał summary.
5:40 p. m. - Cotfon quotations.
5:50 p. m. - Farm market reports.
7 p. m. - Commodore Concert Orchestra.
7:45 p. m. - Congressional Forum.
8:30 p. m. - Madison Concert Orchestra.
10:30 p. m. - Vanderbilt Della Robia Orchestra.
12 p. m. - Weather; balloon news.

880k-WMAC-NEW YORK-341m

1:30 p. m. 12 noon-Musical program. 1 p. m.-Department of Agriculture. 1:16 p. m.-Olcott Vail's String En

semble.
p. m.—Olcott Vail's String Ensemble
6 p. m.—Musical program.
8 p. m.—Current events.
9:30 p. m.—Musical program.
10 p. m.—Moxical program.
10 p. m.—McAlpin news editor.
11 p. m.—Ernie Golden's Orchestra.
12 midnight-McAlpin Entertainers.
12 midnight-McAlpin Entertainers.

570k—WNYC—NEW YORK—526m p. m.—Hilda Reich, soprano. 15 p. m.—Fitzpatrick brothers. songs. 30 p. m.—Police alarms.

7:35 p. m.—Dinner music. 8:40 p. m.—'New York's Largest Flower Garden," by Dr. C. Stuart Gager. 9 p. m.—Lawrence Metcalf, whistler. 9:15 p. m.—Kessler Trio and Quartet. 9:55 p. m.—Songs. 10:10 p. m.—Dramatic reading, Harlette

Weems. 10:30 p. m.—Police alarms; weather.

1290k-WOKO-NEW YORK-233m

8 p. m.-Ismay McIntyre, pianist. 8:15 p. m.-Jeanne A'Dair, soprano, 8:35 p. m.-Rita Redbord, soprano;

Andrew Roth, planist. 19 p. m. Vanity rchestra.

m .--- Dinn

1:30 p. m. Harket reports, hourly 1:30 p. m.

660k—W92-142 p. m.—Knickerbocker Orchestra. p. m.—Weather; balloon news. 1:30 p. m.—Lorraine Grill Orchestra. 1:30-5:30-7:30-\$10:30 p. m.—News ser 5:32 p. .—Market quotations.

12:15 p. m.-Noon service.

790k-WGY-SCHENECTADY-380m

p. m.—Ambassador Concer 30 p m.—Traymore Grill

1:30 p. m.—Luncheon music.
4:30 p. m.—Organ recital.
6:45 p. m.—Organ recital.
7 p. m.—Hotel Traymore dinner music.
7:30 p. m.—Dance orchestra.
8 p. m.—Educational series.
8:15 p. m.—Studio program.
8:30 p. m.—Dance orchestra.
9 p. m.—Dance orchestra. 10 p. m.--Dance orchestra. 11 p. m.--Organ recital.

semble.
6:30 p. m.—Ernie Golden's Orchestra.
7:30 p. m.—Sach's Quality Boys.
8 p. m.—To be announced.
8:50 p. m.—Cousins Shoe Style Talk.
8:50 p. m.—Bradway Association.
9 p.m.—Hardman Hour of Music.
10 p. m.—Broadway Association.
9 p.m.—Hardman Hour of Music.
11 p. m.—Hofbrau Haus Entertainers.
11:36 p. m.—Jack-Denny's Orchestra.
12 midnight—McAlpin Entertainers.
13:50 Funden NGEN

1250k-WHAP-NEW YORK-240m

1300 m. - Holmes String Ensemble. 7:10 p. m. - Mary Pinney, planist. 7:25 p. m. - Kitty Cheatham. 7:25 p. m. - News digest. 8:15 p. m. - Philharmonic Woodwind En-

4 p. m.—van Curler Orchestra. 7:30 p. m.—Baseball scores; health talk. 7:40 p. m.—"French by Radio." 8:15 p. m.—Ninth episode of play, "A Step on the Stairs." 8:30 p. m.—"Enoch Arden." play in five :45 p. m.—Hugh Adams, "Immigration p. m.—Philharmonic Woodwind En-

semble.
9:30 p. m.—Franklin Ford, "Protestant-ism."
9:45 p. m.—WHAP mixed quartet.
10 p. m.—Dorothy Hoyle, violinist; Vida Milholland, soprano; Rebekah Beam, contralto; Lucile Wilkin, pianist; Ruth Montgomery, soprano.
10:45 p. m.—John Erb, organist.

1100k-WEBJ-NEW YOEK-273m

7 p. m.—Blenheim Theater Ensemble. 7:45 p. m.—Kathryn Connolly, soprano. 8 p. m.—Clarence Williams Trio. 8:25 p. m.—Original Blue Bell Sere-

1160k-WRNY-NEW YORK-258m 1160k-WKNY-NEW YORK-230m 11 a. m.-King's Life Lead's Hour. 11:45 a. m.-Ralph Christman, planist. 12 noon-Musical Courier Says-12:15 p. m.-Bob MacDonald, ukelele. 12:30 p. m.-Pauline MacDonald, soprano 12:30 p. m.—J. Caplin, tenor. 12:45 p. m.—J. Caplin, tenor. 5:15 p. m.—Temple Emanu-El Frida; night services.

7 p. m.—Sports. 7:10 p. m.—Commerce of the day. 7:15 p. m.—Radio Theater Index. 7:20 p. m.—Marjorie Stuart, songs. 7:30 p. m.—Margery McRay, soprano. 7:45 p. m.—Alfred W. McCann, "Foods." 8 p. m.—Gordon Hampson Opera Com-

8 p. m.—Graffman's ulights on Spiritual-ism," J. H. Kraus.
9 p. m.—Graffman's violin recital.
9 p. m.—Constantino Ensemble.
10:15 p. m.—Novelty Night.
11:15 p. m.—Acolian Orchestra.

1410k-WMSG-NEW YORK-213m :30 p. m.-Dance orchestra. 4 30 p. m.—Dance orchestra.
8 p. m.—Sport talk.
8:15 p. m.—William McCarthy, barytone
8:30 p. m.—Adler, Weil, Herman Trio
8:45 p. m.—Max Berman, tenor.
9 p. m.—Sidney Raphael, piano.
9:30 p. m.—Mixed quartet.
10 p. m.—Beile Brooks, Jack Lauria

entertainers. 10:30 p. m.—Paul Specht's Orchestra.

p. m.-Warner Theater.
 p. m.-Housekeepers' half hour.
 3:30 p. m.-Bob Flemings's Orchestra.
 p. m.-Murray Schwartz, piano.
 4:30 p. m.-Frances Sper, songs.
 f. m.-Warner Theater Hour.
 p. m.-Knoll & Lang, harmonists.
 6:16 p. m.-Judge Clarise M. Baright.
 6:30 p. m.-Monroe Fleck's Orchestra.
 12 midnight-Twin Oaks Orchestra.

1430k-WBNY-NEW YORK-210m

p. m.-Trio. p. m.-Clifford Odets dramatic review

p. m.—Clifford Odets dramatic review,
 S:15 p. m.—Olive May, "Sunshine Girl."
 S:36 p. m.—Jack Davis, barytone,
 S:46 p. m.—Jack Davis, barytone,
 S:47 p. m.—U. S. Navy Band.
 S:30 p. m.—Martha Kovacs, violinist.
 10 p. m.—Emma Held.
 10:15 p. m.—Orchestra selections.
 S. T. BULYLON BULL\_316m

950k-WAHG-RICHMOND HILL-3161

950k—WAHG--KICHMOND HILL-316; 12:02 p. m.—Edusical program. 7:30 p. m.—Edua Bockstein, planiste. 8 p. m.—Great Artist" organ recital. 9 p. m.—Henrietta Mastin, soprane. 9:15 p. m.—Henrietta Mastin, soprane. 9:30 p. m.—Leon Goldman, violinist. 10:02 p. m.—The Gondoliers. 10:30 p. m.—Southland Davce Orchestrat

740k-WOB-NEWABK-405m

2:30 p. m.—Robert Wyatt, tenor.
2:45 p. m.—Lillan Ring, soprano.
3 p. m.—Frances Pehl, planist.
3:15 p. m.—Robert Wyatt, tenor.
3:30 p. m.—Harry Humphrey, entertainer.
3:45 p. m.—Frances Pehl, planist.
6:16 p. m.—Bill Wathey, "Sports."
6:30 p. m.—News bulletin.
6:40 p. m.—Bretton Hall String Quartet.

1140k-WAAM-NEWARK-263m

10:30 a. m. — Happy hour program. 11 a. m. — Cooking school. 11:30 a. m. — Happy hour program. 6 p. m. — Norman Gehrie's Orchestra.

10 p. m.-Wallie Osborne, orchestra.

p. m.—Alice Laurie. soprano. 15 p. m.—Blanche Darvo, songs.

1190k-WGCP-NEWABK-252m

:30 p. m.—Alice Laurie, soprano. p. m.—Wolgemuth and Bertram, plano

duets. 8:15 p. m.-William Boyd, bird imita-tions. 12 p. m.-Humming Bird Orchestra. 1. m.-Eagle Screpaders.

1340k-WODA-PATERSON-224m

noon-Dance music; opera. . m.-Studio program.

5 p. m.—Studio program. 5:30 p. m.—News; sport talk. 6 p. m.—Pheens: Orchestra.. 8:45 p. m.—Call essay contest. 9:30 p. m.—Call essay contest. 9:45 p. m.—Uke Pete, uke and songs. 10:30 p. m.—Harry Lange's guitar. 10:30 p. m.—Clifford Lodge frolic.

750k—WFI—PHILADELPHIA—395m 0:80 a. m.—Music; home service talk. p. m.—Tea room ensemble. p. m.—Sesquicentennial.

-Concert orchestra.

7 p. m.—Dance orchestra.
7 p. m.—Dance orchestra.
760k.—WIIT.—PHILADELPHIA.—395m
12:05 p. m.—Organ recital:
12:20 p. m.—Religious service; orchestra.
2:30 p. m.—Playlet.
4:30 p. m.—News flashes.
4:35 p. m.—Artist recital.
7:30 p. m.—Dream Daddy.
8 p. m.—Tream Daddy.
8 p. m.—Studio program.
9:30 p. m.—Schickerling artists.
10 p. m.—Freshman radio hour.
12 p. m.—Hufus and Rastus.
11 p. m.—Freshman radio hour.
12 p. m.—Musical comedy and theatrical stars.
590k.—WOO—PHILADELPHIA.—508m

stars. 590k—WOO—PHILADELPHIA—508m 11 a. m.—Grand organ. 12 noon—Luncheon music. 4:45 p. m.—Grand organ; trumpets. 7:30 p. m.—'Sir Hobgoblin.''

12 noon-Luncheon music.
4:45 p. m.-Grand organ; trumpeta.
7:30 p. m.-"Sir Hobgoblin."
7:45 p. m.-"The newspaper and the leges." Harvey Watts.
8:15 p. m.-WOO Orchestra series.
8:25 p. m.-Fox Theater studio prog
10 p. m.-Whitfall Anglo-Persians.

10:30 p. m .- Dance musican

7:10 p. m.—Taik on sports. 7:10 p. m.—Arthur Greenfield, tenor, 7:30 p. m.—Taik on Newark. 7:50 p. m.—Midred Tenbrook, songs. 8:15 p. m.—Midred Huntoon, taik. 9:30 p. m.—Salvatore Villani, tenor; Rina Guindani, pianist, and David Valillio, violinist. 0 p. m.—Wellie Octore

6:45, 7:15, 7:45 a. m.—Gym class. 2:30 p. m.—Robert Wyatt, tenor.

p. m.--Warner Theater. Voucekeepers' half hour.

1100k-WFBH-NEW YORK-273m

# The Transmitting Set's Relation to Musical **Quality of Radio Reception**

Correct Modulation of the Broadcasting Station's Signals Is Important

TN THE preceding article of this series on "Radio Music in the Home" there have been presented in considerable detail, the reasons why unusual fidelity of reproduction is required in radio recention if the listener is to enjoy the full benefits of modern broadcasting, with its frequently excellent programs and individual performers of unsual merit. High quality reproduction, depending as it does on acoustic synchronizing or the production in the home of sound waves exactly duplicating those in the studio, is therefore one of the most essential factors in modern broadcasting transmission and reception. The possible contribution to

950k-WGBS-NEW YORK-316m
10 a. m.-Radio Fashion Show models on schibition, gowns described by Hall Deance.
10:10 a. m.-Kiddie Club program.
10:40- a. m.-Florence Carrol, pianist.
10:50 a. m.-Florence Carrol, pianist.
10:50 a. m.-Timely talks with Terese.
1:30 p. m.-Scripture reading.
1:40 p. m.-Hansen and Howard, songs.
2 p. m.-Jack Lauria, Belle Brooks, en-tertainers.
2:30 p. m.-Jack Lauria, Belle Brooks, entertainers.
2:30 p. m.-Jack Lauria, Belle Brooks,

ntertainers. :40 p. m.—Hansen and Howard, plano

2:40 p. m.—Hansen and Howard, piano twins.
3 p. m.—Radio Fashion Show, models on exhibition, gowns described by Hall Dearão.
3:10 p. m.—Robert Greenbaum, violinist.
3:20 p. m.—Child Health talk.
3:30 p. m.—Robert Greenhaum, Ted Coughlin.
6 p. m.—Uncie Geebee.
6:30 p. m.—Vincent Sorev Concert Trio.
7:15 p. m.—Herman Black "Outlines of Travels."
7:30 p. m.—Arcadia Ballroom Orchestra.
8:39 p. m.—Florence Loftus, soprano; Germaine Gerard, violin.— 9 p. m.—Educational Camp Exhibition

series. 9:15 p. m. Meyer. Glass. barytoné. 9:15 p. m. Walter Hartwig, "Little Theaters." 9:45 p. m. Two piano recitals. 10 p. m. -EMO's weekly movie broadcast. 10:15 p. m. -Andrades Lindsey, Lydia Mason. m. Arrowhead Dance Orches-

10:30 p. m.-Arrowhead Dance Orches-

tra. 11060k-WRNY-NEW YORK-258m

1 a. m.—Anita Browne's Symposium. 1:45 a. m.—Block's mental hygiene ad

11:45 a. m.—Block's mental hygiene ad vice.
12 noon-Organ recital.
1 p. m.—Bernice Hardy.
6:45 p. m.—Fiction.
7 p. m.—Sports, commerce talks.
7:15 p. m.—Radio Theater Index.
7:30 p. m.—Orlando's Concert Orchestra.
8 p. m.—Anna Russo, "Oldtime Songs."
8:15 p. m.—Gluseppi Adami, violinist.
9:15 p. m.—Isabel Austin Musicale.
10:15 p. m.—Draking Kour Players.
9:45 p. m.—Dx hound hour.
14:10t.\_WYSG.~NEW YORK—213m

1410k-WMSG-NEW YORK-213m

1410k-WillSonce orchestra. 8 p. m.-Dance orchestra. 8:15 p. m.-Adelaide De Loca, contralto. 8:30 p. m.-Anphion Male Quartette. 8:45 p. m.-Mme. Edna FGrandin,

songs. p. m.—Former Secretary of Interior William C. Redfield. Metr. Quartetta

william C. Redfield.
william C. Redfield.
9:15 p. m.—Amphion Mate Quartette.
9:30 p. m.—Michael and Edythe Lamberti, 'cellist.
10 p. m.—Jack Heller, uke.
10:15 p. m.—Michael and Edythe Lazy

10:30 p. m.-Paul Specht's Orchestra.

p. m.—Bert Lowes' Orchestra. p. m.—Kismet Dance Orchestra.

p. m.—Kismet Date Orchestral
 p. m.—Popular Trio.
 4:15 p. m.—John McAllister, songs.
 4:30 p. m.—Evercharge Battery Service
 p. m.—Studio Program.
 p. m.—Florence Hynes, songs.
 6:15 p. m.—Charlotte Trystman, plan.

rectial. 6:30 p. m.—Child Health Talk. 6:45 p. m.—Majestic String Ensemble. 7:15 p. m.—Investment Questions. 7:30 p. m.—Cosey Orchestra.

1100k-WBBR-STAT. ISLAND-316m

8 p. m.—Dr. Hans Hang, violinist. 8:20 p. m.—Bible Questions and Answers. 8:40 p. m.—Fred Twaroschk, tenor.

950k-WAHG-RICH HILL-S16m

2:02 (noon)—Musical Program. 2 p. m.—Midnight Novelty Program.

Generations." 8 p. m.—Alma Slunt, soprano. 8:15 p. m.—Zit's tea music 6:15 p. m.—'Sports," Bill Wathey, 6:30 p. m.—Jacques Jacobs's Ensembla 7:30 p. m.—Van's Collegians. 8 p. m.—Orange Chamber of Commerce

p. m.—Orange Chamber of Commerce program.
 S.55 p. m.—Copenhagen Quartet.
 St. p. m.—La Forge-Berumen musicale.
 p. m.—La Forge-Berumen musicale.
 10:30 p. m.—"A Step on the Stairs." mystery play.
 p. m.—The Messner brothers.
 11:05 p. m.—The Messner brothers.

11:05 p. m.—Hild Makesaler biothers. 11:06.—WGCP—NEWARK—252m 8:30 p. m.—Hilda White Kay, contraito Cliff Orchestra. 9:45 p. m.—Mortensen and Morgap.

9:45 p. m.-Mortensen and Morgan, banjoists, 10 p. m.-George Camfield, uke and

aongs. 10:15 p. m.—Studio program. 10:30 p. m.—Helen Huking, soprano. 10:45 p. m.—Margaret Seidel, pianista. 11 p. m.—De Vita's Orchestra.

1340k-WODA-PATERSON-224m noon-Dance music; songs, p. m.-Entertainment. 10 p. m.-News; sport talk, p. m.-Dinner music

p. m.—Dinner music. 760k—WFI—PHILADELPHIA—395m

10 p. m.—Ray Elras Orchestra. 30 p. m.—Concert orchestra. 3 p. m.—Program from WEAF. 590k.—WOO.—PHILADELPHIA.—508m 1 a. m.—Grand organ. 2 (noon).—Luncheon music. 145 p. m.—Grand organ and trumpets. 130 p. m.—Dinner dance music. 160k.—WLIT.—PHILADELPHIA.—395m

760k-WLIT-FILICATELL 12:05 p. m.-Organ recital. 2 p. m.-'Child Training," Dr. Frederic

Leavitt. 2:10 p. m.—Nickey Guy's Orchestra. 4:30 p. m.—News flashes. 4:35 p. m.—Arcadia Syncopators. 5:50 p. m.—Cancert orchestra. 5:30 p. m.—Concert orchestra. 5:30 W.—WIP.—PHILADELPHIA—508m

...Organ recital. ....Dal Ruch and his Arcadians.

p. m.—Bortine storer.
g. m.—Sports corner.
g. m.—University Instrumental Trio.
g. m.—Mother Moore. Chapiain Pick-ens and the boys of the navy yard.
10:05 p. m.—Dance music.
10:30 p. m.—Little Jack Little.

2:30 p. m.—Reports. :30 p. m.—Dinner program. :15 p. m.—Rice Augmented Orgheters, 0:30 to 12 midnight—Dance program. 1070K—WNAC—BOSTON—2269

10:30 a. m.-Women's Club, takin a we

music. p. m.-Luncheon concert 51 saizlow 15 p. m.-Vocal selections. p. m.-Auction bridge matines. p. m.-Tea dance. p. m.-The Smillers. 30 p. m.-Checker Inn Dinner Dance.

Show. :30 p. m.—Musical program. 0 n. m.—Dance music; vocal selections

0 p. m.—Dance music; vocal selections 1 p. m.—Lambert Brothers, Orchestra. 970k—KDKA.—PITTSBURGH—309m; 15 p. m.—Daddy, Winkum, Post studio.

6:30 p. m. Concert. 8 p. m. Farm program. 8:80 p. m. Concert.

m.—Concert program. m.—Radio Tour of Home Beautiful

World Radio Histor

p. m.—Organ recital. —WGY—SCHENECTADY—380m

a. m.—Setting-up exercises. :30 a.-m.--Reducing exercises

-Child health day

p. m.—Tea Room Ensemble. p. m.—Talk, "May Day—Its Purpose." 0 p. m.—Ray Elrae Orchestra.

12 p. m.—Minnight Novelty Alorem 740k—WOR—NEWARK—405m 6:45-7:15 a. m.—Gym class. 2:30 p. m.—Alma Slunt, soprano. 2:45 p. m.—'A New Vision for I Generations.''

1100k-WFBH-NEW YORK-273m

950k-WGBS-NEW YORK-316

complete acoustic synchronizing which can be given by a well-designed and carefully operated transmitting station is so considerable that it merits special consideration.

Fortunately for broadcasting, there are to-day a number of transmitting stations which have apparatus capable of sending out a wave which faithfully carries the program and which are operated by skilled engineers and announcers, so that the musical balance of the orchestra and other features giving "finish" to the program are not neglected.

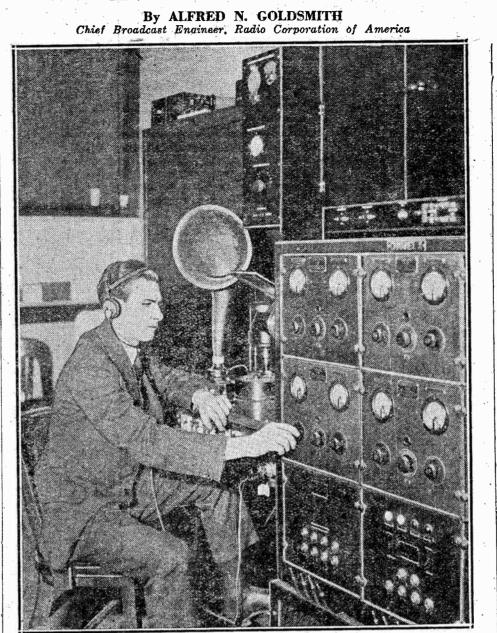
The ideal transmitting station is one having sufficient power to give interferonce free signals even at considerable distances and sending out radio waves which carry an accurate impress of the music or speech corresponding to the studio performance. Otherwise stated, the broadcasting transmitter must be omnitonal or capable of controlling or modulating the broadcast wave at all frequencies or pitches of sound from the lowest to the highest. It must also be equitonal or impartial in its treatment of notes of all pitches, exaggerating none and suppressing none, but giving to each its proportionate volume, and, as hinted above, it must radiate sufficient energy to give a clear signal, riding above all disturbances in the home of the listener and capable of being amplified to any reasonable volnme in the receiving set without introducing disturbing noises or other interference.

Some of the defects which may result from defective transmitting equipment or careless use, even of good equipment are worth considering, as well as the precautions taken at high-grade broadcasting stations to avoid imperfect operation.

#### **Studio Has Problems**

The broadcasting studio presents a whole series of problems in itself. It would not do to take a large echoing room and use it as a broadcasting studio. The such a room blurs the sharpness of broadcast speech or music and produces an unsatisfactory effect in the listener's home. In order to keep such an echo effect, or "room resonance." as it is more technically known, within satisfactory limits, it is necessary to muffle the studio acoustically by hanging heavy drapery or special materials around the walls, ceiling and floor. While an accoustically correct broadcast studio sounds "dead" to the artists performing in it. nevertheless in the listener's home there is a sharp definition to music from such studios which is missing in the case of broadcasting from an ordinary room. The reverberating effect here mentioned is particularly conspicuous in the case of the broadcasting of sermons from certain churches where, unfortunately, the confusing effect of the building echo at times almost destroys the intelligibility of the sermons.

Broadcasting microphones have become a familiar article to American newspaper readers. The broadcasting microphone has to be a particularly precise form of telephone transmitter. Not only must it be omnitonal and equitonal, which is in itself a most difficult requirement, but it must be silent in operation. Some microphones produce a more or less steady hiss or background noise which detracts appreciably from the quality of music, particularly in the softer portions of a selection when the music does not stand out above microphone noise. Furthermore, microphones must have an unusual reserve capacity to avoid "blasting" or rattling when an extremely loud sound is pro-



Constant supervision of quality of output is necessary in the control room of WJZ handling amplifier

example, at a musical climax or at radio waves. In other words, the oscila particularly emphatic portion of a broadcast speech. It is also necessary to place the microphone relative to the orchestra, performer or speaker with great discretion in order that the best and most natural effect is produced. As is here hinted, broadcasting is an art as well as a science.

When we leave the microphone in sending out a broadcasting program we next encounter vacuum tube amplifiers which tremendously increase the electric output of the microphone. As usual these amplifiers also should be omnitonal and equitonal and should be provided with vacuum tubes having an ample capacity reverberation which inevitably occurs in to carry the largest outputs which may be drawn from them.

In every broadcasting station there are certain tubes which are known as oscilwhich pump electricity into the antenna or aerial wire system and permit it to flow out of the system with many alternations during each second. It is these electric vibrations in the antenna which produce

duced in the studio in their vicinity, for , the "ether oscillations" which we call lator tubes produce a steady flow of wave energy which pours from the transmitting antenna. flowing outward with the speed of light to the listeners on distant horizons.

However, somewhere in the transmitter there must also be what are known as modulator tubes. These tubes mold or control the output of the oscillator tubes, turning it on or off in accordance with the forms of the sound waves in the studio. This results in the radio wave being modulated or shaped so that it carries an accurate outline of the sound waves which fall upon the microphone. Obviously, this is a delicate process and one which must be carefully controlled. If the modulation is low-that is, if the outgoing waves are but slightly controlled by the microphone speech or n lators. These tubes produce the ex- be faint in the receiving station. If, on fion of musical quality which cannot be tremely high frequency electric vibrations the other hand, modulation is excessive- | charged either to the transmitting or rethat is, the control of the outgoing wave is too extreme and violent-the quality of the music suffers badly and various forms of distortion and rattling appear in the listener's home. The accurate control of



Proper placing of the microphone in studio of WJZ is important

modulation requires having ample modulator tube control available-a feature which is by no means universal.

#### Modulating Power

And suitable modulation also requires constant vigilance on the part of the station engineers since the variations in sound intensity which must be transmitted by radio are indeed great, varying from those corresponding to a whisper to those of a shout." Low power stations, carelessly administered, frequently overmodulate in a futile attempt to span great distances. The quality of reproduction under such conditions is execrable and utterly unfair to those desiring to promote broadcasting development. Some of the otherwise highest grade stations, on the other hand, become so cautious in their attempt to avoid overmodulation that they overdo the precaution and undermodulate. In many receiving sets this results in "choking" or "blocking" the detector tube and producing a different form of distortion and even a howling effect.

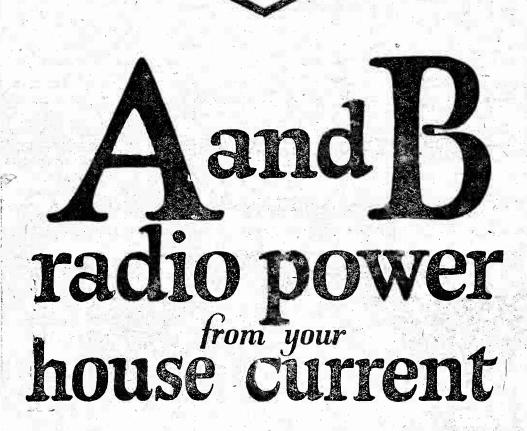
Many miscellaneous precautions are required in the transmitting station. The vacuum tubes used must be extremely free from gas, so that the operation of the station may be quiet and without hiss or clicking effects. All batteries and electric generators used must similarly be silent in operation. The studio personnel must be careful to keep objectionable noises out of the studio. In some cases special problems arise, such as picking up other stations' programs on the control lines of a broadcasting station. For example, a broadcasting station situated in the central part of New York City and broadcasting from points in the same neighborhood is very likely to pick up powerful enough radio signals on its control lines from other nearby broadcasting stations to cause it to send out not only its own program, but those of several others. This can be avoided only by proper precaution in choosing the remote control lines and also by inserting radio frequency blocking circuits into the control lines to avoid this form of interference. Another peculiar feature which broadcast listeners should keep in mind is that it is not fair to judge the quality of distant stations by direct comparison with that of nearby stations. Static or other disturbances which are frequently present in distant reception greatly detract from musical quality. Furthermore, the comparatively faint signals from distant stations are incapable of producing a sufficiently strong response in the receiving set properly to actuate the loud speaker, so that the effect is not so natural as that from nearby stations.

It is also not generally appreciated that fading of the received signal is frequently accompanied by a marked distor ceiving station. Listeners should be very suspicious of the quality of rapidly fading signals since rapid fading is frequently accompanied by quality distortion. It is a common experience to have a broadcasting station blamed by distant listeners, for its supposedly poor quality, although nearby listeners will insist, and entirely properly, that the quality is excellent. Unless a steady and clear signal is being produced it is unfair to judge the quality of a broadcasting station.

The introduction of superpower broadcasting stations having at least several tens of kilowatts in their antennas will greatly improve service where fading is not too great, since the more powerful signals produced by such a superpower station will override static or other disturbances at any reasonable distance most of the time.

Leaving the transmitting station, in the next article of this series we shall consider and explain the various possible faults in receiver 1 which may prevent acoustic synchronizing and consequent high quality reproduction. While the receiver can contribute a great deal to acoustic synchronizing, it must also be remembered that the listeners owe a great debt to the high quality broadcasting transmitting stations, where a tremendous amount of energy and money has been spent to produce perfect results.

NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, NOVEMBER 8, 1925



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DHILCO "A" and "B" Socket Powers are plugged permanently into a lamp or wall socket. They change your bumpy alternating house current into the smooth, hum-free direct current necessary for your radio.

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Jhis switch

& Snap it ON and enjoy your radio Snap it OFF and go to bed

### For Radiola Super-Heterodyne

(old and new models) and other sets using 3-volt drycell tubes, buy Philco Socket Power "AB" shown above. Both "A" and "B" power built into one cabinet, satinfinished in brown mahogany. Connect permanently to your Radio-plug into a light socket-then turn your radio switch "on" and leave it "on." Thereafter nothing more to think about but the one Socket Power switch. Snap it "ON" and enjoy your radio. Snap it "OFF" and go to bed. For 50-60 cycle 105-125 volt \$65.00 alternating current .....

(No rectifying tubes to buy) Socket Power "B" (see below) may be used on any set where house current "B" power alone is \$47.50 desired, at only .....

For Storage Battery (6 volt) Tubes buy Socket Powers "A" and "B" in individual cases. Socket Power "A" permanently connects to a light socket, and, without any thought about recharging, automatically supplies "A" battery current. Socket Power "B" eliminates "B" batteries and does away with all recharging and all bother and expense of replacing worn . out dry cells. Either "A" or "B" may be used alone, but for maximum convenience, use both together. Plug the "B" into the built-in socket on the "A." 'Plug the "A" into your house current. Both "A" and "B" (and the radio set as well) are then controlled by the one "A" switch. Snap it "ON" and enjoy your radio. Snap it "OFF" and go to bed.

Socket Power "A" for 50-60 cycle 105-125	\$40 P
volt alternating current	\$42.5
Socket Power "B" for 50-60 cycle 105-125 volt alternating current	\$47.5
(No rectifying tubes to buy)	



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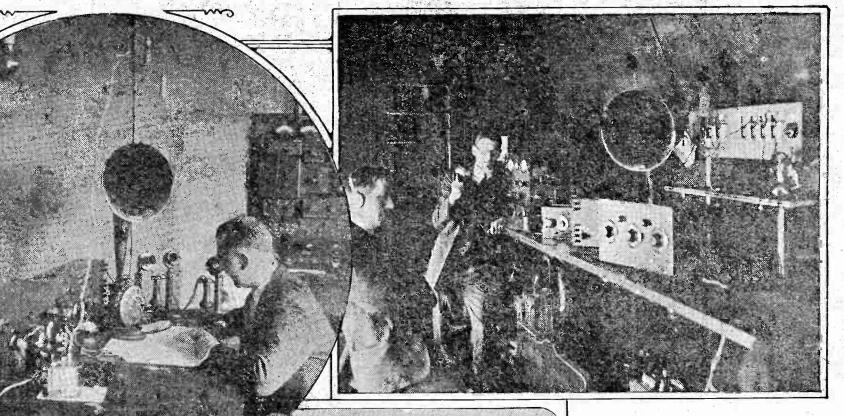
Buy a Philco Diamond Grid Battery for your automobile

## THE NEW YORK HERALD NewVork RADIO MAGAZINE SUNDAY, NOVEMBER 8, 1925 16 PAGES SECTION TWELVE

Administration of Radio in Canada

How Our Northerly Neighbor Regards and Controls Broadcasting; Co-operation With United States Officials; Attitude on Advertising; Tax on Receivers

By CHRISTOPHER CONWAY



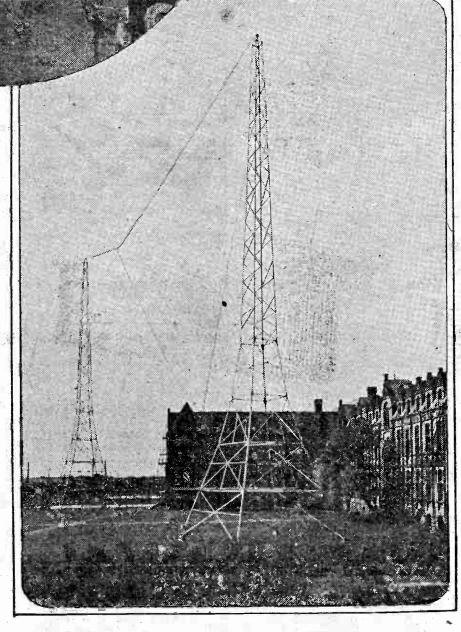
Operating room at Station CNRO, Ottawa, Ont., capital of Canada

N THE eve of the Fourth National Radio Conference, which opens tomorrow at Washington, a review of conditions regarding wireless as they exist elsewhere should prove of interest, and with that thought in mind it is the purpose of this article to deal with the which the control and adminmannerin istration is undertaken in the Dominion of Canada. While the conference at Washington is national in character, yet questions are bound to arise which will possess a far-reaching international bearing, and Canada is so keenly interested in this aspect of the conference as to have appointed the administrative chief of the radio branch of the Department of Marine and Fisheries, Lieutenant Commander C. P. Edwards, O. B. E., F. I. R. E., A. M. E. I. C., as official representative, and in such capacity he will be present during the meetings and discussions in Washington

In answer to any question which may arise in the mind of a reader as to Canada's interest in the conference and to clear any doubt as to any interest on the part of those attending the conference in Canadian radio matters, a word of explanation will not be amiss. Without desiring to suggest a lesson in geography, it must be remembered that the northern part of this continent is shared by two peoples, and that the most populous sections of each country are those which touch upon and approach the international boundary, the latter a straggling line of marks stretching across North America from the Atlantic to the Pacific.

Radio broadcasting recognizes no boundaries, acknowledges no border inspectors, nor pays impost to any protective tariff;

Vorld Radio History



Towers and antenna at CNRA, the Canadian National Railways' broadcasting station at Moncton, N. B., Canada, the most easterly of all broadcasting stations in North America. CNRA is powerful enough to transmit across the Atlantic to the British Isles and Europe

procity between the United States and | ties of engineers who have designed and Canada, in so far as wireless is concerned, constructed stations the impulses from to the extent of the technical skill of oper- which flow freely under two flags.

in brief, there exists an absolute reci- | ators in charge of stations and the facul-

Radio test car operated by the Canadian National Reilways. It is equipped for receiving and broadcasting and is used to check up local conditions on any part of the system

That is a very fine state of affairs, but unless there remains in force a proper and effective working agreement between the two countries regarding wireless, great deal of trouble, inconvenience and annoyance can arise. Therefore, it is essential to maintain friendly co-operation between the recognized authorities on each side of the great boundary which stretches across the girth of this continent.

It is, then, the purpose of this article to deal with conditions in Canada, the method of radio control exercised and the relationship between the department responsible for such control and the public in general, and that section of the public in particular as represented by the owners of receiving sets.

Canada was a pioneer in wireless control and its official representatives were the real leaders in the movement to clear the broadcast band of waves from interference from ships and coast stations, a principle to which all maritime nations, with the exception of France, have agreed to, and which, indeed, will soon become unanimous. Canada was the first country to recognize the rights and privilege of owners of receiving sets and manifested this recognition by using the money accruing from the collection of the modest license fee to finance adequate inspection of broadcasting, and to establish an efficient check on causes of interference due to power line leaks or any of the thousand and one mysterious influences which make their presence apparent in a receiving set.

Broadcasting in Canada comes under the administration of the radiotelegraph service of the Department of Marine and Fisheries, more popularly known as the Radio Branch, the branch being in charge of Lieutenant Commander C. P. Edwards, as mentioned in the foregoing, with the

## Collecting a Bogus Note Via Radio

By Using His Radio "Invention," J. Y Hampton Collects What Was Thought To Be a Worthless Obligation Thirty Years After It Was Issued

≺ HIRTY years after date I prom-667 ise to pay to John Y. Hampton Three Thousand Dollars with interest at ten per cent.'

That was the way the note read. There was no date and the legal phrase, "for value received." was omitted. It was signed Aleck Smartley.

George Hampton returned the note across the polished mahogany table to his father. "That represents a pile of money," he averred-"three thousand dollars, with interest at ten per cent-if it can be collected.

They were comfortably seated, father and son, in the spacious library of John Hampton's southern home. George Hampton, thirty, unmarried and too fond of adventure to think seriously of women, had just arrived from Chicago to spend his annual summer vacation with his father. Hampton senior, sixty years young-nobody ever called J. Y. Hampton old-drew the chair containing his long and aristocratic figure nearer the table and struck a match to a fresh cigar.

"More than \$50,000," he asserted. "And the only 'if' barring its collection will be if Aleck Smartley isn't worth it. Not having that much, we-for I want you to help me-will take all he has."

"I can see Aleck Smartley's finish, all right, J. Y., when you go after his hide." George Hampton, like the rest of Vicksburg's 30,000 population, always called his father J. Y.

"He can dig up fifty thousand, I think, but he won't be worth as much as a dead B battery afterward; which, incidentally, would rid the radio industry of a firstclass crook. His business methods are not well liked in Chicago. But tell me how did you ever come to get such a note from Aleck Smartley?"

How, indeed! For thirty years John Hampton had held an interest in Aleck Smartley; never-to-be-forgotten bitter memories of a clinging past, hateful recollections of a misplaced confidence in his early twenties, which he could not forget. Now that the old memories had again been revived, the suppressed incident of his youth craved expression

The Story of the Note

"I'll tell you the story briefly, George," he said at length: "Thirty years ago, when you were a baby, I was employed by Aleck Smartley, who owned the old Levee Street light-plant. Smartley was apparently everybodys' friend-and a loyal patron of Vicksburg's many saloons. But he was not alone in the last respect. Nearly every little grocery had its bar then, as you, when a boy, may well recall. It seemed quite proper to find a jug of whiskey in the home of every one who

"Well, it was Smartley that induced me to take my first drink of whiskey, and taught me how to drink it straight. A hail-fellow-well-met was Aleck Smartley, the big man of the little town. But he was practically bankrupt, which I was later to learn to my sorrow.

"It was then that my father died, leaving your mother and me a few hundred dollars and the old homestead. Smartley needed this little money and the property. knowing that he could readily convert the latter into cash, so he made me what appeared to be an alluring offer. Through the friendship which he claimed he held for my father he would give me a third interest in his so-called lucrative business for the small sum of \$3,000. He would also make me manager of the plant. Trusting him completely, I accepted his offer blindly and, I might add, drunkenly, over the few strong drinks which he had cunningly prepared in advance for the occasion.

### Had Been Robbed

"The sequel is the same as all such stories," the father went on. "A few weeks later I saw that I had been robbed. I demanded restitution, and Smartley as good as laughed in my face. We were in his office at the time and I had taken a few more drinks than was good for me.

By C. K. THEOBALD

money back then and there. I meant business and Smartley knew it, so he changed his tactics. It was impossible, he told me, to raise \$3,000 on the instant, nor the tall and slender new tenant to grow could he procure it to-morrow. But he showed me where he had personal assets amount. He would give me his thirty-day note, with interest at 10 per cent. And Aleck Smartley judged correctly that I was too drunk and excited when he gave me the note to read it aright.

"I did not discover the fraud until the following day," John Hampton concluded, "when I learned that Smartley had absconded and that he had no personal assets. I never heard of him again until you mentioned in your letter six months ago that he is in the radio business in pay. Chicago.'

"That was a raw deal, J. Y.," the son condoled. "But tell me, how do you propose to make him pay the note, and how can I help you? "I am going to take \$50,000 away from

Aleck Smartley," John Hampton declared, "the principal and interest on that bogus note, the same way in which he robbed me of \$3,000 thirty years ago. I am going to steal it!

George Hampton looked at his father in utter astonishment. "Steal \$50,000 from Aleck Smartley, you and I, J. Y.?" he exclaimed aghast

Will Keep Within the Law

"Oh, we'll keep well within the law," the father smiling assured, rising to return the note to the safe.

George Hampton knew his father to be a resourceful and determined man. He had known him to accomplish many worthwhile things by his shrewdness and discernment, things which many other men would not have dared to start. And he had never known him to begin anything that he had not successfully finished. But this little matter of subtracting \$50.-000 from Aleck Smartley's bank account, well-

John Hampton must have discerned the doubt in his son's countenance, for he said: "I have my reasons for counting on success, George. To begin with, from what you have told me of Aleck Smartlev's exploits in Chicago he is as fond of his drink as ever-and the continued use of booze doesn't tend to sharpen one's wits. Then, besides being egotistical, he is a thief at heart. Smartley is a man who glories in putting over a crooked deal and keeping out of jail, since you tell me that he has stolen at least two radio patents and is flourishing now on the fruits of his victims' labors.

"Well," the elder Hampton continued, "when you first wrote me that Smartley was in Chicago; I set about building, for hat crooked gentleman's special benefit.

a most wonderful radio instrument. It is complete now, all packed and ready for shipment to Chicago, else I would let you see it." "Why did you pack it so soon?" George

Hampton grumbled his disappointment. "If I may not see it, tell me about it, at east."

"That can keep until some other time. Just now I want to tell you how I propose educing Aleck Smartley's pocketbook \$50,000 and how I want you to help me."

### Unfolds His Scheme

John Hampton now unfolded a scheme which had his son's full sanction, as was evidenced by the look of approval he bestowed upon his father.

"Of course, George," the father said in conclusion, "it is important that Aleck Smartley does not recognize me; and I do not think he will, with the flesh I have lost in the past thirty years and the beard I have taken the trouble to grow in the last six months. And I think you have told me that he does not know you. Good. It is equally important, too, that we assume other names in our coup with Smartley, which aliases we will decide upon in the Windy City."

So it came to pass, a few months later, that one J. Yerger Jamison rented, for an indefinate period, a cheap suite of office

"VICKSBURG, Miss.-18,- | ing a revolver in his face, I demanded my | skyscrapers. A sign, in keeping with the | he had best feel the inventor out. So he price of the rooms, on the reception-room door, apprised the public that Mr. Jamison was a patent lawyer. Just as it had suited a full beard prior to his advent in the city, he had deemed it expedient now to -false, of course-of many times the affect a cough, which seemed to have its origin in the very depths of his lungs. Also, before he opened his doors for business which he never expected to get, it befitted his purpose, in view of forthcoming events, to make the place appear as though its owner had endured many struggling years in his calling. Not until he had satisfied himself that all of this was perfect, did Mr. J. Yerger Jamison hire a freckled faced office boy whose hardest job would be to draw his

> Also in the city of Chicago, and at about this same time, Aleck Smartley, selfish, egotistical, domineering, and never as smart as he thought himself to be-but prosperous withal-sat complacently fat and comfortable in the warmth of his private office. As was his early morning habit, he indulged in his pre-war drink of red liquor. Then he took up his mail.

### Aleck Smartly "Bites"

Assorting the letters bearing first-class postage, he came across a legal-size envelope addressed, "Mr. S. S. Smith, care of Smartley Radio Company." This was one of many other letters which, during the past few months, had been passing through his hands for this S. S. Smith. Smartley recalled having given this Smith fellow a job in the factory awhile back. He had come well recommended and the foreman's reports showed that he was well worth his hire. This fellow must be working on some radio invention, Smartley surmised, since the envelope bore the return address of one J. Yerger Jamison, Patent Attorney. It might be to his best interest to make sure of this, and Smartley did not argue with his conscience in the least when he slit the envelope with his paper-knife. But first he marked it "opened by mistake," indicating previous experience in this direction.

"My Dear Friend Sam": Smartey began reading, "Relative to your 'Non Static Radio Receiver,' if the invention functions as you claim-and I certainly have no reason to believe otherwise, since you say you have it in successful operation-you have at once advanced the science of radio telephony many years and made yourself famous.

"You say that you need money too badly for other purposes to go ahead with the patent. I. too, am so penniless, due to heavy expenses attending my shattered health, that I cannot even supply the Patent Office advance fees. But this invention is of such importance that you should experience no trouble in securing funds for its development. I should like to see and hear your device in operation, also to have talk with you regarding these money matters. With this end in view. I will thank you to inform me when I may have an appointment with you. Yours "J. YERGER JAMISON." sincerely,

### He Calls S. S. Smith

Aleck Smartley thought long and pensively over this perusal. He was not well acquainted with the technical end of radio, but he did know that a successful invention of this nature would be worth millions. This S. S. Smith, he thought. was just one more deluded inventor or he had stumbled onto something that radio engineers had long been tryinf to solve. Smartey was inclined to believe the latter. as was Smith's attorney friend, according to the letter he had just read. Who was this patent lawyer anyhow, this J. Yerger Jamison. Smartley did not know him, but no doubt there were many patent lawyers in Chicago of whom he had not heard.

Smith needed money and needed it badly, Smartley mused, as he mechanically slid the letter into its envelope. And Smartley needed this invention, if it were genuine. Possibly a few thousand dollars would buy the patent. Probably he could But I had come for my rights, and, show | rooms on the top floor of one of Chicago's | steal it as he had previous ones. Anyway,

promptly summoned S. S. Smith to his imposing presence.

"Sorry to have disturbed you in your work," Smartley suavely apologized, when Smith, cap in hand and hair unkempt, entered the office, "but I am due to beg your pardon. I opened this through mistake," and he handed over the letter.

"That's-er-all right, Mr. Smartley," Smith managed to say, apparently embarrassed in the presence of so much grandeur. "It's nice-it's good of you to look after my mail, and I am sorry it has, annoyed you." With which he was for immediately departing, when Smartley checked him in the doorway.

### It Was a Mistake

"I must tell you, Smith, that I read the greater part of your letter before I discovered my grave error. You see, I have considerable dealings, with patent lawyers, and I really thought this letter was mine.'

As Smith turned in his steps Smartley's houghts, for some cause or other, sped back thirty years into the past. He recalled now how easily he had robbed a young greenhorn then of \$3,000-Hampton, yes, that was the name; he had almost forgotten it. Smartley's smooth tongue had done the trick then. Well, he still had that requisite.

"If you have discovered a means whereby we can eliminate static," Smartley continued patronizingly as Smith reached the desk and accepted a proffered seat, "I will say that you have accomplished considerable-that your device will be of much value to us." He might have said "invaluable" to the radio industry, did he not have a selfish purpose in mind.

"My invention will do more than cut out static," Smith asserted proudly. "It also positively excludes local interference from lighting transformers, X-ray machines, spark coils and the like, which is such an annoyance to the city listeners-in. And the beauty of it is its simplicity."

"I should very much like to see this invention." Smartley's interest was genuine in this respect. "I wouldn't steal it," he laughed jokingly. "Even though you haven't applied for patents," he added tentatively. "You no doubt have your original sketches and descriptive matter as proof of your first conceived ideas."

### He Saves the Drawings

Smith stuck his thumbs in his overall straps. "I'll say I have," he assured with an air of shrewdness. "I have every scrap of writing and drawing since I first conceived my idea, six months ago. I have filed these for safe keeping with Mr. Jamison, who was a good friend of my father's. so I feel perfectly safe in that respect. But even so, I'd trust you completely, Mr. Smartley, and I'd like to give you a demonstration of my device."

Here was disappointment for Aleck Smartley-the safeguarding of those papers though he did not let his countenance show it.

"Your caution is to be commended in protecting your evidence," he congratulated, and then went on to say that he would be pleased to see this radio marvel in operation.

"That's very kind of you, Mr. Smartley," Smith responded. "I wonder if you could go this evening after supper?"

The radio dealer glanced out of the window to note the unfavorable weather conditions, but Smith forestalled his objection with:

"The worse the weather, the better lemonstration I can give. Mr. Jamison wants to see the invention, too, and perhaps we can all arrange to go to my house together. Mind if I call him on the phone?"

Such an arrangement would be very satisfactory to Aleck Smartley. It might be to his advantage to meet this patent lawyer, who, like his client, was badly in need of money. And Mr. Jamison, when Smith got him on the phone, would be glad to go along if some conveyance could be sent for him.

(Continued on page four)





CARTER "Flat" Plug An original Car-tor design. Matches dilais and Arnobs or your set. Card thru when inserted com-pletely concealed. Instantly removed. No trick triggers on the rest of set out of the rest of set out of Half Size order. Cords hang down and give a pleasing effective Any dealer can show you. A MORA Parter Radio Co. 270 Broadway, N. Y. City Yes, We have **PHILCO** Socket Powers Radio A&B

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io Histo

Vorid Ra

### **Radio** Presents **Complex Problem**

Continued from page eleven ime is that perfection cannot be experienced in reception at such disances, and so the effective service rea of a station is now limited to verland message traffic that now out a new type of condenser. uses the lower frequencies. It is of interest that just this has been done in Europe. In England, for instance,

over most of England. be made to do far more than at sets-or two or three sets, or speak present. It is expected that programs ers, if desired-may be attached to will come, is supplementing radio by quality, volume and clarity. some form of appeal to the eye. It also shows at a glance the cur-Prophecies that we should have radio rent consumption, thus indicating

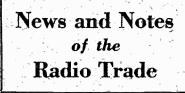
ing released from material restraints. Radio is a conspicuous element of

enlightenment. By it, vast numbers coil wound on these forms, will ings, cleans out prejudices, and reveals ductances. that human differences are the minor instead of the larger facts of life. While radio's functions may include some extension of the scope of formal education, it is likely to be most valuable as a supplement to the education of the schools. Just such general enlightenment may be the salvation of this transition are of mechanical conquest; it will tend to prevent exclusive devotion to the material

things. In presenting these thoughts I have strayed from the beaten path of technical work with which I am ordinarily concerned. I have done so because I believe the present time opportune to remind the radio audience of the partial approach to perfection radio has already made, and to indicate the problems and difficulties of carrying it forward.

### **'The Treaty of Versailles'**

to End Waterman Series In keeping with Armistice Day the final "Waterman's Points of Progress" on Wednesday at 9 p. m., broadcast by WEAF, WOO, WCAP, WGR. WCAE, WJAR, WEEI, WWJ and WCCO, will treat "The Treaty of Versailles" which ended the World War. A program of songs popular during the late war will be given before the talk.



#### **Opens New Haven Factory**

Due to their rapidly increasing business, the Bruno Radio Corpora small area around it. No stone is tion, of 223 Fulton Street, New York being left unturned and no technical City, has opened a large factory at expedient is neglected in the efforts 38 Canal Street, New Haven, Conn. the Consolette, has a very new mechanism embodying straight line expedient is neglected in the efforts 38 Canal Street, New Haven, Common mechanism embodying straight and being made to conquer fading and working day and night, as well as the new UX-120 power tube and many the new UX-120 power tube and many ails, great distances can be reached date their jobbers. Besides the line hardwood case and requires no outfails, great distances can be requires date their jobbers. Desides the fine hardwood case and requires no out of lower frequencies of Quartzite coils, the Bruno Radio side connections. The loop can be corporation manufactures the Bruno used outside of the set or inside, very high power. It is also ques-tionable whether the radio public of Bruno Verice Dial and boxed kit, the Bruno Magic Dial and ultra-vario America would agree to putting broadcasting in among the ship and wit a norther trans of the condensers, and will shortly bring who have offices in the Longacre

### To Test Sets

A new and interesting invention 30-kilowatt station in the center of called the Liberty Comparometer, is already been delivered. the country, on a frequency of 190 a product of the Liberty Transformer kilocycles (1,600 meters), delivers Con pany of Chicago. It is a unique programs to owners of crystal sets and ingenious device that permits putting four radio receiving sets or While radio is already rendering loudspeakers to the test of comparinoteworthy service, it will, of course, son at one time. The four different distant stations. from across the seas will be re- the comparometer, and by merely broadcast from American stations. throwing the switch, any one of the The development of this undertaking sets or loudspeakers attached may from the crude beginnings it has be instantly placed in circuit. It is already had to satisfactory perfection possible to switch from one set or is a considerable undertaking, but it speaker to another without interis going on. Another advance which ruption and thus definitely distinis more remote, but which I believe guish the minutest difference in tone

motion pictures have already been whether or not a set can be operated fulfilled. They have been achieved in economically or whether it consumes

### New Coil Forms

Radio is a conspicuous element of this mechanical paradise; it has ren-dered communication instantaneous and unlimited. But there is still greater satisfac-tion in the thought that radio is also helping to usher in the mental or spiritual era. I am not qualified to estimate the potential social effects That has been done and differs from the standard, in that Radio fans desirous of constructing of radio. That has been done and differs from the standard, in that will be done by poets and statesmen. there are several ribs molded on an Certainly radio is a great force of ordinary smooth piece of tubing. A FOR \$5 you can build a GOOD "B" Elimi-nator for A. C. Complete instructions, \$1. For and 990 K. Paterson, N. J. of people receive a flood of light on found to have many of the advantof people receive a nood of agent is ages of an air core and yet retain BUILD rechargeable B Battery, 100-such light as removes misunderstand-the strength of standard wound in-Royal Storage Battery Co., 124 W. 34th.

Exhibit at Radio Show The Freed-Eisemann Radio Corporation has announced some inter esting new sets which will form part



Brooklyn, N. Y. \_

f their exhibit at the forthcoming ( Fourt National Radio Exposition, in Chicago. Besides their well known building makes a good ground conneutrodyne, they will show the new nection. Latour circuit receivers, one of which is operated on dry cells. They will also introduce the use of six tubes in the neutrodyne receivers NR-45 and NR-7. The NR-45 is inclosed in a cabinet.

#### New Mode

The new model Operadio, known as the Consolette, has a very new

Building, report that many of the dealers who have had the Consolette on order have obtained them, and in many cases the original samples have

Slow adjustment of tuning dials is the only kind which brings in long



A Good Ground

Rate, 40 cents a line. Ads. accepted until 12 o'clock noon Friday.

 motion pictures have already been motion pictures have already been achieved in probably be a long time until they in accessive amount of battery current probably be a long time until they reach anything like a real service structure rent.
 At present the radio listener reads the newspaper or uses his eyes on something else wholly unrelated to the something else wholly unrelated to the some over the atria for any thing his attention—or else he concentrates on the radio by shutting his stention—or else he concentrates on the radio by shutting his stention—or else were so called by radio, just as the motion picture have yers accessfully compared the seven procession of the specially the great majority of programent of some sort of appear time is one of marry velous fruition (and it may be of clima, and usually are due to lakers in aservice stations, and usually are due to lakers in aservice station, of course, greatly out and the specience of building were been and the seven best regulated sets, but have also accomplished wonders in build their own sets.
 Radio Is Conspicuous Element To the present time is one of marry velous fruition (and it may be of clima, of due and any of the complaints received have are best reasonable kickers in a service station, of course, greatly out and the order and approved the material for supresential lines. It will be realized much more tan yeas here the set reasonable lines of the areasonable lines and the ure to follow simple directions. The present time is one of marry velous fruition (and it may be of climay) of scientific development of the ure asonable hickers in a service station, of course, greatly out and the service attain. Area and they are used for material restraints. Radio is a conspicuous element of the service station, of course, greatly out and the service attain. Area and they are used for its is line to the service attain and explanations of the service attain. A maned at the service attain and they the attain the and advies SEND IT BACK

### Service

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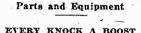
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Including: Set in solid walnut or ma-hogany cabinet, 5-201A blue tubes; 100-ampere rubber case storage battery; 2 large 45-volt B batteries; Giobe loud speaker; aerial equipment, Nothing else to huw

o buy. Demonstration Cheerfully Given GRAMERCY RADIO STORES, 123 E. 23d St., nr. 4th Av. GRAM, 6386.

THE ORIGINAL 7-tube R. F. Receiver described in the July 5 number of this magazine. Address H. N. French, 11 Paul St., Newton Centre, Mass.

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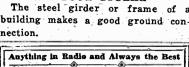
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∀orld Rad

## tes on Stabilizing Tuned Radio-Frequency **Amplifiers for Wireless Reception**

scillation in This Type of Magnifier Causes Interference, but May Be Easily Controlled

### By WILLIAM H. FORTINGTON

g to a broadcast program in receiver. Scarcely a night vhat some listener residing "a t" is roused out of the reverie one of the many excellent nental trios through the howls of a regenerative (?) rewhy always blame the reet of the single circuit variety, st 30 per cent of the howling supposedly non-regenerative

of the matter is that too many nherently neutralized" tuned iency receivers suffer badly ation in the radio frequency set, due to faulty design in so ets that it would require pages e them.

ndustry Has "Botchers" industry, like the automobile its infancy, suffered at the "botcher," and with so many tched sets in use to-day, it ficult to say who are and who e offenders. There are, no users of tuned radio frewho are somewhat disgusted. st may be allayed somewhat. following the points outlined icle, which deals solely with tuned radio frequency re-

ago; meant essentially pre- T. R. F. are better than four stages

set that will not squeal. Some of these city area is the squeal of some | losser methods are quite good, while others are artrocious.

The writer has encountered sets utiliz-

ptions one encounters when a degree as will enable him to build a on infinitely variable resistance is used shunting the inductance. The inductance is, of course, tightly coupled to the grid circuit inductance, and the variable resistance serves to increase or decrease the

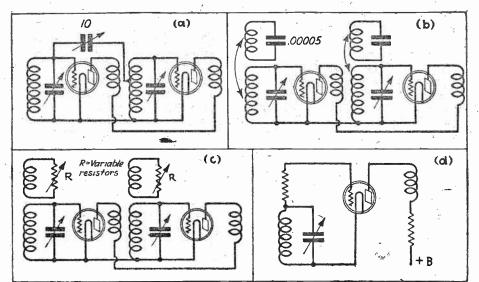


Fig. 2—Four circuits used in present day receivers. (a) The Neutrodyne circuit. (b) An absorption circuit. (c) An absorption circuit for high-wave reception. (d) A method for controlling parastic oscillations.

were so great that no appreciable benefit from the radio frequency amplifier could be observed. It is quite obvious, there-, as applied to the radio art | fore, that two stages of well neutralized

ing two or more stages of tuned radio | loss set up by eddy currents in the abfrequency amplification, in which the sorption coil. With such a device weak losses due to stabilizing methods employed | signals may be brought up to reasonable volume: that is. until the amplifier is about to break into oscillation.

At Fig. 1d will be seen a much used method of controlling parasitic oscillation. Resistance inserted either in the plate or

PS one of the most annoying | facturer has introduced losses to such | method used at (c) is quite good where | design of the R. F. transformer itself. Let us see what form a good R. F. transformer must take.

> Fig. 4 represents a radio frequency transformer such as is commonly used. All coils necessarily contain inductance capacity and resistance. Now it is fairly common knowledge that as the number of turns in the primary winding of a radio frequency transformer is increased, the period, or to be more correct, the wave length of the coil, also increases. We find then that if the inductance value of the primary is increased to that of the secondary, the frequency of the two coils will be the same. All experimenters who have played with the old time regenerative sets enploying a variometer in the plate circuit know that when the plate and grid circuits are near resonance the tube will oscillate.

The above condition also applies to tubes in radio frequency cascade coupling. but to a much more pronounced degree; and it is quite obvious, therefore, that the primary winding must not be in resonance with the secondary, neither must it be in resonance with any close harmonic frequencies of the secondary. Consequently, the number of turns of wire permissible in the primary is strictly limited.

### Transformer Windings

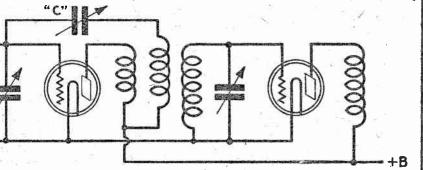
In sets of the neutrodyne type we find that although the number of turns employed in the secondary is perhaps sixtyfive, the number of turns in the primary seldom exceeds eight; in fact, some manufacturers use only six. Again, the num-

'n

То Detector

O+B

0+A-P 0-1



ting diagram showing the reverse feed-back method of preventing oscillatoins in tuned radio frequency receivers

#### Fig. 1—The wiring diagram of a three-stage, tuned radio-frequency amplifier with a potentiometer grid control

grid circuits (or both) of the tube tend, ber of turns allowable in the primary is to limit the functioning of the tube as an limited somewhat due to the inherent amplifier. In other words, the circuits are capacity coupling existing between the two loaded.

used in cheap T. R. F. sets is the earthed the primary to reduce capacity coupling eddy current system, which takes the form | have been tried out, it being found that of placing the variable condenser end the method shown at Fig. 5 is quite sucplate, which is usually grounded, within cessful inasmuch as the existing capacity the field of the coil, so that the eddy current flow in the end plate of the condenser is sufficient to set up losses which will restrain the circuit from oscillating. The coupling relation between the grounded end plate and the inductance is usually variable, so that adjustment may be made at the lower wave lengths, at which is encountered most of the trouble. This method has assumed a commercial name known as the Foucault system.

### - Reverse Feedback Method

Yet another method, somewhat different from the others, is shown at Fig 3. This has been referred to as the reverse feedback. Users of this system speak highly of it, especially where short wave work is encountered. It will be seen that the primary winding of the radio frequency transformer is duplicated, the second winding being reversely coupled to the first. The small variable condenser (c) makes possible very fine adjustments, and when the minimum capacity is in circuit the feedback is practically at zero. As the capacity is increased, the control over oscillation becomes more pronounced, accompanied, of course, by a decrease in signal volume.

After analyzing the foregoing methods of stabilization, the reader might ask of the batteries being removed from the what causes oscillation in the average twostage T. R. F. set. As previously stated, the number of causes of oscillation is | ing a non-inductive resistance of say 50

circuits, as shown by the dotted condenser Perhaps one of the commonest methods | (c) at Fig. 4. Many methods of winding effect between the coils is very low, while the coefficient of coupling is reasonably high. The writer has used T. R. F. trans-

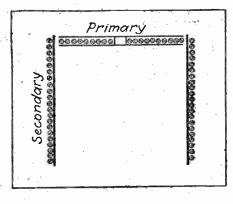


Fig. 5—A diagram showing a method of reducing capacity between coils

formers of this type with as many as sixteen turns in the primary without the slightest trouble from oscillation.

There are, no doubt, many radio fans who are to-day using B battery eliminators and who have found that their receivers oscillate badly, a thing not apparent when ordinary batteries were used. This, it will be found, is due to the effective resistance plate circuit when a B eliminator is used. This trouble may be overcome by insertthat the set is usually quite stable. The legion, the chief of which is due to bad ohms in series with the positive B wire.

llation without losses. To-day | of badly neutralized amplification. ' is more of a slogan, meaning om-squealing - and - annoyingors." Many radio fans are mpression that no matter how | This method was used extensively in Brit-

not the case in the majority | gineers who advecate its use. for although some howling fined to the set, the best part heard outside.

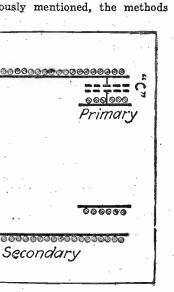


Fig. 4—A diagram showing the effect of capacity between coils

of stabilizing radio frequency amplifiers are many, and it remains for the fan to select the methods which he considers the most applicable to his particular case. - Eighty per cent of the inherently utilized receivers on the market to-day are stabilized by what are known as losser methods. In other words, to secure quiet and flexible operation of his set, the manu-

At Fig. 1 will be seen perhaps what is the oldest method in existence of controlling oscillation in R. F. amplifiers. R. F. set squeals, the squeals | ish aircraft receivers as early as 1916, loying their neighbors. This, and even to-day there are still some en-

> Perhaps an examination of this method would not be out of place. At Fig. 1, which devicts a three-stage R. F. amplifier, it will be seen that a potentiometer is connected across the "A" battery or filament supply, the moving arm, or free contact, being connected to the grid circuit of the amplifier tube. This sliding arm allows a varying positive potential to be applied to the grids of the tubes, which produces damping in the grid circuit through the establishment of grid current a thing which is to be avoided. This method, of course, is now superseded by many improved and more recent ideas, of which perhaps the following will be found to be in fairly common use.

> Fig. 2 depicts schematically four methods such as are commonly used in present day receivers, the first (a) is the well known neutrodyne method of Professor Hazeltine which was the forerunner of the many methods discovered thereafter. The Hazeltine method deals solely with neutralizing the inherent tube capacity, and it is by no means a preventive of oscillation where badly designed T. R. F. transformers are concerned.

Two manufacturers use methods depicted at (b) and (c), in which an inductance is shunted either by a resistance or capacity, forming an absorption circuit which is just sufficient to control oscillation at the lowest wave length. At the higher wave lengths it is, of course, found



title of director. The activities of the Radio Branch comprise in the main: (1) Administration of the radiotelegraph

\*

act and regulations issued thereunder. (2) Construction and operation of radio stations.

The administration of radio throughout the Dominion, as presented in the radiotelegraph act, chapter 43, statutes 1913, has, with the establishment of the De-'partment of National Defence, been transferred from the late Department of Naval Services to the Department of Marine and Fisheries.

### This administration comprises:

(a) The licensing of all classes of radio stations in Canada, including those on ships of Canadian registry, and on aircraft.

(b) The inspection of such stations to ascertain that they are equipped and operated in accordance with the radiotelegraph act and regulations and with the provisions of their respective licenses.

(c) The examination, for certificate of proficiency in radio, of the operating staffs at such stations.

(d) The inspection of all ships, Canadian and foreign, leaving Canadian ports fitted with radio, to insure their compliance with the radiotelegraph act so far .as it affects them, more particularly that section which prescribes that certain passenger ships must be equipped with an efficient transmitting and receiving equipment

The department has twenty-nine stations on the Great Lakes and the Atlantic coast and eight stations on the Pacific coast, some being operated directly as aids to navigation, others as direction finding stations, while service is also prowided for nine private commercial stations installed by owners of lumber camps, canneries, paper mills, etc., on the British Columbia coast.

Canada subscribes to the International Radio Convention which controls the international working of radio.

Other matters which concern the department include the question of an imperial chain of government-owned high power radio stations to interconnect the different dominions of the Empire and at the same time with the United Kingdom. This is rather apart, yet not entirely so, from the purpose of article, and in this connection it may be pointed out that in 1902 the government of the day, realizing the potential value of trans-Atlantic radio service, subsidized the affiliated Marconi Companies to erect the first trans-Atlantic station in the world at Glace Bay, Nova Scotia. This station was duly established, and, while improved practically out of recognition in the matter of apparatus and efficiency, is in operation to-day and giving service to the Canadian people. Licenses have been granted to the Canadian Marconi Company for the installation of super highpower stations at Montreal and Vancouver, the Vancouver station to work a demonstration. It was just such a night with Australia and the Orient, and Mont- as this, only there was more lightning in day is indeed a busy one, and crowded real with Europe. These stations cost the clouds. But there was not the least approximately \$300,000 each.

Mention of the date 1902 recalls a coincidence. It was in 1902 that Sir Ernest Rutherford, then professor of physics at McGill University, carried out a most successful demonstration of his theory that communication could be established between a station and a fast moving train by means of electric waves. That experiment was carried out in the vicinity of Montreal and to-day the chief transcontinental and international trains of the Canadian National Railways which dash by the little station of St. Dominique. carry receiving sets as part of their equipment, offering news and entertainment on a scale worthy of the eminent scientist who conceived the thought.

The public, generally speaking, is more directly interested in the problem of radiotelephonic broadcasting, and it is concerning that particular phase of wireless that there is an immediate interest between Canada and the United States, and one which prevails to a greater extent than is generally appreciated. The question as to the wave-length band reserved for broadcasting stations in the Dominion has been very seriously discussed and has been the subject of compromise between authorities in the United States and Canada.

There is a considerable difference in the

#### (Continued from page one)

operated in the United States, and that | the offending station; if in the United difference would follow somewhat pro rata on the basis of population. There were at most recent report eighty licensed stations in Canada, of which twenty were marked as inactive, and of those included in the remaining twelve are "phantom" stations-that is, stations which are leased on certain occasions and then operated under a call letter different from that of the actual station.

### Location of Stations

The greater number of these active stations naturally will be found in the cities of Montreal, Toronto and their adjacent communities, and lesser numbers in the Western cities, culminating with powerful stations in Moncton. New Brunswick, the most easterly of all North American stations, and Vancouver, B. C.

A glance at a map will show in a graphic manner the proximity of these Canadian stations to well populated stretches of territory in the United States, and immediately indicates the evil effect that would follow unrestricted broadcasting. As it is the channels in use on each side of the line closely approach each other, and the slightest divergence will at once set up a bothersome condition. For the control and protection of broadcasting the radio branch of the Department of Marine and Fisheries maintains constant and adequate protection, using inspectors' in every town. These inspectors listen in on the air, check up any interference present and take steps to remedy the same.

These inspectors do not confine their activities to Canadian stations, and any deviation, no matter how slight, from the States, with an immediate message to the district inspector and a follow-up to Washington. It may be said that this method of "policing" the air has proved satisfactory, and on a recent visit to the offices of the branch at Ottawa it was stated that very little trouble had been experienced on either side of the line, and it was further stated that managers of stations co-operated most sympathetically in rectifying any unusual condition.

### Ship Interference

One other international matter of serious consequence which has been referred to previously is the inter-departmental arrangements which have been made with the United States to clear the broadcast band of waves from interference from United States and Canadian ships and coast stations, with a view to helping broadcast conditions. To aid itself in this work the department has replaced all old type interfering spark apparatus at the stations in Quebec, Montreal, Toronto, Vancouver, Victoria and Prince Rupert with new type continuous wave equipment. and, generally, has taken all possible steps to eliminate all controlable interference with broadcasting by other stations, including those on the Great Lakes.

One other action taken has been a money grant to the Research Council for the purpose of conducting an investigation into noises caused by power lines, etc., with a view to seeing what can be done to reduce interference emanating from this source.

Mention has been made of the fact that owners of receiving sets in Canada are liable to an annual license fee of one dollar, the penalty being forfeiture of the set. assigned wave length is reported on in- It was reported recently that the number stantly in Canada, with a direct call on of licenses issued to the end of the fiscal

### Collecting a Note Via Radio

### (Continued from page two)

So it was arranged that the three would 1 in his mind for possible future use, not drive out to Smith's living quarters that evening in Smartley's car, the latter to bring along one of his best portable radio sets, to be used in a test with Smith's "non-static receiver."

During the drive Smith occupied the front seat with the radio dealer. Mr. J. Yerger Jamison sat in the rear, which was rather to Smartley's liking, for the tall and anæmic-looking patent lawyer had a most annoying cough.

Incident to the drive. Smith had occasion to remark to Smartley: "A few days ago I showed my invention to a friend of mine. George Ogle. Ogle, you know, is chief engineer of the Consolidated Radio Association." Smartley did not know, but he took it for granted. "George could hardly believe his eyes when I made bit of static in my set. George says I have a fortune in my invention, and he should know. He told me he would feel C. R. A. out about it. Turn to the right here, Mr. Smartley, and you'll avoid some heavy traffic. I should have gotten a letter from George to-day. He says he never dreamed that I would ever make such an important discovery." And Smith continued to enthuse about his invention, interspersing his remarks with the hope of lining up with C. R. A. until the trio reached their destination.

It was an East Side rooming house with a dingy drug store on the ground floor, toward which Smith led his companions, himself lugging Smartley's radio instrument. J. Yerger Jamison and his irritating cough brought up the rear. while wicked little lightning flashes served to light them to the doorway.

In the drug store, where Jamison delayed his companions to buy cough tablets, Smartley was impressed with a bit of fraud on the patent lawyer's part. Jamison gave the sleepy-looking clerk a onedollar bill in payment for the medicine. The clerk returned change for five, which mistake, Smartley noted, Jamison adroitly took advantage of. It was a glaring error, and the radio dealer wondered why the clerk did not detect it. It was none of Smartley's business, however, though he was glad it had happened, as it gave in the Dominion and those licensed and character. He tucked the incident away is confined absolutely to concerts.

once suspecting the affair, carefully prearranged, was now to be staged for his never necessary. special benefit.

This story will be concluded in next week's issue of the New York Herald Tribune Radio Magazine.

### The Pope Uses Radio

From the icebound circles at the North Pole to the warmer climates of South America, from the easternmost part of the world to the point opposite, radio is providing the comfort and solace of life. This has been proved by the various dispatches of late telling of the use of radio and the pleasures derived.

Now comes a message from the Vatican at Rome, which states that although his with many duties, the Pope finds tim practically every evening to listen in. The programs are confined to concerts broadcast from Rome and Milan, from Paris, London, Berlin and other European capitals.

the Vatican no Pope has been known to leave its confines. The grounds consist of several acres, but nowhere in the history of the Church has it been shown that once chosen head of the Roman Catholic Church a Pope has ever left the premises.

morning and is not concluded until after midnight. His every minute is so scheduled as to provide certain duties at certain periods of the day. Receiving pilgrims, saying mass and meetings with his various attaches take up a greater part of the time. However, there has been included in his daily program several

In the evening the Pope devotes a portion of these study periods to the reception of radio. His programs are untals, and it is a small matter to adjust the brought into the study of the Vatican. It year had been 91,000, approximately, and that the succeeding months had shown increases in the numbers of licenses granted. It is not pretended that there are only 91.000 sets in Canada but it is hoped that eventually the great majority of owners will appreciate what is being done for them and come forward and show appreciation of the service rendered by paying the modest dollar fee with greater spontaneity and punctuality.

There really is a service rendered for the dollar fee and the value of that service can be increased when every owner of a set pays his share. The proceeds of the license fees are used for the payment of the inspectors who keep watch on the ether and for the maintenance of a specially trained "induction squad." This squad has at its disposal properly equippedcars to proceed to any locality to deal with trouble. The car bodies are made of insulating material, and the ignitor and battery charging system have been adequately screened to prevent interference from this source. Such cars carry as part of the permanent equipment two specially designed superheterodyne receivers, two portable receivers. loops and other special apparatus developed to locate the different classes of interference.

The subject of advertising has been left to the very end. In Canada, as elsewhere. the question of advertising as a source of revenue for broadcasting stations has been the subject of much discussion: it divides itself into two general classes: "direct" and "indirect," such as, for instance, the renting of a station to extoll the virtues of an automobile or any commodity; or the renting of a station by some organization with the mention that the entertainment offered was being given through the courtesy of a commercial organization

It was decided to allow stations to undertake advertising and to check up the results. After the experience of one year it was found that the owners of stations were favorable to the indirect rather than to the direct method and the problem solved itself without any great difficulty. As it is, the Radio Branch allows direct advertising from any station up to 6 o'clock p. m., but after that hour no direct statement may go out without an immediate reprimand, but, indeed, that is

Broadcasting stations operating in Canada may be divided into classes as to ownership, into stations operated by newspapers and intended to exploit these particular journals; stations operated by corporations directly interested in the manufacture and sale of wireless and electrical apparatus and appliances and those owned and operated by the Canadian National Railways,

From none of these stations is the listener-in disturbed by the direct appeal. it being considered sufficient for publicity purposes to mention the name of the corporation or the company furnishing the broadcast. In the case of the Canadian National Railways the purpose it threefold, to obtain publicity by indirect means, to serve a large and scattered population in the rural districts and to obtain adequate entertainment and bulletin service for the convenience and comfort of travelers using their principal trains all of which are equipped with receiving apparatus.

### Neighborly Problems

In view of the apparently increasing demand in the United States for additional broadcasting privileges, the position of Canada becomes more difficult in retaining channels which will be free from those required across the border, but, again, it is believed that this situation will rectify itself, not at once, perhaps, but in the early future.

It is becoming more evident each day that broadcasting to be of any service to owners of stations must be conducted along broad lines and by means of powerful statistics. It is obvious that the cost of an adequate station is such as tobe prohibitive to individuals or companies who merely want to play with radio and the consequent conclusion is that in wireless, as in many other things in life, the survival of the fittest will lead to better broadcasting, improved programs and to a complete advance in appreciation of the wonders of this science.

In Canada, as in other countries, the problems resemble those of the neighbor and it is the hope of those in authority that the measures taken will prove effectend the conference at Washington.

every receiver.



treme importance. radio amateur.

of experimenters.

tube.

From the time the Church first took over

The Pope's day starts at 6 o'clock in the

periods to be devoted to study. doubtedly selected in advance from the schedules of the numerous European capidials so that a concert being broadcast in Paris. in London or Berlin may be easily has been announced that while the recognized head of the Roman Catholic Church | tive. It is with these thoughts in mind number of stations licensed and operated him an insight into the patent lawyer's uses the radio receiving set his diversion that the Canadian representatives will at-

orld Rat

NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY,' NOVEMBER 8, 1925

\* 13

ceiver employing all modern improvements is very nearly perfect.

To sum up the whole situation it may be said that tone quality and selectivity are the two features most looked for by purchasers of radio receivers at the present time. It is also possible to say that there are sets available in which these two features exist to as great an extent as could be asked for. Ability to receive distant stations, a non-radiating circuit and volume enough to satisfactorily reproduce signals on a loud speaker are three other very essential features, but these may almost be classed as prerequisites, for they are possessed by practically

The price of the complete set is no longer as important a feature as it was, for people have found that they receive just about what they pay for. However, although the price of the average complete set has greatly increased, greater value is given for the money received.

Two features which may or may not be considered important, depending entirely upon the person buying the set, are: ability to receive signals with a loop antenna and pleasing appearance. As both of these usually necessitate the investment of more money and as they are not necessarily essential to the reception of good signals they are not always desired. It is believed, however, that they will increase in popularity in

The two remaining features-namely, ease of control and ease of maintainance-are still being perfected. and for this reason many seem doubtful as to their merits. Without doubt. however, before long they will be incorporated in most of the more expensive receivers.



On Monday, November 9, Secretary Hoover will call the Fourth Annual Radio Conference at Washington for the purpose of discussing problems of general interest to the radio industry. It is probable the conference will discuss the amateur's problems and other questions of ex-

This clan of experimenters will be well represented by men prominent in the radio field, and it is expected they will do all in their power to present matters of importance to the At last year's conference the ama-

teur was allotted a number of new wave bands. Therefore it is likely that again this year something will be said about this question. Under the present wave length assignments the "ham" has only one legal wave band,

merce has recognized this and has, whenever possible, favored this clar

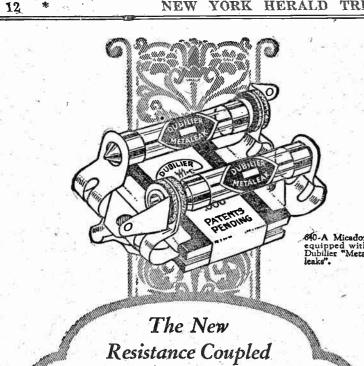
It was the amateur who demon strated the efficiency of the high frequencies (low waves). Much of the success of present-day broadcasting may be attributed to him. Therefore the outcome of the Annual Radio Conference will be of extreme interest to every one interested in radio.

During recent months there has been much comment on the fact that the transmitting amateurs are not using the high wave band (200 meters). This is not true. In spite of the fact that many members of this fraternity are interested in short wave communication, there' still remains a great deal of interest in the high waves. The short waves make local communication almost impossible, due to their peculiar radiating qualities. If amateurs cannot communicate with neighboring "hams" the "game" will tend to lose the fraternal spirit which now prevails.

2CRD has returned to the air after a long silence. This station has apparently either increased power or improved the apparatus, as it seems to have a greater "kick" than ever before. Last year this station did excellent work with one five - watt



NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, NOVEMBER 8, 1925



## Amplification Unit

Dubilier has now perfected a new resistance coupled amplification unit. It consists of the well-known 640 Micadon arranged with special clips for holding the new Dubilier metallized filament resistance units. Together they form a device which is compact, easy to install, low in

price-and thoroughly efficient. Send 10c for 32-page booklet A-1, "Applications of Dubilier Condensers in Radio Circuits".

Address 4377 Bronx Blvd., New York

BUILT EXPRESSLY FOR RADIO USE

YOUR batteries will be

**NEW** in the morning!!

CONDENSER AND RADIO CORPOR

Makes use of full A.C.Curren -not half of it

RADIO

BATTERY CHARGER

P. C. S. Part

#### quirements. In this connection it might be of interest to point out just how and why the design of radio sets has changed since the early days of broadcasting as this should aid one in selecting up-to-date apparatus. When station WJZ first opened in Newark the newspaper publicity given the station excited curiosity and caused a great local demand for number the interference caused by radio apparatus. As the average lay- radiation from regenerative receivers man did not know very much about became a very serious problem. The the benefit to be derived from radio neutrodyne, a five-tube tuned-radio at that time he did not wish to in- frequency receiver which is incapable vest much money in a receiving set, of causing radiation interference, was

teners. The One-Feature Set

The crystal set, as most radio fans the most popular, though many imof to-day know, is the simplest provements have since been made. possible type of radio receiver and aside from the prerequisite of being able to receive radio signals, is possesses but one feature, namely, low first started work on the elimination absolutely uniform. Uncondi prize. As this article progresses it of distortion and improvement of tionally guaranteed by world's will point out how the radio public tone quality in audio-frequency oldest and largest exclusive demanded that manufacturers add ten amplifiers. This was because it is transformer makers. other features to radio receivers.

n radio broadcasting had increased quality of reproduction. Much reonsiderably in the vicinity of New search work is still being conducted York City. The new radio fans soon hearned that with comparativley in the best sets have almost perfect reearned that with comparativley inexpensive equipment amateurs were production able to hear the Chicago station, been a movement on foot to remove wished to do the same. This resulted in a demand for an inex- place it in the living room. As a repensive, sensitive receiver, and to satisfy this manufacturers introduced ance have been in demand. Manuthe cne-tube regenerative of the single circuit type.

The regenerative receiver remained popular for a long time and still is used by many. However the one-tube receiver was soon found to be inadequate. When it was generally known that the music supplied by radio stations could be amplified and used for dancing, etc., the two and manufacturers have found that the three-tube regenerative receiver be- public is willing to pay, and sets came popular and everybody wanted possessing this characteristic are just circuits that would give volume. This beginning to appear on the market. was carried to a much greater extreme than it is to-day, and many ard circuits, but may be operated with even went so far as to use a two- one dial instead of two or three. stage power amplifier and power This feature is incorporated in a speaker in addition to the two-stage | radio set by standardizing the three audio amplifier in the receiver.

first called for when the broadcasting wave length the condensers which stations in this country had increased control the circuit fall at exactly the in number to such an extent that the same place on the dial. In a set of Department of Commerce found it this type it can easily be seen how necessary to assign two wave lengths, it is possible to couple the shafts of namely, 360 and 400 meters, to broad- the condensers together mechanical casting. This problem was first and tune the entire set with one dial. solved by the use of wave traps, because they were inexpensive, but when more and more wave lengths be discussed in this article is ease were given over to broadcasting sta- of maintenance. Receivers in which tions a selective receiver was found this feature is exemplified are those necessary. Two and three circuit re- which operate direct from the 110 generative receivers were first used volts alternating current house supand later untuned and tuned radio- ply without the use of batteries. At frequency sets were introduced.

radio frequency amplification made available; however, there is still much possible sets which operate from a research work to be done in this dipopular yet as they probably will be, that in the very near future either tion at this time. There are three the house supply, or battery eliminareasons for this and they are: first, the nouse supply, of pattery climina-tors, which may be connected to any loop operated sets may be made more standard receiver, will be available. selective; second, they are more portable, and third, they help solve the From what has already been pointed static problem to some extent.

work in the direction of making sets more economical to operate. This was because a five-tube set employing the old "1-amp" tubes cost many new development. At the present times as much to operate as do our present sets. The demand for econ-likened to the automobile industry. omy was first answered by the pres- Changes and improvements will be entation of three new types of made in the future, but none of these and the UV-201a. An endeavor is of present apparatus, nor will they be still being made to reduce the cost radical in their nature. A radio reof operating receivers, and many advances have been made recently.

As the number of radio fans located in cities continued to increase in and immediately the crystal set be- developed to overcome this menace, came popular among broadcast lis- and shortly after many other nonradiating receivers were introduced. This type of receiver is still one of Eliminating

How and Why Radio Receiving

Sets Have Changed in Design

The Up-to-Date Wireless Receiver May Have as

Many as Eleven Features, All of Which Should

Be Considered by the Purchaser

By Dudley F. Walford Jr.

that these accusations have been impressed on the minds of many pros-

pective buyers of radio sets has done much to retard the growth of

the industry. That it is chiefly the desire of the public, and not of the

manufacturer, that the design of radio apparatus be changed from

time to time may easily be seen by any one who seriously considers the

situation. The public states the type of equipment it will purchase, and

the manufacturer tries to produce equipment that will answer the re-

ANY persons are constantly accusing radio manufacturers of trying to stimulate the sale of wireless apparatus by making

a practice of frequently redesigning their products. The fact

The use of non-radiating receivers with non-oscillating detector tubes The opening of station KYW in Chicago marks the beginning of the second era of broadcasting. When this station started operating interest in radio broadcasting had interest impossible to obtain distortionless

> the set from the third floor attic and sult receivers of improved appearfacturers have found that many people are glad to spend from \$100 to \$200 more for the same set if i is housed in a cabinet of pleasing appearance, and this explains why most sets are now supplied in scveral different types of cabinets.

Ease of operation is another feature of a radio receiver for which Most of these receivers employ standtuning instruments to such an extent Sets possessing selectivity were that when they are tuned to a given Batteryless Sets

The last feature of a radio set to

the present time there are several The use of receivers employing satisfactory receivers of this type oop antenna. These sets are not as rection. Nevertheless, it is probable nowever. They first attracted atten-tubes, which will operate direct from

out it may be seen that many changes The introduction of tuned radio-frequency amplification may also be held responsible for starting sold. However, now conditions are DV-5 Tube, 2.49 vacuum tubes, the WD-11, the UV-199 will be capable of reducing the utility

Continued on next page

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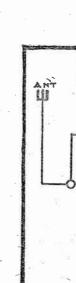
RADIE

A SURE GUIDE in selecting transformers is the experienc of leading fine set builders. They use more Thordarsons than all competitive makes combined. Thordarsons run Recommended by best dealers. Audio





LTHOUGH our course in radio is not intended to develop scientists and engineers in this field, it is necessary for us to at least mention in some degree the scientific phenomena that are involved in the art of radio communication. The first of these to be considered is magnetism. By definition magnetisim is that property possessed by a substance giving it the power to attract pieces of iron and steel.





Think of it! Just plug Ful-Wave Charger in on your A. C. electric socket. Watch for the increased clarity and volume from your receiver in the morning! A Ful-Wave charger keeps your batteries live and enables your receiver to do its best.

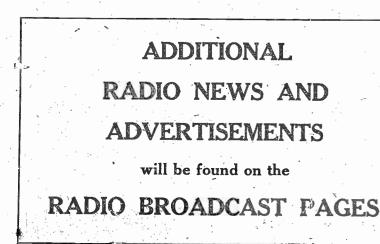
For Radio "A" batteries. A. C. Price line, 110-120 volts, 40 to 60 cycle. \$18

Ful-Wave is better than others because it is factory sealed-needs no adjusting-uses no bulb-no water-no acid. Type"A-B" charges "A" and "B" storage batteries simultaneously. Type "A" charges "A" storage batteries in almost half the time consumed by other chargers.

Ask your dealer for Ful-Wave, the most efficient charger made, backed by the manufacturer's full guarantee.

LIBERTY ELECTRIC CORPORATION of New York 342 Madison Avenue

AT ALL FIRST-CLASS DEALERS



to and an an all of the second as

## **Elementary Information for Radio Novices**

### Magnetism and Electricity as Applied to Radio

By JAMES W. H. WEIR

Technical Editor, The National Stockman and Farmer.

This is the third of a series of lectures for the radio layman which is being broadcast through KDKA, the Westinghouse Electric and Manufacturing Company's station at East Pittsburgh, Pa.

How many of you remember the days when as boys you bought yourself one of those little horseshoe magnets? They were U-shaped and nearly always painted red. Remember the fun yeu used to have chasing pins and needles across your desk at school and how proudly you used to fish your jackknife out of the well simply by tying this little horseshoe contrivance to a string and bringing it near the knife. You didn't know why the knife was picked up and perhaps you didn't care, just so it worked and you were happy. Well, this little piece of iron that you purchased was magnetized. In other words, it possessed the power of attracting other pieces of iron and steel to it. I am not going to go into detail regarding the "whys" and the "wherefores" because it would make my story too long. That you are all able to recognize a magnet when you see it by its action is sufficient for our purpose.

### Many Different Types

Now, all magnets are not necessarily U-shaped, nor do they all attract iron and steel objects at all times. In the crude or natural state a certain kind of iron ore possessed this power of attraction and was termed "lodestone." Sometimes we find cylnindrical pieces of iron or steel wrapped with a coil of wire, through which an lectrical current is passing. The action of the electricity enables the pieces of steel or iron to attract other pieces of iron and steel and they 'are termed with, for it is this type of magnet that enters into the science of radio, making it possible for us to hear the wonderful programs that are being broadcast daily. The most common use of the electromagnet perhaps is in the headphone and in some types of loud speakers.

Around all magnets, no matter what their shape or size, there is an invisible field of force or power. If we were to study the subject of magnetism we would learn a lot about the "magnetic flux" or "field" that exists about a magnet. This field, although invisible, is always present, and for those of you who are interested in seeing it I suggest the following experiment:

### An Interesting Experiment

Take any magnet-the little red horseshoe type will do-and over it lay a sheet of white paper. Now, take a handful of fine iron filings and lightly sprinkle them over the sheet. Almost instantly you will see the filings arrange themselves in well defined lines over the spot on the paper under which the magnet is concealed. Before you is a picture of the "magnetic flux" or "invisible field of force" that surrounds the poles or ends of all magnets.

Let us leave the magnet for a while and take up that other very importan phenomena-namely, electricity. If I were to ask you to-night "what is electricity" I wonder how many of you could give me an answer. Not one, I assure you, because there is no one, not even the most renowned scientist, who could answer that question, "What is electricity?" In spite of this fact, electricity is used everywhere by man. It is harnessed to all manner of machines, both domestic and industrial. It makes possible many things without which mankind would suffer. In other words, electricity, although it cannot be seen, heard or smelled, is man's greatest friend, and is recognized by what it does.

To the scientist, the engineer and the layman electricity makes its presence felt

### really the type we are most concerned | Again we know that electricity is present. It makes its presence known to us by some definite action either beneficial or harmful. **Classes** of **Electricity**

Science has divided electricity into classes, mention of which will perhaps be of help to you when the radio set is being discussed. The two main classes are static or frictional electricity and current or electricity in motion. Each of these classes are subdivided into minor groups, as will now be explained.

Static or frictional electricity, as its name implies, is produced by friction. Some of us may have noticed that in combing our hair on a dry day a crackling noise is heard and little blue sparks play about the comb and our hair. This is static electricity, produced by the friction between the rubber comb and our dry hair. Atmospheric electricity, such as lightning, isalso static electricity, and it is such disturbances caused by electricity in the air that we call "static" in the language of radio. Atmospheric electricity is of three important types, the first of which is the continual slight electrification of the air best observed in fair weather; secondly, the familiar phenomena of the thunder storm, and lastly, the aurora borealis. In brief it may be said that atmospheric electricity is caused by the evaporation of water by the sun's heat and the friction of the moving masses of air.

### AC and DC Electricity

Our chief concern in the radio science, however, is current electricity or electricity in motion. It is divided into two main subdivisions-namely, direct and alternating. Direct current electricity or DC, as it is termed, flows in one direction only. It is not a steady stream, but a rapid succession of electrical impulses all moving in the same direction. Alternating current electricity or AC, as its name tells you, alternates; that is, it changes the direction of its flow first in one direction and then in the opposite direction

Current electricity is produced in a number of ways. It can be obtained from by certain definite actions. We throw a a battery as a result of a chemical action. switch and a hundred lamps light. We | This type is direct and termed voltaic. If know that electricity accomplished the re- produced by heating two dissimilar metals, the most satisfactory results from our "electro-magnets." Electro-magnets are sult. We press a button and a bell rings. | such as antimony and bismuth, it is | radio receiving sets.

termed thermo-electricity. Created by moving a coil of wire in a magnetic field. such as we mentioned some time ago, it is termed induced electricity. Induced electricity plays a very important part in radio, and the coupler and audio transformer are perhaps the best examples of apparatus that function on induced electricity. In these examples, however, it is the field about the wire carrying the electric current that does the work. Further comment on this subject will be given later.

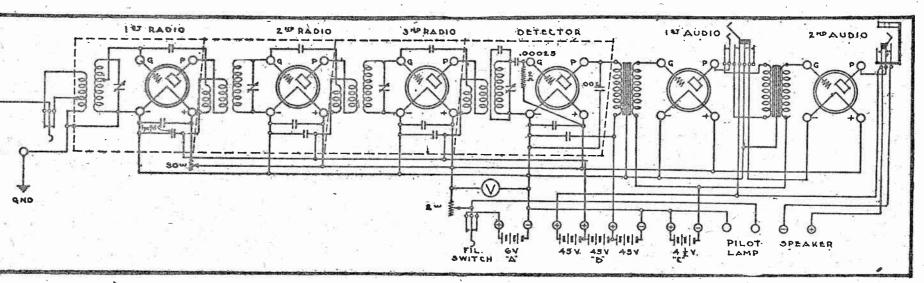
Inasmuch as we are dependent upon certain effects for our assurance that electricity is present, it will be well for us to know a little more about these effects. ( A few positive tests that electricity is present are as follows:

### Tests for Electricity

If a straight wire carrying an electric current is brought near a small magnet. such as a compass needle, and the compass needle so placed that the axis about which it turns is parallel to the axis of the wire the needle will be deflected somewhat. It will remain in this deflected position as long as the current flowing in the wire does not vary; secondly, a wire that has a current passing through it, if measured with a sensitive thermometer, will be found to have a higher temperature than when no current is flowing. In the ordinary incandescent lamp the rise in temperature is so great that the filament of the lamp glows and gives light. Lastly, if the wire carrying the electric current is out and the ends immersed in a solution such as copper sulphate or bluestone solution, as it is commonly known, there will be a chemical change in the solution accompanied by a deposition of metal copper on one of the wire ends. Such, then, are a few positive experiments proving the presence of the electricity.

In our next lesson we shall learn a little about the electrical circuit, the sources of electricity and the simple methods of measuring the strength of the current we employ. This is important because in radio it is necessary to employ certain voltages and resistances in order to get

### **Total Shielding Improves Tone Quality, Distance and Selectivity**



### The wiring diagram of a three-stage balanced radio frequency receiver which is employed in a commercial receiver of the total shielding type

HEN vacuum tube receivers first came into popularity the only form of shielding used was that placed behind the flials of tuning condensers or behind the panel of regenerative receivers to prevent body capacity from producing howls and squeals. Shielding is still used for this purpose, but so great has essential and efficient factor than it was in the early days of radio.

There are many different methods of However, the "total shielding" method which is being employed by some manufacturers of multi-stage tuned radio-frequency receivers is exciting interest at the present time. This method has helped uppermost in the minds of manufacturers | ceiver unless it comes from the antenna, | of tuned radio frequency, a detector and during the past year; namely, distance, selectivity and tone quality.

Early experiments in the use of receivers employing more than two stages of radio-frequency amplification proved decidedly unsatisfactory because of the inability to stabilize the amplifier. The proper use of "total shielding," however, been the advance in this field that an up- prevents all tendency to oscillate or reto-date method of shielding is a far more generate and thereby insures complete stability. So perfectly have some threestage radio-frequency receivers been designed that an average amplification as shielding employed in radio receivers. high as ten per stage has been obtained in some cases. With such a receiver distance is made an almost unlimited possibility.

Maximum selectivity is also obtained through the use of shielding. This is beto solve three problems which have been | cause no signal is able to enter the re- | fall. This receiver employs three stages

and as the signal must pass through four tuning systems in series before it reaches the detector tube interference is practically eliminated and powerful local stations of but slightly different wave lengths can be easily and completely tuned out.

The problem of improving tone quality has also been partially solved by the use of total shielding. By insuring stability and by preventing all tendency to oscillate or regenerate, the quality of the signal is not impaired by this cause, as it is in many radio-frequency receivers.

Experimenters interested in building a multi-stage tuned radio-frequency receiver of the total shielded type will find an excellent example of the art of shielding in the new Stromberg-Carlson six-tube receiver, which made its appearance this

two stages of-transformer coupled frequency amplification. The antenna transformer is tuned by one variable condenser. The three radio-frequency transformers coupling the first, second and third stage and the detector are tuned by a triple condenser. This reduces the number of controls from four to two. The radio frequency stages are balanced by the capacity method, as will be noted in the diagram accompanying this article. Each of the radio-frequency stages and the detector tube are shielded from the other. Also the condenser and transformer of each stage are shielded from the tube. These refinements of the set make possible the prevention of oscillation and regeneration.

(Continued on page six)



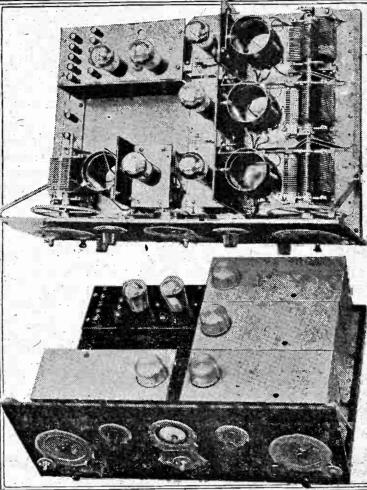
### "Total Shieldng" Improves Tone, Distance and Selectivity

### Continued from page five

that the set is made up of five units. former coupled audio amplifier.

coupling unit. This consists of an in- As the receiver just described is ductively coupled transformer with a commercial product it possesses a semi-aperiodic primary and a sec- several characteristics which it-would ondary tuned by a variable condenser. be impossible, or at least very diffi-This condenser is not coupled to the cult, for the amateur experimenter triple condenser and requires sepa- to duplicate. Accomplishing the tun-

erior view of the receiver with the this unit does not require shielding. hields removed, and it can be seen The photograph in Fig. 2 shows the same receiver with the shields in place. It will be noticed that they are Four of these units consist of a va- box-like in shape and cover the enriable condenser, a radio-frequency tire unit. - A small hole is placed in transformer and a tube, while the the top of each to allow changing the fifth contains the two stage trans- tubes without removing the shield. However, the tube is completely The unit on the extreme left near shielded by a cap placed over the the front of the panel is the antenna tube after it has been inserfed.



rate adjustment, as different sized ing of the three radio frequency antennas would affect the tuning of transformers with a single control this circuit.

set are the three radio-frequency As each of the condensers must be amplifier units. Each contains one completely shielded, the standard section of a triple condenser and also triple condenser cannot be used, and a radio-frequency transformer and a therefore some other method must be vacuum tube. The triple condenser is employed. unlike most on the market, inasmuch One solution is to use three standdensers coupled to the same shaft, horizontally to the panel, and cou-The condensers are spaced some dis- pled by a belt system. This is not tance apart to make it possible for a quite as satisfactory as the arrangewill also be noted that in these three quires frequent readjustment. Howunits, and also in the antenna coup- ever, this is easily accomplished. Anling unit, a shield has been placed be- other solution is to do away with the tween the vacuum tube and the trans- single control idea and employ three former. Without this, it is said, the tuning dials. set would be impossible to balance.

quency currents are entirely shielded, stages must be employed.

Secretary Hoover to Tell

**Proceedings of Conference** The most important event of the be the big radio conference to be held Grand Opera Company at 10 p. m. toin Washington on November 8, 9, 10 morrow and broadcast by WEAF, and 11 between the broadcasting in- WOO, WTAG, WJAR, WCAP and terests, the listening public, amateurs WCAE. Although it precedes \_ "II and the Secretary of Commerce, Her- Trovatore" and "La Traviata" by two bert Hoover. The outcome of the years, it is generally classed with "confab" is awaited eagerly by all them as representing one, if not the concerned, inasmuch as many radical final, high-water mark in Verdi's dechanges are expected. Unfortunately, velopment, for it possesses beauties very few of the listening audience of melody, harmony and orchestrawill be able to be present in person, tion and subtleties in the presentbut in order to let them know of the ment of character beyond his previous proceedings from an authoritative works. source as quickly as possible. Herbert. Hoover, the Secretary of Com- 2d Original Musical Comedy merce, who will be the most promi-bes By Rice and Hobart Thursday nent figure at the conference, has agreed to tell of the proceedings The second original radio musical through stations WJZ and WRC from comedy by the "Goodrich Zippers" the Department of Commerce Build- from the studio of WEAF for a chain ing in Washington. The date set for of thirteen stations (WEAF, WEEL this talk by Mr. Hoover is 9 o'clock WSAI, WGR, WWJ, WCCO, WOC. Thursday evening, November 12, and WEI, WCAE, WJAR, WADC, WTAG the stations broadcasting it will be and KSD) will be presented on WJZ and WRC.

OU will delight in the ability of

the Ferguson Model "Eight" to

bring in even the distant stations with

full, rich volume and tone quality.

The ease with which any one can tune

this Instrument; its surpassing tone

fidelity; its graceful lines and ab-

solute dependability make it the

choice of the lady of the house.

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### **Eliminating Noises**

cleaning connections to storage bat- Around the World" series. teries. Arrender - Start Starting

from \$7 to \$200.

will probably be found the most dif-The three units on the right of the ficult problem for the experimenter.

as it consists of three separate con- ard variable condensers mounted shield to be slipped between them. It ment just described, because it re-

In closing, it should be said that if The unit in the rear on the left all the advantages are to be had ontains the audio amplifier. As all from a shielded radio-frequency reof the circuits containing radio fre- ceiver, at least three radio-frequency

Verdi's "Rigoletto" To Be **Presented by WEAF** "Rigoletto," Verdi's famous tragic oming week in the radio field will opera, will be presented by the WEAF

Thursday at 10 p. m. Lieutenant. Gitz Rice and George V. Hobart, two of Broadway's cleverest lyricists and A scratchy noise is sometimes due song writers, have laid the scene on a to corrosion at points of contact. It trans-Atlantic steamer voyaging from can frequently be eliminated by New York to Europe in the "Whirl

Aerial to Light Pole The price of loud speakers ranges Never connect an aerial to a electric light pole.

In Limited Time and Places Radio Paradise or Perfection May Be Found; Overcrowding of the **Ether One of the Greatest Problems** 

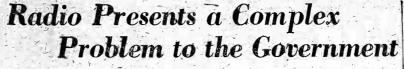
T ERFECTION is a rare thing in this world, When you experience it-perhaps in the beauty of a flower, the flash of light from a dewdrop or a jewel, the smooth, silent might of an efficient machine, the polished perfection of exalted art-in any of these things. you may see a corner of paradise. Radio paradise is that condition under which radio attains perfection. Will we ever get there? How do we get there? Are we there now? Many a disillusioned radio fan will rise up here and say: "Oh, foolish question!" The wives of some fans will say that purgatory is the name of the Europe may supply proof that there place, not paradise. There are people must be iron-handed limitation of the whose experience with radio is such number of stations. There is to-day that they cannot possibly take se-riously a man who talks of radio and casting stations of Europe; to cureparadise in the same breath. Never-theless, I would remind you that two. or three years ago to the man in the broadcasting have all the waves from street the promise of radio and the 500 to 2000 kilocycles (600 to 150 millenium seemed to be just about meters), and in addition all those the same thing. Was this promise from 100 to 375 kilocycles (3000 to entirely vain? 800 meters). To seriously sugges Thousand Years to Paradise this would be to propose, in essence, It is usual to think of paradise as that broadcasting monopolize the in some very remote time or place. whole of radio; away with the ama-We speak of the millennium; a thou- teurs, away with ship communication, sand years from now we shall reach away with radio aids to navigation. perfection. However, just as there Such a proposal is unthinkable. Faced is a religious philosophy which de- by this, a conference of the radio clares that paradise can be entered engineers of Europe, which just met here and now, so we can say that in at Geneva, has taken the bold step of limited times and places radio para- agreeing and declaring that the only dise, or perfection, can already be solution of broadcast station congesfound. We approximate this con- tion is to get rid of some of the dition. While listening with a first- stations. Whether America, through class receiving set to some of the the forthcoming Fourth National fine musical programs or nationally Radio Conference, will take so drastic important events broadcast from a a step remains to be seen,-but it is

difficulties. Few people if every one wanted to start a news-



6

NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, NOVEMBER 8, 1925



By Dr. J. H. Dillinger

Chief of Radio Laboratory, Bureau of Standards

Following is an abstract of an address delivered by Dr. J. H. Dillinger through WRC, the broadcasting station of the Radio Corporation of America, Washington, D. C.

local station with no other closer clear that a definite program of some than a hundred miles to offer inter- kind must and will be adopted to preference, it would be a dead soul that serve radio from the choking of the never got a thrill from the expe- ether channels.

challenge to enlarge and extend the places and the times of such achievement, and to bring about the conditions that will let more people participate. For it is evident that radio has a high mission, a promise of great contribution to progress.

In order to increase the area of example, to rearrange the broadcastchooses may know the thrill of listening in on perfection? While the

the best means of publicity yet de- erated for local purposes. vised. It would not be nearly so bad

paper because the printing of one newspapers already existing. Overcrowding the Ether

own experiences in the way of radio traffic jams, what is happening in Continued on page fifteen

rience. On such occasions one can Another present limitation upor participate, at a distance, in the radio perfection, also arising out of excitement of a world's series; or, the hitherto unlimited freedom of again, all the power and majesty of broadcasting, is its commercializamusical art is actually brought to tion. Listeners are beginning to be one's own fireside. The role of radio, uneasy over the too rude intrusion in these experiences, is close indeed of soap, bonbons and typewriters in to perfection. There is, therefore, a the midst of otherwise beautiful programs. The ruthless hand of commercialism is seen also in the occasional announcement that a perform ance has to be interrupted because of a demand for exorbitant royalties from the holder of copyright on some musical selection. The problems and radio paradise what must be done? imperfections of this class which Is it possible for the government, for confront radio are serious at the moment, and the exact solution cannot ing system so that every one who be seen, but there is no question that time will solve them.

Except for the type of difficulties answer is no, of course, this goal is have mentioned, most of the limitabeing steadily pursued. Some of the tions of radio are being steadily overdifficulties that block the way to a come by scientific and technical prograpid reaching of the goal are quite ress. It is the radio engineer who interesting, and I am happy to say forges the keys to radio paradise for that there are hopeful means of an ever-growing number of people meeting and overcoming all these At present there is only a small area, a few miles, around each station in xity which the radio waves reach the lis of the problem radio presents to the tener with ample intensity, undisgovernment, on which rests the re- turbed by atmospheric (static) and sponsibility of guiding, its develop- electrical interference. Technical ment. This complexity arises funda- progress will bring about increases of mentally because of interference of power and a proper distribution of one radio wave with another. All the broadcasting stations until this the radio signals are conveyed along same grade of reception prevails quite a single track, the ether, and very generally. It will at the same time skillful dispatching is required to provide proper separations of freavoid collisions. At the present time quency and distance so that these every conceivable interest wants to stations will not interfere with each broadcast, simply because radio is other or with the small stations op-

### **Illusion of Paradise**

For most people there can be no newspaper does not get in the way illusion of paradise when listening to of the printing of another; but in radio programs until the quality of radio only so many can operate at sound delivered by the receiving set one time. When this physical con- is greatly improved. This can be dition, which unfortunately the scien- done. Some of the more expensive tist cannot alter, is generally realized, sets now give substantially perfect people will perhaps be at least as quality, with volume as great as the willing to hold back from erecting original performance. These sets stations as from starting newspapers. readily tune in a desired station Not every one who has a message without disturbance from any other. for the public starts a newspaper; he It remains to bring apparatus of such usually uses for his purpose the perfection within reach of the ordinary pocketbook, and there are

steady advances in that direction. The thing that most stands in the There is one problem which baffles way of radio perfection just now is radio engineers at present. That is this overcrowding of the ether be- fading, or the irregular fluctuation cause too many kind souls aspire to of received signal strength which you serve the public through the owner- notice when listening to programs ship of broadcasting stations. If from distances of fifty miles or more. America is not convinced from her The only answer at the present





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**AUDIO COUPLER** 

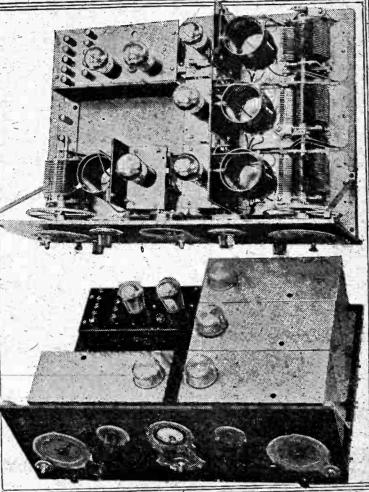
### "Total Shieldng" Improves Tone, Distance and Selectivity

### Continued from page five

that the set is made up of five units. Four of these units consist of a va-box-like in shape and cover the enriable condenser, a radio-frequency tire unit. A small hole is placed in transformer and a tube, while the the top of each to allow changing the fifth contains the two stage trans- tubes without removing the shield. former coupled audio amplifier. The unit on the extreme left near shielded by a cap placed over the the front of the panel is the antenna tube after it has been inserted. coupling unit. This consists of an in- As the receiver just described is ductively coupled transformer with a commercial product it possesses a semi-aperiodic primary and a sec- several characteristics which it would ondary tuned by a variable condenset. be impossible, or at least very diff-This condenser is not coupled to the cult, for the amateur experimenter

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Secretary Hoover to Tell

Proceedings of Conference The most important event of the coming week in the radio field will opera, will be presented by the WEAF be the big radio conference to be held Grand Opera Company at 10 p. m. toin Washington on November 8, 9, 10 morrow and broadcast by WEAF, and 11 between the proadcasting in- WOO, WTAG, WJAR, WCAP and terests, the listening public, amateurs WCAE. Although it precedes \_"Il and the Secretary of Commerce, Her- Trovatore" and "La Traviata" by two bert Hoover. The outcome of the years, it is generally classed with "confab" is awaited eagerly by all them as representing one, if not the concerned, inasmuch as many radical final, high-water mark in Verdi's dechanges are expected. Unfortunately, velopment, for it possesses beauties very few of the listening audience of melody, harmony and orchestrawill be able to be present in person, tion and subtleties in the presentbut in order to let them know of the ment of character beyond his previous. proceedings from an authoritative works. source as quickly as possible. Her-bert. Hoover, the Secretary of Com-2d Original Musical Comedy merce, who will be the most promi-nent figure at the conference, has agreed to tell of the proceedings through stations WJZ and WRC from comedy by the "Goodrich Zippers" the Department of Commerce Build- from the studio of WEAF for a chain ing in Washington. The date set for of thirteen stations (WEAF, WEEI, this talk by Mr. Hoover is 9 o'clock WSAI, WGR, WWJ, WCCO, WOC, Thursday evening, November 12, and WEI, WCAE, WJAR, WADC, WTAG the stations broadcasting it will be and KSD) will be presented on Thursday at 10 p. m. Lieutenant WJZ and WRC.

### Eliminating Noises

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NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, NOVEMBER 8, 1925



fection May Be Found; Overcrowding of the Ether One of the Greatest Problems

By Dr. J. H. Dillinger

Dillinger through WRC, the broadcasting station of the Radio Corporation of America, Washington, D. C.

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great contribution to progress. In order to increase the area of 'radio paradise what must be done? Is it possible for the government, for example, to rearrange the broadcasting system so that every one who chooses may know the thrill of listen-

ing in on perfection? While the answer is no, of course, this goal is

the best means of publicity yet de- | erated for local purposes. vised. It would not be nearly so bad if every one wanted to start a newspaper because the printing of one

ference, it would be a dead soul that serve radio from the choking of the rience. On such occasions one can Another present limitation upon participate, at a distance, in the radio perfection, also arising out of excitement of a world's series; or, the hitherto unlimited freedom of broadcasting, is its commercializamusical art is actually brought to tion. Listeners are beginning to be one's own fireside. The role of radio, uneasy over the foo rude intrusion in these experiences, is close indeed of seap, bonbons and typewriters it to perfection. There is, therefore, a the midst of otherwise beautiful programs. The rathless hand of com mercialism is seen also in the occa sional announcement that a perform ance has to be interrupted because of a demand for exorbitant royalties from the holder of copyright on some musical selection. The problems and imperfections of this class which confront radio are serious at the moment, and the exact solution cannot be seen, but there is no question that time will solve them.

Except for the type of difficulties I have mentioned, most of the limitabeing steadily pursued. Some of the tions of radio are being steadily over difficulties that block the way to a come by scientific and technical prograpid reaching of the goal are quite ress. It is the radio engineer who interesting, and I am happy to say forges the keys to radio paradise for that there are hopeful means of an ever-growing number of people. meeting and overcoming all these At present there is only a small area, a few miles, around each station in Few people realize the complexity which the radio waves reach the lisof the problem radio presents to the tener with ample intensity, undisgovernment, on which rests the re- turbed by atmospheric (static) and sponsibility of guiding, its develop- electrical interference. Technical ment. This complexity arises funda- progress will bring about increases of mentally because of interference of power and a proper distribution of one radio wave with another. All the broadcasting stations until this the radio signals are conveyed along same grade of reception prevails quite a single track, the ether, and very generally. It will at the same time skillful dispatching is required to provide proper separations of freavoid collisions. At the present time quency and distance so that these every conceivable interest wants to stations will not interfere with each broadcast, simply because radio is other or with the small stations op-

### **Illusion** of **Paradise**

For most people there can be no newspaper does not get in the way illusion of paradise when listening to of the printing of another; but in radio programs until the quality of radio only so many can operate at sound delivered by the receiving set one time. When this physical con- is greatly improved. This can be dition, which unfortunately the scien- done. Some of the more expensive tist cannot alter, is generally realized, sets now give substantially perfect people will perhaps be at least as quality, with volume as great as the willing to hold back from erecting original performance. These sets stations as from starting newspapers. readily tune in a desired station Not every one who has a message without disturbance from any other. for the public starts a newspaper; he It remains to bring apparatus of suchusually uses for his purpose the perfection within reach of the ordinary pocketbook, and there are



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## Additional Radio Programs for the Week

(Continued from preceding page) WOR-NEWARK-405

T Fel Lation

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WOR-NEWARK-405 6:45, 7:15, 7:45 p, m.-Gym class. 2:30 p. m.-Alfred Dulin, pianist. 2:45 p. m.-Dr. George Little, "T Samoyede." 3 p. m.-Alfred Dulin, pianist. 3:15 p. m.-Arche Stater's Orchestra. 6:15 p. m.-Words Mispronounced." 6:17 p. m.-"Sports," Bill Wather. 6:30 p. m.-News bulletin. WGCP\_NEWARK-252

WGCP-NEWARK-252 -Elvirá Geiger, pianist. m.-Bill Mendex, orchestra -Hughle Woolford, pianist. . m.—Studio program. . m.—Bert Dagmar, songs. . m.—Sylvia Schatz, pianist

WAAM-NEWARK-263 -Happy Hour. -Jack Smith's Orchestra.

m.—To be announced. WOO—PHILADELPHIA—508 m.—Grand organ: oon)—Luncheon music. p. m.—Grand organ; trumpets.

WIP-PHILADELPHIA-508

 WI--THADJAN BARNAL
 WI-THATANAN BARNAL
 M.-Tea room ensemble.
 M.-THATANAN SHAKESPEARE Club.
 D. M.-Concert orchestra.
 D. M.-Concert orchestra.
 D. M.-Concert orchestra.
 D. M.-Concert orchestra. 8-11

-Concert orchestra; artist

b. m. Artist recital.
30 p. m. — Dream Daddy.
WCAU—PHILADELPHIA—278
30 p. m. — Billy Hayes's Orchestra.
30 m. — Recital.
p. m. — Ethel Brooks, soprano.
p. m. — Barry O'Moore, tenor.
15 p. m. — Central Radio Syncopators
30 p. m. — Frank Cook, songs.
p. m. — Sesqui Centennial hour.
WHAR—ATLANTIC CITY—275
p. m. — Seaside Trio.

WHAR—ATLANTAU UAA 2 p. m.—Seaside Trio. 7:30 p. m.—Health talk. 9 p. m.—Studio concert. WPG—ATLANTIC CITY—300 — Luncheoh music; J. Leonard

1:80 p. m.-Luncheon mušic; J. Leon Lewis, director. 4:80 p. m.-Hall Trio. 6:80 p. m.- "Billy" Rocap. "Sports." 6:45 p. m.-Organ recital. 7:6:....-Dinner music. 5:5 p. m.-World Wonder Excursions.

[5 p. m.—Concert.
p. m.—Dance orchestra.
WGY.—SCHENECTADY.—380
, m.—Music; talk.
0 p. m..—Unner music.
0 p. m..—WGY Book Chat."
5 p. m..—WGY Book Chat."
5 p. m..—WGT Book Chat."
5 p. m..—WGAT Book Chat."
5 p. m...-WGAT Book Chat." :30 :45

m.—Royal Salon Orchestra. p. m.—WGY Orchestra. p. m.—Organ recital. WRW—TABRYTOWN—273

). m.—Dick Tobin, planist. p. m.—Robertson and Doonen. p. m.—Caledonian Pipe Band. p. m.—Dick Tobin, planist. p. m.—Pipe Major Andrew Gre

soloist. 11:05 p. m.—Caledonian Pipe Band. WGR—BUFFALO—319

6:30 p. m.-Dinner music. 8-11 p. m.-Program from WEAF. WTIC-HARTFORD, CONN.-476

WIC-HARTFORD, CONN.-476 6:30 p. m.-Dinner music. 7 p. m.-Dinner music. 7 30 p. m.-Taik, "Diphtheria." WJAR-PROVIDENCE-206 1:05 p. m.-Joe McNamara's Orchestra. 8 p. m.-Musical program. 9 p. m.-Musical program. 9 p. m.-The "Zippera." 10 p. m.-The "Zippera." 10 p. m.-Health exercises. 7:45 a. m.-Morning watch. 1 p. m.-Jay Riseman's Orchestra. 5:0 p. m.-Joe Herman's Orchestra. 5:0 p. m.-Joe Herman's Orchestra. 6:50 p. m.-Joe Herman's Orchestra. 6:50 p. m.-Joe Herman's Orchestra. 6:50 p. m.-Joest and found; weather. 7:45 p. m.-Program from WEAF. WNAC-BOSTON-250 10:0 a. m.-Bible reading; club talks. 12:15 p. m.-Joon service. 1 p. m.-More's Pearl Ramblers. 6 p. m.-Nors Service. 1 p. m.-More's Pearl Ramblers. 6 p. m.-Nors Program. 8 p. m.-Nore's Pearl Ramblers. 6 p. m.-Nore's Pearl Ramblers. 6 p. m.-Noret program. 8 p. m.-Oncert program. 8 p. m.-Concert program. 8 p. m.-Concert program. 9 p. - 2 Service Parla P. Service Parla P. Service Parla P. B. Service Parla P. B. Service Parla P. B. Service Parla P. B. Service Parla P. Serv

WBZ-SPBINGFIELD, MASS.-333

p. m.—To be announced. m.—Market reports. o. m.—English literature course. p. m.—Mrs. Hazel King, soprano.

m.—Musical program. m.—Evening of opera. 5 p. m.—McEnelly's Singing Orche

WCTS-WORCESTER, MASS.-268 a. m.—Raulo chat. oon)—Market and weather reports. -2 n. m.—Luncheon music.

adio enterta 4 30 p. m.—Kallo entertainment. 5:15 p. m.—Yory teiler. 8:30-9 p. m.—'The Larkinitles.'' 8:30-9 p. m.—'Pop'' concert. 9-10 p. m.—Same as WEAF. 10-11 p. m.—The "Zippers.'' WRC-WASHINGTON—489

WRC-WASHINGTON-46 10 a. m.-Women's hour from W 12 (noon)-Organ recital. 1 p. m.-Washington Orchestra. 7 p. m.-Lee House Trio. 7 45 p. m.-Smithsonian talk. - 8:05 p. m.-U. S. Army Band. 9 p. m.-Two-piano recital. 9:30 p. m.-Meyer Davis's Band.

p. m.-Meyer Davis's Band. KDKA-PITTSBURGH-30 7:45 p. m .- "The Conference o

no." 8 p. m.—Farm program. 8:30 p. m.—KDKA Liftle Symphony Or-chestra: Edith Palmer, contraito. 4 p. m.—Liftle Symphony Orchestra. 11 p. m.—Midnight concert... WCAE—FITTSBURGH—461

6;30 p

130 p. m.—Dinner concert.
130 p. m.—Uncle Kaybee.
p. m.—Larkin period.
0 p. m.—The Zeppers.
WADC—AKRON, OHIO—258

6:30 p. m.—Concert orcues 9:30 p. m.—Artists' recital.

6 p. m.—Dinner hour music. WEAR—CLEVELAND—399

7 p. m.-Dinner concert. WEAR-CLEVELAND-390

7 p. m.—Dinner concert. 3 p. m.—R. T. L. program. 9 p. m.—Dutch master artists. 10 p. m.—Organ recital. WSAI—CINCINNATI—309

8:10 p. m.-Program same as WEAF. WLW-CINCINNATI-326

3 p. m.—Dinner concert. 1:03 p. m.—Doherty Melody %oys. 1:55 p. m.—Crosley-Solon orchestra 1 a. m.-Bow-Wows. WKRC-CINCINNATI-326

11 p. m.—Post-Wurlitzer classed 12 midnight—Mixed program. WJR—DETROIT—517 7 p. m.-Jean

9 p. m.-Serenaders and soloists. m.-Dance orchestra. 11 p. m.-Dutch Masters. WWJ-DERTOIT-353

m.—Dinner concert. m.—Program same as WEAF. WREO—LANSING, MICH.—286

8 p. m. Dinner concert. 8:15 p. m. Orchestra, quartet, Instru WEBH-CHICAGO-370 8 p. m. Orchestra concert, songs. 10 p. m. Dance music, songs, readings. 12-2 a. m. Dance music, songs.

WOK-CHICAGO-217 m.—Concert hour. m.-2 a. m.—Musical features. WGN—CHICAGO—370 m. Dinner music. m. The classic hour. m. Dance music 8:30 r 10:30 12:30 KYW-CHCAGO-536

RYW-CHCAGO-35 8 p. m.-Dinner concert. 8:33 p. m.-Farm speeches. 9 p. m.-"Good Reading." 9:30 p. m.-"Evening-at Home." 11 p. m.-"Evening-at Home." WMAQ-CHICAGO-448 7:30 p.

m.—La Salle orchestra. —Garden talk, Boy Scouts. m.—Association of Comm n.-Songs. 10 p. m.—Lecture, songs. 10 p. m.—Lecture, songs. 10:40 p. m.—League of Nations

WENR-CHICAGO-266

n.—Dinner concert. m.—All-American Pioneers. WQJ—CHICAGO—448 7 р. п 9-11 р.

Ginger hour. WLS-CHICAGO-345

7:15 p. m.-Organ. Woodshea WHT-CHICAGO-400

7 p. m.—Classical program. 8:45 p. m. (238 meters)—Musical

tures. 10:30 p. m.—Entertainers. --Your Hour League. WJAZ--CHICAGO--322

1 p. m.-1 a. m.-Concert: WCBD-ZION, ILL-345 p. m.—Saxophone Quintet and WOC-DAVENPORT-484

6:45 p. m.—Chimes concert. 8 p. m.—Program from WEAF. 12 midnight—Dance music.

FRIDAY

WJZ-NEW YORK CITY-455

m.---Women's inc.---m.---News. 5 a. m.---"Arts and Decorations. 11:05 a. m.—"Arts and Decorations."
1 p. m.—Ambassador Trio.
2, 4, 5:30, 7:30 and 10:25 p. m.—News.
4:30 p. m.—Bianche Fink, soprano.
4:20 p. m.—Peter Trotta, Joseph Pandok, guitar and mandolin.
4:30 p. m.—Astor Tea Orchestra.
5:32 p. m.—Market quotations.
5:50 p. m.—Financial summary.
6:30 p. m.—N. Y. University course.
"Money." Professor Reid L. McClung.
7 p. m.—Bernhard Levitow's Dinner Orchestra.

nonley, Molestin Michael Mich

kopf. 9:45 p. m.--To be announced. 10:30 p. m.--Lorraine Orchestra WJY-NEW YORK CITY-405 p. m.-Irwin Abrams's Orchestra

WEAF-NEW YORK CITY-492 WEAF-NEW YORK CITY-492 6:45 to 7:45 a. m.-Health experiences. 10:45 a. m.-Hume service talk. 11:05 a. m.-Music. 11:30 a. m.-Talk. 11:30 a. m.-Talk. 11:40 a. m.-Talk. 11:55 a. m.-Music. 2 (noon)-Market and weather reports. p. m.-Lella Troland-Gardner. Negro apirituals.

rituals

p. m.-Liella Trojand-Cardner, Neglo spirituals.
 4:15 p. m.-Leila Trojand-Gardner.
 4:36 p. m.-Leila Trojand-Gardner.
 4:45 p. m.-Persian Art," Mme. Khan.
 6 p. m.-Edgar Gruen, barytone.
 7:15 p. m.-Iris Torn, planist.
 7:30 p. m.-Tris Torn, planist.
 7. m.-The Happiness Boys.
 8:30 p. m.-Eagle Trio.
 9 p. m.-Talk.
 10 p. m.-Talk.
 10 p. m.-Jascha Gurewich's Saxoo phone Ensemble.
 10:35 p. m.-Moment musical.
 11-12 p. m.-Meyer Davis's Orchestra.
 WGBS-NEW YORK CITY-316

11-12 p. m.—Meyer Davis's Orchestra. WGBS—NEW YORK CITY—316 10 a. m.—Timely talks with Terese. 10:29 a. m.—Household economy. 10:30 a. m.—June Warren, planist. 10:40 a. m.—June Warren, planist. 10:50 a. m.—June Warren, planist. 10:50 a. m.—June Warren, planist. 10:50 p. m.—Scripture reading. 1:35 p. m.—Molica Smith, soprano. 2 p. m.—Mildred Burks, Fred Ottignon duets.

p. m.—Mildred Burks, Fred Ottignon duets.
 p. m.—Interview with Lillian Lauferty 3:10 p. m.—Edith Gutterman, soprano.

WNYC-NEW YORK CITY-526

a. m.—. Decorative Floors. 15 a. m.—. Morning concert. 145 a. m.—. Joe Schmitt's recipes. noon-Luncheon concert. 10 p. m.-Market high spots.

6:20 p. m.—Market high spots. 6:30 p. m.—Plano selections. 6:30 p. m.—Elementary French lessons. 7: p. m.—Advanced French lessons. 7:35 p. m.—Meeting of Board of Esti-mate; resume.

m.-American marine

8 p. m.—American marine week program; orchestra; address by Colonel E. H. Simmons.
9 p. m.—Allen Behr; Ruth Burton, songs.
9:15 p. m.—Hida Reich, sonrano.
9:30 p. m.—Kessler Ensemble.
10:10 p. m.—'Books," Professor J. G. Carter Troop.
10:30 p. m.—Police alarms; weather.

10:30 p. m.—Police alarms; weather.
 WMCA—NEW YORK CITY—341
 6 p. m.—Olcott Vall's String Ensembl
 6:30 p. m.—Ernie Golden's Orchestra.
 8 p. m.—Fred Ruzicka, violinist.
 8:50 p. m.—Talk, Arthur Williams.
 9 p. m.—Hardman hour of music.
 10 p. m.—Orchestra selections.
 11:15 p. m.—Donald Flamm, critic.

WEBJ--NEW YORK CITY-273 m.-Bienheim Theater Ensemble. p. m.-Michele Bontempo, baryto p. m.-Carrie Cohen, pianist.

8:25, p. m.—Recreation Orchestra. WHN—NEW YORK CITY—S61 2:15 p. m.—Judith Roth, songs. 2:30 p. m.—Hock and Jerome, songs. 2:45 p. m.—Music.

p. m.—Music. p. m.—Bobby Grey, songs. p. m.—Silvio Dirienžo, planist.. m.—Herman Streger's Players. p. m.—Uncle Robert's Pals. m.—Gus Gold's Orchestra. m.—Richman Entertainers. M.—Richman Entertainers.

p. m.—Richman Entertalners.
7.30 p. m.—Meiody Orchestra.
8 p. m.—Bert Dagmar, barytone.
8:30 p. m.—Margaret Leary, soprano.
8:30 p. m.—Harold Von der Heide, (La Ruffa.
8:45 p. m.—Bilty Wynne's Orchestra.
10 p. m.—Bilty Wynne's Orchestra.
10 p. m.—Caravan Orchestra.
11 p. m.—Caravan Orchestra.
11 a. m.—Silver, Slipper Orchestra.

a. m.—Silver, Slipper Orchestra. WFBH—NEW YORK CITY—273 2 p. m.—Orchestra selections. 3 p. m.—Studio program. 3:45 p. m.—Elizabeth Arrighi,

3145 p. m.—Fina creatal.
4 p. m.—Fiano recital.
4:30 p. m.—Harry Leslan's Orchestra.
5 p. m.—Grace Angelo, contralto.
6:15 p. m.—Tierney Chefs.
6:30 p. m.—Tierney Chefs.

11:30 p. m -- Fordham Orchestra. WAHG--RICHMOND HILL, N. Y.--316

WEIG-BOSTON-349 8:45 d. m.-Health exercises. 7:45 a. m.-Morning watch. 10:45 a. m.-Home Service Talk. 3:15 p. m.-Art Rubit's Orchestra. 8:50 p. m.-Lost and Found; weather. 7 p. m.-Big Brother Club. 7:45 p. m.-Musicale. 8 p. m.-Maspolitan program. 8:30 p. m.-Half Hour of Hospitality. 9 p. m.-Maulicale. 10 p. m.-Maulicale. 10 p. m.-Maulicale. 112:15 p. m.-Soon service. 112:15 p. m.-Luncheon concert. 4 p. m.-Tea dance. WAHG--RICHMOND HILL, N. Y.-310 12 noon-Musical program. 7:30 p. m.-Maurice E. Connolly, 7:45 p. m.-Euma: May, soprano. 8 p. m.-Euma: May, soprano. 9 p. m.-Euma May, soprano. 115 p. m.-Rainbow Saxophone Quartet. 9:30 p. m.-William Bellham, reader. 9:45 p. m.-Radio talk. 10 p. m.-Radio talk. 10:15 p. m.-Redio talk. 8:30.9 m.-Redio ta 4 p. m.—Tea dance. 4 20 p. m.—Ray Sinatra, planist. 6 p. m.—Kiddles Klub. 6 30 p. m.—Dinner dance. 8 p. m.—Musical program.

8:30-9ff30 p. m.-Recita

WRNY-NEW YORK CITY-259

WRNY-NEW YORK CITY-259 10:30 a. m.-Reducing exercises. 10:45 a. m.-Dr. Harry Finkei. "Diet." 11 a. m.-"Woman in Business." 12 (noon)-Trinity Six, music. 4:15 p. m.-Afternoon program. 7 p. m.-"Whose Birthday To-day." 7:05 p. m.-Telegraph Sport-flash. 7:15 p. m.-Code Edesson. 7:45 p. m.-Code Lesson. 7:45 p. m.-Alterd W. McCann. "Foods." 8 p. m.-Aschenfelder Opera Co. 8:30 p. m.-DeMacchi Opera Company. 9:30 p. m.-"Science Finds Creative Ex-pression."

pression." ):45 p. m.—Concert. 10:15 p. m.—Novelty Night—Simultan eous Music.

WGBB-FREEPORT, N. Y.-244

brooklyns. WOR.-NEWARK-495 6:45-7:15-7:45 a. m.-Gym exercises. 2:30 p. m.-B. P. Adams, "Samuel Cole-ridge". 2:45 p. m.-Miriam Williama, soprano. 3 p. m.-Inangural exercises. 6:15 p. m.-Words Mispronounced." 6:17 p. m.-Words Mispronounced." 6:30 p. m.-Man in the Moon Stories. 6:35 p. m.-Shelton dinner music. 7:20 p. m.-News bulletins.

WGCP-NEWARK-252

WGCP-NEWARK-253 3 p. m.-Songs by artists. 4 p. m.-Hugo Angelo, tenor. 4:15 p. m.-Charol de Thomee, planist. 4:30 p. m.-Clarence Profit, entertainer. 4:45 p. m.-Janet Levy, singer. 6 p. m.-Orchestra selections. 6:15 p. m.-Orchestra selections. 7 p. m.-Orchestra selections. 7 p. m.-Orchestra selections. 8:05 p. m.-Miton Yokeman, tenor. 8:15 p. m.-Clarence Williams Trio. 8:35 p. m.-Serger Klibansky's enter-tainers.

ainers. 5 p. m.—Ukulele Bob McDonald. 0 p. m.—Eva Rothenberg, planist. 5 p. m.—Jimmy Flynn, songs. p. m.—Stickland's Orchestra. 30 p. m.—Bob Murphy's entertai p. m.—Connie's Orchestra.

WAAM-NEWARK-263

WIP-PHILADELPHIA-508

WOO-PHILADELPHIA-508

12 noon-Luncheon music.
13 noon-Luncheon music.
145 p. m.-Grand organ and trumpets.
7:30 p. m.-Dinner music.
8 p. m.-Address, Mrs. Walter Price.
8:15 p. m.-U. S. Navy Band.
8:50 p. m.-Dr. Charles Furey.
9 p. m.-W. O. O. Orchestra.
10 p. m.-McHeess, by E. J. Cattell.
10:30 p. m.-Art Landryfs Orchestra;
Berta Levin string ensemble; Henry Nosco, violinist; Ennio Bolognini, 'cello; Florence Wightman, harp.
11 p. m.-Dance music.

WFI-PHILADELPHIA-395

p. m.—Readings and musical program.
 3:45 p. m.—Eleanor Gunn fashion feature.
 6:30 p. m.—Concert orchestra.
 7 p. m.—Dance orchestra.

WLIT-PHILADELPHIA-395

.--Concert orchestra. --Muphi Epsilon Musical Soron

playlet. p. m.—Dance music. p. m.—Dréam Daddy. m.—"Philadelphia Leads America."

p. m.—Concert orchestra. p. m.—Artist recital. . m.—Morning Glory Club; danc

WCAU-PHILADELPHIA-278

p. m.—Lew Chapman's Orchestra. p. m.—Houston Club smoker. m.—Instrumental Trio.

Billy's Saxophone

m .- Ed Kieffer, humorist Rennie Cormack, songs

0 p. m.—Dancing Academy Orche WHAR—ATLANTIC CITY—275

WPG-ATLANTIC CITY-30 6:45 p. m.—Organ recital. 7 p. m.—Trio dinner music. 8 p. m.—Educational series. 8:55 p. m.—Weckly Line of Cheer." 9 p. m.—The Traymore Concert Orches tra.

m.—Organ recital. WGY—SCHENECTADY—380

tra. 7:30 p. m.—Health talk. 7:35 p. m.—Health talk. 8 p. m.—Festival Choir of the Schene tady Conservatory of Music; orchesti 9:20 p. m.—The Radio Four. Comedu, "The Dover Road."

p. m.—Comedy, "The Dover Road." WRW—TARRYTOWN, N. Y.—273 05 p. m.—Musical program; talk.

p. m. — Musical program; tak.
p. m. — Almo entertainers.
p. m. — Almo entertainers.
10:30 p. m. — Almo entertainers.
10:45 p. m. — James Fitzpatric, harmonic:
11:05 p. m. — Dance or proserve.

m.-Dance orchestra, WGR, BUFFALO-319 10:45 a. m.—Home Service talk. 6:30 p. m.—Dinner music. 7:30 p. m.—Talk

0 p. m.—Dinner mass...
0 p. m.—Taik.
p. m.—Winger's Entertainers.
30 p. m.—Margaret Garrison, planist.
p. m.—Something Different.
1 p. m.-I a. m.—Supper music.
WHAM—ROCHESTER, N. Y.—278
130 p. m.—Exatuman Theater Orchestra
5 p. m.—Theater orchestra.
7.30 p. m.—Theater orcestra.
7.30 p. m.—Weather forecast; market.

WCAC-MANSFIELD, CONN.-275

45 p. m.—Program of music. WTIC--HARTFORD, CONN.--476

Will-HABITURD, CURL, C. 6:30 p. m.-Young People's Hour. 7 p. m.-Emil Heimberger's Trio. 7:30 p. m.-Vocal solos. 8:10 p. m.-Uoral solos. 8:10 p. m.-Dinner music.

p. m.—"Hoodoo Night."
p. m.—Dance music.
p. m.—Popular Half Hour.
WJAR—PROVIDENCE—:
WJAR—PROVIDENCE—:

1:05 p. m.-Woodstock Entertainers 8 p. m.-Musical program. 9 p. m.-Maine Hour.

-Biltmore Dance Orchestra. WEEI-BOSTON-349

m -Albany Strand Theater Orches

2 p. m.—Asia Orchestra. 2:30 p. m.—Music; health talk. 6:30 p. m.—Sunday School lesso

p. m.—Seaside Trio.
s30 p. m.—Fyotball forecast.
p. m.—Seaside Trio.
1:15 p. m.—Strand Organ Recital.
WPG—ATLANTIC CITY—300
s45 p. Correct product of the second seco

10:30 a. m.—Solos. 10:40 a. m.—Home service talk. 1 p. m.—Tea room ensemble.

orchestra. 10:30 p. m.—Rufus and Rastus. 11 p. m.—Popular program.

WAAM--NEWARK-263 It a. m.-Happy hour. 11:15 a. m.-Cooking School. 3 p. m.-Hope's Melody Boys. 7 p. m.-Helena Parrill, soprano. 1:30 p. m.-The Sport Oracle. 1:45 p. m.-Fred Tinkel, pianist. 1:55 p. m.-Hidla Kay, contralto. 0:20 p. m.-Ann Shaw Harmony 1:55 p. m.-Perth Amboy Night. 1:55 p. m.-Hidla Kay. contralto.

m.—Setting-up exe n.—Luncheon music. .—Artist recital.

-Luncheon music

3 p. m.—WGBB's Frolics. 9 p. m.—G. B. Comer, basso. 9:15 p. m.—Roselle Moore, sopran 9:30 p. m.—Billy Eisenroth's brooklyns.

### New Rectifier Developed Which the baseboard as shown in the wiring by cleaning the contact areas with in the same way, taking care that diagram Fig. 1 and in the photograph of the completed instrument, Fig. 2. should be fastened to the right-hand the proper order be maintained; keep in the alimination of the completed instrument, Fig. 2. Gives Full-Wave Rectification Each part should be firmly fastened to the baseboard with wood screws. Fig. 2. The variable resistance R1 the set, make sure that one terminal

### This Tube, Which Operates on the Same Gas Conductance Principles as the S Tube, May Be **Used in B Battery Eliminators**

### By Edwin E. Turner

O REPLACE B batteries successfully an eliminator must possess certain definite characteristics which make of it a specialized piece of electrical apparatus. Its component parts must be the result of painstaking development. Contrary to popular opinion, it is the metal case of the instrument and "B Amplifier" on the eliminator ingly. not possible to construct a satisfactory eliminator by the compounding of the usual three-element tube, a Ford spark coil and a stray condenser. These parts do not lend themselves to the work. Special parts, designed for the purpose, are required.

Cognizant of this fact, the Ray-

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ud

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socket

teries

WFBH\_NEW YORK CITY-273 p. m.-Bert Lowe's Entertainers

-Bert Lowe's Entertai -Studio program. -Ed Berlin's Orchestra

-Garabaldi Arrighi Singers.

WRNY-NEW YORK CITY-259

12 noon-Frinity Six music. 4:15 p. m.-Afternoon program. 4:30 p. m.-Symphony Society notes. 4:45 p. m.-Rita's Kiddie music party 7 p. m.-"Whose Birthday To-day?" 7:05 p. m.-Telegraph sportfash. 7:15 p. m.-Commerce of the Day.

7:15 p. m.—Commerce of the Day.
7:20 p. m.—Cataline Noäck.
7:35 p. m.—"St. Vitus Dance."
7:45 p. m.—Goncert orchestra.
8:15 p. m.—Guseppe Adami, violinist...
8:30 p. m.—Ben Bernie's Orchestra.
9:15 p. m.—Labor and Capital."
9:30 p. m.—Teition.
10 p. m.—Fiction.
10 p. m.—Molion picture review. ~Richard Barthelmess and others.
12 midmight-DX Hound Hour; Ferrucci's Orchestra.
WGLO\_NEW VORK CITY-233

WOKO-NEW YORK CITY-233 8:15 p. m.-Kate Rabin, pianist. 8:35 p. m.-Beatrice Meisler, recita-

8:50 p. m.—Sarah Sommers, whistler. 9:05 p. m.—Vladimir Tobachnik, bary-

WBBR-STATEN ISLAND, N. Y.--273 8 p. m.--Fred Ehrenberg, musical saw. 8:10 p. m.--L Marion Brown, soprano. 8:20 p. m.--Ebje questions and answers. 8:40 p. m.-L. Brown, soprano. 8:50 p. m.-Fred Ehrenberg, musical

WARG-RICHMOND HILL, N. Y .- \$16

WGBB-FREEPORT, N. Y.-244

WOR-NEWARK-405 6:45-7:15-7:45 m. m.-Gym class. 2:30 p. m.-Maxine Brown. 2:45 p. m.-Mrs. Gibson Arnoldi, "Mind

2:30 p. m.—Maxine Brown.
2:35 p. m.—Max. Gibson Arnoldi, "Mind, and Matter."
3 p. m.—Maxine Brown, "Sweetheart of the Air."
3:15 p. m.—'Yavan Brown, "Sweetheart of m.—Zfit's tea music.
6:15 p. m.—'Sports," Bill Wather.
6:30 p. m.—Shelton dinner music.
7:30 p. m.—Yava's Collegians.
8 p. m.—'Yan Appreciation of 'Stephen Crane," Don C. Seitz.
8:30 p. m.—Clara Auwell, harpist.
8:30 p. m.—Clara Auwell, harpist.
9:30 p. m.—Arthur Baecht, violinist.
9:30 p. m.—Arthur Baecht, violinist.
10:15 p. m.—Julius Koehl, pianist.
10:30 p. m.—Arthur McCormick. bary-tone.

10:45 p. m.—Julius Koehl. planist. 11 p. m.—Eddie Elkins's Orchestr

WGCP-NEWARK-252

1818. 4:05 p. m.—Johanna Cohen, ukulele. 4:10 p. 'm.—Shirley Herman, singer. 4:20 p. m.—Richard Cheatham's Band.

p. m .--- To be announced:

WFI-PHILADELPHIA-395

WAAM-NEWARK-263

6 p. m.—To be announced. 7 p. m.—Joe Chickene's Orchestra. 8 p. m.—Jolly Bill Steinke. 8:15 p. m.—Sarah Heilman, soprano. 8:35 p. m.—Entertäiners.

9 p. m.—Entertainers. 9 p. m.—Samuel Silverberg, reader. 9:20 p. m.—Andrew Hayes, tenor. 9:40 p. m.—Entertainers. 10 p. m.—Hartley Joy Boys.

2.05 p. m.—Organ recital. 2:30 p. m.—Concert orchestra. :30 p. m.—Dance music.

9 p. m.-Lecture period. m.-Seaside Trio.

WLIT-PHILADELPHIA-395

p. m.-Concert orchestra. WHAR-ATLANTIC CITY-275

WOO-PHILADELPHIA-508

p. m.—Dinner music. WIP—PHILADELPHIA—508

6:45 a. m.—Setting-up exercises. 1 p. m.—Organ recital. 3 p. m.—Football game, University of Pennsylvania and University of Pitts-

burgh. WPG-ATLANTIC CITY-300

:05 p. m.-Dance music. WPG-ATLANTIC CITY-300

11 p. m.—Dance orchestra. WGY—SCHENECTADY—38

Princeton, 7:45 p. m.—Half-hour bridge lesson. 8:15 p. m.—Football results. 8:30 p. m.—Philharmonic Students' Con-

10:20 p. m.—Potrain results. 10:30 p. m.—Pance program. WRW—TARRYTOWN, N. Y.—273 9:05 p. m.—Entertainment. 9:40 p. m.—Eukelele Woodie. 10:35 p. m.—Johnson and Johnson. 10:30 p. m.—Johnson and Johnson.

p. m.-Dance orchestra. WGR-BUFFALO, N. Y.--319

av p. m.—Intercollegiate football gam Princeton vs. Yale. WHAM—ROCHESTER, N. Y.—278 30 p. m.—Eastman Theater

30 p. m.—Football scores; weather WMAK—LOCKPORT, N. Y.—266

9-10 p. m.—Musical program, WJAR—PROVIDENCE—306 1745 p. m.—Princeton-Yale football game. 8:20 p. m.—New York Philharmonic Or-chestra.

weel-Boston-349

WEEL-BOSION-349 6:45 a. m.-Tower health exercises. 7:45 a. m.-Morning watch. WNAC-BOSTON-280 10:30 a. m.-Bible readings; club talks. 1 p. m.-Luncheon concert. 1:35 p. m.-Popular program. 1:45 p. m.-Harvard vs. Brown football

4:35 p. m.—Tea dance. 6 p. m.—New WNAC Radio Club

p. m.—Den transformer dance.
 p. m.—Dinner dance.
 p. m.—Knickerbocker Club Night.
 p. m.—Musical program.
 p. m.—Bance music.

:15 p. m.—Story teller. WRC—WASHINGTON—469

2 (noon)-Organ recital. n. m.-New Willard Orchestra

2 (noon) — Organ retrat.
p. m.—New Willard Orchestra
245 p. m. Zoological talk.
35 p. m.—Bible talk.
35 p. m.—Musical program.
0:30 p. m.—"Crandall's Nighters."

WBZ-SPRINGFIELD, MASS.-333

0 p. m.-Yale-Princeton football gam WCTS-WORCESTER, MASS.-268

0:30 a. m.—Miscellaneous program. 2:05-2 p. m.—Luncheon music. :30 p. m.—Holy Cross vs. Rutgers Uni-versity football game.

Nighters. 12 (midnight)—Colonial Room Örchestra. WCAP—WASHINGTON—469

1:45-7:45 a. m.—Health exercises. 1:45 p. m.—Princeton vs. Yale Football

game. KDKA-PITTSBURGH-309

6:15 p. m.—Dinner concert. 7:30 p. m.—Westinghouse Band.

Saturday

/orld Radio I

30 p. m.-Football game,

cert. 10:20 p. m.-Football results

3:30 p. m.—Eastman Theate 5 p. m.—Theater organ. 7 p. m.—Theater orchestra.

1:45 p. m.-Into

1:05 p. m.-Dinner mus. 7 p. m.-Bedtime story. 8 p. m.-Sports Corner. Booital.

WPG—ATLANTIC CI 1:30 p. m.—Luncheon mus. 6:45 p. m.—Organ recital. 7 p. m.—Dinner muic. 8 p. m.—Studio concert. 9 p. m.—Concert orchestra

11 a. m.—Grand organ. 12 noon—Luncheon music. 145 p. m.—Grand organ; trumpets. 130 p. m.—Dinner music.

n.—Henry Rogers, planist. p.<sup>-</sup>m.—20th Century Entertainers. p. m.—Jack Davis. songs. p. m.—Rust and Henrichsen, banjo-

n.—Tea Room Ensemble. . m.—Football game, Princeton VS.

3-11 p. m.—Press

10:30 a. m.—Reducing exercises 10:45 a. m.—Women's Hour. 12 noon—Trinity Six music.

p. m.—Chris Meehan, tenor. p. m.—Katherine Connelly, soprano. m.—Orchestra selections. p. m.—Yorkville Trio.

WBZ-SPRINGFIELD, MASS.-333

WRC-WASHINGTON-469 WRC-WASHINGTON-469

m.—Hamilton Orchestra. m.—"WRC's Foolish Entertainers." m.—Book Reviews.

WCAP-WASHINGTON-469

:45-7:45:a. m.—Health exercises. :20 p: m.—Daily market summaries. :45 p. m.—''Age of Synthetic Produ

KDKA-PITTSBURGH-309

m.-Alabama Bice Blowers. WADC-ARRON, OHIO-258

p. m.—Portage Quintet. p. m.—Studio program. WTAM--CLEVELAND-390

WEAR-CLEVELAND-390

'm.-Dance music. WWJ-DETROIT-353

m.-Dance music. WJR-PONTIAC, MICH.-517

m.-Musical program. WREO-LANSING, MICH.-280

WRDO-LAISING, MILE 6 p. m.-Dinner concert. WGJ-CHICAGO-488 8 p. m.-Dinner concert. 11 p. m.-Rainbow Skylarks. 2 a. m.-The Ginger Hour. WMAQ-CHICAGO-448 7:30 p. m.-Wide-Awake Club. 9 p. m.-Mr. and Mrs. Oberndorfer. 9:30 p. m.-Whitney Trio. 10 p. m.-University of Chicago footba conference: songs.

10 p. m.—University conference; songs. conference; songs. m.—Christian Endeavor topics

m.—Dinner music. m.—The Classic Hour. m.—Dance music. WHT—CHICAGO—400

p. m.-Concert hour. p. m.-2 a. m.-Musical features. WLS-CHICAGO-345

KYW-CHICAGO-536

-Organiogue. --''Insomnia Club.'' WENR-CHICAGO-266

m.—Popular program. m.—Midnight Frolic. WOC—DAVENPOBT—484

SATURDAY

WEAF-NEW YORK CITY-492 :45, 7, 7:20 a. m.-Health exercises.

145 p. n...-'Taking a n... Ford." 8:10 p. m..-Louis Caton, fepor. 8:25 p. m..-Musical program. 8:50 p. m..-Wood's Jubilee Singers. 8:05 p. m..-Parnassus String Trio. -Wood's Jubilee Singers - Trio.

7, 7:20 a. m.—Health exercises. p. m.—Princeton-Yale football gan p. m.—Cliff Crest Society Orchest

b. m.-Dinner music.
p. m.-Light Opera Quartet.
p. m.-Light Opera Quartet.
p. m.-Light Opera Quartet.
p. m.-Light Opera Quartet.
p. m.-Aaron Hirsch, violinist.
p. m.-''Taking a Hint From Henry T. Henry

9:25 p. m. — Wood's Jubilee Singers. 9:35 p. m. — Janassus String Trio. 9:55 p. m. — Jan Van Bommel, barytone. 10:10 p. m. — May S. Breen, banjoist Peter De Rose, planist. 10:25 p. m. — Gordon Male Quartet. 10:40 p. m. — May S. Breen, banjoist; Peter De Rose, planist. 10:50 p. m. — Gordon Male Quartet. 11-12 p. m. — Wincent Lopez dance music. With York York York Are

1, 2, 5, 6, 7, 7:30 and 10:55 p. m.-News 1:15 p. m.-Irwin Abrams's Orchestra. 2:30 p. m.-Football game, Yale Univer

p. m.—Lorraine Dance Orchestra.
 p. m.—Market quotations.
 p. m.—Financial summary of dark

concert. 9 p.m.—Pathe News banquet; V President Dawes, speaker. 10:30 p.m.—To be announced. 11 p.m.—Jacques Green's Orchestra;

WGBS-NEW YORK CITY-316

WGBS-NEW YORK CITY-316 10 a.m.-Timely talks with Teress. 10:10 a.m.-Kiddie Klub program. 10:40 a.m.-Midred Tabak, pianist. 10:50 a.m.-Fashion talk. 1:30 p.m.-Broghurst and Mathias. 3 p.m.-Interview with Fanny Ward. 3:10 p.m.-Interview with Fanny Ward. 3:20 p.m.-Interview with Louella Par-sons.

sons. 3:30 p. m.—Augusta Rennick, soprano. 3:40 p. m.—Furniture talk. 3:50 p. m.—Augusta Rennick. 5 p. m.—Uncle Geebee.

g. m.—Uncle Geebee.
630e.p. m.—Orchestra.
7 p. m.—Hallróom instruction.
7:10 p. m.—Hattie Strauss, soprano.
7:30 p. m.—Hattie Strauss, soprano.
7:40 p. m.—Paul Weber, violinist.
8. m.—''Personality of Insects.''
8:10 p. m.—Orpheus Mixed Quartet.
8:30 p. m.—Orpheus Mixed Quartet.
8:30 p. m.—Orpheus Mixed Quartet.
8:40 p. m.—Lyra Nicholas, planist.
8:50 p. m.—Crpheus Mixed Quartet.
8:50 p. m.—Crpheus Mixed Quartet.
9 n. —Carmine Coppola.

WNYC-NEW YORK CITY-526

7 p. m.—Dance orchestra. 7.30 p. m.—Dance program. 8 p. m.—Police alarms. 8 p. m.—Football results. 8:05 p. m.—Police Quartet. 8:30 p. m.—Regina Besner, planist. 9 p. m.—Emily Harford. Avery concert 10:10 p. m.—'Herces of .Medicine. Weinstein. 10:30 p. m.—Police alarms; weather.'

WKCB-BROOKLYN-240

6-7 p. m.-Dinner

m.—Arrow

p. m.—Dance orchestra.
 p. m.—Philharmonic Society studen

p. m.-Dinner orchestra.

wallans

10:30

WJZ-NEW YORK CITY-455

7:15-12 p. m.-Organ; story; farm gram; Rodeheaver hour; Ford

-Dinner concert. --Musical program. --Midnight revue.

m.—Chime concer m.—Bedtime story —Heuer's Orchestr

10-11:30 p. m.—Players in the parable "An Old Fashioned

m,—Classical program. m,—Melody Master (238 meter p. m.—Recital. —Your Hour League. WOK—CHICAGO—217

10:45 p. m.—Christian Endea... WEBH—CHICAGO—370

bany

8:30 p. 10:30 1 12:30 1

6:45 p

8 p. m.—Oriole Orchestra; songs. 10 p. m.—Dance music; Light Company.

12-2 a. m.-Dance music; recital. WGN-CHICAGO-370

p. m.-Dinner concert. p. m.-Orchestra and soloists.

m .- Master half hour WCAE-PITTSBURGH-461

m.-Dinner concert. m.-Daddy Winkum. m.-- "The Rhodes Scholarships

9 p. m.-Hood College Glee Club. 9 20 p. m.-Wardman Park Trio.

0-12 n m - Dance musi

30 p. m.—Dinner concert. 30 p. m.—Uncle Kaybee. 45 p. m.—Address.

-Concert

-Talks.

B. m.—Leo Reisman's E
p. m.—Market reports.
p. m.—Violin recital.
p. m.—Pianist and reader.

n---Organ recital

8:30 p. m.—Rita Equi, soprano; St. Claire, contralto. 9 p. m.—"Whatdoyoucallit Club."

theon Manufacturing Company, of which gives the type numbers of the Cambridge, Mass., has produced a new respective instruments. The eliminatube rectifier, designed particularly tor will require one transformer. At for use in B battery eliminators. Its least two of the manufacturers out use in conjunction with transform- out the two choke coils in a single ers, choke coils and condensers, de- case. Only one of these is required signed for use with it by equally for the construction of an eliminator. progressive concerns, makes possible | Where single chokes are used two a B battery eliminator of unusual ex- will be required. The number needed

B2

B1

514

\*366

\*356

R196

0000

Model 20 Compaci

Price, \$80

lolof

Model 10 (without tub.

Price, \$80

Noael H

1061 Atlantic Avenue

Brooklyn, New York

Radio Speakers, \$12 to \$20

Transformer Choke Type Type

**B4** 

. B3

\*The two choke coils are included in

The filter circuit used in the new

It is not generally recognized that,

in addition to the elimination of the

will have the reserve power an

reception than the best B batteries

using the Raytheon tube, as shown

Figures 1 and 2, is one of the few

which comply with this requirement

List of Parts

In order to construct the Raytheon

Baseboard. Transformer (see list). Choke colls (see list). Variable Resistance, 10,000 to 100,000

ohms. 1 Fixed Resistance Rf. 10,000 ohms (must

Raytheon Type B rectifier tube.

properly constructed eliminator

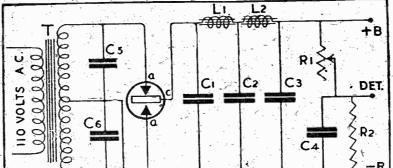


Figure 1—Wiring diagram of the full-wave rectifier herein described

THE LEGEND	
r, special step up that is the line line line line line line line lin	8 Mfd. condenser. L2, iron core choke colls. varlable carbon resistance, 10,000 ,000 ohms. fixed resistance—10,000 ohms, 15 nperes. 5 Mfd. condenser.
*The anodes of the rectifier tube connect standard socket. The cathode of the rectifier tube connect	to the filament terminals of a to the plate terminal of a standard

cellence. The faults of the ther- | of each manufacture is noted here-

the single case.

Manufacturer Acme Apparatus Co, Cam-bridge, Mass All-American Radio Cor-

mionic and electrolytic rectifiers, with: heretofore used for the purpose, are said to be wholly lacking in the new

Raytheon tube. ceivers using as many as twelve standard tubes, one which delivers equal quality and equal or more one which is more economical to B battery eliminator was designed operate than dry or storage B bat- by Professor F. S. Dellenbaugh jr.

The tube is an outgrowth of the Technology, one of the foremost S tube, as it operates on the same gas conduction principles which are responsible for the success of that divine. There is not same device. There is no filament in the trace of hum with either the head tube to burn out or to become ex-hausted by constant use, so the life of the tube is almost immessionable second stage of audio amplification. the tube is almost immeasureable. Full wave rectification is accom-

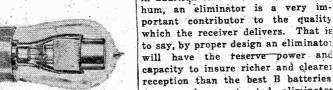


Figure 3 — A tube which is capable of accomplishing full wave rectification

plished in the one tube. That is to say, both halves of the alternating B battery eliminator the following current cycle are rectified, resulting parts will be required: in less operating expense and better 1 quality of reproduction. Also the tube handles large loads without a marked falling off in voltage. As a marked failing on in voltage: is applied to result a higher voltage is applied to the B battery posts of the receiver. Particularly with multi-tube sets, giving greater volume and clearer tone. Special transformers and chokes, particularly designed for use with the new tube, have been placed on the marked failing of the receiver. Special transformers and chokes, particularly designed for use with the new tube, have been placed on the market failed to continuously. Special transformers and chokes, particularly designed for use with the new tube, have been placed on the special transformers. Special transformers and chokes, particularly designed for use with the new tube, have been placed on the special transformers. Special transformers and chokes, particularly designed for use with the new tube, have been placed on the special transformers. Special transformers and chokes, particularly designed for use with the new tube, have been placed on the special transformers. Special transformers and chokes, particularly designed for use with the new tube, have been placed on the special transformers. Special transformers and chokes, particularly designed for use with the new tube, have been placed on the special transformers. Special transformers and chokes, special transformers and the special transformers and transformers and the special transformers and transformers a result a higher voltage is applied to 1

market by several manufacturers. They are given in the following table, The parts should be laid out

Each part should be firmly fastened end of the baseboard as shown in the eliminator a foot or more from By bending the small tabs fastened should be mounted upon it as shown, of the A battery is grounded and to the board in an upright position, spectively, as in Fig. 1. The elimi- socket. The eliminator is now operwhich will be found the most con- nator should be wired spaghetti cov- ative. In order to lower the value A soldering lug should be put under gram. one of the screws holding each of the instruments to the board, and In order to place the B battery The voltage which the eliminator

the baseboard as shown in the wiring by cleaning the contact areas with to the posts on the receiver marked to the cases of the condensers at and the three posts should be labeled insert a plug into the receptacle at right angles to their usual position, "B Amplifier," "B Detector" and "B the left and connect by means of it is possible to screw the condensers Negative" from top to bottom, re- a cord with the nearest electric light venient position for wiring purposes. ered bus bar, as shown in the dia-s of voltage applied to the detector

### Wiring Instructions

these should be connected to the neg- eliminator in operation insert the delivers is higher than that ordinaative B lead. Make sure that this tube in the socket, connect the posts rily employed, so the C battery voltlug is in good electrical contact with marked "B Negative," "B Detector" age should be increased correspond-

tube, screw the knob of the variable resistance.

\*



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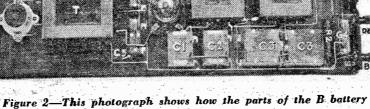
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ance music Bond

Ridgely's Davison's Dance music Roseland Adcuitto's Dance music Joe Zimmerman's Virginians Dance music

Dance music Ben Bernie's Zit's Bernie's

9:00 9:30 0:00 0:00 0:00 0:01

10:15 10:30 10:30 11:00 11:00

WHN WGBB WLIT WHN WMCA 30 WGCP

WAHG WJZ WOO WEAF

## The Herald Tribune Daily Broadcasting Programs for Week Ending November 14

### TO-DAY

F 8 . ...

WJZ-NEW YORK CITY-455 m.-Children's hour; stories, mu comic stories. 11 a. m.—St. Thomas's Episcopal Church 7:20 Yo a. m.—St. Thomas's Episcopic concert.
 services.
 12:30 p. m.—Rivoll. Sunday; concert.
 2:30 p. m.—Sunday radio forum.
 p. m.—St. George's Episcopal Church services. Mozelle Bennett, violinist; Rebecca Pharo, soprano; George Bag-

Rebecca Pharo, soprano; George Bag-dasarian, tenor
545 p. m.—"The Outposts, of Peace," Literary Vespers, by Edgar Burrell.
7-p. m.—Carilion from Park Avenue Bap-tist Church.
7:80 p. m.—Nathan Abas's Concert Orchestra.

Orchestra. 9 p. m.—Dextra Male Chorus. 8:30 p. m.—Program from Steinway Hall. Orchestra, violin recital. 10 p. m.—Josephine Evan's concert quartet. WJY.—NEW YORK CITY.—405 8:15 p. m.—Bernhard Levitow's Concert Orchestra. 8:15 p. m.—Bernhard Levitow's Concert Orchestra.
10 p. m.—"Reminiscences of a Reporter," William H. Crawford.

WEAF-NEW YORK CITY-492 m.---"Sunday Hymn Sing." m.----Sunday Hymn Sing. m.--Interdenominational services. Ad-ess by the Rev. Wesley Megaw; Aida dress by the Rev. Wesley Megaw; Alda. Brass Quartet. 3:45-5:30 ps. m.—Men's conference from Y. M. C. A. Address by Dr. S. Parkes Cadman; Gloris Trumpeters. 6:45-7:20 p. m.—Addresses given at 200th anniversary of first New York newspaper at Newspaper Club. 7:20 p. m.—Musical program Capitol Theater Family. 9:15-10:15 p. m.—Adwater Kent Hour, Eva Gauthier, soprano; John Powell, pianist.

WGBS-NEW YORK CITY-316 30 p. m.-Program from Warner's 8:30 p. m.—Program from Warner's Theater. 9:30 p. m.—Opera, "La Forza del Destino." WHN-NEW YORK CITY-361

WHN\_NEW YORK CITY-361 1. p. m.—Organ recital. 2.3 .p. m.—Queens County. Christian En-deavor program. 3. p. m.—Popular song review. 3. 20 p. m.—Dr. Stratton Scofield's Bible Class; answering questions/ 4 p. m.—Address by Jüdge Ralston. 5 p. m.—Calvary Baptist Church service. 4 p. m.—Calvary Baptist Church 5 (10 p. m.—Stratton Scofield's Bible 6 (15 p. m.—Symphony orchestra. 5 (10 p. m.—Stratton Scofield's Bible 6 (15 p. m.—Symphony orchestra. 5 (10 p. m.—Stratton Scofield's Bible 6 (15 p. m.—Stratton Scofield's Bible 6 (15 p. m.—Stratton Scofield's Bible 6 (16 p. m.—Symphony orchestra. 6 (17 p. m.—Stratton Scofield's Bible 6 (18 p. m.—Stratton Scofield'

10:45 p. m. Janssen's Orchestra. 12 midnight—Richman Orchestra WNYC-NEW YORK CITY-526

lospital. Speakers and cho WENY-NEW YORK CITY-259

WRNY-NEW YORK UTI-239 3:45 p. m.-Body fit talks. 3 p. m.-Wausic of All Religions." 3:45 p. m.-Bible reading to music. 4 p. m.-Dr. J. Lane Miller. 5 p. m.-Becker String Quartet. 3:15 p. m.-Charles D. Issacson's concert Rita Maginot. Lafayette Quartet, Lorns Lee, Joseph Diskay.

Lee, Joseph Diskay. WMCA-NEW YORK CITY-341 11 a. m.-Christian Science services. 5:30 p. m.-Cosmopolitan Trio. 6 p. m.-Ecole Golden's Orchestra. 7 p. m.-Ernie Golden's Orchestra. 7:35 p. m.-Olcott Vail's String Ensemble

WFBH-NEW YORK CITY-273 with the transformed and t

30 p. m.—Franklin Four. WLWL—NEW YORK CITY-288 8 p. m.—Paulist Choristers. Sermon Rev. Francis P. Duffy; benediction WBBE-STATEN ISLAND, N. Y.-273 10 a. m.—Watchtower Orchestra. 10:20 a. m.—Fred Twaroschk, tenor. 10:30 a. m.—Bible lecture, W. N. Wood-

worth. 11 a. m. -- Fred Twaroschk, tenor; orchestra. 9 p. m.—Choral singers. 9:10 p. m.—Violin duet. 9:15 p. m.—Bible lecture, F. W. Frantz. 9:45 p. m.—Choral singers; violin duets;

WGBB-FREEPORT, N. Y.-244 10:40 a

10:40 a. m.—Church services. WGCP-NEWARK—252 8 p. m.—Charlotte Trystmann, planist. 8:15 p. m.—Arline Felker's Entertainers. 8:45 p. m.—Dick's ukulele club. 9:05 p. m.—Isabelle Henderson, soprano. 9:20 p. m.—Isabelle Henderson, soprano. 9:35 p. m.—Leslie McLeod, tenor. 9:35 p. m.—Leslie McLeod, tenor. 9:50 p. m.—Sylvia Schatz, planist. 10 p. m.—Sylvia Schatz, planist. 12 p. m.—Richman's Entertainers. WGGO\_PHITADELPHIA—508

WOO-PHILADELPHIA-508 10:45 a m.—Services. n.—Musical exercises opening Sun-6 p. m.—Sacred recital. WIP—PHILADELPHIA—508 7:15 p. m.—Evening service. 9:30 p. m.—Ben Stad's Symphony

chestra. WFI-PHILADELPHIA-395 4:30 p. m.—Chapel service. 7:30 p. m.—Services. 9:15° p. m.—Atwater Kent hour. WLIT—PHILADELPHIA—\$95 WLIT—PHILADELPHIA

WLIT-FHILADELFHIA-378 2:04 p. m.—Arcadia Concert Orchestra. WCAU-PHILADELPHIA-278 5 p. m.—Mrs. Faul Jones, sopräno. 5:15 p. m.—Radio church service. 5:25 p. m.—The Rev. John W. Stockwell. 5:35 p. m.—Recital. 6:30 p. m. Pennsylvania Concert chestra. 10:15 p. m. Jaffe's Collegians.

WHAR-ALLASTRE 10:45 a. m.—Short sacred recital. 2:15 p. m.—Short sacred recital. 2:45 p. m.—Sermon, Philip Howard. 7:50 p. m.—Serving service. 9 p. m.—Seaside Hotel Trio. 9 p. m.—Seaside Hotel Trio. 11:15 p. m.—Strand organ recital. WPG—ATLANTIC CITY—300 8:15 p. m.—Organ recital. 4:15 p. m.—Vocal and instrumental

9 p. m.—Traymore Concert Orchestra. 10 p. m.—Organ radial m.—Organ recital. WGY—SCHENECTADY—380

WGY-SCHENECTADJ-380 9:45 a. m.-Service. 12:30 p. m.-Rivolt Theater Orchestra. 7 p. m.-Carillon program. 7:30 p. m.-Pennsylvania Orchestra. 8 p. m.-Vocal solist. 8:30 p. m.-Josephine Evans, concert quar-tet.

WEW-TABRYTOWN, N. Y.-273 8 p. m.—Services.
10:30 p. m.—Musical program.
WBG—BUFFALO—319
8 p. m.—Vesper services.
7:45 p. m.—Evening services.
9:15-10:15 p. m.—Atwater Kent hour.
WHAM—EOCHESTEE, N. Y.—278
2:15 p. m.—Buffactor services.

WHAM--KULHISTER, A. A. A. A. S. WMAK.-LOCKPOBT, N. Y.-266 10:30 a. m.-Service. 7:30 p. m.-Service. WEEL-BOSTON--349 WEEL-BOSTON--349

WERL-BUSICUN-332 10:50 a. m.-Morning service. 4:45 p. m.-Dr. S. Parkes Cadman. 7:20 p. m.-Capitol Theater Family. 9:15 p. m.-Atwater-Kent Hour. 9:15 p. m.-Atwater-Kent Hour.

WNAC-BOSTON--280
1:30 p. m.-Concert.
4 p. m.-Varied musical program.
6:15 p. m.-Carillon concert and even and e service. WJAR-PROVIDENCE-306 WJAR-PKOVIDENCE-300 7:20 p. m.-Capitol Theater Family. 9:15 p. m.-Atwater-Kent hour. WBZ-SPRINGFIELD, MASS.-333 10:55 z. m.-Church services. Choir c twenty-four voices. 8:30 p. m.-Musical program from Stels www.Uall New York, from WJZ.

 way Hall, New York, from WIZ.
 WCTS-WORCESTER, MASS.-268
 St5 p. m.-Men's conference from WEAF
 T20 p. m.-Capitol Theater Family,
 Sci5 p. m.-Program from WEAF;
 WCAP-WASHINGTON-469 9.15 p.

WCAT-washing 11 a.m.-Services. 4 p. m.-Services. 7:20-9:15 p. m.-Capitol Theater Family. 9:15-10:15 p. m.-Atwater-Kent-hour.

. m.—Church service. .—Organ recital. m.—Vesper services. m.—Dinner concert. WCAE—PITTSEURGH-461

-45

KDKA-PITTSBURGH-309

6:30 p. m.—Dinner concert. m.—Capitol Theater Family, 9:15 p. m.—Atwater-Kent hour. WADC—AKRON OHIO—258 6:30 WEAR-CLEVELAND-390

-Theater orchestra Fireside hour. 8:15 p. m.-Studio program. WLW-CINCINNATI-422

White-Songs and service. 11 p. m.—Classical program by artists WJR—PONTIAC, MICH—517 8:30 p. m.—Radio frolic. WSAI-CINCINNATI-326

m.—Program from WEAF, m.—Chime concert; sermor m.—Program from WEAF 3:45 p. m. 145 p. m.—Chinis 145 p. m.—Program from ... 10:15 p. m.—Program from ... 10:15 p. m.—Concert orchestra. WWJ—DETROIT—352 Capitol Theater Far

7:25 p. m.—Capitol Theater Family WREO-LANSING-286 8 p. m.—Church service. KYW—CHICAGO—536

KYW-CHICAGO-536 6 p. m.-Studio concert. 8 p. m.-Church. service. WLS-CHICAGO-345 7:30 p. m.-Organ solos; Liftle Brow Church. WCRD-ZION CITY-345

WCRD-ZION CITY-345 9 p. m.-Mixed quartet and organ. WHT-CHICAGO-400 7:30 p. m.-Tabernacle band and choir. 10:30 p. m.-Request program. 11:30 p. m.-Back home hour. WOK-CHICAGO-217 7:30-9:30 p. m.-Concert and dance mi 2 a. m.-Musical program. WQL-CHICAGO-447 9-11 p. m.-Rainbow Orchestra; artist

8-10 p. m.—Selected artists program. WOC—DAVENPORT—484

WSUI-IOWA CAAL-10:15 p. m.—Familiar hymns. KFMX—NORTHFIELD, MINN.—337

AFMA-Ollege vesper service. 8 p. m. -College vesper service. WCCO-ST. PAUL-416 9:15 p. m. -Program from WEAF. WCAL-NORTHFIELD, MINN.-337 KTHS-HOT SPRINGS-375

14 p. m.—Singing orchestra. WOAW—OMAHA—526 10 p. m.—Evening chapel service

MONDAY WEAF-NEW YORK. CITY-492 6:45-7:45 a. m.—Health ExerCises, 10:45 a. m.—Home Service Talk. 11:15 a. m.—Cameron Emslie, planist. 11:15 a. m.—Talk. 11:15 a. m.—Columbia University Lecture. 12 noon—Market and Weather Reports. 3:30 p. m.—Coremony, in connection with laying of the corner stone of the nave of the Cathedral of, St. John the Divine. Speakers: Governor Alfred E. Smith, Eilhu Root, Rev. James E. Freeman, Rev. S. Parkes Cadman, Sir Campbell Stuart and Bishop William T. Manning. Music by combined choirs of the Cathe-dral and Trinity Church. 4:30 p. m.—John Hepler, planist. 4:45 p. m.—Carr Rollins, barytone. 7:30 p. m.—Jeanne Kramer, planist. 4:35 p. m.—Your Hour." 1:30 p. m.—Waiter Scott, violinist. 7:45 p. m.—"Your Hour."
8:30 p. m.—Walter Scott, violinist.
8:45 p. m.—Health Talk.
8 p. m.—Music by Gypsies.
10 p. m.—Grand Opera, "Rigoletto."
11-12 p. m.—Ben Bernie's Orchestra. WJZ-NEW YORK CITY-455 WJZ-NEW YORK CITY-455 10 a. m.-Women's Hour. 11 a. m.-News. 1 p. m.-Meyer Davis' Music. 2, 4, 5:30, 7:30 and 10:25 p. m.-News. 4:05 p. m.-Slvia Adolphi, soprano. 4:15 p. m.-Iou Allen, guitar. 4:30 p. m.-Trio. 5:32 p. m.-Market Quotations. 5:50 p. m.-Financial Summary. 6:30 p. m.-N. Y. University Course. 7 p. m.-Dinner Concert. 8 p. m.-Réveiers. 9 p. m.-'Hour with Chic Society." o p. m.—Reveters. 9.p. m.—"Hour with Ohio Society." 10 p. m.—Hyman Tashoff, violinist. 10:30 p. m.—Joseph Knecht's Orchestra WGBS\_NEW YORK CITY\_316 10 a. m.-Timely talks with Terese. 10:10 a. m.-Jack Cohen, planist. 10:20 a. m.-Helen Hill, Truth in Adv 10:20 a. m.—Heien Hill, "Truth in Advettising,"
10:30 a. m.—Fashion talk; planist,
10:40 a. m.—Fashion talk; planist,
1:35 p. m.—Judith Roth,
2 p. m.—Bob Platz,
3 p. m.—Bob Platz,
3 p. m.—Bob Platz,
4 p. m.—League of Women Voters,
3:50 p. m.—Uncle Geebee,
6:30 p. m.—Premier Orchestra,
7 p. m.—Premier Orchestra,
WNN—NEW YORK CUTY\_361 WHN-NEW YORK CITY-361 2:15 2:25 n m -Mae Bellin song 2:30 p. m.—Frank Mansfield, tenor; trio. 3 p. m.—Andy Razaf, tenor. 3 p. m.—Andy Razaf, tenor.
3 s.45 p. m.—Hugo Angelo, tenor.
3:55 p. m.—Al Wilson's Playmates.
4:05 p. m.—Halnes and Scott.
4:15 p. m.—Frank Galassi, planist.
4:25 p. m.—William J. Rietz, tenor.
4:35 p. m.—William J. Rietz, tenor.
4:35 p. m.—Harry Stone's Orchestra.
6 p. m.—Harry Stone's Orchestra.
7 p. m.—Marlboro State Trio.
7 p. m.—Swanee Orchestra.
8 p. m.—Storage Batteries." H. B. Shontz.
8:30 p. m.—Guardian Entertainers. :30 p. m.-Guardian Entertainers. b p. m.—Petry and Russell,
9 p. m.—Billy end Russell,
9:20 p. m.—Billie and Marie Van, singers.
10 p. m.—Billy Wynne's Orchestra.
11:30 p. m.—Silver Silpper Orchestra.
12 midnight—Ted Lewis's Orchestra. WRWY-NEW YORK CITY-259 0:30 a. m.—Reducing exercises. 10:45 a. m.—New books in review. 11 a. m.—Charlotte Ruellau, songs. 11:15 a. m.—YMUSCal Courier'' says-12. (noon)—Trinity Six hour of music. 15 p. m.—Brayton Eddy, "Water -200. m. Brayton Eddy. 4:15 p. m.—Brayton Eddy, "Water Animal."
4:30 p. m.—Henry Rogers planist.
7 p. m.—"Whose Birthday To-day?"
7:05 p. m.—Telegraph Sportflash.
7:13 p. m.—Commerce of the day.
7:45 p. m.—Cole lesson.
8 p. m.—Ferrucci's Orchestra.
8:15 p. m.—Yelegraph Sportflash.
8:45 p. m.—'Evolution of Jazz."
8:45 p. m.—'Evolution of Jazz."
9:5 p. m.—Yazzing Tannhauser."
9:15 p. m.—Wusic Travelogue.
9:45 p. m.—John Agostini, 'Violin Dances.'
10 p. m.—I'he Body.' Dr. Bolton.
10:15 p. m.—Popular Songs.
10:30 p. m.—Popular Songs.
10:45 p. m.—Rose Dreeben, "Poet Peasant." ant." 0:45 p. m.—Florence Gerringer, planist. 1:15 p. m.—Radio Theater Players,

WMCA--NEW YORK CITY--341 m.-Olcott Vall's String Ensemble WMCA-NEW YORK CITY-341 p. m.—Clocit Väll's String Ensemble. :30 p. m.—Ernie Golden's Orchestra. :80 p. m.—Luilaby music. : p. m.—Knjckerbocker Family Circle. :30 p. m.—Judith Roth, soprano. p. m.—Lecture on Christian Science. 0:15 p. m.—Erntertainers. 1:30 p. m.—Jack Cohen, planist. WKCB-BBOOKLYN, N. Y .-- 240 7-8 p. m .- Dinner music

WNYC-NEW YORK CITY-526 1 a. m.—"Decorative Floors." 1:15 a. m.—Morning concert. 1:45 a. m.—Joe Schmitt's recipes

12 non—Luncheon concert.
13 non—Luncheon concert.
16:10 p. m.—Market high spots.
6:30 p. m.—Elennentary German lesson
7:30 p. m.—Deloce alarms.
7:35 p. m.—Lehigh Serenaders.
8:30 p. m.—Claise Higeins planiet.

8:20 p. m.—Christopher Meehan, tenor.
8:30 p. m.—Christopher Meehan, tenor.
8:40 p. m.—Christopher Meehan, tenor.
8:50 p. m.—Christopher Meehan, tenor.
9 p. m.—Irving Cohen, violinist; Harold Noble, barytone; Mabel Emple, soprano 10:10 p. m.—Police alarms; weather.

WFBH-NEW YORK CITY-273

WFBH--NEW YORK CITY--273 2 p. m. --Orchestra. 3 p. m. --Studio program. 4 p. m. --Piano recital. 4:30 p. m. --Yama Yama Boys. 5 p. m. --Norman Secon, planist. 5:30 p. m. --Trace Argeio, contraito. 5:45 p. m. --Theo Alban, tenor. 6 p. m. --Katherine Connolly, soprano. 6:15 p. m. --The Pinewalders. 11:30 p. m. --The Pinewalders. 11:30 p. m. --The Vorke CitY--233 WOLO-NEW YORK CITY--233

WORD-NEW YORK CITY-283 3:15 p. m.—Mandolin and guitar. 3:35 p. m.—Semalina Stevenson, soprano. 8:50 p. m.—Will Hubing's Orchestra. WLWL-NEW YORK CITY-288 m.-Bernardine Carnelli, soprano. p. m.—Bernardine Ca 10 p. m.—WLWL Trio

m.-Leo J Bartinique, barytone 9,20 p. m.-Leo J Bartinique, barton. 9:30 p. m.-Question box. 9:45 p. m.-Bernardine Carnelli, soprano. 9:55 p. m.-WLWL Trio. 10:05 p. m.-Leo J Bartinique, barytone. 10:15 p. m.-String Quartet. WBBR-STATEN ISLAND, N. Y.-273 WBDA-STATEX FLAIDATE, SOFTADO. 5:10 p. m.-Irene Kleinpeter, soprano. 5:25 p. m.-Carl, Park, violinist. 8:35 p. m.-Bible instruction. 8:45 p. m.-Irene Kleinpeter, soprano. 8:55 p. m.-Carl Park, violinist. WANG-RICHMOND HILL, N. Y.-316

WAHG-RICHMOND HILL, N. Y.-316 12 noon-Musical program. 7:30° p. m.-Maurice E. Connolly . 7:45 p. m.-Maurice E. Connolly . 7:45 p. m.-Edgar Gruen, barytone. 8:30 p. m.-Von der Heide, La Ruffa. 8:45 p. m.-Joe Zimmerman, planist. 9:15 p. m.-Syncrophase Trio. 9:16 p. m.-Edgar Gruen, barytone. 9:46 p. m.-Edgar Zimmerman, planist. 10 p. m.-Glean Zimmerman, planist. 10 p. m.-Glean Smith's Orchestra. WGBB-FREEPORT, N. Y.-244

WGBB-FREEPORT, N. Y .--- 244 WGBB-FREEFORT, N. 1.--24 8 p. m.-Crescent City Trio. 8:30 p. m.-Elsa Bodie, soprano. 8:45 p. m.--Philip Inglima, violinist. 9 p. m.--Philip Inglima, violinist. 9:30 p. m.--Boh Hildenbrand's. Orch 9:30 p. m.--Boh Hildenbrand's. Orch 9:45 7:45 7:45 a.m.-Our class 6:45-7:15-7:45 a. m.-Gym class. 2:30 p. m.-Brace Conning, Camelia Camp bells Charles La Torre, "Shakespeares

belle Charles La Torre, "Shakespeareau Readings." 2:40 p. m.—Sadye Gann, pianiste. 3 p. m.—"Shakespearean Readings." 3:20 p. m.—Marfo Alverez, barytone. 3:30 p. m.—Sadye Gann, pianiste. 3:45 p. m.—"Bread. Its Place in the Diet." 3:15 p. m.—"Words Mispronounced." 8:17 p. m.—"Sports," Bill Wahey. 6:30 p. m.—Eddie Elkins's Orchestra. 8 p. m.—"Battle Hymn of the Republic" music.

music. 8:30 p. m.—"Al Reid's Hour." 9:30 p. m.—Edward H. Bierstadt, "Hang chow." 9:45 p. m.-Ballin and Race, piano duo.

10 p. m.—Nows Bulletin. 10:15 p. m.—Ballin and Race, piano duo. 10:30 p. m.—Archie Slater's Orchestra. 11 p. m.—Frances Pehl, pianiste. 11:15 p. m.—Suzanne Richmond, soprano. 11:30 p. m.—Suzanne Richmond sopran( 11:30 p. m.—Irving Aronson's dance music WGCP—NEWARK—252
 3.15 p. m.—Eva Rothenberg, planiste.
 3:15 p. m.—Andy Pendleton's Band.
 4:15 p. m.—Uncle Robert's pals.
 4.30 p. m.—Ornbert contents

4:30 p. m.—Uncle Robert's pais.
6 p. m.—Orchestra selection.
6:15 p. m.—Orchestra selections.
8 p. m.—Charles Phillips, planist.
8:15 p. m.—George Hirose, barytone.
8:30 p. m.—Perry Bradford's entertaine
8:50 p. m.—Ona Welsh, planiste.
9:30 p. m.—Studio program.

9:10 p. m.—Studio program., 9:30 p. m.—Studio program., 10 p. m.—Strickland's Orchestra. 11 p. m.—Ritz Orchestra. 11:30 p. m.—Bob Murphy's entertainers 12 p. m.—Connie's Orchestra. WAAM—NEWARK—263

a. m.—Happy hour. p. m.—Ben Goldfarb's Orchestra. p. m.—Ben Goldfarbs Orchestra.
 p. m.—Jee Brown, tenor.
 7:30 p. m.—The Sport Oracle.
 7:45 p. m.—Arthur Ackerman, planist.
 8 p. m.—Ella Dowd, soprano.
 8:30 p. m.—Josephine Swanwick, soprano.
 8:50 p. m.—C. E. Craik, tenor.

. m.—C. E. Crain, con-. m.—Entertainers. . m.—The Beaver Trio. m.—Fred Frey's Sirens. WIP—PHILADELPHIA—508

m.—Luncheon music. m.—Artist recital. m.—Market Hints. p. m.—Dinner music.

6:05 p. m.—Dintier music:
7 p. m.—Bedtime story; dancing lesson.
WOO-PHILADELPHIA—508
31° a. m.—Grand organ.
12 (noon)—Luncheon music by Golden's Crystal Tea Room Orchestra.
4:45 p. m.—Grand organ; trumpets.
7:30 p. m.—Dinner music.
8 p. m.—Your Hour."
8:45 p. m.—Carl Rollins, barytone.
9 p. m.—Grand opera, "Rigoletto."
11 p. m.—Grand opera, "Rigoletto."

m.-Dance music. WFI-PHILADELPHIA-395

WFT-PHILADELPHIA-395 10:30 p.m.-Solos. 10:40 a.m.-Home Service Talk. 11 p.m.-Tea Room Ensemble. 3 p.m.-Talk, J. Rodger; recital. 3:45 p.m.-Fashion Feature. 6:30 p.m.-Concert Orchestra. 7 p.m.-Dance Orchestra. 7 p.m.-Dance Orchestra. 212:05 p.m.-Organ recital; conceri

m.—Organ recital;

chestra 2-3 p. m.—Concert orchestra; recital, 4:30 p. m.—Magazine Corner." 4:35 p. m.—Talk, John Loughran; re-cital

4:35 p. m.—Talk, John Loughran; recital,
5 p. m.—Talk.
7:30 p. m.—Bhort Agro-Waves.
8:15 p. m.—Short Agro-Waves.
8:15 p. m.—Concert orchestra.
8:30 p. m.—Artist recital.
9 p. m.—Stanley Theatre Movie Review; orchestra; organ recitat.
10 p. m.—Dance orchestra.
10:20 p. m.—Vandeville features.
10:40 p. m.—Vandeville features.
10:40 p. m.—Weekly theater ohat.
8:10 p. m.—The Amsterdam girl.
9:20 p. m.—The Amsterdam girl.

p. m.—The Amsterdam girl.
 p. m.—Danny Dougherty, songs.
 p. m.—Delaware Serenaders.
 p. m.—Freedman and Travaline, song
 p. m.—James Loughrey, tenor.
 WHAR—ATLANTIC CITY—275.

WHAB ATLANTIC CITY-275 2 p. m.—Seaside Trio. 7:30 p. m.—Fashion review: 8 p. m.—Seaside Trio. WPG-ATLANTIC CITY-300 4:30 p. m.—Tea music. 6:45 p. m.—Organ recital. 7 p. m.—Oinner music. 8 p. m.—Children's hour. 8:30 p. m.—Eilly Buckley's Crew. 9 p. m.—Ambassador Concert Orchestra. 10 p. m.—Studio concert. 11 p. m.—Dance orchestra. WGY-SCHENECTADY, N. Y.—330 2 p. m.—Asia, orchestra.

WGX-SCHERECTADY, N. X.--S: 2 p. m.--Asia orchestra. 3:30 p. m.--Music, cooking lesson, v 6:30 p. m.--Dinger plotam. 7 p. m.--Farmer's program. 7:45 p. m.--WGY orchestra, Em .-Bates, soprano, and George A. A ley, cornetist; literary series.

WRW-TARRYTOWN, N. Y.-273 7 p. m.-Children's stories; music. 9:30 p. m.-Talk. 9:45 p. m.-Galaxy stars. 10:05 p. m.-Galaxy stars. 10:39 p. m.-Galaxy stars. 11:05 p. m.-Galaxy stars. 11:05 p. m.-Galaxy stars. 11:05 p. m.-Galaxy stars. 12:05 p. m.-Galaxy stars. 12:05 p. m.-BUFFALO, N. Y.-319 0:30 p. m.-Dinner music. 6:30 p. m.-Dinner music. 8:30 p. m.-Dutch Master's program. 9 p. m.-Allen's Saxaphone Band.

p. m.-1 a. m.-Supper music. WHAM-ROCHESTER, N. Y.-278

3:30 p. m. — Eastman Theater Orchestra.
5 p. m. — Theater organ.
7 p. m. — Eastman Theater orchestra.
7:30 p. m. — Weather forecast; market.
WHAZ — TROX, N. Y. — 380
9 p. m. — Father and son night; instrumental, vocal selections, short talks.
9:30 p. m. "Red Cross Roll Call," Cornelius Burns.
10:15 p. m. "Anthracite Coal Substitute" Professor E. A. Fessenden. sor E. A. Fessenden

Professor E. A. Fessenden: 11 p. un.—Campus Serenaders, soloists, WMAK—LOCKPORT, N. Y.—266 8-9 p. m.—Murray Whiteman's Serenade 9-10 p. m.—Musical program. WCAC—MANSFIELD, CONN.—275 7.05 p. McScherkender, CONN.—275

125 p. m.-Market reports, 130 p. m.-Dairy farming course, 145 p. m.-Program or music, WTIC-HARTFORD, CONN.-476 5:30 p. m.-Dinner music. 7:45 p. m.-'Good Factories and Farms.

WJAR-PROVIDENCE-306

0 a. m.→Housewives' exchange. 105 p. m.→Studio program. p. m.→Berry spring time. 130 p. m.→Musical. program. 150 p. m.→American J.ed Cross:

---Gypsles. n.--Grand Opera Company. WEEI--BOSTON---349

WEEL-BOSTON-349 6:45 a. m.-Health exercises. 7:45 a. m.-Morning watch. 10:45 a. m.-Home service talk. 2 p. m.-Happy Hawkins's Orchestra. 3 p. m.-Talk. A. J. Philpott. 6:50 p. m.-Lost and found; weather port

6:00 D. m. -Lost and found; weather 1 port.
7 p. m. -Big Brother Club.
7 145 p. m. -Levey A. Dennett, violinist.
8 p. m. -Anonymous Orchestra.
8:45 p. m. -Program from WEAF.
10 p. m. -Orgram recital.
1 p. m. -Luncheen orchestra.
4 p. m. -Luncheen orchestra.
4 p. m. -Kiddles' Klub.
6:30 p. m. -Ti D. Cook's dinner dance.
7:35 p. m. -Talk.

:40 p. m.—Concert. p. m.—Suzanne Pipe, soprano; Frankly McManus, barytone. n. m. Matropolitan Orchester p. m.-Metropolitan Orchestra. WBZ-SPRINGFIELD, MASS.--333

WB2—SPRINGFIELD, MASS.—333 6:80 p. m.—Organ recital. 7:05 p. m.—Lecture in psychology. 7:30 p. m.—Capitol Theater Orchestra. 8 p. m.—Edward Boyle's Orchestra. 8:30 p. m.—Elsa Evans, soprano. 9 p. m.—Aleppo Drum Corps. 9:30 p. m.—The "Riviera Four." 10:05 m.—Le Bolognatic Orchester

:05 p. m.-Leo Reisman's Orchestra, WCTS-WORCESTER, MASS.-268

10:30 a. m.—Radio chat. 12 p. m.—Market and weather' report. 12:05-2 p. m.—Luncheon music. 1:15 p. m.—Story teller. -Concert program. WRC-WASHINGTON-469

2 non-Organ recital. p. m.-Shoreham Orchestra. m.—Musical program. WCAP—WASHINGTON—469

WCAP-WASHINGTON-469 6:45-7:45 a. m.—Setting up exercises 7:20 p. m.—Daily market summaries. 8:20 p. m.—Apollo chorus. 8:45 p. m.—Health talk. 9-10 p. m.—Music by Gypsies. 10-11 p. m.—Operatic concert. KDKA—FITTSBURGH—309 6:15 p. m.—Chuldren's nericd.

6:15 p. m.—Children's period. 7:45 p. m.—"International Art." p. m.-Happy home hour. WCAE--PITISBURGH--461 7:30 h

m.—Dinner concert. m.—Uncle Kaybee. .....American Red Cross. m.—Nixon orchestra. 7:45 p 11 p. m.—Loew's Aldine Theater. WADC—AKRON, OHIO—253 6:30 p. m.—Dinner concert. WEAR—CLEVELAND—390

p. m.—Allen Theater program. WTAM—CLEVELAND—390

6 p. m.—Dinner music. 8 p. m.—Radio show. 9 p. m.—Concert. 11 p. m.-1 a. m.—Dance music. WKRC—CINCINNATI—422

7.15 p. m.—Dinner dance. 8 p. m.—Freda Sanker's orchestra.

10 p. m.—American Legion program. 12 midnight—Theatrical stars. 1 a. m.—Popular orchestra. WSAI—CINCINNATI--326

m.--"Times-Star" concert orchestr WJR-PONTIAC/MICH.--517

11 p. m.-1 p. m.-Concert. WLW-CINCINNATI-422

m.—Orchestra, soloists. m.—Musical program.

1:30 p. m.—Jewett Jesters. WWJ—DETROIT---853

6 p. m.-Dinner concert. WMAQ-CHICAGO-448

7:30 p. m.—La Salle orchestra. 7:40 p. m.—Family Altar League. WOK—CHICAGO—217

8 p. m.-2 a. m.-Musical features. WHT-CHICAGO-400 7 p. m.-Classics.

TUESDAY

WJY-NEW YORK CITY-405

7:30 p. m.—Ambassador Trio. 10 p. m.—To be announced. 2 P. M.—Charles Dettborn, Hawailan

w EGG-NEW YORK CITY-273 7 p. m.-Dan Barnett's Orchestra. 7:45 p. m.-Two-act play, "My Educate: Children."

Children." S p. m.—Rallroad talk, Garrów Geer. 8:10 p. m.—Radio chats. 8:20 p. m.—Milton Yokeman, tenor. 8:35 p. m.—Rudolph Joskowitz, violinist.

TO-DAY

Time P. M.

10:00 10:15 10:45 12:00

WGCP WCAU WHN WHN

7:35 WNYC 8:00 WTIC 8:07 WHX 8:05 WHN 8:05 WHN 10:00 WHN 10:11:30 WGCP 10:15 WAHG 10:30 WJZ 10:30 WJZ 10:30 WJZ 10:40 WLIT 11-12 WEAF 11:00 WHAZ

11-12;30 WHN 11-1 WGR 11:30 WOR

11:30

Wave Station Length Orchestra

MONDAY, NOVEMBER 9

361 319 405

252 Strickland's 278 Jaffe's 361 Janssen's 361 Richman's

Lehigh Dance music M. Whiteman's Roseland Hildenbrand's Billy Wynne's Dance music Glenn Smith's J. Knecht's Archile Slater's Dance music Ben Bernie's Camuus

Serenaders Dance music Vincent Loper's

Campus

P. M.—Charles Dettoorn, Haws guitar.
 10 p. m.—Paul Specht's Orchestra.
 WEBJ—NEW YORK CITY—273

6 p.m.—Dinner concert.
 8 p. m.—Orchestra and gypsies.
 WREO—LANSING, MICH.—286



COWN, N. X.—273 stories; music. nment. stars. s Koenig's orchestra.	Eastern Standard Time	WBZ-SPRINGFIELD, MASS333 6:30 p. mLeo Reisman's Ensemble. 7 p. mMarket report. 7:05 p. mTo be announced. 8 p. mMrs. John R. Fausey, soprano.	WEAFNEW YORK CITY-492 6:45-7:45 a. mHealth exercises. 10:35 a. mChurch chimes; announce- ments. 10 p. mMerchants program. 9 p. mMerchants program. 9 p. mTo be announced. 10 p. mOrchestra.	THURSDAY
stars. Koenig's orchestra. LO, N. Y.—319		8:15 p. m.—Special theatrical program. 9:30 p. m.—Alandale Minstreis. WCTS—WORCESTER, MASS.—268 10:30 a. m.—Radin chat: music.	10:39 a. m.—Caroline Andrews, soprano. 10:42 a. m.—Address by the Rev. Dr. S. Parkes Cadman. 10:52 a. m.—Redferne Hollinshead, tenor. 11 a. m.—Organ recital. 12 noon—Luncheon music.	WJZ-NEW YORK CITY-455 10 g. mWomen's program. 11 g. mNews.
music. Master's program. caphone Band. program.	WJZ-NEW YORK CITY-455 10 a. mNews. 11 a. mNews. 13 a. mNews. 14 b. mChris Meehan, tenor.	12 p. mMarket and weather reports. 12-2 p. mLuncheon music. 5.15 p. m'Story Teller''	10:59 a. m.—Bugle call to silence. 11 a. m.—Two minutes silence; taps. 13 a. m.—Two minutes silence; taps. 14 a. m.—Two minutes silence; taps.	1 p. m.—Nathan Abas's luncheon music. 2, 4, 5:30, 7:30 and 10:30 p. m.—News. 4:05 p. m.—Beryl Rennie, soprano.
apper music. STER, N. Y278 Theater Orchestra. gan.	11:05 a. m.—Talk. 1 p. m.—Nathan Abas's talk. 2, 4, 5:30, 7:30 and 10:30 p. m.—News; 6-7 p. m.—Dinper music. <b>WKCB—BROOKLYN</b> , N. Y.	-240 8-8:30 p. m.—Ross Gorman's Orchestra. B:30-9 p. m.—Vecal selections. 9-10-p. m.—"Eveready Hour."	11:05 a. m.—Myro Glass, barytone. 11:25 a. m.—Myro Glass, barytone. 11:30 a. m.—Organ recital. 10 p. m.—Organ recital. 10:30 p. m.—Dance music.	5:32 p. m.—Market quotations. 5:50 p. m.—Financial summary.
Theater orchestra. r forecast; market. DX, N. Y	4:05 p. m.—Miltonella Beardsley, planist. 4:20 p. m.—Jeanne a' Dair, soprano. 4:30 p. m.—Bennhard Levitow's tea music. WOR—NEWARK—405	10:30 p. m.—Program from WEAF. WRC—WASHINGTON—469	12 noon-Chapel services. 12:20 p. mMarket and weather reports. 6:45 p. mSetting-up exercises. 4:4:45 p. mRav Nichols Orchestra. 1 p. mLuncheon music.	6:30 p. m.—N. Y. University course. 7 p. m.—Bernhard Levitow's Dinner Or- chestra.
tions, short talks.	5:30 p. m.—Market quotations. 5:50 p. m.—Financial summary. 6:30 p. m.—Prof. J. P. San "Paris.". 1:40 J. J. P. San	tamarina, 12 noon—Organ recital. 1 p. m.—New Willard Orchestra. 6.50 .p. m.—"Show Shopping," Leon.	1:45-5 p. m.—Poem with musical accom-3 p. m.—Artist recital.         paniment.         0 p. m.—Dinner music.         ard         9:50 p. m.—Peace," Channing Polleck.	8 p. m.—U. S. Army Band. 9 p. m.—Helen Howison, soprano. 9:30 p. m.—Royal Salon Orchestra. 10:30 p. m.—Ben Glaser's Orchestra.
acite Coal Substitute" Sessenden: renaders, soloists.	fessor H. Sheldon. 7 p. m.—'St. Bernard," by Frank Dole, of 8:15 p. m.—Fred Koester's Orche 6:15 p. m.—'Words Mispronounce	ct. stories. stra. 5 p. m.—Shoreham Orchestra. b p. m.—Wurlitzer Musicale.	7 p. m.—Synagogue services. 7:30 p. m.—U. S. Army Band. S p. m.—Bon Bon Buddles. 10:40 a. m.—Home service talk. 1 p. m.—Tea room ensemble.	WJY-NEW YORK CITY-405 7:30 p. mVanderbilt Orchestra. 8:15 p. m"The National Horse Show,"
<b>PORT, N. Y.—266</b> Vhiteman's Serenaders, program.	7:15 p m.—Vanderbilt Orchestra. 8 p. m.—Musicale. 9 p. m.—New York Edison hour. 7:00 m.—Waltaner Main in the Moon St 6:55 p. m.—Sheiton dinner music	10 p. m.—"The Grand Tour." 10:30 p. m.—W. Spencer Tupman's chestra.	<ul> <li>8:30 p. m.—Proley concert.</li> <li>9 p. m.—Waterman's Point of Progress.</li> <li>Or- 10 p. m.—'Ipana Troubadours.''</li> <li>11:12 p. m.—Ben Bernie's Orchestra.</li> <li>14:12 p. m.—Ben Bernie's Orchestra.</li> </ul>	al John McE. Bowman. WEAF-NEW YORK CITY-492
(ELD, CONN,-275 reports, rming course. of music.	10:30 p. m.—Mayflower Orchestra. WEAF—NEW YORK CITY-492 3 p. m.—Isabelle Henderson, s	oprano. 7:30 p. m.—Daddy Winkum.	<b>WEBJ-NEW YORK CITY-278</b> 8 p. m.—Red and Grey Melody Boys. 7 p. m.—Dance orchestra. 7 p. m.—Dance orchestra.	WEAF, WEEI, WCAP. 11-12 a. m.—"Housewives Hour"; speak-
ORD, CONN.—476 music. "actories and Farms."	6:45-7:45 a, m.—Health exercises. 11 a, m.—Maria Saumell, planist. 11:10 a, m.—Lecture. 11:15 p, m.—Diack Davis, songs. 4:15 p, m.—Diack Davis, songs. 4:30 p, m.—Gertrude Guarente, p	Sieg. 5 p. m.—Musical settings by Little Sy phony Orchestra.	9:05 p. m.—Jerry Alexander, pianist. 9:30 p. m.—The Roth Trio. WHN_NEW YORK CITY.—361 2-3 p. m.—Corgan recital; religious ser ice; orchestra, 2-3 p. m.—Corgan recital; religious ser ice; orchestra,	y- 12 noon-Market and weather reports. 4 p. m:Charles Phillips, planist: 4 15 p. mAlma Wesstrom, soprane.
sic. VIDENCE-306 s' exchange. program,	11:25 a. m.—Motion picture forecast. 11:45 p. m.—J. Moore tenor. 12:45 p. m.—J. Moore tenor. WAAM—NEWARK—263 11 a. m.—Happy Hour.	wchurch quartet.	ra; 2:15 p. m.—Jimmy Clarke's Entertainers, 4:30 p. m.—Talk, Julia Abbott; recital. 2:45 p. m.—Musical program. 3:45 p. m.—Danks. 8 p. m.—Talk, "Current Events."	4:80 p. m.—Charles Phillips, planist. 4:45 p. m.—Talk. 5 p. m.—Dinner music. 7 p. m.—Mid-week services: Federation
ng time program. .n J.ed Cross:	4 p. m.—Joseph Biers, barytone. 4 15 p. m.—Thomas Hughes, planist. 4 30 p. m.—Vearl' Ryno, soprano.	6:30 p. m.—Dinner concert. 7:15 p. m.—Uncle Kaybee. 7:30 p. m.—Program from WEAF. 8:30 p. m.—"The Gold Dust Twins."	125 p. m.—Jack Smith, barytone. 135 p. m.—Uncle Robert's Pals. 1 p. m.—Dunce Robert's Pals. 1 p. m.—Dinner music. 3 p. m.—Lew Crapman's Orchestra.	Quartet; address by Rev. Arthur Bruce Moss. 7:30 p. mSerenaders.
era Company. OSTON-349 exercises.	6 p. m.—Dinner music. 7 p. m.—Florence Johnson, contralto. 7:10 p. m.—Columbia University lecture. 7:30 p. m.—Davis Saxophone Octet. WOO—PHILADELPHIA—	10 p. m.— "The Eveready Hour." 10 p. m.— Grand opera. WADC— AKBON OPPO	7 p. m.—Cotton Orchestra. 7:30 p. m.—Helen Carner, planiste. 7:45 p. m.—Leroy Fontesanto, tenor. 9 p. m.—Instrumental trio.	8 p. m.—"The Larkinites." \$:30 p. m.—"Touring," George Cooley. 9 p. m.—Address by Secretary Hoover be-
watch. service talk. wkińs's Orchestra.	8 p. m.—"Financial Events," Dudley Fowler. 8:10 n. m.—Ross Gorman's Orchestra. 4:45 p. m.—Grand organ. 4:45 p. m.—Grand organ and tru	B p. m.—Elnning's Ramblers. 10 p. m.—Times-Press Hour. WTAM_CI KUFF AND 200	<ul> <li>3 p. m.—Judith Roth, songs.</li> <li>3 p. m.—L. Wolfe Gilbert and Abel Baer, 9:50 p. m.—Moe and Joe, popular dittles</li> <li>4 p. m.—Moe and Joe, popular dittles</li> <li>5 p. m.—L. Wolfe Gilbert and Abel Baer, 9:50 p. m.—Penndashery Collegians.</li> <li>8 p. m.—Talk.</li> </ul>	<ul> <li>fore the Fourth Annual Radio Conference.</li> <li>9:30 p. m.—Music.</li> <li>10 p. m.—The "Zippers."</li> </ul>
Philpott. id found; weather re-	8:30 p. m.—"The Gold Dust Twina." 9 pp. m.—"Eveready Hour," 10 p. m.—!'Ayucion Bridge Instruction." 6:45 a. m.—Setting up exercises.	0 p. m.—Dinner must. WEAR—CLEVELAND—390	3:45 p. m.—Rock and Jerome, songs. J p. m.—Ridgely's Serenaders. 10 p. m.—Roekland Orchester. 11 p. m.—Ridgely's Serenaders. 12 p. m.—Albany Strand Theater Orchester.	11-12 p. mVincent Lopez's Orchestra. WGBS-NEW YORK CITY-316
r Club. Dennett, violinist. s Orchestra. 1 from WEAF.	11-12 p. m.—Meyer Davis's Orchestra. WGBS—NEW YORK CITY—316 3 p. m.—Artist recital. 6:05 p. m.—Bole Ray's Night Ha 7 p. m.—Roll call; birthday list.	8 p. m.—Radio artists. 9 p. m.—Loew vaudeville and music. 10 p. m.—Dister's Orchestra. WSAI—CINCENNATI—326	11 p. m.—Sliver Slipper Orchestra. 11:50 p. m.—Melody Orchestra. 12 a. m.—Richman Entertainers. 13 p. m.—Armistice program; School ban speakers.	<ul> <li>10 a. m.—Timely talks with Terese.</li> <li>10:10 a. m.—Don Clark's "Song Factory."</li> <li>10:20 a. m.—Furniture talk; songs.</li> <li>10:40.a. m.—'Homes and Gardens'; songs.</li> </ul>
and band. OSTON-280 reading.	10 a. m.—Timely Talks with Terese. 10:10 a. m.—Timelen Armstrong, songs. 10:20 a. m.—Household talk. 10:20 a. m.—Household talk. 10:20 a. m.—Inosehold talk. 10:20 a. m.—Inosehold talk.	akers in- 9 p. m.—Chimes concert. 9 p. m.—Eveready hour.	WNYC-NEW YORK CITY-526 10:05 p. mMelody Boys' Orchestra, 11 a. m"Decorative Floors," Prender 10:30 p. mSong contest, 11:05 p. mMelody Boys' Orchestra,	1:30 p. m.—Scripture reading. 1:35 p. m.—Rosalie Blanchard, Walter Croft, duets.
recital. orchestra. za Trio.	10:30 a. m.—Helen Armstrong; songs.       Arthur, Admiral Scales, Claren In and Richard V Lancaster.         10:40 a. m.—Home finance; songs.       lin and Richard V Lancaster.         1:30 p. m.—Jean Thoma, soprano.       10:30 p. m.—Pagoda Orchestra.	10:30 p. m.—Concert from studio. WLW-CINCINNATI-422 8:30 p. m.—O. Henry play.	gast. 11:15 a. m.—Morning concert. 11:45 a. m.—Joe Schmitt's recipes. 10:45 a. m.—Home Service Talk. 7 p. m.—Marray Whiteman Serenaders.	1:40 p. m.—Leonard Garfunkle, planist. 2 p. m.—Nat Katz's Orchestra. 3 p. m.—'Woman in the Home.''
lub. ok's dinner dance.	<ul> <li>2 p. m.—Gertrude Seidenman, pianist.</li> <li>8 p. m.—'Industrial Conditions in Egypt.''</li> <li>1 p. m.—Tea room ensemble.</li> <li>8 p. m.—Beitr Nameson, Ida Wasnett</li> <li>9 p. m.—Philadelphia, Music Clu</li> </ul>	10 p. m.—Formica Orchestra.	3:30 p. m.—Seventh anniversary of sign- ing armistice. 3:30 p. m.—I a. m.—Supper music. WHAM—BOCHESTER, N. Y.—278	6 p. m.—Uncle Geebee: 6:30 p. m.—Pearl Smith, animal interpre- tations.
pe, soprano; Franklyn e. n Orchestra.	duets. 3:20 p. m.—Driving lessons. 3:30 p. m.—Betty Nemerson, Ida Wysocki. 6:30 p. m.—Concert orchestra.	the Ma- 11 p. mDance music; songs. 12 midnight-"Doc" Howard's Enterts ers.	Invocation. Songs by school children. 5:50 p. m.—Dasting interforemeters salutation Army Chorus. Prominent p. m.—Theater organ. speakers. Prayer.	<ul> <li>6:40 p. m.—"What the World Is Doing."</li> <li>7 p. m.—Harry Voltaire hour:</li> <li>8 p. m.—Dance orchestra.</li> <li>8:30 p. m.—"Fiji Islands," Walter Aller-</li> </ul>
TELD, MASS333 recital. in psychology.	3:50 p. m.—Betty Nemerson, Ida Wysockt. 6 p. m.—Uncle Geebee. 6:30 p. m.—Byse' program. 11 a. m.—Organ recital.	EAF. 395 WJR—PONTIAC, MICH:—517 7- p. m.—Orchestra; soloists, 9 p. m.—Serenaders; soloists, WWJ—DETROIT517	<ul> <li>b. 10 p. m.—Sharket high spots.</li> <li>b. 20 p. m.—Flano selections.</li> <li>c. 30 p. m.—Elémentary Spanish lessons.</li> <li>d. 30 p. m.—Advanced Spanish lessons.</li> <li>WCAC—MANSFIELD, CONN.—275</li> </ul>	8:50 p. mElizabeth Baumann, söprano. 9 p. mPaul Edwards, tenor.
Theater Orchestra. oyle's Orchestra. Ins, soprano. Im Corps.	6:50 p. m.—Charfes Jones, "Salesman- ship." – Concert orchestra. 12:30 p. m.—Concert orchestra. 2-3 p. m.—Concert orchestra; rec 7 p. m.—Arrowhead Orchestra: 4:30 p. m.—Talk; artist recital.	ital. 8 p. m.—Dinner concert. 8 p. m.—Program from WEAF. WREO—LANSING—304	7:35 p. m.—'The Red Cross Roll Call.'' 7:50 p. m.—Cremona Stringed Trio. Songs; address by Joseph Thompson; 6:30 p. m.—Dinner music.	9:10 p. m.—Elizabeth Baumann, soprano. 9:20 p. m.—Jack Wehrlen, Paul Edwards. 9:30 p. m.—Y. M. C. A. program, Glee
stera Four." Isman's Orchestra. STER, MASS.—268	<ul> <li>S p. m.—Vocational forum.</li> <li>S p. m.—Uccational forum.</li> <li>S p. m.—Quartet of Woman's Voices;</li> <li>duets.</li> <li>S p. m.—''Personality of Water Ani-</li> <li>7:30 p. m.—Becital.</li> </ul>	WHI-UHICAGO-400	10:25 p. m.—Lawrence. Metcalf, whistler. 10 p. m.—Dance music. 10:30 p. m.—Police alarms, weather.	Club, .10 p. m.—Norman Secon, pianist. 10:10 p. m.—Paul Lowenkron, violinist.
chat. d weather report. heon music.	mals." 9 p. m.—Agnes Verbeckmoes, soprano. 9 p. m.—Rener Verbeckmoes, soprano. 9 p. m.—Rener Verbeckmoes, soprano. 9 p. m.—Rener Verbeckmoes, soprano. 9 p. m.—Rener Verbeckmoes, soprano.	11:10 n m Doneo music	res. 10:30 a. m.—Reducing exercises. 10:45 a. m.—Health advice. 10:45 a. m.—Health advice. 10:45 a. m.—Health advice. 10:45 a. m.—Health advice. 10:50 b. m.—U. S. Army Band. 9 p. m.—Waterman's Points of Progress. 10:45 a. m.—Health advice.	10:20 p. m.—Norman Secon, planist. 10:30 p. m.—Arrowhead Orchestra. WNYC—NEW YORK CITY—526
ller. Deram. HINGTON-469 hour from WJZ.	9:40 p. m.—Harry Link, Willie duets. 10 p. m.—Irving Argay, violinist. 9:40 p. m.—Harry Link, Willie songs. 10:30 p. m.—Billy Hayes's Orche	Horowitz, 1 a. m.—Yonr Hour League. WMAQ—CHICAGO—448 stra. 7:30 p. m.—La Salle Orchestra.	11 a. m.— 'Gardening Lore.' 12 noon-Trinity Six Hour of Music. 4:15 p. m.—Samnel Bernard, "Timeology." 7:45 a. m.—Health exercises. 7:45 a. m.—Morning Watch. 10:45 a. m.—Home Service Talk.	6 p. m.—Dinner music. 7 p. m.—Market high spots. 7:10 p. m.—Dance program.
tal. Orchestra. program.	10:30 p. m.—Arrowhead Orchestra.       WHAR—ATLANTIC CITY-         WHN—NEW YORK CITY-361       2 p. m.—Seaside Trio.         12:30 p. m.—Organ recital.       7:30 p. m.—Seaside Trio.	<ul> <li>-275</li> <li>9 p. m.—Literary Sidelight; songs.</li> <li>9:40 p. m.—Travel talk.</li> <li>10 p. m.—University of Chicago, lecture</li> <li>10:20 p. m.—Musical program.</li> </ul>	7 p.s.m.—"Whose Birthday To-day?" 7:05 p. m.—"Telegraph Sportflash." 3 p. m.—"Lost and Found; weather. 7 r.15 p. m.—"Commerce of the Day." 7 m.—Lost and Found; weather.	7:30 p. m.—Police alarms. 7:35 p. m.—Dance orchestra. 7:45 p. m.—Haskell Proper, saxophone.
HINGTON-469 ting up exercises. arket summaries. chorus.	2:15 to 3:15 p.m.—Overture and vaude- ville from Loew's State. 3:15 p.m.—Lexington Theater Orchestra. <b>WPG-ATLANTC CITY3</b>	WLS—CHICAGO—345 al. 7:15 p. m.—Organ; story; songs of Italy 00 KXW—CHICAGO—536	7:35 p. m.—Coae lesson. 7:35 p. m.—Musicale. 7:45 p. m.—Musicale. 8:00 p. m.—Bon Bon Buddles. 8:30 p. m.—Program of music.	8 p. m.—"Football," John B. Foster. 8:15 p. m.—Samuel Gray, barytone. 8:30 p. m.—Gedney and Magee, banjoists. 9 p. m.—Samuel Gray, barytone.
talk. y Gypsies.	6:40 p. m.—Sunshine Talks. 7 p. m.—Iceland Orchestra. 7:30 p. m.—Oakland's Chateau Shanley. 8 p. m.—Allce Brady interviewed. 1:30 p. m.—Luncheon music. 6:45 p. m.—Cran recital. 7 p. m.—Trio dinner music. 8 p. m.—Fashion flashes.	8 p. m.—Dinner concert. 9 p. m.—Musical program. 10 p. m.—Concert program. 11 p. m.—'Evening at Home."	8 p. m.—Mario Curci, songs. 8:30 p. m.—Talk. 8:45 p. m.—''A to Z Piano Classics.'' 9 p. m.—'Transoceanic Telephony.'' WNAC—BOSTON—280	<ul> <li>9:15 p. m.—New York Zither Trio.</li> <li>9:45 p. m.—Harold Lieberman, violinist.</li> <li>10:10 p. m.—"Trend of the Times"</li> </ul>
<b>TSBURGH309</b> n's period. ational Art."	8:15 p. m.—Miller, Plotti, Val, songs. 8:30 p. m.—Francis Capoulliez, barytone. 8:45 p. m.—Mall Dual Trio. 10 p. m.—Students of L. Powell E	2 a. m.—"Insomnia Club. WEBH—CHICAGO—370 8-9 p. m.—Dinner concert.	9:15 p. m.—Harvey Corbett, "Adventure." 9:20 p. m.—Francine Vyde, repertoire. 9:30 p. m.—Noon service.	10:30 p. m.—Police alarms; weather, WHN—NEW YORK CITY—361
ie hour. ISBURGH-461 concert. Kaybee.	<ul> <li>9 p. m.—Chris Meehan, tenor.</li> <li>9:15 p. m.—Clarence William's Trio.</li> <li>9:45 p. m.—Bob Schaefer, song writer.</li> <li>11 p. m.—Dance orchestra.</li> <li>11 p. m.—Dance orchestra.</li> <li>11 p. m.—Dance orchestra.</li> <li>12 p. m.—Music: one-act play.</li> </ul>	10 p. m.—Dance selections; theater bits. 11 p. m2 a. m.—Dance music; songs. WGN—CHICAGO-370	. 10:15 p. m.—Chevaller de Lancellott), songs. 4 p. m.—Tea dance. 10:15 p. m.—Biography. 4:20 p. m.—Vocal and piano solos. WMCA—NEW YORK CITY—341 6 p. m.—Klddies Klub.	12:30 p. m.—Lexington organ recital. 3:15 p. m.—Lexington Orchestra. 6:40 p. m.—Sunshine talk, Billy B. Van. 7 p. m.—Iceland Orchestra.
an Red Cross. chestra. dine Theater.	11 p. m.—Caravan Orchestra. 11:30 p. m.—Rodeo Orchestra. 12 a. m.—Kentucky Revue and Orchestra. 13 a. m.—Dinner music. 6:30 p. m.—Dinner music.	7:30 p. m.—Dinner music. 9:30 p. m.—Classic hour. 11:30 p. m.—Dance music. WOK—CHICAGO—217	6 p. m.—Olcott Vail's String Ensemble. 6:30 p. m.—Ernie Golden's Orchestra. 7:30 p. m.—Violet Kaye, "Happy Girl." 7:50 p. m.—Edward French, planist. 6:30 p. m.—Dinner dance. 8:30 p. m.—Varied program. 6:30 p. m.—Leo Reisman's Ensemble.	7:30 p. m.—Music. 8 p. m.—Oakland's Chateau Shanley. 8:30 p. m.—Guardian Entertainers.
ON, OHIO—253 concert. EVELAND—390	WNYCNEW YORK CITY-526         7:30 p. mWater Supply Eng Professor Warren Taylor.           7:10 p. mThe Canadians.         7:45 p. mStephen St. John Cirb.	Plectrum 1 p. m.—Artists. WENR—CHICAGO—266	<ul> <li>8 p. m.—Services from Northminster 7 p. m.—Market reports. Church.</li> <li>9 p. m.—Joseph Wetzel, tenor.</li> <li>8 p. m.—Special Armistice Day program.</li> </ul>	9 p. mJimmy Clarke's Entertainers. 9:20 p. mOld time songs. 10:30 p. mKentucky Orchestra.
ter program. EVELAND	<ul> <li>7:35 p. m.—The Canadians.</li> <li>8 p. m.—American Marine Week; Brook- lyn. Band, Durward H. Primrose.</li> <li>10 p. m.—'The Grand Tour.'' 10:30 p. m.—Mayfiower Orchestra: WRW—TARRYTOWN N Y</li> </ul>		9:30 p. m.—Frank Wadsworth, "Your Job." 10 p. m.—Aandy Asciuto's Orchestra. 11 p. m.—Entertainers. 12 p. m.—Market and Weather Report.	11 p. m.—Swanee Orchestra. 11:30 p. m.—Rodeo Orchestra. 12 a. m.—Ted Lewis's Orchestra.
znce music. CINNATI-422	<ul> <li>9 p. mDinner to Hon. Charles E. Hughes,</li> <li>9:05 p. mRoth Serenaders,</li> <li>Irving T. Bush, Elihu Root, Charles E.</li> <li>9:30 p. mFrank Johnson, plan</li> <li>9:45 p. mFrank Johnson, plan</li> </ul>	11 p. m.—Rainbow Skylarks. 2 a. m.—The Ginger Hour. ist. WCBD—ZUON, ILL.—345	11:30 p. mJack Smith. songs. WFBHNEW YORK CITY-273 2 p. mDave Brown's Orchestra. 3 p. mDave Brown's Orchestra. 4 12:05-2 p. mLuccheon music. 7:15 p. mIterson in Spanish. 8 p. mLesson in Spanish. 8:15 p. mConcert program.	WRNY-NEW YORK CITY-259 10:30 a. mReducing Exercises. 10:45 a. mMrs. Rose Berry, "Paint-
dance, ker's orchestra. Legion program.	10:45 p. m.—Police alarnis; weather, 10:45 p. m.—Harry Ash's Orchestra. WRNY_NEW YORK CITY_259 11:05 p. m.—Grenestra. 10:30 p. m.—Hoth Entertainers.	9 p. m.—Clarinet quartet and celectial be WOC—DAVENPORT—484 8:30 p. m.—Program from WEAF. 10:30 p. m.—Crescent Orchestra.	3.15 p. m.—Emma Kneiles songs. 12 non—Oran recital.	ing." 11 a. m.—"New Books." 11:15 a. m.—"Musical Courier Says"—— 12 noon—Trinity six-hour of music.
ical stars. chestra. CINNATI326	10:30 a. m.—Reducing exercises. 10:45 'a. m.—''Arts and Decorations.'' 12 noon—Trinity Six Hour of Music. 4:15 p. m.—H. N. Foster, "Quick Suppers.'' WGR—BUFFALO, N. Y.— 6:30 p. m.—Dinner music. 8-11 p. m.—Program same as W WHAM—ROCHESTER, N. Y.	EAF.	<ul> <li>4:30 p. m.—Lou Lockett, Norman Secon.</li> <li>5 p. m.—Jerry Antone's Orchestra.</li> <li>6 p. m.—Anita Bunn, soprano.</li> <li>6:15 p. m.—Majestic String Ensemble.</li> <li>6:45 p. m.—Health exercises.</li> </ul>	4:15 p. m.—Afternoon program. 7 p. m.—''Whose Birthday To-day?'' 7:05 p. m.—Telegraph sportflash
Concert. CINNATI-422 cert. ag'' concert orchestra.	4:30 p. m.—Studio program.       3:30 p. m.—Theater orchestra.         6:45 p. m.—"Scholastic Sports."       5 p. m.—Eastman Theater organ         7 p. m.—"Whose Birthday To-dag?"       7 p. m.—Theater orchestra.		7:30 p. m.—Jack Smith, songs. 7:35 p. m.—Limericks. 7:35 p. m.—Fred Fisher, Bob Schaffer.	7:15 p. m.—Commerce of the day, m. 7:20 p. m.—Chef Cretaux chats. The formation of the form
AC, MICH517 soloists. ogram.	7:05 p. m.—Telegraph sportflash. 7:15 p. m.—Commerce of the day. 7:20 p. m.—Emory Buckner, law series. 7:20 p. m.—Gustav Tinlot, violir Kefer, 'cellist.	ist; Paul 10 a. m.—Women's hour. 11 a. m.—News service.	11:30 p. m.—Bal Masque Orchestra. WHAG-RICHMOND HILL, N. Y316 12 noon-Musical program. 12 noon-Musical program.	8:30 p. mRadio questions and answers.
Jesters. TROIT	7:30 p. m.—Kiddie light opera dances. 7:45 p. m.—Concert orchestra. 8:15 p. m.—Uight opera singers. 8:30 p. m.—Light opera singers. WTIC—HARTFORD, CONN. 6:30 p. m.—Dipner music. 7 p. m.—Barytone solos. 7:20 p. m.—Dipner music.	2, 4, 5:30, 7:30 and 10:30 p. m.—News. 4:05 p. m.—Kathleen Phillips, soprano.	7:30 p. m.—Billy, Eisenhuth's "Lynbrook- lyns," 8:30 p. m.—John Flynn, angling lore. 6:15 p. m.—Dinner concert.	8:45 p. m.—Life's jokes. 9 p. m.—Talk, Estelle Sternberger. 9:15 p. m.—Lorna Lee, songs. 9:30 p. m.—Essays (* philosophy.
and gypsies. ING, MICH.—286 cert. IICAGO448	9 p. m.—Sadrian Trio. 9:15 p. m.—Theater talk. 9:30 p. m.—Sadrian Trio. 9:30 p. m.—Studio program. 9:30 p. m.—Studio program.	5:30 p. m.—Market quotations. 5:50 p. m.—Financial summary.	8:45 p. m.—Louis Caton, tenor. 9 p. m.—Frank Lauria, violinist. 9:15 p. m.—Crescent Quartette. 9:36 p. m.—Louis Caton, tenor. 9:45 p. m.—Criminology talk. 9:50 p. m.—Louis Caton, tenor. 9:50 p. m.—Louis Caton, tenor. 9:50 p. m.—Criminology talk. 9:64 p. m.—Criminology talk. 9:730 p. m.—Criminology talk. 9:730 p. m.—Criminology talk. 9:730 p. m.—Criminology talk. 9:750 p. m.—Criminology talk.	9:35 p. m.—Bill Riets, songs. 5:45 p. m.—Resta Crowell's Classic Theater.
orchestra. Altar League. ICAGO-217	10 p. m.—Urrent theater. 10 15 p. m.—Irving Players, "One Word 8:30 p. m.—Italian hour. 8:30 p. m.—Coll Dust Twins.	<ul> <li>6:30 p. m.—N. Y. University course: "Si cess in Various Professions," Profess James E. Lough.</li> <li>7 p. m.—Dnner orchestra.</li> </ul>	sor 145 p. m.—Crescent Quartet. 10 p. m.—Frank Lauria, violinist. 10:15 p. m.—The Sunshine Girl. 10:15 p. m.—Father and son talks.	10 p. m.—Volga Trio. 11 p. m.—Radio Art Theater. WMCA—NEW YORK CITY—341
usical features. ICAGO—400 ogram.	Play." 11 p. m.—"Town in Review." WMCA—NEW YORK CITY—341 10:30 a. m.—Talk by Vera M. McGowan. 7:45 p. m.—Morning watch	8 p. m.—N. Y. Edison hour. 9 p. m.—Armistice Day program; U. Army School Band; speakers: Charles	WGBB—FREEPORT, N. Y.—244 S: 8 p. m.—Antonetta Longo, planist. P.8:15 p. m.—Charrie Harrison, soprano. WADC—AKRON, OHIO—258 (38) p. m.—Dinner concert.	6 p. m.—Olcott Vail's String Ensemble. 6:30 p. m.—Robert Soffer, planist. 7 p. m.—Ukelele Bob McDonald.
	10:30 a. m.—Talk by Vera M. McGowan. 11 a. m.—Ida Allen's "Homemaker's Hour" 6 p. m.—Olcott Vail's String Ensemble. 6:30 p. m.—Frank Gebbis's Orchestra. 6:30 p. m.—Lost and found: wee	the Rev. Father Francis P. Duffy. 10:30 p. m.—Virginians.	and the second secon	7:15 p. m.—Lecture program. 7:30 p. m.—Lanson's Orchestra. 8 p. m.—"Hale and Héarty."
SDAY	7 p. m.—Jack Wilbur's Personalities. 8 p. 'm.—Hattie Matthews, soprano; Fred A. Semmens. barytone, 9 p. m.—Big Brother Club, 7 45 p. m.—Big Brother Club, 7 45 p. m.—Ross Gorman's Orchestr	talk, 10 a. m.—Timely talks with Terese. 10 a. m.—Betty Anthony, soprano.	9:30 p. m.—Harold Davison's Ramblers. WOR—NEWARK—405 WEAR—CLEVELAND—390	<ul> <li>8:30 p. m.—Alexander Dellerson, bary- tone.</li> <li>8:45 p. m.—Idalia Hare, soprano.</li> <li>9 p. m.—Alexander Dellerson, barytone.</li> </ul>
ORK CITY-405 dor Trio. nnounced.	8:30 p. m.—Henry Burbig; Henry Kaye. 9 p. m.—Minnie Well, pianist. 9:30 p. m.—Catherine Harvey, soprano. 10:30 a. m.—Bible readings.	EAF. 10:20 a. mHousefurnishing talk; song 1:30 p. mScripture reading. 1:35 p. mIslian Jesso. songano.	<ul> <li>3. 2:30 p. m.—William Burke, tenor.</li> <li>b. m.—Marion Adams, soprano.</li> <li>c. m.—Book review.</li> <li>d. p. m.—Book review.</li> <li>d. p. m.—Book review.</li> </ul>	9:15 p. m.—Idalia Hare, soprano. 9:30 p. m.—George Kohlmeirer's Orches- tra.
nt's Orchestra.	10 p. m.—South American Troubadours. 10:15 p. m.—George Davis, tenor. 10:30 p. m.—Fred Mensing, zither. 11 p. m.—Ernie Golden's Orchestra. 11 p. m.—Music to picture.	<ul> <li>2 p. m.—John Von Aspe, tenor.</li> <li>3 p. m.—Hospital request program: Interview with Royal Dixon: Florence Loft</li> </ul>	3:15 p. m.—Marion Adams, soprano. er-3:30 p. m.—'Ceremonies Unveiling Mont- 10:15 p. m.—Dance music. us.] clair Memorial." WSAI—CINCINNATI—326	10 p. m.—"How to Drive Automobiles." 10:05 p. m.—George Kohlmeirer's Orches- tra.
t's Orchestra. play, "My Educated	WFBH-NEW YORK CITY-273 6 p. m. New WNAC Radio Clu	duets.	les, 6:17 p. m.—"Sports," Bill Wathey 6:30 p. m.—Shelton dinner music. 7:20 WLW—CINCINNATI—422	10:30 p. m.—Dr. Carl Tannert, cellist; Frederick Selfert, barytone. 11 p. m.—Ernie Golden's Orchestra.
k, Garrow Geer. ats. okeman, tenor.	4:15 p. m.—Judith Roth, soprano. 4:30 p. m.—Tea Table Talk. 4:45 p. m.—Boston American orch	omerville :30 p. mJersey Collegians. 7 p. mNorbert Lusk, "Movie Sid	8 p. m.— Tropics of the Day." [11 p. m.—Songs and address. de-S:15 p. m.—Dick and Flo Bernard, songs 11:45 p. m.—Zither players. 8:30 p. m.—Dr. Frank H. Vizetelly, 12 midight—Organ concert.	WFBH—NEW YORK CITY—273 2 p. m.—Sextet. 3 p. m.—Johnny Gerhardt's-Orchestra.
Joskowitz, violinist.	5 p. m. — Ford and McLean. 11 p. m. — Dance music.	7:10 p. mJulie Wintz's Collegians.	8:45 p. m.—Dick and Flo Bernard, songs. 6 p. m.—Dinner concert. 9 p. m.—Sam Siegel, mandolin. 8 p. m.—Orchestra and soloists	4 p. m.—Radiovues, Mrs. Öwen Kildare, 4:30 p. m.—Billy Cohen's Hottentots, 5:30 p. m.—Volly Endriss, contraito, 5:45 p. m.—Murray Schwartz, pianist,
Danor	• Orchestras for Th		9:15 p. m.—Captain Anton Heinen, "Air- ship Reliability." 9:30 p. m.—Allen Concert Trio. 10 p. m.—News. Bulletin. 10 p. m.—News. Bulletin. 9:50 p. m.—Jean Goldkette's Orchestra; soldist.	6:15 p. m.—Helen Muller, songs 6:30 p. m.—Hock and Jerome, songs. 7 p. m.—Bal Masque Orchestra.
Janut		15 WCCK	10:15 p. m. Julius Seebach, barytone. 10:30 p. m. Allan Concert Trio. 10:45 p. m. Julius Seebach, barytone. 10:45 p. m. Julius Seebach, barytone. WREO-LANSING-286	7:30 p. m.—Health Talk, Dr. H. H. Rubin. 7:35 p. m.—Paul Epps's Revelers.
Vave	12:00 WGCP 252 Connie's 1:00 WFBH 273 Charles Kerr's TUESDAY, NOVEMBER 10 11:30 WFBH 273 Bal Masqu	ys 10:15 WAHG 316 Benton Harbor	11 p. m.—Zlt's Orchestra. 11:30 p. m.—William Frawley, songs and stories. 6-7 p. m.—Dinner concert. WEBH—CHICAGO—370 Sp. m.—Concert orchestra; songs.	WLWL-NEW YORK CITY-288 9 p. mLotta Madden, soprano. 9:10 p. mWLWL Trio.
ength Orchestra 52 Strickland's 78 Jaffe's	9:05 WRW 273 Roth 10:00 WJY 405 Paul Specht's THURSDAY, NOVEMBER	's 10:30 WJZ 455 Lorraine	WGCP-NEWARK-252 3 p. mSongs by artists. 3:45 p. mClarence Williams Trio. 4:15 p. mClood News Party. 8 p. mDinnee music; songs. 12-2 a. mDance music; recital. KYW-CHICAGO-536 8 p. mDinnee Chicker (Chicker)	9:20 p. m.—James J. Byrne, bass. 9:30 p. m.—Talk. 9:45 p. m.—Lotta Madden, soprano.
61 Janssen's 61 Richman's NOVEMBER 9	10:30         WEAF         492         Vincent Lopez's         9:00         WJAR         306         Robert Po           10:30         WJSBS         316         Arrowhead         9:10         WOKO         233         Dance mu           10:30         WIBS         316         Arrowhead         9:10         WOKO         233         Dance mu           10:30         WIP         508         Dance mu         10:05         WMCA         341         Kohlmejen	wers's 11:00 WJAR 405 Biltmöre sic 11:10 WGR 319 Vincent Lopers 11:30 WFBH 273 Fordham	4:30 p. m.—Charlotte Trystmann, pianist. 3 p. m.—Orchestra. 3 lilo p. m.—Musical program. 3 lilo p. m.—Midnight revue.	9:55 p. m.—WLWL Trio. 10:05 p. m.—James J. Byrne, bass. 10:15 p. m.—"Marriage and Divorce," Mgr. McMahon.
26 Lehigh 76 Dance music	10:48         WNYC         526         Harry Ash's         10:05         WHP         508         Joe Ray's           11:00         WEAF         492         Meyer Davis's         10:05         WBZ         333         McEnelly'           11:00         WMAAF         492         Meyer Davis's         10:05         WBZ         333         McEnelly'           11:00         WMAAF         841         Ernie Golden's         10:33         WGBS         316         Arrowhea	12:00 WGCP 252 Connie's SATURDAY, NOVEMBER 14	chine. 6:30 p. m.—Orchestra selections. 8:05 p. m.—Hock and Jerome, songs. 8:30 p. m.—Dinner concert.	Mgr. McMahon. 10:35 p. m.—WLWL Trio. 10:50 p. m.—Organ recital. WOKO—NEW YORK CITY—233
66 M. Whiteman's 61 Roseland 44 Hildenbrand's	11-1         WHN         361         Dance music         10:30         WHN         361         Dance music           '11:30         WFBH         273         Fordham         10:30         WJZ         455         Ben Glass           'WHN VET VET AV         NOVEMBER 11         10:30         WRC         469         Meyer Day	sic 7:00 WNYC 526 Dance music r's 8:00 WJZ 455 Dance music is's 48:11 WGBB 244 Presseman's	8:20 p. m.—Charol de Thomee, planist. 8:35 p. m.—Bert Dagmar, songs. 8:50 p. m.—Lulu Weyant. 12:30 a. m.—Dinner music. WENR—CHICAGO—266	WORD-NEW YORK CITY-233 8:15 p. m.—Bertha Pinco, soprano, 8:35 p. m.—Charles Reed, tenor. 8:50 p. m.—Billy Ihlefeld, planist.
61 Billy Wynne's 52 Dance music 16 Glenn Smith's	WEDAESDAY, NOVEMBER IL 9:00 WHN 361 Ridgely's 9:30 WGBB 244 Davison's 12:09 WHN 361 Ted Lewig	len's 8:30 WRNY 259 Ben Bernie's opez's 10:05 WIP 508 Dance music	9:05 p. m.—Bernard Share, violinist. 9:15 p. m.—Daborne and Meredith, songs. 9:45 p. m.—Win Unger, songs. 1-3 a. m.—All American Pioneers.	8:50 p. m.—Billy Inlefeld, planist. 9:10 p. m.—Dance orchestra. WKCB—BROOKLYN—240

Kohlmeier's Joe Ray's McEnelly's Arrowhead Dance music Ben Glaser's Meyer Davis's Ernie Golden's Vincent Lopez's Ted Lewis's 12:00 WGCP 252 Connie's SATURDAY, NOVEMBER 14 ATUIBDAY, NO WNYC 526 WJZ 455 WGBB 244 WRNY 259 WIP 508 WRC 469 WRW 273 WGBS 316 WGF 480 WOR 405 WMC 405 WMC 455 WMC 455 WMC 459 WRC 469 7:00 8:00 8:11 0:05 10:30 10:30 10:30 10:30 11:00 11:00 11:00 11:00 11:00 12:00 Dance music Dance music Presseman's Ben Bernie's Dance music Crandall's Dance music FRIDAY, NOVEMBER 13 Arrowhead Arrownead Dance music Eddie Elkins's Ernie Golden's Vincent Lopez's J: Greën's Ferrucci's Recreation Eisenbruth's Dance music Dance music Dance music

-Richman Entertainers. WAAM-NEWARK-263 WAAM-NEWARK-263 m.-Happ hour program. a. m.-East Orange and Monto fs School football game. m.-Elmer Nippes's Orchestra. p. m.-Sport oracle. p. m.-Cora Morris, soprane.

p. m.—Orchestra selectiona.
p. m.—Hock and Jerome, songs.
p. m.—Charol de Thomee, planist.
p. m.—Bert Dagmar, songs.
p. m.—Lulu Weyant.
p. m.—Osborne and Meredith, so
p. m.—Win Unger, songs.
m.—Connie's Orchestra.
m.—Connie's Orchestra.

8 p. m.—Rainbow Orchestra. 11 p. m.—Musical program. 2 a. m.—Ginger hour."
 WIS—CHICAGO—345
 7:15 p. m.-1 a. m.—Organ; story; ...
 tice Day program; concert.
 WMAQ—CHICAGO—418 WMAQ.-CHICAGO-448 7 p. m.--Organ recital; story, 9 p. m.--Northwestern University lectur 8:30 p. m.--WMAQ Players; 10 p. m.--WMAQ Players;

WQJ-CHICAGO-448

WAHG-RICHMOND HILL, N. Y.-316 12 (noon)-Musical program (Continued on next page)

6 p. m.-Dinner music.

WBBR-STATEN ISLAND, N. Y.-273

8 p. m.—Instrumental trio. 8:10 p. m.—Barbara Jonasch, soprano. 8:20 p. m.—Sunday-school lesson. 8:40 p. m.—Barbara Jonasch, sourano. 8:50 p. m.—Instrumental trio.

8:15 p. m.—Bertha Pinco, soprano, 8:35 p. m.—Charles Reed, tenor. 8:50 p. m.—Billy Inlefeld, planist. 9:10 p. m.—Dance orchestra. WKCB—BROOKLYN—240

. Chan

¥ 9

### **College Prof.** Makes Electron Sing for WGY's Radio Audience

the fourth of a series of talks on row and then the last-he produced the electron.

16 \*

illustration, a photo-electric cell was by uncovering all four rows he seconnected to the broadcast circuit, cured notes of good organ quality. and a disc with many rows of per-

the major chord. By uncovering two As shown in the accompanying rows he obtained two notes, and then For the construction of an organ

## **Engineers Tussel**

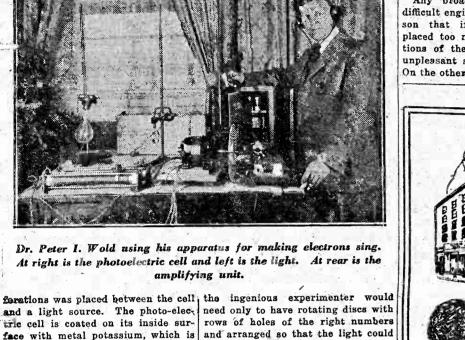
physics at Union College, when he row with twenty-four holes. By cov-introduced the radio audience of ering one row or another he secured different notes. By moving backward different notes. By moving backward the inside were not enough to fully protect the backward backward the taken by wJZ's engineers. This and deflected the wind. But there were not enough to fully protect the variable of the last is by covering first the inside were not enough to fully protect the variable of the last is by covering first the inside were not enough to fully protect the variable of the last is by covering first the inside were not enough to fully protect the variable of the last is by covering first the inside were not enough to fully protect the variable of the last is by covering first the inside were not enough to fully protect the variable of the last is by covering first the inside of the last is by covering first the inside were not enough to fully protect the variable of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the inside of the last is by covering first the last is by covering first the last is by covering first the last of the last is by covering first the last of the hail and even the wind has to be kind in the world, are hung in a "mics," so they shed their overcoats considered. Recently, when broad- tower, the smaller bells at the top and added them to the pile of procasting the carillon of the Park Ave- and the heavier lower down, where tecting cloth and the broadcast went nue Baptist Church, the engineers a firmer foundation is found. Plac- on. And so the next time you sit were nearly swept to their deaths ing the microphone was a big prob-from the roof of the church when lem. High in the tower only the favorite program give a thought to attempting to place several micro- higher pitched bells registered with those who toil to make all this phones there to pick up the sound the heavier tones in the background. possible, and be a little more thankof the bells.

difficult engineering feat, for the rea- phones with the higher bells jingling son that if the microphones are in the background. Again. the roof placed too near the bells the vibra- of the church proved to be the solutions of the clappers will cause an tion, and here was where the eleunpleasant sound to be transmitted. ments did their work.

or carillon, as the case may be, swept the roof of the edifice, and the With Elements to extraneous noises enter into the placing of the "mics" was a danextraheous noises enter into the gerous feat with a long drop to the broadcast and ruin the effect. In street awaiting a single misstep. Broadcast Chimes practically all of the broadcasts of After the microphones had been Although the average listener may bells thus far attempted the roof of placed the wind howled around the diaphrams, keeping up a constant ac-The possibility of creating a new musical instrument by utilizing the photo-electric effect was brought out by Dr. Peter I. Wold, professor of the third with thirty and the inside whysics at Union College, when he converted to the disc contained four holes. By cov-At a lower level the rumble of the ful for your radio set. Any broadcasting of bells is a deep bells monopolized the micro-

(are placed too far from the chimes | cast an eighty-mile an hour gale

**Colored Leads Save Tubes** There is less chance of "blowing" tubes if "code wire" or colored leads are used to make the battery connec-



very sensitive to light. At the center pass through the holes to the photoof the cell is a plate of tungsten. electric cell. Any row or combination A battery of 135 volts has its nega- of rows could be uncovered by small tive terminal connected to the potas- slides operated from a keyboard, and sium coating and its positive termi- the loudness of the notes might be nal to the tungsten plate. When light controlled conveniently by regulating falls on the potassium coating elec- the brightness of a lamp. A loud trons are given off and travel to the speaker could be used to convert tungsten plate, thus constituting a the electrical vibrations into sound current. By means of a motor the vibrations. One of the important disk with circular rows of holes was rotated between the light and the that it is practically instantaneous cell. When the disc was revolved in its action. It does not require slowly a low-pitched note was given time to build up, as in the case of off, rising gradually as the speed of some other electric musical instruthe disc increased.

features of the photo-electric cell is ments.

### His "Gang" on Wednesday

"Roxy and his Gang" will be heard during the coming week on Wednesday night from 9 to 10, to be broad- Insurance Company at Hartford. cast by WEAF and a chain of stations direct from the studio at 195 Broadway, New York City.

"The Gang," many of whom are Doug Stanbury, "Gamby," Frank morning of August 26 at the time Moulan and Florence Mulholland, has the IXG was calling a man down in been augmented by many new entertainers, including Duke Yellman and his orchestra, Jack Oakley, barytone; Soeph Wetzel, tenor; Adrien da Silva, tenor; Max Terr, accompanist; Olive and nuts is recommended for fixed Cornell, colorature soprano (formerly condenser connections. a member of the WEAF Grand Opera Company); Phoebe Crosby, soprano; Jessica Dragonette, soprano; Frederic Fradkin, violinist; Joseph Stopak, violinist: Geoffry O'Hara, noted singer-composer, and others,

Beginning Thursday evening, No vember 26, "Roxy and his Gang" will be heard regularly through WEAF and a chain of stations.

3 stores

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Greenhits

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**85 BARCLAY STREET** 

73 WEST BROADWAY

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41

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Charger

Q.95

"Roxy" With New Members | A Short Wave Broadcasting Station Heard in Australia 1XG, the experimental and short wave station of WTIC, the Travelers Conn., has been heard in Australia. Ernest J. Lord. of Bowen Hills. Brisbane, Queensland, Australia, owner and operator of A-2SL, picked up members of the old group, such as signals from 1XG at 5 o'clock the

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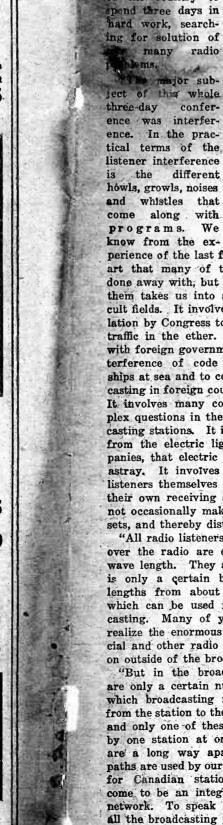
meets the demand of the broadcast

listener, requiring

C. A. Receiver

Brownsville, Tex.





## THE NEW YORK HERALD New Vork Maine Tribune RADIO MAGAZINE SUNDAY, NOVEMBER 15, 1925 16 PAGES SECTION TWELVE

**Radio Problems Discussed at Capital** 

### Sec. of Commerce Summarizes Fourth Conference Recommends Work of Committees **Important Changes**

### **By HERBERT C. HOOVER\***

KANTY E have just completed the Fourth National Radio Conference in Washington. As I have been the chairman of that conference, I have been requested to report the results of the conference to the radio listeners, for you are the people most vitally concerned in its conclusions. You, the listeners, were represented at the conference through listeners' clubs in different parts of the country and through the radio press, who to a great degree reflect your views. The conference also included representatives of the broadcasting stations; it included representatives of the manufacturers of equipment; it included representatives of many government departments, that is, the army, the navy, agricultural, postoffice, the merchant marine and the Department of Commerce; it included representatives

TTACKING with marked courage and decisiveness the complex problems now facing radio broadcasting, the Fourth Annual Radio Conference, held in Washington last week, formulated the basic principles upon which the development of the art shall be founded. Briefly, it advocated heroic measures to reduce the number of broadcasting stations, it established the basic principle that public service and not private ambition shall determine the extension of the broadcasting privilege. it condemned the manufacture of radiating receivers, it deprecated the use of radio broadcasting for direct advertising, it recommended the removal of broadcasting stations from congested districts and it defined a sound principle upon which the

By EDGAR H. FELIX

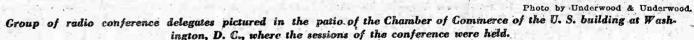
of neighboring forgovernments. Some 500 men and women left their homes and business fairs in all parts. f the country to and three days in many radio major sub-

perience of the last few years in this new art that many of these noises can be done away with, but the doing away with them takes us into a dozen varied difficult fields. It involves questions of legis-

lation by Congress to further control the traffic in the ether. It involves treaties with foreign governments to eliminate interference of code signals from their ships at sea and to co-ordinate the broadcasting in foreign countries with our own. It involves many complicated and complex questions in the operation of broadcasting stations. It involves co-operation from the electric light and power companies, that electric currents will not go astray. It involves co-operation of the listeners themselves that they shall keep their own receiving sets so that they do not occasionally make them into sending sets, and thereby disturb their neighbors. "All radio listeners know that messages over the radio are carried on a specific wave length. They also know that there is only a certain band of these wave lengths from about 200 to 650 meters which can be used for telephone broadcasting. Many of you, perhaps, do not realize the enormous amount of commercial and other radio work that is carried on outside of the broadcasting band.

"But in the broadcasting band there are only a certain number of paths over which broadcasting messages can travel from the station to the ears of the listener; and only one of these paths can be used by one station at one time, unless they are a long way apart. Some of these paths are used by our neighbors in Canada for Canadian stations, and ours have come to be an integral part of a single network. To speak in actual figures for all the broadcasting in the United States there are practically eighty-eight wave

\*An address delivered November 12, 1925, at Washington, D. C., through the stations of the American Telephone & Telegraph Company, and the Radio Corporation of America.



Photograph by Pacific and Atlantic Hon. Herbert C. Hoover broadcasting his address at the close of the 4th annual National Radio Conference from his office in the Chamber of Commerce of the U. S. Building, Washington, D. C.

lengths which can be used at the present

"The air to-day is overcrowded. And

even worse, we are faced with the desires

(Continued on page four)

nearly 600 broadcasting stations clamoring

for their use.

Perhaps no single problem received development of the art, and we now have greater attention than the present intolerable conditions of overcrowding now disturbing broadcast listeners. In the words of the Secretary of Commerce, within whose jurisdiction all problems of radio communication lie, "of the 578 stations 197 are using at least 500 watts of power, and

technical development. It takes no argument to demonstrate that eighty-eight wave lengths (and no more are available) cannot be made to serve innumerable stations, no matter how ingenious we may be in arranging time divisions and geographical separations."

The recommendations of the committee on operating regulations, under the chairmanship of Major General Charles M. Saltzman, which grappled with this problem, were accepted with almost entire unanimity by the conference. The committee reported "that the band of frequencies now assigned to broadcasting is overcrowded, causing serious interference. Therefore, the committée recommends, in the interest of public service, that no new stations be licensed until. through discontinuance, the number of stations is reduced and until it shall be in the interest of public service to add new stations."

As a substitute for the doctrine of "freedom of the air." under which licenses were granted to all who applied, until the present congested condition of the ether arose, the committee formulated a new doctrine "that public interest, as represented by service to the listener, shall be the basis for the broadcasting privilege." As a precaution to prevent the erection of stations for which there are no wave lengths available, a resolution was adopted by the conference requiring a permit from the Department of Commerce before actual construction is begun. Representatives of several such stations, erected despite warnings from the Department of Commerce that there would be no wave lengths available for their use, made impassioned pleas before the conference, pointing to the injustice occasioned by the fact that their large investment in broad-



partment of Commerce over 175 applications for new licenses. . . Heretofore it has been possible to duplicate channels geographically to a large extent among those using 500 watts, but, with the increase of power, this system becomes more and more difficult, for the borderland of interference is wider spread. . . It is a physical

there are now pend-

ing before the De-

fact that we have no more channels. It is not possible to furnish them under the present state of

## Collecting a Bogus Note Via Radio

By Using His Radio "Invention" J. Y. Hampton Collects What Was Thought To Be a Worthless **Obligation Thirty Years After It Was Issued** 

The first installment of this story told how Aleck Smartley robbed J. Y. Hampton of \$3,000 by plying him with liquor and then giving him a bogue note for his money. After this incident Smartley was not heard from until thirty years later, when George Hampton found him manufacturing radio apparatus in Chicago. As the note was of no value. Hampton planned to extract \$3,000 with interest at 10 per cent from Smartley by some other means. He and his son went to Chicago and assumed the names of J. Yerger Jamison and S. S. Smith. Jamison established himself as a patent lawyer and Smith obtained employment with Smartley and ted the latter to believe that he had invented a non-static receiver.

This installment of the story starts with Smith about to demonstrate his invention to his employer and patent attorney.

MITH led his companions up a creaky flight of stairs, then along a mustysmelling hall to the rear of the building, where he opened a padlocked door.

"This is my shop," he explained, relocking the door when the three had entered the room. "And this," he added proudly, pointing out an instrument on a table in the middle of the room, "is my non-static radio receiver.'

The instrument referred to, as Smartley and the patent attorney viewed it, was not out of the ordinary, and the set was externally connected to a loud speaker of popular make. But most unusual was a silvery looking ball, probably six inches in diameter, suspended in the aerial just above the instrument. The entire surface of the sphere was thickly studded with small, round-head projections, resembling a ball of yarn made into a pin cushion.

"It's the ball that does the trick, gentlemen," the inventor announced with pride. "That and what's inside of it-together with a peculiar circuit within the set. And now," turning to Smartley, "we'll hook up your set first, on the table here, by the side of mine and compare the reception of the two instruments."

Smith at once proceeded to make this "hook-up," removing the aerial and ground wires from his own instrument and connecting them to Smartlev's.

"I'll remove the silvered ball now." he explained, speaking rather more to the patent attorney, who had just completed another spell of coughing, than to Smartley. "The ball, as you know, Mr. Jamison, is the static collector and will not function on Mr. Smartley's set without changing the interior circuit. And now," to Smartley, who stood willing to be convinced, "you had better tune in yourself. being familiar with your set."

"Little chance of picking up anything on such a night," Smartley complained. though he sat down graciously enough for one of his importance, and began to tune in.

The static was worse than bad. It was deafening. However, after considerable and patient manipulation of the dials, Smartley reached a point where he could bring in Zion City and Memphis at will. But such popping and cracking and spluttering was there, that the sacred music in Zion City was much like the jazz band from WMC. He tried a few more stations, with no better results, and finally gave up in disgust.

"That was good, Mr. Smartley," Smith encouraged, "considering the weather. Now let's see if I can do any better on my set." He was expertly changing connections from one set to the other as he spoke. Smartley the while trod in a complete circle around the instrument, i. specting it from all angles. But it gave out no secrets. J. Yerger Jamison, his cough having subsided as his expectation arose, followed Smartley's lead.

#### The Invention Works

At the first turn of the dial when Smith began to tune in the silvery sphere above his instrument became alive with miniature lightning, the vivid little flashes silently chasing one another in zigzag fashion around the globe.

"There's your static, Mr. Smartley," Smith explained with a knowing smile.

### By C. K. THEOBALD

my instrument." He moved another dial and there issued from the loud speaker a slight grating noise, followed by a violin solo that came in as clear as a bell. Now he brought in half a dozen other stations in as many minutes-lectures, jazz, bedtime stories, instrumental and vocal selections. all under perfect control.

Here was real reception, the like of which Aleck Smartley had never heard before, though Mr. Jamison seemed to take it as a matter of course. No squeaking, no howling, no crashing from static, even with the incessant flashing of lightning outdoors. Moreover, there was no interference when Smith, by way of experiment, turned on a high-tension sparkcoil within a few feet of the instrument. "Do I win?" Smith shut off the dials and looked from Smartley to Jamison with

a what-did-I-tell-you air of self pride. "You do," Smartley admitted, "and I ... like to make arrangements with you to

finance the invention." "I'd like to get in on it myself if I had the money and the ethics of my profession did not forbid it." Mr. Jamison concluded this interjection with another

brief period of coughing. "I appreciate your offer," Smith replied, addressing Smartley, "but I have promised George Ogle to give the Consolidated Radio Association first considera-

Aleck Smartley was plainly disturbed in mind, though he held a poker-playing face. Here, he thought, was a fortune before his eyes and about to slip through his fingers. Without a doubt C. R. A. with their millions behind them, would gobble up this invention without undue loss of time. As yet the device had not seen the patent office, and this emaciated J. Yerger Jamison had in his possession all data pertaining to it-even the rough sketches and the first conceived ideas of the inventor.

### **Smartley Puzzled**

Smartley could not fathom the principle of the thing, the remarkable performance of which he had just heard. Even though he did know the secret and should steal the idea, he must first be able, in the event of future litigation, to show first conception of the device. He must obtain those papers, and he thought he saw a way: he recalled the incident of Jamison's thievery in the drugstore downstairs, and his own experience in knavery placed him in a good position to believe that a man who would steal a little would steal more.

In their drive back to the city, Smith having been left at home. Smartley took immediate opportunity to feel his companion out.

Incky dog, this Smith, eh. Jamison?" he led off with. "He'll make more out of [ My proposition is simple: I have learned this invention than you and I could accumulate if we had several more lives to live."

"I'll say he's lucky. Here am I, sixty, broken in health and should have sufficient money to retire on, when along comes a man who will pay me in fees a few paltry dollars to help make him a millionaire at thirty. But so it goes!" And Mr. Jamison coughed out a sigh.

"Perhaps," Smartley suavely suggested, you, like most of us, have not taken full advantage of your opportunities-or you do not see your opportunities when they confront you."

"Meaning just what, Mr. Smartley?" From the tone of Jamison's voice. Smartley felt that he could safely make a hold suggestion. "I mean," he asserted that opportunity is knocking at your door this very instant-and at mine. Why should you not make more than your fees in this particular instance, when you have the power to put me in control of Smith's invention?

Just here Mr. Jamison took occasion to ough more severely than ever. "I don't quite see this fortunate turn of affairs confronting me." he equivocated, when he had again caught his breath. "It would have to be a fifty-thousand-dollar opportunity to enable me to retire. I am open to a proposition involving that amount of money, which I will be glad to have you moments with a handful of papers.

after supper, in my office. Just now I think I had best get out of this wet weather, if you will be good enough to drive me to my rooms."

The following morning, in his office, Aleck Smartley felt that he might well congratulate himself on having so shrewdly discovered that Jamison was open to a shady proposition. Also, he felt entitled to two drinks of pre-war liquor instead of his customary one. Then he went through his mail, to discover another letter addressed to S. S. Smith. He lost no time in slitting the envelope.

"My dear old chum:" Smartley read, "it is a great pleasure to inform you that C. R. A. is so favorably impressed with your invention that I have been empowered to enter into negotiations with you for an outright purchase, with royalty remunerations attached. We can do nothing, of course, until you have applied for patents, and I will be in Chicago next week to give you all necessary aid in this direction.

#### "Sincerely your friend, "George Ogle."

Once again Smartley took a drink of whisky to his own success, this time on having been lucky enough to intercept this important bit of news.

"This is Tuesday," he reflected, "and this George Ogle will be here next week -possibly Monday. I must get busy and bring matters to a quick close with Jami-

### **Jamison and Smartley Plan**

When Smartley arrived at Jamison's office that night he found the door closed and he began to fear that the patent attorney may be too ill to keep his appointment. His fears were groundless, however, for after the lapse of half an hour his quarry came coughing down the cor-

The usual commonplace greetings over and the office door locked behind them, Jamison conducted his guest into a disorderly little room, the door of which was marked "Private." When they were seated near a large table littered with drawings, letters, small models and what-nots. Smartley plunged at once into the matter n hand.

"We were speaking of opportunities last night," he began, "and now we"\_\_\_\_\_

"We are just a pair of crooks," Jamison curtly interrupted, much to his confederate's surprise. "Let us be plain. There is no longer any need to chase the devil around a stump. You intimated last evening that you desire control of Smith's invention. I need money to regain my health; you want fame. State your proposition briefly and plainly."

"My dear, Jamison !" Smartley effused, 'you're a man after my own heart. I see that we are going to from Smith that you are in possession of the secret of his invention, including all drawings, sketches and certified dates of his first conceived ideas. These documents will be worth to me-er-thirtyfive-thousand dollars," with which he had his wallet half way from his pocket.

Jamison waved the purse aside. "Not so fast. Smartley," he said. "We have met here for the express purpose of stealing Sam Smith's invention, and I don't propose to have you steal fifteen-thousand dollars from me. Particularly not when the invention will be worth millions to you. I told you last evening that I could not retire on less than fifty thousand. If you are not prepared to give me that much in cash-no incriminating checks," he declared with unmistakable determination-"I do not care to waste any more breath on the subject.

Smartley waited impatiently until the disturbance had subsided. "I did not quite understand," he lied glibly, "that fifty thousand would be your price. But I happen to have that much with me. I'll give it," he agreed reluctantly, for he had found it necessary to borrow beyond his means that morning in order to raise the amount.

"Then I can afford to waste more breath," Jamison continued. He arose and went to the safe, returning in a few

"Toat is as near as it will ever get to | explain later on-say, to-morrow evening | "These sketches and drawings," he explained, handing the package to his fellow conspirator, "are Smith's first conceived ideas of his device. Look them over."

Smartley Obtains the Papers

Smartley spread the papers on the table and examined them carefully, noting that each and every sketch and all descriptive matter had been properly witnessed and sealed with the signature of notary.

"With these documents destroyed," the patent lawyer informed, "Smith wouldn't stand a ghost of a chance in a lawsuit to establish his rights.

"Simple as A B C," Smartley averred, though he did not quite understand it, "but I never would have thought it possible if I had not seen and heard it last night."

"Simplicity is the backbone of all great inventions," said Jamison. "And now"--he paused to gather up the documents from the table and slip a rubber band about them - "before I hand you this in exchange for your money I want to give you some advice, which is part of every service I render my clients. First, fire Smith. Do this as soon as he comes to work in the morning. Give him a month's pay instead of notice. Let your other employees know-all of them-that you have discharged him because he has been trying to steal a valuable radio invention on which you are working. You can realize that this would prove of much value in court should future litigation arise, which event I do not at all anticipate. Secondly, make copies of Smith's invention-and make them with your own hands. Have some crooked notary-you should know best where to buy one-date your copies prior to Smith's, and have him properly, however wrongly, sign and seal them. Then immediately destroy Smith's documents. Next, board the fastest train you can catch for Washington and hire the best attorney you can find there to rush your official drawings into the Patent Office. This done, you can make your model and be sitting pretty

Not once from the time he had first surreptitiously opened S. S. Smith's letter until the present psychological moment did Aleck Smartley entertain any doubt but that he was well on the way to fame and fortune. He had seen revealed in the sketches which this dishonest patent lawyer had just shown him the simple secret of a remarkable radio device. True, he did not understand it, but he had radio experts in his employ who would.

Reasoning thus, Aleck Smartley did not hesitate to hand over to J. Yerger Jamison \$50,000 in good United States money and receive in return a packet of papers which would, he felt sure, soon material-A few hours later J. Yerger Jamison

and S. S. Smith, both previously and properly christened Hampton, were comfortably seated in the smoker of a southbound passenger train, leaving the Windy City behind them at the rate of fifty miles or so an hour.

"Here is something I overlooked, George, in our coup with Smartley," John Hampton remarked with a sigh of mock regret, tendering his son an open letter. "I forgot to mail it in Chicago. Read it," he requested. "It's the last letter that the late J. Yerger Jamison ever wrote-and probably ever will."

"My dear Mr. Smartley," the erstwhile inventor read, "I trust you will pardon my oversight in overlooking last evening some very important details concerning the non-static radio receiver. I can only blame my negligence on the distressing state of my health, which now, thanks to the magic power of sudden wealth, I have quite fully and permanently regained. It is a pleasure to give you this tardy information now.

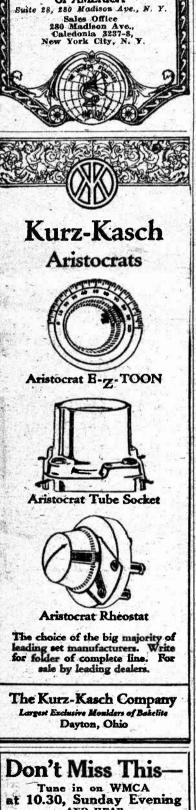
"To function best the receiving set should be electrically connected to a highgrade phonograph. The Toud speaker. though apparently connected with the receiving set, is really in direct electrical contact with the talking-machine adapter. "I must not forget to mention that the

(Continued on page six)



out the world in sales and has won the favor of musically critical people because of unrivaled clarity and deep, full life-like tone. Six models, including console units \$12 to \$42.50. Write for "Amplion

edigree" and dealer's address. THE AMPLION CORPORATION OF AMERICA



Bernays Johnson **Daven** Orchestra Something new in Radio



Exchange anything in Radio Daddy's Only Son."

**New Reproducing Device Presented At Aeolian Hall** 

Before a distinguished audience of ientists, musicians and men and somen prominent in society, the panatrope, a new musical reproducing instrument which is said for the first time to utilize the electrical principle of reproduction of sound, which involves radio principles, was esented at Aeolian Hall Wedneslay, November 11, at 4 o'clock. The panatrope has been perfected by scintists of the Radio Corporation of America, the General Electric Company, the Westinghouse Electric and Manufacturing Company and the Brunswick-Balke-Collender Company. Dr. Goldsmith, who spoke to the udience, described the instrument as

ollows: "The mechanical method of phonograph recording has been superseded the panatrope by electric recording. Here an entirely different method used. The singer stands in front of a device which is analogous to the inest broadcasting microphones. This extremely accurate telephone transnitter produces electric currents which are amplified by vacuum tubes ike those in a radio receiving set and the final output of these vacuum ubes operates a most precise cutting tool which makes the master record. Note the absence of the sound-distorting horn and the fact panatrope system.

"On the reproducing end of the thing is not so good."

The electric reproduction, as used in the panatrope, a very different process is employed. There is no sound box and there is no horn. In-stead, the needle resting in the rec-ord groove actuates a tiny strip of metal in what is known as the elec-trical pick-up, a small device inclos-ing the needle holder. The vibrations of a metal strip produce electrical eurrents, which then pass through a powerful vacuum tube amplifier using to forty other stations how enditions are right and will pick up twenty in factors of the weekly of strippic and plug. Service and the strip produce of the strippic and plug. Service and the strippic and plug. Service and the strippic and plug. Service at the strippic the modern radiotrons. In most of tubes is fed into a remarkably loud speaker of the free-edge cone type. It is a device which is much more nearly omnitonal and equitonal than the horns, and which has the possibility of producing a tremendous volume of sound.

"In electrical reproduction cound therefore we do not depend upon the record to supply the energy o produce the sound, but we leave that (as we should) to the nowe plant, or the batteries. And all the anabilities of modern amplifiers and oud speakers for the production of

'Stay in Your Own Back Yard' localities. It was put in service to And Other Antiques Tuesday meet an insistent demand for morn "By the Light of the Silvery Moon" ing broadcasting. and "Dear Old Rose," two old time At the King plant it is necessary and nine other stations (WEEI, WFI, of the King laboratories, built WCCO, KSD).

Use the Radio Exchange Col- Own Backyard," two old "mammy"

### 275 Meters Is the Most Popular Wave

More radio broadcasting stations are operating on 275 meters (1090 Kc) than any other wave length. There are twenty-six in all. One has a power of 5,000 watts, twelve have a power of 500 watts or more and thirteen use less than 500 watts.

The most powerful station of erating on this wave length i WORD, the People's Pulpit Asso ciation, Batavia, Ill. The lowest power station is WOCL, the Hotel Jamestown, Jamestown, N. Y. which has a power of 15 watts. Stations operating on 275 meters are located in twenty-one different states. Louisiana has three stations operating on this wave length, and New York, Pennsylvania and Illinois each has two stations. The remaining seventeen states have one station each.

The next most congested wave length is 250 meters (1200 Kc), on which twenty-four broadcasting stations are operating, five o which employ 500 watts or more.

### **Brooklyn Radio Fan**

Solves DX Problem de luxe receivers.

It is one of the mysteries of radio that the energy for cutting the record that fifty stations might come rolling no longer comes from the voice of in one night and the very next evethe singer, but on the contrary from ning reception at any great range the electric generators or batteries is unsatisfactory or quite impossible. feeding the vacuum tubes. Every one This circumstance is not the fault knows how perfect such a system of the apparatus or the operator in an be from our experiences with most instances. It is due to atmoshigh-grade broadcasting stations. pheric conditions and applies more Electric recording; therefore, is the to the summer than the winter. Howonly suitable method of making ever, even in the winter many nights sound records for public use, and the are a great deal superior for DX electrically cut record represents an than the average. "And," the fans entirely new grade of performance. hum in chorus, "those are the nights So much for the recording end of the the neighbors aren't here to listen to the radio! When Maey come every-

powerful vacuum tube amplifier using to forty other stations by midnight or before. Then I phone the crowd. these instruments the entire ampli- and they troop in to hear, probably these instruments the entire ampli-fier is operated from alternating cur-rent from the house lighting supply. The amplified output of the vacuum I hear these stations and others every CABINET. then WMBF, and so on Orumany Bronads CABINET. I hear these stations and others every night, but unless they come in extra volume I cannot thrill the folks, and so I do not ask them around until KDKA is whiszing in and, of course, FARTS WHOLESSALE AND RE-TAILS BOMCO STORAGE BATTERY CO., 146 WEST 68TH. PHONE TRAwith the DX season on that happens about six nights a week!

"So get your test stations and see how it works in your part of the country."

### **Buffalo Has One of Smallest**

**Radio Broadcasting Stations** One of the smallest practical broadcasting stations and one which works high-quality music of any desired six days a week is in use at the King volume are here utilized for the first Quality Products radio plant at Buffalo, N. Y.; and possibly duplicates of it are in use by this time in other

popular ballads of a decade or so to begin giving receiving sets their ago will be the numbers which the final tuning up early in the morning amous "revivalists," "Goldy" and before any of the large broadcasting "Dusty," have unearthed for their stations with their varied programs RADIO CABINETS and consoles mad half hour of entertainment on Tues- are on the air. To meet the difficulty day at 8:30 p. m., broadcast by WEAF Howard A. Gates, in charge of one WCAE, WGR, WWJ, WOC, WOR, miniature broadcaster, mounting it umn if you want to Buy, Sell or songs which were written long before of abent a black. However, this the days of Al Jolson, and "Tin My range is sufficient since the serials

Since the installation of this baby dealers have been so impressed with the idea that they have built similar ones in order to give early morning A New Design Inductance Coil demonstrations as well as comparative tests of various receiving sets. recently heen produced by the Reich-An added advantage is that the hearer in a dealer's store may listen to both as the Doughnut Coil. The new coll the original matter being broadcasted. and its reception by the King set at Reichmann. the same time.

### **Radio Supervisor Thanks the**

Arthur Batcheller, United States supervisor of radio for the second district, New York, has sent a letter to R. N. Conwell, transmission engi- culiar type of winding produces a neer of the Public Service Electric good radio of resistance to indusand Gas Company, a part of which tance and minimizes energy losses in follows:

"I note with interest the success terferences affecting broadcast recep- is no intercoupling between the coils tion. I believe your company was. The new coil may be employed any one of the first to engage in this place in a radio receiver where a important work and that your activi- Luning inductance is required. ties in this connection have been voluntary, your main objective being that of rendering public service. The have included in my annual report Office in Washington. A Brooklyn radio fan has solved the name of your company as one of one of the most embarrassing prob- the active public service electric comlems that confront proud owners of panies which have volunteered to take up this work.

"I take this opportunity to express and clarity to the reception of a reto you my fullest appreciation of the generative set.

on the roof just above the final test splendid work you have done in this connection and I am sure that the broadcast listeners feel greatly inbroadcasting station several King debted for the good you have accomplished."

\*

15

A new design of low-loss coil has mann Company, of Chicago, known was developed and designed by Frank

The principle it operates under is new to the radio broadcast field. The coil, which is wound in a rather pe-P. S. Co. of N. J. for Their Help culiar manner, is intended to confine all its magnetic lines of force in the field of the secondary coil included in the mounting. It is said the peinductance. It is also said the doughnut coil will not have to be placed which your engineers have had in at different angles to insure stable locating and terminating many in- and selective operation, because there

2000 Patent Applications

There are more than 2,000 appliwork of your company is indeed most cations for radio patents now pende commendable and for two years I ing at the United States Patent

> Vernier for Detector Often a vernier attachment on the detector rheostat will add distance

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### **PHONE PENNSYLVANIA 4000**

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panatrope system.
To the reproducing end of the panatrope system.
To the reproducing end of the panatrope there are used entirely in the reproduction, fas and there is how the Brooklynite has achieved a wonderful-reputation for the biggest buy of the season in a scheet of thin material which is vis to the trainment, his friends knowing the diaphragm or a sheet of thin material which is vis the needle. The sound by a lever attached to a needle which rests in the record groove. All the energy for vibrating the diaphragm comes from the record itself via the needle. The sound produced by the diaphragm passes through and is influenced by the horn. Even the best of horns is not omnitonal nor equitonal. And the volume of sound which can be reproduction, as used in the sound produced in this way without serious distortion is limited.
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### SIX SEVENTY-FIVE

FOR \$5 you can build a GOOD "B" Ellim mator for A. C. Complete instructions, \$ Ferrand, \$90 E. 26th St., Paterson, N.

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Does Your Radio Give You Troublet, S. LEVY-RADIO EXPERT, will adjust your set and solve your problems. Charges reasonable. Phone Ripatrick (642.

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Radio design, manufacturing procedure—and value—are revolu-tionized in Trinity Six.

Before Trinity Six could be offered to the public at the astound-ing price of \$50.00, our modern factory had to be equipped with special automatic machinery.

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If you want to buy, sell or exchange your 5,000. Germany is the chief source the blaring saxophone, is now doing radio sets or parts the Radio Exchange will ket. A small amount is also im- music is now being broadcast every help you.

### **British Listeners Find They Enjoy Classical Music**

By Frank J. McEniry News Bureau, Station KOA

being uplifted and are radio listen-ers swinging over to the classics? "Yes!" is the emphatic answer of Percy A. Scholes, widely known dent of the Jewett Radio and Phono- Thousands are now music critic of the British Broad- graph Company. casting Company, with headquarters in London who is on a tour of in London, who is on a tour of America.

read in musical history that Beetho- pessimism that has recently crept ven was born in 1770, but for thou- into the field. sands he was only born in 1900 or 1910, when phonographs or repro- mind and has no foundation in fact," ducing pianos came into our homes. he said. "The industry would be And for millions more Beetnoven much better off if it were imbued was only born in 1921, 1923 or per- with such a spirit as Judge Gary haps as late as 1925, when many of gives to the steel industry. us first acquired radio receiving sets."

Substantiating the experience of staff members at KOA, Denver, he pointed out that marked changes in little short of marvelous. the public attitude toward music of a higher standard have taken place one's imagination. within recent months.

the greatest event in the history of well as the minds of the public. the art of music," he continued. "That America should have developed such as much, written about as much or manifold broadcasting activities is matter for congratulations. Our licity medium as radio possesses in British experience is sure to be the its own broadcast. American experience give listeners plenty of fine music and they will there has latterly crept into the inlearn to like it."

Less than eighteen months ago, he recalled, English radio enthusiasts by any real, basic cause that its source the hundreds charged that Bach, Beethoven and Wagner were acceptable "highbrows who like to swank about their superior tastes," but were not suitable to tired workers.

"Likewise, it appeared that the avfor music by composers with unpro- the industry; they hoaxed the merone listener expressed it. A great selfishness and specious merchandise, many persons demanded a few 'nice and now they find their game is run. merican jazz.'

mire works of classical composers, ing loud enough to make others bemusic that has artistic impulse. On lieve that all radio is in the same the other hand, they are not averse boat they find themselves in. what we call 'amusement music.' the sort that enjoys a life of about never so bright as it is this autumn,

As music critic for the British broadcasting organization, Mr. Scholes's duties consist principally of International Radio Week a fortnightly review of the leading nusical events of London. This is broadcast from the London station, fifteen minutes. In addition, critics to be observed January 24-30, 1926, of books, dramas and films are heard when it is expected that many startat regular intervals.

### Songs, Pep Meetings, Frat

programs ever arranged by the Eveready impresario, Mr. Paul Stacy, and WSAL

laid in a typical college town on the all. eve of a great intersectional foot. Many organizations have already ball game at which representatives come out with whole-hearted support the "Frat" houses and street scenes tion toward the support of Interna-

Namee in his inimitable style just as tries into closer connection. if he were actually present. The part International Radio Week will that the "Red Grange" of one of the have the endorsement of the official team plays in the final result will be revealed on Tuesday night revealed on Tuesday night.

Radio in Its Infancy in Finland Radio is in its infancy in Finland, the number of receiving sets used in that country having grown, during made radio equipment.

### **Radio Should Try** Gary's Optimism, Says Jewett

Those individuals who at the present time happen to be leaders in the In the Timmons B Is musical taste and appreciation radio world would do well to take a Liminator you buy

velopment and its immediate future, ter receptions and "For example," he observed, "we Mr. Jewett described the spirit of greater distance

> "This pessimism is only a state of "If any segment of the business

world ever had reason to be happy it is radio. "Its progress up to date has been

"Its future is doubtless beyond

"I can think of no other industry "Introduction of broadcasting was which has so captured the hearts as

> "No other industry is talked about possessed of such a wonderful pub-

"Everything is in its favor and yet dustry this spirit of pessimism. Its existence is so utterly unfounded on can be traced only to one point. Therein one finds reason to brighten

"Radio: not unlike other new in dustrial developments, attracted quite a few get-rich-quick persons. They erage listener had little or no time brought nothing but self-desire to nounceable names ending in 'sky,' as chants and the public through their sentimental songs' or some 'honest In my opinion the pessimism existing to-day in radio is to be traced di-"These attacks have virtually rectly to this brand of parasites. eased," he continued. "At last They find their game is up; they British listeners are learning to ad- certainly regret it, and they are talk-

"It is not true. Radio's future was two years and then falls into obliv- and it is going to get brighter all the time. Radio is young and youth will not despair.

Radio interests the world over are linked with all other stations of the already beginning to focus their atcountry, and requires approximately tention on International Radio Week, ling disclosures in the business methods and scientific advance of the Dance in "College Night" industry, of interest to every coun-One of the most unusual continuity try, will be made known to the world. Hook-Up

Leaders behind the movement to in which Graham McNamee, sport- weld the nations of the world into ing announcer, will describe part of a common bond of understanding for an imaginary football game, will be the progress of radio, declare that "College Night," to be staged in the the principal results it is hoped to studio of WEAF on Tuesday at 9 accomplish will be to unify business p. m. and broadcast by WEAF and methods for simplifying export and the usual chain of stations, including import, and to compare the scientific WEEI, WFI, WCAE, WGB, WWJ, advance of radio as it applies to the allowing one nation to profit by an-WTAG, WOO, WJAR, WCCO, KSD various countries, with the idea of The "scene" of the hour will be other's experience for the benefit of

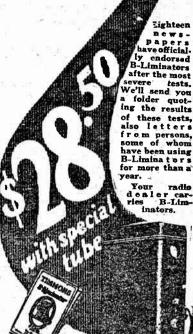
of all large colleges of the East and of the movement. Among the first West are present. Snatches of col- of these was The Radio Manufacturwest are present. Snatches of col-lege songs from the dormitories, pep ers' Association, which contributed 2 Greater clarity on all notes meetings, a dinner dance in one of a check for \$500 as an initial dona- 3 Improved reception of distant in which fist fights and wagering de- tional Radio Week. It is planned 4 Better volume control will be presented one after the other. broadcasting tests of an interna-The scene then shifts to the tional nature, which are expected to of transformers. For those who wish the thrilling close of the game, which feature of the science and to draw the thrilling close of the game, which the radio fans of the various coun- in place of regular audio hook-up. Autoformers are \$5 each at dealers'.

### **Davis Saxophone Octet**

**Playing in Cincinnat** The Davis Saxophone Octet, whose director, Clyde Doerr, hopes to wine 1924, from very few to approximately out the stigma usually attached to of supply for the Finnish radio mar- missionary work in Cincinnati, for its ported from England, Sweden and Tuesday evening at 7:30 through other European countries. Radio WSAI, as well as WEAF, New York; dealers and enthusiasts in Finland WCAE, Pittsburgh, and WOO, Philaappreciate the quality of American- delphia. This will occur on November 17.

"The Tummons B'Liminator has passed be acid test of daily average use for more than a year in thousands of homes."—Newark, N. J., Call.

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ing.

long.

long.



The Author Claims Excellent Volume and Selectivity With Only Two Controls

### **By GEORGE M. MEYER**

OW would you like to build a four-tube set that would give volume almost equal to any fivereceiver on the market? It can be The receiver about to be described may be constructed without the use of "low loss" parts or trick wound coils. It is an excellent receiver and as for volume and clarity of reception, nothing more could be desired. An actual test of this outfit over a period of about one year resulted in the writer adopting this circuit for his own radio set, which is at present connected up in a discarded victrola cabinet, the shelves having been removed for the housing of the set and B battery eliminator described in the New York Herald Tribune Radio Magazine March 15, 1925, by the writer.

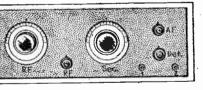
In order to use a small panel for this two-control outfit to enable it to fit in the cabinet of the talking machine, the amplifier circuit was placed in back of the radiofrequency and detector apparatus. This called for deep baseboard. The front panel measured eighteen inches long and seven inches high. Small strips of wood were screwed to the sides of the former music compartment so the set on the baseboard could be removed. This was done so changing the tubes or battery connections could be easily accomplished.

The circuit makes use of a stage of radio-frequency amplification which seems to supply tremendous volume to the detector tube.

### **Radio-Frequency Circuit**

It is the writer's opinion that greater radio-frequency amplification per stage can be obtained when the circuit is tuned in single circuit fashion; that is, with a condenser connected in series with the antenna tuning coil rather than across a coil having an untuned primary winding. In past experience with receivers employing a stage of tuned radio-frequency ahead of the detector results have shown that greater amplification of radio-frequency currents is possible with the series circuit. In fact this type of circuit has been known to produce as much amplification as two stages of tuned radio-frequency employing condensers shunted across secondary coils and non-tuned primaries. It is for this reason that this four-tube set will produce as much volume and receive as much DX as some five-tube tuned radiofrequency recivers.

Special couplers or coils are not neces



### A suggested panel layout

sary, as the two coils in this receiver may be home-made. Below is a list of the parts required to complete the set: One panel.

Two .0005 variable condenser. One .00025 grid condenser with mount-

One four megohm leak. One .002 fixed condenser. One tube 3 inches diameter, 4 inches

One tube 3 inches diameter, 41/2 inches

One pair of audio transformers. Seven binding posts.

Four sockets. Two single jacks. Two 20 ohm rheostata One 10 ohm rheostat. Two 4-inch dials.

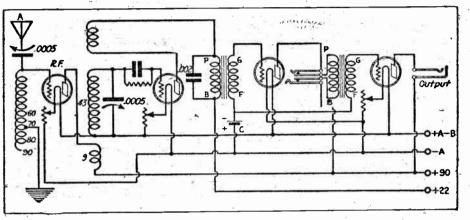
A careful selection of the parts is esential: Those having a wide reputation and well known to sets builders should be Obtain the best parts money can buy and be sure of a good set of vacuum tubes. Have them tested before using.

### **Battery Wiring**

Designers of some of the highest class receiving sets have specified flexible stranded copper wire for all filament and plate battery connections. These leads The latter may be mounted on brass I left of the panel is employed to tune the brackets or by means of small blocks of wood fastened to the baseboard.

The secondary of this coil is shunted by .0005 variable condenser. The reversed winding is in the plate circuit of the radio-frequency tube. The end nearest the secondary connects to the B battery of the detector tube. The outer end connects to the plate terminal of the radio-frequency amplifier tube. After the set has been tested, it may be well to try reversing these connections.

The nine-turn winding which follows the direction of the secondary is connected in the plate circuit of the detector tube.



### Wiring diagram of a four-tube R. F. receiver herein described

are all bunched together and tied to keep hem out of the radio-frequency circuit. The wires running to the sockets, binding posts and rheostats should be kept near the baseboard of the set. A receiver wired in this fashion will not be subject to squeals or high pitched notes common to a great many home-made sets in which the A and B battery circuit is allowed to traverse the tuning circuit.

This flexible stranded rubber-covered wire is appearing at many radio shops. If it is not available, use flexible lamp cord and strip the outer cotton covered insulation off until the rubber shows. This is a trifle larger in diameter than is used in practice, but will answer the purpose The set may not appear to be wired as neatly as if bus bar wire were used, but it will probably work better.

### Secondary Tuning Coil

The secondary tuning coil which feeds he letector tube should be carefully made and wound tightly with No. 24 D. C. C. or D. S. C. copper magnet wire. There are three separate windings on this coil, one for the plate of the radio-frequency tube, the secondary and the plate coil of the detector circuit. The tube should be three inches in diameter and four and one-half inches long. Start about half an inch. from one end and wind nine turns of wire, being careful to prevent the wire from coming unwound. Fasten each e of this small winding through small holes made in the tubing.

Then in the reverse direction wind the secondary coil with forty-three turns of wire. Leave one-quarter of an inch between the first winding and the secondary. Remover the secondary coil is wound directly opposite to the nine turn coil. Both ends of the secondary winding should be fastened through holes in the tubing. Skip a half inch and wind nine more turns of wire in the same direction as the forty-three turn winding. You now have completed the coil. It may be mounted in back of the secondary tuning condenser and placed at right angles to the antenna coil.

If the antenna coil is mounted upright from the base (as shown in the sketch) the coil with the three windings should be mounted parallel to the baseboard. The two coils should be a half inch apart.

When the circuit is under test, if it regenerates or squeals, this coil is wound too near the secondary. There are two methods of overcoming the regeneration. One is to slide this coil away from the secondary another quarter inch or about circuit three to five turns. This will prevent the regeneration to the extent of stopping oscillation. There will still be a certain percentage of regeneration present which is necessary in order that the receiver function on distant stations. Howver, the set should not squeal on any wave length. It will not radiate, due to the blocking effect of the stage of tuned radio frequency.

### Audio Amplification

In building this receiver the writer chose a good set of transformers and used the old reliable transformer coupled audio amplifier circuit. The quality of reproduction on the loud speaker is entirely governed by the audio amplifiers. Should poor transformers be used distortion may be expected. Never neglect this part of the receiver, but use good transformers. It is a foolish move to purchase two poor transformers. The writer suggests getting a 5 or 6 to 1 ratio for the first stage and a 3 or 2 to 1 for the sevond step.

A C battery seems to be in style, and so one has been included in the circuit. It will improve reception as well as prevent excessive drain on the plate batteries. Ninety volts of B battery will require a C battery of 4.5 volts. If one of the new RCA power tubes is used in the last stage a great increase in volume over the 201A will be obtained.

There is no use putting in a jack for the detector tube, as headphones are very seldom used. A jack has been provided after the first stage of audio so reduced volume on local reception may be obtained. Two stages are not always necessary except for the weaker stations. The jack for the first stage is of the closed circuit type, connected as shown in the diagram.

The output jack for the last stage is of the single circuit type. The plate of the last stage tube is connected to the upper contact of the jack and the B battery 90 volts to the other terminal. It is sometimes necessary to place a .002 fixed condenser across the output terminals of the last stage jack. This is recommended for those who use cone type speakers.

### **Tuning Controls**

A word or two of explanation concern ing the tuning of this receiver is given to nable those who have constructed similar outfits to obtain the best of results. There are but two controls as far as actual tuning is concerned. One of these to the b other.

first stage of radio-frequency and the antenna circuit. The second tuning condenser is used to tune the detector circuit. This adjustment is in control of the wave lengths and may be called the "station selected," as it is used to pick out the stations. If the set has been properly constructed, this tuning dial should be fairly sharp on all stations. It may be logged; that is, the dial settings may be taken down on a card and used for future reference. The readings should never change unless the station is assigned another wave length.

#### Antenna Coil

The radio frequency coil is wound on a three-inch tube about six inches long. No. 24 double cotton or silk-covered wire is required for the winding. The entire coil contains ninety turns of wire, with four taps take-off at intervals. Start the winding about half an inch from the end of the tube, and before taking the first tap, wind fifty turns of wire. Make a loop or twist which may be cleaned later for connections. Continue winding the coil in the same direction until the seventieth turn. Take another twist and proceed to the eightieth, where another tap is taken. Finish the coil at the ninetieth turn and leave a short end for connecting the bus bar wire.

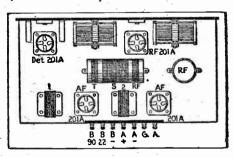
Two small brass braces can be screwed to the bottom of the coil for holding it in an upright position on the baseboard. A block of wood may be fastened to the sides of the form and this screwed to the baseboard in place of the brass braces. The coil should be rigid. Clean the tap twists and run a little solder down the wires to keep them stiff and in shape for tapping purposes

This coil should be placed directly in back of the aerial tuning condenser and about an inch away. The .0005 variable condenser which tunes this coil is connected to the top turn. This should be made to the fixed or stationary plates of the condenser. in order to avoid any possible "body capacity." The rotar plate connection goes to the antenna binding post on a strip at the rear of the baseboard.

The top of the coil also connects to the grid terminal on the radio-frequency tube socket. Make the lead as short as possible and direct to the socket, avoiding bends and fancy shaped wires.

The socket should be a good one, preferably of glass construction with heavy springs, or a good sturdy composition socket. Side-wiping socket spring prongs are good.

The antenna series condenser aids in bringing about resonance between the primary radio-frequency circuit and the detector circuit. The adjustment of this dial may not be so critical as the other dial across the secondary tuning condenser. It may be well to experiment



#### How parts may be arranged behind the panel

with the taps on the coil winding. Pick out a tap which will give a dial reading on the antenna condenser which takes in wave lengths between 200 and 550 meters. It is difficult to state offhand which tap will be correct. Once the proper turn is located the lead wire to the condenser may be fixed permanently. In some cases, however, it will be found more efficient to try a few less turns when tuning to some of the stations around 250 meters or thereabouts. Too many turns may cause tuning on the shorter waves to be a trifle sharp for some persons. It is possible to log this dial as well as the

## Sec. of Commerce Summarizes Conference

and demands of nearly 200 new broadcasters who wish to erect stations and to force their way into the already congested lanes. There are now more vehicles on the road than there is room for and more are crowding it. Unless something is done the whole traffic will be jammed.

**T** 

"This was the primary problem with which the conference had to deal. It is the cause of major interference. It faced it holdly. It looked at it solely from the attitude of the listener, exclusively from the viewpoint that it was the duty of every one to think and act with one goal in view; that is, that a clear, intelligible valuable signal, free from conflict with other stations should reach the ear of the listener.

"The conference declared that the public interest, as represented by service to the listener, should be the basis for every broadcasting privilege. And it therefore determined that it would ask the Congress of the United States to enact legislation in your interest to the effect that there must be a legal limit upon the total number of broadcasting stations until the art further develops new channels.

### **Manufacturers at Conference**

"I take pride in the fact that in this conference, made up as it was not only of representatives of the listeners, the amateurs, the great newspaper and magazines of the United States, but of the manufacturers and broadcasters, with millions of dollars invested in their enterprises and at stake in this situation, not a dissenting voice was raised against the resolution by which they formally recognized that your interests are dominant in the whole situation.

"It was significant to me that the resolution which so declared was introduced and advocated by a high official of one of the greatest radio companies in the United States, and I want to assure you that this resolution represents the real sentiment of the conference. It is honest and it is sincere

"I think, therefore, that if I were asked what are the two outstanding results of the conference, I would say that they lie, first, in the recognition of the listeners' dominant interests in radio, and second, as a corollary, in the determination that the amount of interference must be reduced. That means fewer stations and better ones. or at least no increase in numbers, and it must result in more efficient service and better programs. This request to Congress was that these stations are to be under strict governmental regulation; that each one shall obtain his license from the Department of Commerce, and before he does so he must demonstrate that his operation will serve the public interest. His license may be canceled or revoked at any time for violation of its terms or infraction of law. He must conform to law and regulations. He must perform the

(Continued from page one)

service which he had promised or his life as a broadcaster will end.

"It may be that we shall hear a great deal about freedom of the air from some of the people who want to broadcast and who will not be able to show that their desires accord with your interests. But there are two parties to freedom of the plied to every station, big or little. There air. and to freedom of speech, for that matter. There is the speechmaker and the listener. Certainly in radio I believe in freedom for the listener. He has much less option upon what he can reject, for the other fellow is occupying his receiving set. The listener's only option is to abandon his right to use his receiver. Freedom cannot mean a license to every person or corporation who wishes to broadcast his name or his wares and thus monopolize the listener's set.

"We do not get much freedom of speech if fifty people speak at the same place at the same time, nor is there any freedom in a right to come into my sitting room to make a speech, whether I like it or not. So far as opportunity goes to explain one's views upon questions of controversy-political, religious or social-it would seem that 600 independent stations. many competing in each locality, might give ample opportunity for great latitude in remarks. And in any event, without trying out all this question, we can surely agree that no one can raise a cry of deprivation of free speech merely because he is compelled to prove that there is something more than naked commercial selfishness in his purpose.

"The ether is a public medium, and its use must be for public benefit. The use of a radio channel is justified only if there is public benefit. The dominant element for consideration is in the radio field and always will be, the great body of the listening public, millions in number.

### Distinction Wiped Out

"At the outset of the conference, I think there was some fear on the part of the small stations, which serve chiefly local communities, lest they were to be crowded out by the larger and more powerful stations. There was some feeling as between the Class A stations on the one side and the Class B stations on the other. It was soon found that any such fear was groundless. The distinction between Class A and Class B is wholly arbitrary. It goes back to ancient times in radio history of four years ago when the favorite occupation of the broadcaster was the transmission of phonograph music. Some of the more progressive stations declared that there was a higher form of entertainment and they were put into a separate class, designated as Class B, on the condition that they would provide better programs

"The conference, therefore, resolved to wipe out this arbitary distinction between the two classes. From now on, all stations will be on the same basis. There is to be only one test, if Congress passes the necessary legislation, that is, service to the listener and this test will be apis full recognition of the fact that many of the smaller stations perform a real service to their communities which can be given in no other way and there is no desire on the part of anybody to disturb them.

### Wave Band Unchanged

"It was suggested that we might make room for more stations if we widened the broadcasting band. Your instruments would not cover new stations outside the present band, and if this suggestion were adopted it would mean that we should have to invade the band which has been assigned to amateurs, of whom there are thousands. The conference agreed with me that radio has a useful contribution to the fine development of the American boy. None of us wish to minimize his position in growing American life and therefore the conference confirmed here his province.

"While the recommendations of the conference should utimately result in tremendous betterment to broadcasting, we must not expect radical improvement too soon. The conference was merely an advisory body. It had no final power. It expressed the views of every one interested in radio. Before most of its recommendations can become effective they must be enacted into law by the Congress of the United States. I hope that this legislation will be given us by Congress at its next session. I hope, likewise, that it will impose regulation only to the extent absolutely essential. It has been the pride of the radio industry that it has been largely self-governing and I believe this condition may well continue. I know of no finer example of the true spirit of American industry than the voluntary recognition by the men engaged in radio communication of the public interest in their enterprises. That sentiment has characterized radio since its birth.

"Radio has grown up in the spirit of service. It has been the world's greatest example of self-government in business. It has needed no czar, no iron hand of control. There is, of course, a return in publicity to be had from broadcasting. Broadcast stations are not and do not necessarily claim to be philanthropists. They, like the great magazines and newspapers, are a great public service. Let us give the broadcast managers their full meed of praise for having created and freely given to us a radio service better than in any country in the world.

"The problems of those radio listeners,

### **Conference Recommends Important Changes**

the conference aptly set forth the situa- | wave length assignment either by reason

(Continued from page one)

tion when he stated that "we hear a great | of defective transmitting equipment or trols.

made no changes which have bearing on the broadcasting situation. Amateurs of the Hawaiian Islands, however, may resent the loss of the upper half of their transmitting band in favor of a commercial inter-island radio telephone service. This was vigorously opposed by the amateurs until it was pointed out by engineers that these wave lengths, from 171 to 200 meters, are the only ones upon which reliable commercial co

can be had. Upon assurance that no other encroachments upon their field were contemplated, the amateurs yielded graciously. Other changes in wave-length allocations concerned only government and marine services.

### **Interest in Copyright**

A tense interest was maintained in the deliberations of the committee on copyright relations to broadcasting, which conducted its fiery deliberations under the able chairmanship of Wallace H. White. The copyright situation is fraught with tremendous significance. The very foundations of broadcasting will be threatened if the. demands of copyright holders, who were represented by Mr. E. C. Mills, of the American Society of Composers, Authors and Rublishers, should become too heavy for broadcasting stations to bear. Defending the tary Hoover's remarks at the opening of farees cited instances of disregard of broadcasters was Mr. Paul B. Klugh,

isolated from the city communities, were especially considered in the conference. Methods were recommended by which we can secure an extension and improvement of the service to our farmers. There is no greater purpose of radio than to bring to our farmers a mass of information that may be of use to them in the conduct of their work, but it is of equal importance to bring into their homes the majority of those things by way of entertainment which have for so many years been limited to those who live in the towns.

"The navy must have wave lengths by which they communicate with their ships at sea. They must have wave lengths by which they communicate with their aeroplanes in the air.

"The army must have wave lengths by which they communicate with forces in the field and with their airplanes. We must have wave lengths assigned for international telegraph, for we are now in daily radio communication by code with every important country in the world. One of the greatest services radio has performed is communication between ships and shore and between ships at sea. Radio has enormously reduced the loss of human life at sea, and we must provide full facilities for that at all times. There has been a very wonderful invention called "the radio compass" which takes the place of the old magnetic compass by which ships have been navigated for centuries. We must provide wave lengths for use on the ships.

"We must bear in mind that radio broad casting is the birth of the last five years and that our previous conferences have been largely concerned with trying to get the service established; to create an effective service that could reach every home. The agency is now established. When I called the first conference only thirty people were present. There were then only two or three broadcasting stations and only a few hundred thousand listeners. To-day there are nearly 600 stations and about 25,000,000 listeners. The problem of the present conference was to perfect that service.

### Must Be Legislation

"In general the conference, representing every phase of this question, was unanimous that there must be new legislation to give more control in the protection of public interest and in the perfection of the service. The conference recognized that radio has introduced a new element in the American life, that it possesses great values in home entertainment. in education and the spirit of religious thought; that it contains a great moral purpose not only to bring many new things into the lives of our people but to cement them together in a greater common understanding, and that the obligation of the industry is to provide these services."

the situation to a crisis. The conference,

was not empowered to settle these ques-

tions, but the committee handling this

problem outlined a principle of settlement

of differences which may ultimately

furnish a satisfactory conclusion to this

long standing argument. So important

is this matter to the future of radio

broadcasting and so ably did the com-

mittee set forth the situation, that it is

**Copyright Report** 

of broadcasting unless musical composi-

tions are made available to broadcasters

upon a fair, equitable and permanent

"Whereas, An insistent demand from

the public requires that music be made the

principal part of broadcast entertainment.

"Whereas, Practically all of this music

"Whereas. The broadcasters recognize

is held by copyright proprietors and is

not available to broadcasters except on

the right of the copyright proprietors to

compensation for the use of their compo-

sitions and are willing to pay a fair and

prohibitive and unstable terms, and

"Whereas, There can be no continuation

quoted in full:

basis, and

and

## fee and it is alleged that the constantly increasing fees demanded have brought

deal of interest.

WRY.

### to-day.

wave length. But so crystallized was the sentiment of the conference against the licensing of a single additional broadcasting station that it refused, by a nearly there are two parties to freedom of the unanimous vote, a proposed amendment which would permit the Secretary of Commerce to license broadcasting stations provided channels could be found which would not cause "appreciable interference."

Fourth

### No Wave Length Changes

casting equipment is useless without a

All recommendations for the broadening of the broadcasting band by invading the amateur territory were met with firm opposition on the part of both amateurs and radio manufacturers. Proposals were made by representatives of broadcasting stations seeking licenses that the broadcasting band be extended downward to 150 meters, but it was contended that this would render obsolete radio equipment of immense value now in the hands of listeners and multiply the problems of receiver design without providing a sufficient number of broadcasting channels to meet all of the applications now pending. Another alternative-further divisions of time so that several stations can use the same channel at different hours was condemned by the conference as being a wasteful duplication of equipment and personnel without commensurate improvement of broadcasting service.

The adoption of these various measures by the conference is considered by those competent to judge the situation as a momentous step forward in the improvement of broadcasting conditions. Secre-

deal about the freedom of the air. But | careless adjustment of air and to freedom of speech for that matter. There is the speech maker and the listener. Certainly, in radio, I believe in freedom for the listener. He has much less option upon what he can reject, for the other fellow is occupying his receiving set. The listener's only option is to abandon his right to use his receiver. Freedom cannot mean a license to every person or corporation who wishes to broadcast his name or his wares and thus monopolize\_the listener's set . . .

### Listener vs. B

"We do not get much freedom of speech if fifty people speak at the same place at the same time, nor is there any freedom in a right to come into my sitting room to make a speech whether I like it or not. So far as opportunity goes to explain one's views upon questions of controversy, political, religious or social, it would seem that 578 independent stations, many competing in each locality, might give ample opportunity for great latitude in remarks."

One of the measures which it is expected will reduce heterodyning of carrier waves, which evidences itself in the receiving set hy a continuous whistle, is the enforcement of a plea, made by John V. L. Hogan, one of the foremost radio engineers of the country, for closer adherence to assigned frequencies. Many of the con-

executive chairman of the National Association of Broadcasters. Up to this time many stations have taken out short term licenses for a blanket con-

The committee on allocation

equitable maximum fee for each broadcast

(Continued on page six)





orld Radio Histor

Provided, further, that the term of connection with indoor aerials.

**((**))

**Elementary Information for Radio Novices** 

The Electrical Circuit and Its Measurements



menters.

ingly excellent idea.

It is said that interference caused by radiating receivers is one of the greatest problems in radio broadcast reception. Now it will be eliminated. However, we are wondering if this will apply to amateur wave lengths. The amateur will be almost lost without a regenerative receiver. As a matter of fact at the present time this is the only type of set adapted to his work. Receivers which are not regenerative are difficult to handle on short waves where the quickest possible means of covering the entire wave band in the shortest length of time is required for successful operation. The fact that the amatcur employs a receiver which is capable of radiating will not interfere with the reception of broadcast signals. However, if this regulation applies

2LZ recently remounted his transmitter and is operating on both 150 and 75 meters. He succeeds in working stations to the north and south of him with regularity, but has difficulty in reaching the west. His transmitter employs one five-watt tube. 2XBF is evidently keeping a late

tion, 2ZB.

mitter.

After buying two perfectly good five-watt tubes, 2LZ had the misfortune of dropping one of them. The remaining tube is being used on both 175 and 80 meters, and excellent results are being obtained.

The consistency with which American amateurs have been reporting he reception of stations in foreigr nations marks, in our mind, the opening of an excellent DX season in which almost unbelievable things will happen as far as amateur radio is concerned. Already the static has fied as if overpowered by its enemy Jack Frost. On both the 40 and 80 meter bands

brass." However, if one desires to com-

tant signals with its rays.

Vorld Radio His

2BIR, who recently put a fortymeter set in operation, has worked his first foreign station. At this writing we do not know the call letters of the station, but we do know that it is French, and BIR is quite elated.

By JAMES W. H. WEIR Technical Editor, The National Stockman and Farmer

a battery of chemical cells as the source | tremely simplified by means of voltmeters of power. Inasmuch as we are dealing with radio let us consider the circuit of the vacuum tube filament. This circuit is composed of a battery, a switch, a pathway of wire, a rheostat and a vacuum ITH the study of the electric cir-cuit we actually tube. The switch represents the break and make in the metallic pathway to and from the battery. Its purpose is to open cuit we actually enter the portals and close the circuit, permitting the curof practical radio, due to the fact rent to flow to light and extinguish the that, no matter where electricity is used, filament of the tube. The rheostat is a there must exist a complete electric cirresistance or opposing force to the curcuit if electricity is to flow. In its simplest rent flow from the battery and is used to form the electric circuit consists of two control the temperature of the filament. things-namely, a source of electrical

Let us picture the circuit for a moment. A wire is attached to one terminal of the battery and connected to one side of the tube filament. The other side of the tube filament is then connected to one side of the rheostat. From the other side of the rheostat a wire is led to one side of the switch and finally from the other side of the switch a wire is connected to the remaining terminal of the battery. The flow of electricity does not commence until we throw the switch, thus completing the wire pathway. The filament of the tube opposes the flow of the electric current to such an extent that it becomes hot to the point of incandescence, and in this condition it is said to be lit.

### **Electric Circuit**

Such is the fundamental construction of any electric circuit. Keep in mind that it always embodies, first, a source of electrical supply, and second, a metallic pathway, over which the electricity may flow. The pathway will more than likely include the apparatus upon which the electric power operates, a means of control, and a make-and-break arrangement, which is known as a switch.

Now in radio, as well as in the study of electricity, it is often of value to know how fast the current is flowing, the amount of push behind it and the opposition to its flow. The work entailed in making these measurements has been ex- , the current flow.

itself rather than by mandatory legisla-

tion, and it urged upon every broadcasting

station the adoption of a code of stand-

the popularity of radio broadcasting if it

**Report on Interference** 

A group of recommendations made by

the committee on interference, under the

leadership of Major General George O.

Souier. presented a series of resolutions

to the conference which were accepted al-

most without modification, with regard to

existing radiating receivers. Its report

stated that the elimination should "prefer-

ably take the form of persuasion rather

than coercion." It urged the use of vig-

orous publicity to educate the users of

radiating receivers and urgently recom-

mended "that at some definite and reason-

able future date the manufacture and

sale of all radiating receivers for broad-

cast reception be discontinued. Because

were generally indulged in.

grams from objectionable matter.

and ammeters. In spite of this, however, all radio fans should be acquainted with the basic principles of determining these measurements. These principles are all to be in found in "Ohm's Law."

Before taking up "Ohm's Law," however, it will be necessary for us to learn a little regarding the units in which electric power and energy are expressed. Let us go back a moment to our water pipe. system. At this point insert a water motor in the water circuit, in addition to the pump. Now, the power necessary to operate this motor will depend on the flow of water through it, the opposition afforded by the size of pipe and the pressure acting between the inlet and outlet of the motor. In the case of the water circuit the rate of water flow is measured in gallons per second, while in electricity the rate of current flow is termed amperes per second. The pressure in water in the water pipe circuit is measured in pounds per square inch, while in electricity it is measured in volts. The amount of power in the water system is usually designated in terms of horsepower, while in electricity it is measured in watts or kilowatts. Energy in the water analogy is measured in horsepower hours, while in electricity it is measured in kilowatt hours.

### **Professor Ohm's Discovery**

If the pressure in our pipe line is increased the flow of water through it in gallons per minute is increased. Professor Ohm found that an increase in voltage applied to a given conductor or wire path would also cause a strictly proportional increase in the current flow. Applying this discovery he worked out a series of rules which I shall now give you:

(1) To find the resistance in any electrical circuit divide the pressure by the current flow or rate.

(2) To find the voltage in any electrical circuit multiply the resistance by | our study of the phenomena surrounding

### Fourth Conference Recommends Important Changes

rendition of each copyright musical number, and

This is the fourth of a series of

twenty-four lectures for the radio

layman which is being broadcast

through KDKA, the Westinghouse

Electric and Manufacturing Company

supply and a pathway over which the sup-

plied electricty may travel. To those

unfamiliar with electricity it is helpful to

liken the simple circuit to a closed path-

way of pipe running into and out of a

pump, which is inserted to circulate the

water. In this case-the pump takes the

place occupied by the unit supplying the

electricity and the pipe replaces the wire

Now, the creation of electric power

originates from either of two sources.

First, it may be obtained from a dynamo

whose operation depends on the magentic

effect of the electric current; secondly, it

may be obtained from batteries of chem-

ical cells. For the present we shall con-

fine ourselves to the chemical cell only,

as the dynamo takes little part in the op-

eration of the simple radio receiving set.

**Chemical Batteries** 

ical means was discovered long before the

dynamo, and for many years the chemical

means was the only source of power sup-

ply. Naturally, the cost of producing

electricity for commercial use by this

method was very high. In radio, how-

ever. despite the cost, it is often more

advantageous to use batteries, as there are

but few sets on the market capable of

operating without them, and such sets are

In our electric circuit then we will use

exceedingly high in price.

The production of electricity by chem-

pathway.

station of East Pittsburgh, Pa.

"Whereas, Broadcasters believe that copyright owners should have the sole. complete and entire right to withhold their property from all broadcasting if they so desire; but that if a copyrighted number is released by the owner thereof to one or more broadcasters, then such number shall become available to all broadcasters. and

"Whereas, The present conditions threaten the entire broadcasting structure and the continuation and permanence of broadcasting depends upon solution of this problem, and

"Whereas, All attempted solutions through negotiation between the parties have proved unavailing; now, therefore, be it

"Resolved, That it is the sense of this conference that the only possible solution lies in the enactment of suitable legislation based upon the above principles, and it is the recommendation of this conference to the Secretary of Commerce that such legislation be suggested to Congress."

### Advertising by Radio

A problem upon which practical unanimity obtained was the question of advertising by radio. The committee on advertising drafted a resolution which stated that "the best interests of the listening public, of the radio industry and of the broadcaster are all served by that form of broadcasting which provides a meritorious program of entertainment and educational nature and which limits itself to the building of good will for the sponsor of the program whether he be the owner of the station or a subscriber utilizing its facilities. . . The conference deprecates the use of radio broadcasting for direct sales effort, and any form of special pleading for the broadcaster or his products, which forms are entirely appropriate when printed or through direct advertising mediums." The conference also of the benefits which will accrue to the

### (Continued from page four)

problem should be solved by the industry | radiating receiver it is urgently recommended that if the manufacture and sale of such receivers be not discontinued within a reasonable period, legislation to that end ards which would safeguard radio pro- shall be sought.

> Objection to the committee's report was cffered by Powell Crosley jr., who maintained that it discriminated against regenerative receivers, to the advantage of other types which also may radiate due to defective adjustments. Arising after manufacture or to inherent characteristics of design. He also pointed out that radiation is entirely controllable with regenerative receivers, that listeners could be educated to prevent radiation with such receivers, that their lower cost made radio available to thousands who could not otherwise enjoy the benefits of radio reception, and that the annoyance caused by occasional accidental radiation is highly exaggerated. The final report of the committee was modified as a result of Mr. Crosley's remarks so that its wording does

approved the recommendation that this radio public from the suppression of the for five years instead of for ninety days,

as at present; that rebroadcasting of programs without consent of the original broadcasting stations should be prohibited by law, that legislation should be passed which permits appeal from decisions of the Secretary of Commerce to an appropriate court, and numerous other significant proposals.

the propagation of the radio waves.

(3) To find the current flow in the cir-

cuit divide the pressure by the resistance.

To simplify these rules the pressure is

termed voltage, the resistance ohms and

The power furnished by electricity to

any electrical apparatus depends on the

amount of current flow and the pressure

or voltage. In other words, if we mul-

tiply the volts by the amperes we get the

power in watts. To be more specific, if

a motor takes five amperes and operates

on 110 volts it uses 550 watts. The cost

of electrical service is based on kilowatt

hours. For instance, if the motor used

three kilowatts of power per hour in eight

hours it would use twenty-four kilowatt

**Practical Problem** 

Now, let me give you a practical prob-

lem illustrating the use of "Ohm's Law."

Let us go back to our vacuum tube circuit.

The battery we are using, let us say, is

rated at six volts. Assuming that the re-

sistance of the rheostat, the conductor

and the vacuum tube totals twenty-four

ohms, what will be the current flow in am-

peres? Applying the third section of

"Ohm's Law." which states that the num-

ber of amperes flowing equals the voltage

divided by the number of ohms resistance.

we have six volts, divided by twenty-four

ohms, or twenty-five hundredths amperes.

The power being used is six volts times

Of course, to operate a radio set all this

calculation is unnecessary, but it is always

well to be familiar with the law of Ohm.

Every radio set owner should be provided

with a voltmeter and an ammeter in order

.25 amperes, or 1.5 watts.

the rate of current flow amperes.

#### **Firms Represented**

The proceedings of the conference were marked by a spirit of co-operation and fair consideration to the numerous diverse interests involved. Representation was accorded to broad magazines, newspapers having radio sections, press associations, organizations of broadcast listeners, commercial radio companies, manufacturers of radio apparatus. amateur organizations, radio trade associations and governmental departments.

### Collecting a Note Via Radio (Continued from page two)

'static collector'-the silvery ball affairis operated by a high-tension spark coil connected with the aerial.

"To obtain the best illusionary effect all external wires should be concealed and the phonograph and spark coil should be nowhere m evidence.

"I sincerely trust that you will not think me presuming on your ignorance in giving you the foregoing information. "Incidentally, and in concrusion, an old friend of yours requests me to send you the inclosed note, which, through some slight oversight on your part, you did not pay thirty years ago. You will no doubt be pleased to observe that the note is marked 'Paid.'

"Cordially yours,

"J. YERGER JAMISON." George Hampton laughed as he returned the missive to his father. "That's

what I call rubbing it in, J. Y. What are you going to do with the letter?" "Mail it, together with the note, when our train makes the next stop."

THE END

The Fight

The committee heard the appeal of Mr. Schubel, representing station WHN, to the effect that he considered notices of bargain sales in various stores and descriptions of products on sale a part of his station's function of disseminating useful informaion to the public, and that this kind of information is acceptable to the radio audience and a benefit to the country at large by reason of the resultant stimulation of business. Mr. Schubel's remarks. however. aroused no enthusiasm on the part of the committee, so contrary were they to the almost unanimous consensus of opinion upon the subject. The radio microphone is an invitation to the broadcast listener's home, and a sales appeal by the broadcaster is considered by most of those in a position to judge an imposition which not only antagonizes but threatens

not discriminate against the regenerative receiver as the only type which radiates. The conference, however, did not withdraw is recommendation leading to the ultimate prohibition of the manufacture of highly radiative types of receivers.

Scores of proposals were adopted by the conference which will contribute to the betterment of radio conditions. It was learned that radio amateurs voluntarily recommended the abandonment of spark telegraphy in their band of wavelengths, that successful negotiations had been concluded with certain foreign governments reducing or eliminating spark telegraph communication within 250 miles of our shores which will interfere with broadcast reception; and recommendations were adopted to the effect that high power broadcasting transmitters should be removed from congested areas, that licenses should be issued to broadcasting stations

### that the strength of his batteries may be determined from time to time, as this procedure will guarantee perfect reception at all times. Next week we shall learn a little more about alternating current and will begin

The Fourth National Radio Conference closed last Thursday evening without hampering with the amateur wave band assignments, thanks to Hiram Percey Maxim, the representative of the American Radio Relay League and the transmitting amateur. The argument favoring no change of wave length assignments was that the amateur succeeded in operating so well during the past year that there was no need for change in wave bands for this fraternity of experi-

The conference did decide, however, that radio manufacturers should discontinue the manufacture of regenerative receivers. Apparently nothing was said about what wave lengths, prohibition of this type receiver was to be effective. For broadcast reception, where the requirements of the receiver are to receive modulated signals, this is an exceed-

to amateur bands the amateur will find a means of making a receiver that will not radiate and will be equally efficient for his needs.

schedule, as we have heard him on the air on several occasions during the last week. He seems to handle all messages which are given to him with remarkable speed. He receives them during the day at XBF and relays them at night at his own sta-

2CQZ is operating on both 40 and 180 meters. At the present time he is rebuilding his short wave trans-

British, French and other amateurs located in the western portion of Europe may be heard as early as 5 o'clock in the evening. This insures regular communication, because most American amateurs are home for dinner about this time and usually find a few minutes afterward to "pound

municate with amateurs located in the southern Pacific waters he will have to be an early riser, as their stations are seldom heard before 3 o'clock in the morning. (It may happen that some amateurs do not come home till this hour.) In spite of the hour we have heard amateurs communicating with Australia and New Zealand amateurs quite frequently. Communication can be maintained until the sun comes above the horizon and seemingly blots out these dis-

### Five Men at WKRC Have Same Name

"Eugene" is not a common name, by any means, but when five men are together every night in one studio with the same name, there is some confusion. Station WKRC, the K del Radio Corporation, has five "Eugenes" at their station; Eugene Mittendorf, studio director; Eugene Perazzo, musical director: Eugene Schmidt, tenor soloist of the Cincinnati Conservatory of Music; Eugene Wesselman and Eugene Huber, operators. And so they have been given a number; Eugene Mittendorf is "Number One." and so on down the line. The five "Genes" challenge any other radio station in the world to produce five men with the same name, even though the name be "John," who are permanently at the studio and on programs.

Station WJZ will co-operate with the Know-Your-School Day, Community Violin and Organ Recital to Board of Education of New York and Health Day and For God and Follow St. George's Vespers City in bringing the subject of edu- Country Day. cation into the homes of the radio Monday, November 16-Program in audience. To this end the hour of charge of Dr. Benjamin Veit, dis-2 to 3 in the afternoon of the week trict superintendent of junior high Church at 4 o'clock this afternoon of November 16 has been turned over schools. Music and class recitations In addition to Mascagni's Intermeazo to the Board of Education by the sta- by pupils of junior high schools in which Miss Bennett will play as tion for their use, and educational New York City. programs will be presented. The Tuesday, November 17-Class reci-Board of Education has arranged to tation by pupils of Richmond Hill organ recital will follow immediately bring to the studio entire classes, High School; junior high school orand recitations will be held there just chestra; lecture by Alfred C. Bos- Kemmer at the organ. At this thme as they are in the schools. By this som. method the radio audience will have Wednesday, November 18-Program of Gluck, arranged for violin by daily lessons being taught in the av- of New York Training School for Kemmer's organ solo will be erage public school in the city, and Teachers, and program by pupils of at the end of the week should have his school.

School Classes to Recite to |day's topic. The topics in their cor-1 town High School; "Agriculture in Microphone in Education Week The week of November 16, is known The week of November 16, is known as American Education Week, and Day, Conservation and Thrift Day,

the opportunity to listen in on the in charge of Hugo Newman, principal Kreisler and "The Old Refrain." May

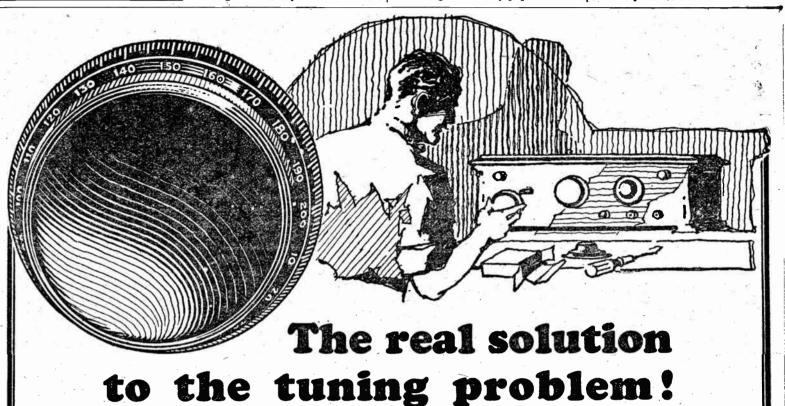
a better understanding of the type Thursday, November 19-Flushing of education the children are receiv- High School Orchestra; talk by the given a particular topic, and classes the Board of Education; class recita- | a gamble on the radio weather," says reciting on that day will discuss the tion in Agriculture by pupils of New-| Secretary Hoover.

Viclin solos by Miss Mozelle Bennett, the soloist of St. George's part of the service, a violin and after the vespers with Mr. George Miss Bennett will play the Melodia Thee Is Joy," by Bach.

### **Radio Golf**

"Radio Golf is an exercise of still ing. Each day of the week has been Hon. George J. Ryan, president of and of the efficiency of the set pluga

- in



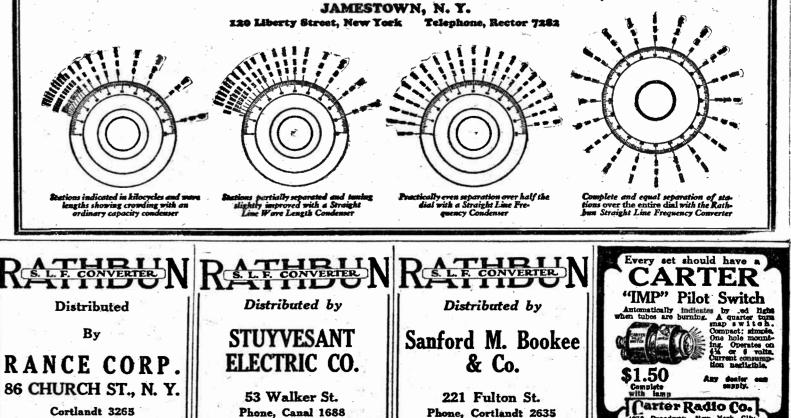
MAKE your radio a 1926 model. Replace your present Dials with Rathbun Straight Line Frequency Converters which spread all stations within the range of your receiver uniformly around the whole circle of 360°. All stations are a uniform distance apart on these new Converters. This is the ideal tuning condition. Why be satisfied with Dials or Condensers which are limited to 180° or only half the dial? Why stop at 180° when there are 360° in the circle? There are no gears with their back lash, no friction with its slippage in Rathbun Straight Line Frequency Converters-only two moving parts, a variable cam and a lever. Easily and quickly installed on any set-it is not necessary to cut Condenser shafts or drill panels.

The Rathbun Straight Line Frequency Converter is one of the few really new things in Radio during the past three years.

Don't forget that we build the Rathbun Single Hole Mounting Condenser with genuine Bakelite ends. This year's models are all enclosed with transparent pyralin dust bands which preserve their high efficiency for life. Small, light, rugged, handsome and none lower loss or higher in efficiency. Reasonably priced.

> Ask your dealer for Rathbun Straight Line Frequency Converters. If he has not yet stocked them, he will quickly obtain them for you





\* ff



(Continued from preceding page) WOR-NEWARK-405 6:45-7:15-7:45 a. m. Gym class.-2:30 p. m. Brace Conning, Camella Campbel, scenes from "Romeo and Juliet." 2:45 p. m. Al Wilson and Playmates. 5 p. m. Brace Conning, Camelia Camp-bell. \$15 p. m.-Al Wilson's Playmates. m.—Al Wilson's Playmates. m.—Shirley Booth, songs. m.—"The Doberman Pluscher. m.—"Words Mispronounced." m.—Sports," Bill Wathey. m.—Shelton dinner music. m.—News bulletin.

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TO

WGCP-NEWARK-252 m.—Elvira Geiger, planist. ). m.—Bert Dagmar, songs. p. m.—Eller and Aronson, enter-8:45 p. m.-Hughle Woolford, planist.

a.—Studio program. a. m.—Harry Spear, songs. b. m.—Sylvia Schatz, pianist. WFI-PHILADELPHIA-395 -Phoenixville Club.

m.—rhoenixvine Ciub.
p. m.—Fishion feature.
p. m.—Concert orchestra.
m.—The Larkinites.
p. m.—"Pop" concert.
m.—Adress by President. Coolldge.
m.—"Zippers." WLIT-PHILADELPHIA-395. 5 p. m.-Organ recital; religious

12:30 p. m.—Concert orchestra. m .--- Concert orchestra: artist r

4:30 p. m.—Artist recital. \*:80 p. m.—Dream Daddy. WCAU-PHILADELPHIA-278 6:30 7:30

. m.--Snellendus m.--Recital. m.--Recital. p. m.--Central Radio Syncopators. J. p. m.--Musical chefs. Sesqui-Centennial hour. m.—Billy Hayəs's Orchestra. m.—Snellenburg Orchestra.

. m.—Setting-up exercises. a.—Luncheon music. a.—Artist recital. ...—Pagoda Orchestra. 1.—"The Sesqui-Centennial.

p. m.—"The Sesqui-Centennia.
 Silf p. m.—Services.
 p. m.—Talk.
 Silf p. m.—Fraternity night features.
 19:05 p. m.—Joe Ray's Night Hawka.

WOO---PHILADELPHIA----508 a. m.—Grand organ. aoon—Luncheon music. p. m.—Grand organ and trumpets.

p. m.—Tea music. p. m.—"Billy" Rocap, sports p. m.—Organ, recital.

**p. m.**—Dinner music. **m.**—World wonder excursions. **8:15 p.** m.—Concert. MHAR\_ATLANTIC CITY\_275

m.—Seaside Trio. p. m.—Health talks. m.—Seaside Trio. WGY—SCHENECTADY—380

p. m.—Musić; talk.
30 p. m.—Dinner prògram.
38 p. m.—WGY book chat. –
45 p. m.—Address, "Conservation and hrift Day," Dr. A. R. Brubaker.
p. m.—United States Army Band.
p. m.—Royal Salon Orchestra.
130 p. m.—Royal Salon Orchestra. 0 p. m.—Organ recital. WEW—TARRYTOWN, N. Y.—273

9:05 p. m.—Dick Tobin, planist. 9:15 p. m.—Arcadian Serenaders. 9:45 p. m.—Joseph Davis, saxophonist. o. m.—Arcadian Serenaders. . m.—Dick Tobin, pianist, . m.—Westchester Ramblers Of m.—Joseph Davis, saxophonist.

11:05 p. 11:15 p. m.—Westchester Rambiers. WGR-BUFFALO-319 ) p. m.—Dinner music. p. m.—Program same as WEAF. WTIC—HARTFORD. CONN.—476 6:30 7:30 7:45 

WJAR-PROVIDENCE-306 1:05 p. m.—Joe McNamara's Orchestra 8 p. m.—Honolulu Four. 9 p. m.—Musical program. 10 p. m

WEEI-BOSTON-349 WİÉEI-BOSTON-349 6:45 a. m.-Health exercises 7:45 a. m.-Organ studio watch. 1 p. m.-Assembly lnncheon. 5 p. m.-Jay Riseman's Orchestra. 6:50 p. m.-Joe Herman's Orchestra. 6:50 p. m.-Lost and found; weather. 7 p. m.-Big Brother Club. 7:45 p. m.-Talk. 8-11 p. m.-Program same as WEAF. WNAC-BOSTON-230

m.—Program same as WEAF. WNAC-BOSTON-280

WNAC-BOSTON-280 10:30 a. m.-Bible readings; Women's Club talks. 12:15 p. m.-Noon service. 1 p. m.-Luncheon orchestra. 1:50 p. n.-Popular songs. 4 p. m.-Morey Pearl's Ramblers. 6 p. m.-New WNAC Radio Club.

3:30 p. m.-Dinner dance. . p. m.-Musical program. WEZ-SPRINGFIELD, MASS-333

WEZ-SPRINGFIELD, MASS.-333
6:30 p. m.-To be announced.
7. p. m.-Market reports.
7:05 p. m.-"English Literature," Prof. E. Charlton Black.
7:30 p. m.-Kimball dance orchestra.
8 p. m.-Musical program.
9 p. m.-Opera, "Rigoletto."
10:05 p. m.-William Anderson program.
WTAG-WORCESTER. MASS.-268
10:30 a. m.-Radio Chats.
12:05 p. m.-Luncheon music.
4:30 p. m.-Radio entertainment.
5:15 p. m.-Radio entertainment.
5:15 p. m.-Program same as WEAF.
WRC-WASHINGTON-469
10 a. m.-Went's-Hour from WJZ.

10 a. m. -Wom's Hour from V 12 noon-Organ recital. 1 p. m. -Washington Orchestra. 7 p. m. -Lee House Trio wjz.

7 p. m.—Lee Honse Trio.
7:45 p. m.—Smithsonian Talk.
8 p. m.—United States Army Band.
9-10 p.'m.—Annual dinner of the Chamber of Commerce; address by President Coolidge.
10. p. m.—Royal Salon Orchestra.
11-12—Meyer Davis' Band.
KDKA—PHTSBURGH—309
6:15 p. m.—Dinner concept.

7.43 p. m.—Current program.
8 p. m.—Half Hours with Famous Composers; orchestra and artists.
p. m.—KDKA Symphony Orchestra;

WCAE-PITTSBURGH-461

WCAR-FILIER 6:80 p. m.-Dinner concert. 7:30 p. m.-Children's period., 8 p. m.-Larkin period. 10 p. m.-The Zippers. WTAM-CLEVELAND-390 Discourse music. 6-7 p. m.—Dinner music. WEAR—CLEVELAND—390

7 p. m.—RTL program. 8 p. m.—Community Fund. 9 p. m.—Dutch master artists

p. m.—Organ recital. WADC—AKRON. OHIO—258 6:30 p. m.—Dinner music. 9:30 p. m.—Artists' recital.

m.—Artists recita... m.—Silvertown Orchestra. WSAI—CINCINNATI—S26 8-10 p. m.—Program same as WE WLW—CINCINNATI—422 8 p. m.—Dinner concert; talk. 10 p. m.—Recital. 11:03 p. m.—Doherty Melody Boys; ten.

and organ solos. 12:15 a. m.—Orchestra selections. 1:15 a. m.—Midnight Bow-Wows. WKRC—CINCINNATI—422 Oost-Wurlitzer diassical

11 p. m.—Post-Wurlitzer classical set 12 midnight—Mixed program. WJH—PONTIAC, MICH.—517 p. m.—Goldkette's Ochestra; soloist.

WWJ-DETROIT-353 M.—Program same as WEAF. WEEO-LANSING. MICH.—28

# p. m.-Dinner concert; enser Special anhiversary program.

wok-CHICAGO-217 p. m.-Artists' recital. m.—Artists' recital. m.-2 a. m.—Artists and orchestra WEBH-CHICAGO-370 n.—Dinner concert; songs. m.—Dance music; songs. . m.—Dance orchestra; artists. WGN-CHICAGO-370 m.-Dinner dance music

m.—Dinner dance mus m.—The classic hour. m.---Dance music WLS-CHICAGO-345 7:15 p. m.-Organ; story; Salvati WMAQ-CHICAGO-448

7 p. m.—Organ recital; orchestra. 9 p. m.—Graden talk; financial talks. 10 p. m.—Iniversity of Chicago lect 10:40 p. m.—League of Nations Asso

WQJ-CHICAGO-448 -Rainbow Orchestra 8 p. m.-Rainbow Orchestra 11 p. m.-Musical program. 2 a. m.-Ginger hour. WHT-CHICAGO-400 ...-Classical program. . m. (238 meters)-Orchestra p. m.-Jelke Entertainers. m.-Dance music KYW-CHICAGO-536

m.—Dinner concert. p. m.—Farm speeches. m.—"Good Reading." p. m.—"Good Reading. :20 p. m.—Musical program. 1 p. m.—"Evening at Home." 2-3 a. m.—"Insomnia Club."

WJAZ-CHICAGO-322 WCBD-ZION, ILL.-345 9 p. m.-Zion choir; orchestra and quar-tets. WENR-CHICAGO-266

7 p. m 9-11 p. a.—Dinner concert. m.—Rauland Lyric Trio. WOC—DAVENPORT—484 WOC-DAVENPORT-484 6:45 p. m.-Chimes concert. 8-11 p. m.-Program from WEAF. 12 midnight-Le Claire Orchestra.

### FRIDAY

WEAF-NEW\_YORK\_CITY-492 WEAR-NEW With Exercises, 6:45-7:45 a. m.-Health Exercises, 10:45 a. m.-Home Service Talk, 11:05 a. m.-Ruth Friedman, planist m.—Talk. . m.—Columbia University Lee ture. 12 (noon)—Market and Weather reports. p. m.—Dora Gutentog, Sadie Zuckera. m. — Dora Gutentos, Saute Succestance, man, pianists,
4:15 p. m.—Harriet Youngs, soprano.
4:35 p. m.—Dora Gutentog, Sadie Zucker-

4:35 p. m.—Dora Gutentog, Sadle Zucke man, duets.
(45 p. m.—'What Do Fishes Eat?"
6 p. m.—Dinner music.
7 p. m.—Gene Ingraham's Orchestra.
7:35 p. m.—Story Teller.
7:45 p. m.—Minie Weil, planist.
8 p. m.—The Happiness Boya.
8:30 p. m.—Eagle Neutrodyne Trio.
9 p. m.—Home Entertainers."
10:15 p. m.—Musical program.
10:36 p. m.—Musical program.
10:36 p. m.—Musical program.
11:12 p. m.—Musical Program.
12.2 m.—Musical Cortestra. WJZ-NEW YORK CITY-455

0 a. m.—Women's program. a. m.—News. 1:05 a. m.—"Arts and Decorations. p. m.—Ambassador Trio: 4, 5:80, 7:30 and 10:25 p. m.—New

 4, 5:30, 7:30 and 10:25 p. m.—News sorvice.
 5 p. m.—Educational program.
 4:05 p. m.—Ethel Rea, soprano.
 4:15 p. m.—Charles Phillips, planist.
 4:30 p. m.—Astor Tea Orchestra.
 5:32 p. m.—Market quotations.
 5:50 p. m.—Financial summary.
 6:30 p. m.—Y. Y. University Course; "Banking," Prof. Reid L. McClang.
 7 p. m.—Hernhard Levitow's Orchestra.
 8 p. m.—Museum talk.
 8:15 p. m.—Lorraine Orchestra.
 WJV—NEW YORK CITY\_465 WJY-NEW YORK CITY-405 7:30 p. m.—Irwin Abrams' Orchestra. 8:30 p. m.—Ada Kehlman, soprano.

WGBS-NEW YORK CITY-316 WGBS-NEW YORK UIX-315 10 a. m.-American Education Week; Mary Miller, pianiste. 1:35 p. m.-Msel Bornkessel, soprano. 2 p. m.-Mildred Silverman, pianiste. p. m.-Dr. John H. Finley, "The Blind." 3:10 p. m.-Leroy Montesanto, tenor. 3:20 p. m.-Value of the Drama," Ever-att Hackess.

a. 220 p. m. — "Value of the Drama," Ever-ett Hackess.
b. m. — Leroy Montesanto, tenor.
b. m. — Dr. Alfred G. Robyn.
b. m. — Leroy Montesanto, tenor.
c. m. — Uncle Geebee.
c. 30 p. m. — Jule Anzel's Orchestra.
c. 50 p. m. — "What's Your Radio Prob-lam"."

-Ohio State football rally. Ted 7 p. m.—Ohlo State football rally. Te Lewis, cheer leader, and band.
WNYC—NEW YORK CITY—526
6:10 p. m.—Market high spots.
6:20 p. m.—Plano selections.
6:30 p. m.—Elementary French lessons.

7 p. m.—Advanced Frank. 7:30 p m.—Police alarms. 7:35 p. m.—Board of Estimate\_meeting

resume. 8 p. m.—Concert by Patterson's Artists: Clarabel Nordholm, Lillan Freedman, Augusta Ludwig, Hortense Rabinovich, Mrs. Lester Miller, Fugene Frey. 9 p. m.—Rudolph Joskowitz, violinist. 9:30 p. m.—Recital; talk, Herman Neu-

man, 19:10 p. m. --- 'Books'' Prof. I. C. Tra 10:30 p. m.—Police alarms; weather. 10:35 p. m.—Colonial Dance Orchestra WHN-NEW YORK CITY-361

215 p. m.—June Lee, singing.
230 p. m.—Hock and Jerome, songa.
245 p. m.—Arnold Zeitler, violinist.
3 p. m.—Max Hitrig, Jack Val, Lev Piotti songa. tti, songs. p. m.-Judith Roth, soprano.

Flotti, songa.
Si45 p. m.—Judith Roth, soprano.
9 p. m.—Herman Streger, planist.
4:30 p. m.—Uncle Robert's Pals.
5 p. m.—Gus Gold's Orchestra.
6 p. m.—Daddy Winkum's Machine.
6:15 p. m.—Larry Richman's Entertainers.
7:30 p. m.—Marie Leder, Edith Higgins, singers.

singers. 1:30 p. m.-Barnet Ginsberg, violinist.

B'30 p. m.—Barnet Ginsberg, violinist
S'45 p. m.—Johnny Tucker, singing.
p. m.—Henrietta Turner, songs.
p. m.—Martin Walsh, singing.
10:30 p. m.—Dance orchestra.
11 p. m.—Caravan's Orchestra.
11:30 p. m.—Alabam Orchestra.
12 midnight—Revue and orchestra. WRNY--NEW YORK CITY--259 10:30 a. m.-Reducing

10:30 a. m.—Reducing exercises. 10:45 a. m.—Dr. Harry Finkel, "Diet." 11 a. m.—Twomen in Business." 12 m.—Hour of music. 4:15 p. m.—Afternoon program. 4:30 p. m.—Symphony Society notes. 6 p. m.—Hour of music.

n.—Hour of music. m.—"Whose Birthday Today?" b. m.—Cemmerce of the day.

7.15 p. m.—Commerce of the day.
7.15 p. m.—Code lesson.
7.45 p. m.—Alfred McCann, "Foods."
8 p. m.—Taverna Opera Company.
8.45 p. m.—Eugene Fry, songs.
9.15 p. m.—Bugene Fry, songs.
9.15 p. m.—Bugene Finds Creative Expression." pression." 10 p. m.—Ralph Christman, opera story 10:15 p. m.—Novelty Night, German

WFBH-NEW YOBK CITY-273

WFBH-NEW ACCEPT p. m.-Orchestra. p. m.-Murray Schwartz, planist. i p. m.-Judith Roth, soprano. i 30 p. m.-Tea table talks. i 4:45 p. m.-Irma Sachs, soprano. 5 p. m.-Bob Fleming's Orchestra. 6 p. m.-Educational talk. 6 p. m.-Katherine Connolly, prano. WJAR-PROVIDENCE-306 10 a. m.-Housewives' exchange. 1:05 p. m.-Woodstock Entertainers. 8 p. m.-Margaret Reid. 8:15 p. m.-Beethoven Quartet. 9 p. m.-Rozvis Gang." 11 p. m.-Bitmore Dance Orchestra.

6:30 p. nr - Tierney Chers. 11:30 p. w - Fordham Orchestra

WMCA-NEW YORK CITY-341 p. m.-Olcott Vail's String Ensemble. 30 p. m.-Ernis Golden's Orchéstra. 30 p. m.-Taik on Education Week; 1:30 p. m.—Tałk on Education ween., Albert Renna, violinist.
8:15 p. m.—Marion Lindsay, soprano.
8:50 p. m.—The Municipal Housewife,"
Fred M. Zittell.
9 p. m.—Hardman Hour of Music.
10 p. m.—Elsa Gray, soprano.
10 p. m.—Elsa Gray, soprano.
10 p. m.—Edward French, pianist.
11:15 p. m.—Donald Flamm. critic. WEBJ-NEW YORK CITY-273

7 p. m.—Lehigh Serenaders. 7:45 p. m.—Alice Heinau, soprano. 8:05 p. m.—A. Wayne, entertaining s:25 p. m.-Roth Instrumental Trio.

WKCB-BROOKLYN, N. Y.-240 8:30 WAHG-RICHMOND HILL, N. Y .--- 316 12 (noon)—Musical program. 7:30 p. m.—Maurice E. Connolly. 7:45 p. m.—Alvin Genesen, Sid Cohen.

p. m.—Organ recital. p. m.—Alvin Genesen and Sid Cohen.

p. m.—Alvin Genesen and Sid Cohen.
p.15 p. m.—Metropolitan Serenaders.
p. m.—Martha Brauninger, soprano.
p. m.—Metropolitan Serenaders.
p. m.—Frofessor Mayne, "Speech."
10:15 p. m.—Kentucky Ramblers.

WOR-NEWARK-405 6:45-7:15-7:45 a. m.-Gŷm class. 2:30 p. m.-Alice Raymond, violinist. 2:45 p. m.-"Ralph Waldo Emerson,

p. m.—Alice Raymond, violinist.
p. m.—Ralph Waldo Emerson
p. p. Adams.
p. m.—Ice Raymond, violinist.
p. m.—Archie Slater's Orchestra.
p. m.—Ywords Mispronounced."
T. m.—'Sports.'' Bill Wathey.
p. m.—Man in the Moon Stories.
p. m.—News bulletin.
WAAM NEWLADY 2020

WAAM-NEWARK-262

WAAM-NEWABK-263 11 a. m.-Happy hour cooking school 6 p. m.-Danny Hope's Boys. 7 p. m.-Joe Chickene's Orchestra. 7:80 p. m.-The Sport Oraclé. 7:45 p. m.-John Mark, violinist. 8 p. m.-John Mark, violinist. 8:35 p. m.-Agnes Kernochan, contraltor. 8:35 p. m.-Agnes Kernochan, contraltor. 8:56 p. m.-A. MacGregor Brown, bary-tone.

p. m.—New Brunswick Night. WGCP-NEWARK-252

w. --Songs. m. --Studio program. p. m. --Tenor and concert pianist. m. --Orchestra. p. m. --Daddy Winkum's rhyme machine. 5:30 p. m.—Orchestra. 7 p. m.—Richman Entertainers.

7 p. m.—Richman Entertainers. 7:30 p. m.—Studio program. 8:15 p. m.—Clarence Williams Trio. 8:35 p. m.—Charles Rosencranz. Orches-

tra. 9:05 p. m.—Shirley Herman, songs. 9:15 p. m.—Ukelele Bob McDonald

9:30 p. m.—Eva Rothenberg, planist.
9:30 p. m.—Eva Rothenberg, planist.
9:45 p. m.—Plotti and Val, songs.
10 p. m.—Bob Murphy's entertain
11:30 p. m.—Bob Murphy's entertain
12 (midnight)—Connie's Orchestra. WFI-PHILADELPHIA-395

10:30 a.

10:30 a. m.—Solos. 10:40 a. m.—Home Service Talk. 1 p. m.—Tea room ensemble. 3 p. m.—Conservation and Thrift D musical selections. 3:45 p. m.—Fashion feature. 6:30 p. m.—Concert orchestrs. 7 p. m.—Dance orchestrs.

WLIT-PHILADELPHIA-395 12:05 p. m.—Organ recital: religious WLII-FHILADELPHIA-395
12:05 p. m.—Organ recital; religious services; orchestra.
2-4 p. m.—Concert orchestra; playlet.
4:30 p. m.—Drace inusic..
7:30 p. m.—Dream Daddy.
8 p. m.—Philadelphia Leads America.'
8:15 p. m.—Fhiladelphia spelling bee.
10 p. m.—Dance orchestra, Frank Desio, director.

director. ):30 p. m.-Rufus and Rastus.

Popular program. WCAU-PHILDELPHIA-278 7:45 p. m.—Lew Chapman's Orchestra. 8:15 p. m.—Chiropráctic talk. 8:30 p. m.—Houston smoker entertain-

9 p. m. Hill's Instrumental Trio. 1:30 p. m. Billy's saxophone 1:45 p. m. Hill's Instrumental Trio.

9:30 p.m.—Billy's saxophone. 9:45 p.m.—Ed Kiefer, humorist. 10 p.m.—Maids of Melody. 10:30 p.m.—Loeser's Dancing Orchest. WIP-PHILADELPHIA-508

a. m.—Setting-up exercises. m.—Luncheon music. m.—Dinner music. m.—Bedtime story.

WOO-PHILADELPHIA-508

1 a. m.—Grand organ. 2 noon—Luncheon music. :45 p. m.—Grand organ and trumpet :30 p. m.—Dinnar music.

p. m.—Dinner music.
m.—To-day's topics.
p. m.—J. W. C. I. Band.
p. m.—Nicolletti Harp Ensen
p. m.—Fox Theater Orchestra.

p. m.—Comedy Boys. :10 p. m.—Organ recital. p. m.—Dance music. WPG—ATLANTIC CITY---300

WFG-ATLANTIC CITY-36 6:45 p. m.—Organ recital 7 p. m.—Dinner music. 8 p. m.—Educational series. 8:15 p. m.—High School Orchest 8:55 p. m.—'Weckly Line of Chee 9 p. m.—Concert Orchestra.

10 p. m.—Organ recital. WHAR—ATLANTIC CITY—275

p. m.—Football forecast. m.—Seaside Trio.

p. m.—Strand organ recital. WGY—SCHENECTADY—380

Colors." 6:30 p. m.—Sunday school lesson. 7 p. m.—Albany Strand Theater of

30 p. m.—Albany chestra.
chestra.
1:30 p. m.—Health talk.
7:40 p. sin.—"Know Your School Day," Dr. George M. Wiley.
7:50 p. m.—Comedy-drama, "The Taming of the Shrew."
m.—One-act play, "The Violing The Street "

30 p. m.—Vocal program by pupils. WEW—TARBYTOWN, N. Y.—273

WRW---Melody Boys' Orchestra.
(35 p. m.--Melody Boys' Orchestra.
(35 p. m.--Almo Entertainers.
(35 p. m.--Melody Boys' Orchestra.
(36 p. m.--Almo Entertainers.
(30 p. m.--Nicolas Koenig's Orchestra.
(35 p. m.--Frank Johnson, pianist.
(36 p. m.--Nicholas Koenig's Orchestra.

chestra. WGR-BUFFALO-319

WGR-BUFTALO-319 10:45 p. m.-Radio cooking school. 6:30 p. m.-Dinner music. 7:30 p. m.-Talk by Santa Claus. 8:25 p. m.-Niagara School of Music 8:55 p. m.-"Honey," R. B. Willson.

p. m.—Winger's Entertainers.
:30 p. m.—Buffalo Arts Club.
0:30 p. m.—''Something Different.'

30 p. m.—Weather forecast; marke WMAK—LOCKPORT, N. Y.—266

(20 p. m.—Music; reports.
 (20 p. m.—Poultry course.
 (21 p. m.—Poultry course.
 (22 p. m.—Music] program.
 (23 p. m.—Young People's Hour.
 (21 p. m.—Dinner music.)

p. m.—Dinner music. 15 p. m.—Margretta Purves, soprano. 30 p. m.—Travelers' quartet and artista. 0 p. m.—Dance music. 1:30 p. m.—Popular half hour. WJAR—PROVIDENCE—306

o 10 p. m.—Six-piy balloon hour. WCAC--MANSFIELD, CONN.—275

p. m.—Asia Orchestra. 1:30 p. m.—Music; one-act play, 'False

### Committee on Allocation of Frequency Makes No Changes Whatever in **Broadcast Wave Band**

WRNY-NEW YORK CITY-259

WRNY-NEW, YURA CALL-10:30 a. m.-Reducing exercises. 10:45 a. m.-Wornen's Haur. 12 m.-Hour of Music. 4:15 p. m.-Phiharmonic society notes. 4:30 p. m.-Symphony society notes. 6:55 p. m.-New York's Neighborhoods. 7 p. m.-"Whose Bitthday To-day?" 7:05 n. m.-Telegraph sportflesh.

7 p. m.—"Whose Birthday To-day?"
 7:05 p. m.—Telegraph sportflesh.
 7:10 p. m.—Commerce of the day.
 7:15 p. m.—Opera notes.
 7:20 p. m.—John Martin, Fairy Tales.
 7:35 p. m.—Dental series.
 8:15 p. m.—Romantic plano series.
 8:30 p. m.—Bernets Orchestra.
 9:15 p. m.—Dr. George Fisher, "Y wanis."
 9:30 p. m.—Bernstein Trio.
 10 p. m.—"Fictor," Margerite Glant;

10 p. m.—"Ficton," Margerite Glant, 10:15 p. m.—Judith Roth, soprano. 10:30 p. m.—Catalina Noack, songs. 11 p. m.—Motion picture review and stars.

stars. 12 midnight-DX Hound Hour; Fer-

WMCA-NEW YORK CITY-341

WMCA-NEW YORK CITY-341 6 p. m.—Olcott Vall's String nsemble. 6:30 p. m.—Frank Wunderlich's Orchestra. 7:80 p. m.—To be announced. 8:45 p. m.—Joyce Meredith, readings. 9 p. m.—Sneddon Weir, barytone. 9:15 p. m.—Joyce Meredith, readings. 9:36 p. m.—Cinderella Dance Orchestra.

WNYC-NEW YORK CITY-526 7 p. m.-Dinner concert. 7:30 p. m.-Doiner concert. 8 b. m.-Dointer concert. 8 b. m.-Football scores. 8:05 p. m.-Salvatore Manetto, violinist-8:45 p. m.-Robert Campbell, barytone, 9 p. m.-Fred Ehrenberg, musical saw. 9:40 p. m.-Fred Ehrenberg, musical saw. 9:40 p. m.-Fred Ehrenberg, musical saw. 10 10 p. m.-Fred Ehrenberg, musical saw. 10:30 p. m.-Police alarms; weather. 10:35 p. m.-Doince program. WORNE CITY-233

10:35 p. m.-Dance program. **WOKO-NEW YORK CITY-233** 8:15 p. m.-Mme. Cecella Rivere; so-prano. 8:35 p. m.-Regalbutp Sisters. 9:06 p. m.-De Keller Stamey, recitations. 9:20 p. m.-Kenneth Meltz, tenor.

9:20 p. m.—Kenneth Meitz, tenor.
WFBH—NEW YORK CITY—273
2 p. m.—Football game between Fordham College and Georgetown College.
5 p. m.—Garabaldi Arright Singers.
5:30 p. m.—Education talk.
6 p. m.—Orchestra.
7 p. m.—Majestic String Ensemble.
WKCB—BBOOKLYN, N. Y.—240
6-7 p. m.—Dinner music.

6-7 p. m.—Dinner music. WBBR—STATEN ISLAND, N. Y.—273

8 p. m.—Charles Rohner, violnist. 8:10 p. m.—Fred Twaroschk, tenor. 8:20 p. m.—Bible questions and answers. 8:40 p. m.—Ered Twaroschk, tenor. 8:50 p. m.—Charles Rohner, violnist. WAHG—RICHMOND HILL, N. V.—316

WOR-NEWARK-405 6:45-7.15-7:45 a. m.-Gym class. 2:30 p. m.-Dorotby Drummon, planist. 2:45 p. m.-"The Columbine." a one-act

2:45 p. m.—"The Columbine," a one-act playlet.
3 p. m.—Dorothy Drummon, planist.
3:16 p. m.—"Xir's music.
6:15 p. m.—"Sports," Bill Wathey.
6:30 p. m.—Shelton dinner music.
7:30 p. m.—Van's Collegians.
8 p. m.—Michael Salpeter, Violinist.
8:15 p. m.—"Hunting the Wild Tapir."
8:45 p. m.—Bichael Salpeter, Tio.
9:30 p. m.—Albert Newland, barytona.

9 p. m.—Bernstein Sisters Trio.
9:30 p. m.—Albret Newland, barytone.
9:45 p. m.—Alfred Dulin, pianist.
10 p. m.—Emma Keller May, soprano.
10:30 p. m.—Eddie Elkins's Orchestra.
WAAM—NEWAKK—263

2:30 p. m.—Football game broadcast 6 p. m.—Ernie Krickett's Orchestra

6 p. m.—Ernla Krickett's Orchestra 7 p. m.—The Gill Family. 7:20 p. m.—Horace Beaver, readings. 7:30 p. m.—Al Pfister's Orchestra. 8 p. m.—Jolly Bill Steinke. 8:30 p. m.—Hilda Kay, contraito. 8:34 p. m.—Fanny Horowitz, planist. 9 p. m.—Samuel Silverberg, reader. 9:20 p. m.—Hilda Kay, contraito. 9:40 p. m.—Entertainers. 10 p. m.—Hartley Joy Boys.

-Hartley Joy Boys. WGCP-NEW-ARK-252

p. m.—Planist and songs: 3:45 p. m.—Johanna Cohen, jukuleje. p. m.—Rust and Hendrickson, banjoists.

p. m.—Cheatham's Band. WFI—PHILADELPHIA—395

1 p. m.—Tea Room Ensemble: 1:45 p. m.—Football game, Harvard va.

Yale. 6:30 p. m.—Concert orchestra. 7 p. m.—Dance orchestra from the grill

WCAU—PHILADELPHIA—273
7:30 p. m.—Lew Chapman's Orchestra.
8 p. m.—Stage Dancing Lesson.
8:15 p. m.—Girls' Vocal Trio.
9 p. m.—Hill's Instrumental Trio.
9:40 p. m.—Moe and Joe, Dittles; Micky Marr at the piano.
10 p. m.—Hall Chase's Collegians.
10:30 p. m.—Songs
WIP—PHILADELPHIA—503
3 p. m.—Dal Ruch's Arcadians.

8 p. m.—Popular science lecture. 8:15 p. m.—Artist recital. 9:30 p. m.—"Good Cheer," D. L. Ander-

p. m.—Dance Orchestra. WHAR—ATLANTIC CITY—275

m.—Seaside Trio. p. m.—Lecture Period. m.—Seaside Trio. WGY.—SCHENECTADY—380

vard. 2:30 p. m.—"Community and Health Day," Daniel Chase. 2:40 p. m.—Football scores. 2:45 p. m.—Dance program. WRW—TARRYTOWN, N. Y.—273

WRW-TARKYTOWN, N. Y.-273 9:45 p. m.-Gordon MacMunn, songs, 10:05 p. m.-Sunnyside Serenaders, 10:20 p. m.-Nicolas Koenig's Orchestra, 10:40 p. m.-Nicolas Koenig's Orchestra, WGB-BUFFALO-319 1:45 p. m.-Intercollegiate football game, Harvard vs. Yale,

game, Harvard vs. Yale. WHAM-ROCHESTER-278

p. m.—Eastman Theater Organ p. m.—Eastman Theater Orches

7:30-8 p. m.—Piano Recital, ( 8-9 p. m.—Musical Program, 9-10 p. m.—Musical Program, WJAR—PROVIDENCE—306

WJAK-PROVIDENCE-306 1:45 p. m.-Yale-Harvard football game. WNAC-BOSTON-280 1:45 p. m.-Harvard vs. Yale football game

game. 4:35 p. m.—Copley Plaza tea dance 6 p. m.—New WNAC Radio Club.

6 p. m.—New WNAC Radio Glad. 6:30 p. m.—Dinner dance. 7:50 p. m.—Broadcast from Opera. House, "The Miracle." WBZ-SPELFORFIELD, MASS.—333. WBZ-SPELFORFIELD, MASS.—333.

9 p. m.—Two-piano recital. 9:30 p. m.—''A Memory of Old South:" 10:30 p. m.—''Crandall's Saturds

Nighters." WCAP-WASHINGTON-469 WCAP-WASHINGTON-469

game. KDKA—PITTSBURGH—309

6:15 p. 7:30 j

6:45-7:45 a. m.—Setting-up exercises. 1:45 p. m.—Harvard vs. Yale football

6:15 p. m. Dinner concert. 7:30 p. m. Helps to Sunday School teachers. The opera "Martha", KDEA Symphony Orchestra.

m.-Harvard-Yale football game WRC-WASHINGTON-469

Saturday

7 p. m.—Eastman Theater Orchestra. 7:30 p. m.—Football scores; weather WMAK—LOCKPORT. N. Y.—266

lecture.

8 p. m.-Talk. WLIT-PHILADELPHIA-395

4:30 p. m.—Dance music. 7:30 p. m.—Concert orchestra. WCAU—PHILADELPHIA—278

3 p. m.—Dal Ruch's Arcadians. 6:05 p. m.—Dinner music.

son. 10:05 p. m.—Dance music. WPG—ATLANTIO CITY—30

m.-Dinner Music. m.-Studio Concert

m.-Football ga

10 p. m.—Eeorge Renmel, pianist. 10:30 p. m.—Erva Giles, sopraho. 11 p. m.—Ernie Golden's Orchestra.

WNYC-NEW YORK CITY-526

Orchestra

"Ki-

WEEI-BOSTON-349

6:45 a. m.—Health exercises. 7:45 a. m.—Health exercises. 7:45 a. m.—Organ Studio watch. 70:45 a. m.—Orne Service Talk. 3 p. m.—Dr. H. J. Broughton. 3:15 p. m.—Dar. Gorchestra. 6:50 p. m.—Logt and found; weather. 7 p. m.—Big Brother Club. 7:50 p. m.—Mig Blatt, reader. 8:30 p. m.—Sager's Hospitality. 9 p. m.—Musicale. 10 p. m.—Orchestra.

0 p. m.—Orchestra. 0:30 p. m.—E. B. Rideout, meteoro

10:30 a. m.—Bible reading. 12:15 p. m.—Noon service.

WNAC-BOSTON-280

2119 p. m.—Noon service.
p. m.—Tea dance.
220 p. m.—Tea dance.
230 p. m.—Ray Sinatra, Perley Stevens.
330 p. m.—Checker Inn Dinner Dance.
p. m.—Varied program.
1 p. m.—Harvard-Yale dance.

WBZ-SPRINGFIELD, MASS.-333

p. m.—Leo Reisman's Ensemble. n.—Market reports p. m.—"Civil Service Examination

105 p. m.—'Clvil Service Examinations.' 155 p. m.—Choir of First-Baptist Church p. m.—To be announced. 30 p. m.—Francis O'Donnell, tenor Elleen Kennedy, violinist. p. m.—Lloyd Broome, Valmond Cyr, or Fan recital

gan recital. 9:45 p. m.—Stanley Cross, bass. 10:05 p. m.—McEnelly's Singing Orches-

WTAG-WORCESTER, MASS.-268

WTAG-WORCESTER, MASS.--268 130 a. m.--Radio chats. 2 p. m.--Market and weather report. 1:05-2 p. m.--Luncheon music. 15 p. m.--Story Teller." p. m.--Concert program.

WRC-WASHINGTON-469

a. m.—Women's hour from WJZ. noon—Organ recital. . m.—Hamilton Orchestra. . m.—WKRC's Foolish Entertaine: . m.—Book reviews.

WCAP-WASHINGTON...469 :45-7:45 a. m.—Setting-up exercises. p. m.—Market summaries. :45 p. m.—: Modern Reirigerating D

m.—Almas Chanter's. Male Chorus.

p. m.—Dance music. KDKA—PITTSBURGH—309

p. m.—Dinner concert: p. m.—Daddy Winkum. b. m.—Radio chat. b. m.—Dutch master half hour.

m.—Teaberry time WCAE—PITTSBÜRGH—461

WEAR-CLEVELAND-390

m.-Community Fund. m.-Radio travelogue and talks.

WADC-AKRON, OHIO-253

m.—Dance music. WJR—PONTIAC, MICH.--517

m.-Musical program. WREO-LANSING, MICH.-286

WQJ-CHICAGO-448

-The Ginger hour. WMAQ-CHICAGO-448

7 p. m.—Organ; Family Altar League. 7:30 p. m.—Wide-Awake Club. 9 p. m.—Wide-Awake Club. 10 p. m.—University of Chicago, football

m.—Dinner music. m.—The classic hour.

m.—Dance music. WHT—CHICAGO—400

m.—Classical program., p.m.—Alamo Orchestra (238

-Your Hour League. WOK-CHICAGO-217

11 p. m.-2 a. m.-Vocal and orchestra

8 p: m.—Orchestra; songs; violinist. 10 p. m.—Light Opera Company. 12-2 a. m.—Dance orchestra; songs. WLS—CHICAGO—345

m.—Dinner concert. m.—Musical program. m.—Midnight revue.

9-11 p. m. — Popular program. 1-3 a. m. — Midnight froilc. WOC — DAVENPORT — 484

SATURDAY

WEAF-NEW YORK CITY-492

6 p. m.—Dinner music. 7 p. m.—Ethel and Dorothea Ponce,

7.10. Internet of the singlers.
7.15 p. m.—J. J. Derwin, banjoist.
7.25 p. m.—Warren Scofield, barytone.
7.40 p. m.—J. J. Derwin, banjoist.
7.50 p. m.—Ethel and Dorothea Ponce,

7:50 p. m.—Ethel and Dorothea Ponce, singers.
8 p. m.—"The Marvel of an Eye-glass Lense."
8:10 p. m.—Edward Steele, planist.
8:25 p. m.—Edward Steele, planist.
8:40 p. m.—"The Child, the Parent and the School," Dr. Stephen S. Wise.
8:55 p. m.—Edward Steele, planist.
9:05 p. m.—Edgard Orchestra and the Radio Dream Girl.
10 p. m.—Musical program.
11-12 p. m.—Vincent Lopez's Orchestra.
WJZ—NEW YORK CITY\_455
1:10, 5, 6, 7:30 p. m.—News.

1:10, 5, 6, 7:30 and 10:30 p. m.—News. 1:15 p. m.—Irwin Abrams's Orchestra. 2 p. m.—Football game, Yale vs Har Vard.

5 p. m.—Lorraine Dance Orchestra.
6:02 p. m.—Market quotations.
6:10 p. m.—Farm market reports.
6:20 p. m.—Farnancial summary.
7 p. m.—Bernhard Levitow's Orchestra.
8 p. m.—Two piano concerto.
8:30 p. m.—Dance orchestra.
9 p. m.—U. S. Navy Night:
10:15 p. m.—Marion Ledos, soprano.
10:30 p. m.—Paul Specht's Orchestra.
WGBS—NEW YORK CITY-316
10 a. m.—Timely Talks with Terese.
10:10 a. m.—Ethel Derner, pianist.
10:50 a. m.—Fashion Talk.
1:30 p. m.—Agnes Verbeckmoes, soprano.

prano. 1:40 p. m.—Orchestra. 3 p. m.—Talk, "Education After Mar

3 p. m.-Talk, Eugeneration riage." 3:10 p. m.-Frieda and Lillian Drellich, mianists.

planists. 120 p. m.—Interview with Royal Dixon, 130 p. m.—Frieda and Lillian Drellich. 140 p. m.—Frieda and Lillian Drellich. 150 p. m.—Uncle Geebee. 150 p. m.—Uncle Geebee.

5:00 p. m.—Prieda and Dinian Drenkin.
6 p. m.—Uncle Geebee.
6:30 p. m.—Concert Trio.
7 p. m.—Bailroom dancing instructions.
7:10 p. m.—Rose Karasik, soprano.
7:30 p. m.—William Williams, tenor: Ina Grange, coach. Adele Klaer and David Kobinson, monologues.
7:50 p. m.—James Brown, "Journalism."
9 p. m.—Irving Argar, violinist.
9:20 p. m.—Arrowhead Orchestra.

p. m.-Lorraine Dance Orchestra.

m.—Elmer Grosso's Orchestra.

2-3 a. m.—Insomnia Club. WENR—CHICAGO

6:45 p. m.—Chime conce 9 p. m.—Band concert.

webh--chicago-370

WLS-CHILAGO-365 (15 p. m.-12 midnight-Organ; story Unversity of Indiana homecoming Rodehaver recital; farm talks. KYW-CHICAGO-536

10:30 p. m.-Dutch masters.

erence. p. m.—Elizabeth Stokes, soprano p. m.—Christian Endeavor topics. WGN—CHICAGO—370

m.—Dinner concert. m.—Rainbow Skylarks.

8:30 p.

12:30

m.—Singing Syncopators. p. m.—Kindergarten hour.

p. m.—Dinner concert. m.—Studio concert. WWJ—DETROIT—353

6 p. m.—Dinner concert. 8 p. m.—Orchestra and soloists.

6:30 p. m.—Dinner concert. 7:30 p. m.—Children's period. 8:30 p. m.—Cchert. WTAM:—CLEVELAND—390

6:45 a

On November 9 Herbert C. Hoover, Secretary of .Commerce, called the Fourth National Radio Conference in the Chamber of Commerce Building, Washington, D. C. After delivering an address which outlined the work to be accomplished by the conference, nine committees were appointed to study conditions and recommend the necessary changes. The committees are as follows: Committee No. 1, on allocation of frequency, or wavelength. bands, Dr. J. H. Dellinger, chairman; J. F. Dieler, secretary. Committee No. 2, on advertising and publicity, Commissioner D. B. Carson, chairman; E. A. Beane, secretary. Committee No. 3, licenses and classification, Deputy Commissioner A. J. Tyrer, chairman; S. W. Edwards, secretary. Committee No. 4. operating regulations, General Charles McK. Saltzman, chairman; Arthur Batcheller, secretary. Committee No. 5, marine problems, Captain Ridley McLean, chairman; C. C. Closter, secretary. Committee No. 6. amateur problems, Hiram Percy Maxim, chairman; R. Y. Cadmus. secretary. Committee No. 7, interchairman; O. R. Redfern, secretary. Committee No. 8, legislation, Stephen Davis, chairman; W. Van Nostrand,

Deiler, secretary. Following this will be found ab- tion. stracts from the committee reports

Page 1 by E. H. Felix. Committee No. 1 General Allocation of Frequency

In view of the fact that radio development during the last year has

problems.

report;

World Radio History

were found available for broadcast Commerce, to stand. The table showing the allocation

of the various frequency or wavebands to various forms of radio service will be found accompanying the

> Committee No. 2 Advertising and Publicity

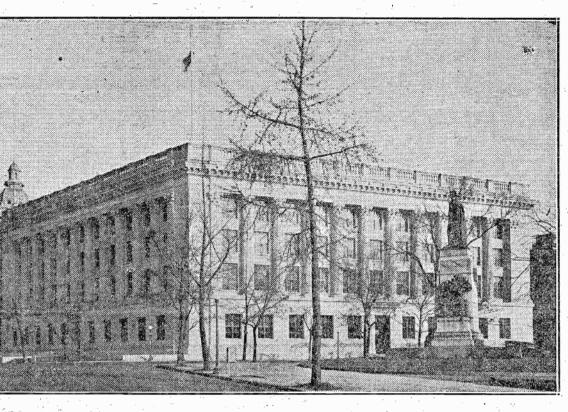
or publicity, into three classes: 1. Direct advertising. 2. Mixed advertising.

3. Indirect advertising.

broadcasting station.

those to whom it is addressed. The following resolution has been unanimously adopted by this com-

casting stations: Resolved. That the conference dep- ing station.



The building of the Chamber of Commerce of the United States, Washington, D. C., in which the fourth annual National Radio Conference and all committee meetings were held.

ference, General George O. Squier, printed or through direct advertising mediums.

Resolved, That the conference concurs in the suggestion of the Secresecretary. Committee No. 9, copy- tary of Commerce that the problems right relation to broadcasting, Hon. of radio publicity should be solved Wallace H. White, chairman; T. J. by the industry itself and not by government compulsion or by legisla-

Resolved, That the conference urges which apply to broadcasting. It will upon all owners of radio broadcastbe noticed that the reports of com- ing stations the importance of safemittees 5 and 6 have been left out guarding their programs against the entirely, as they have no relation to intrusion of that publicity which is broadcasting problems. The report objectionable to the listener and conof Committee No 9 also is omitted, sequently detrimental to others in as this is included in the article on the industry as well as to the reputation of the individual broadcasting station.

### Committee No. 3

Licenses and Classification Exhaustive discussion by your combeen in general harmony with the mittee and others attending the meetallocation of communication channels ing was given to discontinuing the suggested by the Third National distinction between Classes A and B Radio Conference, the present com- as applied to broadcasting stations. mittee has had to recommend only Consideration was given to the fact minor changes in that allocation. The that the present distinction between discussions have involved three major Classes A and B is purely artificial and based originally on the proposi-The first of these is the matter tion that Class B stations could not of extending the band of frequencies broadcast phonograph music. Your assigned to broadcasting. The com- committee recommends that the Demittee recognizes that extensions of partment of Commerce discontinue this kind would permit the operation the terminology A and B as applied of additional broadcasting stations, to classification, and allow the presor the relief to some degree of the ent classification, based on power, present condition of overcrowding. wave length assignments and the re-Nevertheless, no additional channels quirements of the Department of

interference would be relatively sirability of requiring in advance per- in the interest of public service to is a matter for self-service and help- that the Secretary of Commerce withslight. Furthermore, any such change mits by the Secretary of Commerce add new stations. in broadcasting channels would in- for the construction of such new staevitably render at least partially for the construction of such the owner thereof committee that public interest as This education of and action by tion to this end. fit proportionate to the certain dam- able to operate it, and also place in ing privilege. age could be found, and consequently able to operate it, and also place in the privilege. allow the Secretary of Commerce authority Resolved, That this conference broadcast listeners' clubs which have

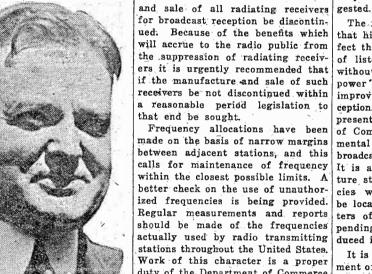
> which may be erected. Committee No. 4

**Operating Regulations** 

the Department of Commerce should speculating in wave lengths. The committee divided advertising, decline to grant any more licenses until the present number of broadcasting stations shall have been substantially reduced.

ence in the territory covered.

ing for direct sales effort, and any this committee that, with a view to terference. form of special pleading for the minimizing interference to large This committee urgently recom- class gradually improved in the qual- creating interference, nor should it



radio service.

maintaining and checking the fre-

with a properly calibrated instrument.

It is recommended that all offend-

radio problems that have to do. with

the giving of the best possible radio

In addition, it is recommended that

service to the public.

Hon. Herbert C. Hoover, Secretary of Commerce, who presided at the Fourth Annual National Radio Conference.

broadcasting stations, use discrimination looking towards the locating harmonics shall be compelled to in- ing and distress only has materially of such stations outside of congested stall suitable means to suppress har reduced interference. This could be centers. monic radiation. ---

this committee that the band of radio interference problem, in so far that this frequency is used as little frequencies now assigned to broad as the solution seems to be possible as possible in establishing communiing except by sacrifice of the major In view of the very considerable rious interference. Therefore the subjects as the education of a portion of marine stations which habitually casting is overcrowded, causing se- at this time, apparently involves such cation without reducing the number wave-length band used by the ama- expense attached to the construction committee recommends, in the in- of the public in all parts of the listen on this frequency. teurs; and careful analysis showed of broadcasting and commercial land terest of public service, that no new United States and the co-operation In view of the great congestion that even if this entire band were to stations and the difficulty of secur- stations be licensed until through with companies and individuals who which exists at the present time be transferred to broadcasting, the ing wave lengths for such stations, discontinuance, the number of sta- render electric supply and communi- within the limits of broadcasting frecontribution toward the reduction of your committee considered the de- tions is reduced and until it shall be cation services. In other words, it quencies, it is urgently recommended

Resolved, That it is the view of this public. obsolete the millions of broadcasting might have assurance that when his represented by service to the listener the listening public can be brought receiving sets now in use. No bene- station was completed he may be shall be the basis for the broadcast- about, as has been found experimen-

the broadcasting waveband was not to limit the number of new stations views with considerable apprehen- been guided by information from sion and disfavor any practice con- those who have made a special study templating the sale of a wavelength of the subject. and that we earnestly recommend The establishment and maintenance Operating Regulations that all future propositions of this of systematically and conservatively and agreed upon at these annual conthis conference that further division kind be scrutinized most carefully conducted radio clubs in all commuof time among stations is not in the by the Department of Commerce so nities should serve as a fundamental interest of public service, and that as to eliminate the possibility of factor for solving this and other

#### Committee No. 7 Interference

One form of interference to broadcast reception is that which may be each district be supplied with suf-Resolved, That it is the sense of caused by certain types of receiving ficient personnel and an automobile It was the consensus of opinion this committee that duplication of apparatus. The elimination of in- equipped with apparatus suitable for that both direct and mixed advertis- frequencies in the present broadcast terference from radiating receivers finding interferences and making regulation to keep open the traffic ing were objectionable to the listen- band should not be permitted in the already in use should preferably take measurements necessary to good radio lanes is absolutely essential and that ing public. In fact, indirect advertis- case of stations of greater than 500 the form of persuasion rather than broadcast service. ing could be made detrimental to the watts, and that in the case of stations coercion. It is felt that one of the From the standpoint of overriding only by the central authority of the interests of both the public and the of 500 watts or lower duplication most effective means of eliminating interferences, the increase of power Federal government, which must have should be permitted; stations sepa- such interference is to give publicity at broadcasting stations should help the right through issue of licenses, Advertising to achieve its best re- rated by a sufficient electrical dis- to methods of operating receivers in to solve the radio interference prob- control of power, assignment of wave sults must create the good will of tance to avoid beat notes or interfer- such a manner that they will not lem. radiate.

recommends that rebroadcasting of the press might stimulate the or- is gradually being reduced by the tion. This power should be vested mittee for the guidance of all broad- programs should be prohibited except ganization of broadcast listeners to improvement of equipment but is in the Secretary of Commerce, as it with the permission of the originat- assist each district supervisor, there- still rather serious in isolated cases. is to a limited degree at present. But by forming a clearing house for the If the number of damped wave trans- governmental authority should not be recates the use of radio broadcast- Resolved, That it be the sense of local elimination of sources of in- mitting sets can be gradually re- extended to mere matters of station

broadcaster or his products, which groups of listeners, the Department mends that at some definite and rea- ity of their transmission the situaforms are entirely appropriate when of Commerce shall, in licensing all sonable future date the manufacture tion will be still further improved,

Interference Committee Says Public Should Be Educated in the Use of Regenerative Sets

¢ 7

with little hardship to the owners of such stations.

Unquestionably much interference now experienced is the result of using higher transmitting power than necessary. There is a noticeable tendency to provide sufficient power to maintain communication under unfavorable conditions and then to continue with that power through all the more favorable seasons. The happy medium between maximum power and insufficient power can only be achieved by constant supervision of operations by the responsible management, assisted so far as possible by government inspectors.

Interference from careless testing is similar to that from the use of excessive power in that it is usually under the direct control of an operator without due appreciation or respect for the rights of others. Care on the part of responsible managements that their operators are properly instructed in testing methods, combined with vigilance, and report. to supervisors on the part of all cognizant of such abuses are about the only remedies which can be sug-

for broadcast reception be discontin- The fear which was felt a year ago ued. Because of the benefits which that high power would adversely afwill accrue to the radio public from fect the reception of a large number the suppression of radiating receiv- of listeners has been shown to be ers it is urgently recommended that without foundation. The increase of if the manufacture and sale of such power by transmitting stations has receivers be not discontinued within improved general conditions of rereasonable period legislation to ception. It is recommended that the present attitude of the Department Frequency allocations have been of Commerce of authorizing experimade on the basis of narrow margins mental development of high power between adjacent stations, and this broadcasting stations be continued. calls for maintenance of frequency It is also recommended that all fuwithin the closest possible limits. A ture stations which radiate frequenbetter check on the use of unauthor- cies within the broadcasting band ized frequencies is being provided. be located away from congested cen-Regular measurements and reports ters of population, the distance deshould be made of the frequencies pending on the field strength proactually used by radio transmitting duced in the congested area.

It is recommended that the Depart-Work of this character is a proper ment of Commerce endeavor to secure duty of the Department of Commerce the enactment of legislation which Apparatus is now available for form regulations regarding the use of form regulations regarding the use of quency of transmitting stations. It radio transmitters by ships in ports of Commerce require all stations to use some means of frequently check- covering the use of radio by ships in ing their transmitted frequencies the vicinity of the United States.

The recommendation of the Third National Radio Conference that 500 ing transmitting stations emitting kc (600 meters) be reserved for callcarried still further through adoption Resolved, That it is the sense of The solution of this portion of the of uniform methods of operation so

> ful co-operation on the part of the hold further licenses within these limits, pending Congressional legisla

#### Committee No. 8 Legislation

It has been the pride of the radio industry that it has been to a large extent self-regulating, most of the regulatory features necessary for its ferences rather than imposed by governmental authority. It is highly desirable that this condition shall continue to the greatest measure possible. Nevertheless, it must be recognized that in the widespread network of stations that now exist throughout the country, each a potential destrover of the messages of the other. regulation can be imposed efficiently lengths and other appropriate The interference resulting from measures, to handle as a whole the Resolved, That this committee The committee also believes that the use of damped wave transmitters interstate and international situaduced and the remaining sets of this management, not affecting service or

### NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, NOVEMBER 15, 1925

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	WKRC-CINCINNATI-326	WFBH-NEW YORK CITY-278	WCAC-MANSFIELD, CONN275	A STATE OF A
TO-DAY	7:45 p. m.—Songs and service. 11 p. m.—Classical program by artists.	3 p. m.—Charles West, ukelele.	220 p. m.—Music; reports. 225 p. m.—Reports. 230 p. m.—Dairy farming course.	Eastown Stan
	8:30 p. mRadio frolic.	4 p. mOrchestra.	WTIC-HARTFORD, CONN476	Eastern Stan
WEAF-NEW YORK CITY-492 2 p. m"Sunday Hymn Sing." 8 p. mInterdenominational services. Ad-	3:45 p. m.—Program from WEAF. 8:45 p. m.—Chime concert; sermonette.	5:15 p. m.—Educational talk. 5:39 p. m.—Katherine Work, planiste, 6 p. m.—Elizabeth Hesion, contraite.	8:30 p. m.—Dinner music. 7:45 p. m.—"Artificial Rubber." 9. m.—Dinner music.	
<ul> <li>dress by the Rev. Thomas H. Mac- dress by the Rev. Thomas H. Mac- Kenzie; Aida Brass Quartet.</li> <li>8:45-5:30 p. mMaris Conference from Y. M. C. A.; address by Dr. S. Parkes</li> </ul>	10;15 p. m.—Program from w.B.Ar. 10;15 p. m.—Concert. orchestra. WWJDETROIT852	6:10 p. m. Alma Danzig, plano.	WJAR-PROVIDENCE-306	WJZ-NEW YORK CITY-455
8:45-5:30 p. m. Man's Conference from Y. M. C. A.; address by Dr. S. Parkes	7:25 p. m.—Capitol Theater Family. WREO—LANSING—286		1:05 p. mStudio program.	10 a. m.—Women's hour. 11 a. m.—News; talk. 1 p. m.—Nathan Abas's Music.
Cadman; Gloria Trumpeters. 7:20 p. m.—Capitol Theater Family. 9:15-10.15 p. m.—Atwater Kent hour;	8:30 p. m.—Chuřch service, RYW.—CHICAGO-536 8 p. m.—Club service.	8 p. m. – Anna Diamono, planist.	Bou p. m - Home Care of the Sick.	2 p. mHducational week program.
Mabel Garrison, soprano; Dally Londouy,	WLS-OHICAGO-345	8 35 n m losenh Harrington, tenor.	10 p. m.—Grand opera company.	4:05 p. m Nickels Trio. 4:20 p. m Esther Klinefelter, soprano.
WJZ-NEW YORK CITY-465 8 a. mChildren's hour; stories; music;			6:45 a. m.—Health exercises. 7:45 a. m.—Organ studio.	4 380 p.m.—Market quotations. 5 382 p.m.—Market quotations. 5 560 p.m.—Financial summary. 6 390 p.m.—New Fork University course; "The X-Ray," Professor H. Sheldon, "Davhungs" Frank Dala
000	9 p. mLadies' chorus and brass quartet.	9 p. mKathryn Winston, soprano.	10 45 a. mHome service talk. 2 p. mHappy Hawkins's Orchestra.	6:30 p. mNew York University course; "The X-Ray," Professor H. Sheldon.
12:30 p. mRivoli Sunday concert.	7:30 p. m. Tabernacle band and choir.	9:10 p. m.—Instrumental Trio. 9:20 p. m.—Kathryn Winston, soprano.	6:50 p. mLost and Found; weather re-	7 p. m.— "Dachshunds," Frank Dole. 7:15 p. m.— Vanderbilt Orchestra. 8 p. m.— To be announced.
Jubilee Singers; Metropontan Drass Ouartet.	11:30 p. mBack home hour. WOK-CHICAGO-217 7:30-9:30 p. mConcert and dance music	9:30 p. m.—Question Box, Rev. J. N. Gillis. 9:50 p. m.—William Carney, tenor.	port. 7 p. mBig Brother Club. 7:45 p. mJ. Norton Binkley, tenor.	9 p. mNew York Edison Hour. 10 n. m. The Grand Tour: "The Rhine."
<ul> <li>\$:30 p. m.—Belgian Quartet.</li> <li>4 p. m.—St. George's Episcopal Church vesper services; George W. Kemmer, vesper services; George W. Ke</li></ul>	2 c. m.—Musical program. WOJ—CHICAGO—447	10 m m Tustrumental Trio	8 p. m.—Anonymous orchestra. 8;45 p. m.—Tower health talk. 9 p. m.—Music by Gypsies.	10:30 p. mMayflower Orchestra. WGBS-NEW YORK CITY-316
verper services; George Halist; Re- organist; Mozelle Benatt, violinist; Re- becca Pharo, soprano; George Bagda-	9-11 p. mRainbow Orchestra; artista, WENR-CHICAGO-266	10:05 p. m.—William Carney, tenor. 10:15 p. m.—Taik on education. 10:30 p. m.—Instrumental Trio. 10:40 p. m.—Organ recital.	10 p. mOrchestra	10 a. mTimely Talks with Terese. 10:10 a. mGertrude Seidenman, planist.
sarian, tenor. B:45 p. m. Literary vespers; "The Trall of	10:30 p. m.—Copular program. WIBO—CHICAGO—226 7-9 p. m.—Dinner concert.	WKCB-BROOKLYN, N. Y240	WNAC-BOSTON-280 10:30 a. mBible readings; club talks. 12:15 p. mOrgan recital.	10:20 a. m. Household talk. 10:30 a. m. Gertrade Seidenman, planist.
sarian, tenor. 5:45 p. m.—Literary vespers; "The Trall of Rapture," Edgar Burrell. 7 p. m.—Carillon of Park. Avenue Baptis	t 11 p. m.—Popular program. WEBH—CHICAGO-\$70	WRBR-STATEN ISLAND. N. Y273	1 p. m.—Luncheon concert. 4 p. m.—Copley's Plaza Trio. 4 p. m.—Kiddles Klub.	10:40 s. m.—Thrift talk; piano. 1:30 p. m.—Scripture reading.
Church. 7:30 p. m.—Nathan Abas's Orchestra. 8 p. m.—Ellie Ebeling, soprano.	6-7 p. m.—Twilight musicale. 8-10 p. m.—Selected artists program. WOC—DAVENPORT—484	8 p. m.—Jubilee entertainers. 8:10 p. m.—World News Digest. 8:20 p. m.—Jubilee entertainers.	4 p. m.—Kiddles Klub. 6:50 p. m.—T. D. Cook's dinner dance. 7:35 p. m.—Concert.	1:35 p. mJuliette Lane, soprano. 1:40 p. mTed Maredith, Nat Osborne, songs
<ul> <li>5.15 p. m.—Copenhagen Quartet.</li> <li>5.15 p. m.—To be announced.</li> <li>10 p. m.—Godfrey Ludlow, violinist.</li> <li>10 p. m.—Godfrey Ludlow, violinist.</li> </ul>	7:30 p. m. Church service.	8:30 p. mBible instruction. 8:40 p. mJubilee entertainers.	8 n m Bostonia Trio	3 p. mMusic education program; An- drades Lindsay, Lydia Mason, plano
	10:45 p. m.—Symphony orchestra.	WAHG-RICHMOND HILL, N. Y516 12 noon-Musical program.	<ul> <li>p. m.—Metropolitan Theater Orchestra. WHZ—SPRINGFIELD, MASS.—333</li> <li>6:30 p. m.—Organ recital.</li> <li>7 p. m.—Market reports.</li> </ul>	duets. 6 p. mUncle Geebee. 630 p. mInterview with Inea Haynes
8:15 p. m. Bernhard Levitow's Concer Orchestra. 10 p. m. "Reminiscences of a Reporter,"		7:30 p. m.—Maurice E. Connolly. 7:45 p. m.—Josiah Free, barytone. 8 p. m.—Syncrophase Trio.	7 p. mMarket reports, 7:05 p. m"Psychology." Professor Abra- ham Myerson.	Irwin and Will Irwin,
William H. Crawford. WGBS-NEW YOBK CITY-\$16	9.15 n. m.—Program from WEAF.	8:30 p. m. Frank Almon and Eddle Smith.	7:30 p. m.—Capitol Theater Orchestra. 8 p. m.—W. Edward Boyle's Orchestra.	6:50 p. mCharles Jones, "Salesman- ship."
\$:30 p. m. Warner's Theater.	WCAL-NOETHFIELD, MINN337 10 p. mSacred program KTHS-HOT SPRINGS-575	9 p. mMabel Besthoff, planst. 9:15 p. mSyncrophase Trio.	8:30 p. m. Dr. Lawrence Obrey, tenor. 9 p. m. Aleppo Drum Corps.	7 p. m.—Arrowhead Orchestra. 8 p. m.—Y. M. H. A. Vecational Forum. 8:15 p. m.—Frieda and Lillian Drellich.
emble: Vera Nettl, Soprand. WHN-NEW YORK CITY-361	10 p. m.—Classical music. 11 p. m.—Singing orchestra. WOAW—OMAHA—326	10:15 p. mGlenn Smith's Orchestra.	9:30 p. m.—Florentine Trio. 10:05 p. m.—Brunswick Grchestra. WTAG—WORCESTER, MASS.—263	duets. 8:30 p. mClassic Saxophone Sextet.
1 p. m.—Organ recital. 2-3 p. m.—Queens County Christian En	10 p m-Evening chapel service.	WOR-NEWARE-405 6:45, 7:15, 7:45 a. mGym class . 2:20 m. Creste's Opensiand Orchestra	10:30 a. mRadio chats 12:05-3 p. mLuncheon music.	8:40 p. m.—Mary Zoller, xylophone. 8:50 p. m.—'Intelligence of Nature."
deavor program, 8-4 p. m.—Church services. 5 p. m.—Roseland Dance Orchestra.	A second s	2:80 p. m.—Oreste's Queensland Orchestra. 3:15 p. m.—Mario Alverez, barytone. 3:30 p. m.—"Gift Furniture."	7 p. m.—Science talk. 7:15 p. m.—Story teller. 7:45 p. m.—Boy Scout announcements.	9:05 p. m Classic Saxophone Sextet; Mary Zoller, xylophone.
7:30-10 p. m. Jonannia Orchestra.	MONDAY	3:45 p. mMarlo Alverez, barytone. 6:15 p. m Words Mispronounced."	8-10 p. m.—Concert program. 10-11 p. m.—Crand opera from WEAF.	9:50 p. mQuartet of women's voices. 10:30 p. mArrowhead Orchestra. WHN-NEW YORK CITY-361
12 midnight—Harry Hittinian 5	WEAF-NEW YORK CITY-492	6:16 b. m.—"Words Mispronounced." 6:17 p. m.—"Sports," Bill Wathey. 6:30 p. m.—Shelton dinner music. 7:30 p. m.—Eddle Elking, Orchestra.	WRC-WASHINGTON-469 10 a. mWomen's hour from WJZ.	12:30 p. mOrgan recital.
WENY-NEW YORK CITY-259 2:45 p. mBody Fit Talks	6 45-7-7:20 a. m.— 'Health Exercises.''		12 (noon)—Organ recital, 1 p. m.—Shoreham Orchestra. 4:30 p. m.—Musical program.	2:15 p. m.—Overture and vandeville. 3:15 p. m.—Lexington Orchestra. 6:30 p. m.—Leslie McLeod, tenor.
2:45 p. mMusic of all religions. 3 p. mMusic of all religions. 5:45 p. mBible reading to music. 4 p. mDr. Christian Reisner's hour.	11:05 p. m.—Iris Torn, planist. 11:15 a. m.—Talk. 11:30 a. m.—Columbia University lecture,	8:30 p. m.—"Al Reid's Hour." 9:30 p. m.—"Cities Once Great—Lenin- grad." 9:45 p. m.—Fred Ruzicks, violinist.	WCAP-WASHINGTON-469	6.40 p. m.—"Sunshine Talk," Billy Van. 7 p. m.—Dance Orchestra.
6 p. m.—Dr. Chistan guartet. 6 p. m.—Becker's String Quartet. 8:15 p. m.—Issacson concert from DeWit	Dr. Kenyon. 12 noon-Market and weather reports.	10 p. m.—News bulletin. 10.10 p. m.—Sol Sabino, mandolinist.	6:45-7:45 p. m.—Setting up exercises. 7 p. m.—Market summaries. 7:10 p. m.—Trumpet of quartet and choir	7:30 p. m.—Oakiand's Chateau Shanley. 8 p. m.—Herman Streger's Players. 8:30 p. m.—Miller, Piotti and Val, songs.
Clinton School. WMCA-NEW YORK CITY-341	4:15 p. mBlanche Fink, soprano.	10:30 p. m.—Archie Siater's Orchestra.	of clarinets. 7:45 p. m.—"Washington, Nation's Capi- tal."	8:45 p. m.—Charles Guglieri, musical saw. 9 p. m.—Judith Roth, soprano.
11 a. mServices.	4:30 p. m.—Grace Pauze, pianist. 4:45 p. m.—"Sing With Mother Goose." 6 p. m.—Dinner music.	11.15 p. mBallin and Race-plano dpo, 11.30 p. mIrying Atonson's Crusaders. WAAMNEWARK263	8:45 p. m.—Tower health talk. 9-10 p. m.—Music by gypsies.	9:15 p. m.—Joseph Turkel, tenor. 9:30 p. m.—Clarence Williams Trio. 11 p. m.—Caravan Orchestra.
<ul> <li>p. m.—Roemer's information of the second seco</li></ul>	7 p. m.—"The Radio Dream GILL"	11, a m.—Happy hour. 6 n. m.—Ben Goldfarb's Orchestra.	10-11 p. mGrand opera. 11-12 p. mWashington Post" hour. KDKA-PITTSBURGH-509	11:30 p. m Rodeo Orchestra 12 midnight - Kentucky Revus and Orches-
5 p. m.—Field Artillery Band. 5:45 p. m.—Edward Albans, songs,	7:25 p. mCarl Hollins, Darytone.	7.80 m m The Sport Oracle.		The second s
6 p. mMasonic news.	7:45 p. m.—Carl Rollins, barytone. 8 p. m.—"American Citizenship; Its Ben- efits and Obligations," Henry W. Taft.	9 n. mHarry Dudley-Latzo bout.		taik,
6:30 p. mBossert's Lumberge	8:30 p. m.—Colonial Aces, Hawanan Ind.	3 n. m.—Eva Rothenberg, pianiste	9 p. m.—Happy home hour. WCAE—PITTSBURGH—461 6:30 p. m.—Dinner concert.	11 a. m.—Ida Allen's Hour. 8 p. m.—Olcott Vail's String Ensemble. 6 90 m. — Cinderalla Dance Orchestra
7:15 p. m.—Franklin Four. 7:50 p. m.—Limericks. 7:55 p. m.—Franklin Four.	9 p. m.—'Music by Gypsies.'' 10 p. m.—Grand opera, ''I Pagliacci." 11-12 p. m.—Ben Bernie's Orchestra.	3:15 p. m.—Andy Pendleton's Band. 4:15 p. m.—Shirley Herman, songs.	7:30 p. m.—Children's period. 7:45 p. m.—American Red Cross.	6:30 p. m.—Cinderella Dance Orchestra. 6:45 p. m.—"Cuban Exposition." 7 p. m.—Jack Wilbur's personalities.
WLWL-NEW YORK CITY-235		4:30 p. m.—Uncle Robert's cousins. 6 p. m.—Littamann's Orchestra. 6:15 p. m.—Daddy Winkum's rhyme ma-	8 p. m.—Nixon Orchestra. 9 p. m.—Studio concert. 11 m. — Joewie Aldine Theater	8 p. mLecture program. 8:15 p. mRaymond Parker, tenor; Doro-
the Rev. W. J. Duane, bullet N. Y 273	11 a. mNews service.	6:30 p. m.—Orchestra.	11 p. mLoew's Aldine Theater. WADC-AKBON, OHIO-253 6:30 p. mDinner concert.	thy Taylor, contraito. 8:45 p. m.—Educational talk. 9 p. m.—Polka Dot Orchestra.
10 a. mWatchtower Orchestra. 10.20 a. m L. Brown, soprano. 10:30 a. m Bible lecture, R. H. Barber. 10:30 a. m Bible lecture, R. H. Barber.	1 p. m.—Meyer Davis's Orchestra. 2-3-4-5:30-7:30-10:80 p. m.—News. 2 p. m.—Educational week program.	8.15 n.mPerry Bradford's entertainers.	7 p. m.—Allen Theater program.	10 p. m.—South American Troubadours. 10:15 p. m.—Jose Bohr, songs. 10:30 p. m.—Manhattan Serenaders.
11 a. m. Soprand and orelin choir.	3 p. mOrchestra selections.	8:50 p. m.—Gertrude Guarente, planist. 9:05 p. m.—Bob Ward's little Wards. 9:25 p. m.—Studio program.	WTAM-CLEVELAND-390 6 p. mDinner music.	11 p. mErnie Golden's Orchestra,
9:15 p. m. Bible lecture, it violin choir.	4:20 p. mWilliam Holiman, "Character Tonic Talks."	10 p. m.—Strickland's Orchestra. 11:30 p. m.—Bob Murphy's entertainers. 12 p. m.—Connie's Orchestra.	9-11 p. mLadies' ensemble and Martha Lee Club.	WNYC-NEW YORK CITY-526 7 p. mMarket high spots. 7:10 p. mThe Capacians
WGBB-FREEPORT, N. Y245	4:30 p. m.—Trio concert. 5:32 p. m.—Market quotations. 5:40 p. m.—Farm market reports.	WFI-PHILADELPHIA-395 10:30 a. mSolos.	11 p. m1 a. m.—Dance music. WLW—CINCINNATI-422 7:15 p. m.—Dinner dance.	7:10 p. m.—The Canadians. 7:30 p. m.—Policé alarms. 7:35 p. m.—The Canadians.
WFI-PHILADELPHIA395	5:50 p. m.—Financial summary. 6:30 p. m.—New York University course,	10:40 a. m.—Home service talk.	9 p. m.—Freda Sankers's Orchestra.	8 p. m.—Clarion Male Quartet. 8:20 p. m.—Emma May, soprano. 8:35 p. m.—Minnie Richter, violinist.
4:30 p. m.—Chapel services. WLIT—PHILADELPHIA—895 WLIT—PHILADELPHIA—895	The Problem of Religion, Prot. Charles	3 p. m.—Pupi' of Mabel Parker. 3:45 p. m.—Fashion feature. 6:30 p. m.—Concert orchestra.	12 midnight-Theatrical stars. 11:80 a. mHelvey's Troubadours. WSAI-CINCINNATI-326	8:55 p. m.—Emma May, soprano. 9:10 p. m.—Minnie Richter, violinist, «
2-4 p. m.—Special Sunday concert: 8:20 p. m.—"The Round Table Forum." WIP—PHILADELPHIA—508	I B D. III. C. P. Grillich, Violinibe,	7 p. m.—Dance orchestra. WIIT—PHILADELPHIA—395	11 p. m1 p. mConcert. WLW-CINNCINNATI-422	9:30 p. mChandler Mixed Quartet. 10 p. mHarry Ash's Orchestra.
10:45 a. mMorning service. WOO-PHILADELPHIA-508 2:30 p. mMusical exercises opening Sur	9:20 p. m. United States Army Band. 10:30 p. m. Joseph Knecht's Orchestra.	12:05 p. m.—Organ recital; religious serv- ice. 2-3 p. m.—Concert orchestra; heart talk;	8 p. m.—Dinner coocert. 9 p. m.—"Times-Star" concert orchestra. WJR—PONTIAC, MICH.—617	10:30 p. m.—Police Alarms; weather, 10:35 p. m.—Harry Ash's Archestra.
day school.	WGBS-NEW YORK CITY-316 10 a. mTimely Talks with Terese. 10:10 a. mJack Cohen, planist.	artist recital.	9 p. mMusical program	WFBH-NEW YORK CITY-273 2 p. mBob Fleming's Orchestra. 3 p. mAgnès Brennan, soprano,
6 p. m.—Sacred reinan 7:45 p. m.—Evening services. 9:15 p. m.—'Atwater Kent Hour." WCAU—PHILADELPHIA—278	10:20 a. m.—Truth in Advertising, 10:30 a. m.—Fashion talk; piano.	5 p. m.—Talk on Sesqui-Centennial. 7:30 p. m.—Dream Daddy. 8 p. m.—Short Agro-Waves.	11:30 p. mJewett Jesters. WWJ-DETROIT-353 6 p. mDinner concert.	3:15 p. m.—Orchestra. 3:45 p. m.—Educational Talk.
5 p. mRecital.	1:30 p m.—Scripture reading. 1:35 p m.—Celinda Bates, soprano. 1:40 p m.—William Williams, tenor.	8:15 p. m.—"Current Events"; concer:	8 p. mBand and gypsies. WEEO-LANSING. MICH288	4 p. m.—Studio programme. 4:30 p. m.—"Tea Table Talk." 5 p. m.—Dot McLean, Leo Ford, songs.
Stockwell.	3:00 p. m.—American Education Week program.	B p. m. Stanley Alleatte movie review.	6 p. mDinner concert.	5:30 p. m.—Orchestra program. 6 p. m.—Abner Silver, composer.
5:35 p. m.—Recital. 5:45 p. m.—The Rev. John W. Stockweil 6:30 p. m.—Pennsylvania Trio. 6:30 p. m.—Pennsylvania Urchestra.		10 p. m.—Dance orchestra 10:20 p. m.—Vaudeville features. 10:40 p. m.—Lanin's Dance Orchestra. WCAU—PHILADELPHIA—278	7:30 p. mLa Salle Orchestra. 7:40 p. mFamily Altar League. WOK-CHICAGO-217	6:15 p. mJudith Roth, soprano, 6:30 p. mBessert Lumberjacks,
7:30 p. m. Cathay Concert	WRNYNEW YORK CITY259 10:30 a. mReducing exercises. 10:45 a. m"Six New Books."	8 p. mRecital.	WHT-CHICAGO 400	11:30 p./mDance' Orchestra. WEBJ-NEW YORK CITY-273
8:15 p. m.—Organ recital.	111 A M	9 p. m.—Amsterdam Girl. 9:10 p. m.—Nokol Man. 9:30 p. m.—Delaware Serenaders.	7 p. m.—Classical program. 8 p. m.—Classics.	7 p. m.—Original Mobile Quintet. 7:45 p. m.—Joe Sherman and Lew Pollack 8 p. m.—Railroad talk, G. T. Geer.
9 p. m.—.Concert Ortenestan	4:15 p. mRadio reminiscences	10 p. m. Freedman and Travaline, songa 10:20 p. m. James Loughrey, songs.	THESDAY	8:10 p. m.—Sara Turits, seprano. 8:20 p. m.—Mystery Radio Talk. 8:25 p. m.—International Dance Orchestra
10 p. m.—Organ rectar. WHAR—ATLANTIC CITY-275 10:45 p. m.—Morning service. 2:15 p. m.—Short sacred recital. Deppe	4:30 p. m.—Eve Rothenberg, planist. 6 p. m.—Hour of music. 7 p. m.—'Whoge Birthday To-day7"	WOO-PHILADELPHIA-508 11 a. m.—Organ recital. 12 noon-Luncheon music.	TUESDAY	WENY-NEW YORK CITY-259
2:15 p. m.—Short saction to the sector of th	7:05 p. m.—Telegraph Sportflash. 7:10 p. m.—Commerce of the day. 7:15 p. m.—Opera notes.	4:45 p. m.—Grand organ, trumpets.	WEAF-NEW YOBK CITY-492 6:45-7:45 a.mHealth exercises: 11 a.mMrs. Miranda Marguglia, planist	10:30 a. m.—Reducing exercises. 10:45 a. m.—"Arts and Decorations." 11 a. m.—Melledge's hour.
9 p. m.—Seaside Trio. 11:15 p. m.—Strand organ recital. WEW_TAREYTOWN, N. Y.—273	7:15 p. m.—Opera notes. 7:35 p. m.—Major Atkinson—"Travel." 7:50 p. m.—Lullaby Ledy.	8 p. m "American Citizenship," Henry W. Taft.	11.10 a. m. Lecture; planist	12 noon-Hour of music. 6:55 p. m''New York's Neighborhoods.
witw_TARBYTOWN, N. 1. 243 8 p. m. —Services. 10:30 p. m. —Musical program.	8:00 p. m.—Ferrucci's Orchestra.	8:30 p. mHawalian Trio. 8:45 p. m"The Radio Dream Girl."	11:35 a. m.—Motion picture forecast. 11:50 a. m.—Bee and honey talk	7 p. m.—"Whose Birthday To-day?" 7.05 p. m.—Telegraph portilash.
11:05 p. m. Dance Ofchestry-380	8:10 p. m.—Rychurida of Jazz. 8:30 p. m.—Celeanor Dugas: "Painting." 8:40 p. m.—Ferruce's Orchestra 8:45 p. m.—"Jazzing Melody in F."	9 p. m.—Music by Gypsies. 10 p. m.—Grand opera, "I Pagliacci." 11 p. m.—Dance music.	12 noon-Market and weather reports. 4 p. mDorothy Mueller, contraite. 4 15 p. mDorothy Wilder niantet	7:10 p. m.—Commerce of the day. 7:15 p. m.—Opera notes.
11 a. m., Choral celebration. 12:30 p. m. Rivoli Theater Orchestra.	9 p. m.—Yazzing Melody in F. 9 p. m.—Power by Radio. 9:15 p. m.—Musical travelogue—England.	6:45 a. m.—Setting-up exercises.	4:15 p. m. — Dorothy Wilder, planist, 4:30 p. m. — Women's program: "Education for Peace," by Katherine Blake; And Blake; sonrano	7:50 p. m "Theater Costume." 7:45 p. m Concert orchestra
4 p. m.—Choral Evensong. 7 p. m.—Carillon program from WJZ. 8 m.—WJZ studio program.	9:30 p. m.—Moods in music. 9:45 p. m.—Tillie Sper, plano dances.	1 p. m.—Luncheon music. 3 p. m.—Artist recital. 6:05 p. m.—Dinner music.	Bialy, soprano, 6 p. m.—Dinner music, 7 p. m.—Mina Hager, contralto.	S:15 p mOpera Mignon.
7 p. m.—Carlinon flogtani vices 7.50 p. m.—WJZ studio program. WGR—BUFFALO—319 8 p. m.—Vesper services.	10 p. m.—Poetry Post. 10:10 p. m.—Myron Brooks, musical saw. 11:15 p. m.—Radio Theater Players.		7:30 p. mDavis's Sarophane Octotte	9:55 p. m.—Alexandre Zeitlin, "Sculpture. 10 p. m.—"Important Dates in Radio." 11 p. m.—Town in review.
7:45 p. m. Evening services are as WEA 9:15-10:15 p. m. Program same as WEA	F. WHN_NEW YORK CITY- Sel 2:15 p. m.—Evelyn Ryan, plasist.	WPG—ATLANTIO CITY—300 4:30 p. m.—Tea music. 6:45 p. m.—Organ recital.	8 p. m.— "Financial Events," Dudley Fowler 8:10 p. m.—Ross Gorman's Orchestra. 8:30 p. m.—The Twins.	• W.CB. BROOKLYN, N. Y. 210 6-7 p. m. Diner music.
8:15 p. mRadio Chaper Bervices	2:25 p. mWilliam Hallman, "Crane"	8 p. m.—Children's hour.	9 p. m"Everendy Hour."	WOR-NEWARK-405 6:45-7:15-7:45 a. mGym class.
10:30 s. m.—Morning service. 7:80 p. m.—Evening service. WJAR—PROVIDENCE—306	2:35 p. m.—Dorothy Darrath, soprano. 2:45 p. m.—Jack Mayers! Orchestra.	8:30 p. m.—Billy Buckley's Crew. 9 p. m.—Concert Orchestra.	10:30 p. m.—Vincent Lopez's Orchestra. 11-12 p. m.—Meyer 'Davis's Orchestra.	2:80 p. mDorothy Paca, soprano. 2:45 p. m "The Stage Villainess."
7:20 p. m.—Capitol Theater Family.	3:45 p. m.—Bernard Seaman, pianist. 3:55 p. m.—Hugo Angelo, tenor. 4:05 p. m.—Vincent Daniels, pianist.	11 p. m.—Dance orchestra. WHAR—ATLANTIC CHTY—275 2 p. m.—Seaside Trio.	7:30 p. mAmbassador Trio.	3 p. mDorothy Paca, soprane. 3:15 p. mFred Koester's Orchestra.
WEEL-DUSION- VIC	4:15 p. m.—Haines Good News Party.	7:30 p. mFashion review. 8 p. mSeaside Trio.	Knox. 8:20 p. mLouise Voccoli, soprano.	6:15 p. m.— "Words Mispronounced." 6:17 p. m.— "Words Mispronounced." 6:17 p. m.— "Sports," Bill Wathey, 6:36 p. m.— "Man in the Moon Stories." 6:55 p. m.— Shelton Dinner Music.
10:50 a. m.—Morning Screes Cadman. 8:45 p. m.—Dr. S. Parkes Cadman. 7:20 p. m.—Capitol Theater Family. 8:15 p. m.—Atwater Kent hour fre	4:30 p. m.—Stanley Cowan, songa. 4:45 p. m.—Harry Stone's Orchestra. 6 p. m.—Littmann's Dinner Music.	WGY-SCHENECTADY-380 2 p. m-Asia Orchestra.	8:40 p. m.—To be announced. 10 p. m.—Paul Specht's Orchestra.	6:58 p. m.—Shelton Dinner Music. 7:20 p. m.—News Bulletin.
WEAF. WNAC-BOSTON-280	6:30 p. m.—Littmann's Dinner Music.	2:30 p. m.—Music; cooking lesson. 6:30 p. m.—Dinner program. 7 p. m.—Talks and news items.	Contraction of the local division of the loc	
10:53 a. m.—Morning service. 1:30 p. m.—Concert. 8:15 p. m.—Old South Meeting Hou	7 p. m.—Mariboro State Trio. 7:30 p. m.—Swanee Orchestra. 8 p. m.—Storage Battery Talk.	7:45 p. m.—"Constitution Day," Ellis Staley. 8 p. m.—State College Chorus; address,	n	- Orala antes
Forum.	8:30 p. m.—Guardian Entertainers.	"Literary Appreciations: John Bur- ronghs, Earth's Lover." WRW-TARRYTOWN, N. Y273	<b>Danc</b>	e Orchestra
WBZ-SPRINGFIELD, MASS-333 10:50 a. mChurch services. 8 p. mRabbi Stephen S. Wise, "Americ	9 p. m.—Edgar Duffy, baritone. 9:15 p. m.—Billie and Marie Van, duet can 9:30 v. m.—O'Brien Brothers, guitar, mai	s. 7 p. m.—Children's stories. n- 7:30 p. m.—Musical program.	TO-DAX	1 9:00 WMCA, 841 Polks Dot
Self Isolation. WTAG-WORCESTER, MASS-268	9:45 p. mPhilip Krumholtz, baritone.	9:05 p. m.—Entertainment; talt. 9:40 p. m.—Galaxy program.	Time Wave P. M. Station Length Orchestra	10:00 WJY 405 Paul Specht's 10:00 WNYC 528 Harry Ash's
8:45 p. m.—Program from WEAF. 7:20 p. m.—Capitol Theater Family. 9:15 p. m.—Program from WEAF.	11 p. m.—Cotton Orchestra. 11:30 p. m.—Silver Slipper Orchestra. 12 a. m.—Ted Lewis' Orchestra.	10:05 p. m.—Brown's Orchestra. 10:30 p. m.—Songs. 10:45 p. m.—Galaxy program.	10:45 WHN 861 Janssen's 11:05 WRW 273 Dance music	10:05 WIP 508 Joe Ray's 10:30-12 WMCA 341 Dance music 10:30 WEAF 492 Vincent Loper's
11 a. m.—Service.	12 a. m.—Ted Lewis' Orchestra. WMCA—NEW YORK CITY-341 6 p. m.—Olcott Vall's String Ensemble.	11:05 p. m.—Brown's Orchestra. WGR—BUFFALO—\$19	MONDAY, NOVEMBER 16 7:85 WNYC 526 Harry Smith's	10:30 WJZ 455 Mayflower • 11:00 WEAF 492 Meyer Davis's
4 p. m.—Service.		10:45 a. m.—Home service talk. 6:30 p. m.—Clef Dwellers Urchestra. 8:80 p. m.—Dutch Master's program.	8:05 WHN 361 Roseland 9:00 WMAK 266 Melodette 9:05 WOKO 233 Dance music	11:00 WHN 861 Dance music 11:00 WPG 800 Dance music
9:16-10:15 p. m.—Atwater Kent hour. KDKA—PITTSBURGH—309 10:45 a. m.—Church service.	8:30 p. m.—Educational Talk. 8:45 p. m.—Musical program.	9 p. m. Recital, John Dodsworth. 9:45 p. m. Boris Golokow, mandolin.	9:30 WCAU 278 Delaware Count 10:00 WGCP 252 Strickland's	WEDNESDAY, NOVEMBER 18
4 p. m.—Organ recital. 4:45 n. m.—Vesper services.	10:15 p. m.—Lecture on Christian Science. 10:15 p. m.—Entertainers.	10 p. m.—Popular piano recital. 11 p. m1 a. m.—Supper music.	10:05 WRW 273 Brown's 10:15 WAHG 316 Glenn Smith's	T-25 WNYC 526 Dance music 8:00 WEBJ 273 Crescent
6:30 p. m.—Dinner concert. 7:45 p. m.—Church service. WCAC—PITTSBURGH—461	12 (midnight)—"Cuban Exposition," Sen Felipe Taboada.	or 3:30 p. m.—Eastman Theater Orchestra. 5 p. m.—Theater organ,	10:30 WJZ 455 J. Knecht's 10:30 WHAZ 380 Palladino	9:20 WEBJ 273 McLean's 9:80 WHN 861 Ridgley's 10:00 WTIC 476 Dance music
8:45 p. mDr. S. P. Cadman from WE		7 p. mTheater orchestra.	10:40 WLIT 895 Lannin's. 11-12 WEAF 492 Ben Bernie's	10:00 WLIT 895 Dance music 10:00 WHN 861 Dance music
7:20 p. m.—Capitol Theater Family, 9:15 p. m.—Atwater Kent hour. WADC—AKRON, OHIO—258	6:20 p. m.—Piano selections. 6:30 p. m.—Elementary German lessons. 7 p. m.—Advanced German lessons.	WHAZ-TROX. N. Y389	11-12:30 WHN 861 Dance music 11:00 WPG 800 Dance music 11:1 WGR 819 Dance music	10:00 WMCA 841 Ascuitto's 10:05 WRW 273 Orawumpum
6:30 p. m.—Dinner music.	7:30 p. m.—Police Alarms.	guitars.	11:15 WMCA 841 Dance music r 11:30 WOR 405 Irving Aronson	
7 p. m.—Theater orchestra. 8 p. m.—Fireside hour from radio shew	8:30 p. m.—Frank Maloney, baritone, Eli abeth Neusch, soprano, 9 p. m.—Virginia La Bett, violinist; J	o- 10:30 p. m. Palladino Artisan Orchestra	12:00 WGCP 252 Connie's TUESDAY, NOVEMBER 17	10:30 WOO 508 Dance music 11:00 WEAF 492 Ben Bernie's
9 p. m. Organ recital. WLW CINCINATI 423	10:10 p. m.—Virginia La Bett, Volinist, J seph Davies, baritone: 10:10 p. m.— "Egypt," Charles Crossma 10:30 p. m.—Police alarma: weather.	WMAK-LOCKPORT, N. Y266	8 25 WEBJ 273 International	11:00 WHN 881 Dance music
8 p. m. Services and soloists.	10:30 p. m. Police alarms, weather.	9-10 p. m Melodette Dance Orchestra.	A second s	

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World Radio History

11:00 11-1 12:00 12:30

9:05 9:15 10:00 10:00 10:00 10:12 10:15



10:30 WCAU 278 Locser's 10:30 WJZ 455 Lorraine 10:30-12WHN 861 Dance mmake 10:35 WNYC 728 Colonial 11:00 WEAF 492 Meyer Davis's 11:10 WGR 319 Dance minks 11:10 WGR 319 Dance minks 11:10 WGR 319 Dance minks 11:20 WHN 801 Dance minks 12:00 WHN 801 Dance minks 8:30 WJZ 405 Dance minks 8:30 WJZ 405 Dance minks 8:30 WRV 273 Serenaders 9:05 WFR 481 Cinderella 9 WOR 405 Vincent Lopes's WGR 819 Vincent Lopes's WHCA 841- Dance music WHN 861 Ted Lewis's THUESDAY, NOVEMBER 19 THUESDAY, NOVEMBER 19 8:00 WGBS 316 Dance music 8:30 WMCA 841 Cinderella 9:15 WRW 273 Arcadian 9:25 WOKO 233 Band 10:05 WTP 508 Joe Ray's 10:30 WGBS 816 Arrowhead 10:30 WGBS 816 Arrowhead 10:30 WGBS 816 Arrowhead 11:00 WRC 469 Meyer Davis's 11:00 WMCA 841 Ernie Golden's 11:00 WJCA 455 J.Green's 11:00 WJCA 492 Vincent Loper's 11:00 WFG 500 Dance music 12:00 WHN 861 Ted Lewis's FRIDAY, NOVEMBER 20 WRUCA 841 Ky, Rambler V WMCA 941 Meiropolitan WGCP 252 Strickland's WLIT 895 Dance music WTIC 849 Dance music WACA 841 Ky, Ramblers

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WFI-PHILADELPHIA-58 (0:50 a. m.-Solos. b. m.-Tearcom ensemble. b. m.-Artists from Potitstown. 3:45 p. m.-Fashion feature. 3:30 p. m.-Concert orchestra. f. p. m.-Dance orchestra. WLIT-PHILADELPHIA-895 WILT-PHILADELPHIA-325 12:05 p. m.-Organ recital. 12:15 p. m.-Concert orchestra. 2:3 p. m.-Concert orchestra. 2:3 p. m.-Concert orchestra: recital. 1:30 p. m.-Talk; artist recital. 7:30 p. m.-Dream Daddy. 8 p. m.-To be announced. 10 p. m.-Dance orchestra. WOO-PHILADELPHIA-508

WFI-PHILADELPHIA-\$95

WOO-FHILADELITHIA-CGS a. m.-Grand organ and trampets. 5 p. m.-Grand organ and trampets. b. m.-United States Army Band. 0 p. m.-Pooly Period. m.-Roxy's Gang. p. m.-Fox Theater program. 20 p. m.-Dance music.

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WEBH CHICAGO 879 9 p. m.—Dinner concert; songs; talk. 10 p. m.—Dance selections. 12 to 2 a. m.—Dance music; impro

story

WMAQ-CHICAGO-448 WMAQ-CHICAGO-438 p. m.-Organ recital; story. p. m.-Northwestern University beture :30 p. m.-Mrs. E. Kressman, sopmano, 0 p. m.-WMAQ Players. WHT-CHICAGO-400

WHT-UHUAUU-7 p. m.-Classical program. 8:46 p. m. (238 meters)-Alamo Orchestra 10:30 p. m.-Organ recital. 1) a. m.-Your Hour League. WOK-CHICAGO-217 7 p. m.-Artists 11 p. m.-Artists and orchestra.

8:45 n. m.-College of the Air. WOC-DAVENPORT-484 6-45 p. m. -Chines concert. 16 p. m. -Program same as WEAF. 11 p. m. -Musical program.

Section Section

T.35 p. m.—Entertainers.
WORK CITY→533
S. m.—Herbert Link, planist.
S:15 p. m.—Hary Rosenkrants's Band.
S:25 p. m.—Larry Rosenkrants's Band.
S:25 p. m.—Larry Rosenkrants's Band. WLWL-NEW YORK CITY-288 9 p. m.-Dorothy MacDonough, soprane, 9:30 p. m.-Instrumental Trie, 9:30 p. m.-Talk 9:45 p. m.-Dorothy MacDonough, so-

9:45 p. m.—Dorothy MacDonough, see prano.
9:55 p. m.—Instrumental Trio.
10:15 p. m.—'Marriage and Diverce," Joseph McMahon.
10:35 p. m.—Organ recital.
10:35 p. m.—Organ recital.
WBBR-STATEN ISLAND, N. Y. 573
8 p. m.—Carl Park, violinist.
8:20 p. m.—Herald Male Quartet.
8:30 p. m.—Herald Male Quartet.
8:40 p. m.—Herald Male Quartet.
8:50 p. m.—Herald Male Quartet.
8:50 p. m.—Herald Park, violinist.
WAHG-RICHMOND HILL, N. Y. 510 12 nooh-Musical program. WAAM-NEWARK-263 11 a. m.-Happy Hour program. 6 p. m.-Fred Smith's Orchestra.

(Continued on next page)

New York Amateurs Form

### **Radio Fans and Blueprints**

The Skill, Judgment and Integrity of the Organization Back of the Print Responsible for Efficiency

By LIEUT. VICTOR GREIFF, M. I. R. E. Designer and Consulting Engineer, Receptrad Products

producing results never before circuits of to-day and to-morrow. thought possible. Back of this and responsible for it is the widely popu- New Broadcasting lar radio blueprint, and back of the blueprint there is a world of scientific endeavor, production and service. The respect of the fan for the blueprint is where is it leading?

The experienced radio set builder tube, tap every four turns," and this was interpreted lit- gible. manded, until to-day, thousands of ferred to the antenna circuit, hence fans build readily from specialized parts receivers that would have taxed the facilities of a Navy Yard five years ago. This could not be accom plished were of a large volume of general radio literature plus a highly developed back of the radio exact properties of the units. The blueprint shows the cirquality performance of the set.

quiring the development of original quickly placed a towline on the launch standards and the development of and pulled it into Sheepshead Bay. new types of transformers. Of course, the transformer for radio or audio is the simplest device to conlistener-true reproduction of tone, airplane thrills. no matter what the power of the circnit.

The keynote in all the functions back of the blueprint is much the same requirement that has made amateur photography possible; that islatitude. The blueprint and the parts together must give results under the widely varying conditions that are possible outside the laboratory, and here is where the skill and judgment of the designer are really shown. Hundreds of circuits have been proposed together with complete instructions for building the popular and powerful reflex and super-

favorite of the jokesmiths, it is teur's chance, whether he be begin- behalf of the amateurs of the seca matter of common knowledge that ner or expert, is immensely greater ond district, which it represents, to when he uses a co-ordinated set of secure their own traffic and league the average man finds in the building carefully tested parts and the con- organization. radio set a wonderful nection blueprint for them with or- Heretofore the second district was wonderful reward at the ganization skill and service behind a part of the Atlantic Division and end of it and that, while the home- them. This is the secret of the super- amateurs. With the formation of the creasing popularity of the superthem. This is the secret of the in- had no official vote in A. R. R. L. made radio set a bare year ago was heterodyne and reflex circuits-the new division, however, amateurs of a humorously crude affair, to-day skill, judgment, integrity and facili- this district will have full sway in amateurs are building themselves the ties of the organization back of the their new division. The name "Hudmost advanced and powerful sets and the success of the highly efficient ignated for this new division, which

Set for WFI

Station WFI, Strawbridge & Clonotorious and sometimes amusing. thier, Philadelphia, has just installed One sometimes receives a letter ask- the latest and most improved type of ing for an explanation of an acci- Western Electric broadcasting outdental spot on the print. The fans fits. This is the first installation of The height of the new masts is 170

days are passed, and as the radio art tenfa circuit to the primary or oscildays are passed, and in the primary or oscil-develops more efficient windings, later frequency. Under these condiparts and specialized units are de- tions the harmonics are not trans-

**Knowledge of Code Brings** 

further; production control, research by a long swell was running before and sons of veterans unable to be laboratory and information service a stiff wind. Desperate efforts to re- in actual attendance. behind the blueprint are to be pair the engine failed. The launch behind the blueprint and was about six miles southeast of Long Veteran Speakers to Confess Beach. Night was fast approaching. In the aristocratic super-heterodyne looked pretty bad, that Mr. Klein be- Warren C. DuBois, is a feature of hook-up service "back of the blue- thought himself of the telegraphic WEAF's program on Thursday eveprint" meant the design of a coupler code, learned in his early amateur ning. Mr. DuBois is an instructor in that would operate freely at all wave days and kept up during his connec- public speaking at New York Unithe without adjustment; accu- tion with F. A. D. Andrea, Inc., as gen- versity. rately tuned filters for the long wave eral manager. Before him was the lengths unknown outside of naval horn of the launch. Grasping the radio stations and university labora- button, he started sending out the tories; measurements of wave lengths S O S call over the troubled waters. that could not be checked by any lo- The piercing shriek of the Klaxon cal standardizing laboratories, re- was heard by a fishing boat, which

### Andre Peyre at WEBJ

"Flying for the Movies" will be nect and from which the most is re- the first radio talk in this country duired in a number of ways. The to be made by a famous woman aviamplifying transformer must be de- atrix. Mlle. Andre Peyre, dainty signed for different tubes, different French aerial dare-devil and holder battery connections, different intensi- of a number of women's airplane recties of incoming signals, different ords, has no intention of trying to wave lengths, varying in different induce young girls to leave home to cases from two hundred meters to join her new profession. On the twelve thousand meters, and bands contrary, when she talks at WEBJ of musical tones from the lowest on Tuesday she will almost guarantee to the highest in order to obtain to straighten the permanent waves the foremost requirement of the of her listeners when she tells of her

RGA

Radiola Super-Het-

erodyne, Radiola

3A, Radiola 3,

Radiola Bal. Amplifier in stock

De Forest D 12, latest model in stock

SHEARN

1122 Madison Av., at 84th St.

Butterfield 0450 Closes 7 P. M.

8 E. Fordham Road

Kellogg 6005 Closes 10 P.

**A New Radio Division** The Second District Executive Radio Council has just been advised by the A. R. R. L. that its efforts to have a separate traffic division to comprise

the entire second radio district have been officially approved at a recent board of directors meeting of the league. This announcement is the culmination of several months of par-WHILE the radio fan has been a heterodyne circuits; but the ama- leying and work by the council on

will go into operation on September . This is the first time since the organization of the league that such

Knowledge of the Continental code tary organization have granted exand quick thinking on the part of R. clusive broadcasting rights to West-M. Klein rescued nine men stranded inghouse Radio Station WBZ. Arin a disabled power launch off the house company and the G. A. R. were Long Island coast last week. The made with William L. Anderson, naparty had been on a fishing trip for tional patriotic instructor of the G two days off the New Jersey shore A. R. The convention will be held aboard the Brown Betty and were on event of interest which transpires the week of August 10, and every their way back when the engine went during its session will be sent out assembly and can go no dead. A nasty choppy sea confused into the air by WBZ for old veterans

> "Some Confessions of Veterar It was at this stage, when things Speakers," the title of an address by

> > *The Greatest Value*

ever offered in a

Radio

Receiving Set~

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MASTERPIECE

**5** Tube Tuned

**Radio Frequency** 

Ask your Dealer for a demonstration or write for complete literature

literature ~~~~

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## What Women Think of Radio in the Home

The Radio Receiver Should Be Considered as Family Equipment; Suggestions for Program Valuable to the Housewife; More Home Material Wanted

By MRS. CHRISTINE FREDERICK



got a divorce because she said hubby ad become a raving radio fan, who forgot he had a wife or that his home was not a laboratory.

What has radio done to the home, and what do we wives think about it?

The funny papers have made us believe that the men and boys of the family never give the poor radio receiver a rest and that wifey can't pry hubby away from it for an evening out. The learned professors are solemnly of the opinion that hubby is "sublimating" himself away from wine, women and song via radio, and is now the most domesticated animal in captivity.

But why assume that the men and the flappers of the family are the only ones who get anything out of radio? Why not consider radio as a family equipment and look into the subject of what Mrs. Radio Fan is thinking about the little black box and its magic properties? After all, she is the one who has to sweep up the dirt and work over the rug on which the battery acid leaked!

Well, I'll tell you what we women think who have studied this new thing which has come into the home. We think it is a piece of household equipment which ranks with the sewing machine or the washing machine; ranks far higher, in fact, than anything that has ever been put into a home. But we think that, man-like, the people who run the radio business have rather overlooked the woman end of itthe home possibilities of it. After all, there are others than men and boys in the family, and the women folk are in the home all day long. Moreover, it is the woman in the home whose isolation is the most pronounced, and who, therefore, has

World Radio History

OME time ago an enraged woman, not. Isn't it time, then, that the full at and that women be given the share of radio attention that the situation calls for

### Home Cooking Lessons by Radio

Out in Chicago, at my suggestion, a great public utility company which desired to interest more women in home cooking began to broadcast cooking talks at 11 o'clock in the morning, with th result that the idea was a big success Now these talks are a daily feature, and what's more, women take study courses in cooking by radio and receive certificates after having "passed" in this study course. There are special memorandum books supplied to women listeners-in, and the broadcast recipes are written into these memorandum books. "Radio teas" were also started in the afternoon hours. so that women could listen in and feel themselves part of a group. These radio teas have been huge successes, literally hundreds of thousands of women "attending" them.

I mention this instance of advanced service to women to prove that we have only begun to tap the home possibilities of radio. After all, jazz isn't everything! And the fun of tuning in stations far away is, after all, short lived. I suppose men used to play with telephones like that when they were first installed-thrill over how far away they could talk. But the telephone got down to its real business of daily service after a while, and so must radio. We must have good, useful stuff coming by radio during the daysomething women can get value from.

What are the possible and practical adaptations of radio to the home? Many most to gain from radio. Men have con- | features now being broadcast seem extacts in their daily work and a change tremely unsuited to an extensive audience; of thought and ideas, whereas women have " while some touch on such important sub-

jects that I feel they would render much round of possibilities of radio are looked | greater value to the home if given in a continuous series and at a regular hour, thus developing automatically expectant listeners-in. If I knew, for example, that there would be a "first aid" lecture at 4 p. m. on each Thursday for successive weeks, or a household talk given every morning at 9, my interest would be more keen; and with a number of such series operating the listeners would segregate themselves into groups anticipating a particular feature and thus develop a cumulative interest. In short, the sooner radio broadcasting adopts the definite schedules of subjects and hours common to institutions, or always found in a Chautauqua program, the more greatly will the public benefit.

### **Suggested Radio Programs**

Taking for granted that the instruments used and the broadcasting facilities be developed will be within the reach of every one. I believe that the following outline of subjects would answer the needs of the majority of women and families and provide them with a service which will put them in touch with the world of thought, progress and amusement;

- 1-Physical Education: a Daily "setting up" exercises.
- b "First aid" instruction.
- c Health talks.
- d Beauty hints.
- 2-Junior Features:
- a Little children's hour. b Woodcraft and animal stories.
- c Adventure and history tales.
- d Activities of Boy Scouts and Camp Fire Girls.
- -Household Interests:
- a Housekeeping and cooking. b Market reports.
- c Care and hygiene of children.

d Home decoration and furnishing. 4-Cultural Topics:

- a Correct English. b Musical programs.
- c Drama and book reviews.
- d Fashion and dress discussion
- ----Social Interests: a Current events.
- b Public affairs and politics.
- c News of sports.
- d Worship services.
- e Home finance and thrift.

f Club and organization activities. I have suggested "setting up" exercises as a daily radio feature because I think it will answer the oft expressed wish that we could bring the gymnasium spirit into the house. Every one agrees that we should all perform daily gymnastics. but which of us finds pleasure in taking exercise alone? And it is a well known fact that we cannot derive full henefit from something we do not enjoy doing. It will be easily possible to broadcast the instructions for such a drill as guided by the voice of a physical director. A most desirable period would be between 6 and 7 a. m., repeating at fifteen minute intervals so that different families could have a choice as to the most convenient time. It would not be difficult to set an alarm clock for the exact hour at which the entire family preferred to wake up and participate as a group in this stimulating drill. The first sound coming from the radio might well be the bugie reveille: "Ta tah ta ta tah-ta tum!" followed a moment later by the greeting and command. "Good morning, everybody! Now for a good start. Snap in! All together now, hands on shoulders-placeone, two, three, four!" etc.

The popularity and value of "first aid" instruction was proved by the active interest in it even after the war. Radio will be able to make vivid and helpful to still greater numbers of people lessons on the

## Six-Tube Portable Radio Receiver of **Excellent** Design

the listener. The pivoting cover, on the

contrary, permits the finest adjustment to

be made at the touch of a finger and quite

independent of the position of the case.

Simplicity Necessary

Simplicity, not only of operation but of

maintenance, is greatly desired by the rap-

idly growing class of radio owners who

care nothing for the method of reception,

but only for the results. An interesting

example of the degree to which this type

of owner has been considered by the de-

signers is the automatic battery connec-

tor, which permits the changing of the

battery cells' without disconnecting a sin-

gle wire, and makes impossible the re-

versing of positive and negative poles.

This feature will be appreciated particu-

larly by women, as they can change bat-

teries themselves without expert assist-

**Battery Problem** 

In many portables the smallest size

batteries are used, but in this set the

medium sizes were found to give more

The "A" battery problem was difficult to solve, principally because of the variety

of types of batteries available for this

work. After many endurance tests, all of

the small sized cells, such as flashlight

and "C" batteries, were discarded as being

### A Small Size Suitca se Contains the Set and All Accessories

ance.

satisfaction.

### By FRANCIS J. ARMSTRONG

THE early days of broadcasting, when the programs consisted principally of the playing of a few phonograph records, the reading by the wireless operator from some book of history or selections played by an unknown artist simply to fill up the allotted time. the listener certainly had to be a "radio bug" to sit through more than one program.

But now, when the air is full of intensely interesting entertainment from the solo by a noted soprano to the "news as it happens" or from speeches by the world's famous men to the broadcasting of the current sporting events, the average person is brought to a realization that radio has become an important part of his daily life.

The mechanical genius who found sheet joy in the working of the apparatus, regardless of the program, is giving way to the discriminating person who listens to

inches wide and only five and one-half inches thick. Within the case is an ingeniously aranged set from speaker to batteries and loop, available for instant use. Any portable set to be of real value must be as powerful and as selective as its more cumbersome brothers, and the restriction of space makes the problem of design and construction much more difficult than in

the production of ordinary sets where bulk

is not a serious consideration. For in-

stance, the elimination of outside roof

antennæ is only possible by the use of

the program purely for entertainment or instruction, and who wishes to have nothing to do with the machine that brings in the program other than to turn the controls.

Radio is rapidly approaching the stage where it is becoming a necessity not only in the home, but wherever one happens to be for the moment. Recent events such as the Republican and Democratic conventions have brought strikingly to all thinking people the part that radio is destined to play in their lives. Nothing connected with the art of radio itself is more fascinating than the realization on the part of many persons that the radio will be to them not only a source of entertainment, but also a means of keeping them in touch with all the great current events taking place throughout the country. The broadcasting of the coming political campaign will be a great stimulus to radio in general.

### New Attitude Affects Design

This new public attitude toward radio has naturally had its effect on radio designs, and the manufacturers are realizing that radio is not comparable to the phonograph, but is more closely related to the newspaper and telephone. In fact, it would not be stretching the imagination to say that the future might see some connection between the telephone and the radio.

However, the present buyer of a radio set is faced with the problem of selecting the apparatus that will best keep him in touch with the daily changing program, no matter where he may be, in his city or country home, office or even touring in his motor. This changing demand on the part of the radio public has stimulated the development of complete radio receivers in portable form, which development. with its consequent elimination of roof antennas, has in turn increased the de mand for radio sets in general.

The portable radio, as perfected under the trade name, "Karryadio," has now made its appearance in form suitable to be carried about ready for immediate reception of the broadcast of the hour.

Karryadio is a completely equipped receiving set made by the Armley Radio Corporation, so compact as to be entirely self-contained in a suitcase measuring

high amplification of the original radio waves, which in a limited space is a problem to be approached with care. After months of work, the designers of Karryadio obtained six stages of amplification condensed into a space ten inches square and four inches high without sacrifice

### **Carrying Case**

efficiency.

It was also borne in mind that a portable radio must not look like a radio set when being carried, for the discriminating buyer does not like to be made conspicuous or to attract attention to himself through a case which with its outside controls radiates "there goes a radio set." This fact was always kept in sight by the designers with the result that no unsightly controls mar the beautiful lines of the case.

A characteristic of well designed luggage is its thinness, which permits carrying with the least inconvenience and fatique. The experienced traveler will welcome the extreme reduction in this dimension obtained in the set by its collapsible sound amplifier, which gives the equivalent of the ordinary "loud speaker" in volume but occupies little space when folded up.

Another feature which makes an instant appeal is the remarkable simplicity of the loop aerial. Realizing that the set must be at all times available for instant use, all forms of detachable loops were discarded and a loop antenna built into the case cover so arranged that it pivots for directional reception as soon as the case is opened.

The loop itself would have been as efficient if placed in an ordinary hinged



inadequate, and the ordinary dry cell decided upon.

As UV-199 or C-299 tubes are used. three batteries in series are required for proper voltage. Two sets of three, making six altogether, made the best combination, but brought the weight of the entire machine up to the point where the user might find it too cumbersome. Three cells. therefore, were specified, but the unique idea was adopted of providing a reserve cell, which allows the working of the cells in rotation, thus giving each cell a chance to recuperate and greatly prolonging its life.

Dry cells are similar to humans in this respect. If both are not overworked and have a chance to rest much greater work and longer life are assured. In the factory tests it was found that four cells rotated. at one-half hour intervals, so that no one battery had more than one and one-half hours continuous service, lasted as long as six batteries in the circuit all the time The automatic battery connector makes it time.

Regardless of the form in which a radio cessitated movement of the entire case paratus must be used throughout. And as to be ever present for such occasions.

only seventeen inches long, fourteen | with the horn at times pointed away from | quality was the dominating keynote in designing this set, the best of each piece of apparatus was used regardless of cost. This fact will be recognized by an examination of the following list of material used:

### Parts Used in Set

1. The tuning condenser is a Hammarlund. 2. The radio-frequency transformers

used are Duratrans. 3. The fixed condensers used are also

made by Dubilier. 4. The audio-frequency transformers are Amertrans.

5. The rheostat and potentiometer used are of Federal manufacture.

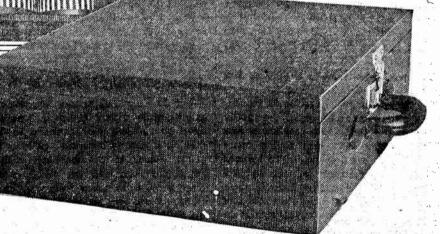
6. The tube sockets are the latest of the non-microphonic type, and manufactured by the Benjamin Electric Company.

7. Loud speaker is an English unit, the amplion, made by Alfred Graham Company, England.

Not only have the best parts been used throughout but electric connections between these elements are carefully made by fine spaghetti-covered heavy wire with soldered, nickle plated terminal lugs at every connection, firmly secured by lock washers. Lock washers were found to be a necessity, particularly in a portable set where the machine receives considerable handling.

The finish on the outside of the case is the best grade of du Pont fabricoid and makes a handsome suitcase.

The circuit used is the old standby transformer-coupled, three steps of radiofrequency, tube detector, and two transformer-coupled audio steps. Patents are pending on the unique features described. The radio dealer at the present time is faced with a problem to which he should give deep consideration. The good merchandiser wishes nothing but satisfied customers. The question therefore comes up as to what set should the dealer recommend to the average customer-a selfcontained portable, or the more cumbersome stationary set? The average person cannot afford and does not want two sets. But every one, at some time or other

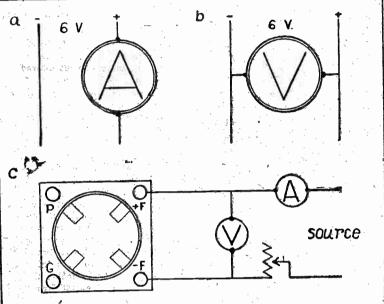


vishes for a set which can be readily carried from place to place. Perhaps, merely moving from one apartment to another, or perhaps, for use on the weekend trip, or the months spent in the coun-

Certainly, the ordinary stationary set is not readily portable, but the portable receiver can easily fulfill the requirements of the stationary set if nothing is lacking to make it a regular machine.

Karryadio has been equipped with an antenna and ground connection so that it may be used with an outside antenna and give as good results as the larger and more cumbersome stationary sets.

Portable radios in general are coming to be recognized, not as a fad, but as a real necessity. If one happens to be in the country without a phonograph and a new record comes on the market it can always he obtained later and replayed at will: but a speech, for instance, by a great man over the radio, if not heard at the time of broadcasting will be lost in so far as easy to change the batteries from time to the personality of the man is projected in his voice. Reproduction of the speech in cold print cannot be as satisfactory. cover, but its adjustment would have ne- | set is assembled, the highest quality ap- | Only a portable radio can be relied upon



radio set.



TATE & S. & A Y A

Wandelt Gray battery:

### **Proper Connections for Ammeters and Voltmeters**

First, the ammeter. The connect- tery posts.

At one time or another radio lans hegaine of by designating the poor violates with be able to follow the the Coming Matches." Captain Greed wish to have either a voltmeter, an as negative that has no identifying progress of the horses, even though was educated at Marlborough College,

ing of an ammeter in a circuit is The circuit given in Fig. c for the mont and Aqueduct tracks. always the same, no matter whether ammeter is for measuring one tube's Epinard, the famous four-year-old Hartford to Have a New the amount of current to be meas- amperage only. For use on all tubes which Pierre Wertheimer has re-

shows how to use the instruments the tubes.

ter is always connected in series with binding post and the rest of the country in just one-third the time, the source of current before it gets circuit. That is, the "A" battery and as result the DX fans will get to the load. For simplicity the dia- positive lead goes first to the am- their much needed rest. In a telegram given accompanying this story meter and then to the filaments of gram to WGY Mr. Edwards reported

will depend upon the amount of cur- anna' from WGY, a KDKA concert Every ammeter has two terminals. rent flowing in a circuit. For testing from East Pittsburgh and a prize-These two are marked as to polarity. the drain of a set employing one fight from WBZ, Springfield, were all That is, one of them is marked with UV-102A tube the scale reading can received by me on a crystal to-night either a plus sign or stamped "Posi- be as low as one-half an ampere. simultaneously." tive." This terminal is connected to The same for a WD 11 or 12. For a the positive battery lead, and the 199 tube no ammeter is necessary. Determining Cost of

made by the Gray Electro-Chemical capacity.

last few months. The latest of these indefinitely either charged or dis- forty-mile radius. As there are is the Gray Endurance B Battery charged without any diminution of about 700,000 homes in the same

method of treating the metal ele- rosive, nor inflammable. nitely prolongs their life; is the the battery. work by Dr. F. C. Gray and Paul with excessive rates of current.

.The manufacturers, who express faith in their product by giving a two radio reception is obtained. make the following claims for the tion.

ments which, it is claimed, indefi- Severe vibration does not result of eighteen months' research The plates do not buckle or warp

> There are no acids used. A greater range of distance

year guarantee to each purchaser, It is absolutely noiseless in opera-It can be shipped dry charged and

It can be short-circuited, over- can be made ready for use within charged, or charged in reverse direc- ten minutes after unpacking.

Horse Races To Be Broadcast by WJZ For the first time since horse racing

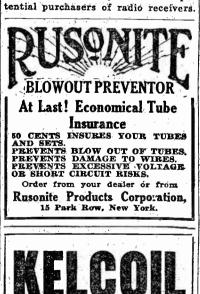
of both races direct from the Bel-

ured is one-millionth of an ampere the ammeter should be connected in cently brought to this country, and which is now in training for the series of three races scheduled for the early fall, will be the star attraction of the first racing broadcasting in history, and the best horses of this country will be "seen" in competition with the foreign favorite by radio listeners. J. Andrew White, who has described every type of sporting event which the radio has so far carried to the distant fans, will be at WJZ's microphone in the judges' stand, and direct Western Union wires, specially installed for the event, will carry his voice to the broadcasting studio on West Forty-second Street, New York, where it will be "put on the air."

### A Novel Method of Tuning In Broadcasting Stations

DX fans who require the entire evening to call the roll of the nation's broadcasting stations will be envious of C. B. Edwards, of Kingston, R. I., who has discovered a method of bringing in three stations at once. If three stations may be brought in at one time it will be posor one million amperes. The amme- series with the positive "A" battery sible to log all the stations in the a radio hash of the following inon a six-volt battery for use in a The scale reading for an ammeter gredients: "Three acts of 'Polly-

territory, this estimate would indi-Company, of Bayenne, N. J. A special Its gases are neither noxious, cor- cate that there are 610,000 homes in Chicago and vicinity which are po-



SIX DOLLARS **GETS MORE STATIONS** LOUDER AND CLEARER THAN ANY COIL ON THE MARKET SYCO RADIO PRODUCTS CORP. 440 Drexel Bldg., Philadelphia

Captain Creed at WEAF Captain Percy Redfern Creed, fawish to have either a voltmeter, an marks upon it. ammeter or both. These instruments are either to be placed on the anel of a set and are to be permanently first be decided whether the voltage of a set and are to be permanently first be decided whether the voltage connected to the receiver or are to of the entire circuit is to be meas- Aqueduct on September 4 and 27, for years and in 1892 made 211 runs for to used as external trouble shooters ured or just the voltage across one through the co-operation of Major Marlborough College against the fa-In either case it is well for the filament. If just the voltage im-prospective purchaser of these in-struments to know just how they ured, then connect the voltmeter as should be used and how to connect the voltmeter to the "A" bat-them in a circuit.

**Broadcasting Station** The New York Herald Tribune Radio Magazine is informed that the Travel-





#### Parts and Equipment

tive." This terminal is connected to the positive battery lead, and the positive "A" battery lead, and the server standard of the setter standard of the server standard of the setter standard o

### TROUBLES

GUARANTEED SERVICE SUPER-HETERODYNES and other circuits.

### Full line of tubes, parts and accessories. Sets Built, Wired and Repaired

CHAS. DOWN, 221 West 44th St. New York City. PENN. 7779.

SPECIAL SATURDAY AND MONDAY. 100 VOLT UNIT KNOCKDOWN \$1. 140 VOLT UNIT KNOCKDOWN \$1. ELE-MENTS, 6c A PAIR; GLASS CELLS, 3c EACH; SEPARATORS, 1c EACH; PURE NICKEL WIRE, ½c A LENGTH; PO-TASRIUM HYDROXIDE, 2 POUND CANS, 50c. 100 VOLT MAHOGANY CABINETS, \$5. Build a See Jay re-charge C Battery. These batteries con-sist of full size genuine Edison element (not the small size). Pure nickel wire, heavy glass cells, hard rubber separa-tors and imported Potassium Hydroxide. SEE JAY BATTERY CO., 915 BROOK AV., BRONX, N. Y. Third AV. L to 161s SL. Station. Mail orders filled. Phone Jerome 1739. Open until \$ o'clock.

BUILD YOURSELF A RECHARGEABLE "B" BATTERY Parts for 100 volts, \$8.00; 140 volts, \$12.50; 45 volts, \$4.50; 22% volts, \$2.60; Edison elements, 6c per pair; debinets; Io0 V., \$2.25; insulators, 1c each; gen-nine glass tube (will stand extreme heat), r each Sc each. Panels, switches and other parts in stock. Mail orders filed promptly. ROMOO STORAGE BATTERY CO. 146 West 68th st., N. Y. Phone Col. 1253. EDISON GEV \* 2

### Situations Wanted

RADIO MAN with international reputa-tion for workmanship, makers of world's smallest 5-tube set, etc., wants best offer is retail salesmin, instrument construction, service work; 10 years practical experience in all branches. Kasindorf, 49 Poplar av., Silver Beach, Brant



"B" BATTERY WIRE for building storing, "B" batterfem. Genuing hon-corrective, size No. 20. H. BOKER & CO. INC. 101 Dunne st., New York City. WHOLESALE RETAIL

SPECIALIST ON NEUTRODYNE Repair and install REFLEX REGENERATIVE REFLEX REGENERATIVE Sets built to your design; workmanship guaranteed; price very reasonable. F. WUNDSAM Former Supt. of the DeForest Co. 647 THIRD AV. NEAR 42D ST. Telephone Murray Hill 9332.

PHONES MAGNETIZED, REPAIRED, KEYSTONE BATTERY 229 East 14th St. Lexington 2662. For Sale

### ADD THREE stages of RADIO FRE-QUENCY to your set. Radiola A. R. made by Westinghouse especially for R. C. set (wave lengths from 200 to 700 me-ters), will increase volume and bring in distance on loud speaker. Can operate distance on loud speaker. Can operate with loop. Brand new. Full directiona. LIST \$86.00 SALE PRICE \$25.56 FERRAR RADIO CO., \$49 B'way. N. Y. ELECTRODYNE, five tubes, \$125; "ex-pert-bilt" by Marconl .:ssistant. Don's buy an apology set. 201 Jay Street,

### Bitterles

EDISON CELLS, 140 AMPERES, 54.75. ROMCO STORAGE BATTERY CO. PHONE COL. 1253. 146 W. 68 ST., N. Y.

### Miscellaneous

BACK numbers Science Invention less Age, Everday Engineering, Science, Radie News, Popular Radio Broadcast. Some 1915. 6120 19th gv., Brooklyn.

At one time or another radio fans, negative or by designating the post wish to have either a voltmeter, an as negative that has no identifying From Coast to Coast

### **Broadcast Bands Are Crowded**

Interdepartmental Radio Committee Doing Its Best to Curb Interference, but Broadcasters Increase in Number

### By THOMAS STEVENSON

casters.

Interdepartmental Radio Advisory tangles resulting from misunder-Committee, a body of which the gen- standings among broadcasters. eral public has heard little or noth- The seriousness of the broadcasting through WJZ. The Goldman affair, his "I See by the Papers" for the hot ing. The committee was organized situation can only be realized when a by the way, will be continued on Fri- weather, WOR's program is a bit in April, 1922, by Secretary Hoover study has been made of the allocation day night of this week and an all- worse than it has been for the last in order to work out an agreement of wave lengths to the various types Wagner program will be played. among the government departments of stations. Here are the present as to the use of certain frequencies allocations above 75 kilocycles (berecommended for government broad- low 4,000 meters) to commercial, govcasting by the first national radio ernment and private radio stations: that will be continued through the about the best musical event offered conference. In the beginning the As readily can be seen, unless har-new week are the New York Philhar-aside from the Philharmonic band. committee dealt only with broadcast- mony prevails among the broadcast-

The committee is composed of of radio on commercial ships, more members from the various govern-, wave lengths are being required for Philharmonic concert should have a Marine Band will play again through ment departments interested in radio them. The government radio stations trifle more than the usual interest WEAF. This band actually plays in activities. The chairman of it is are now doing a larger business than attached to it, for the final elimina- Washington, but WEAF's wire trans-Judge S. B. Davis, solicitor for the ever before and they are demanding tion contest for the soloist will be think it was in the studio of this Department of Commerce, and the more wave lengths. New broadcast- carried out. Six contestants who first-class broadcaster. If we were secretary is L. E. Whitemore, radio expert of the Bureau of Standards. and all of the wave lengths allocated have been chosen from a large num-ever forced to admit our conclusions as to who is the best technical broad-Meetings are held on alternate Friday for that purpose are crowded to ca. ber of applicants will be entered in as to who is the best technical broadmornings, at which reports are re- pacity. ceived and discussed from its sub- This is one of the immediate prob- data relative to the program of the the honor did not rest at 195 Broadcommittees which have been present- lems to which the Interdepartmental University, but they have been so way. ed for study. The committee has sev- Radio Advisory Committee is giving tion, mobile radio, government policy vinced that the real solution of the they will continue to remain good. | lightfully entertaining that we aland legislation and material for problem would be additional legislaproadcasting.

he committee to leave final decisions smoothly.

75-94 95-120

121-150

190-230

230-235 235-250 250 250-275

275-285 285-315 815

815-84 375 875-445 445

445-550

550-1,350 1,350-2,000

2.000-2.100

2,100-2,300

Wave Length, Meters 4,000-3,190 8,156-2,499

2,478-2,000

1.579-1.304

1.804-1.277

1,200-1,09

1,090-1,053

952-800

800-674

674-545

545-223 222-150

150-143

143-130

**Ilo, International** 

eral standing subcommittees, such as its thought and attention. While the consistently good in the past that those on technical problems, opera- members of the committee are con- there is little risk in holding that tion, they are doing their best in the It has been the general policy of meantime to keep things running

> Use. s government, 5 commercial overnment exclusive. 20 land stations, 31 by the New York Federation of spect that it deserves. Government exclusive. 20 land stations, 31 by the new 1014 reduction will be also notice that May Bréen and 5 Government exclusive. 43 land stations, 109 would have us believe that this cho-her syncopators will be at WEAF on Government exclusive. 4 land and 200 ship stations. Marine phone. Radio compass. Marine phone. Government exclusive. 50 land and 25 ship and aircraft stations. 2,700 commercial ships. 58 shore stations. Also foreign ships. 525 broadcasting stations. 17,000 amateur stations. 132 experimental stations. 89 technical and training schools. 11 point to point commercial. 8 government land stations.

1 point to point commercial.

### **Radio Language** O. C. Roos, of Boston, president of By Powel Crosley Jr. "Rails," makes these statements about

"It may interest your readers to working with CKAC, 'La Presse,' dustry during the last year, and sec-Montreal, to educate the radio public ernational language: KYW and WMAQ, Chicago; WNAC, Boston; WBZ, Springfield; WGR, Buffalo; WGI, Medford Hillside; WLW, Cincinnati; PWX, Cuba. Many others are joining the army.

"The following llists are well known radio engineers and officers of power of wireless communication. 'Rails' (Radio Auxiliary International Language Society): E. F. W. Alexanderson, chief radio engineer, Radio spheres which now enjoy the ben-Corporation of America; Major Gen-efits of radio will indicate in unmiseral G. O. Squier, inventor 'wired wireless' and 'line casting'; John S. Stone, a great mathematician and radio inventor; John Hays Hammond ir., inventor of battleship and tor- also that it has been an invaluable pedo control by radio and of the influence in bringing the nations of 'scrambled' system of radio; George the world in closer relationship, as Lewis, assistant to Powel Crosley, well as affording people in all walks radio manufacturer; John V. L. Ho- of life, of every class, creed and gan, author of 'Outline of Radio,' color, a medium destined to enterwhich is to be translated into Ilo. tain, edify and instruct. Two of these Ilists have been past As executive chairman, the writer presidents of the Institute of Radio cannot urge too strongly that every Engineers, of which I was a founder. co-operation be given the Interna-The amateur interest is represented tional Radio Week committee for the by Irving Vermilya, running three success of the fortcoming event. By If you want to buy, sell or stations in New Bedford, Mass., and strengthening the foundation now laid exchange your radio sets or 'getting across' easily. The Super- its perpetuity will be assured for the visor of Radio, 1st District, United benefit of mankind, who regard radio

ficer."

ships. Universities. 4 stations. farine phon Marine phone. Government exclusive. 18 ship stations. Marine phone. 12 ships on 1,100 meters. Mississippi-Warrior service. 4 point to point thoughts. We are quite sure, howstations. Marine phone. Also 1 point to point station. Radio beacons. 13 stations. Government exclusive. 4 hand and 200 ship will be enjoyable for those who like radio's greatest whistler, will be at

### International **Radio Week**

Executive Chairman

International Radio Week, to be held November 23 to 30, will serve a learn that, so far, the following ra-twofold purpose. First, it will mark diophone broadcasting stations are the rapid progress made by the inond, it will be the means of uniting in Ilo, the perfect radio auxiliary in- the radio interests of the world in a great international exposition. Reports received at this time indicate that virtually every country interested in radio will aid in the forthcoming event, with a view to showing the keen interest being taken in the science and to prove the world-wide

> It will be a period when the nations of the Eastern and Western hemi-

parts the Radio Exchange visor of Radio, 1st District, Sinted States, as one of the greatest achievement. in the world's history.

### The New Week on the Radio By Pioneer

WASHINGTON .- In the absence of with the departments. Its recommen- Monday night we have the broad- twenty minutes with him, feeling that egislation authorizing the Secretary dations have no binding effect and it east by WOR of the concert a good investment was made, f Commerce to regulate radio, all does not of itself undertake new du- given by the newly formed Newark government departments are co-op-ties. In spite of this, the Interde-erating to keep interference down to partmental Radio Advisory Commit-Philharmonic Band. This is WOR's the lowest possible minimum and tee exercises a big influence on radio first experience with outside broad- monic Band Concert, WOR's mixture promote harmony among the broad- activities. It co-operates with Chief casts, but we have found that they for the week is a little lean. We can-Radio Supervisor Terrill, who is a are making a very creditable job of not find one outstanding event on it. The center of these activities is the member of it, in straightening out it and it compares quite favorably In fact, if we are to consider the fact with the Goldman Band broadcast that Holly McCosker has discontinued

ing, but successive methods devel- ers, serious interference will result. monic and the concert from the New Next on the list we would place the oped the desirability of extending Most of the wave lengths are now. York University Summer School of concert orchestra of the S. S. Leviathe scope to include a wider field, crowded to capacity. The amateurs Music. The former will be broad- than. That will broadcast on Wedneswhich was accomplished in January, are dissatisfied with their present cast on the night of the 13th and the allocations. With the increased use latter on the night of the 12th. The the contest. We have no advance caster we would have to do a lot of thinking and listening to decide that

> (Copyright 1924) Chorus, which sings sacred and clasfornia, but we don't share his appointment-proof event. sacred music.

> > has been more interesting on a large gen's work has been consistently number of occasions than George La- pleasing. val Chesterton. Chesterton, being English, usually talks about things in WEAF's new program that we chats about the "Slums of London." out a feeling of guilt.

> > LTHOUGH the new week does | We have found Chesterton's expres-A LTHOUGH the new week does not boast of many new fea-sion richly imaginative, and any nortures, we find enough of the mal being with a little interest in the old ones to make it interesting. On world of affairs can spend fifteen or

Aside from the Newark Philharfew weeks. The new program is full of all manner of talks and lectures Some of the other stable features about things of little interest. Yascha day night.

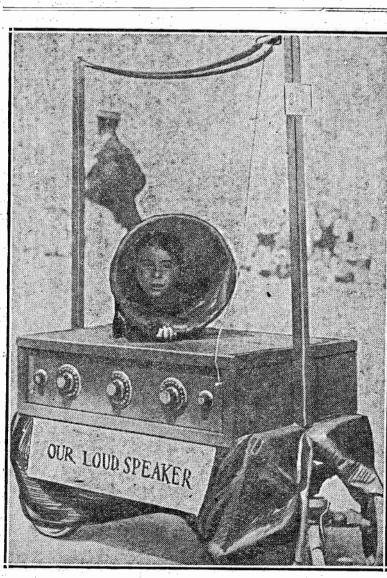
Cello recitals at WEAF have always like to mention them before-This afternoon the Cornish Male hand when they appear with the advance data. The Rev. Hans Dresse! will play his cello on Tuesday night. sical music, will broadcast from WJZ WEAF has never failed to treat the in connection with the program given radio master instrument with the re-

rus is known from Palestine to Cali- Tuesday night. Here is another dis-

WEAF. Whistling is perhaps about the most difficult kind of music to broadcast, so easily is it distorted by We don't know of a lecturer who the microphone. However, Sybil Fa-

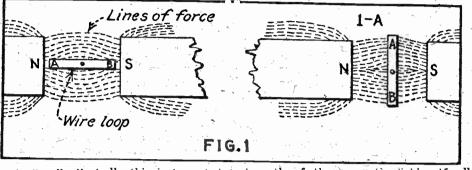
English. On Thursday night he would mention in this column with-

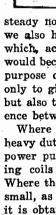
magnet.



William Rand, "Radio on Wheels," wins prize in Bradley Beach parade







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ators.

may put them.

## An Explanation of the Difference Between **AC and DC Current**

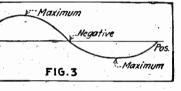
### A Simple Description of Élementary Generators for the Two Types of Commercial Electrical Energy

### **By GEORGE HOPPERT**

writers to explain clearly the dif- of a permanent magnet, an electric presference between alternating and sure or electro-motive force (emf) will be direct current. Not so long ago I read | set up in the wire. This electro-motive an article giving the definition of alter- force or voltage will depend on three facnating current as follows: "An alternat- | tors-the speed at which the wire is reing current is one which does not have a 1 volving, the length of the wire and the

which, according to the above definition, would become an alternating current. The purpose of this article is, therefore, not only to give an understandable definition. but also to show the reason for the difference between the two kinds of electricity. Where electrical energy is required for heavy duty, such as house lighting and for power purposes, it is obtained by revolving coils of wire in a magnetic field. Where the current drain is comparatively small, as in your radio set or automobile. it is obtained from either primary (dry)

cells or secondary (storage) batteries. Certain bodies (especially iron and steel) have the property of attraction or repulsion known as magnetism. Where no external energy is used to induce this magnetism, the metal possessing it is known as a permanent magnet. Every magnet, permanent or temporary, has two poles, a north pole and a south pole. The polarity of a magnet can easily be deter-



mined by suspending it so that it can move freely and by allowing it to come to rest. One end will always point toward the north. This end is called the north pole: the opposite end is called the south

Now, if we take two of the permanent magnets and bring them together we will find that the north pole of one will attract the south pole of the other and vice versa, but that if we bring the north poles of both magnets together there is no attraction, but rather a repulsion. Every magnet, whether permanent or temporary, has what is known as a magnetic field. This magnetic field is the area in which its magnetism exists and it can be determined by the old test with a bar magnet, a piece of paper and some iron filings. The magnet is laid on a table and the paper placed over it. The iron filings are then sprinkled over the paper. By touching the edge of the paper rather sharply the filings will fall into an arrangement showing exactly the magnetic field of the bar magnet. It will be noticed that the filings arrange themselves in lines, and these lines are known as lines of force of the

A current of electricity flowing through a wire is surrounded by lines of force just as in the bar magnet. When a coil of wire is wound around an iron bar or, better still, a bundle of soft iron wires, and current passed through it, these lines of force will pass through the bar as well as around the entire coil of wire and the bar becomes strongly magnetized. When a magnet takes this form it is called an electro-magnet and retains its magnetic property only as long as the current is flowing through the wire.

### **Current Production**

It was shown in the last paragraph that it is possible for a body to become a magnet by intercepting and collecting "lines of force" set up by a current of electricity flowing through a coil. This is also true if the process is reversed; i. e.,

steady now." Partially this is true, but | strength of the magnetic field. If all we also have a fluctuating *direct* current | three are favorable a flow of current will result.

> Let us analyze this flow of current: Figure 1 shows a section of the wire loop between the north and south poles of two permanent magnets. If the loop is revolved the sides of the loop A and B will cut the lines of force flowing between the poles and an emf is generated in each side. When the loop has reached the position shown in Fig. 1-A neither side is cutting any lines of force, but is traveling parallel to them, and no emf is generated, but as soon as this point is passed the sides begin to cut the lines of force again, this time in the opposite direction, so that the direction of the emf generated is reversed. It can be seen that in its path from the horizontal to the vertical position the wire cuts fewer and fewer lines of force until in the vertical position it cuts none at all. Inasmuch as the number of lines of force is a factor in determining the pressure, or emf, it is evident that as the wire nears the vertical position the emf becomes less and less until it is at absolute zero. It necessarily follows that as it again reaches the horizontal position, this time with ends reversed and consequently flow of current reversed, it cuts more and more lines of force until it reaches its maximum at the horizontal position. This accounts for the surging pressure or voltage in an alternating current.

It isn't always necessary to have the wire moving and so cut the lines of force. The same effect can be gained by having a bar magnet inside the loop or wire and the magnet revolving. In this case the lines of force are traveling with the magnet and are cut when they come into con- device called a commutator. The commu-

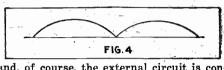
stances, for practical reasons, the magnets are stationary.

In Fig. 2 we have an illustration of the very simplest form of alternating current generator. L is the wire loop fastened to the axis P so that it can be revolved between the poles N and S of the magnet. The ends of the loop are connected to the rings A, which are known as "slip-rings," and to these the external circuit is connected by brushes B. When the loop is turned both sides will cut the lines of force passing between the poles of the magnet and generate an emf which will cause a current to flow in the external circuit. In the position shown the loop is not cutting any lines of force, as has been previously explained.

A quarter of a revolution further on the sides of the wire are in the center of the poles of the magnet and the emf wave is at its maximum point. From this point. for a quarter of a revolution, it will decrease until it reaches zero, then the direction is reversed and it inceases to negative maximum, from which it decreases to zero again. At this point a complete revelution of the loop has been made. The direction of the current in the external circuit was reversed every half revolution.

Fig. 2 shows what happened in the ex-

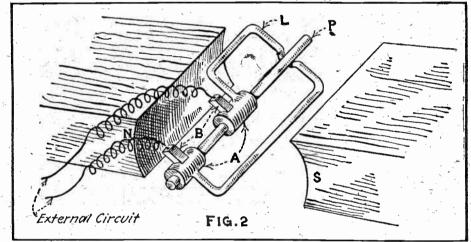
T SEEMS very difficult for most that it intercepts or "cuts" lines of force | tact with the wire. However, in most in- | tator used for this machine would consist of two metal segments in place of the two slip-rings A as-shown in Fig. 2. They are in the form of half a slip-ring and are insulated from each other, generally with mica. To these the ends of the loop are connected. Two brushes rest on this commutator directly opposite each other



and, of course, the external circuit is connected to the brushes.

When the loop is revolved the two segments of the commutator move around so that at the position where the loop is not cutting any lines of force, i. e., the vertical position, the brushes touch both commutator segments. When this point is passed the brush which was formerly in connection with one of the segments and consequently with one end of the loop is now connected to the other segment or other end of the loop and vice versa with the other brush. So that the direction of the current, which has been reversed in the loop, will remain the same in the outside circuit. Fig. 4 shows the current wave generated by this machine in one revolution

The part of a generator furnishing the



ternal circuit when the loop was revolved. The complete curve is a cycle or an alternation. The horizontal line is known as the "base-line" and represents the zero of emf. During the first half of the revolution the current was flowing from positive to negative and during the second half of the revolution from negative to positive.

In order to obtain direct current from this machine it is necessary to employ a

### **Regeneration Can Now Be Measured**

The Bureau of Standards has devised a method of calculating the amplification produced by the "tickler" method of regeneration. This discovery, in the opinion of experts, marks another milestone along the road to a perfect radio-receiving set.

The importance of the discovery can be stimated only when the necessity of amplification is understood.' Amplification is needed to strengthen weak signals, and elso to operate a loud speaker. Obviously, if amplification can be calculated in adance, it will result in clearer signals, as too much amplification is just as bad as not enough, since distortion results.

Hitherto, while it was well understood how to amplify radio signals by regeneration in electron tube circuits, there were verv few data on the amplification produced by this method of regeneration.

"The amplification of received radio signals by regeneration in electron-tube circuits is well known," said the Bureau of Standards in announcing the discovery. "One method of regeneration is the feeding back of alternating current power by means of inductively coupled coils in the two circuits, from the plate circuit to the tuned circuit connected to the grid of the electron tube. This method has been used if a wire is rotated in a magnetic field so | extensively in modern radio-receiving sets | said:

and is known as the 'tickler' method of regeneration. However, very few quantitative data have been available on the amplification produced by this method of regeneration.

"By means of a simple alternating-current theory an equation has been derived from which the amplification produced by inductive feedback ean be calculated. This equation shows that regeneration can be considered as producing a reduction in the resistance of the tuned circuit and so increasing the current. The equation derived was completely verified by experiment."

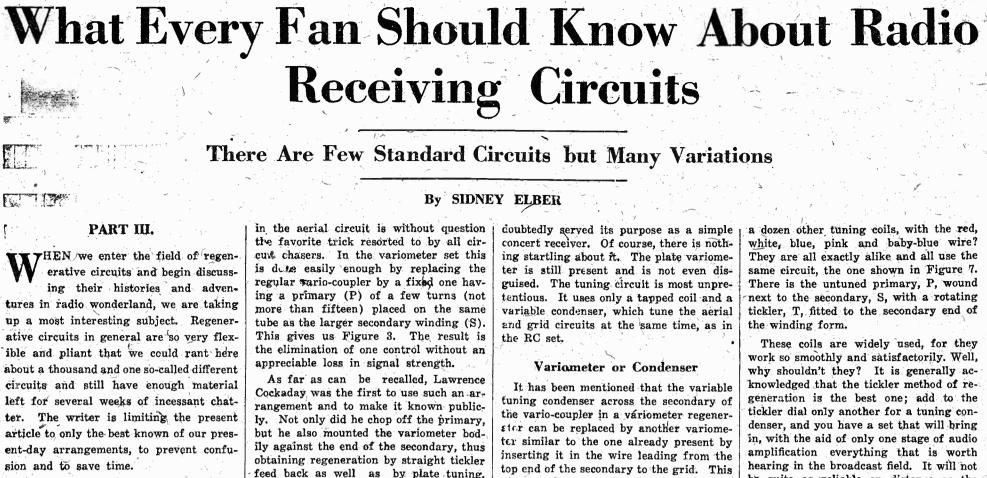
An unusual feature about the discovery is that a woman participated actively in the experiments. Dr. C. B. Jolliffe and Miss J. A. Rodman, of the Bureau of Standards, are given credit for the discovery.

Another step is being taken by the government which, it is believed, will eventually lead to the standardization of all radio equipment. The Bureau of Standards is conducting a series of tests to determine the most acceptable types of ary cells for use by government purchasformulated specifications for a standard transmitting tubes. In announcing the These variations, however, are very slight, dry-cell tests the Bureau of Standards | and for ordinary purposes it can be as-

lines of force is called the field and the part which cuts these lines of forces and generates the pressure is called the armature. Of course, commercial apparatus assumes a very different appearance from the very simple model illustrated in Fig. 2, but it operates on exactly the same principle. The armature in a large generator consists of coils of wire wound around an iron core. The field is excited with electro-magnets, the electrical energy either being fed by the generator itself or from an outside source. Because an alternating current would change the polarity of the field magnets, only direct current generators are "self-excited." 1. e.. clectro-magnets operated by their own current. You can see now why it is impossible to charge a storage battery on alternating current without some sort of rectifier in the circuit because, due to the reversals in the current flow as much energy would be taken out as was put in.

In your radio set alternating current is flowing right up to the grid of your detector tube. After the detector tube you have a pulsating direct current which varies with the variation of the incoming signal. While this is a varying current, it is not alternating, as one would be led to believe from the definition given at the beginning of this article. The chief difference is that though the pulsating direct current may also have a "wave" similar in appearance to the alternating current line, the direct current wave never goes below the base-line, which in altenating current indicates a reversal of the flow.

This may, and I hope it will, settle a number of questions that have arisen since the radio fan was compelled to become further acquainted with the mysteries of alternating and direct current. It might be well to add that the only way we can secure a steady flow of direct current is ing officers. The government has already from a battery, primary or secondary, and even the slight variations are caused receiving tube and is compiling data on by local action within the battery itself. sumed that the flow is steady.



It must be definitely understood that the basic and underlying action of all regenerative circuits was first discovered

feed back as well as by plate tuning. This was a clever stunt and worked out very nicely.

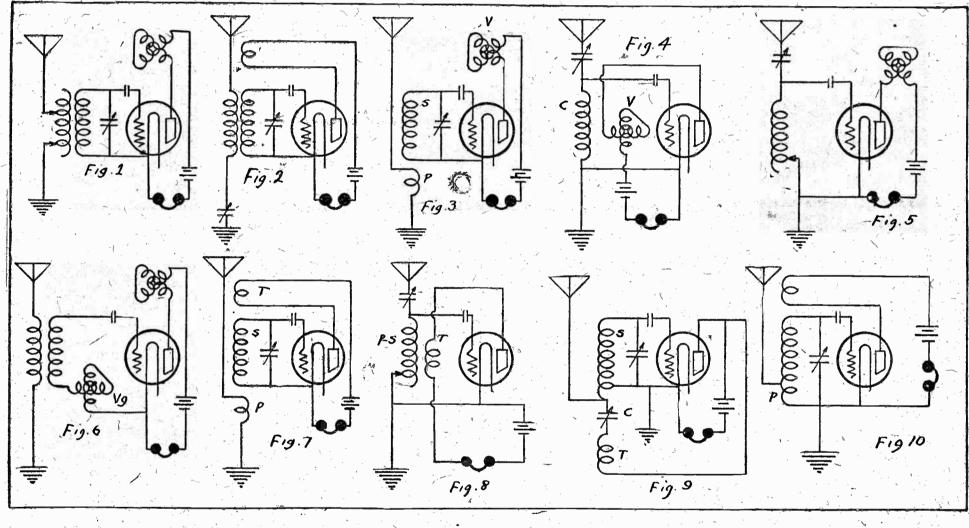
The untuned primary-variometer re-

rives us the two-yariometer receiver.

Nothing is gained by this substitution,

white, blue, pink and baby-blue wire? They are all exactly alike and all use the same circuit, the one shown in Figure 7. There is the untuned primary, P, wound next to the secondary, S, with a rotating tickler, T, fitted to the secondary end of

work so smoothly and satisfactorily. Well, why shouldn't they? It is generally acknowledged that the tickler method of regeneration is the best one; add to the tickler dial only another for a tuning condenser, and you have a set that will bring in, with the aid of only one stage of audio amplification everything that is worth hearing in the broadcast field. It will not be quite as reliable on distance as the more complicated radio frequency sets, but it will pull the DX'ers in all right, and except in the matter of appearance. Ex- | pull them in nicely. This circuit by the



scores of incidental experimenters did not widely copied. One shameless radio fan to choose between condenser and variome- | rant manufacturer seems to think. It is start until Armstrong made known his own investigations. It is true that | it to a not so distant town, and convinced much impórtant development work was accomplished by the later men. and all credit is due them for it, but there also | fan got a lot of free publicity, but it didn't. have been many palpable fakers who unabashedly labelled the labors of others as their own. The writer does not wish to invite libel suits by openly mentioning names, but the reader can peer between the lines and draw his own conclusions. Murder will out, anyway.

As mentioned in a previous article, the variometer and tickler regenerative methods have been most freely adapted to "new" sets. Two definite sets, the variometer-vario-coupler and the three-coil honeycomb (Figures 1 and 2), because of the length and time they have been used and known, will be regarded here as the foundation ones from which the variations are obtained. These receivers were employed long before broadcasting became the gigantic service that it is to-day, so the wisdom of their choice as criterions for younger affairs will not be questioned.

### **Variometer Circuit**

Let's start with the variometer outfit. The regenerative action results from the presence of the variometer in the plate circuit, so that fixes that instrument. All the changing must be done on the grid side of the tube; in other words, in the tuning circuit.

Getting rid of the tuned primary coil

Cockaday's receivers, carried a young and unsophisticated radio editor that it was his very own brain child. Said last long. Murder, etc.

### Single Circuit

The circuit of Figure 4 may look vaguely familiar to quite a few persons. It should, for it is the fundamental circuit of the onetime famous and now departed "RC" set. (May it rest in eternal peace and solitude!) Regeneration was produced in it by a variometer (V) in the plate circuit, also coupled to the grid (C). The big dial up on top turned both the variometer rotor, and also the aerial tuning condenser. Why, we don't know. The combination was not a particularly wonderful one, as the tuning was broad and the regeneration adjustment rather coarse.

This was a single-circuit set-"single" because the aerial and tube circuits were combined and used the same tuning devices. Its one advantage was its simplicity of operation, but even this was superficial. It was so simple that everything came in at once on it.

The circuit of Figure 5 is similar to that of Figure 4, but the mechanical positions of the parts are different. This is. or rather was, a popular circuit among New England fans. It was introduced atout two years ago, and at the time un-

by Armstrong. The work of the many generator worked beautifully and was perience has proved that there is nothing way, is not "three circuit," as one ignoter tuning; the advantages and disadvar tages of each method just about balance, as do the actual results; which count more than anything else.

> Now not so long ago the writer read with amazement in a Western paper one of the boldest and most foolish radio stories he has ever seen. Some local radio "engineer" (so the credit line said) apparently had devised, after long and tedious labor, a marvelous and epochal receiving circuit which would do everything but sprinkle the front lawn. After wading through several columns of autobiographic wishwash we finally came to the description of the circuit, and, lo and behold! it made use of two variometers, a variooupler and the usual accessories! The claim for originality was made on the sole fact that the secondary tuning variometer, instead of being placed between the secondary and the grid, were most brilliantly installed between the secondary and the filament. This is about as different from the first scheme as the dancing of one Tiller girl is from that of any one of her partners.

> Tickler feed back circuits are not one bit less changeable than variometer ones. Again there is the tendency to eliminate the aerial tuning circuit, and instead of finding the helpful, movable primary coil of the honeycomb set, we find five and ten turn untuned primaries.

Who hasn't seen the "Ambassador," "Air King," "Yankee," "Uncle Sam" and | all radio fans are interested in.) World

Other tickler circuits can be recognized easily enough. In Figure 8 is the old single circuiter with a vario-coupler and riable condenser. This squealer is now about obsolete. It brings in a lot of interference and generates almost as much itself for others. Its passing is not mourned.

Figure 10 shows a circuit similar to that of Figure 7, but not as good as it. The bottom of the secondary winding is used as a primary instead of a separate coil. It is seen around occasionally.

### **Reinartz Tuner**

Figure 9 commands immediate respect. It is the Reinartz, not Reinhartz, Rheinartz. Rheinhartz, or Rineharts, and it probably created more furore in its time than any other. Truthfully, it is not an original circuit either, but to rush to the defense of Reinartz, it must be stated that that prolific experimenter fully acknowleaged the fact that his circuit was but an adaptation of the Weagant system of shunt tickler feed back when he first described it in OST.

The tickler coil in the Reinartz is connected across the plate circuit rather than in series with it, as in the other sets just described. It is usually kept fixed, the regeneration being controlled by the condenser C.

(The next installment will deal with audio-frequency amplifier circuits, which

### THE NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, AUGUST 10, 1924

Neutrodyne

purposes of that concern.

up the receiver and exclaimed; The hall man, hearing the remark, this concert may bring forth.

thought the stranger was with Mr. Stein and did not interfere. The intruder quickly disappeared in the

make your vacuum tubes flicker. -

Current Tap 20

RADIO

A DICOMPETE

**VEXCHANGE** 

ALL TUBES REPAIRED AND GUARANTEED 2.50 W. D. H or 12 U. V. 199-200-201A U. V. 202 repaired \$3.50 BADIO TUBE EXCHANGE, 200 B'way, N. Y MB Mail Orders Given. Prompt Attention. Orders Sent Parcel Post C. O. D.

C.A.

BA

Broadcast Recital **Brings** Collector And the Thief Alphonse Bohrer, the well-known To Operate WEEI Quick to see the advantages of racomposer and pianist, whose WJZ re-\$2.45 which he claimed was a year tion of WEEI. overdue. Bohrer fortunately had Stein put the set in his automobile paid the bill by check, and was able a stranger entered the hall, picked car for Canada immediately upon broadcasting. concluding his program on the 11th, Bob Emery, formerly of Amrad,

### Violoncellist at WEAF

man was instituted. But the set was his father was professor of the piano, a dummy used for catalogue photo- and from him he received his early ing end of the station. public and private recitals.

### **Radio Editors**

WEEI, the new 500-watt broadcast- dio education, both to rural and Somewhere in New York there is a citals have been among the outstand- ing station of Edison Light, Boston, urban populations, Edna K. Barker is The campaign conducted by the ark, N. J., to get a neutrodyne re- cluded his last appearance before the portunity to practice what they have tical. The coming classes in French, ceiver from the Eagle Radio Company WJZ' microphone a bill collector preached, for they will have com- however, are already more popular to be photographed for the catalogue dashed into the studio with a bill of plete charge of the policy and opera- with the general public as well as

Charles Burton, radio editor of and drove to his office in New York the next day to show the alert agent ["The Herald-Traveler," will be super- at 8:20, Pacific time, August 20. City. He got out, carried the set into his canceled check. In the evening of intendent of the broadcasting de- Tune in and take it. Write in and he spoke to an acquaintance who had heard from for over fifteen years. Post," will be director of publicity Inc., San Francisco. The course is accosted him. As they were talking Mr. Bohrer plans to leave by motor and assistant superintendent of free.

"Oh, all right. I'll take it along!" for he is not sure just what result will be program director of the new station. He will be assisted by E. Lewis Dunham ("Uncle Eddie"), who night will be abolished on August 13. pheric disturbances have interfered The eminent violoncellist Rev. was his assistant at WGI, and by Fans who can tune in on this station but little with the enjoyment of radio crowd on the street with his precious Hans Dressel will play a solo concert Miss Marjorie Drew, who was chief will be provided with an unusual reception. Letters from public offibundle. As soon as he had discov- as the leading feature of WEAF'S clerk of WGI's broadcasting depart. musical program. The Filipino or- cials, educators and clergymen emered his loss Stein called up a police program on Tuesday evening. Mr. ment: Clarence V. Purssell will have chestra of the U. S. S. Leviathan and phasize the fact that, in addition to station, and a general search for the Dressel was born in London, where charge of the technical and operat-

insides. What the thief said when he the rudiments of music and appeared E. I. for Edison Electric Illuminating tra will be broadcast, in conjunction conventions came in many quarters examined his loot would undoubtedly at an early age as a pianist at both Company, are incorporated in the with WJZ, from the Lewisohn Stad- as a revelation of the power and descall letters-WEEL

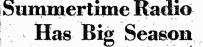
KPO Adds French Lessons To Scholastic Program

with educators and students of economie and social life.

The KPO French course commences

### WGY Will Broadcast

ium, College of the City of New York, tiny of radio in the home.



disillusioned crook bitterly bemoan- ing features of the winter radio pro- will open early in September. It will offering another foreign language Radio Section of the Associated Man. ing his luck. In fact, so far as he is grams, returns to the radio audience transmit on a wave length of 303 course to the KPO listeners-in. The ufacturers of Electrical Supplies to concerned, all the joy has been taken in a special radio recital from that meters. Two Boston radio editors radio course in Spanish, which rose make the summer of 1924 a radio out of his business. It happened this station on Monday evening. Mr. Boh- who for many months have been so rapidly in favor under Mrs. Bark- summer by the improvement of way: Harold Stein, general manager of "Foto Topics," was called to New-certs, for immediately after he coner's organization and direction, was equipment, service and programs, has which radio has taken upon the public and the better quality of reception this season as compared with the warm months of 1923.

One of the interesting develor ments disclosed in these communicaties." In thousands of the smaller gathering of neighbors and friends for an evening of music or for an informal dance.

Due to the notable improvements in receiving apparatus as well as the On Wednesday Evening greater power and range of many The usual silence of station WGY, broadcasting stations in the United Schenectady, N. Y., every Wednesday States. the usual summertime atmosa radio address by Captain Herbert, these entertainment features, radio Hartley will be broadcast from 7:30 has become an indispensable public to 9 p. m. At 9 p. m. a concert by service. The broadcasting of the graphing purposes only. It had no musical training, He soon mastered Edison Light's official initials, E. the New York Philharmonic Orches- Democratic and Republican national

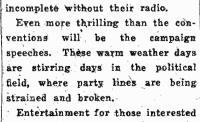
summer daus Below are listed Manufacturers and Dealers who can supply your wants. Shall I Buy vhere the growd goes A Radio This WONDER Summer? Some thousands of prospective Lego Wonder 22 East 125th St., Near Madison Ave. radio fans are asking themselves this 874 COLUMBUS AVE. question. From their friends they Fixed Detector WE HAVE A FOLLOWING!-Because have "caught the bug" and are thorwe have never been ent of stock on advertised mer-chandise, never have refused to refund money, nor have we ever made a promise that wasn't kept. oughly determined to have a set of **REFLEX & CRYSTAL SETS** their own, but are laboring under the TRADE IN YOUR OLD SET FOR A DE FOREST D12-NOW ON DISPLAY Liberal Allowance Made on All Sets mistaken impression that they won't Something entirely new. 100% SENSITIVE need it until the fall season sets in. Much more than in previous years **10 IMPORTANT FEATURES** GENUINE RCA 201A TUBES \$7.59 the summer of 1924 offers entertain-READ THEM CAREFULLY ment for those who are privileged to WITH EACH \$3 PURCHASE SETS -No parts to replace or wear out listen to things in the air. STANDARD MERCHANDISE SALE 2-The use of a NEW MATERIAL The recent national Republican GENIUNE FISCHER and Democratic conventions were en Cole Coll volume. to a 4-tube Erla Set joyed by many thousands who never before had come to a realization of -Absolutely 100% sensitive. Na searching for sensitive spot. **B** Batterics Eveready and what a wonderful miracle radio 4-Glass encased, it is immune from sun and dust. Burgess in stock. B.R.P. 221/2 73 B.R.P. 45v... 1.75 really is. There is no question that Couplers 5-Especially designed to withstand high voltage or reflex circuits. thousands of new recruits were = 1,000 Other Items Too Numerous to Mentionadded to the ever growing list of fans to whom life would be dull and



YOUR DEALER HAS FREE HOOK-UPS

RELIANCE RADIO SUPPLY CO. 57 Dey Street, New York Mfd. by EXCELSIOR RADIO CO. - 222 Grand St., B'klyn, N. Y.

parts the Radio Exchange tions, children's programs and fashion will help you. talks.

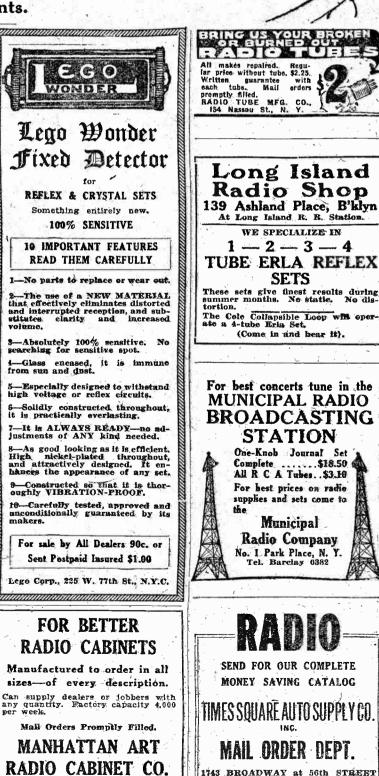


n sports is also plentiful. Baseball scores from the big leagues and prize fight returns are among the attractions in the athletic world.

All things considered, if one is contemplating a radio at all, there is everything to justify getting it eo₩.

A glance at the following list of things available by radio row will further support this conclusion. Things You Will Miss by Not Having a Radio This Summer

Presidential campaign speeches baseball scores, prize fight returns, church services, camping and moto If you want to buy, sell or talks, hotel dance orchestras, Philxchange your radio sets or harmonic and Goldman concerts, dinner music, hot weather food sugges-



NEW YORK, N. Y.

.... 553 W. 53rd St.

N. Y. C

Tel. Columbus 6375,

Last Week on the Radio

By Pioneer

### "Fooling With The Radio"

Probably one of the commonest expressions heard in American households to-day when the whereabouts ing correspondence last week that it be a cause, and that you, too, may of father or son are sought, is, "Oh,

delphia as loud as I can bear the be estimated-not only "fooling" by headphones on the one tube receiver, father and other novices, but by cx-

It is easy to understand how seems all right from the same loca- man who has been busy in a store or office all day is glad to get home at night and "fool with the radio." It makes him forget the cares of H. B. SALISBURY. the day. But it is not quite so easy to understand why radio experts and Many letters like the above have research men who have worked at top been received, and in some cases we speed all day on radio problems of

> "Radio widows" may not all agree, but, of course, the real answer for resulted. They are eternally striving to make the set work better, to make it simpler, to eliminate minor diff-

> made in simplifying the control of modern sets. A well known four-tube

> their home.

bit of news the details of which Undoubtedly you know that there "But I do not feel sorry for him," have then bought another paper to fies that all communication must be It is not the actual amount of work find it. To people who have already carried on with the least power possi- which one does that tires. Fatigue read their evening paper on the way ble, but qualified observers who have and happiness in one's work do not home from business this feature logged this Sound traffic report that go together. In fact, I do not think might not appeal, but such people your operators use a considerable ex- my husband gets as tired as some are the minority of listeners. I cess of power. And this, combined men who work far fewer hours, but therefore solicit your encouragement with the obsolete spark system em- who do not have work which so abpoorly tuned signal that blankets the instincts. Probably the reason that upper scale of broadcast wave lengths Edison can live on so few hours of and hashes up the finest programs. sleep a night is that his trained brain. ast reception, and we re- of fatigue far below the

o: the musical instrument in a radio

you remedy the present intolerable Elimination Contest From WJZ An event of no small importance make the stadium concert by the Secretary. New York Philharmonic Orchestra, In addressing a letter of this na- which stations WJZ, New York City. ture to this particular concern we and WGY, Schenectady, are to broadbelieve that the first gun has been cast simultaneously on Wednesday. Noting your experience with static fired in the battle of interference one of unusual attraction to the radio commercial body of broadcast listen- the regular stadium concert. The six Your receiving station is about ers who pay \$1 a year for the privi- soloists who will be heard by the twelve miles from mine, yet often lege of having a part in the activities listeners are the ones selected from when you complain of static I have of the association. Since these ac- hundreds of applicants, having been none, and again when you note "heav- tivities have to do with matters like chosen after a series of eliminations enly stillness of the ether" I receive the above, every listener should be which has lasted all summer, and crashes denoting disturbance. I some- proud to share them. Numbers count, represent the foremost of the younger artists of this country.

is impossible to find space for but a very small portion of it in this a very small portion of it in this last year. Occasionally one breaks that he is. There is more in the 75c weekly pays for this column. Those who do not find thei: through every wave length. opinions aired can anticipate the ap- I have a 3 tuber, vintage of 1922, phrase than is realized. Radio owes pearance of their letters in next I get New York, Newark and Phila- this so-called "fooling" than can ever week's space. **D.X.Special** Our first letter has been received not using the two amplifying tubes from Elbert B. Hamlin, who does not (all except WJZ, which comes in badly perts and engineers. agree with us concerning WJZ's "Fi-Vacation Model RADIO SET nancial Developments": "Sir: I venture to comment upon after note the hours of disturbance a paragraph by you in The Herald and compare with your reports. Tribune of July 19, in which you criticized 'The Financial Developments of the Day' as broadcast by WJZ. "I doubt if you can realize the are actually reprimanded for having one kind and another start in as value of this broadcasting to a large mentioned that there was any static number of people. You say that it at all. Perhaps this is our own soon as they have had their dinne: can be of interest only to those en-HIS is a remarkably fine set at such a low price-and congaged in the brokerage business. I mention that static is not strictly sists of a 3-tube Set complete, ready to tune in-with tubes, batteries, loud speaker and plug. No Interest Added for doubt if it is of any interest to that universal. Like thunder showers, it class of persons, because they have is more often local, and when we their tickers. But it is of interest complain about it it does not mean their "strange" conduct is that they to a large number of us who are actively interested in financial matactively interested in financial matters and who like to know what has trouble while the downtown section the "movies" or to be taken out in happened before we get our news-paper for the full jetails the follow-glad to note that the present writer, becaute the the the present writer, conducting the present in the car they are simply "fooling with the radio," but in reality they are ing morning. With an apology for the contradiction, the 'small changes' that there are the dealth into the present writer, ciates this fact. We can only hope the contradiction, the 'small changes' that those who doubted our word will ments of the last five years have are of interest from day to day, have occasion to read it. whether one is an active or an occasional trader or investor. A person's We have received a very encourag- culties, to increase its range, and, interest is where his treasure is, and ing letter from Alfred E. Caddell, above all, to perfect the quality and to be able thus to get reliable infor-mation is not only of interest but of cause it shows that the association ing radio, in common with all other value. Broadcasting needs more is alert to its function in protect- great public utilities, to new stages 'meat and taters' to appeal to the ing the interests of radio listeners. of efficiency and usefulness. rian who pays for the equipment; Here is the copy of the letter re- Recently great strides have been the entertainment appeals more to ferred to: • HE greatest radio bargain we have ever the other members of the household, New England Steamship Company, This financial feature is one of the Pier 14, North River, New York City. reflex set has only one knob to tune offered. A wonderful outfit, consisting of few that appeal to the business man. Gentlemen: The American Radio with, and a new station can be the famous Pathe 5-tube Phusiformer Set, To establish stability broadcasting Association, a national organization brought in by every turn of a few constructed in a beautiful art cabinet and built-in must have more rather than less of of listeners-in, is in receipt of many argrees on the dial. such material. Before writing this complaints of code (QRM) interfer- "Radio widows" and the general loud speaker. Tubes and batteries extra. I have asked the opinion of fourteen ence which have been lodged by ex- public need not waste any sympathy

Ludwig Baumann&6 Open Until 9 o'Clock Saturday Night. 35 St. to 36 St. on 8th Ave, Newark: 49 Market St. 581 Broad St. Harlem: 144 West 125 St.

Ludwig Baumann

does not charge interest!

Credit.

\$2.50 weekly

pays for this

5-Tube set in a De Luxe

CABINET

The text of The Herald Tribune Radio Magazine is the best on the subject published by any newspaper. The amateur is given really instructive articles on how to build and the advanced fan finds his proper diet in selected scientific articles by well-known authorities.

It publishes about the right amount of human interest stories and contains the largest proportion of text matter, in relation to advertising, of any Radio Section in any newspaper.

"ELBERT B. HAMLIN." sure that some people better broade

thereto. Very truly yours,

however, it simply increases the mo- lengths. notony of broadcasting, for we read A copy of this communication is set depends, in the last analysis, all of our financial news in the morn- being sent to Herbert Hoover, Secre- upon proper amplification, in which ing paper, and we find that it is quite tary of Commerce, and to the news- the sound is multiplied but not disas complete and authoritative as that papers, for the situation warrants torted. offered from this source.

on the condition of static in the daily be given your efforts. Yours very truly, in the New York musical world will column. Not that it helps the matter in the least, but some people like to compare notes. Here is one comparison: My Dear Pioneers

and other things, and comparing with and that the courage displayed by the audience, for on that date the final my own, I conclude that static is, as A. R. A. has been commendable. The elimination contest for soloist of the General Hancock said of the tariff, a A. R. A., let us mention, is a non- Philharmonic will be incorporated in local issue.

times think flashes from the third too.

We accumulated so much interest-, rail of the Long Island Railroad may tion on the one tube. I shall here-Respectfully,

writers, for we have neglected to home.

people locally. Of these twelve use perienced operators and traced di- on either experts or amateurs who this service more or less regularly rectly to your ships plying Long sit up half the night "fooling with and offered to write WJZ to this Island Sound and to the land station the radio." The wife of the chief effect. I have frequently myself in Brooklyn with which they work. engineer of an important transformer made purchases or sales because of Broadcasting stations go to great ex- manufacturer which maintains one it. Its broadcasting does not detract pense to send out good programs, but of the leading research laboratories from the sales of newspapers, be- while this code is being sent it is in the industry told the writer recause one must always get details absolutely useless for any one within cently that her husband stays up from the papers. It stimulates rather a range of twenty to fifty miles of till 12 and 1 o'clock several nights than decreases sales of newspapers. Long Island Sound to try to enjoy a week experimenting with the set in as, for example, I have often heard broadcast programs.

may not find in one paper, and is a national regulation that speci- she observed. "It does not tire him. of this feature and those similar ployed, results in a very coarse, sorbs all their faculties and creative

When we wrote our criticism of The American Radio Association is working on problems which interest 'Financial Developments of the Day' bending every effort to bring about him so deeply, operates with a degree profit by it, but we wondered if the spectfully ask that you co-operate person's." number was sufficiently large to jus- with the ARA to put an end to this Pre-eminent among the problems tify the amount of time consumed abominable nuisance. There is no ex- cf radio development on which 1.0vaaily in the broadcasting of this cuse for its continuation and it simply ices and research experts alike are event. After reading Mr. Hamlin's must cease-we would, of course, like now working is improving the clarity letter we have decided that WJZ had to see you stop it voluntarily. One and purity of tone in receiving setsbetter continue with its work and way to better conditions immediately to secure amplification without disnot mind our cantankerous rantings, would be to instruct your operators tortion. Without good tonal quality for if the event attracts the atten- to use their heads in carrying on any set, whatever may be its range tion of a few people who derive as traffic and keep it off the air in the of power, falls short of the ideal of much service from it as Mr. Hamlin early evening hours if they cannot perfected operation. Accurate and its position should be secure. To us, help trespassing on broadcast wave rure reproduction of the voice or

action. However, in the event that We have made a habit of reporting conditions, the fullest publicity will

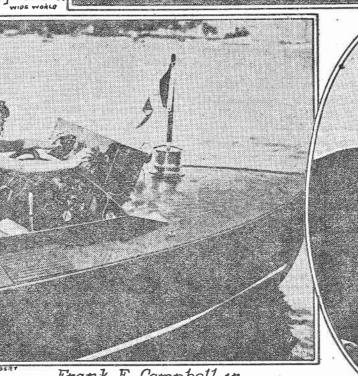
ALFRED M. CADDELL,



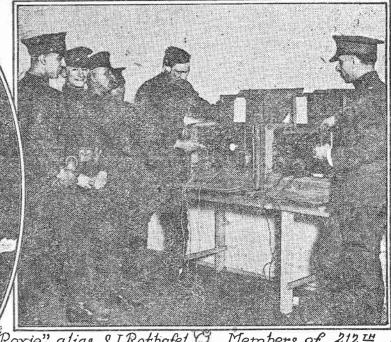
## **Up-to-the-Minute News of Radio in Pictures**



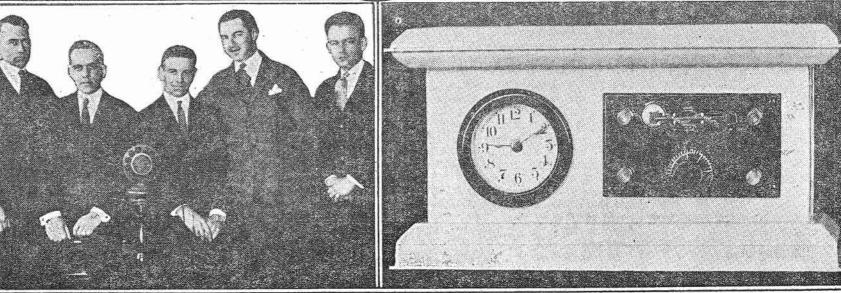
Hospital, Washington D.C., Serves 900 Head Phones and three Loud Speakers



Frank E. Campbell, jr., motor boat speeder and radio fan



Roxie" alias S.L.Rothafel, Methoders of 212 14 Leader of the Capitol Matti-aircraft regiment Theatre "gang". Study Radio



The Announcers al Station WGY, Schenectady NY Combined Clock and Crystal Radio Receiver for Travelers

THE NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, AUGUST 10, 1924

A DEPARTMENT OF POPULAR DISCUSSION OF TECHNICAL POINTS USUALLY CONSIDERED TOO INTRICATE FOR GENERAL EXPLANATION

matters, such as radio, which are presented to the public. There must always be an initial period when the public is twirling stick developed. These things waking up to the subject, and in that period the glamour and marvel of it all is so stressed that it becomes increasingly difficult to undo that sort of impression. No doubt all scientific things are wonderful. All new things appear marvelous and the less the observer knows about them the more he is mystified. The more he is mystified, the greater the marvel to him.

6

Some self-constituted authority listed the "seven wonders of the world" some years ago, setting down such things as Niagara Falls, the Pyramids of Egypt, the Handing Gardens of Babylon, the Colossus of Rhodes, the Great Wall of China and such things, as I recall them from memory, mixing together natural wonders with man-made wonders. Then only recently, in a contest conceived by "The Scientific American," a list of scientific wonders of the world was compiled by the public votes, and in this list, I believe, were only mentioned man's inventions, such as the airplane, wireless telegraphy and telephony, the X-ray and others which I have forgotten. By our own lack of intellectual breadth, or, to put it more bluntly, we don't realize our own ignorance. We are mystified by anything complex because we don't take the time nor the trouble to resolve it into its individual parts. To use an old saying, "we can't see the trees because of the forest." We frequently put the accent in the wrong place.

### Magician's Skill

We appreciate Houdini and marvel at the things he does because we don't understand them, but reason tells us they must be simple and easily explained. The thing we should marvel at is his wonderful skill in doing them and in fooling us. The fact that a sleight-of-hand performer can stand openly and do a thing, and, in spite of being keyed up with every sense alert, we can't see him do it is most astounding, but the answer is simple. As they express it at the side shows, the hand is guicker than the eye.

Familiarity surely breeds contempt as these things witness. What can be or is mcre marvelous than the simplest things of life? What is more mysterious, for example, than fire, probably the first great contribution to civilization when primitive man sometimes, somewhere seized a burning brand from the forest fired by a lightning flash and fed its flame as he carried it back to the tribal home and there continued to keep it burning? What a magnificent courage it must have taken to do this, and what a growth must have occurred in that tribe, for now there was heat as the winter snows came, and no necessity for going southward in the fall. Now there was light during the long, dark night. There was protection from wild beasts. By and by when by accident some food was spilled into and rescued from the fire, cooking started.

It is not hard to understand why there became a race of fire worshipers. Those who live in the open to-day come very near to glorifying fire.

### **Making Fire**

Yet time went on for centuries, and if the fire went out there was no way of starting it except by borrowing a burning coal from another fire somewhere. Then

us to learn how simple things are stones resembled the sparks from the fire, give him to-day. Are we going to have in fundamentally, especially in those and presumably some men became skilled in lighting pith that way. Friction was have? Are we going to have short haul found to develop heat and we find the show brains. They show reasoning from | and the same programs from one district cause to effect

'Even in old New England days there was no further progress in fire making. The flint and steel and tinder box were king, and the borrowing of burning coals from a neighbor a mile or two away was not uncommon. Then matches made their appearance. I'd like to write a prospectus for a match factory. Think of being a partner in the making of those little scratch sticks, for want of which untold millions must have died in ages past. Yet probably not ten people who read this page have the slightest idea of what happens when you strike a match, except that you may get a flame. Most of you gentle readers don't care what happers. All you want is a light.

standpoint. The great buying public are beginning to care less and less about how marvelous radio is and beginning to think along the lines of what will radio do and how well will it do it, and what shall I buy for the most complete satisfaction? The buyer is more critical in the matter of quality. He wants results for every dollar expended.

radio the same problem as the railroads sets and trunk line outfit? Are we going to have the country divided into districts to another just as on the vaudeville circuits?

Assuming that some day we are going to secure quality reception, and I am frank to say that we have a long way to travel in that direction, must the set break through the local barrier and pick up distance, or will it be sold as an entertainment proposition and with three or four or a dozen local stations the owner will

and scientific discoveries to be made in radio will depend largely upon what the public wants. If local reception is all that will be demanded this year, next year and the years to come, the problem to be attacked is, first, quality, and second. economy of operation. After those matters will come simplification, especially of controls, and then the artist-designer will step in and beautify it all.

Distance Reception

If cutting through the local programs to reach out to the far distant stations is continually to be desired, something brand new will have to be developed. We have That opens the door to a discussion of | not yet scratched the surface on distant

T IS often quite a shock to any one of | it was noticed that sparks from striking | what the buyer wants and what can radio | reception. Personally, I believe that distant reception is the whole lure of radio to millions of listeners. I have been in dozens, perhaps hundreds, of homes and I have had mail running as high as 3.000 letters in one month. I have taken counsel with many buyers and prospective buyers, and more than a majority of times have I heard them distinctly say, "I don't want distance. I want good reception of our nearby programs." In New York they'll add, "We've got the best stations in the country, and they have good things every night. I guess we'll be

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R.P. CLARKSON

satisfied with home stations." Yet I have never seen a set of any kind whatever installed for any person, man, woman or child; rich or poor; old or young, but what immediately after showing how the set is operated, tuning in a nearby station and listening awhile. some one says. "Can you get so and so on this? How far will it receive?" and a multitude of similar questions, ending up in an endeavor to haul in some station a thousand miles or more away. Moreover, I have never seen a customer satisfied until he had received distance, and I have never seen an owner show off a set to friends without pulling in distance or apologizing for the set, or offering some alibi.

If this distance-getting is essential we are bound to see several years more of struggle, dissension, legal entanglements, freak circuits and spasmodic buying, unless in some way the ironing out of the broadcasting tangle itself shows the way to the listener-in.

### **Skilled** Operation

I hold no brief for any manufacturer. I have no connection with any of them, and have never had nor have I now any financial interest in any set or circuit whatsoever. I don't care whether one tube or ten is used in a set or whether this, that or the other scheme becomes popular. For that reason I can say without reservation that I do not believe we are anywhere near the ultimate result in broadcasting reception. No set will fulfill the requirements of the bulk of purchasers, and yet I do not know of any set on the market that will not give entire satisfaction in the hands of an experienced operator. It is this necessity for skilled operation that must be obviated in the set of the future.

I believe the success of the neutrodyne in the past was due to the fact that purchasers believed that all you needed to do was to set the dials and the door to distance would open itself. There is no reason why the super-heterodyne, properly constructed, shouldn't operate in the same way, but it didn't, probably due to the number of tubes and the necessity for all of them to be good, which they weren't. Neither of these sets as developed will beat a good regenerative set in the proper hands, but either of them would be more satisfactory to the average handler.

Just what place the reflex principle will have in the future it is impossible to tell. It doesn't seem to produce the results it should do theoretically. Maybe the trouble is in the tubes, as it seems to have been in all other circuits. Certain circuits seem to require certain tube characteristics for reasons gradually becoming more or less well known. The development of the reflex idea was probably less for the purpose of saving tubes than for the purpose of saving the current the extra tubes required, and, with the low-current consuming tubes, this advantage grows less

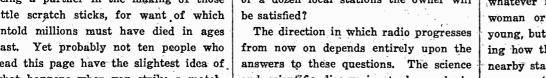
current.

The advantages of the neutrodyne KDKA's signals can be relayed from are the ease of tuning, selectivity and the Arctic to the Bowdoin. It is exvolume. It is easier to construct than pected that the two boats will be able the super, providing the parts used are of good manufacture and instructions used followed to the letter. With the above information should be possible for you to pick the voice to the McMillan ship. set you wish to build. Suggest, however, that no matter which one is chosen only the best parts be used in ilization, it has been arranged to the construction and that care be taken in the assembly and wiring.

obtained,

N. Jordan-I have made a wavemeter using a dry cell tube as an that the ship's signals may be lost. oscillator, but find that the tube does not oscillate very strong and, even J. W. Bernier, Canada's veteran Arcwhen it does, only in spots. How can tic explorer. Captain Bernier, though his be remedied? Answer-Some dry cell tubes are, most active men aboard ship, and nfortunately, difficult to get in an when going through ice packs he dioscillating condition. To make them rects the operation of the ship from oscillate it will be necessary to con- the crow's nest, which is ninety-two nect a piece of flexible wire to the feet above the deck level. grid post of the socket and another to The radio operators on board are the plate post. Then these two are William Choat, chief operator and J. twisted together. These pieces of Finnie, assistant operator. Mr. Choat wire should be three inches long. is one of the best known radio ama-Tape the finished connection and be teurs in Canada and was intrusted sure that the ends of the wires do with the mission of carrying on the not touch. It is best when using this Arctic's communication because of form of oscillator force that the flex- his long service with the amateurs. ible wires be fastened permanently The Arctic is a three-masted to the baseboard of the set to pre- schooner with an auxiliary steam envent a change in calibration. Re- gine. She was designed particularly member when using a dry cell tube for polar expeditions. The hull is of the dull emitter class that con- 36 inches thick, consisting of an outlife of the tube materially.

J. Smith-I have an audio fre- Between the various layers are 6 quency transformer that has had the inches of heat insulating material connection markers removed and Between the decks there is about 6 therefore cannot use it because I inches of cork insulation to prevent do not know how to connect it in a heat radiating from the vessel. circuit. The primary and secondary In addition to the Canadian Westare clearly marked, but which ter- inghouse Company's short wave set minal is which is not. the Arctic is carrying a large amount Answer-The primary coil is con- of mail for McMillan, with special nected as follows: The outside or letters from the officials of the Caend of the primary coil is connected | nadian Westinghouse Company which to the plate of the tube. The in- will give operator Mix full instrucside, or start, of the coil is connected tions regarding short wave reception. to the B battery positive. The outside, or end, of the secondary coil is 547 Broadcasters Now connected to the grid of the second A list compiled on August 1 shows amplifying tube, and the outside, or 547 broadcasting stations in the start, of the secondary coil is con- United States, as compared with 530 nected to the filament negative. on July 1, 1924.



Radio is rapidly getting to that same

What Is Wanted?

### What Women Think of Radio in the Home

slight accidents, or any "first aid" information which it is just as necessary to know in order to handle the emergencies cf everyday peace time living as it was in days of war. Health talks would cooperate in and strengthen the orders of the Department of Health, not only in habits of daily hygiene but particularly in periods of epidemic where advance precautions, made emphatic by the personal command of health officials via radio, would do much toward lessening any serious spread of the disease.

While considerable provision from the very first has been made for entertaining little children with a bedtime story hour there is still much opportunity to satisfy the needs of the older boy and girl. ics like woodcraft, camp life, electricity, chemistry and directions for many mechanical constructions which the boy is eager to make at home would be keenly listened to and would exert a marked educational influence on the young mind. Short talks of adventure, biographies of famous characters living or dead, deeds, of mythological heroes, would all stir the imagination if retold by the magic voice of the wireless.

No one but a woman knows how wearisome is the daily problem of "What shall we have for dinner to-night?" A pleasant, intelligent voice over the air making suggestions is sure to be welcome. "It's rather hot and sultry to-day," I can hear such a voice say, "and why not, therefore, try a meat aspic to-day? In case you don't know what a meat aspic is like, I'll tell you how to make one. The men will like it"-and so forth. And on another occasion this broadcaster could tell women what they perhaps have not noticed, that there's a glut of peaches in the market and they're cheap. "Why not make some peach pie?" she'll say. "I heard a wonderful recipe from a famous pie cook the 'other day"-etc, etc.

As a matter of fact, I speak from experience, because I've radio broadcast just such material myself, and have had splendid response from it. It's all in the way it's done and the practical nature of

radio audience-you "get the switch" mighty quickly, especially from women, if you're not "there with the goods."

### Radio Advice on Home Tasks

But radiophone service for the housekeeper will not be confined merely to the preparation of food. I have worked out detailed plans for the most efficient timeand-motion saving methods of doing each day's work. I can explain simply and clearly, on Sunday morning, just the best and quickest way of getting Monday's washing done. On Monday moning I can give a little talk on efficiency methods for ironing day. By giving these talks on the day preceding each task the housewife have time to think over what she hears and adjust the general labor-saving suggestions to her particular problems.

Fifteen or twenty minutes will be the program, and there's almost no housewife who can't afford that much time between 9 and 10 in the morning, especially if she's getting first aid for the rest of her day's work. After the children and the man of the house have left for school and business, respectively, there's always a bit of a lull before beginning the day's special activity. The average housewife probably spends at least fifteen or twenty minutes every morning gossiping with a neighbor over the backyard fence or the ordinary telephone. She can take as much time for her radiophone service without neglecting her work.

But I'm just giving the high-spots of this matter of radio and home service. Educational work is important in the home; politics is certain to be important this fall especially; and therefore we women are interested in getting material by radio that will make for character and development. Just jazz, small time vaudeville, advertising talks, appeals for girls to come and be chorus girls---that's pretty thin value to pipe into your home over the magic route of the air, when there's such a great wealth of value that could be provided! I want women to bestir themselves and demand more attenthe help you give-also the voice you tion from broadcasters to home material.

### Continued from page one care of the sick. what to do in case of | have. Nothing is more elusive than a



### This Week's Most Interesting Questions

M. H. McGee-I am contemplating either five or more tubes. Please neutrodyne as compared with a seven or eight tube super-heterodyne.

will be given and then you may choose for yourself.

The main fault of the super-heteroas it is claimed to operate. The number of tubes, the parts and the battery drain are all drawbacks, and the our opinion, unless the transformers 120 meter ICW set. are wound at home and tested with a wayemeter to make them all alike, and unless it is built with each stage

sumes a lot of B battery current. of dials, providing the batteries are for transmission. kept up, and the fact that when a

usually loud enough to enjoy. tralized, with a consequent distor-

Push-Pull Amplifier J. T. C .-- I wish to build a push-pull

amplifier and would like to know whether it is necessary to have one pull amplifier or not? Answer-It is advisable that

stage of straight audio-frequency amplification be placed before a pushpull amplifier in order that full benefit from the push-pull amplifier be

Oscillati

**Transformer Connections** 

The steamship Arctic sailed recently from Quebec on a voyage to Etah, Greenland, carrying a full comthe construction of a receiving set of plement of special radio equipment suitable to pick up special broadcasts give me your opinion on a five-tube from KDKA, East Pittsburgh, Pa.

VDM, S. S. Arctic

The Arctic is carrying two Canadian Westinghouse special receivers, Answer-This is something which one of which is for delivery to Donis almost impossible to do and give ald Mix, radio operator of the Mcjustice to the many receivers of each Millan expedition, somewhere along type that are now in use and giving the Greenland coast. The other set satisfaction. However, the general is for use aboard the Arctic. Both faults and advantages of each set are designed to receive special signals which will be transmitted from the new experimental station of the Westinghouse Electric and Manufacdyne is to get one to operate as well turing Company every Monday night from 10:30 to 11. Eastern standard

In addition to its receiving equiptery drain are all drawbacks, and the big problem of getting parts that ment the Arctic is supplied with three transmitting sets, one standard will operate efficiently goes a long 1/2 kw. 600 meter spark set, one 1 kw. way in making the set unpopular. In 2,100 meter ICW set and one 2 kw.

The call letters of the Arctic are VDM and it will operate on a wave length of 120 meters.

Through the efforts of Commander shielded from the others, then the C. P. Edwards, in charge of the Raneutrodyne is the better; also con- diotelegraph Branch of the Dominion of Canada, a complete schedule of transmission has been arranged. The advantages of the super are Communications for the Arctic and the two tuning controls, the loop the parents of the two radio operaerial, the fairly accurate calibration ators on board will be sent to KDKA

When the Arctic arrives off the distant station is tuned it comes in coast of Greenland she will have been in constant communication with the The faults of a neutrodyne are East Pittsburgh station. It is exthat a set is liable to become deneu- pected that when the ship reaches Greenland she will be able to get in tion of signals and difficulty of tun- touch with Donald Mix, radio opering; they must be operated on an ator with the McMillan expedition, aerial and consume a lot of B battery either on his 2,100 ICW set or on his 600 meter spark set. Then to carry on in this manner until the special set can be delivered to the Bowdoin, after which KDKA will transmit direct both on CW and on

Gal

**Cabinet** alone

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To insure that communication from the Arctic may be received in civequip two of the Hudson Bay Company boats, the Bayeskime and Nascopie, with Canadian Westinghouse special receivers, designed not only to pick up KDKA's special wave, but also the signals from the Arctic. It stage of amplification before the push is hoped by this means to relay messages from the Arctic through the Hudson Bay Company's boats to the Labrador coast stations and then on to G. A. Wendt, of the Canadian Westinghouse Company, at Montreal or straight through to KDKA. It is anticipated that the Arctic, through its transmitting equipment, will be able to keep in communication with KDKA, although it is quite possible

The Arctic is in charge of Captain

stant oscillation will decrease the er layer of 12 inch pitch pine, the second layer of 12 inch green heart and an inner layer of 12 inch oak

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are seven reasons why you should not "Just get along" with an ordinary speaker when you can get a Thompson. \$28. 

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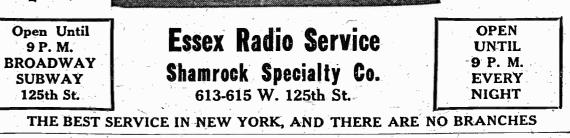
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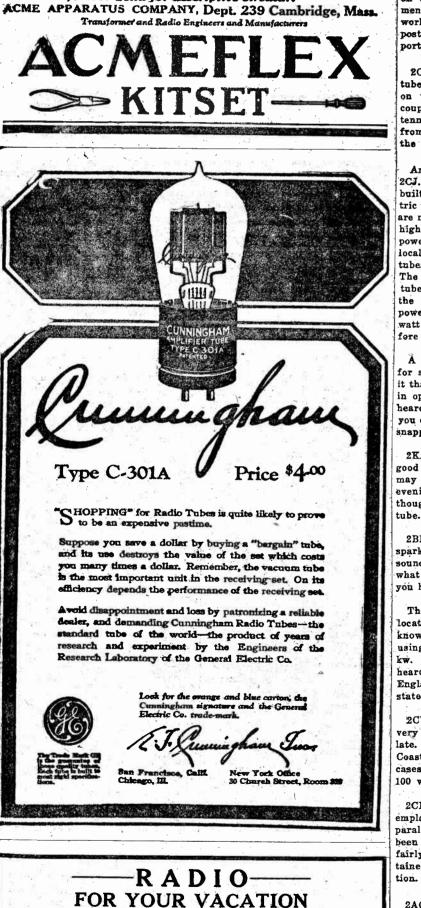


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2-TUBE CROSLEY



means of their use. Since the ama- the trouble. teur demonstrated what could be done on the high frequencies commercial companies, experimenters and govern- operating under the call of 2MO has cated in New York City. While this ments have shown a new interest in been recently opened. The station is probably the desire of the majorthem. For this reason the amateur is owned by a captain of the Signal ity in this district inasmuch as a was invited to participate in their in- Corps and is operated by Ted Wilvestigations. The governments of the son 2IK, formerly a second operator there is some question as to whether United States, Canada, France and at 2BRB. From reports, good results it is the best for amateur radio. Italy asked them to co-operate in are being obtained. short-wave tests. The amateur, always hungry for new experiences, has proved to be of great assistance in this, as in every case, and will probably continue to be.

This coming winter he will again have an opportunity to show his abilexploration steamer, the Arctic, equipped with a transmitter to oper ate on 120 meters, is frozen in the ice where the sun sinks behind the hori- with low power is 2AEL. He seems the adio clubs of Greater New York zon for many months at a time.

wave bands it ought to be an easy note. matter not only to keep in communication with the Arctic but to carry 2XBF has been doing some fine stations in the division. ortant tests.

on the plate. With three thermo- understand the transmitter has been should be possible for the operators tenna reports have been received some excellent results will be ob- out the division to make known from England and all districts but tained this coming fall. the seventh.

2CJ. The present transmitter is doing his best to keep the messages fellows are getting along. I had some tric broadcast transmitter. Two sets are mounted on a panel 5 feet 6 inches high and 24 inches wide. The lowpower transmitter, which is used for ready for the coming DX weather is brief stay in Bridgeport. I am of the local work, employs three 5-watt 2AX. His CW has plenty of kick and opinion that I couldn't have found a tubes with "S" tubes as a rectifier, will probably carry well. He was better bunch of amateurs anywhere The larger one uses two 50-watt heard handling traffic in good style in the country. They sure did treat tubes and a "sink" rectifier to supply the other evening. the DC plate voltage. The high power set has provisions for a 250watt tube, which may be installed be- on the narrow band of 150 to 200 that was that most all the first disfore the cold weather sets in.

good results from spark coil CW. He to have your license changed so as may be heard most any time of the to enable you to operate below 80 evening working local stations as meters. though he had no less than a 50-watt

spark a number of times of late. It not be so many failing to raise the uncoupled Hartley. sounds like old times to hear it, but station known as CQ. There would 11V is another station doing fine what happened to that nice CW set be more stations worked and the work with a 50-watt tube and 1,000

The station of John M. High jr., located at Riverdale, N. Y., better known to the amateur as 2GR, is now using a new remotely controlled onekw. CW transmitter. He has been heard in Hawaii. France. Holland and England, as well as working every state in the Union.

very fine DX and traffic handling of a new antenna system. Let's hope he funds. The OM has a position as late. They have worked the Pacific gets them soon, as the sooner they radio engineer now, and soon expects Coast a number of times. In both are obtained the sooner the spark to be on with as much power as he cases the power does not exceed goes. FB OM sure glad to hear it. can dig up. HI! 100 watts.

been in operation only a short time with 1,200 volts of rectified AC on of them just now, so I guess that is fairly good results have been ob- the plate. tained. He also has good modula-

tried the set "perks" fine on 190 by fall. meters.

did with his chemical rectifier. He 8,009 volts on the plate.

HERE has been a remarkable says things have gone completely included in the 2d Government Radio increase in interest in the wrong, his radiation has dropped District be removed from the Atshorter wave length all over the from five amperes to two and his lantic Division of the A. R. R. L. world since last fall, when amateurs rectifier refuses to work at all. He and caused to constitute a new divifirst began to work across the ocean is going to rebuild his whole trans- sion, the Hudson Division. The reand many other distant points by mitter and hopes this will remedy sult of this change will be that the

# A new station at Governor's Island

We understand that 2BT and 2ADK have been visiting amateur stations in the Middle West, of which 9ATO the greatest amateur radio district. was one, as well as many others. In the opinion of the writer and Both these stations will be on the many other prominent amateurs in have an opportunity to show his abl-ity when the Canadian government's air with renewed interest ofter they the Second District, a majority of return.

to be on the air almost any time of will be unable to meet the needs of Now that the amateur has been day and is working 'em in fine style. While be unable to meet the needs of these stations as well as the Atlantic allotted the use of four new short That station also has a good clear Division, which was governed by

on tests with amateurs and govern- work in daylight with his CW and ments in all parts of the civilized ICW set. He has a good ICW note probably only solution to the above world. Make it your duty to keep that sounds something like an andio outlined conditions is that the amaposted on the schedules of these im- frequency oscillator. Is that what teurs in small towns, throughout you use OM?

tube with 1,000 volts of rectified AC handling traffic in fine style. We Executive Council. In this way it coupled amperes going in the an- overhauled and it is expected that of active amateur stations through-

Another station doing good work is bad, but in spite of this every one is let you know how the first district moving. FB, keep up the good work. spare time last week, and I thought I

The amateur no longer has to work meters. The new wave lengths asstation that hasn't been heard 40 to 43 meters, 20 to 22 meters and 50 to 22 meters and 50 the men for some time is 2AZA. Rumor had 4 to 5 meters, zu to 22 meters and paper they read for the amateur news 4 to 5 meters. These bands are to in The New York Harald Tribune and it that he was trying to get a CW set be restricted to CW transmission they say it is the berries. in operation, but as yet we have not only and there will be no more quiet heard the call on the air. When are hours on wave lengths of 80 or be-my good time in the first district is you coming back, OM? We miss your low. On the new short waves it is AVW. He is using a five-watter required that the coupled type trans- with 500 volts on the plate in a 2KA is another station that obtains mitter be used. It is also necessary

If a few more amateurs would equip trouble with the B. C. L's on account their stations with a good short- of key clicks, but straightened the 2BNI has been heard on his old wave low-loss tuner there would matter out by coupling his heretofore

> finds not the least bit of difficulty good operating. Another station in carrying on two-way communica- using a coupled Hartley circuit. tion with amateurs in the first and | 1ASR just changed his address, and third districts in daylight. FB OM. so hasn't got the set going yet. Come

semble his new CW set. He says all 1AVT is another station tempora-2CWO and 2CLA are doing some that is needed now is the tubes and rily off the air because of insufficient

2CRT installed a new phone set the second district with an awful seen of his station from the outside A ninth district station heard in employing two five-watt tubes in punch is 9DRC. The transmitter tells me it must be very fine, indeed. parallel. Although the station has employs a single fifty-watt bottle I met many others, but I can't think

### 9NQ is still pounding through with station:

2AGD has been having considerable old half KW transformer with an because of the loss of his huge store trouble in getting his transmitter to old "sink" gap. It sounds fine for age, which went dead with use. The operate on a legal wavelength spark these days, but it is expected battery was a contribution received However, after many stunts were that a CW set will be in operation from 2BEE, and take my word that

2BAW is using sixty-cycle AC on nese ship that was signing the call tery saw some service. The station the plate of his fifty-watt tube again. of JUPU. The ship was something will be on the air, with the good will He seems to be able to raise the like fifty miles west of San Fran- of God, in about a week. A fivelocal stations much better but deesn't cisce. 9DP was using three fifty- watter, with as much on the plate as seem to be doing as good DX as he watt tubes in his transmitter and I can get, will be used, 73's.

8AGP was heard to say he has a new mast built of lath and 2 x 2 posts. With a new antenna he has made many new D records for his

The American Radio Relay League has decided to comply with the request of the Second Radio District Executive Council that the territory policy of the amateurs in the Second Radio District will be governed by the members of the A. R. R. I. 10. vote was taken by the A. R. R. L.

New York City may be one of the greatest cities in the world and may contain some of the greatest men and industries, but it could not be the amateur stations that carry on Another station doing good work disticts, and a district governed by men operating under the same conditions as the majority of the active

What seems to be the best and New York and New Jersey form radio clubs and have themselves repre-2CUA is using a new W.ºE. 60-watt 2ACD has been heard occasionally sented in the Second Radio District their desires.

> might drop around to some of the Another Brooklyn station back and stations in Connecticut during my me fine, and wherever I went I was received cordially. There was one funny thing I noticed everywhere, and trict men knew more about second district news than some of the men is The New York Herald Tribune, and

> > coupled Hartley circuit, and is doing remarkable work, being heard in England and working every district in the United States and some in Canada. The old boy had some

you had working for a while, OM? result would be better traffic reports. warming the plate. England, France, Holland and all United States dis With two five-watt tabes 2BEO tricts worked tells its own story of

> on. OM, don't allow the back yard The last 2CEV has begun to as- garden to keep you away from the air.

1AJP has a fine station-among the best I have ever seen. I am sorry I all the first district news I have for you. Here is some "dope" on my own

his old spark set. He is using an 2AAJ has been off for some time anything that old boy 2BEE gives. away isn't worth taking, HI! I will On May 31, 9DP worked a Japa- thank him, nevertheless, as the bat-HARRY DOETLER 2441

### England to Canada The Deresnadyne Tuned R. F. Circuit Uses Neutrodyne By Marconi's New "Beam" System

to prove his claims.

power station.

as middlemen.

Atlantic wireless, which took place at cuit. Signal Hill, Newfoundland, is to be represented in the Wembley Pageant. The scene will reproduce as faith-duces a new principle in radio recep-ers are mounted on a bakelite shelf be of .00025 mfd. capacity and should the Garod. The neutrodyne produced fully as possible the eventful trials duces a new principle in radio recepters are mounted on a basente such be mounted 5% inches from center the low tones of the basses just as Marconi made in December, 1901. G. advantages over present types of each of the tuning condensers. The to center on the panel. The audio-clear and just as natural as it did the S. Kemp, who assisted Marconi in the tuned radio-frequency circuits. The shelf should be two inches wide and frequency amplifier is standard and high tones of the violins in the previ-Signal Hill experiments, will take the circuit is the product of nearly two should extend to the rear of the does not differ from that used in ously mentioned test, giving the same part at Wembley that he did at years of experimental work on the cabinet. A transformer should be other radio receivers, UV 201-A or proper balance to the top and bottom Newfoundland, more than a score of part of E. A. Beane, radio super- mounted on the rear of each shelf in C 301-A tubes may be used through- of the production. years ago.

World Radio History

Broadcasting Station The receiver is absolutely stable The windings of all three transform- amplifier to reduce the B battery con- out four other sets of different A new and powerful wireless sta- and is free from howls and squeals, ers should run in the same direction. sumption. makes." tion will soon be erected in India to be connected with the imperial wireless chain, according to a report to Tennis Championships men's national lawn tennis champion- fore the microphone of Station WJ7 Democrats to Use To Be Broadcast ships will be broadcast on Saturday on Monday evening, for he is the Radio in Campaign the Department of Commerce from Clem L. Shaver, new chairman o the Department of Commerce from Vice-Consul W. H. Scott at Bombay. A novelty in radio programs and on Labor Day, September 1, both at The station will be erected by a com- an interesting sports feature as well 4 p. m. All of America's great tennis ever requested that no advance no- is enthusiastic about the idea of uspany which has just organized under have been arranged for WEAF's lis- stars, including winners in the Olym- tices containing his past career be ing radio in the national Presidential the name of the Indian Telegraph teners for the afternoons of August pic games, will participate in this sent to the press. Officials of Broad-Company, Ltd., with a capital of 30,- 15 and 16, when the semi-final and national tennis classic. This is the cast Central have had so few geniuses he will inquire into the possibilities 000,000 rupees (about \$9,200,000). final matches of the national women's first occasion that a courtside de who preferred to hide their past light of so arranging the tour of John W. The report stated that F. M. Chiney tennis championships will be broad scription of tennis games will have under the basket of secrecy that they Davis through the West as to reach & Co., of Bombay, are organizing the cast, beginning at 4 p. m. These been broadcast. are still quite dumfounded. The a maximum audience by radio with project and have obtained all rights matches will take place at the West from Marconi's Wireless Telegraph Side Tennis Club stadium, Forest Sava Tcherny at WJZ violinist's name is Sava Tcherny, a minimum of speeches. If the Daviswhich is all that he wishes said Bryan campaign can be so adjusted, Company, Ltd., of London. The pro- Hills, L. I. A tennis expert, whose Refuses Publicity The title of "unique broadcasting it when I play over the radio; if I out the country and the surrounding posed station, it is said, will be one name will be announced at a later of the most powerful in the world date, will give a vivid description of of the most powerful in the world date, will give a vivid description of and able to transmit messages all the lightning game. It is also an- artist" certainly belongs to a young am not good, why tell them I am environs will be appealed to through over the globe. | nounced that the semi-final of the foreign violinist who is to play be- beforehand ?" the ether.

LONDON.-The greatest interest is A New Type of Tuned Radio Frequency That Gives attached here to the announcement of Postmaster General Vernon Hartshorn in the House of Commons that the government is prepared to cooperate with the Marconi company in the development of directional wireless. This is considered a striking

Marconi is to be allowed to erect in Great Britain a station for communication with Canada by short-wave, lower-power, directional telegraphy. Marconi's experiments with the beam ray have convinced him that it is faster and cheaper than the high power stations, besides providing comparative secrecy and avoiding "jamming." Now the British government is going to give him a chance

Australia and South Africa seem inclined to co-operate and to share Marconi's confidence that the beam system will make the high power station obsolete. India is more conservative and appears to favor the high

Postmaster General Hartshorn seems to think that the beam system will only work well at night and that it will be mainly used for the transmission of "deferred matter." In his view the gigantic high power station that the British government is building at Rugby is still indispensable.

the notion that large intervening faithful reproduction. transmissions are dependable even in

The Postmaster General says no. He considers it absolutely essential that Great Britain should possess at least one first class wireless station , capable of communicating directly with the most outlying parts of the British Empire and able to broadcast messages simultaneously to ships and stations in all parts of the world.

Dame Clara Butt recently had the honor of being the first to sing directly to all Great Britain. Her voice was broadcast from the new high power station, 5XX, at Chelmsford, without lower power stations acting

It was not a complete success and session of local stations for the pres- the circuit itself. of 1.600 meters with

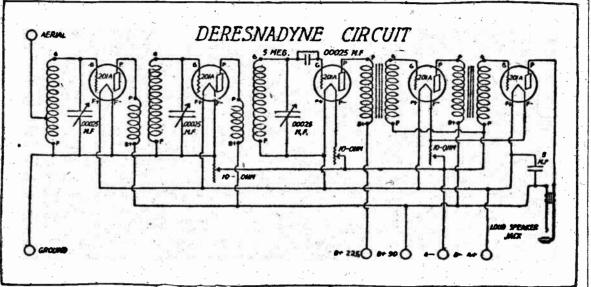
### India to Have Powerful

quietness of operation.

**By JAMES E. CARTIER** UTOMOBILE buyers in the is highly selective, is quiet in opera- | How Transformers Are Wound · past were satisfied with a tion and has a quality of reproducperformance of forty miles tion that is superior to previous dyne are wound on flat spider web. The cause of "swinging" and "fad-forms of tuned radio-frequency cir- forms, four inches in diameter. An ing" has been a puzzle to scientists victory for Senator Marconi and his an hour. To-day they demand sixty cuits, and it is at least the equal in uneven number of slots should be ever since continuous waves were miles an hour, together with other ability to reach out and bring in the cut in the form radiating out from a first produced. The arrangement provides that factors, such as smoothness and distant signals with great volume. hub in the center, consisting of a The circuit will not oscillate. This circle 1% inches in diameter. The

**Good Results** 

The transformers for the Deresna-The radio fan of yesteryear was signing, proportioning and placing of turns of No. 28 double silk covered close to a large electric power house.



It is generally admitted that the intensity of wireless signals tends to casionally with volume sufficient to parts. diminish in sunlight hours. But Mar- operate a loud speaker. The fan of No resistances or absorption meth- The first transformer used for experiences, Mr. Pierce sends some coni would not accept this limitation to-day is seeking not only improved ods are employed to prevent oscilla- coupling the antenna to the first tube excerpts from his notes taken at the of the possibility of his favorite beam range and volume but also the ad- tion. No neutralizing condensers are has only one winding of sixty-two ray. He considers that his experi- ditional qualities of quietness, ab- used and no attempt is made to bal- turns, a tap is taken off fiften turns ments from Poldhu, Cornwall, have sence of howls and squeals, and ance the capacity of the tubes as in from the inner end for the antenna done much to refute this fallacy and

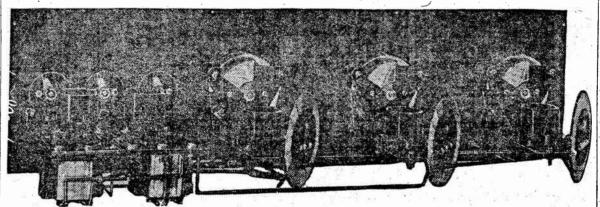
short wave transmissions. His ex- in radio is in the direction of tuned ent types.

aylight. Then, of course, there is the con-fronted the engineer in the perfec-is tructed for low impedance. This line, while the last transformer is record of the date, but it corretroversy as to whether the beam sys- tion of this form of amplification constitutes the deresonated plate cir- connected to the positive filament sponded with the newspapers of that tem is going to put the Rugby plant due to the inherent coupling between cuit from which the received derives line in order to give the detector tube date, and as the incident was immeout of business before it is finished. the elements of the vacuum tubes, its name.

the neutrodyne. The receiver will connection. The grid of the first judged from reception in Cincinnati. not radiate energy from the antenna, tube connects to the outer end of the tracts of land interfere seriously with The obvious trend of development grievous fault with many of the pres- winding, the inner end being con-

size wire.

a positive bias.



there is little danger of the super- the transformers, and the wiring of The plate circuit, which includes In winding the coils, the primary noises and no distortion.

time the use of the additional anpower of 16 kilowatts was employed. paratus often distorted and reduced wave band to be covered. the strength of the signal, and de-

### New Circuit Appears

Company of Chicago.

the primary of the transformer, is de- and the secondary may be wound on "This program was heard just at ent. Atmospherics interfered so much Straight radio-frequency amplifica- signed so as never to approach too together, that is, seven turns are supper time, and after hearing the with the reception in London, Cardiff tion has hitherto been very unstable, closely to resonance at broadcasting wound on with the wire double, then concert for thirty minutes I turned and Newcastle that land transmission and the various methods employed to wave lengths. The transformers are fifty-five turns are wound on with it off and went down to supper. The soon had to be used, but as far north prevent oscillation have served to also placed with relation to one an- only a single wire; the primary hav- tone was quite uniform, there being as Aberdeen, in Scotland, the concert complicate the construction and oper- other, so that the proportions and ing been cut off at the seventh turn. no fading or sudden increases in was heard without interference. A ation of the circuit. At the same interrelations throughout the set The outer end of the secondary is volume. eliminate oscillation over the entire connected to the grid, the inner end "The most difficult tones for a set

idea of the manner in which the ap- plus terminal of the B battery. sets you will fail absolutely to hear

to the filament closs to the tube to pick up are the bass tuba and the The construction of the set is with- socket. The outer end of the primary string basses of the orchestra, owing Marconi's first experiment in trans- creased the selectivity of the cir- in the range of a novice. The rear winding is connected to the plate, to the low frequency of their vibrapanel view will give a fairly good the inner connection to the 90-volt tions. In a large number of good

> visor for the ninth district, and E. a vertical position with its plane set out, or a UV 200 may be used for a visor for the ninth district, and E. a vertical position with its plane set out, of the Andrews, of the Andrews Radio at an angle of approximately 55 de- detector. A C battery of from two set for clear, clean, natural reception grees from that of the front panel. to six volts may be used in the audio and was selected by me after testing

### In Fading Tests; Gets London

The marked tendency of radio transmitting stations to "swing" off their scheduled wave length in regular periods has been detected in a novel manner by Joseph Otis Pierce, a chemical engineer of Cincinnati.

The receiver used by Mr. Pierce is is accomplished through proper de- primary winding consists of seven located in an exceptionally bad spot satisfied with a receiver that would the apparatus rather than by the ad- wire. The secondary winding con- He employs an aerial consisting of two wires, each fifty feet long, running north and south, with the lead in from the northern end. The set is a Garod neutrodyne, on which he received 2 LO, London, England, during the trans-Atlantic tests last winter.

> In his letter regarding "swinging," Mr. Pierce says: "The instrument is particularly selective and will cling to one station like a crab. When tuning is set just between two stations this set will sound one station for a while and then automatically swing over to the other station and cut out the first, it will then swing itself back to the first station, and so on, but has never sounded two stations together. These changes will take place at intervals of forty seconds and show a remarkable degree

In addition to reporting his latest time he heard London. These show a remarkable critical analysis of the timber of the British orchestration as His statement follows:

"I picked up the orchestra concert nected to the filament minus lead. from the Hotel Savoy, London, Engperience goes to show that short wave radio-frequency amplification. A In the Deresnadyne circuit the spe- The grid return connections of the land, on a wave length of 380 meters number of difficulties have con- cially designed radio-frequency trans- first two radio-frequency transform- between 6 and 6:30 p. m., central diately reported to Mr. Bolles, of the Bolles-Brendamour Company, Cincinnati, there is no question that my reception was synchronous with the foreign program. This program came in loud and clear on the phones and also on the loud speaker. All four tubes were used and with a little further adjustment the strong basses could be heard just as clearly as the violins and flute. The general tone of the orchestra was a little different from what we are used to in America, probably due to the fact that they use the English concerting and have four or six of them playing with the other instruments. This gives the orchestra an organ-like quality which is very pleasing. There were no

The Deresnadyne receiver intro- paratus is arranged. The transform- The three tuning condensers should the bass instruments; not so with

"The neutrodyne is a remarkable

KFAF-DENVER-278

m.--Evening, musical program. WGAZ-SOUTH BEND, IND.---360

m. to 1 a. m.—Orchestra selection KFKX—HASTINGS, NEB.—286

1 p. m.—Arion Trio. to 4 a. m.—Henry Halstead's Dar

n.—Cocoanut Grove Orchestr —Organ recital. \*CKAC—MONTREAL—425

WEDNESDAY

\*WEAF-NEW YORK CITY-492

a. m.—Minnle/Well, planist. 110 a. m.—"Young Mother's Program," Talks by Eleanor P. Brown. 150 a. m.—Market and weather reports.

i-4:40 p. m. — Moonlight Instrumental Trio, James Palmerie, Sam Fontano, Hy-man Richman.
 :40-5 p. m.—Walter H. Preston, barytone.
 p. m.—Waldorf Astoria dinner music.

7130 p. m.—Joint rectat, Altren Corner, William Liebling.
7150 p. m.—Farm talk, by H. E. Cook.
8 p. m.—Sybil Sanderson Fagen, whistler.
815 p. m.—Joint recital.
8135 p. m.—Sybil Sanderson Fagen, whist-

145 p. m.--Charles Wold, player of musi-

\*WJZ-NEW YORK CITY-455

\*WJZ-NEW YOKK CITY-455 p. m.-Hotel Astor Trio. p. m.-Eleanor Gunn's fashion talk. 10 p. m.-Daily menu. 15 p. m.-Talk by John C. Cutting. 30 p. m.-"Education," by Marietta

Johnson, John Karket reports, p. m.—Cafe Ensemble. :20 p. m.—Financial developments day.

7:20 p. m.—Financial developments of th day.
7:30 p. m.—Cafe Ensemble.
8 p. m.—'Problems of Retailing."
8:25 p. m.—New York Philharmonic Or chestra. Contest between six sololat picked for Stadium concerts.
7:30 p. m.—Billy Wynne's orchestra.
\*WFBH—NEW YORK CITY\_273
11 a. m.—Woman's Hour.
12 m.—Orchestra selections.
2 p. m.—Bob Schafer, Mrs. Bob Schafer James Brennan.
2:36 p. m.—Bano recital, Jack Horn.
3:30 p. m.—Jeanette Sheldon, elocutionist:
3:30 p. m.—Jeanette Sheldon, elocutionist:
4 p. m.—Jack Little and Tommy Maile.
5:30 p. m.—Nelson Van Horn, plano recital.
5 p. m.—Jacks Little and Tommy Maile.
5 p. m.—Jackson Van Horn, plano recital.

p. m.-Kiddies' period. :15 p. m.-Reading, Helen Reynolds Bat

50 p. m.—Rita Melvia, soprano. 45 p. m.—Jack Kemberly, barytone. p. m.—Panchard Orchestra. 30 p. m.—Edouard Panchard, hotel trav

130 p. m.—Musical program. \*WBBR-STATEN ISLAND, N. Y.—273 p. m.—Male duet, Fred Franz and Fred Twaroschk. 15 p. m. — "Rebuilding Jerusalem," by

Victor Achmiat. 145 p. m.-Maie duet. 145 p. m.-Maie duet. 150 p. m.-Samuel Weber, planist. 150 p. m.-Harry Hock's entertainers. 145 p. m.-Original Louisiana Five. 145 p. m.-Original Louisiana Five. 145 p. m.-Mifred Jackson, impersonator. 15 p. m.-Maifred Jackson, impersonator. 15 p. m.-Molecut Vall's trio; Paul Specht's dance orchestra. 130 p. m.-Billy Page's syncopators. 1 p. m.-William E. Krigger, barytone. 120 p. m.-Joseph C. Wolfe, barytone. 130 p. m.-Henny Cogert and Charles Hirst, 150 p. m.-Dissed Park orchestra.

songs. 9:20 p. m.—Palisades Park orchestra. 9:45 p. m.—Boys' period.

tor. :30 p. m.—Lena Kaufman, violinist.

\$:45 p. m.—Leah Seley, soprano.
\$:15 p. m.—Bandestel's Park Orchestra.

1:30 p. m.-Lena Kaufman, violin 1:45 p. m.-Leah Seley, soprano. p. m.-Bradford Dixon, writer

-Clover Gardens orchestra. \*WOR-NEWARK-405

It-What It Is-Who Uses It," Glibert P. Farrar. 115 p. m.-Matilda Rosenstrauch, planist. 130 p. m.-Frederic H. Gummic, tenor; Clara Altman, contralto. 145 p. m.-Rudolph Hopf, barytone. p. m.-Concert Orchestra of the S. S. Lavietheoncert Orchestra of the S. S.

Dayinghi S TUESDAY, AUGUST 12 WHN 360 St. Louis Kings WFBH 273 Majestic WHN 360 Vall's and Specht's WGR 319 Vincent Lopes WNAC 278 Shepard Colonial WOR 405 Halsey Miller's WJY 405 Billy Wynne's WAA 263 Sterling WEAF 492 May Singhi Breen's WHN 360 B.J. Goodman's 
Panchard's Vail's and Specht's

Vairs and Speck Vincent Loper. Shepard Colonial Majestic Bhlly Page's Dance Music Woodlawn Palisades Park Clover. Gardens Billy Wynne's

WJZ 455 Roger Wolfe's WEDNESDAY, AUGUST 13 WFBH 273 Panchard's WHN 360 Vall's and Spec WGH 319 Vincent Lopez WNAC 278 Shepard Coloal WFBH 273 Majsatic WHN 360 Bully Page's WDAR 395 Dance Music WAAM 263 Woodlawn WHN 360 Pallsades Park WHN 360 Elover Gardens WJZ 455 Billy Wynne's,

alogues. 45 p. m.—Orchestra selections. 30 p. m.—Musical

ctor Achmidt

:45 p. m.-Male duet.

cal glasses. p. m.—Trio. :45 p. m.—Charles Wold

m.—Synagogue services. p. m.—Joint recital, Alfred Oorner,

:30 p. m.-Midnight concert. KGO-OAKLAND, CALIF-312

Orchestra. KFI-LOS ANGELES-469

p. m.—Kiddies stories. (30 p. m.—Rex Batile's Orchestra (30 p. m.—Studio program. 10:30 p. m.—Joseph C. Smith's Orch

### TO-DAY :

\*WEAF-NEW YORK (ITY-492 1-4 p. m.-..."Sunday Hymn Sing." 1-5 p. m.-.Interdenominational services auspices of Greater New York Federation Radio Choir; Carlos Abba, harpist; 10:30 George Vause, pianist, and Arthur Bil-lings Hunt, harytone and musical direc-tor. Address by Rev. Henry T. Sell, D.D., author-lecturer. b. m. --..."Songs of Faith." by Professor 2 p.

ings Hunt, harytone and musical direc-wise p. m.-Ernie Golden s Orcnestra.
ings Hunt, harytone and musical direc-wise WFBH--NEW YORK CITY-273
D.D., author-lecturer.
a. m.-Stongs of Faith," by Professor
p. m.-Midfréd Louise Gardner, soprano.
2 p. m.-Al Wilson, Herman Engler and Miss Judith Rotä.
2 p. m.-Al Wilson, Herman Engler and Miss Judith Rotä.
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2 p. m.-Al Wilson, Herman Engler and Miss Judith Rotä.
2 p. m.-Al Wilson, Herman Engler and Miss Judith Rotä.
3 p. m.-Frank Wright and Frank Besseine.
3 p. m.-Robert Walker, tenor.
3 p. m.-Alvin Hauser, plano meidels.
3 p. m.-St. Thomas Episcopal Church
3 p. m.-Children's hour. Original stories.
3 p. m.-Children's Male Chorus.
3 p. m.-Children's Male Chorus.
3 p. m.-Chrish Male Chorus.
3 p. m.-Jinumy Clarke's Entertainers.
4 p. m.-Clarke's Entertainers.
4 p. m.-Clarke's Linty-360
3 p. m.-Christ a scientine scient scie L. Robinson. 3:16 p. m.—Cornish Male Chorus. 3:30 p. m.—Church Community Chorus. 4 p. m.—Talk. 4:15 p. m.—Barytone. 7 p. m.—Nathan Abas's Pennsylvania Or-

chestra. \$:25 p. m.-New York Philharmonic Orchestra. WJY-NEW YORK CITY-405 8:15 p. m.—Concert orchestra. \*WFBH--NEW YORK CITY-273

to 8.p.m. Sunday concert.
WBBR STATEN ISLAND, N. Y. 273
9:10 p. m. I. B. S. A. Quartet.
9:25 p. m. Bible lecture, Judge J. F. Rutherford. 9:50 p. m.-I. B. S. A. Quartet. \*WHN-NEW YORK CITY-360

\*WHN-NEW YORK ON TO THE WHAR -NEW YORK ON THE OF TH

10:45 a. m.—Morning service. 3:35 p. m.—Comfort's Philharmonic O \*WGB-BUFFALO-319

m.—Organ recital. •WGY—SCHENECTADY—\$80 \*WGY\_SCHENKLTADI-Sov 10:30 a.m.—Church service. 3 p.m.—Concert by Schenectady's Sym-5: 7 8:30 p.m.—Concert, by the New York Phil-8 harmonic Orchestra. \*WGI\_MEDFORD, MASS.—S60 \*WGI\_MEDFORD, MASS.

WGI-MEDFORD, MASS.-360 5 p. m:—''Adventure Hour'': musicale: talk. \*WMAF-S, DARTMOUTH, MASS.-360 1:20 p. m.—Remarks, by Joseph Plunkett. 1:25 p. m.—Musical program from the stage of Mark Strand Theater. 2:0 to 10 p. m.—Special program by feat-wred vocal and instrumental artists. \*WNAT-BOSTON-244 5 to 11 p. m.—Special orchestra concert: \*WNAC-BOSTON-278 \*WNAC-BOSTON-278 \* WNAC-BOSTON-278 \* Manual Antipaction of the strate concerts of the state collegians. \* WNAC-BOSTON-278 \* Manual Antipaction of the strate concerts of the state collegians. \* WNAC-BOSTON-278 \* Manual Antipaction of the strate concerts of the state collegians. \* WNAC-BOSTON-278 \* Manual Antipaction of the strate concerts of the state collegians. \* WNAC-BOSTON-278 \* Manual Antipaction of the strate concerts of the state collegians. \* WNAC-BOSTON-278 \* Manual Antipaction of the strate concerts of the state collegians. \* WNAC-BOSTON-278 \* Manual Antipaction of the strate selections. \* WNAC-BOSTON-278 \* Manual Antipaction of the strate selections.

11 a. m.—Eentire church service. 3:30 p. m.—Stone's military band. 6:45 p. m.—Entire service. \*WBZ—SPRINGFIELD, MASS.—331 p. m.—Organ recital.
9:30 p. m.—To be announced.
•WJAR—PROVIDENCE—360 T20-9:15 pl m.—Muiskal program fr the Capitol Theater.
 9:15-10:15 p. m.—Organ recital.
 9WKBF.—PROVIDENCE—286
 10 to 11:16 p. m.—Organ recital: soloista
 \*KDKA.—PITTSBURGH.—326

KDKA—PITISEURGH—320
8:45 p. m.—Concert.
8:45 p. m.—Dinner concert.
8 p. m.—Church services.
9 p. m.—Church services.
9 p. m.—Radio church services.

2:30 p. m.—Radio church 7 p. m.—Dinner concert. WCAP—WASHINGTON—469 Bervices. WLAF-WASHINGTON-409 11 a. m.-Church services. 4 p. m.-Open air services. 6:20 to 8:15 p. m.-Musical program the Capitol Theater. 8:15 p. m.-Organ recital. WHAS-LOUISVILLE-400

10:57 a. m.—Organ muss., 5 p. m.—Concert. WSH—ATLANTA—429 WSH—ATLANTA—429

6 p. m.—Methodist Church services. 8:30 p. m.—Wesley Church service WQAM—MIAMI, FLA.—283 \$ p. m.—Musical talent from church WEAP—MOBILE, ALA.—309

p. m.—Vesper service.
 midnight—Musical concert.
 WLW—CINCLNNATI—423

WLW-Darbert p. m-Concert by the Western Southern Orchestra. WWJ-DETROIT-517 WWJ-DETROIT-517 7:30 p. m.—Services at i pal Cathedral. meman's Concert Band.

m.---Orchestra selections. WCX--DETROIT--517 6 p. m.—Dinner concert. 7:45 p. m.—Episcopal church

ion quartet. WHAA—IOWA CITY-484 m.—Familiar hymns by Vance Mo 

10:30 p. m.-Musical program. WHO-DES MOINES, IOWA-528

WMAY-ST. LOUIS-546 m.-Dedication of the Cari 8:30 p. m.-Dedication of the .... Berglund Memorial Tablet. WDAF-KANSAS CITY-411 WDAF-KANSAS city-411 5 p. m.-Newman Theater program. WOS-JEFFERSON CITY-141

8:30 p. m.—Open air religious Missouri State Prison Band. WEBH—CHICAGO—370 7-9 p. m.-Artist program;

WLS-CHICAGO-345 6-8:30 p. m.-Music program by lederation. KYW—CHICAGO—536

11 a. m.—Church services. 2:30 p. m.—Chapel service. WDAP—CHICAGO—369

WDAP-CHICAGO-360 6 p. m.-Organ recital. 10:15 p. m.-Concert by Drake Cor Ensemble. WQJ-CHICAGO-443 3 to 10 p. m.-Raiph. Williams's Orche 7 to 9 p. m.-Artist series program. WTAS-ELGIN, HLL-286 5:30 p. m.-Bedtime story. 5:35 p. m.-Dell Lampe's Ballroom chastra

 Ensemble
 WQJ-CHIICAGU-TA

 S to 10 p. m.-Raliph Williams's Orchestra.
 8:30 p.

 7 to 9 p. m.-Baditme story.
 12:45 p. m.-Miss Marle Koester, "Styles"

 8:35 p. m.-Dell Lampe's Ballroom Orchestra.
 12:55 p. m.-Dell Lampe's Ballroom Orchestra.

 9 p. m.-Date program.
 WTAS artists.

 9:30 p. m.-Badtion Story.
 10:56 p. m.-Deluck O'Brien, readings.

 9 p. m.-Dance program.
 WTAS artists.

 9:30 p. m.-Radio chapel service.
 10:56 p. m.-Church service.

 10 p. m.-Musical chapel service.
 11:58 p. m.-Concert.

 12 midnight--Popular program.
 70 p. m.-Della Concert.

 70 p. m.-Church service; orchestra sellators or concert.
 70 p. m.-The children's period.

 12 midnight--Popular program.
 9 p. m.-Concert. KDK's printon.

 9 p. m.-Leona Hunter Pierce, soprano.
 10 p. m.-Diner concert.

 12 midnight--Popular program.
 70 p. m.-Diner concert.

 13 midnight--Popular program.
 70 p. m.-Diner concert.

 9 p. m.-Concert, KDK's printon.
 116 p. m.-Leona Hunter Pierce, soprano.

 12 midnight--Popular program.
 9 p. m.-Donert.

 13 midnight for the print concert.
 116 p. m.-Leona Hunter Pierce, soprano.

 14 midnight for the prine concert.
 116 p. m.-Leona Hunter Pierce \*WEAF-NEW YORK CITY-492 9. m.-Miriam Witkin, soprano, accom panied by Winfred T. Barr. 4:15 p. m.-William Chosnyk, violinist. 4:30 p. m.-Women's program. 6 p. m.-Waldorf Astoria dinner music. 7:30 p. m.-John C. Smith's Orchestra. 8:15 p. m.-'Inheritance Taxes," J. Elliott Hall Hail. 8:26 p. m.—James Haupt, tenor. 8:30-10 p. m.—Concert by the United \*WJZ-NEW YORK CITY-455 4 p. m.—Eleanor Gunn's fashion talk. 4:16 p. m.—Eleanor Gibson, "Boya." 4:16 p. m.—J. Paimer Gibson, "Boya." 4:16 p. m.—Talk by Frederic J. E p. m.-Fred Hall's Orchestra.

5:30 p. m.—Market reports. 7 p. m.—Concert Orchestra. 7:20 p. m.—Financial Develo ay. ) p. m.—Concert Orchestra. . m.—Estey Organ Recital.

p. m.—Alphonse Bohrer, planist. 230 p. m.—Ernie Golden's Orchestra WFBH—NEW YORK CITY-273

\*WHN-NEW YORK CITY-360
2:15 p. m.—Jimmy Clarke's Entertainers
2:45 p. m.—Gus Ackerman, planist.
3 p. m.—Wright and Bessinger.
3:45 p. m.—Chat with children.
4 p. m.—Leon Stein, barytone.
4:15 p. m.—Song recital, Charlott Schaefer, soprano; Adelaide Travers contraito.
4:45 p. m.—Gene Austin, barytone.
5:15 p. m.—Music.
6:30-7:30 p. m.—Olcott Vail's trio; Pan Specht's dance orchestra.
8 p. m.—Roseland Dancing Academy.

Specht's dance orchestra. 8 p. m.-Roseland Dancing Academy. 9 p. m.-Palisares Park orchestra. 10 p. m.-Talk and musical program. 12 p. m.-Iak and musical program. 13 p. m.-Irane Klinepeter, sonram. p. m.—lrene Klinepeter, sopra 15 p. m.—World news digest.

\*WOR-NEWARK-405 8:45 p. m.-Irene Klinepeter.
\*WOB.-NEWARK-405
2:30 p. m.-Helen Arzinger, soprano.
2:45 p. m.-Helen Arzinger, soprano.
2:45 p. m.-Helen Arzinger, soprano.
3:25 p. m.-Helen Arzinger, soprano.
3:20 p. m.-Helen Arzinger, soprano.
3:30 p. m.-Fashion talk, Mins Dorothy Mines.
3:45 p. m.-Tenor solos, James R. Cooley.
6:16 p. m.-Tenor solos, James R. Cooley.
6:16 p. m.-Tenor solos, James R. Cooley.
6:16 p. m.-Fashion talk, Mins Dorothy Mines.
7:15 p. m.-To-day's sports.
8 p. m.-Gustav H. Brasch, basso.
8:15 p. m.-Gustav H. Brasch, basso.
9:30 p. m.-Twwark Philharmonic Concer Band of fity.
9:15 p. m.-Gustav H. Brasch, basso.
9:30 p. m.-Two Carolinians' concert.
10 p. m.-Time Carolinians' concert.
11 a. m.-Plano recital.

WHAR-ATLANTIC CITY-275

. m.—Orchestra selections. . m.—Orchestra selections. 0 m.—James Burt, radio talk. . m.—Leda Goforth, soprano. •WOO—PHILADELPHIA—509 4 m.—Organ recital. m.—Luncheon music. 146 p. m.—Grand organ; trumpets 130 p. m.—Sports results; police -dianer music

dinner music. 8:30 p. m.—Musical program: Hel Thomas, soprano; Raymond L. Yeak accompanist; E. B. Eckhardt, tenor. 9:10 p. m.—Theater Grand Orchestra. 10 p. m.—Grand organ recital. 10:50 p. m.—Dance program, Candelor orchestra 11:03 p m.—Continuation of dance pr gram. \*WIP---PHILADELPHIA---509

10 a. m.—Seashore gossip. Health ts 3 p. m.—"What Wild Waves Say." 3:05 p. m.—Visiting artists; chats. 3:30 p. m.—Comfort's Philharmon chestra. :05 p. m.-Dinner music by Frisco

WITCHILLADELLITHIA-393
 p. m.—Meyer Davis's Orchestra
 5.30 p. m.—Walera C. Harlan, soprano
 Caroline Hoffman, pianist.
 5.30 p. m.—Meyer Davis's Concert Or chestra.
 WDAR—PHILADELPHIA-395

WDAK—PHILADELPHIA—395
 12 noon—Organ recital; features; cond orchestra.
 2-3 p. m.—Concert orchestra; music, 4:30 p. m.—Mrs. Louis Love, "Reducin 5:45 p. m.—Breaball scores, 7:30 p. m.—Dream Daddy, 7:50 p. m.—Uneam Daddy,

:50 p. m.-Movie Review

A p. m.—Concert orchestra. 8 p. m.—Concert orchestra. 8:30 p. m.—Artist recital. 9:30 p. m.—Stanley Theater featur 10 p. m.—Dance orchestras 'and Minstrels. WGR—BUFFALO—319

\*WGE-BUFFALC-SA 12:30 p. m.-Organ recital. 6:30 p. m.-Vincent Lopez's orchestra. 7:80 p. m.-News; Bcores. 9-11 p. m.-Nusical program. 11 p. m.-Vincent Lopez's dance orc? \*WGY-SCHENECTADY-\$80 p. m.-Musical program by range Society dance orchestra; / Leo Peariman and Edward Di WHAZ-TROY, N. Y.-380 8:45 p.

WHAZ-TROY, N. Y. -380 O p. m.-Popular dance music, Anthony J. Flush's Syncopators; Owtario Can-tanucci, barytone; Frank Davis, soloist; elocution pupils of Gretta M McOmber. \*WMAF--S. DARTMOUTH, MASS-363 p. m.-Dinner music p. m.—Dinner music. 30 p. m.—John C. Smith's Orchestra. 25 p. m.—James Haupt, tenor. 30 to 10 p. m.—United States Marin Rand.

\*WNAC-BOSTON-278 \*WNAC-BOSTON-278 p. m.-Orchestra selections. p. m.-Copley Plaza trio. p. m.-Children's haif-hour. :30 p. m.-WNAC dinner dance. p. m.-Notifications by Senator Walsh, of Montana; selections by the band; John W. Davis's speech of acceptance. \*WBZ-SPRINGFIELD, MASS.-337 p. m.-Dinner concert

WB2—STRINGFIELD, MASS.—3
 5. p. m.—Dinner concert.
 7:30 p. m.—Bedtime story.
 7:40 p. m.—Concert by WBZ trio.
 8:30 p. m.—Semi-official meeting on national G. A. R. convention.
 \*WJAR—PROVIDENCE—S60
 10:45 a. m.—Miss Marle Koester, "

WCAE-FIITSDURUM-102
 6:30 p. m.-Dinner concert.
 7:30 p. m.-Uncle Kaybee; scores.
 9 p. m.-Ukulel lesson, C. Martin
 9:0 p. m.-Musical program.
 11-p. m.-Late concert.
 WRC-WASHINGTON.469

3 p. m.—Fashion development tt 3:10 p. m.—Song recital. 3:25 p. m.—Current Topics. 3:35 p. m.—Piano recital.

7:30-9 p. m. United States Marine B. 9 p. m. Talk by Frederic J. Haskin. 9:20 p. m. To be announced.

9:30 p. m.—Professor Gasper Pa orchestra. WQAK-SPRINGFIELD, VT.-275 7:30 p. m.-Musical program. 10:30 p. m.-Concert. WQAM-MIAMI, FLA.-283 b. m.—Lestey Organ Recital.
 b. fab. p. m.—Sourcett.
 b. m.—Sava Tcherny, violinist; Keith
 c. McLeod, accompanist.
 c. McLeod, accompa 8:30 p. m.—Schmeman's Concert 9:30 p. m.—Orchestra selections. WCX.—DETROIT.—S17 6 p. m.—Dinner concert.

. m.---Musical program. -Jackie Coogan. WOC-DAVENPORT-484 m.—Musical program. p. m.—Bernie Schultz's Orchestra. WHO—DES MONIES, IOWA—526

m.—Musical program. m.—Orchestra selections. WOS—JEFFERSON CITY—441

WGS-JEFFERSON CITY-441
 p. m.—Addresses.
 9:30 p. m.—Popular dance music.
 KSD.—ST. LOUIS-546
 9:30 p. m.—Artists' program.
 10:40 p. m.—Concert by Crow's Band.
 KWW-CHICAGO-335
 6:45 p. m.—Children's story.
 WMAQ-CHICAGO-448
 6 p. m.—Theater organ recital.
 6:30 p. m.—LaSalle Orchestra.
 WOAW-OMAHA.—526
 7:30 p. m.—Artist numbers.
 WGAZ.—SOUTH BEND, IND.—360
 8:10 p. m.—Artist numbers.
 WGAZ.—SOUTH BEND, IND.—360
 8:10 p. m.—HASTINGS, NEB.—286
 6:15 p. m.—Organ recital.

m.—Organ recital. —Musical program. WFAA—DALLAS—476 :30 p. m.—Songs by artists. KGO—OAKLAND, CAL—312 p. m .- Educational , program, KFI-LOS ANGELES-469

11 p. m.-Dance orchestra. 1 a. m.-Cocoanut Grove Orchestra. • CKAC-MONTREAL-425 1:45 p. m.-Luncheon concert.

### TUESDAY

WEAF-NEW YORK CITY-192 a.m.—Emanuele Stieri, barytone. 1:10 a. m.—"Feeding the Family," Dr. Mary D. Rose. 1:35 a. m.—Motion picture, Adele Woodaid. 1:50 a. m.-Market and weather reports. 11:50 a. m.—Market and weather reports
4 p. m.—Alma G. Slunt, soprano, accmon panied by Marian Rasmussen.
4:10 p. m.—Arthur Behim, singer.
4:20 p. m.—Arthur Behim, singer.
4:30 p. m.—Arthur Behim, singer.
4:40 p. m.—Arthur Behim, singer.
4:40 p. m.—Arthur Behim, singer.
4:40 p. m.—Ducts and solos, Elsie McGal Persons; William H. Stamm, accompani ed by Winifred T. Barr.
7:46 p. m.—Ducts and solos.
8:16 p. m.—Dets and solos.
9 p. m.—Ducts and solos.
9 p. m.—Ducts and solos.
9 p. m.—Dets and solos.
9 p. m.—Ther Wins."
9-10 p. m.—May Singhi Breen's Synco-pators.

WJZ-NEW YORK CITY-455

m.—Trio concert.
m.—Eleanor Gunn's Fashion Talk.
p. m.—Baily menu.
Ethel Walsh.
m.—Mme. Pauline Kollman, so-11 p. m.—Late concert by 'Sid's' gang.
m.—Instruction in internation p. m.—'Tashions of the Stage," Cora 5:15 p. 4.36 p. m.— Frashious of the Stage, Cora code.
5 p. m.—Market reports.
7 p. m.—'The Russian Wolfhound," by 7:45 p. m.—Sports, by Louis A. Dougher.
Frank Dole, of The New York Heraid 8 p. m.—Piano recital, Helen Williams.
Tribune. 8 p. m.—"Our New 8:15 p. m.—"Our New by Theodore G. Risley Violin recita Tribune. 20 p. m.—Financial developments of the day, (30 p. m.—Hotel Vanderblit Orchestra. (30 p. m.—New York University summer) school concerts. Frances Sonin, juvenile character songs. Bernard Litchenberg. Bernard Litchenberg. (30 p. m.—Violin recital, Sol Mnister (315 p. m.—Song recital. (315 p. m.—Song recital. (316 p. m.—Song recital. (316 p. m.—Song recital. (316 p. m.—Song recital. (316 p. m.—Iving Boernstein's Trio. (316 p. m.—Iving Boernstein's Trio. (316 p. m.—Irving Boernstein's Trio. (316 p. m.) (31 .so p. m.—song recital. p. m.—A political talk, John E. New 15 p. m.—Irving Boernstein's Trio. WHAS—LOUISVILLE, KY.—400 p. m.—Theorem Construction.

p. m.—.Volga Singers. m.—.Roger Wolfe's Orche. \*WJY-NEW YORK CITY-405 30 p. m.—Billy Wynne's Inn Orchestra. 15 p. m.—'Lessons From Roman His-tory,'' Professor Kraemer, 30 p. m.—New York Philharmonic Or-

\*WFBH-NEW YORK CITY-273

11 a. m.—World news. 11 a. m.—Wornan's hour. 12 m.—Orchestra.selections. 2 p. m.—Aivin Hauser, piano selecti 2:15 p. m.—Reading, Helen Reynolds hit?

bitt 1:30 p. m.—Bernard & Robinson. 1 p. m.—Marion Doran, soprano. 1:16 p. m.—Violin recital, Frank J. Herel 1:30 p. m.—Joseph C. Wolff, barytone. 4 p. m.—Pupils of Alviene School. 4:30 p. m.—Elizabeth Topping, piano re

m.---Kiddies'-period. 5:15 p. m.—Old songs contest. 5:36 p. m.—Fatherine Connolly, so 5:45 p. m.—Frank J. Herel, violin 6 p. m.—Fernando Villa, tenor. 6:15 p. m.—Hotel Orchestra. 11:30 p. m. to 2 a. m.—Mid-night

WHN-NEW ORK CITY-360

2-3:15 p. m.-Overture and vaudeville 3:45 p. m.-Irving Miller, barytone. p. m.-Irving Miller, barytone. p. m.-Boys' period. 15 p. m.-Talk by Elizabeth Alexande Major. 116 p. m.—Loretto C. Lynch, "Tea Time 9:15 p. m.—La. Salle orchestra. 146 p. m.—Loretto C. Lynch, "Tea Time 9:15 p. m.—Miss Hazel O'Neill, soprano. WEBH—CHICAGO—370 4:45 p. m.—Loretto C. Lynch, "Tea Time Talk"
9:15 p. m.—Cloretto C. Lynch, "Tea Time Specht"s Dance Orchestra.
9:30 p. m.—Orginal St. Louis Rhythm Kings.
6:30-7:30 p. m.—Orginal St. Louis Rhythm Kings.
9:30 p. m.—Orginal St. Louis Rhythm Kings.
9:30 p. m.—P. Feingold, violinist; conce selections.
9:30 p. m.—Solos; dance selections.
9:30 p. m.—Bertram J. Goodman's orchestra.
10 p. m.—Bertram J. Goodman's orchestra.
10:45 p. m.—Ben Gordon tenor; Bell Hecht, planist.
11:20 p. m.—Cub Alabam revue.
\*WEBJ-—KEW YORK CITY\_273\*
7. p. m.—Elybrun's Motion Picture Revue.
5. f.

WAAM -NEWARK-263
11 a. m.—Piano recital.
11:10 a. m.—Radio cooking school.
11:30 a. m.—Florence Doobner, soprano.
7:30 p. m.—Lillian Spitzer, planist; Alle Rincke, violinist.
p. m.—Jaines V. Moore and Al Lang
8:15 p. m.—Sterling Melody Boys.
9:15 p. m.—Himmy Shearer.
10:30 p. m.—Jimmy Shearer.
10:30 p. m.—Jimmy Shearer.
11 a. m.—Organ. recital.
13 noon-Luncheon music.
4:45 p. m.—Grand organ: trumpets.

4:45 p. m. Grand organ; trumpets

m.—Meyer Davis's Orchestra. p. m.—Meyer Davis's Orchestra. p. m.—Musical program: Elizabeth (arp Cornog, soprano; Irene Guest oog, violnist; Marguerite Barr, con-ralto; Caroline Hoffman, planist. 0. p. m.—Meyer Davis's Orchestra. b. m.—Fairmount Park Symphony Or-hestra 20 p. Harp Loog traite

b. m.—Fairmount Fara Sympace, chestra.
\*WIP—PHILADELPHIA—509
10 a. m.—Seashore gossip; health talk.
1:05 p. m.—Organ recital.
3 p. m.—'What Wild Waves Say."
3:06 p. m.—Visiting artists' chats.
3:30 p. m.—Comfort's Philharmonic chastra.

chestra. 6:05 p. m.-Ehrenzeller's Concert C chestra. 7 p. m.-Bedtime storles. 8 p. m.-Comfort's Philharmonic C chestra. 8:46 p. m.-''What Wild Waves Say.'' 8:50 p. m.-Vessella's Concert Band. 10 p. m.-Bob Leman's Dance Orchest \*WDAR-PHILADELPHIA-395 12 noon-Organ recital; features; concert

2 noon-Organ recital; features; orchestra. to 3 p. m.-Concert orchestra. :30 p. m.-Artist recital.

p. m.—Baseball scores. WHAR—ATLANTIC CITY—275

2 p. m.—Orchestra selections. 8 p. m.—Selections. •WGR—BUFFALO—319 12:80 p. m.—Organ recital. 6:30 p. m.—Vincent Lopez's orchestra.

MGY-SCHENECTADY-380 8:45 p. m.-Musical program by Jaha Goldberg, planist; Ernest Bliss, barytone \*WMAF-S. DARTMOUTH, MASS.-363

WMAF-S. DARTMOUTH, MASS.-303
 S n.-Dinner music.
 P. m.-Duets and solos by Elsie McGall Persons, soprano; William H. Stamm, tenor, accompanied by Winifred T. Barr.
 7:45 p. m.-The Rev. H. C. Dressel, cel-Vert

8 p. m.-Duets and solos. 8:15 p. m.-The Rev. H. C. Dressel, cel-

8:40 p. m.—Duets and solos.
8:50 p. m.—Judith Roth, singer.
9 to 10 p. m.—May Singhi Breen's Syn

p. m.—Orchestra selections.
p. m.—Orchestra selections.
30 p. m.—WNAC dinner dance.
10 p. m.—Boston American Theater.

\*WBZ-SPBINGFIELD, MASS .--- 337

m.—Leo Reisman ensemble p. m.—Leo Reisman orchestra. p. m.—Bedtime story. p. m.—Albert Cowles players. p. m.—G. A. R. campfire.

1:05 p. m.-Biltmore orcness. 8 p. m.-Baseball scores. 8:05 p. m.-Zikes's melodious orchestrs 1. Henry MacDuff.

stra. \*KDKA-PITTSBURGH-326

p. m.—Scores; inning by inning. p. m.—Organ recital, A. L. Taylor.

7 p. m. Scores; concert. 130 p. m. The children's period. 7:46 p. m. News bulletins. 8:15 p. m. University of Pittsburgh edu

cational course. ) p. m.-Mrs. F. M. Myler, contraito; Emil O. Wolf, violin; Charles E. Joralmon, reader.

-Violin recital, Sol Mnister -Song recital.

WMC-MEMPHIS-500

band.

lullaby time; fa

. m.—Organ recital. m.—Midnight frolic. WLW—CINCINNATI--423

-Dance program. m.--Special features.

+30 p. m.-Story, radio cartoon. p. m.-Cleveland orchestra; Alma Sch er, planist; B. P. Tendolph, tenor. WWJ-DETROIT-517

b. m.—Dinner concert. p. m.—Dinner concert. 0 p. m.—Red Apple Club. WOO—DAVENPORT—484 5:45 p. m.—Chimes concert. WHAA—IOWA CITY—484 Concert. by Williamsburg

m.-Farm speeches

30 to 12 p. m.-Mus

6:45 p. m.\_\_\_\_\_Di

5:05

6:05 WIP

6:30 WHN

\$:30 WGR

-Schmeman's concert h Orchestra selections. WCX-DETROIT-517

KYW-CHICAGO-536

:45 p. m.—Children's bedtime story. p. m.—Dinner concert, by Joska De Bab-ary's and Paul Whiteman's "Collegians." p. m.—Musical program, by artists.

50 p. m.—Musical program. to 11:30 p. m.—"At Home" program. WLS—CHICAGO—345

WMAQ-CHICAGO-448

WDAT-Organ concert. p. m.—Organ concert. p. m.—Chapman's Dance Orchestra. WQJ-CHICAGO-448 J. a. m. to 2 p. m.—Ralph Williams' Or

TO-DAY

MONDAY, AUGUST 11

Frisco Serenader

360 Vail's and Specht's

319 Vincent Lopez

10:00 10:00 10:30 11:00

6:00 6:30

6:30 6:20 6:45 7:30 8:15 8:45 9:30 10:00 10:30

WJZ 455 Fred Hall's

6:30 WGR 319 Vincent Lopez 6:30 WNAC 278 Westminster 6:40 WFBH 373 Majestic 7:30 WEAF 492 John C. Smith's. 8:00 WHN 360 Roseland 8:00 WHN 360 Roseland 8:00 WHN 360 Pathsades Fark 10:00 WDAR 509 Arcadia 10:00 WDAR 509 Arcadia 10:00 WJZ 455 Ernie Golden's 10:30 WOC 509 Candelor's 11:03 WOC 509 Candelor's

Time Wave P.M. Station length Orchestra 2-3 WBS 360 Sterling 10-11 WHN 360 Faul Specht's

509

6:15 WOR 405 Elite

\*WJAR-PROVDENCE-360

list, :30 p. m.-Judith Roth, singer.

pators. WNAC-BOSTON-278



### \* Means Daylight Saving Time

### All Other Programs Are in Eastern Standard Time

\*WAAM-NEWARK-263 7:30 p. m.-Josephine Lehmann, pianis 8 p. m.-Ben Friedman, tenor. 8:30 p. m.-Finch and Britt. 8:45 p. m.-Woodlawn Dance Orchestr 9:45 p. m.-Judith Roth. 10 p. m.-Al Wilson. 10:15 p. m.-Herman Engler, popul songs. \*WOO-PHILADELPHIA-509 a. m.—Organ recital.
 11 a. m.—Organ recital.
 12 noon—Luncheon music.
 145 p. m.—Grand organ trumpets.
 130 p. m.—Sports results; police reports dinner music by A. Candelori's Orches tra.
 8:16 p. m.—Grand organ recital, Harriett G. Ridley.
 9 p. m.—WOO Orchestra; Dr. A. Maltsey Russian tenor.

\*WFI-PHILADELPHIA-395 1 p. m.-Meyer Davis's Concert Orche 3:05 p. m.-Dance music, Sol Zaleb. 6:30 p. m.-Meyer Davis's Orchestra. \*WIP-PHILADELPHIA-509 b. m.—Seahore gossip.
p. m.—"What Wild Waves Say."
1:05 p. m.—Visiting artists; chats.
3:30 p. m.—Comfort's Philharmonia n. — Talk by Dr. Frank. E. Ebaugh. 15 p. m. — Bob Leman's Dance Orchest. 105 p. m. — Eddie Elkins' Orchestra. m.—Bedtime stories. \*WDAR—PHILADELPHIA—395

p. m.---WOO Russian teno

 2 hoon—Organ recital; religious servic concert orchestra.
 3 to 3 p. m.—Concert orchestra; Mrs. Letter and the service of the servi will talk. 1:30 p.m.—Artist recital. 1:45 p.m.—Baseball scores. 1:30 p.m.—Dream Daddy. 8.p.m.—Arnoid Abbott: dance m WGR—BUFFALO—319

\*WGR-BUFFALO-319 12:30 p. m.-Organ recital. 6:80 p. m.-Vincent Lopez's orchestra. 7:30 p. m.-News; scores. 9-11 p. m.-Musical program. 11 p. m.-Vincent Lopez's orchestra. \*WGY-SCHENECTADY-380

5:30 p. m.—Adventure story. 7:30 to 9 p. m.—Musical program by Fill pino orchestra. p. m.-New York Philharmonic Orchestra. \*WBZ\_SPRINGFIELD, MASS.-337 p. m.—Baseball results. 30 p. m.—Baseball results.

p. m.—Baseball results,
i30 p. m.—Basteball results,
i40 p. m.—Mrs: Alexander Thomson, coltraito,
i15 p. m.—Special French program.
p. m.—Joint reception at Cadet Armor
i30 p. m.—Leo Reisman's. orchestrisongs by Bill Coty and Jack Armstron
\*WNAC-BOSTON-278
0:30 a. m.—WNAC Women's Club talk \*WNAC-BOSTON-278 10:30 a. m,-WNAC Women's Club talks. 1 p. m.-Orchestra selections. 4 p. m.-Orchestra selections. 6 p. m.-Children's hour. 6:30 p. m.-WNAC dinner dance.

:30 p. m.—WNAC dinner dance. p. m.—To be announced. •WJAR—PROVIDENCE—360 0:45 a. m.-Marie C. Koester,

ay." , m.—Studio program. , m.—Joint recital, Alfred Or r; William Liebling, barytone. ...—Sybli Fagen, whistler. m.—Spoli Fagen, whistler. m.—Charles Wold.

p. m.—1710 45-10 p. m.—Charles Wold. WMAF—SO. DARTMOUTH, MASS.-

--Dinner music. --Synagogue services. m.--Charles Robinson, barytone. m.--Dorothy Hoyle, violinist. --Charles Robinson, barytone. m.--Bernard and Robinson, Dir

m.--

8:30 p. 9:30 p.

Daylight Saving Time

5:00 5:05 5:20 5:20 5:30

6:30 7:15 7:40 8:30 9:00 9:30 0-11 0:30 0:30 1:00 1:30 2:00

6:00 6:05 6:30 6:30 6:30

World Radio History

WHN 360 WIP 503 WOR 405 WHN 360 WNAC 278

WFBH 273 WEAF 492 WEAF 492

WEAR, 492 WJY 405 WHN 360 WEAF 492 WHN 360 WJZ 455 WWJ 517 WHN 260 WLW 423

WFBH 273 WIP 509 WHN 360 WNAC 278 WGR 319

Stars. 30 p. m.—Dorothy Hoyle, violinist. 45 p. m.—Bernard and Robinson, to 10 p. m.—West End Ladies' Trio. \*RDKA—FITTSHURGH—326 •RDKA-PITISURGH-320 [215 p. m.-Daugherty's Orchestra. 115 p. m.-Scores, inning by inning. 130 p. m.-Dinner concert. 7 p. m.-Scores; dinner concert. 7 p. m.-The children's period. 215 p. m.-Jackie Coogan. 215 p. m.-Jackie Coogan.

m.—Cencert by Nevin Trio. \*WCAE—PITTSBURGH—162 m.—Dinner TSBURGH—162 p. m.—Dinner concert. p. m.—The Sunshine Girls; scores p. m.—Musical program. WCAP.—WASHINGTON—469

130 p. m.—United States Navy Band. p. m.—Eveready Trio. 145 p. m.—United States Navy Band Con-

p. m.- "Science News of the Week. m.—To be announced. WRC—WASHINGTON—469 m.—Fashion developments. m.—Song recital. . m.—National Conference

report. 1:30 p. m.—Song recital. 2:45 p. m.—Piano recital. Eleanor Glynn 2:50 p. m.—Current topics. 4 p. m.—Song recital. 2:15 p. m.—Instruction in Internationa Code.

Stanlas for 55 p. m.—The Day's Sports, Bill Steinke, p. m.—'Advertising—Those Who Make It-What It Is-Who Uses It," Gilbert P. Farrar. (15 p. m.—Stories for children. (15 p. m.—Concert by Mrs. Harmon (15 p. m.—Concert by Mrs. Harmon (15 p. m.—Concert by Mrs. Harmon (15 p. m.—Stories for children. (15 p. m.—Concert by Mrs. Harmon (15 p. m.) (15 p. m.

8 p. m.-Virginia zmental Trio, 9:15 p. m.-Instrumental Trio, WWJ-DETROIT-517 WWJ-DETROIT-517 m.—Schmeman's Concert Band. m.—Orchestra selections. WCX—DETROIT—517

8:45 p. m.—Rudolph HopI, barytone.
9 p. m.—Concert Orchestra of the S g Leviathan.
9:45 p. m.—Matilda Rosenstrauch, pianist.
9:45 p. m.—Matilda Rosenstrauch, pianist.
9:45 p. m.—Matilda Rosenstrauch, pianist.
10 p. m.—Frank J. Shipman, "Your American Merchant Marine."
10:30 p. m.—Barytone solos, Rudolph Hopf.
10:36 p. m.—AtliANTIC CITY.—275
7:30 p. m.—Orgentra selections.
WHAR—ATLANTIC CITY.—275
7:30 p. m.—Orgentra selections.
8:30 p. m.—Orgentra selections.
8:30 p. m.—Song recital, by Mary Kli9 p. m.—Atlista' program.
12:45 a. m.—Nighthawk frolic.

### 6:45 p. m.-Children's bedtime stor 5:45 p. m.—Children's bedüime story 7 p. m.—Dinner concert by Jos Babary's and Paul Whiteman's gians." 7:30 p. m.—Studlo program. 8:8:58 p. m.—Musical program by a 9:16 p. m.—Maiscal program by a 9:16 p. m.—Maiscal program by a 9:16 p. m.—Midight revue. WLS—CHICAGO—345 5:30-11 p. m.—Musical place times the part of the part 6:30-11 p. m.-Music; lullaby time; meeting; farm land discussions WMAQ-CHICAGO-448 m.—Theater organ recital: p. m.—Stories for children. p. m.—Program by Walther League. KFKX—HASTINGS, NEB.—286 6:15 p. m.—Dinner concert. WGAZ-SOUTH BEND, IND.—369 -10 p. m.—Big Five Orchestra. KFMX—NORTHFIELD, MINN.—233 :30 p. m.—Organ recital. p, m.—Organ recital. \*CKAC—MONTREAL—425 1:45 n. 1:45 p. m.—Classic concert. 4 p. m.—Weather: news. PWX—HAVANA—400 8:30-11 p. m.—Concert by Cuban Army. THURSDAY \*WEAF-NEW YORK CITY-492 a. m.—Marie Nicholson, soprano, talk. :30 a. m.—"Mid-Summer Menu," Bernard H. Smith. 1:50 a. m.-Market and weather 1:50 a. m.—Market and Weather, ports. p. m.—Elsie Peck, soprano, :10 p. m.—Sylvia Schachter, pianist. :20 p. m.—Sylvia Schachter, pianist. :30 p. m.—Sylvia Schachter, pianist. :40 p. m.—Stories for children. :p. m.—Waldoif-Astoria dinner music. <sup>7</sup> m. —Mid-week services, Federat 7 p. m.—-Mid-week services, Federation Radio Choir; prayer; solo by Arthur Billings Hunt, barytone; address by Rev. George Adams, Ph.D., D.D. 7430 p. m.—'Some Confessions of Veteran Speakers,'' Warren C. Du Bois. 740 p. m.—Elmer Grosso's Dance Orches-tra. tra. :15 p. m.—"International Polo and the Coming Matches," Capt. Percy Redfern Creed. :30 p. m.-Elmer Grosso's Dance Orchestra. -10 p. m.—Program to be announced. 0-11 p. m.—Vincent Lopez's Orchestra. \*WJZ-NEW YORK CITY-455 . m.—Nathan Abas's Orchestra. m.—Eleanor Gunn's Fashion Talk. 4:10 p. m.—Daily menu. 4:15 p. m.—The Progress of the World." 5:30 p. m.—Market reports. 7 p. m.—Concert orchestra. 7:20 p. m.—Financial Developments of th

9 p. m.—Silverman's Orchestra. WEBH—CHICAGO—370 7:30 p. m.—George Foster, planis 8:30-10:30 p. m. — Reader, steel dance orchestra

rchestra. KYW-CHIAGO-536

130 p. m.—Concert orchestra. p. m.—Weekly French lesson. 130 p. m.—New York Philham chestra. 10:15 p. m.—"Slums of London," George Laval Chesterton. 0:30 p. m.—Waldorf-Astoria Roof Orches-

\*WJY-NEW YORK CITY-405 7:30 p. m.—Piedmont Trio. 8:45 p. m.—Book Review, Grace Colbron. p. m.—Al Reiser's Orchestra. \*WFBH—NEW YORK CITY--273

11 a. m.-Morning music, 11:30 a. m.-Mildred V. Feldman, 12 non-Leonardo Orchestra, 1 p. m.-Lives of Great Men, Pas Present.

Present. 2:30 p. m.—Alvin Hauser, planist. 2:45 p. m.—Rose Stanton, soprano. 3:45 p. m.—Juidred Gardner, soprano. 3:15 p. m.—Juidth Roth, Al Wilson a Herman Engler. 3:30 p. m.—Miss Singe Wygren, songs. 3:45 p. m.—Norma Ruth Walker, soprano. 4:15 p. m.—Metropolitan Trio.

p. m.—Alvin Hauser, piano selecti
 p. m.—Kiddles' Period.
 p. m.—Fred Hughes, tenor.
 p. m.—Ida Fehleisen and Ann

b:30 p. m.—Ida Feniesen and Ann De drick, songs.
6 p. m.—Fernando Villa, tenor.
b:15 p. m.—Hotel orchestra.
b:30 p. m.—Jack Delaney, humor.
b:45 p. m.—Hotel orchestra.
7 p. m.—Marcia Stanton, soprano.
7:15 p. m.—Orchestra selections.
11:30 p. m. to 2 a. m.—Midnight Rendes wors.

\*WHN\_NEW YORK CITY\_360 :15 p. m.—Bob Schaefor's entertainers. :45 p. m.—Frank Laforese, barytone. :15 p. m.—Eleanor Gerlach, soprano. :30 p. m.—Minnle Banges, planist. :45 p. m.—Loretto C. Lynch, 'Tea Tim

Talk." Talk." For Partridge's Orchestra.
5 p. m.—Leonard Partridge's Orchestra.
6 30 - 7:80 p. m.—Olcott Val's Trio; Paul Specht's Dance Orchestra.
8 30 p. m.—Palisades Park Orchestra.
10 p. m.—Vincent Lane, tenor.
10:30 p. m.—Reseland Ballroom Orchestra.
11:15 p. m.—Geseland Ballroom Orchestra.
11:15 p. m.—Gene Austin, barytone.
11:15 p. m.—Jack Kelly's Orchestra.
\*WBBL STATEN ISLAND. N. Y.—273
\*\*10 p. m.—Vocal selections.

Sunday Sch

128800n. —Instrumental selections. \*WOR.—NEWARK.—405 2:30 p. m.—Castle Edward's Orchestra 3 p. m.—Castle Edward's Orchestra. 3:15 p. m.—Castle Erward's Orchestra. 3:15 p. m.—Castle Erward's Orchestra. 3:15 p. m.—Castle Erward's Orchestra. 3:16 p. m.—Castle Erward's Orchestra. 3:17 p. m.—Learne Correct 
3:30 p. m.—Harry Cox's Orchestra.

b. au p. m.—Harry Cox's Orchestra.
7:20 p. m.—Resume of day's sports.
\*WAAM—NEWARK—263
11:10 a. m.—Ada Bessie Swan, Radio Cooking School.
11:30 a. m.—Florence Doebner, soprano.
6:30 p. m.—Ray Southwick's Orchestra.
7:30 p. m.—James Vincent Moore's entertainers.

tainers. 8 p. m.—Walter Storey, "Motion Pictures." 8:45 p. m.—Harry Knox's Entertainers. 10 p. m.—Catello's Radio Entertainers.

## **Dance Orchestras for This Week**

7:10 WJY 7:80 WJZ 8:15 WDAR 9:00 WEAF 9:40 WEAF 10:00 WOO 10:30 WJZ 10:30 WHN 11:00 WGR 11:33 WOO 11:30 WHY 11:30 WGY Leonard Nelson's Ernie Golden's Young's and Fry B. Fischer's Candelori's Harold Stern's Roseland V. Lopez Candelori's Sam Wooding's Casmer's 10:45 WOR 405 Man. Serenader 11:60 WGR 319 Vincent Lopes 405 455 395 492 492 509 455 360 819 509 360 880 THURSDAY, AUGUST 14 L. Partridge's Ky. Serenaders Harry Cox's Vall's and Specht's Westminster Vincent Lopez Hotel Majestic Elmer Grosso's Elmer Grosso's Elmer Grosso's Al Reiser's Palisades Park Vincent Lopez Roseland Waldorf-Astoria SATURDAY, AUGUST 16 6:15 WOR 405 Charley Storm's 6:30 WHN 360 Vail's and Specht's 7:00 WJZ 455 Waldorf-Astoria Jean Goldkette's Jack Kelly's Doherty's Boys Ti00 WJZ 455 Waldorf-Aste
WFBH 273 Leonardo's
8:16 WNAC 278 Westminster
9:20 WNAC 278 Copley Plaza
10:00 WBZ 337 Copley Plaza
10:10 WFP 59 Bob-Leman's
10:30 WJZ 455 Astor
10:30 WHN. 360 Reseland Copley Plaza Copley Plaza Vincent Lopez Bob Leman's FRIDAY, AUGUST 15 Cholly Storm's Eddie Elkin's Vail's and Specht's Shepard Coloniai Vincent Lopes Astor J. A. Chickene's Recoland

\*WOO-PHILADELPHIA-509 a. m.—Organ recital: m.—Luncheon music. 5 p. m.—Grand organ; trumpets

p. m.—Sports results; police re-• **\*WFI—PHILADELPHIA**—395 m.—Meyer Davis's Conce p. m.—Swarthmore t Orchestra Chautauou p.

Ladies' Quintette. 6:30 p. m.-Meyer Davis's Orchestra. 8 p. m.-Boy Scout Radio Corps. 8:30 p. m.-Fairmount Park Sympho Orchestra. Orchestra. s.8:55 p. m.—Talk by Harry L. Wymond. 10 p. m.—Concert by Fairmount Symphony Orchestra. \*WDAR—PHILADELPHIA—395

12 m.—Organ recital; featu orchestra. 2-3 p. m.—Concert orchestra. 3:30 p. m.—Artist recital.

5:45 p. m.—Baseball scores. \*WIP—PHILADELPHIA—509 lo a. m .- Seashore gossip; health sugge

10 a. m.—Seashore gossip; health sug tions.
3 p. m.—"What Wild Waves Say"
3:05 p. m.—Radio baby clinic.
3:30 p. m.—Comfort's Philharmonic chestra.
6:05 p. m.—Kentucky Serenaders.
7 p. m.—Bedtime stories.
8 p. m.—''Timely Talks to Motorists."
8:15 p. m.—Comfort's Philharmonic chestra.

chestra. :45 p. m.—"What Wild Waves Say." :50 p. m.—Performance of Murr Minstrels.

:80 p. m.—Concert by Vassella's Band. WHAR—ATLANTIC CITY—275

m.—Orchestra selections. m.—Orchestra numbers. \*WGR—BUFFALO—319 12:30 p. m.—Organ recital. 16:30 p. m.—Vincent Lopez's Orchestra.

6:30 p. m.—Vincent Lopez's Orchestra.
7:30 p. m.—News, scores, story.
•WGY-SCHENECTADY-S80
2 p. m.—Music and household talk.
6:30 p. m.—Organ recital.
8:30 p. m.—Pogram of New York Philharmonic Orchestra.

\*WMAF-S. DARTMOUTH, MASS.-363 p. m.—Dinner music. p. m.—Mid-week church services. :30 p. m.—"Some Confessions of V

30 p. m.—"Some Confessions of Veteran Speakers," Warren C. Du Bois.
30 p. m.—Elmer Grosso's Dance Or-

chestra, 9:10 p. m.—To be announced \*WNAC—BOSTON—278 p. m.—Orchestra selections, p. m.—Orchestra selections, 3:30 p. m.—WNAC dinner dance, 3:30 p. m.—WNAC dinner dance,

p. m.-To be announced. \*WBZ-SPRINGFIELD, MASS.-337 6 p. m.—Leo Reisman Ensemble. 6:30 p. m.—Songs by Bill Coty, Jack Ar

strong. st40 p. m.-Leo Reisman Orchestra. 7:05 p. m.-Market reports. 7:30 p. m.-Red&ime story. 9. m.-Redtal by Mildred Teitelbaum, pianist. 9:30 p. m.-To be announced. \*KDKA-PITTSBURGH-326

\*KDKA—PITTSBURGH—326 12:15 p. m.—Scaizo's Orchestra. 3:15 p. m.—Scores; inning by inning. 6:30 p. m.—Dinner concert, KDKA phony Orchestra. 7 p. m.—Scores; dinner concert. 7:30 p. m.—The children's period.

 30 p. m.—The children .
 35 p. m.—Farm, program.
 p. m.—Concert, KDKA Symphony Or
 p. m.—Concert, KDKA Symphony Or chestra; Virginia Kendrick, contralto Leonard W. Siegel, basso-cantante; Man garet McCartney.

m.—Concert. \*WCAE—PITTSBURGH—462 
 05
 \*WUAE
 FILLISM

 6:30 p. m.
 Dinner concert.

 Isabel
 7:30 p. m.
 Uncle. Kaybee; scorès.

 9:30 p. m.
 Musical program.

 11 p. m.
 Moore's Radio Review.

 -273
 WRC
 WASHINGTON-469

p. m.—Fashion developments :10 p. m.—Arthur McCormick barytor -'Beauty and

3:20 p. m.— Beauty and Elsie Plerce. 3:25 p. m.—Current topics. 3:35 p. m.—Plano.recital. 4 p. m.—Song recital.

 p. m.—Stories and songs for children.
 WHAS—LOUISVILLE, KY.—400
 8:30 to 10 p. m.—Ella Sharrard Violi Quartet. WLW-CINCINNATI-423

10:03 p. m.—Play, "Business Man Gentleman," and musical numt p. m.-Popular program. WJAX-CLEVELAND-390

p. m.—Songs, violin selection numbers, WMC—MEMPHIS—500

7 p. m.—Musicai. WWJ.—D.KTROIT.—517 8:30 p. m.—Schmeinan's Concert Band. 9:30 p. m.—Orchestra selections. 10 p. m.—Dance music by Jean Goldkette' Orchestra. 11 p. m.—Orchestra selections. WOC—DAVENPORT.—484 10 p. m.—Orchestra program. WDAK—KANSAS CITY.—411 7 n. m.—Piano selections; address; cl

 m.—Plano selections; iddress; children's story; orchestra selections.
 KYW-CHICAGO-536
 \*6 p. m.—Children's bedtime story;
 p. m.—Dinner concert by Joska De Babary and Paul. Whiteman's "Collegians."
 p. m.—'Good Reading," by the Rev. 6:45 p. m.—

p. m.— Good Reading," by the F C. J. Pernin. :20 to 9:20 p. m.—Musical program artists.

artists. 9:20 p. m. "Safety First," Z. C. Elkin. 10 to 11:30 p. m.— "At Home" program WLS-CHICAGO-345 6:30 to 10 p. m.—Music; vaudevilla lullaby time; farm talks. WMAQ—CHICAGO—448 vaudeville night

6:30 p. m.-La Salle Orchestra. 9:15 p. m.-Tb be announced. WEBH-CHICAGO-370 7:30 p. m.-Louis Perlman, violinist; con-cert selections. 9:30 p. m.-Tenor and dance selections. 11:30 p. m.-Soprano, pepular and dance selections. WDAP-CHICAGO-360 -Dinner concert; Drake,

p. m.—Dianer concert; Drake, p. m.—Organ recital; quartet. WFAA—DALLAS—476

WFAA-DALLAS-476 9:30 p. m.-Music box illustration. 12 midnight-Meirose Orchestra. WOAW-OMAHA-526 7 p. m.-Story hour. [2:30 p. m.-Yost's Orchestra.

11 p. m.--Cocoahut Grove Orchestra. a. m.--Lillian Martin concert. \*CKAC-MONTREAL-425 p. m.--Weather, news. p. m.-Leased to CNRM.

FRIDAY

WEAF-NEW YORK CITY-492 . — Jeane Austin, singer and planist. t. m. — "Mars Closer to Earth Than Before," Cameron Rogers. . m. — "Roses in Summer," Kenneth Ever Before," Cameron Rogera. 11:25 a. m.—"Rosea in Summer," Kenneth R. Boynton. 11:50 a. m.—Market and weather reports. 4 p. m.—Forest Huff's Orchestra. 4:65 p. m.—J. Garfield Daie, tenor, ac-companied by Frank Herbert Scherer. 5 p. m.—Waldorf-Astoria. dinner music. 7:30 p. m.—The Story of the Enchanted Cattails," Blanche E. Wade. 7:46 p. m.—Henry White, barytone. 8 p. m.—Marion Lindquist, humorous and dramatic reader. 8:16 p. m.—Himmie Clark, jazz planist. 8:30 p. m.—Henry White, barytone. 8:15 p. m.—Henry White, barytone. 8:45 p. m.—Henry Workt correstra. 9:30 p. m.—B. Fischer's Dance Orchestra. 9:30 p. m.—Taik. 9:40 p. m.—Dance Orchestra continued. \*WJZ-NEW YORK CITY—455 1 p. m.—Hotel Ambassator Trio. 4 p. m.—Bileanor Gunn's fashion taik. 4:10 p. m.—Daily menu. 4:15 p. m.—Arts and decorations. 4:30 p. m.—Carls Golden's orchestra. 5:30 p. m.—Financial developments of the day.

7:30 p. m.—Ernis Golden's orchestra.
8 p. m.—Current topics, by Dr. William H. Allen.
8:10 p. m.—Goldman Band concert, Wagner program; Genia Fonariova, soprano.
10 p. m.—Time pop question game.
10:30 p. m.—Harold Stern's orchestra.
\*WJY—NEW YORK CITY—405
7:30 p. m.—Lengard Nelson's orchestra. WDAF-KANSAS CITY-411 9 p. m. -Orchestra selections and minstrels, 12:45 a. m. -Nighthawk frolic. 8 KYW-CHICAGO-366 6:46 p. m. -Children's bedtime story. 7:30 p. m. -Barm speeches. 8:20 p. m. -Farm speeches. 9 p. m. to 12:30 a. m. -Midnight revue. 6:30 to 11 p. m. -Music; lullaby time; farm talks.

MUSICAL program. WDAF-KANSAS CITY-411

talks 6 p. m.—Theater organ recital. 6 :30 p. m.—La Salle orchestra. 9:15 p. m.—To be announced. 9:20 p. WEBH—CHICAGO-370

WEBH-CHICAGO-370 9:30 p. m.-Tenor and dance selectio 11:30 p. m.-Flutist, saxophone trio; selections.

selections. WDAP--CHICAGO--360 11 p. m.-Jack Chapman's Orchestr.

SATURDAY

\*WEAF-NEW YORK CITY-492 to 5 p. m.-Courtside description of final matches of women's national lawn ten-nis championship.

iis championship. . m.-Waldorf-Astoria dinnér music. . m.-Waldorf-Astoria dinnér music.

p. m.-Ruth Donaldson, soprano. p. m.-Metropolitan Male Chorus. p. m.-Halsey K. Mohr, planist. p. m.-Ruth Donaldson, soprano. p. m.-Halsey K. Mohr, compose

8:30 p. m.—Halsey K. Mohr, composer-planist.
8:40 p. m.—Metropolitan Male Chorus.
9 p. m.—Edward Avis, bird whistler.
9:15 p. m.—Eva Welcher, violinist, accom-panied by Arnold Block.
9:30 p. m.—Metropolitan Male Chorus.
9:40 p. m.—Metropolitan Male Chorus.
9:40 p. m.—Vincent-Lopez'S Orchestra.
\*WJZ—NEW YORK CITY-455
1 p. m.—Vanderbilt Orchestra.

•WJZ-NEW YORK CITY-455 p. m.-Vanderbilt Orchestra. p. m.-Evan D. Thomas, bass-barytone. :30 p. m.-Roger Wolfe's Orchestra. :30 p. m.-Waldorf-Astoria Orchestra. :15 p. m.-School High Stot Contest. :30 p. m.-N. Y. Philharmonic Orchestra :30 p. m.-Astor Roof Orchestra. :0:15 p. m.-Talk by Fred Fletcher. :0:30 p. m.-Astor Roof Orchestra. • WFRH-NEW YORK OITY-278 9 a. m-Children's program.

•WFBH--New YORK CITY--273 9 a. m--Children's program. 10 a. m.-Religious services. 2 p. m.-Music and readings. 2:30 p. m.-John Kimberly, barytone, Irons Arderin, piano. 2:45 p. m.-Jihamie Ciark's Entertainers. 3 p. m.-Panchard Orchestra. 3:30 p. m.-Bitty Murphy, contraito. 3:46 p. m.-Aivin Hauser, old songs. 4:15 p. m.-Jack Niles and -Ellsworth Morss.

4:46 p. m.-Jack Nices and American Morses.
5 p. m..-Kiddies' period.
5:16 p. m..-Katherine Connolly, songs.
5:30 p. m.-Fred Hughes, tenor.
6 p. m.-Orchestra selections.
7 p. m.-Dred Hughes' Christian, health helps.
7:30 p. m.-Leonardo's Orchestra.
\*WHN-NEW YORK CITY--360
2:15 p. m.-Henny Cogert, Chas. Hirst songsters.
2:30 p. m.-Britt and Frinch, singers.
2:30 p. m.-Britt and Frinch, singers.
2:45 p. m.-Drim Bank's orchestra.
4 p. m.-Ellen Montague Cross concert.

C. E. Park, violinist; C. H. Haughn, pianist. 8:15 p. m.—Bible questions and answers by Judge J. F. Rutherford. 8:45 p. m.—I. B. S. A. Trio. \*WOR—NEWARK-405 7:15 p. m.—Resume of day's sports. 8 p. m.—Illyan Mae of day's sports. 8:30 p. m.—Orchestra of the S. S: Presi-dent Harding. 9:16 p. m.—Lilyan Mae Challenger, con-traito.

traito. 9:30 p.m.—Yascha Fishberg, violinist. 9:45 p.m.—Talk by Robert Wilderforc 10 p.m.—Ben Friedman's Entertainer: \*WFI-PHILADELPHIA-395 There are the set Symphony

1:30 p m.—Co chestra.

1:05 p. m.-Organ

<sup>3</sup> p. m.—Fairmount Park Symphony Or-chestra; musical notes by Samuel Lacier. \*WIP\_PHILADELPHIA—509 \*UP\_PHILADELPHIA—509

chestra. 6:05 p. m.—Kentucky Serenaders. 7 p. m.—Bedtime stories. 8 p. m.—Comfort's Philharmonic Or-chestra. 8:45 p. m.—'What Wild Waves Say.'' 8:56 p. m.—'Vessella's Concert Band

\*WHAR-ATLANTIC CITY-275

12:30 p. m.—Organ recital, \*WGY—SCHENECTADY—380

p. m.—Orchestra selections;
 7.30 p. m.—Dr. Gratton Tyler Brown on "Asthma and Hay Fever."
 8 p. m.—Orchestra selections.
 \*WCR—BUFFALO—319

WGY-SUHENROUTADI-Sov 10:30, p. m.-Dance music, Joseph A. Chickene's Orchestra. \*WBZ-SPRINGFIELD, MASS.-337

7:30 p. m.—Bedtime story. 7:40 p. m.—Concert Hotel Kimball Tric 9 p. m.—To be announced.

1:15 p. m.-Westminster Roof Garden

• p. m.-Copley Plaza orchestra. • WNAC-BOSTON-278

chestra. 9:30 p. m.—Copley Plaza ochestra. •WPAR—PROVIDENCE—360 1:05 p. m.—Biltmore orchestra. 7:10 p. m.—Musical program. •KDKA—PITTSBURGH—326 7:45 p. m.—Helps to teachers of

(165 p. m.—Reips to the classes.
p. m.—Wasting house. Band.
WCAE—PITTSHURGH.—462
7:30 p. m.—Uncle Kaybee; scores.
9:30 p. m.—Musical program. WRC—WASHINGTON.—469
WRC—WASHINGTON.—469

7:30-10

WHAS-LOUISVILLE, KY.-400
 7:30-10 p. m.-Concert by Carolyn Pell.
 WMC-MEMPHIS-500
 9:30 p. m.-St. John's Male Quartet.
 WCX-DETROIT-517
 F. m.-Dinner concert.
 WWJ-DETROIT-517
 7:30 p. m.-Schmeman's Concert Band.
 KSD-ST. LOUIS-546
 9 p. m.-Missouri Theater Orchestra.
 WOC-DAVENPORT-484
 M. -Orchestra program

10 p. m. Orchestra program. HYW-CHICAGO-536

W AAS 8 p. m.—To be announced. 9 p. m.—Chicago theater revue. 9 p. m.—Chicago theater revue

Arne 7:30 p. m.—Plano and concert selections. 9:30 p. m.—Stories; soprano and dance se lections. 11:30 p. m.—Tenor and dance selections,

**KW-CHICAGO-536 8** p. m.-Musical program by artists. **9** p. m.-Talk, by Vivette Gorman. **9**:05 p. m.-Short stories, articles; hun ous sketches. **WLS-CHICAGO-345** 

WLS-CHICAGO-340 7:45 p. m.-Lullaby time; farm sumfary; national barn dance; Husk O'Hare's Col-lege Inn Orchestra. WMAQ-CHICAGO-448 8 n. m.-To be anhounced.

WJY-NEW YORK CITY-405
7:30 p. m.-Leonard Nelson's orchestra.
8:15 p. m.-Eugenie Prolon, pianist.
9 p. m.-Sallors concert by officers of the White Star liner Majestic; Frank Butcher, Stanley Thornton, banjo duets; Gordon Wilson, tenor; Harold Williams, cello; Austin Rigby, accompanist; talk by Fred E. Marble.
\*WHN-NEW YORK CITY-360
2:15 p. m.-Judith Roth, Al Wilson, songs.
2:30 p. m.-Jimmy Flynn, Bob Miller, songs.

2:30 p. m.—Jimmy Flynn, Bob Miller, songs.
2:45 p. m.—Fred Hughes, tenor.
3 p. m.—Vincent D. Daniels.
3:45 p. m.—Chat with children.
4 p. m.—Jos. C. Wolfe, barytone.
4:15 p. m.—Mabel Livingston.
4:30 p. m.—Ross Fowler, barytone.
6:30-7:30 p. m.—Olcott Vail's String Trio; Specht's Dance Orchestra.
9:30-10 p. m.—Paliisades Park Dance Orchestra. chestra. 10 p. m.—Wright and Bessinger

10:15 p. m.—Baseball statistics. 10:20 p. m.—Tom Bracken and Bob King,

songs. 10:30 p. m.—Roseland Ballroom Orchestra. 1 p. m.—Vaudeville artists. 1:30 p. m.—Club Alabam Revue; Sam Wooding's Orchestra. \*WFBH-NEW YORK CITY-273

\*WFBH--NEW YORK CITY-273 11 a. m.-Science, by Jack Niles. 11:30 a. m.-Marion Doran, soprano. 12 noon-Orchestra selections, 2 p. m.-Bay Park orchestra. 2:30 p. m.-Marcia Stanton, soprano. 2:45 p. m.-Program of music. 3 p. m.-Bay Park orchestra. 3:15 p. m.-Bernard and Robinson. 3:30 p. m.-World neighborhood news. 4 p. m.-Jos. C. Wolff, barytone. 4:30 p. m.-Vold neighborhood news. 4 p. m.-John Barton, barytone. 6:30 p. m.-Frank J. Herel, violin red. 6:35 p. m.-Choly Storm's orchestra. \*WEBJ-NEW YORK CITY-273

\*WEBJ-NEW YORK CITY-273

"WEBJ-NEW YORK CITY-273 p. m.-Blybruvis review of new plays. 7:20 p. m.-Edith Quisenberry, soprano. 7:25 p. m.-Yairplane Travelogue," Captain Richard R. Blythe. 7:35 p. m.-Harrison Marshall, tenor. 7:46 p. m.-Kathleen Hughes, soprano. 7:65 p. m.-Edith Quisenberry, soprano. 8:15 p. m.-Novelty.

m.—Novelty. m.—Harrison Marshall, tenor. m.—Kathleen Hughes, soprand

1:45 p. m.—Piano solo. 1:50 p. m.—Henrietta Turner, µkelele girl,

WHAR-ATLANTIC CITY-275

p. m.—Orchestra selections. :80 p. m.—John A. Watt, "The Care Radio Batteries."

Radio Batteries." 8 p. m.—Orchestra numbers. •WOR.—NEWARK—405 2:30 p. m.—Recital, by Elizabeth Nie-meyer, soprano. 2:45 p. m.—Solos, by Mme. M. Blazejewicz-Ullman, pianist. 3 p. m.—Talk, by Zoe Beckley. 3:15 p. m.—Talk, by Ralph Morgan. 3:30 p. m.—Elizabeth Niemeyer, soprano. 3:46 p. m.—Solos, by Mme. M. Blaze-jewicz-Ullman. 6:15 p. m.—Agnes Leonard, songs for chil-dren.

WFI-PHILADELPHIA-S95
 p. m.—Reyer Davis's Concert Orchestra.
 Stof p. m.—Russian program, by Sainuel Zalmanoff; Zina Kolibree, soprano; Bessie Presswine, pianist; Samuel Zalmanoff, tenor.
 Sig p. m.—Meyer Davis's Orchestra.
 WHI-PHILADELPHIA-509
 a. m.—Seashore goesip; health talk.
 p. m.—What Wild Waves Say."
 Stof p. m.—Comfort's. Philharmonic Orchestra.

chestra. 5:05 p. m.—Eddie Elkins's Orchestra. 7 p. m.—Bedtime stories

p. m.-Concert orchestra.

2 p/m.-Music and talk. 4.10 p. m.-Stories for childre

son. —Goldman Band concert. 8:15 p. m. —Radio drama, "His Chance." 11:30 p. m. —Dance program. \*WNAC —BOSTON —278 Concertions

30 p. m.—Concert orchestra.
 33 p. m.—Başeball scores.
 34 p. m.—Draem Daddy.
 p. m.—Book review; dance p
 Emmett Weich Minstreis.
 WGR—BUFFALO—319

\*WGR-BUFFALO-319 12:30 p. m.-Organ recital. 6:30 p. m.-Vincent Lopez's Orchestra. 7:30 p. m.-News; scores, 9-11 p. m.-Concert program. 11 p. m.-Vincent Lopez's Orchestra. \*WGY-SCHENECTADY-380

p. m.-International Sunday School Les

\*WNAC-BOSTON-278 1 p. m.-Orchestra selections. 4 p. m.-Orchestra selections. 6 p. m.-Children's half hour. 6:30 p. m.-Shepard Colonial Orchestra. 8 p. m.-To be announced. \*WBZ-SPRINGFIELD, MASS-337

•WHZ-SPRINGFIELD, MASS 337 6 p. m.-Dinner concert, 7:30 p. m.-Bedtime story. 10 p. m.-Concert by Vera H. Colburn, so-prano; Henry Cohen, cellist; Doris H. Tirrell, accompanist. 11 p. m.-Concert by the WBZ Trio. •WMAF-S. DARTMOUTH, MASS.-363 8:15 p. m.-Jinmie Clark, jazz pianist. 8:30 p. m.-Henry White, barytone: 8:46 p. m.-Marion Lindquist. 9 to 10 p. m.-Hotel quartet. •WJAR-PROVIDENCE-360 8 p. m.-Scores.

3 p. m.—Scores. 8:05 p. m.—J. Herbert Taylor, barytone.

. m.—Biltmore Orchestra. \*KDKA—PITTSBURGH—326

7 p. m.-Scores; dinner concert. 7:30 p. m.-The childrens period, Uno

7:46 p. m.—News bulletins.
8:40 p. m.—Stocknasn report.
9 p. m.—Concert, KDKA Jazz Quartet.
\*WCAR\_PTTTSBURGH\_462
7:30 p. m.—Uncle Kaybee.
9:30 p. m.—Uncle Kaybee.
9:30 p. m.—Musical program.
WRC—WASHINGTON—169

WRC-WASHINGTON-455 1:45 p. m.-A Talk on Motoring. 8 p. m.-Musical program. 9 p. m.-Band concert. WHAS-LOUISVILLE, KY.-400 10 p. m.-Tropical Hawaiian

WHAD 8:30 to 10 p. m.—Iropaca Quartet. WLW—CINCINNATI—423 WLW—CINCINNATI—423

4 p. m.—Plano recital, WMC-MEMPHIS-500 9:30 p. m.—Britling's Cafeteria. Orchestra. 42 midnight—Midnight=Frolic. WCK.—DETROIT.—517

WCK-DETROIT-517 7:30 p. m.-Musical program. WWJ-DETROIT-517 8:30 p. m.-Schmeman's Concert Band. 9:30 p. m.-Orchestra selections. WOS-JEFFERSON CITY-441

WOS-JEFFFERSON CITY-441
 p. m.-Address.
 9:20/p. m.-Varied program.
 8:20-ST. LOUIS-546
 p. m. - Abergh's concert ensemble; Arne Arnesen, violinist.
 11 p. m.-Dance music. by Dedemich's er-ehestra.

Wiggeley. :45 p. m.-News bulletins.

2 noon-On orchestra.

• m.—Bedtime stories. •WDAR—PHILADELPHIA—395

2:46 p. m.—Solos, by Mme. M. Blazejewicz-Uilman, pianist.
3 p. m.—Talk, by Zoe Beckley.
3:15 p. m.—Talk, by Ralph Morgan.
3:30 p. m.—Elizabeth Niemeyer, soprano.
3:46 p. m.—Solos, by Mme. M. Blaze-jewicz-Uilman.
4:16 p. m.—Agnes Leonard, songs for chil-dren.
6:15 p. m.—Agnes Leonard, songs for chil-dren.
6:16 p. m.—Carane of day's sports.
\*WOO\_PHILADELPHIA.—509
11 a. m.—Organ recital.
7:20 p. m.—Sports results; police reports; dinner music.
9:30 p. m.—Sports results; police reports; dinner music.
9:30 p. m.—Carane organ, trumpets.
9:30 p. m.—Grand organ recital, Harriette G. Ridley; Gertrude Schultz, contralto.
9:45 p. m.—Haik Schwer Davie's Orchestra.
9:45 p. m.—Haik Schwer Javie's Orchestra.
9:45 p. m.—Haik Schwer Javie's Orchestra.
9:45 p. m.—Haik Schwer Javie's Orchestra.
9:45 p. m.—Hith Andelley.
9:45 p. m.—Hith Schwer Javie's Orchestra.
9:45 p. m.—Hith Schwer Javie's Orchestra.
9:45 p. m.—Hith Schwer Javie's Orchestra.
9:45 p. m.—Hith and Frinch, singers.
2:46 p. m.—Zithe Montague Cross concert.
4:40 p. m.—Jense Calkins tenor.
4:50 p. m.—Kathryne Connolly, soprano.
5:50 p. m.—Resume of day's sports.
5:50 p. m.—Resume of day's sports.
5:60 p. m.—Bays' period, Wm. J. Stuart.
9:45 p. m.—Flick Harmony Four.
9:45 p. m.—Flick and Ballroom orchestra.
9:45 p. m.—Fliks Bellow and subset.
9:45 p. m.—Flik and frikt, songbirds.
9:45 p. m.—Flike and ballroom orchestra.
9:45 p. m.—Reseland ballroom orchestra.
9:45 p. m.—Flike and ballroom orchestra.
9:45 p. m.—Bible questions and answers

NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, OCTOBER 11, 1925

# radio power from your house current

Boin

16 \*

Philco "A" and "B" Socket Powers are plugged right into a lamb or wall socket. They transform your alternating current into smooth, hum-free, direct current necessary for your radio.

One switch controls everything-"A" power, "B" power, even the radio set itself. Snap it "ON" and you get a strong, uniform flow of bo h "A" and "B" power. Snap it "OFF" and your power is shut off -your radio is silent-and current begins gently feeding back into Socket Power "A" from your light wires."

No more recharging to think aboutno more bother and expense of disconnecting worn-out dry cells and replacing them with new.

Equal yimportant-there are no tubes burn out-no high voltage transformers -no moving parts-no hum-no distortion-no falling off in reception. As dependable as your electric current and tarned on exactly like an electric light.

Once you connect Philco Socket Power to your radio you never need change a single wire. You forget all about getting wires mixed and burning out tubes. You forget that radio is mysterious and technical. You just enjoy it.

This switch controls everything

~yourApower ~your B power ~even the radio set itself

A and K

### For dry cell (3 volt) tubes

Buy Philco Socket Power Type "AB" as nictured above. Both "A" and "B power built into one handsome brown ished case-controlled by one witch. No hum-no distortion. Costs only one cent per day to operate. Supplies as high as 130 volts of "B" current. Ideal for both old and new mo o Radiola Super-Heterodyne.

Simplicity itself to use. Connect to your radio once for all. Plug into a light, wall or base socket. The one Socket Power switch then controls everything-"B" power as well as "A." You even leave the radio set switch "ON" at all times. No dry cells to replace-no thought about recharging. Easy as turning on an electric light.

For 50-60 cycle 105-125 volt alternating current.....\$65.00 For storage battery (6 volt) tubes

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Plug Socket Power "B" into the builtin receptacle on Socket Power "A." Plug Turn the "B" switch and the radio switch "ON" and leave them on permanently. The switch on the "A" then controls everything. To use the radio, snap this "A" switch "ON." When through using the radio snap it "OFF.". A touch of your finger does everything. Nothing to think about but the one "A" switch. Socket Power "A" for 50-60 cycle

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# THE NEW YORK HERALD NewYork aribune 1AGA7INE

SECTION SIX

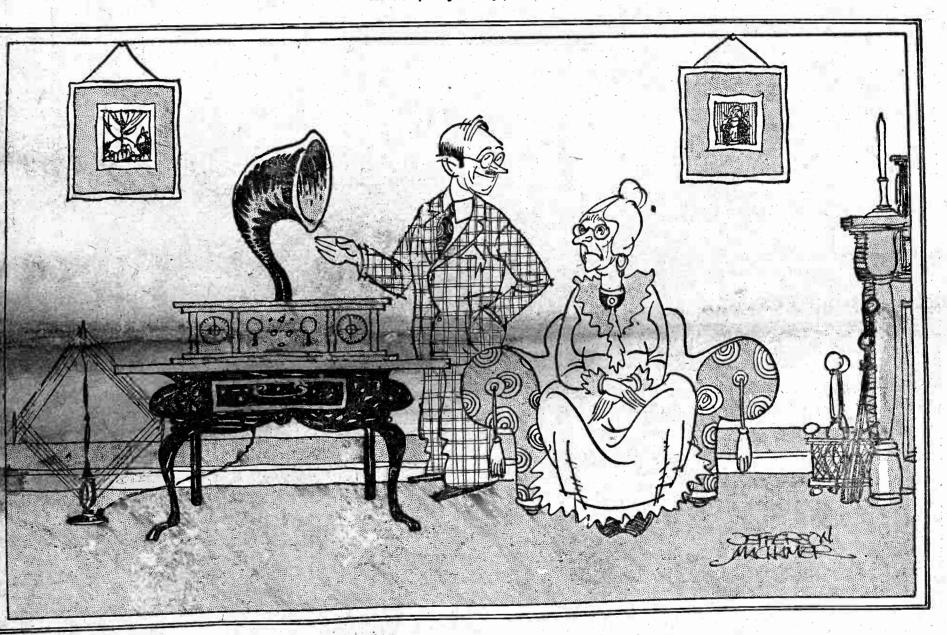
SUNDAY, OCTOBER 11, 1925

16 PAGES

## Mr. Bink's Radio

The Author Discusses Feelingly the Different Types of Radio Fans and Radio's Effect on Grandma and Caesar, the Wailing Dog

By ELLIS PARKER- BUTLER Author of "Pigs Is Pigs," Etc.



Then I'll try the celebrated Boomberay Marine Band of 108 pieces and she'll say: "It ain't no use-it ain't no use-it don't sound to me like nothin' but a dog yowling!"

thing when radio became no longer a mere knit-sweater affair but could be bought in a box and brought home like a dozen fried oysters or a pint of ice cream. By "knit-sweater affair" I mean that sort of radio that comes through the air with a message that is about as interesting to the average man as is the page in the women's magazine telling how to knit a sweater. You know how that goes -"Knit four, purl three, skip one, knit two, purl three, skip two-" and so on for line after line.

The old-style radio used to come-and still comes that way. "Dah-he-de-dahdah-de-dah." "Code," is what the technical fellows call it, and it still spits in your ear now and then when you are trying to hear Patagonia or Peru or Peoria.

The "spitter" we have most of here near New York is the one Mr. Binks calls "Navy Yard." Whether it is the Navy Yard or not I don't know, and-as far as that goes-neither does Mr. Binks, but that is what he calls it.

The Navy Yard if it is the Navy Yard and if you have Mr. Binks's sort of "takehome-a-radio-in-a-box"-lurks at the far side of the dial. The concerts are mostly

World Radio I

then "Navy Yard" gets lonely at the far side and comes sneaking over to the concert-and-lecture side, but it knows it does not belong there and it says "dah-de-dedah" in a faint little voice and goes away again. Then, sometimes, Mr. Binks says -to show off, perhaps-"That's Navy Yard," and, just to show you, he swings his dial hand to the far end of the dial and "Navy Yard" is right at home there. "ZANG - ZANG - A - ZANGY -ZANG!" "Navy Yard" shrieks then, spitting sharp pointed gravel into your ear as if shooting it out of a machine gun at three yards' distance, and Mr. Binks grins and savs:

"That's Navy Yard, sending code. May be talking to a battleship in the Indian Ocean or the China Sea. Strong, ain't it?"

Then Mr. Binks shifts back to the near and of the dial, and you get: "-tull Annie Laurie, I wuh-hu-hud-la-hay-me-he dowhoun-un-hund dee," or, faint and far, that beloved refrain: "'The-e At-lan-tah Journall.' Dong-dong-dong!" or, from Ridgewood, the cheery announcement: "The next number on our program, played by the Hit-'Em-in-the-Eye Jazzbo Six, of Brooklyn, New York, is the 'Don't-Bite-Your-Garter-If-You - Have - False - Teeth' Fox Trot."

For radio has become all things to all men. You can tune in at one white line on your dial and be asked to support the

T WAS, unquestionably, a wonderful | at the near side of the dial. Now and | ing irons to the suffering natives of Zan- | L. I., and hear a tiny, squeaky little voice, zibar, or move on to the next wi and hear "And little Tootsie took the hand of the great big bear and went into the wood-chuck's house." or move to the next white line and hear "This is WVJ signing off. One minute, please. Good-night!" You can hear anything from a symphony orchestra of 300 pieces to a frightened amateur playing "Dood-dah. doo-dah." on one of these jewsharps that bites the tongue that caresses it. It's wonderful.

> And Mr. Binks thought so. Mr. Binks was an enthusiast. It is one of the amazing things about radio-in-a-box that every one who possesses one is an enthusiast. A man can buy a phonograph or a grand piano or an elephant and be quite calm and normal about it. He can say "Yes, this is my elephant. He's fair to middling. He isn't a Jumbo, by-any means, but I'm rather fond of him in some ways," and let it go at that, but for some reason a man can't own a radio-in-a-box without getting all keyed up and excited and telling his neighbors and-in a general way-behaving as if he had discovered the moon and had to call everybody to come and see it, and brag about it, and feel fussed if any one seems to think it isn't a perfectly wonderful moon and the greatest thing ever discovered. That's the kind of enthusiast Mr. Binks was.

And that is all right, too. It is a wonderful thing to sit down and turn a couple movement for supplying second-hand curl- | of knobs in your own home in Westcote,

cake of very hard ice, say "This is Kansas City." But-I ask you, as man to man, is a man who happens into a shop and buys a radio outfit as he would buy a pound of cheese entitled to swell up and strut around as if he had invented radio and patented it and given it alone and unaided to a waiting world? The answer seems to be "Yes." The ayes have it, so to speak. That is just what a man does seem entitled to do and feel. That's how I did and felt about the box of radio I brought home. Until Binks bought his and swelled and bragged and jawed until was ashamed of him.

Yes, nearly all the men I know are that way about radio-except one. Dodson Bates is different. Dodson Bates is a stout, red-faced man, and he has one of these small, wiry wives that I call pinprickers. Always pricking and prodding otherwise comfortable husbands to do this and do that. And for twenty-three years. every Sunday morning, just when Dodson Bates had settled down with the Sunday newspapers, his wife would begin prodding and pricking him to get ready to go to church. For twenty-three years, every Sunday morning, Dodson Bates did go to church, too, and sat in the pew fighting to keep his eyes open during the long sermon, and suffiring as only a man does

(Cont ued on page six)

## Interesting Information on the Mechanical **Evolution of Variable Condensers**

New Types Employ the Same Fundamental Principle of Construction, but Are Greatly Improved By ROBERT HERTZBERG

HE variable condenser, like the picturesque old gray mare of the ancient ditty, "ain't what she used to be." Being the most important control instrument of a radio set, it has naturally received much attention from radio engineers and designers, and it has gradually evolved from a large, crude device, innocent of accuracy in either manufacture or operation, to the compact, neat little affair of to-day which is assembled to factory requirements of infinitesimal thousandths of an inch, and which operates with uncompromising precision. Just how much it has been improved and refined can be seen from an examination of | is fixed to the frame of the instrument, the instruments available on the market at the present time.

types, for the total number of instruments is great to the point of confusion. They all display the same fundamental idea in construction; that is, the employment of two adjacent metal surfaces closely spaced in air or other insulating material, but not actually touching, and with some means of regulating the total active area of facing plates; however, the effect is achieved in four different mechanical fashions, so each must be considered individually.

The first system involves the use of a closed saucer of molded insulation, divided into two sections by means of a sheet o mica. Small wells in the sides of the disk hold mercury in such a fashion that when the knob of the device is turned the two portions meet each other but remain unmixed because of the intervening mica. The more mercury in the facing wells the greater the capacity, and vice versa.

This particular type of condenser is mentioned only as a matter of interest. Being highly sensitive to jars and other vibratory disturbances, it never was a success, and enjoyed but a short-lived vogue about two years ago.

### The Tube Type

The second type makes use of round metal tubes, usually brass, telescoping into each other, but not actually touching. The larger tube remains stationary, while the other, arranged on a suitable slider. rack and pinion, or screw, travels in and out of it, the capacity increasing as the two tubes engage and decreasing as they separate. This is known as the "Billi" type of condenser.

Condepsers of this type were widely used many years ago on ship radio receivers. but it was not until within the last few months that the construction was applied to broadcast apparatus. There is now being made a very novel and unusual condenser embodying the principle. How-

employed, there are two brass spirals, wound up like the springs of a clock; one and mounts against the back of the panel in actual service, while the other is at-It is necessary to classify the various | tached to a round plate which allows it to mesh and unmesh with the first spiral by means of a heavy screw passing through the centers of both springs and out through the front of the frame.

Some examples of new condenser design

The device incorporates the straight line frequency principle and a 350 degree dial: that is, the movement from minimum to maximum capacity is made through a complete turn of the dial instead of a half, giving a fine vernier effect. The action is smooth and free of back-lash, the weight of the moving member being perfectly balanced.

#### The Book Type

The third classification embraces the 'book" type. The designation is derived from the fact that the active metal plates, instead of meeting each other with surfaces parallel and in the same plane, fold together like the leaves of a book. There are only two plates, one fixed in such a manner that it is at right angles to the panel when the condenser is mounted, and the other moving on a hinge and opening away from the far edge of the first. The position of the adjustable plate is controlled by a heart-shaped cam operating against the tension of a spring which tends to keep the plates separated. The capacity varies inversely in proportion to the distance between the plates.

The book-type condenser is extensively used by one of the largest radio manufacturers in the country. It works effectively and is both cheap and simple in construction.

The fourth category is by far the most important, as it comprises the majority of the condensers made to-day. It is the meshing plate class, and in it are found scores of instruments of interesting variety.

In its oldest and most common form the meshing plate condenser consists of two spaced stacks of semi-circular metal other is built onto a round shaft and arranged in such a fashion that its plates enter between the fixed plates, but at no point touch them. The capacity is thus varied simply by turning a knob attached to the end of the round shaft. The stator plants are clamped between two heads of some insulating material like hard rubber or bakelite, which also serve as bearings for the protruding ends of the rotor shaft.

In this elemental form the meshing plate condenser has survived through twenty years of service, a record which in itself is proof of the design's general desirability. It is still giving good service, but it has undergone extensive mechanical improvement, as the following description | the knob is turned the two gears move in of some of the 1926 models will indicate:

First there is the grounded frame "lowloss" type. This species is instantly recognizable because of its all-metai frame and usual skeleton appearance. The entire support of the instrument is of metal, the stator plates being insulated from the rotor and the rest of the metal work by means of small pieces of insulating material strategically placed at such points where the electric "field" of the condenser is weakest and least troublesome.

### **Mechanical Schemes**

The number of these condensers is legion. A thick book could be filled with the details of the various ingenious mechanical schemes devised by the engineers to hold the parts together. One instrument is built inside a heavy Ushaped yoke, with a single small strip of insulation, preventing short circuit between the rotor and stator. A good many "low-loss" condensers are assembled betwen two skeleton work end frames. with the insulation inserted between the latter and the end plates of the stator unit. Several makes provide a single strong forward frame with a heavy forward bearing, and leave the back entirely open. Still another type is drum-like in appearance, with four-pronged end frames held together by four narrow strips of insulation, from which in turn the stator plates are suspended. Some condensers ever, instead of two straight tubes being | plates. One stack is stationary, while the | are limited in movement to a half circle,



have built-in verniers in ratios as high as 200:1. Some are equipped with balancing counter-weights. Some are built of brass, most of them of aluminum and one of silver-plated brass.

An important variation of the meshing plate condenser is found in the twin rotor type. Here there are two sets of square plates, both movable. In one make they are actuated by two meshing bakelite gears of equal size, one of which in turn is operated by a third small gear coupled to the external control knob. As opposite directions and either close or open the square plates. In a second the plates are actuated by short levers which travel in two grooves cut spiral shape in an insulating disk, the disk being revolved in turn by the outside dial. The spiral is of such shape that a movement of the disk causes a smooth opening or closing action on the plates.

### **360 Degrees Rotation**

1 to

These unusual condensers provide 360degree scale movements, freedom from back-lash and absolute removal of "live" current-carrying metal from the panel and from the operator's hand.

In two other meshing plate condensers rotary movement of the plates is replaced by linear movement; that is, one set remains stationary, but the other slides in and out of it. In one of the instruments the plates are built at right angles to their mounting frame, with the moving ones next to the panel. A threaded shaft attached to the end of the latter plates passes through the center of a special knob threaded to receive it. As the knob is turned the shaft moves in and out. carrying the plates with it and thereby varving the capacity. In the other type the plates are parallel with the panel. The moving unit is operated by a rack and pinion system, the small gear

RANCE CORP.

NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, OCTOBER 11, 1925





() "B" battery

Football Games To musical education. Radio is just an-other instrument for the artist to New Booklet for the

schedules of the important intercola new technique 🔏 co-operative obto describe the Army-Notre Dame time with it." game, while McNamee will work with him in observing the details of the

WEAF has the unique distinction of having two announcers equally capable of handling a sports assignment, and the advantages of having both on the scene are many. In the first place, since both are experienced den City, N. Y., using only a single booklet is published in convenient announcers and know what is neces- five-watt transmitting tube, received pocket size and is for free distribuannouncers and know what is neces-sary for a vivid description of the and acknowledged a long message to the King Quality Products, Inc., game, the one acting as observer from Commander S. C. Hooper, former Rano Street, Buffalo, N. Y. will be able to pick out the essential details much more effectively than the ordinary observer who might be carried away by the excitement of Seattle off Tahiti, a distance of ap- naval radio electricians, until recently the game or by a feeling of partisan-ship. Next, since each will see all September 14, according to a state-form of "a jagged spark," has been the games on WEAF's schedule, the ment made public last week. After adopted for uniform wear familiarity and knowledge of the relaying Commander Hooper's mesteams will grow accumulatively with sage, directed to a friend in Boston, each succeeding game. For example, the amateur station relayed additwo, weeks after the Army-Notre tional messages which were forwarded Dame game, Carlin will announce the to their destinations. Yale-Army contest; and so will be Although transmission across the line-up.

### Fear Radio Rivalry tric flatiron

Radio's role in furthering the cause of good music in America has won the praise of musicians.

broad statement:

as it does to-day, in spite of the in- periority. Greanmic creasing number of houses devoted clusively to the silent drama. Mr. Goldenburg, in a letter to the

Freed-Eisemann Radio Corporation, further states: "Vocal and instrumental virtuos

who broadcast frequently will find their prestige heightened, their clientele surprisingly widened, when they go on tour. The legion of radio listeners constitutes a potential army of music lovers. Through appreciatory development, accomplished via radio, they may be attracted to the concert auditorium.

"Radio broadcasting never will take the place of the concert hall, for nothing can quite compensate for the loss of personal contact with the artist, but radio can be made a great educational factor in the cause of music; the quality of radio entertainment can be raised to a high artistic standard that will entitle it to the consideration of serious-minded folk who prefer cultural entertainment to trivial amusement. That this purpose is nearing consummation cannot be doubted when such artists as Reinald Werrenrath sing for millions of radio fans.

"The messages of the great composers of music, heretofore available only in the larger cities, by means of radio now reach into the remote places. Through hearing such concerts as that which was broadcast Sunday night, millions of listeners, unacquainted with fine music, are laying the foundation of a liberal

Be Described by employ, for the listener to enjoy. "Thanks to radio I experienced con-Carlin, McNamee cert hall enjoyment in my own draw-ing room, and I heard a great artist An interesting contribution to cur-The WEAF twin announcers, Phil-miles distant. There may not be such made in the publication of a twentyips Carlin and Graham McNamee, a thing as a miracle, but radio ap- page booklet by the King Quality

the soul. From a critic it is an ad- from the pen of Frank A. Hinners legiate football games, employed for mission signifying a change of heart, member of the Institute of Radio legiate football gamas, employed for the first time in sports, announcing equivocation boldly proclaim, that ners confines himself to the greater radio broadcasting and reception steps that have been taken in the serving and ann/"incing. On Satur-day, October 17, beginning at 2:45 have reached that degree of perfec- improvement in radio reception, and tion that interests me. Radio is does not confuse the mind of the lay p. m., Phillips Carlin will be at the reaching out into the lofty places reader with any discussion of the where I shall hope to spend much less important details in improve-

## L. I. Amateur Gets

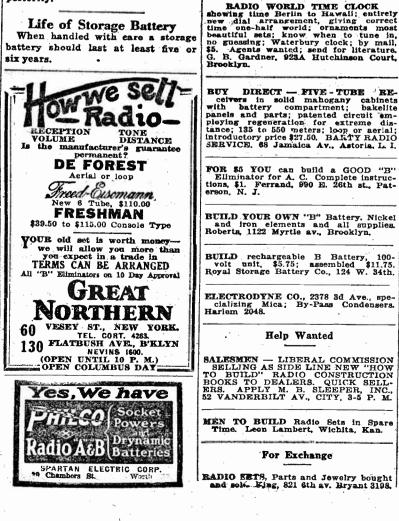
Director of Communications, United States Navy, from the U. S. S. A new insignia for United States

extremely familiar with the Army Pacific by amateurs is becoming a frequent occurrence, the communica-It is evident that the success of tion direct from the South Sea Isles the announcing will be practically de- to Garden City is unusual in two rependent on both men. The man at spects. Using only a single five-watt the "mike" will observe the distance tube, the acknowledgment traveled gained and the type of the play, 3,000 miles over land, as well as 6,000 while the observer will pick out the miles across the Pacific, a somewhat

have an opportunity to clear this con- ing a Belgian amateur station, BK2, at Brussels, while the American station was using but five watts of Musicians Need Not power, which is but one-fiftieth of 5-TUBE MASTERTONE SET COMPLETE the energy used by the average elec-

### Enamel Acrial Wire

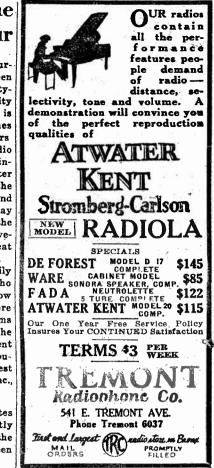
Enameled aerial wire has been proved by many tests to be the best The composer-critic, William Smith for use in building aerials. Bare Goldenburg, of Cincinnati, makes this wire becomes coated with soot, which causes certain electrical losses, and "Professional musicians have much fabric-covered wires absorb moisture less to fear from radio competition, that also causes losses. The wire I believe, than they seem to think. used should be of the best grade The motion picture did not supersede copper. Stranded wire of the same the spoken drama. In fact, opinions size as ordinarily round wire is theoo the contrary notwithstanding, the retically better, but in actual receivtheater of America never has thrived ing practice it is hard to tell its su-



### **Radio Amateur**

lips Carlin and Graham McNamee, will alternate each Satarday in broad-"An honest confession is good for called "The Radio Quest," and comes ment that have come in such great number during the last few years.

The booklet is intended primarily for the amateur, and the man who South Sea Island has only the vaguest idea of how reception comes about, with the more important principles. Technical terms Amateur radio Station 2GY, of Gar- and descriptions are avoided. The



**#** 15

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SUPERHETERODYNE 8 tube; will sell separate or complete, very reason C. Kuhlen, 740 Jackson av., Bronx.

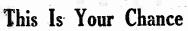
Freed-Eisemann, N. R. 20; sacrifice. Viera, 128 St. Edward's st., B'klyn. Triangle 6813.

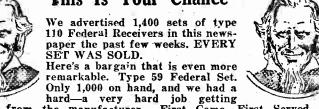
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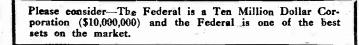






14 \*

hard—a very hard job getting them from the manufacturer. First Come—First Served. BUY NOW—DON'T BE SORRY LATER. \$29.95—Very little MONEY and think what you're getting for it!



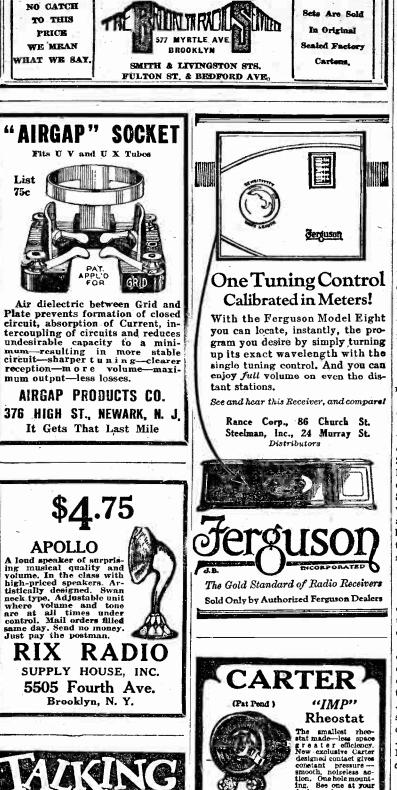


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**Results in Poor Selectivity** S. L. F. Condensers Improve Tuning; Ratio of Coils Length and Diameter Important; Meth-

Coil Data

Answer-The primary coil or an-

The Blocking Condenser

H. C. Kent-What is the purpos

Answer-This condenser allows the

passage of radio frequency currents,

but breaks the circuit for high volt-

sers usually have a capacity greater

than .001 mfd and may be fixed.

Capacity Effects

eliminate capacity effects in a re-

generative receiver? Should each in

strument be shielded separately of

Answer-A metal shield in a radio

G. L. Smith-Will metal shielding

ods of Eliminating Body Capacity Effects H. N. Henderson-What will cause / Answer-In no case is one allowed a radio receiver to have poor selec- to use a transmitting set without a

tivity and operate poorly in general? license. Two licenses are required. Answer-There are many possible One for the station and another for reasons why a set will not function the operator. The former gives the properly, most of which lie in the station a legal call, while the latter general layout of the apparatus. One insures that the station is in compeof the most common faults in con- tent hands while on the air. Further struction of the home-built radio information may be obtained from receiver is the improper location of the Radio Supervisor's office at the Custom House, New York City. the apparatus.

First, we have the home-built coil, which usually has a far greater diameter than necessary. Coils with a coils of a three-circuit tuner be for tance and the selectivity large diameter usually have a large covering the entire broadcasting external field. The field of such coils range? will usually come in contact with some other instrument that has tenna coil should have about thirty To obtain the tuning accurnothing to do with the field of the turns wound on a 2½-inch diameter. coil, such as a variable condenser. The secondary should consist of about This results in stray currents flowing sixty turns wound on a 3-inch diamabout the circuit of the receiver in eter tube. For covering the broad- densers. places where they are not desired. casting range, if this coil is of the As a result poor tuning is obtained. low-loss type, a 17-plate variable con-

It seems to be the general opinion denser (.00035 mfd) should be emthat the proper ratio between the ployed for tuning. The tickler coil length of the winding of a coil and should have about fifty turns of fine the diameter should be between 1:1 wire wound on a 21/2-inch tube. The ratio and the theoretical ratio of coils should all be wound in the same 1:2.45. Coils having ratios between direction. For the primary and secthese two standards will not have an ondary No. 18 or 16 wire will answer extremely large field. Also by locat- the purpose. The tickler need not ing the coils and instruments in the be a low loss coil and No. 30 wire set two or more inches apart stray will therefore suffice for this purcurrents may be reduced to a mini- pose. The tickler should be variably mum. Incidentally, such placing of coupled to the secondary. Although SAN FRANCISCO CHICAGO NEW YORK the apparatus will greatly reduce it is not necessary, the primary coil may also be variably coupled to the "body capacity" effects.

Another mistake often made in the secondary. By coupling this coil it construction of home-built radio re- is possible to obtain more selective ceivers is trying to cramp the instru- | tuning. ments in small quarters and the use of metal fixtures for the mounting. A safe rule to follow is keep each piece of apparatus at least two inches of a blocking condenser in the radio or more away from its neighbor. receiver circuit? Coils and other inductances in the radio-frequency circuit should be placed as far to the rear and away from other pieces of apparatus as age battery current. These condenpossible.

YOU

There is no advantage in having them Straight-Line Frequency Condensers variable, as this condenser is usually F. J. Watson-What advantages are not a part of the tuning circuit. gained by the use of straight-line requency variable condensers for tuning a radio receiver?

Answer-The main advantage of this type of condenser is that it does not crowd stations operating on the lower end of the broadcasting range should one shield be employed for in a few degrees on the condenser the entire receiver? dial. In other words, it broadens the tuning on the higher frequencies. receiver will reduce hand capacity ef-The reason for this is obvious. At fects to a minimum. It has, however, the high end of the scale of the been found that in a well designed broadcasting band of wave lengths and constructed set, hand capacity there are fewer kilocycles to the effects are absent. meter than at the low end of the Either of the two methods in the scale. based on kilocycle variation, it is not purpose. In either case the shields difficult to see that the straight-line should be connected to the ground frequency condenser would tend to terminal of the set. It must be rebroaden out the number of degrees membered that shielding in a rebetween stations operating on 250 generative receiver tends to increase meters or thereabouts.

### Coil Ratio

oder-What is the prope ratio between the length and diameter of a coil for maximum value of inductance?

the ratio between the length of the a regenerative receiver if the stacoil and the diameter is theoretically tionary plates are insulated and the 2.45 to 1. However, it seems to make rotary plates grounded to the frame little difference whether the coil is of the instrument? exactly this ratio in actual practice. Answer-In a condenser of the with a ratio of 1:1, while others with a ratio of 3:1. For ordinary radio broadcasting purposes a coil between these two latter ratios will operate rotary plates to the grid return to

#### Secondary Tuning

G. B. Gray-What capacity variable condenser should be employed for tuning the secondary of a three circuit tuner?

.0005 mfds for the broadcast band. A typical example of the forme However, in most cases the former type of coupling is the primary and capacity will suffice.

### Transmitting Regulations

D. M. Walters-Is a novice allowed ary). An example of the latter type to construct a small transmitting set is the single circuit receiver. The and operate it while he is learning antenna and grid circuits are both the code 1

Improper Arrangement of Parts

### CONDENSER Closer Tuning

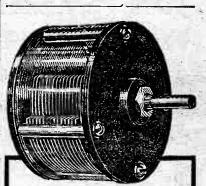
W. L. Nash-What size should the Closer tuning gives the diswhich mean so much in radio reception.

> acy you want, you should use **Remler Twin-Rotor Con-**

Type 630 Maximum .00035 Type 631 Maximum .0005







### The New RATHBUN Straight Line Wavelength CONDENSER

These new models are completely enclosed with transparent pyralin dust proof bands which preserve their high efficiency over an indefinite period of

Small, light, rugged and handsome, none are lower in loss or higher in efficiency. Thoroughly guaranteed and reasonably priced.

RATHBUN MANUFACTURING CO. INC. sestown, N.Y. **120 Liberty Street** 



steady use.

New York

tube. Sin main World Radio History

tive coupling? Answer-The proper size of a condenser depends largely on the type are coupled by induction. That is, of coil with which it is used. A well two coils are placed in such a mandesigned coil may be made to cover ner that the external field of the coils the broadcast wave bands with intersect and thereby causing induc-.00035 mfds condenser connected in tion between the two. Conductively shunt with it, while a poorly designed coupled circuits are those which are coil may require a condenser of coupled by a direct connection.

secondary circuit of a three-circuit tuner. The antenna (primary) is coupled to the grid circuit (secondtuned by means of the same coil.

Inasmuch as selectivity is above question will accomplish the

the capacity between the ground and the instruments, with a result of a slight sacrifice in efficency. **Connection** of **Condenser** K. V. Fisher-Should the stationary or rotary places of a low loss

variable condenser be connected to Answer-For maximum inductance the grid terminal of the detector or

above design when used to tune the secondary circuit of a regenerative receiver, the stationary plates should be connected to the grid, and the the filament of the detector.

Coupling

Answer-Just as the name implies. inductive coupling is where circuits

H. N. Kreger-What is the differ ence between inductive and conduc

## Something New in Audio Frequency **Amplification for Radio Reception**

The Author Claims Complete Absence of Distortion When Receiving From a High-Class Station

T N THE early days of broadcasting in this country the craze among broadcast listeners was all for noise, and yet more noise, the quality of reproduction receiving no attention at all. Happily, these days are over. Nowadays every one strives to improve the quality of his reception, so that the output of his loud speaker shall resemble as faithfully as possible the input sounds at the microphone end of the circuit.

In an endeavor to achieve this end all sorts of corrective devices have been applied to the usual forms of transformercoupled A. F. amplifiers, and tubes have been worked well within their limits-i. e., volume has been reduced. Extensive use has also been made of resistance and capacity as a means of coupling A. F. stages, for, as is well known. this method of coupling introduces no appreciable distortion if properly arranged and handled. Resistance-capacity coupling, however, suffers from the disadvantage, from the point of view of the impecunious, that the same degree of amplification per tube cannot be obtained as with transformer coupling, and a higher value of B battery voltage is necessary.

In view of the above remarks, it is strange that no particular effort seems to have been made by manufacturers of A. F. transformers to produce a distortionless instrument, or by designers to produce some alternative means of amplification which will combine purity with great volume, using a minimum of tubes.

Great advances have been made in England, both in the matter of improved transformers and in alternative methods of amplification, and in the present article the writer will endeavor to describe a very promising A. F. amplification circuit. Pierce's Trigger Circuit

The underlying principles of the new circuit are covered by two British patents, one being due to G. W. Pierce and the other to E. W. B. Gill. Pierce's original circuit is shown in Fig. 1, and Gill's modification of it in Fig. 2.

Referring to Fig. 1, it will be seen that the method of coupling the two tubes is by means of a battery, the positive terminal of which is connected to the plate of the first tube, while the negative terminal

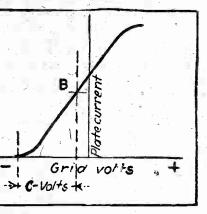


Figure 5—The characteristic curve of the second tube prior to the arrival of a signal. Point B is the operating point at a negative potential on the grid.

is connected to the grid of the second tube. Since the completed circuit of this battery goes through the plate-filament path of the first tube, the actual voltage applied to the grid of the second tube depends upon the conductivity of the first tube.

Thus, as signals arrive on the grid of the first tube, varying its conductivity, so the potential applied to the grid of the second tube is varied, and corresponding changes of plate current occur in its plate circuit, and, consequently, in the telephones connected therein. In this way, therefore, it will be seen that a kind of trigger action results, the incoming signals impressed on the grid of the first tube producing effects which cause great changes in the plate current of the second

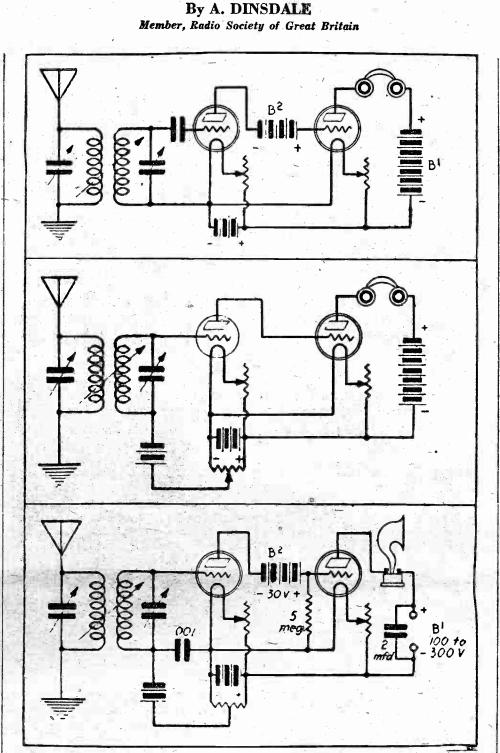


Figure 1-Top: Pierce's original circuit. Figure 2-Middle: Gill's modification of the circuit shown in Figure 1. Figure 3-Below: The circuit combining the trigger action with the limiting action.

ing that the battery between the plate of the first tube and the grid of the second has been eliminated, and potentiometer control of the grid of the first tube has been added

The important point in connection withgrid of the first tube is increased, so the plate current of the second tube is reduced. This follows because, as the conductivity of the first tube is increased, so the grid of the second tube becomes more negative, and all users of negative grid bias know that increasing the biasing voltage results in reducing the plate cur-

### **Prince's Modification**

A circuit combining the trigger action of Pierce's circuit with the limiting action cuit has been used on telephony with con-

Gill's circuit, shown in Fig. 2, is very siderable success, and is therefore of insimilar to Fig. 1, the only differences be- | terest to all readers of an experimental turn of mind. The theoretical considerations of the circuit are as follows: We will assume that the grid of the

first tube (Fig. 3) has been made sufficiently negative by means of the potentiometer and grid bias to render the tube this circuit is that as the voltage on the non-conductive. This means that the battery B2 is open circuited. The grid of the second tube is, therefore, to all intents and purposes, free and will have impressed upon it some fairly high and steady value of negative potential, the exact value of which will depend upon the characteristics of the tube in use.

Under such conditions, prior to the arrival of any signal, a certain value of steady current will flow through the plate circuit of the second tube, and this is really the "normal" plate circuit.

Upon the arrival of a signal the grid of of Gill's circuit is due to Major C. E. the first tube is made less negative, and if Prince, and is shown in Fig. 3. This ctr. | the signal is sufficiently strong the tube will be made conductive, as far as the bat-

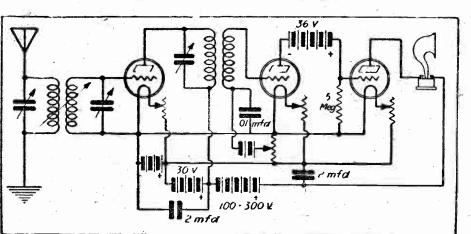


Figure 6-4 three-tube circuit which has one stage of R. F. amplification

tery B2 is concerned. A current from B2 will flow through the circuit, and the effect of this will be to greatly increase the negative potential on the grid of the second tube. This large increase in negative bias will cause a correspondingly large reduction in the plate current of the second tube.

The action of the two tubes is shown graphically in Figs. 4 and 5. In Fig. 4 the point "A" on the characteristic curve shows the condition of the first tube when the grid is initially made negative prior to the arrival of any signal.

Fig. 5 shows the characteristic curve of the second tube, "B" being the operating point at the negative potential obtaining on the grid prior to the arrival of a signal. When the first tube is made conductive by the application of signal voltage to its grid an increase of "C" volts in the negative bias impressed on the grid of the second tube will cause the plate current to drop to zero, as shown.

### **Choice of Tubes Important**

The trigger action of the circuit can easily be comprehended when it is considered that with the normal currents carried by the first tube (i e., when no signal is arriving) the plate-to-filament resistance is comparatively low in comparison to the filament-to-grid resistance of the second tube. Thus, as soon as the first tube becomes conductive practically the full voltage of the battery B2 is applied between the filament and grid of the second tube and its plate current falls to zero.

It is therefore possible by this means to arrange for a reduction in plate current which will be many times greater than any plate current change which could be effected by applying the original signal voltage directly to the grid of the second

It necessarily follows, then, that in order to obtain maximum results the normal plate current of the second tube should be as large as possible. It follows also that since at the end of each signal impulse the grid of the tube will be left with an excessive negative charge upon it means of escape must be provided, so that the grid shall immediately return to a fit

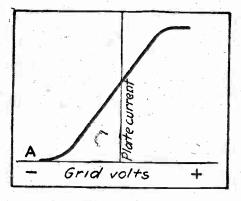


Figure 4-Point A on the curve shows the condition of the first tube when the grid is negative before the reception of a signal

state to deal with the next signal impulse. This may be arranged by introducing a grid leak, as shown in Fig. 3.

It will be apparent that much of the success of the trigger action will be dependent upon a sharp and sudden change in the first tube from a non-conducting to a conducting state. This requirement can be met by employing a tube with a sharp bend at the bottom of the characteristic, and any tube designed to act as a detector answers this requirement. Naturally, the sharper the bend of the characteristic the better, and the sharpest bends can be obtained from soft tubes. A soft tube, therefore, is recommended for carrying out this particular function, while a small power tube (say 5 watt) is recommended for the amplification stage.

As the trigger of a rifle requires a certain definite minimum amount of energy to pull it off and release the enormous power contained in the cartridge, so does the circuit under consideration require a

## **A Two-Tube Reflex Radio Receiver Which** Will Not Howl

### By Adding Audio Frequency Amplification Loud Speaker Volume May Be Obtained

OST reflex sets have failed to give satisfaction because no prorision had been made in the design of the coils to prevent howling when the set was in resonance. In cases where more than one tube was used, necessitating more than one circuit, the usual type of coils caused feedbacks, due to their stray fields. Naturally if it is possible to design coils having a very concentrated field, then interstage coupling, feedback and such troubles can be done away with. This is accomplished by the coils used in this set, the forms of which will make a very efficient radio-frequency set if two stages of RF are used. The constants, of course, will not be the same as those given for this set, but the windings will be identical.

The astatic windings are used, the simple form of which is shown in Figure 1. This may be used if desired and a cardboard tube used as the form with a slot cut at the proper place. But for the most efficient results a combination of the basket weave and astatic windings is used, as shown in Figure 2. The coils in that case will be of the best low-loss type for this receiver.

The coil winder used to make these coils must have an even number of pegs, preferably fourteen. This insures the same number of pegs on each side so that it will be the same as the basic winding using the slot in the cardboard tube. The winder should have an inside diameter of 3½ inches.

### Method of Winding

The method of winding is clearly shown in Figure 2, but a little explanation is necessary. Start the wire at Point 1 and wind in the direction of the arrows. The

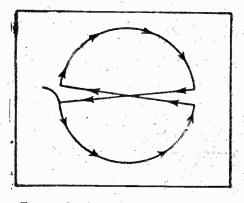


Figure 1—Simple form of astatic winding

method of winding is over two, under one, over two, etc., until the Point 2 is reached. Then the wire is passed to Point 3 and the process repeated, over two, under one,

### **By PETER MOMBELLO**

which the wire is passed to Point 1, thus | turns No. 20 DCC, there being only one ompleting one turn. At this point the econd turn must not coincide with the first, so that the wire is passed over only one peg, then under one, then followed by the regular process until the wire is stretched to 3. At this part there must

winding, The relation between the secondary and

the primary on the coils will depend entirely on the location in which the set is operated. If great selectivity is not needed the primary may be interwound not be any coincidence, so that the wire with the secondary. The No. 18 and No.

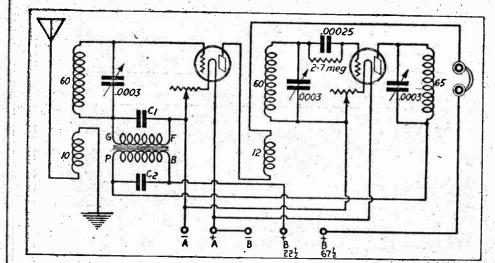


Figure 3-The wiring diagram for the receiver herein described

over two, etc., until Point 4 is reached, at | 20 wire are held together in the hand and goes over only one peg instead of two like the turn under it. This may sound complicated, but it can be very easily explained. When the corners 1 and 3 are reached, the builder should notice the previous turn. If the wire passes over two pegs in the previous turn, then he must make the next turn go over only one peg. Conversely if the wire goes over only one peg in the previous turn, then the next turn must go over two pegs. This principle is carried in every turn of the coil. If the wire inevitably conincides at the corner, then a mistake has been made in the round part of the coil in the fast turn. This method immediately checks up mistakes in the winding as soon as they are made. Even without practice this winding procedure is easy once the principle is grasped.

These coils have all the advantages of low-loss coils and they have the added advantage of a concentrated field so that no leakage can take place through several coils of this type when used in a set.

**Constants of Coils** 

For use in this receiver three such coils must be made having the following constants as shown in the diagram in Figure 3. The first coil has ten turns No. 18 DCC wire on the primary and sixty turns No. 20 DCC on the secondary. The second coil has twelve turns No. 18 DCC on the primary, same number as the first coil on the secondary. The third coil has sixty-five

wound simultaneously. When the required turns for the primary are wound the wire is brought down temporarily to the bottom of the coil winder, and the secondary wire is continued by itself until its required turns are completed. This is the best method of winding, but for selectivity the primary and secondary must be wound by themselves and then separated by onehalf inch or more to obtain the required degree of selectivity. In this latter case a few wooden pegs are left in the windings to give them support and maintain the separation. These pegs should be long and even so that the coils may be made to stand upright on the baseboard. The set as shown was designed for earphone reception, but a loud speaker may be used provided the necessary amplification is first added. The following parts will be needed to

make the tuner alone. The best pieces of apparatus should be used throughout: One pound No. 20 DCC wire, one-half

bound No. 18 DCC wire. Three low-loss .0003 variable con densers.

One audio-frequency transformer, 6:1 atio.

Two rheostats to fit tubes used. One panel, 7x18 inches; one baseboard 8x16 inches.

Three medium ratio dials. Two .002 fixed condensers. One grid

condenser and leak.

Nine initial binding posts. Two sockets.

## **Something New in Audio Frequency Amplification**

certain minimum amount of signal energy to operate it.

As a rough guide to requirements, if a circuit similar to Fig. 3 is used without any regeneration or R. F. amplification, the signals delivered by the detector alone must equal in strength what may be termed "loud and clear" headphone reception on a crystal detector.

If signals are of a strength which make it possible to just distinguish speech without straining the hearing, then it will be necessary to add one stage of some form of R. F. amplification before the detector.

Signals which are barely audible on the detector alone will require probably two stages of R. F. to render them sufficiently strong to operate the trigger. It will therefore be seen that it is a good idea to arrange a phone jack so that phones may be plugged into the detector circuit as a guide in tuning, the grid of the second tube being temporarily shorted to the filament through the telephone windings.

Once the requisite minimum signal energy has been arranged for to operate the trigger, practically the only limits to the degree of A. F. amplification obtainable | or 3 volts. are the capacity of the power bulb used |. The potentials of the B batteries will | as possible.

This method of A. F. amplification may | The makers' stated requirements for the be applied to almost any existing receiver ( tubes will give a very good indication of possessed by the reader. It is only necessary to cut out the A. F. portion, leaving the R. F. circuits as they are. In the detector circuit the grid condenser and leak should be eliminated or short-circuited during experiments, and a suitable type of | desired and the depth of the experimentdetector tube substituted for the one in | er's pocket.

As pointed out above, the detector tube has to operate at, or very near, the lower | the battery B2. bend of the characteristic, and this bend should be sharp. To bring the operating point to the lower bend, negative grid bias may be applied, but a tube possessing a grid of very fine mesh will require less bias and will function better.

As a general guide to the method of arrangement, a three-tube circuit is given in Fig. 6 which has one stage of R. F. amplification, coupled in the orthodox manner. With a suitable detector tube the grid bias should not be more than 2

### (Continued from page three)

and the value of the B battery potential. | also depend on the types of tubes used. what is required, and small experimental variations on either side of these values will soon clear up these points. In the case of the power tube, the voltage required depends greatly upon the volume

An important matter requiring serious attention is the position and insulation of

This battery, it must be remembered, is in the grid circuit of the power tube, and on broadcasting wavelengths the capacity of this grid to ground, and also stray capacities from the battery B2, may cause paralyzation of the power tube before full advantage can be taken of the enormous amplification obtainable. Efforts to eliminate capacity effects should, therefore, be made, and also, in view of the unique position of the battery in the circuit, it should be well insulated from ground and connected to both tubes by as short leads

The panel arrangement may be made neat by putting one of the variable condensers in the center and the other two on the extreme left and right of the panel. The two rheostats come on a lower level near the baseboard between the condensers. The coils are placed upright behind their respective condensers and as far apart as possible from one another. Care should be taken to see that the socalled "slot" in the astatic windings is in the same line for all the coils running from left to right, parallel to the plane of the panel. The two sockets are placed in a plane behind the coils and in a line with the rheostats. The audio transformer is mounted behind the first rheostat. The binding post strip is placed in the back center with the post pointing outward through the back of the cabinet.

When wiring the set either large enameled copper wire or bus bar may be used. All battery connections should be made first. The grid and plate wires should-be as high up as possible and at right angles to each other. To avoid hand-capacity effects connect the rotor of the condensers to the low potential or filament.

If there is sufficient capacity effect between transformer windings, the removal of condenser C2 may sometimes improve reception. This should be experimented with. Condenser C1 is usually necessary

On the question of tubes for this set, the UV-199 are recommended because of their slight tendency to oscillate, due to heir small internal capacity.

When tuning the set, put the condenser across the plate coil at a reading between ) and 5 and slowly rotate the other two condensers simultaneously until a station

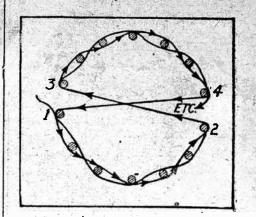


Figure 2 --- Method of winding the combination astatic and basketweave coils

is found. Then the value of the plate condenser is increased. Station may be logged on the first two dials. The last dial need not be logged, since this controls the volume.

If, in operation, it is found that signals are so strong that paralization of the power tube results, this may be corrected by reducing the output energy from the detector circuit. De-tuning or dimming the detector filament will accomplish this. Another way out is to alter the value of the power tube grid leak till a value is

found which prevents paralysis. Alteration of the potential of B1 will also assist in achieving the same result. If the circuit is switched on for the

first time with a loud speaker in circuit it will very likely appear to be quite dead, and nothing will alter this condition till some station providing the correct amount of signal strength to operate the trigger is tuned in. For this reason it is advisable to tune in first with head phones in the detector circuit.

Once the correct adjustments have been found the circuit will suddenly jump to life in a most startling fashion.

Considerable experimentation may be necessary at first in order to find the correct adjustments of all the circuits and

(Continued on page six)

musical programs. radio.

were unfamiliar names.

tenna system.

The speech of Secretary of Com-This has been accomplished by the Public Interest Requires Local running a cable along the gable of Rather Than Federal Regulation of the church roof and at equal dis- the Electrical Public Utilities" will tances down the side running strands be broadcast direct from the Hotel of No. 14 copper wire parallel to Mayflower, in Washington, D. C., at 8 the top cable. These wires are con-nected together by means of copper chain of stations, including WEEI. strips, and the entire system is con- WCAP, WJAR, WOO, WCAE, WSAI, WGR, WTIC, WCCO and WCTS. Sec-It is hoped by the engineers of this section that when this shielding ference of the National Association of Railroad and Utilities Commismaterially reduce the resistance of the earth connection, which has Interstate Commerce Commissions of sions, at which representatives of the caused trouble in making the set each state attend, and which is the most important meeting of the year in determining the policies in con-Next Subject of Health Talk nection with the public utilities.

Will Be "Louis Pasteur" will be the subject of the "Tower WEAF. WEEI and WCAP.

dramatic as that of any general or at 9 p. m., by WEAF and six other military character. His life struggle stations. Besides these pieces, for scientists the truth of the germ the- are many gypsy numbers used by ory of disease was replete with thrill- these artists for which no music is ing incidents. It resulted in the con- necessary, the musicians playing the munization process.

Besides taking the horror out of the operating chamber by antiseptic Members of International methods and being the father of Dance Orchestra All Veterans modern bacteriology, Pasteur was Every member of the International also instrumental in wiping out the Dance Orchestra, which plays under destructive cattle and sheep disease the direction of Edward Behringer at which was rampant in his native land, WEBJ, saw action in the American France, and checked the disease which Army during the war. They have was ruining the famous wine grapes. changed their program from shraphel

should test at least 17 volts.

# Manufacturer Says Radio Increases Desire to Travel Radio leaders contend that radio of the movement to "see America

people to visit the scenic centers of cent. take trains and steamers are now a corresponding increase.

by scores of friends who have de-

"California and Florida are, or

"This situation is a splendid thing tone. for the country, bringing all sections as 'the university of the air.'

The high resistance of the ground WOO, Philadelphia. connection at Station WLWL, the the church from the field of the an-

**Testing Batteries** 

batteries should not be tested with an ammeter, but with a voltmeter. The test should be made while the

of the movement to "see America Masterpiece receiver, report gross day. Every Sunday from 3:45 to the facts that are keeping the na- a Syrian composer, is recognized as first" than the combined propaganda of cities, railroads and educational 1925, of \$690,708.89, as against \$163, the sessions of the men's conferences, intermediate the set and that it was the be-ginning of a process of reintegration music, and a special orchestra will of cities, railroads and educational 1925, of \$690,708.89, as against \$103, one sessions of the men's contenents, ginning of a process of tentogration moves and educational 630.38 for the month of September, now starting on their twenty-second which will ultimately bind the naagencies in the past to' encourage 1924-an increase of over 400 per

in other places, and men and women entered it is believed that sales for who have had no previous desire to each of the next six months will show

anxious to see for themselves the 10- Although the company recently calities from which they have heard opened a large new factory in the Bronx, New York, and another large "Thousands upon thousands of factory in Chicago, negotiations are radio listeners, who in the past have now under way to triple the presen! regarded Atlants, Davenport, Detroit Chicago facilities. As soon as this and scores of smaller places simply latter arrangement is consummated as spots on the map," declares Joseph the company will use the Chicago fac-D. R. Freed, president of the Freed- tory for its central shipping point, Eisemann Radio Corporation, "are thus relieving the New York factories visiting, or will visit at first chance, of the burden of shipping to the Centhe cities in which the broadcasting tral states. Additional factories are stations they hear are located. So planned in the near future in San I assume from statements made to me Francisco and Toronto, Canada.

### veloped an intensive desire to trave! Toscha Seidel's First Radio through hearing about these cities by Concert To-night From WEAF

Toscha Seidel, famous Russian violinist, will be featured during the course, centers of special interest at second "Atwater Kent Radio Hour" all times, but radio has been of the and will play in the studio of WEAF utmost assistance in their drives to this evening from 9:15 to 10:15 p. m. bring Easterners and Northerners to This is the first time in radio histheir sunny skies. Any fan, almost tory that weekly concerts by Metrowill admit that he 'never heard of' politan Opera stars and other leading. some of these towns which are now artists of the musical world have being so well advertised by radio. been given for radio broadcasting. Look at the roster of stations and The first concert was given the preyou will find places that in the last ceding Sunday evening by Reinald Werrenrath, famous American bary-

These recitals are exactly the same closer together in mutual admiration as would be given in a concert hall and respect. What we hear by radio with the artist playing several groups leads us to seek further information. of solos with piano or organ for acand thus we may truly regard radio companiment. On this evening Ar-"Just as most of us are keen to and organ. Mr. Loesser, besides acthur Loesser will assist at the piano find out, in early life, particularly. companying Mr. Seidel, will play two what the inside of a watch looks like piano solos. The chain of stations sometimes with disastrous results, so linked with WEAF for the broadcastpeople are not content to hear music from a distinct city, they want to zee Washington; WJAR, Providence: WEEI, Boston; WCAE, Pittsburgh; WLWL to Shield Church From WOC, Davenport; WCCO, St. Paul-Field of Their Antenna Minneapolis; WGR, Buffalo, and

Paulist League station in New York Radio to Get Hoover's Speech City, has made it necessary to shield At R. R. and Utility Conference

Louis Pasteur, probably the great- Selections of Gypsy Camp Fire est figure in the history of medicine, Music in Harry Horlick's Hour Harry Horlick, with his A. and P. Health Talk" to-morrow at 8:45 p. m., Gypsies, will introduce some of the given by Dr. Iago Galdston through selections which he imported from Europe during the last summer in his The life of Louis Pasteur is as hour of music to-morrow, broadcast to prove to the world and his fellow which written scores are used, there gnering of the dread rabies, small- pieces entirely from memory. These pox and was the begininng of the selections are of the type which would process of the vaccination which in be heard around the camp fire of a the last five years has resulted in troup of wandering gypsies and are a practical diminution of the danger the distinguishing features which of diphtheria by the diphtheria im- characterize these unusual hours given every Monday night.

to saxophones and will broadcast a series of dance tunes, beginning at Contrary to the popular notion, dry 8:15 Tuesday evening.

**Missionary to Build Sets** Receiving sets are to be distributed tubes are turned on. Each cell of A by a British missionary to natives ir battery should test at least 1.1 volts the South Sea Islands. Cocoanu and each 22% volt block of B battery palms, 80 to 90 feet high, are to be used for aerial masta.

possesses a keenly analytical mind most cordial.

tions in peaceful and lasting har-Dr. Cadman has recently returned mony. It was the first time he had tiana," termed an "Egyptian fox-

The hour opens with his "Egyp-

the United States rather than to rush The company further reports an from a two months' tour of Europe, met his German brethren in the min-to Europe at first opportunity. Above chormous smount of unfilled orders, where he attended the International istry since the war, and the welcome Sphinx," an Oriental waltz; "Saloma" all, radio has instilled a deep interest and at the rate that orders are being Church Conference in Stockholm. He in their country and Denmark was and "Fatima," which, as their names indicate, are Oriental dances;

## DERESNADYNE II A superlative 5-tube receiver

## at little more than a cheap set

FOR those who want a radio receiver second to none the Deresna- $\Gamma$  dyne will settle the question of which radio set to buy. It does not choose between tone quality and volume, nor between distance and selectivity. It combines them.

The Deresnadyne is remarkable for its purity of tone. And tone is what counts after you've owned a set a while. It is non-oscillating--extraneous noises are absent.

"The Deresnadyne is remarkable for its selectivity. In this respect it acknowledges no superior.

The Deresnadyne is remarkable for distance. Operating from Chicago where the interference is very great, owners have reported the reception of Calgary, Havana, Los Angeles and Springfield, Mass., in one evening.

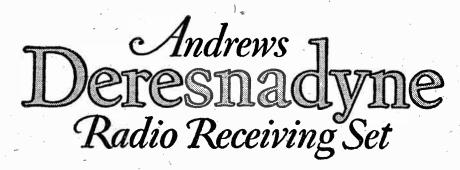
The Deresnadyne is remarkable for volume. During International week, operating from Chicago, it brought in European stations loud and clear over the loud speaker.

The Deresnadyne is not a Neutrodyne. It is not a Heterodyne. It is different in principle as well as results.

DERESNADYNE II, illustrated above, makes available to those who already own battery and speaker equipment the same performance as Deresnadyne I and III, which operate from the light socket. Specially priced at \$125.

DERESNADYNE III-a complete 5-tube receiver operating from the light socket. Deresnadyne III is the last word in radio convenience. It is equipped with permanent guaranteed power units and operates from the lighting circuit. Built-in loud speaker. All equipment included in the cabinet. Price complete with matched tubes-\$285.

### AT YOUR DEALER'S





World Radio History

## Up-to-the-Minute News of Radio in Pictures



who has played eighteen holes of golf Saturday afternoon and then read until 1 or 2 a. m. and who has to sit and listen to a sermon in a hot church.

About the middle of the twenty-fourth year Dodson Bates's wife passed on to a better climate, and it was when she had been an angel for about six months that I managed to coax Dodson Bates to come to my house and listen to my radio. I had to coax him for two months, and then he came reluctantly, and all we got that night was static and squeals. Dodson Bates came five times and all we got was static and squeals, and he got plumb disgusted and said he wouldn't have one of those radio machines in his house for a million dollars. He said he could not be hired to have one, and nobody could get him to listen in again for any amount of money.

That's how things were when we were coming out from town one afternoon on the 5:15 train, and four of us were playing 500-Bink and Dodson Bates and Joe Minch and I-and Joe Minch happened to mention that he had just bought a radio outfit. He said it was one of the sort that is built like a phonograph cabinet, like a Victrola.

"And it's wonderful," he said. "Why, last Sunday I sat there in my own livingroom and heard a whole church service. right direct from the church."

Dodson Bates looked up instantly. "With the sermon?" he asked. "Could

you hear the sermon. too?" "Absolutely!" Joe Minch said. "Clear as anything. Every word."

"And your radio is built like a Victrola? About four feet high, say?" asked Dodson Bates, getting more and more excited.

"That's right," Joe Minch told him. Dodson Bates threw down his cards and

got out into the aisle. "What's the matter?" I asked.

"Matter!" Dodson Bates exclaimed. "Matter? I'm going to get off this train at the next station, and I'm going back to town and I'm going to buy one of those radio machines like Joe Minch's. Yes, sil ! I'm going to have it sent to my house and I'm going to rig it up, and next Sunday morning I'm going to turn on the sermon and pull my biggest and easiest easy chair up to that machine, and I'm going to put the car things on my ears and sit down in that chair and put my feet on top of that radio cabinet and go to sleep! And every Sunday morning for the next twenty-four years I'm going to turn on that sermon and sleep right spang through it from start to finish!"

And I shouldn't wonder if he did. He has always been very bitter about sermons.

#### **Talking About Bink**

But what I wanted to say was that some of these people do annoy a radio enthusiast dreadfully. I remember what Dodson Bates told Joe Minch about me. Time and again, as I have told you, I invited Dodson Bates to my house to hear my radio and he said to Joe Minch:

"This is how it works. Ellis comes to me and he begins grabbing about getting concerts and talks from Honolulu and the moon and further-from San Francisco and Poduk and Chicago and forty-eleven other places. And every night, too. He just goes home about 10:30 p. m. and turns the knobs and hears the King of Siam and Galli Curci and Napoleon Bonaparte and Skagway and Havana and Patagonia, all as clear as a bell and just as if they were in the next room. So I let him coax me to go and hear it. So I go. He sits me down on a sofa and says: 'Now! Now we'll see what we get!' And he turns sixteen knobs and all I hear out of the thing are grunts from some pig yard and then a couple of cats screeching on a back fence, and then one of the pigs gets caught under a gate and squeals bloody murder. That keeps up from 10:30 o'clock till 1:30 a. m., and then he says, 'I'll just use the ear phones until I get tuned in right.' So he news, he ear phones to his ears and twists the knobs, and all at once his face lights with a glow of utter bliss and he turns his eyes to the ceiling and whispers with awe, 'Chicago!' Chicago!' And he hands the ear things to me and I put them on and what I hear is, 'Psst! Psst! Ugh! Ugh! Yeow!' Same old cats and dogs and razor-back hogs. Ain't it awful?"

Some of your friends are like that always, but I know only two other individuals quite as unsatisfactory as Dodson Bates. One is my grandmother and the provements in electrical efficiencies have to be.

### (Continued from page one)

Mr. Bink's Radio

able to get any satisfaction out of my radio whatever. ' I'll put her in a chair in front of my horn and shout-we have to shout at grandmother at the tops of our voices, she is so deaf.

"Now. grandmother, this is the great tenor, Rosario Bossi."

Grandmother will listen. She will keen herself up and strain her ears and fold her hands, across her stomach and close her eyes and just concentrate for all she is worth, and in a minute she will say:

"It ain't no use, Ellis; it ain't no useit don't sound to me like nothin' but a tog yowling."

Then I'll try her with the celebrated Boomberay Marine Band of one hundred and eight pieces and she'll say:

"It ain't no use, Ellis; it ain't no use--t don't sound to me like nothin' but a dog yowling.'

the moving plates being fastened to a

shaft on which the usual external dial is

so much in the public eye at the moment.

is one whose plates are of such shape that

when the instrument is properly matched

to a correctly designed coil the broadcast-

ing stations are spread evenly over the

dial according to their kilocycle (fre-

quency) figures. The effect is accom-

plished by cutting away either the rotary

or stationary plates in a certain geometric

The regular condenser using semi-circu-

lar plates is said to be of the "straight"

line capacity" type, its capacity, independ-

ent of its effect on the rest of an asso-

ciated circuit, varying directly according

to its setting. Thus, if the capacity is a

certain amount at a dial reading of 10,

it is twice as much at 20, three times as

much at 30, and so forth. There is

also a "straight line wave length" con-

denser, similar in its plate shape to the

straight line frequency condenser, which,

when used under the proper conditions,

separates wave length figures evenly

over the dial just as the latter distributes

S. L. F. Type Popular

turer is making an S. L. F. condenser to

meet the popular demand. One very prom-

inent firm, however, believes that true,

condensers possess mechanical defects, so

instead of marketing an S. L. F. condenser

it offers a unique dial which gives a

straight line wave length effect with an

ordinary straight line capacity condenser.

The same company does have, though, a

condenser whose rotary plates are cut

away slightly to furnish a more gradual

capacity increase at the lower end of the

Many of the new condensers can be ob-

tained in nests of two, three and four

stators with a common rotor, for use in

controlling several tuned radio-frequency

stages at once. Some of the single con-

densers are so built that they can be con-

nected in tandem if desired, the makers

supplying special supporting brackets and

coupling joints for the purpose. Others

have special little pulleys provided on

their shafts so that they can be turned

together when mounted separately on a

Many of the other improved details of

condenser construction as exemplified in

the latest models can be given only slight

mention. There are conveniences such as

one-hole panel mounts; reduced over-all

sizes; dependable gear and friction ver-

niers; stronger pig-tail connections and

better wiping contacts; absence of trou-

blesome back-lash; 360-degree scale move-

In general, the improvements that have

been made have been mechanical, but im-

ment. etc.

panel by means of a fish-line coupling.

scale than its standrard model permits.

Practically every condenser manufac-

the frequency figures.

The "straight line frequency" condenser,

screwed.

fashion

other is Mr. Bink's dog. Grandmother Butts or whatever great soprano happens is a dear old soul, but she has never been | to be singing that night, and all grandmother says is:

> "It ain't no use, Ellis; it ain't no useit don't sound to me like nothin' but a dog yowling."

That is mighty discouraging to a man who loves his radio and is eager and tremulous to have all his family and friends enjoy it, but, after all, a grandmother is a grandmother and you have to treat her kindly. As I said to Bink:

"Even if a grandmother does make mean remarks about a man's best radio efforts, he can't take her out and shoot her for it, as if she was a dog. But," I said, "if I had a dog like yours I certainly would take it out and shoot it."

Bink's dog-it is the other individual that does not appreciate radio---is what I would call an anti-radio hound, if I did not call it something worse. I don't know what is the matter with that dog unless it has invented a new disease that might Then I'll try grandmother with Galli- be called radiophobia. The dog-his name Curci or Maria Forlorna or Ethel Bethel | is Cæsar-is a large, yellowish dog with

### The Evolution of Condensers (Continued from page two)

which meshes with the flat rack holding | invariably resulted at the same time. So widespread has the betterment been that even the very cheapest affairs display highly acceptable characteristics; it is difficult, in fact, to purchase a really poor condenser nowadays.

### **Radio Exhibits at Electrical Show**

Everything new electrically, from the latest innovations in electro-therapeutics to electric kitchenmaids, from four-wheel tractors to curling irons and from the most advanced discoveries in the radio world to the newest fireless cooker, will be publicly exhibited and demonstrated in the Grand Central Palace October 14

to 24. Electrical authorities are united in the opinion that this year's exposition will be the most comprehensive electric show ever held. The last year has seen remarkable strides in the invention and perfection of electrical devices. Indeed, so many devices have been developed recently that, together with the new models of electrical equipment already well known to the public, three entire floors of the Grand Central Palace will be occupied by the expo-

The radio exhibits alone should make the coming electrical exposition the most comprehensive and the most interesting ever held. according to Arthur Williams, vice-president commercial relations of the New York Edison Company. "The radio straight line frequency conditions are dif- exhibits in this year's show will be the ficult of attainment in actual practice with most extensive ever shown in one place," coils selected at random, and that S. L. F. Mr. Williams states. "Several of the most important of these exhibits will be under the direction of the radio division of the navy and the Signal Corps of the army. Indications are that every type of radio device now in use anywhere in the world, from the simple crystal set to the newest devices for transmitting photographs by radio, will be publicly demonstrated."

### Something New in

### Audio Amplification (Continued from page four)

component values, but, once these have been found, they need never be altered, and the set will henceforward be foolproof. Uusing only a detector and one small

power tube, loud speaker signals can be obtained which will be audible 100 vards away or more, for a modulated output of seven milliamps or more can be obtained. The crystal purity of the reproduction given by this unique circuit is truly remarkable, and will surprise those who have become used to the imperfections of iron-core transformer coupled A. F. amplifiers.

The absolutely complete absence of distortion when receiving from a high-class broadcasting station is almost uncanny, and will serve to prove to doubters that the modern loud speaker is by no means so imperfect as it is generally made out

sad eyes and burrs in his tail, and I think the trouble with him is that his liver overamplifies and gives forth too much of the static he seems to be full of. As soon as Bink or any of Bink's family goes to the radio receiver, Cæsar gets as close as possible in front of it, or behind it, or under it, if he happens to be in the cellar, and raises his head and rolls his eyes and opens his mouth and utters a loud. long, tremulous wail that is like the wail a soul in torture would utter if it was an especially loud utterer and in especially painful torture.

Cæsar's wail begins with a sad but gentle wail, increasing and becoming sadder and sadder until it shakes the house and makes the dishes rattle in the house next door. Then Cæsar pauses for breath and begins again and tries to beat all records for sadness and blood-curdlingness and loudness-and does it. Then he pauses for breath again and does it again, louder than before. People who hear Caesar wail to the radio a couple of times want to rush out and commit suicide before they have to hear him wail again.

And it does not seem to make any difference what comes out of the radio horn: one thing is as good as another to Czsar. A high-class soprano solo and a wad of static and a lecture on baked beans are all the same to Cæsar. A link of fat code that sounds like sausages frying and a few remarks by a Boy Scout person are both equally disagreeable to Cæsar. A broadcast fox trot from Denver that yields nothing but the "Thum-thum-thum" of the drum, and a thousand-dollar-a night barytone from Newark give him. equal pains in his howler. No matter what is turned on the etheric waves seem to penetrate to Cæsar's secret inwards and make him let loose all the agony of soul that has been accumulated by all his ancestors since the time of Adam and Eve. I told Bink quite frankly that if I had a deg like that I would shoot him. But Bink is fond of the dog.

On this particular night Bink came over to my house and dear old grandma was sitting in front of my loud speaker saying:

"It ain't no use, Ellis; it ain't no useit don't sound to me like nothin' but a dog yowling."

I saw a look of fiendish triumph come over Bink's face: the look of a man who thinks he has a better radio set than yours.

"I don't wonder," he said. "That set of yours never did sound like anything but a dog yowling. Miserable loud-speaker you've got. Now mine"\_\_\_\_

### Grandma and Bink

He turned to grandma and shouted at the top of his voice: 🐡

'Grandma, you ought to come over and hear my radio. I've got a good radio. Not like this. I say NOT LIKE THIS. I say, come over and hear mine."

"I'd be pleased to," grandma said. "This one never sounds to me like anything but a dog yowling."

So there she went after all the trouble I had taken for weeks and weeks to make enjoy my radio, trotting over to Bink's house.

He took her in the living room and set chair for her and eased her into it, and she folded her hands across her stomach and closed her eyes and leaned back in the chair. Bink picked up a newspaper and looked at the broadcast programs, and that dog of his-that miserable anti-radio hound, Cæsar-got up and walked over to the loud speaker and put his tail between his legs and raised his nose and got ready to pour forth his agony in sound. Then Bink went over to grandma and shouted to her:

"I'm going to get WKX first, grandma," he shouted. "WKX. I say I'm going to get WKX first. Singing! I say it will be singing! It's Ethel Bethel Butts singing, grandma. It's Ethel Bethel Butts, the great soprano, singing. From WKX."

"Yes, yes! I hear you," grandma said. "Ethel Bethel Butts, the soprano, singing." So Bink walked over to his radio and turned on the knobs. It was a bad night -a static night-and nothing came out but spits and fizzes. But that was enough for Cæsar. He sat down on his haunches and elevated his nose and yowled ten times louder than a steam siren and forty times as sadly. And in an instant two big tear drops welled into grandma's eyes and trickled down her dear old cheeks and she gave a sigh of satisfaction and said: "My, my! I hear her perfectly. Ain"

she got a lovely sweet, sad voice?"

If you want to buy, sell or exchange your rector of WRNY and his concerts radio sets or parts the Radio Exchange will under the auspices of the City of New help you. World Radio <u>History</u>

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FONES

NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, OCTOBER 11, 1925

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IVARIUS AWARDED ADIO WORLDS FA

STRA

Distributed by R. H. MoMann, Inc. 122 Chambers St., New York Musical Products Dist. Co. 22 W. 19th St., New York Sibley Pitman Electric Corp. 6th Ave. & 13th St., New York Victory Electric Supply Co. 1207 Bedford Ave., Brooklyn North American Radio Supply Co 1845 Broadway, New York Wholesale Radio Company 115 Leonard Street, New York

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HERBERT H. FROST, Inc., Chicago

Two Chicago Hotels In Guests' Rooms

Radio means so much to many people, once they become "addicted" to it, that it has lead many hotels throughout the country to supply

It was after considering many plans and types of sets that such stone, in Chicago; the new Roosevelt, in New York; the Copley-Plaza, in Boston; the Benjamin Franklin, in-Philadelphia, and others adopted the Operadio.

The set is entirely self-contained. This means that there are no outside connections to be made-not even aerial or ground. The instrument uses six tubes, which means that the guest can obtain as great a volume as can be desired. When the instrument is delivered the radio man, or in some cases the bell-boy delivering it, shows the guest how it is operated. This takes but two or three minutes. He shows, for instance, that the little meter on the panel is to be used as a guide when turning on the current, so that too much will not be turned on. He then demonstrates that all that is necessary is to turn the two controls in unison to change from one program to another. This is all there is to it. To turn the instrument off, the guest merely has to turn the little wheel to the left.

In the big cities selectivity is a very important consfiideration because of the proximity of several broadcasting `stations. In Chicago, the powerful Drake Hotel-Tribune broadcasting station is on the roof of the Drake Hotel. With many sets it is literally impossible to tune out this station, but the Operadio met this severe test of cutting out this station, WGN, and tuning in others.

Thus, the guest who has occasion to travel can spend a quiet evening in his room, and at the same time enjoy wonderful programs from the leading radio stations. The great demand for this radio service in the hotels which adopted it, is the best indication of the desire on the part of the traveling public to enjoy radio even when away from home.

List of Morning Features of

**Special Interest to Women** At 10:45, on Columbus Day, the Betty Crocker Gold Medal Home Service Talk will tell of an "Aristocratic Vegetable." Two worth-while addresses will be made: Dr. Harry J. Carmen, professor of history at Columbia University, on "Causes of the Discovery of America" and Mr. Winter Russell, prominent New York lawyer and an eloquent speaker, on 'The Will Spring."

Tuesday will bring a musical program, a lecture by Mr. Kemble under the auspices of the Board of Education. and a motion picture forecast on the new "movies" by Adele Woodard. president of the National Motion Picture League. On Wednesday Betty Crocker will continue her menus, "To Eat and Grow Thin." Besides a musical program there will be a talk for mothers and a health lecture.

During the Housewives' Hour WEAF on Thursday Mrs. Lilly Haxworth Wallace, writer, lecturer and food specialist, well known to the American woman for her practical and helpful methods of teaching, will Celebration," This will be of help in planning hallowe'en parties. Vee Lawnhurst, popular pianist, will play. Mary E. Pennington will speak under the auspices of the National Association of Ice Industries on "Household Refrigeration."

On Friday Betty Crocker will tell how to make a "Waffle Breakfast." The second talk in the series by Mrs. Charles Gregory, New York State Chairman of the New York State Federation of Women's Clubs, will be "The Homes of New York," a plea for better homes. Mrs. Rollin Lynde Hartt, formerly Miss Helen Harrington, of the Coburn Players and lecturer of note, will continue her series of talks under the auspices of the United Parents' Association on "Ourselves and Our Children."

**De Witt Clinton Hall Concert** To Be Broadcast by WRNY

WRNY announces that it wil broadcast all the Charles D. Isaacson concerts at De Witt Clinton Hall Sunday nights at 8:15 to 10:15. The opening event brings the Norfleet Trio, Cornelia Zuccarri, operatic soprano; Lorna Lea, "The Love Song Girl," and others.

Charles D. Isaacson is program di-York are now in their tenth year and have totaled over 4,000 in number.



\* 11

Beacon Radio Mfg. Co., Inc., the Radio Receiver Division of "the world's greatest parts plant," announces to the radio public three of the outstanding achievements in the TRINITY SIXs

1 The elimination of the main cause of set trouble, even in the costliest receivers (connections soldered by inexperienced workers), is achieved by Beacon construction. The use of continuous %-in. wide nickeled phosphor-bronze strips, eye-leted to a canvas-bakelite sub-panel by special Beacon-designed machinery, eliminates practically all soldered con-nections in TRINITY SIX, saving labor for us, and trouble and money for the user.

7 The elimination of all profits to outside manufacturers, 2 except those paid for raw materials, is another exclusive Beacon feature. Even the cabinet and panel of TRINITY SIX are "Beacon-Built" from raw stock. So, also, are the straight-line frequency condensers. Every special nut, bolt and screw in the TRINITY SIX is made by Beacon.

3 TRINITY SIX is the first production-engineered radio set. The Beacon receiver plant was planned and built solely to turn out the TRINITY SIX. Neither TRINITY SIX nor any part embodied in it is a side line of any other business. Beacon builds radio only.

What Beacon Gives You For Fifty Dollars A six-tube set; two stages tuned radio frequency for distance; one detector stage, one stage transformer-coupled audio am-plification for volume; two stages resistance-coupled ampliplification for volume; two stages resistance-coupled ampli-fication for clarity of tone; straight-line frequency condensers for easy tuning; filament-control jacks for head phones and speaker (which can be used together); solid bakelite used in dials, rheostats, grid leaks and resistances; special "B-Cono-mizer" (saves "B" batteries); canvas-bakelite socket-cushioning sub-panel; hand-capacity-eliminating front panel; mahogany-finished cabinet 28"  $\times$  11"  $\times$  13" with liberal space for "B" batteries and dry cells; five-cord colored battery connection cable built in set.

Write for full description and specifications, in our free booklet—"The Value Only Beacon Can Give." We will in-form you of the TRINITY SIX dealer nearest your home.

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### Additional Radio Programs for the Week WCAZ-PITTSBURGH-461 WBW-TARRYTOWN, N. Y.-273

(Continued from page nine) WRNY--NEW YORK CITY--258 5 a. m.--News flashes. 15 a. m.--Women's Hour. 30 a. m.--Reducing exercises. 45 a. m.--''Practical Interior Decora me.''

10 \*

m.-Emma Keller, soprano. p. m.-Luncheon hour er entertain 12:30 p. m.—Luncheon nour entertain ment.
4:15 p. m.—Afternoon program.
7 p. m.—Telegraph sport flash.
7:15 p. m.—Chef Cretaux Chats.
7:30 p. m.—Chef Cretaux Chats.
7:30 p. m.—Mrs. Harriet Seymour.
8 p. m.—Roosevelt Concert Orchestra.
8:15 p. m.—Lorna Lea, love songs.
8:30 p. m.—Life's Jokes, with Robert Sherwood, Chas. Dana Gibson, Robert Henchley.

Stav p. Sherwood, Chas. Jan. Benchley. 9:15 p. m. —Yama-Yama Boys. 9:35 p. m. — Yama-Yama Boys. 9:35 p. m. — Essays on Philosophy. 9:35 p. m. — Lesta Crowell's Theater. 10 p. m. — Jolga Trio.

m.—Concert pianist. m.—Cable Montgomery, sopra m.-Violin solos. .-Raymond Maher, barytone. m.-The Amphions. WHAP-BROOKLYN-240

WBBR-STATEN ISLAND-273 p. m.—Instrumental Trio.
 8:15 p. m.—Barbara Jonsch, soprano.
 8:25 p. m.—Sunday school lesson.
 8:45 p. m.—Suprano; trio solos.
 WHAG—RICHMOND HILL, N.Y.—316

WOR-NEWARK-405 6:45-7:15-7:45 a. m.-Gym class. 2:30 p. m.-William Rietz, entertainer. 2:45 p. m.-George Little, "The Chihum bus."

hua." 3.p. m.—Fred Koester's Orchestra. 8:30 p.m.—Herbert Fields, Richard Rod-gers and Lorenz Hart, songs. 8:45 p. m.—Fred Koester's Orchestra. 6:15 p. m.—Words Mispronounced." 6:17 p. m.—Shelton Dinner Music. 7:15 p. m.—"Sports," Bill Wathey. WGCP-NEWARK-252 3 p. m.-Piano solo: race resul

11 a. m.—Happy Höur, John A. So WOO---PHILADELPHIA---508 in A. Scott 11 a. m.—Grand Organ. 12 noon—Luncheon Music by Golden's Crystal Tea Room Orchestra. 145 p. m.—Grand Organ; Trumpets. 7:30 p. m.—Dinner' music.

WIP-PHILADELPHIA-508

3.45 a. m.—Setting-up exercises.
1 p. m.—Luncheon music.
5 p. m.—Artist recital.
5 0.5 p. m.—Pagoda Orchestra.
6 p. m...-Yagoda Orchestra.
8.30 p. m.—The La Stelia Male Quartet.
8.30 p. m.—Recital with composers.
10 p. m.—Joe Ray's Night Hawks. WLIT-PHILADELPHIA-395 p. m.-Organ recital; Concert O m.-Organ recital;

chestra. 2-3 p. m.—Concert Orchestra. 4:30 p. m.—Artist recital. 4:45 p. m.—Talk, Colonel Alice Herron. 5:50 p. m.—Scores, sports results. 7:30 p. m.—Dream Daddy. WFI-PHILADELPHIA-395

WFI-PHILADELPHIA-335
 Ip. m.—Tea Room Ensemble.
 p. m.—Women's Club of Swarthmore addresses and recital.
 8:45 p. m.—Fashion feature.
 8:45 p. m.—Concert Orchestra.
 8 p. m.—Featuring WEAF Artists.
 WCAU-Philadelphia-278
 6:30 p. m.—Male quartet.
 8 p. m.—Vocal and instrumentalists.
 9 p. m.—Central Radio Artists.
 9:30 p. m.—Featurak Cook; songs.
 10 p. m.—Centennia Hour.

WPG-ATLANTIC CITY-300 WPG-ATLANTIC CITY-300 1:30 p. m.-Luncheon music, [J. Lec Lewis, director. 2 p. m.-World series game. 4:30 p. m.-Hall Trio. 6:30 p. m.-'Organ recital. 7 m. Lungan recital.

.---Dinner music. .---'World-Wide Excursions." m.---Organ recital. m.--Ambassador Concert Orch

10:30 p. m.--Dance Orchestra, WHAR-ATLANTIC CITY-275

2 p. m.—Seaside Trio. 7:30 p. m.—Lecture period. 8 p. m.—Seaside Trio. 8 p. in.—Scaside Trio.
9 p. m.—Studio concert.
WGY—SCHENECTADY—380
2 p. m.—Music; talk.
6:30 p. m.—Dinner program.
7:30 p. m.—WGY Book Chat."
7:45 p. m.—Mrs. William J. Breslin.

-Pan-American program. p. m.—Organ recital. WRW—TARRYTOWN—273

emblo inus m.—Sports. m.—WRW entertainers

WGR-BUFFALO-319 6:30 p. m.—Dinner music. 8-11 ). m.—Program same as WEAF. WHAM—ROCHESTER, N. Y.—278

5:50 n. m.-Eastman Theater Orchestr 5-6 p. m.-Eastman Theater organ, 7 p. m.-Eastman Theater Orchestra. nestra

WJAR-PROVIDENCE-306 , m.—Joe McNamara's orchestra. n.—The Larkinites. , m.—Musical program. m.—Silvertown Orchostra.

WTIC-HARTFORD, CONN.-476

m.—Dinner music. m.—Weather report; scores. m.—Talk. m.—Dinner music.

745 p. m.—Dinner music.
WEEI\_BOSTON\_349
745 a. m.—Health exercises.
p. m.—Assembly luncheon.
to 4 p. m.—Concert from Radio Show.
25 p. m.—Lost and found; weather.
30 p. m.—Big Brother Club.
380 p. m.—Earl Alpine, barytone.
p. m.—'The Larkinites.''
390 p. m.—Silvertown Orchestra.
90 p. m.—Silvertown Schestra.

WNAC-BOSTON-280 a. m.—Bible readings. a. m.—Club talks. p. m.—Noon service. n.—Concert Orchestra.

 p. m.—Concert Orchestra.
 1:50 p. m.—Popular songs, Ted and Dick Waterson.
 p. m.—Dance orchestra from the radio 6:30 p. m.-WNAC dinner dance

 p. m.—Beacon entertainment radio show.
 p. m.—Musical program. WBZ-SPRINGFIELD, MASS.-333

30 p. m.—Leo Reisman's Orchestra.
7 p. m.—Market reports.
7 rok p. m.—Settet of children.
7 rok p. m.—'Drama of Ideas," Channi: Pollock. Channin

7:45 p. m.-Daniel J. Morgan, tenor. 8 p. m.-Musical program. 9 p. m.-Evening of opera, "Aida."

WCTS-WORCESTER-268 WCTS-WORCESTER-268 2:17 30 a. m.-Radio chats. 34 f 2:10 2 p. m.-Luncheon music. 34 f 30 p. m.-Radio entertainment. 31 5 p. m.-Story teller; scores. 31 to 11 p. m.-Program same as WEAF. WRC-WASHINGTON-469 10 a. m.-Women's Hour, from WJZ. 12 noon-Organ recital. 1 p. m.-Women's Hour, from WJZ. 12 noon-Organ recital. 1 p. m.-Washington Orchestra. 7 p. m.-Washington Orchestra. 8 p. m.-"Plant Lice and Scales." 9 p. m.-"Plant Lice and Scales." 9 p. m.-"Plant Lice and Scales." 9 p. m.-"Plant Lice and Scales." 10 p. m.-Woyal Hcir of Music. 11 p. m.-Meyer Davis's Mand.

p. m.—Dinner concert. p. m.—Uncle Kaybee. n.—Larkin period. m.—Radio artists. m.—Silvertown Orchestra. KDKA—PITTSBURGH—309 . m.—Dinner concert. . m.—Children's period. . m.—KDKA Symptrony p. m.—Midnight concert. WABC—AKRON, OHIO—258 p. m.—Concert orchestra. 6:30 p. m.—Concert orchestra. 9:30 p. m.—Artists' recital. WTAM—CLEVELAND—390

7 p. m.-Statler Orchestra. WEAR-CLEVELAND-390

WEAR-CLEVFLAND-390 7 p. m.-Dinner concert. 8 p. m.-R. T. L. program. 9 p. m.-Chauncey Lee's Orchestra. 10 p m.-Organ recital. WSAI-CINCINNATI-309 8-11 p. m.-Program same as WEAF. WLW-CINCINNATI-326 8 p. m.-Dinner concert.

 p. m.—Dinner concert.
 11:03 p. m.—Doherty Melody Boys.
 11:45 p. m.—Songs, concert, orchestra.
 a. m.—"Bow Wows." WKRC-CINCINNATI-\$26

WJR-DETROIT-517 WJR-DETROIT-517 p. m.-Jean Goldkette's Orch soloist. 9 p. m.-Serenaders and soloists. 10 p. m.-Dance orchestra. WWJ-DETROIT-353 Orchest

8 p. m.-I

. m.-Dianer concert. . m.-Same as WEAF. WREO-LANSING, MICH.-286 p. m.—Dinner concert. 15 p. m.—Orchestra, quartet, inst

mental solos. WOK-CHICAGO-217 7 p. m.-Artists fecital. 11 p. m.-2 a. m.-Artists and orchestr selections.

WGN-CHICAGO-870 WGN-CHICAGO-876 8:30 p. in.-Dinner music. 10:30 p. m.-The classic hour. 12:30 a. m.-Dance music:

m.—Dance music: WMAQ—CHICAGO—448

WMAQ-CHIUABO-420 7:30 p. m.-La Salle Orchestra. 9 p. m.-Garden talk. 9:15 p. m.-Musical program. 9:30 p. m.-Financial talk. 9:35 p. m.-Golden Gate concert.

-Lecture ; music. WQJ-CHICAGO-448 p. m.—Rainbó Orchestra.
 p. m.—Musical program.
 a. m.—Ginger hour.

-Ginger hour. WLS-CHICAGO-345 Salvat

p. m.—Organ; story; Salvatior Band. WHT-CHICAGO-400

p. m.--Classical program. 3:45 p. m. (238 meters)--Music

Bram. 1 a. m.-Your Hour League. KYW-CHICAGO-536 Dinner concert.

8 p. m.—Dinner concert. 8:33 p. m.—Farm speeches. 9 p. m.—'Good Reading.'' 9:20 p. m.—Musical program. 11 p. m.—'Evening at Home.'' WTAS—ELGIN, ILL.—302 9 p. m.—Purple Gragelle Boyn p. m.-Purple Grackle Boys. WCBD-ZION, ILL.-345

p. m.-Clarinet quastion and organ. WJAZ-CHICA(:0-322 Concert.

WJAZ-CHIUAGO-322 11 p. m.-1 a. m.-Concert. WOC-DAVENPORT-484 6:45 p. m.-Chimes concert. 8 p. m.-Program from WEAF. 12 (midnight)-Dance.music. WDAF-KANSAS CITY-366

---School for 12:45 p. m.—Nighthawk frolic. WCCO-MINNEAPOLIS-ST. PAUL-416 6:30 p. m.—Children's hour. 8 p. m.—Program from WEAF.

M.—Songs. KTHS—HOT SPRINGS—375 10 p. m.—Violin and piano solos. 11:10 p. m.—Dance music. WOAW--OMAHA-526

p. m.—Classical. p. m.—Randall's Orchestra.

WMC-MEMPHIS-500 9:30 p. m.-Musical program. WHAS-LOUISVILLE-400 8:30 p. n.—Concert. WSB-ATLANTA-428 45 p. m.—Fortlight Frolic. KPRC—HOUSTON, TEX.—297

8:30 m.-Dance music. tory of N WFAA-DALLAS-476 ):30 p. m night) - Trent Syncopate CFCA-TORONTO-356

9 p. m.—Arlists. 10:45 p. m.—Gilbert Walson's Orchestration (1998) (1

### FRIDAY

WEAF-NEW YORK CITY-493 16:45, 7, 7:20, 7:45 a. m.-Health Exer-1:05 a. m.—Music. 11:15 a. m.—'The Homer of New York.' 1:30 a. m.→Music. 11:40 a. m.—Talk to Women. 11:30 a. m.—Music.
11:40 a. m.—Talk to Women.
11:55 a. m.—Music.
12 noon—Market and Weather Reports.
4 p. m.—Margaret Schilling, soprano.
4:30 p. m.—Margaret Schilling, soprano.
4:35 p. m.—Thomas Hughes, pianist.
4:45 p. m.—Thomas Hughes, pianist.
5:2 m.—Dinner music. p. m.--Dinner music.
p. m.--Michael Markels's Orchestra.
30 p. m.--Story Teller.
45 p. m.--Carl Roeder, Hannah Klein. 130 p. m.—The Happiness Boys.
130 p. m.—To be announced.
135 p. m.—Hannah Klein, planist.
130 p. m.—The York Trio.
0 p. m.—Oriental Hour.
142 p. m. Monro Deniel Columnation

10 p. m.—Oriental Hour. 11-12 p. m.—Meyer Davis's Orchestra WJZ—NEW YORK CITY—455 en's hour. 1 a. m.—News. 1:05 a. m.—'Arts and Decorations.

1 p. m.—Ambassador Trio. 2, 4, 5:15, 8 and 10:25 p. m.—News. 4. 5:15, 8 and 10:25 p. m.—News.
 4.6 p. m.—Scores, racing returns.
 4:05 p. m.—Christopher Meehan, tenor.
 4:20 p. m.—Astor Tea Music.
 5:15 p. m.—News, baseball, racing.
 5:26 p. m.—Market reports.
 5:50 p. m.—Financial summary.
 6:01 p. m.—Benhard Levitow's Orchestra
 8 p. m.—Scores and racing returns.
 8:15 p. m.—Museum of History talk.
 8:30 p. m.—Museum of History talk.

 8:30 p. m.—Colgate program.
 9:30 p. m.—To be announced.
 10:30 p. m.—Ben Glass's Orchestra.
 WJY—NEW YORK CITY—405
 7:30 p. m.—Ivip Absence on the second sec 7:30 p. m.—Irwin Abrams's Orchestra 8:30 p. m.—''Hidden Edol,'' Musical Co

WGBS\_NEW YOBK CITY\_316 10 a. m.—Timely talk with Terese. 10:10 a. m.—Lodima Lockwood, soprano. 10:20 a. m.—Sewing talk. 10:30 a. m.—Lodima Lockwood, soprano. 10:40 a. m.—Furniture talk; song. 1:30 p. m.—Scripture reading. 1:35 p. m.—Ida Rowley soprano. 3:10 p. m.—Fiano harmony lessons.

m.-Piano harmony lessons m.-Songs and stories for dren. 6 p. m.—Uncle Geebee. 6:30 p. m.—Jule Anzel's Orchestra 7 p. m.—''What's Your Radio Proble

7 p. m.—''What's Your Radio Problem ?"
 7:10 p. m.—Jule Anzel's Orchestra. WHN.—NEW VORK CITY.—361
 2:15-3:15 p. m.—Musical program.
 3:45 p. m.—Jack Smith, barytone.
 4 p. m.—Silvio Dirienzo, pianist.
 4:15 p. m.—Jee Sherman, songs.
 4:30 p. m.—Herman Shreger's Players.
 4:40 p. ni.—'Sunshine Talks."
 7 p. m.—Richman Entertainers.
 7:30 p. m.—Burr McIntosh, philosopher.
 8 p. m.—'Colonial Aces.''
 8:30 p. m.—Francis Capuilliez, barytone.
 8:45 p. m.—Grossman and Meredith, songs.

b) p. m.—John Cassidy, barytone.
c) p. m.—John Cassidy, barytone.
c) p. m.—Roeseland Orchestra.
c) p. m.—Revie and orchestra.
c) p. m.—Revue and orchestra.

-WHAP---BBOOKLYN, N. Y.---240 8:30 p. m.---Bacital WNYC-NEW YORK CITY-526 30 p. m.—Elementary French lessons. p. m.—Advanced Erench lessons. 10 p. m.—Police alarms. 5 p. m.—Resume of meeting of Board f Estimate. m.—Joseph Provi -Joseph Davies, barytone. 9 p. m.—Winger's Entertained 9:30 p. m.—Mission program, 10:30 p. m.—Musical program, 11 p. m.-1 a. m.—Supper music,

m.-Sports

10:45 a .m.-Home se

8:30 p. m.-Dinner music

m .--- Maine Hou

sic. 10:05 p. m.—Dance music.

11:30 p.

m.-Almo Entertainers.

p. m.-WRW Orchestra. p. m.-Almo Entertainers

m.—Euke Trio. m.—WRW Orchestra

WGR-BUFFALO-319

WJAR-PROVIDENCE\_306

p. m.-Providence dance orchestra WTIC-HARTFORD, CONN.-476

and pupils. p. m.—Edgar Allen Poe, readings; mu

m.-Popular half hour. WEEI-BOSTON-349

b. m.—Neapolitan program.
b. m.—Sager's Half Hour.
p. m.—E. H. Band's artists.
m.—Band and Scotty Holmes's

chestra. 10:30 p. m.—Radio forecasting. WNAC-BOSTON-280 10:30 a. m.—Bible readings. 10:40 a. m.—Women's Club talks. 12:15 p. m.—Noon service. 1 p. m.—Concert orchestra. 4 p. m.—Vocal and instrumental artists. 4:35 p. m.—From Radio Show; vocal and piano solos.

b. m.—Concert program.
 c. m.—From new Metropolitz
 Theater, opening night performance

WBZ-SPRINGFIELD, MASS.-333

WBZ-SPIKINGFIELD, MARSON CAR 6:30 p. m.-Lenox Ensemble. 7 p. m.-Market reports. 7:05 p. m.-Artists. 7:30 p. m.-Rubert Whitcomb, planist; Mrs. E. B. Heywood, soprano; Daniel Devons, barytone. 8 p. m.-Isabel Steele, planist. 8:15 p. m.-Mrs. Margaret MacFarlane, soprano.

m.—"Whatdoyoucallit" Club. WCTS-WORCESTER-268

WCTS-WORCESTER-266 10:30 a.m.-Radio chat; music. 12-2 p. m.-Luncheon music. 7:15 p. m.-Story teller. 8 p. m.-Concert. WRC-WASHINGTON-469 10 a.m.-Women's hour from WJZ. 12 noon-Organ recital. 1 p. m.-New Willard Orchestra. 5 p. m.-WKC's Foolish Entertainers. 6 p. m.-Book reviews.

WCAP-WAS INGTON-469

m.—Health exercises. m.—Market summaries

7:45-8 p. m.— Mon's Club at All Saint During Danger." 8-9 p. m.— Mon's Club at All Saint Church, weekly political review. 9:15-9:45 p. m.— Wardman Park Trio. 10-12 p. m.— Dance music.

m.—Dinner concert. m.—Children's period. m.—Talk. m.—Teaberry time.

SATURDAY

WEAF-NEW YORK CITY-492

45-7:45 a.m.—Health exercises. 45 p.m.—Army vs. Notre Dame for ball game, play by play. 5 p.m.—Ray Nichols's Orchestra.

ball game, par of parts
5 p. m.—Ray Nichols's Orchestra.
p. m.—Doinser music.
p. m.—Devis Caton, tenor.
1:30 p. m.—Opera Quartet.
1:45 p. m.—Opera Quartet.
1:45 p. m.—Grosskopf String Trio.
8:16 p. m.—Grosskopf String Trio.
8:45 p. m.—Dicker Julie String Trio.
9:45 p. m.—Dick Jubilee Singers.
10:20 p. m.—Apollo Orchestra.
11 p. m.-12 mldight—Vincert Lopez's Orchestra.
WZ NEW YORK CITY—455

p. m.-12 midnight-Orchestra. WJZ-NEW YORK CITY-455 WJZ-NEW YORK CITY-455

1:15 p. m.-Irwin Abrams's Ochestra. 2, 4, 5:15, 8 and 10:30 p. m.-News. 2:30 p. m.-Football game; United State Military Academy vs. Notre Dame.

Military Academy vs. Notre Dame.
5 p. m.—Tea music.
6 p. m.—News, baseball and racing returns; market reports.
7 p. m.—Dinner concert.
8 p. m.—Baseball, football and racing returns.
8:15 p. m.—United States Army Night; band; General Charles P. Summerall.
9:30 n. m.—To & anonuced

WNYC-NEW YORK CITY-526

:30 p. m.—Police alarms. :35 p. m.—Sarah Paris, Ethel Leitman

8 p. m.—Football scores.
8:05 p. m.—Helen Laufenberg, contralto.
8:20 p. m.—Police quartet.
8:50 p. m.—Ressler Ensemble.
9:30 p. m.—Banquet of the Jewish War Veterans. Speakers: David A. Brown, Charles P. Summerail, the Rev. Dr. Edward Liseman, Father Francis P. Duffy, George P. Nicholson, Morris Florea. Professor Prampin's Orchestra.
10:35 p. m.—Banquet resumed.
WGBS—NEW YORK CITY—316

WGBS-NEW YORK CITY-316

10 a. m.-Timely talk with Terese, 10:10 a. m.-Kiddie Klub. 10:40 a. m.-Harold Andrews, tenor. 10:50 a. m.-Fashion quizz, 1:30 p. m.-Scripture reading. 1:35 p. m.-Bob Kruh's Orchestra. 2 p. m.-Bob Kruh's Orchestra.

1:35 p. m.—Juna stodell soprano.
2 p. m.—Bob Kruh's Orchestra.
3 p. m.—Laying of cornerstone for Level Cluby Inez Quick, soprano.
6 p. m.—Uncle Geebee.
6:80 p. m.—The Dulcimerians; Crystal Ramblers.
7 p. m.—Dance instructions.
7 p. m.—The Dulcimerians; Crystal Ramblers.
7:10 p. m.—The Dulcimerians; Crystal Ramblers.
7:30 p. m.—Dave Elman, burlesques.
7:50 p. m.—Robstock String Trio.
8:10 p. m.—Marguerite Stern, soprano.
8:40 p. m.—Marguerite Stern, soprano.
9 p. m.—Robstock Trio.
9 p. m.—Robstock String.

jingles. 9:20 p. m.—Rosella Sheiner violiniste. 9:30 p. m.—Warners's Theater program 10:30 p. m.—Dance Orchestra. WFBH—NEW YORK CITY—273

WFBH-NEW YORK CITY-273 2:00 p. m.-Sunlite Serenaders. 3:00 p. m.-Bert Lowe's Enfertainers. 4:00 p. m.-Montana Ramblers. 5:15 p. m.-Maude Edens, contraito. 5:35 p. m.-Marjorie Wall, soprano. 6:00 p. m.-Southern Serenaders. 7:00 p. m.-Bronx Orchestra. WOKO-NEW YORK CITY-233 8 p. m.-Christine Thompson, planist.

8 p. m.—Christine Thompson, pianist. 8:15 p. m.—Soprano solos.

nets. m.—Football scores. p. m.—Helen Laufenberg, contralto

9:30 p. m.—To be anonunced. 10 p. m.—The Texans, songs.

6:45 a

6:15 p. 7:30 p. 7:45 p. 8:30 p.

piano solos. p. m.—Kiddies Klub. 130 p. m.—WNAC dinner dance.

6:30 p. m.-Young people's period. 7 p. m.-Dinner music. 8:30 p. m.-Benjamin Knoz, baryton

) a. m.—Housewives Radio Excha 105 p. m.—Woodstock Entertainers

-Musical program.

m.-Isaiah Seligman, pianist. m.-Dorothy Taylor, contralto. m.-The Allan Trio. 9:40 p. m.-Dance Orchestra. 10:10 p. m.-The Book of the Hour.' 10:30 p. m.-Police alarms; weather. 10:35 p. m.-Colourn internet for the state of the

10:35 p. m.—Police alarms; weather.
10:35 p. m.—Colona; junce Orchestra.
WMCA—NEW YORK CITY—341
12 (noon)—Olcott Vall's Ensemble.
6 p. m.—Olcot Vall's Ensemble.
6 p. m.—Brie Golden's Orchestra.
7:30 p. m.—Wr. Curtis Nicholson, "The Right Word."
7:40 p. m.—Hye Sorensen. barytone.
8 p. m.—Wr. We Women." Betty Brainerd.
8:15 p. m.—Wth Friedman, planist.
8:50 p. m.—'Herald Square.'' R. R. Moore.

p. m.—Hardman hour of music: Dr. Barnabas Istok, violinist; Dr. Vassilly WEEI-BOSTON-349 6:45 a. m.-Health exercises. 7:45 a. m.-Morning watch. 10:45 a. m.-Morning watch. 10:45 a. m.-Home Service Talk, "Waffle Breakfast." 2-4 p. m.-Concert from Radio.Show. 6:25 p. m.-Lost and Found; weather. 6:30 p. m.-Big Brother Club. 7:30 p. m.-Whitng's program. 8 30 n. m.-Sager's Hell Hour.

Zavadsky, pianist, and trio. p. m.—"How to Drive," Harry Rainess 10:03 p. m.—Theo Alban, tenor, 10:39 p. m.—Dance músic, 11:15 p. m.—Donde Flamm, critic, 12:12:30 p. m.—New York Academy f

Music concert. WLWL-NEW YORK CITY-288 p. m.—Ann Wolcott, planist. 10 p. m.—Agnes Brennan, soprano. 30 p. m.—Talk, Michael Williams. 8:45 p. m.—Rinaldo Schinone, tenor. 9:15 p. m.—"Evolution,' Bertram Windle. 9:35 p. m.—Agnes Brennan, soprano. 9:50 p. m.—Paulist Choristers.

9:50 p. m.—Paulist Choristers. WEBJ—NEW VORK CITY--273 7 p. m.—Blenheim Theater Ensemble. 7:45 p. m.—A. Wayne, entertaining

7:45 p. m.—A. Wayne, entertaining reporter.
8:10 p. m.—Edith Law, soprano.
8:30 p. m.—Original Mobile Quintet.
WFBH—NEW VORK CITY—273.
2 p. m.—Eddie Meyers's Orchestra.
3 p. m.—Edizabeth Arrighl, songs.
4 p. m.—Elizabeth Arrighl, songs.
4 p. m.—Mrickerbocker Hospital talk.
4:15 p. m.—Willam Sullivan, barytone.
4:30 p. m.—Pitzehordt, Vorchestra.
6 p. m.—Pitzehordt, Sorchestra.
6 p. m.—Filme Moore, soprano.
6:15 p. m.—Billy Johnston's Orchestra.
11:30 p. m.—Fordham Orchestra.

1:30 n. m.—Fordham Orches'ra. WRNY—NEW YORK CITY—258 45 a. m.—News Flashes.

10:30 a. m.—Reducing exercises. 10:45 a. m.—'Diet," Dr. Harry Finkel. 12:30 p. m.—Luncheon hour entertain

12:30 p. m.—Luncheon hour entertainment.
4:15 p. m.—Afternoon program.
7 p. m.—Whose Birthday To-day?
7:05 p. m.—Telegraph sport flashes.
7:15 p. m.—Irwin Kurtz; talk.
7:25 p. m.—Code Lesson.
7:45 p. m.—Hedy Spielter, planist.
8 p. m.—Opera, "Manon" company, with Cornwell, Riehl and others.
8:30 p. m.—Owerse "Deverbs and Paradoxes."

"Cavalleria," with Zuccarri, Forbert

and others. 9:30 p. m.—"Science and Democacy," William Grunstein. 9:45 p. m.—Band concert. 10:15 p. m.—Novelty night; artists' sup-

WAHG-RICHMOND HILL, N. Y.-316

per. WAHG--RICHMOND HILL, N. L. 12 (noon)--Musical program. 7:30 p. m.-Prof. Mayne, "Speech." 7:45 p. m.-Humor by artists: Evan Davies, Arthur Feldman, Cliff Ulrich, Fay Meisel, Bert Lowe. 10 p. m.--Radio Question Box. 10:15 p. m.--Andy Ascitto's Orchestra. 10:15 p. m.--Andy Ascitto's Orchestra. 10:15 p. m.--Andy Ascitto's Orchestra. 10:15 p. m.--Dinner concert. 10:15 p. m.---Dinner concert. 10:15 p. m.---Dinner concert. 10:15 p. m.---Din

10:15 p. m.—Andy Asciutto's Orchestra. WOR—NEWARK 466
6:45-7:15-7:45 a. m.—Gym class.
2:30 p. m.—Joe E. Brown, songs.
2:45 p. m.—Prof. J. P. Santamarina.
3: p. m.—Worls Slater's Orchestra.
3: 45 p. m.—B. P. Adams, "Shelley."
6:15 p. m.—Worls mispronouinced.
6:17 p. m.—"Sports," Bill Wathey.
6:30 p. m.—"Man in the Moon" stories.
7 p. m.—Songs; race results (half hourly).
3: 15 p. m.—Leslie McLeod, tenor.
4 p. m.—Sam Weber, planist.
4:15 p. m.—Proft and Patty Carter, cultertainers.

4:15 p. m.—Profit and Patty Carter, entertainers.
4:36 p. m.—William J Rietz, songs.
4:35 p. m.—Charol de Thomee, pianist.
8 p. m.—Radio Hour.
9:05 p. m.—Shrifoy Herman, singer.
9:25 p. m.—Eva Rothenberg, pianologue.
9:40 p. m.—Prank Gialasi, songs.
9:50 p. m.—Della Riordan, barytone.
10 p. m.—Strickland's Orchestra.
11:30 p. m.—Radie Ge Eentertainer.
WAAM—NEWARK—263
14 a. m.—Happy Hour, John A. Scott.

n.—Happy Hour, John A. Scott .—Danny Hope's Melody Boys. .—To be announced.

m.—Entertainers. m.—Hilda Kay, contralto. m.—Talk on New Jersey. .—Walter A. Cobb, pianist. m.—Andrew Hays, tenor

p. m.—Jimmy Thiese, ukelele WIP—PHILADELPHIA—508

3:45 a. m.—Setting-up exercises. 10 a. m.—.''Menu," Mrs. Anna B. Scott.

Artist recital.

11 a. m.-Grand organ. 12 noon-Grand organ and trumpets.

Wri-Annalist 10:30 a. in.—Solos. 10:40 a. m.—Home servicė talk. 1 p. m.—Ensemble music. 3 p. m.—Talk; recital. 3 p. m.—Talk; recital.

0 p. m.—Dinner music. 0 p. m.—'Soccer,'' George Burford. 5 p. m.—Charles Silverton, barytone. . m.—WOO Orchestra.

p. m.—Concert orchestra. WLIT—PHILADELPHIA—395

p. m.—Scores. m.—Music League hour. m.—Hill Harmony Four. p. m.—Rennie Cormack, songa.

ido p. m.—Rennie Cormack, songa.
ido p. m.—Locser's Dance Orchestr
WFG—ATLANTIC CITY\_300
p. m.—Organ recital.
p. m.—Trio dinner music.
p. m.—'Educational Series."
il5 p. m.—Concert orchestra.
0 p. m.—To be announcid.
0 p. m.—Dance orchestra.

WHAR-ATLANTIC CITY-275 p. m.—Seaside Trio.
(30 p. m.—Fashion talk.
p. m.—Seaside Trio.
1:15 p. m.—Strand organ recital.

WGY-SCHENECTADY-389

WGY-SUMERCULADI-2 p. m.-Music; talk. 6:30 p. m.-Sunday School Lesson. 7 p. m.-Strand Theater Orchestra. 7:30 p. m.-Health talk. 7:40 p. m.-Musical comedy, three acts. "The Hidden Idol." 10:30 p. m.-WGY Orchestra; E. Arthur Hannay, tenor.

3:30 p. m.—Eastman Theater Orchestru 5-6 p. m.—Eastman Theater organ 7 p. m.—Eastman Theater Orchestra.

Hannay, tenor

WLIT—PHILADELPHIA—395.
12:05 p. m.—Organ recital; orchestra.
2-3 p. m.—Concert orchestra; playlet.
4:30 p. m.—Dance music.
5:50 p. m.—Scores; sports results.
7:30 p. m.—Dream Daddy.
8 p. m.—Talk:
8:10 p. m.—To be announced.
10 p. m.—Dance orchestra.
10:30 p. m.—Popular program.
WCAU—PHILADELPHIA—278
7:55 p. m.—Scores.

m.—To be announced.
 p. m.—The Sport Oracle.
 p. m.—Helena Parell, soprano.
 p. m.—Jack Smith, barytone.
 p. m.—Entertainers.
 m.—Hilda Kay, contraito.
 p. m.—Entertainers.

m.-Talk

6:45 a. m.

### NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, OCTOBER 11, 1925

AMATEUR -**L'ICKBACKS** BY EVERETT M. WALKER-SCOR

8:35 p. m.—Christine Thompson, pianist. 8:50 p. m.—Vladimir Tobachnik, bary-

3.00 p. m.—Vladimir Tobachnik, barytone.
WMICA—NEW YOBK CITY—341
6:00 p. m.—Olcott Vall's String Ensemble.
6:30 p. m.—Olcott Vall's String Ensemble.
6:30 p. m.—The Amphions.
8:00 p. m.—The Amphions.
8:00 p. m.—Uwhat's Happening Now."
8:15 m.—Erva Giles, soprano.
8:30 p. m.—Uwhat's Happening. barytone
8:45 p. m.—Erva Giles, soprano.
9:00 p. m.—Mario Alvarez, tenor.
9:15 p. m.—Leonard Hoenninger, barytone
9:30 p. m.—Mario Alvarez, tenor.
9:45 p. m.—Hario Alvarez, tenor.
9:45 p. m.—Harvey Officer, planist.
10:00 p. m.—Ukulele Bob McDonald.
10:35 p. m.—Tarick O'Connor, Theo Halleren, futes.

10:35 p. m.—DRuicle Dob BicDonard. 10:45 p. m.—Patrick O'Connor, Theo Hr leran, flutes. 11-12 p. m.—Ernie Golden's Orchestra.

WRNY-NEW YORK CITY-258

1:45 a. m. — News flashes. 0:15 a. m. — Women's hour. 0:30 a. m. — "Exercises for Thin Women." 12:30 p. m. — Luncheon hour entortain-

12:30 p. m.-Luncheon hour entertain-ment. 2:35 p. m.-Radio matinee. 2:35 p. m.-Huismann Sisters, planistes. 2:45 p. m.-Deborah Lipson, soprano. 4:15 p. m.-Afternoon program. 7:06 p. m.-Telegraph sport flash. 7:15 p. m.-Telegraph sport flash. 7:26 p. m.-Fairy Tales, Gregory Harts-wick.

wick. 7:40 p. m.—"Health," Dr. Siegfried Block. 7:45 p. m.—Concert orchestra

7:45 p.m.—Concert orchestra. 8:15 p.m.—Chas. Houbiel's Plano Series. 8:30 p.m.—Hen Bernie's Orchestra. 9:15 p.m.—''Labor - Capital,'' Matthew Woll.

Woll. 9:30 p. m.—Bernstein Trio. 10:00 p. m.—''Harriet Beecher Stowe." 12:1 a. m.—DX Hound Hour with Fer-ruci's Orchestra on the Toonerville Trolley. WHAP-BROOKLYN-240 6.7 p. m.—Dinner music.

6-7 p. m.-Dinner music. WBBR-STATEN ISLAND-273 When here, musical

b) p. n.—Fred Ehrenberg, musical saw 10 p. m.—L. Marion Brown, soprano.
 20 p. m.—Bible questions and answers

A0 p. m.-Soprano; musical saw. AHG-BICHMOND HILL, N. Y.-316

WAHG-RICHMOND HILL, N. Y.-316
12 (noon)-Musical program.
12 (noon)-Musical program.
12 (moni)-Musical program.
12 (moni)-Musical program.
13 (minight)-Benton Harbor Orchestra
WOR-NEWARK-405
6:45, 7:15, 7:45 a. m.-Gym Class.
2:30 p. m.-Banjo Boya.
2:45 p. m.-Talk. Eleanore Browne.
3 p. m.-Banjo Boya.
3:15 p. m.-Tit's Orchestra.
6:15 p. m.-Words Mispronounced."
6:17 p. m.-Shelton Dinner Music.
7:16 p. m.-Yan's Collegians.
8 p. m.-Talk, Arthur B. Reeve.
8:13 p. m.-Richard C. Hartt, barytone.
8:45 p. m.-Richard C. Hartt, barytone.
9:50 p. m.-Athur Baecht, violinist.
9:30 p. m.-Athur Baecht Bernard, entertainers.

tertainers. 9:45 p. m.-Dick and Flo Bernard, en-10 p. m.-Dick and Flo Bernard, enter-

10 p. m. — Jick and Fio Definite, enter-tainers.
 10:15 p. m. — Mount Vernon Quartet.
 10:30 p. m. — Clarence Williams Trio.
 11 p. m. — Eddie Elkins's Orchestra.
 WGCP — NEWARK — 252
 3 p. m. — Planist; race results (half houriv).

D. m. — Planist; race results (half houriy).
 S:15 p. m. — Ukelele; Lou Hayes.
 S:30 p. m. — Henrietta Cross, Maurice Abraham, sorigs.
 S:45 p. m. — Ona Welch, planist.
 p. m. — Rust, Henrichsen, banjoists.
 4:15 p. m. — Cheatham's Orchestra.
 WAAM — NKWARK — 263
 6 p. m. — Gus Steck's Orchestra.

WAAM-NEWARK-203 6 p. m.-Gus Steck's Orchestra. 7 p. m.-Willam Hohmyer, Elmer Everiss, piano duetists. 7135 p. m.-Alice Lauri, soprano. 7335 p. m.-Jolly Bill Steinke. 750 p. m.-William Hohmyer and Elmer Everiss.

Everiss. 8:05 p. m.-Webster Quartet. 8:25 p. m.-Gill Family, musical novel-

6:05 p. m.—Ual Ruch's Arcadians. 7 p. m.—Binner music. 7 p. m.—Sports' Corner." 8 p. m.— "Sports' Corner." 8:15 p. m.—The Music of the World." 10:05 p. m.—Dance Music. 11:05 p. m.—Organ Rester.

WOO-PHILADELPHIA 50

WLIT-PHILADELPHIA-395

12:05 WIAL-FRILADELPHIA...395 12:30 p. m.—Organ recital. 12:30 p. m.—Concert Orchestra. 2:3 p. m.—Concert Orchestra. 7:30 p. m.—Concert Orchestra. WFI—PHILADELPHIA...395 1 p. m.—Tea Room Ensemble. 2:45 p. m.—Football game, Army vs. Notre Dame. 6:45 p. m.—Concert Orchestra. 8 p. m.—Tea Room Ensemble; artists. WFG—ATLANTIC CITY...300 1:30 p. m.—Morton Luncheon Music. 6:45 p. m.—Organ recital.

1:30 p. m.—Morton Luncheor 6:45 p. m.—Organ recital. 7 p. m.—Dinner Music.

2 p. m.—Seaside Trio. 7:30 p. m.—Lecture period.

9 p. m.—Evening Concert. 10:30 p. m.—Dance Orchestra. WHAR—ATLANTIC CITY—275

8 p. m.—Seaside Trio. WGY—SCHENECTADY—380 3 p. m.—Football game: Army vs. Notre

Dame. 8:15 p. m -- Army School Band Program.

30 p. m.—Dance program. WRW—TABRYTOWN, N. Y.—273

9:05 p. m.-Musical program. 9:30 p. m.-Westchester County Charter,

Notre Dame. WHAM-ROCHESTER. N. Y .--- 278 WHAM-ROCHESTER. Theater Orchestr

cast; market report. WJAR-PROVIDENCE-306

WJAR-PROVIDENCE-306 2:45 p. m.-Army-Notre Dame game. WNAC-BOSTON-280 2:15 p. m.-Harvard vs. Holy Cross foot-ball game. 6:30 p. m.-WNAC dinner dance. 8 p. m.-Concet program. 10 p. m.-Dance music. WEEI-BOSTON-349 1:45 n. m.-Health exercises.

p. m.—Health exercises. p. m.—Program from Radio Show. m.—Band and Holmes's Orchest

p. m.-Dok Eisenbourgs' Orchestra. WBZ-SPRINGFIELD, MASS.-333 n. m.-Play by play account of t

b. --Play by play account of the Harvard-Holy Cross football game, WCTS-WVORCESTER-263
 10:30 a. m.-ARadio chat; market report.
 12-2 p. m.-Luncheon music.
 5:15 p. m.-Story teller.
 WRC-WASHINGTON-469

15 p. m.—Musical program. 0:30 p. m.— "Crandall's Saturday Nighters."

WCAP-WASHINGTON-469

WCAE-PITTSBURGH-461

KDKA-PITTSBURGH--- 309

Band and

6:30 p. m.—Dinner concert. 7:30 p. m.—Uncle Kaybee. 8:30 p. m.—Concert.

6:15 p. m.—Dinner concert. 7:30 p. m.—Children's perior 8:30 p. m.—Westinghouse

3:45 a. m. Health exercises. 1:30 p. m. Navy-Princeton football game given play by play.

p. m.—New Willard Orchestra p. m.—Washington Orchestra. p. m.—Bible talk. 15 p. m.—Musical program.

8:45 a 2:30

:30 p.m.—Eastman Theater Orchestra. -6 p.m.—Eastman Theater Orchestra. -9 p.m.—Eastman Theater Orchestra. -30 p.m.—Football scores; weather fore-

9:30 p. m.—Westcnester county Can George Slater. 10:05 p. m.—Serenaders. 10:30 p. m.—Johnson and Johnson. 11:05 p. m.—Dance Orchestra. WGR.—BUFFALO-319 2:45 p. m.—Football game: Arm

8 p. m. - To be an

11 a. m.-Grand Organ. 12 (noon)-Luu:cheon Music. 4:45 p. m.-Grand Organ; Trumpets. 7:30 p. m.-Dinner Music.

12:05 p.

6:45 a. m. — Setting-up exercises. 10:30 a. m. — Reducing exercises. 1 p. m. — Organ Recital. 3 p. m. — Dal Ruch's Arcadians.

During the last three months many amateurs in the United States have attempted to make transmitting sets still trying to make their sets oscillate on these short waves,

In most cases improper antenna equipment has been the cause of poor results. It is obvious that it is almost impossible to have a short wave transmitter operate on a wave length far below the fundamental of the antenna used in connection with the set. Although it is possible to operate the set on a harmonic of the antenna's wave length, for amateur operation this method is prohibited by law. Frankly, although many engineers claim this is an excellent means of utilizing the short waves, it does not appear to us that as much energy can be radiated as if the set were to operate on the fundamntal. We know of a number of amateurs

who have attempted to operate their stations on a short wave band with the antenna formerly employed for the 150 and 200 meter assignment. The outcome has been, in most cases, poor results, with the exception of a few who had an antenna with har-, monics on the particular wave length they desired to employ.

With regard to the proper length of the antenna and counterpoise for 40 meter transmission, the general concensus of opinion seems to call for a thirty-five foot length for both. In most cases best results have been obtained with this antenna supported in a vertical position. It is a well established fact that a vertical an-

tenna is ideal for transmission. As for the correct number of wires in a short wave transmitting aerial, there is a difference of opinion. Some say a small cage is best, while others indorse the single wire antenna. We are inclined to favor the latter type. It is the easiest to erect and reports from stations employing the single wire antenna indicate that results are being obtained. The greater the number of wires in the antenna the greater the capacity. Again the old statement comes to our mind "where there is capacity there is wave length." Therefore, it would not be possible to build an antenna as high or as large if more than one wire were to be used. This would necessitate a lower antenna. It is always desirable to have an antenna as high as possible.

In spite of the agitation of a certain band of amateurs who are employing the use of the high waves exclusively it cannot be denied that ultra short waves are excellent for long distance transmission. By this we do not mean to say that the high waves are useless-for they are far from it. For local communication there is nothing like them. It has come to be known as the "rag chewers" band. Rag chewing is not objectionable. On the contrary it should be encouraged, as it tends to promote a fraternal spirit among the transmitting amateurs of the country. However, the short waves have demonstrated their ability for covering great distances, and should be tried by every transmitting amateur who has a set in operation.

The Type H—a simple horn of graceful lines and antique green and black finish. Great in volume—true in tone. Ad-justable by the turn of a thumb-screw

The Phonograph Attachment -- a splendid speaker with any good phonograph. Same unit as Type H horn. Adjustable, and furnished with a connec

The Superior Matched Tone Headsetis now, as always, ideal to tune in with—to listen un-disturbed and undisturbing. Offered at a new low price \$4.50

Another station which was recently converted to short wave transmission is 2BIR. The first night of operation a Pacific Coast station was worked on 40 meters. The transmitter at 2BIR employs a fifty-watt tube with 700 volts at 100 milliamperes on the plate. The antenna current at 39 meters is a little greater than three-quarters of an ampere All districts have been worked during the past week.

Announcement was made by the Radio World's Fair of the presentation of a silver cup trophy to Donald S. C. Comstock, of East Hartford Conn., for his contribution to radio science and the cause of exploration. Comstock heard the MacMillan expedition more than any other operator in America. He is a broadcast listener who became a "ham."

The American Radio Relay League was in charge of the contest, and through K. B. Warner sent this telegram relative to Comstock's record: "Three years ago he became interested in transmitting amateur radio work. Known as a prosperous tobacco planter and packer in his native Connecticut Valley, he has created an enviable record in pursuit of his fascinating hobby, amateur radio, working on short wave lengths-20 and 40 meters-from his station, which is

known as 1MY.

World Radio History

A Four-Element Vacuum Tube | contains a regular filament and plate, | plate, being connected to the plus of | WEBJ Offers Hour Program British radio fans and finds employ- base.

famous Mullard works in London, also used in one arrangement as a Gay.

Available to British Fans but has two grids instead of one. The the B battery in amplifier circuits. A real four-element vacuum tube, extra element is placed between the something known in the United States filament and the usual grid, and has Chickly Land A my burgers a diversined one-note program to the benefit of "shut-ins." Around 8 the benefit of "shut-ins." Around 8 only to a few laboratory experi- a flexible wire, which is independent The Cherry Lane Players will o'clock A. Wayne, the entertaining

operate on 40 meters or below. While according to the National Radio vantage to obtain double regenera- at 11:30 from WGBS. It is a coinci- the original Mobile Quintet, under tion with the aid of tickler coils dence that "Polly" is the sequel to tas direction of Joseph Leyser, will

The novel bulb, made in the wired to each. The extra element is "The Beggar's Opera," also by Mr. play a half-hour of peppy dance

For 'Shut-Ins' Friday Evening WEBJ will offer on Friday evening

\* 7

radio musical selections from their reporter, will flood the ether with ment by the latter in unusual circuits, The two grids are connected to ad- lightful eighteenth century operetta, Law will sing love songs and at 8:30 current revival of John Gay's de- entortaining nonsense. At 8:10 Edith music. Good-night will be said at 9,



A COUSTICS is the science of 1 sound. Radio acoustics is the science of transforming electrical impulses into audible sound-the absorbing study of radio reproduction. And in this field Brandes have been pioneers since 1908.

Brandes recently announced a new, complete line of speakers that bring out a wealth of tones that heretofore were muffled and lost.

### Yes, really better radio!

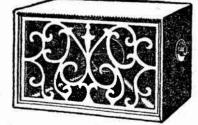
In the middle register-the speaking voice-most of the good speakers are thoroughly satisfactory.

But-and this is the real test-tune in a piano solo. Listen to the high notes. And the low. Listen to the piano accompaniment of a song or a violin solo. You'll notice that a Brandes brings out a full range of perfectly natural tones. A mellow, complete harmony-with not a trace of nasal tone.

### Test these speakers yourself

There's really only one way to buy a radio speaker. Hear as many as you choose. Test them thoroughly. You will find that the Brandes Speakers have more tones, fuller harmonies, wider range-and that they speak and sing with a very definite and satisfying reality.









**EXPERTS IN RADIO ACOUSTICS SINCE 1908** 

minimum minimum merining

## The Herald Tribune Daily Broadcasting Programs for Week Ending October 17

WADC-ARRON, 0410-258 WFBH-NEW YORK CITY-273 6:30 p. ta -Dinner missie. WEAR-CLEVELAND-390 2 p. m.--Orch Sura. 2:30 p. m.--Garibaldi Arrighi Singers. 3 p. m.--William Sullivan, barytone. 3:15 p. m.--Marcedes Hauser, sograno. 3:45 p. m.--Labolle Evans, sograno. TO-DAY p. m.--Theater orchestra. 3-10 p. m.--Mixed quartet; instrumen quartet. WLW-CINCINNATI-122 3:45 p. m.—Lunbelle Evans, sograno.
4 p. m.—Orchestra.
4:45 p. m.—Marjorie Wall, songs.
5 p. m.—Theo. Alban, tenor.
5:30 p. m.—Knickerbocker Hospital Talk.
5:46 p. m.—Mrs. Matty Levine, songs.
6:15 p. m.—Alvin Hauser's "At Home Party."
WHAP-BROOKLYN-240
7-8 p. m.—Chiner music. B.a.m.—Children's hour: Btorles, music, comic storles.
B.a.m.—St. Thomas's Episcopal Churca services; Rt. Rev. Frank Du Moulin.
12:30 p. m.—Rivoil Theater Concert, orchestra and soloists, Dr. Hugo RiegenTeld, conductor.
2:30 p. m.—World Series Easeball Game; Major J. Andrew White announcing.
T p. m.—Nathan Abas's Concert Orchestra.
8:00 p. m.—Capitol Theater program.
8:00 p. m.—Church service, Stories, music, WHAP-BROOKLYN-240 7-8 p. m.-Dinner music. WBBR-STATEN ISLAND-273 8 p. m.-Irene Kleinpeter, soprano. 8:15 p. m.-World News Digest. 8:30 p. m.-Carl Park, violinist. 8:40 p. m.-Bible Instruction. 8:50 p. m.-Vocal Duets. WAHG-RICHMOND HILL, N. Y.-316 12 noon-Musical program. p. m.—"Reminiscence. Illiam H. Crawford. m.—Prince Mohiuddin, 'cellist; 8:30 p. m.-Church service, KYW-CHICAGO-536 William H. Crawford. 8:30 p.m.—Prince Mohluddin, 'cellist: 5-6 p.m.—Studio concert. 9 p.m. — Broadcast of "The Student 8 p. m.—ChiCAGO—345 Prince," with Ilse Marvenga, Howard Marsh and a chorus. 10 p.m.—Godfrey Ludlow, violinist. 10 p.m.—Godfrey Ludlow, violinist. 10 p.m.—ChiCAGO—345 8 p. m.—L'tile Brown Church. WCBD—ZION CHTY—34 8 p. m.—Utile Brown Chirch.
8 p. m.—Utile Brown Chirch.
9 p. m.—Utile Brown Chirch.
9 p. m.—Utile Outerta and celestial f
10:30 p. m.—Tabernacie and choir.
10:30 p. m.—Request program.
11:30 p. m.—Back Home Hour.
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es.
wdd-ChilCAGO-480
arti a.11 p. m.—Rainbow Gardens Orch 8:50 p. m.—Vocal Dueta.
8:50 p. m.—Vocal Dueta.
WAHG-RICHMOND HILL, N. Y.—316
12 noon-Musical program.
7:30 p. m.—Louise Rebman, Ethel Jam-gotchian, plano duets.
7:45 p. m.—Samuel Gray, barytone.
8 p. m.—Martha Brauninger, soprano.
8:15 p. m.—Horace Taylor, reader.
9:30 p. m.—Synchrophase Trio.
10:05 p. m.—Glenn Smith's Orchestra.
WORK=NEWARK-405
6:45-7:15-7:45 a. m.—Gym Class.
2. p. m.—Spectrophase Trio.
10:05 p. m.—Glenn Smith's Orchestra.
WORM=NEWARK-405
6:45-7:15-7:45 a. m.—Gym Class.
2. p. m.—Spects. Bill Wathey.
131 p. m.—Shelton Dinner Music.
7:15 p. m.—George Gilmore "American Archaeology."
130 p. m.—Tances Williams, Al Wohlman and Eddie Elkins' orchestra.
3. p. m.—Edward H. Blerstadt "Crete."
3:45 p. m.—Edward H. Blerstadt "Crete."
3:45 p. m.—Holen Barnett, barytone.
10:30 p. m.—Archie Slater's Orchestra.
11 p. m.—Archie Slater's Orchestra.
12 p. m.—Archie Slater's Orchestra. WJY-NEW YORK CITY-408 2:80 p. m. -Sunday Radio Forum; Dr. Isaac Ward; barytone; Joe Wexel, tenor. 8:30 p. m. - Mario Caiati, 'cellist; Lucille Ward; barrione, Calati, 'cellist; Black, accompanist; per services; Dr. Karl Reiland, rector; George Kommer, organist; Mozelle Ben-nett, violinist; George Bagdassrian tenor. tenor. Heref Levitow's Concert Or-10:15 p. m.-Familar hymns. KFMX-NOBTHFIELD, MINN-337 stra. n.—Morris L. Courtright, barytone. 19 p. m. --Morris L. Courtright, barytone, WEAF--NEW YORK CITY-492
2 p. m. -- 'Sunday Hymn Sing.''
2:45-8:45 p. m. -- Interdenom.national Serv-ices; address by Rev. Charles H. Sears; Federation Quartet; Brass Quartet.
2:45-5:30 p. m. -- Men's Cohference in Y. M. C. A.; address by Dr. S. Parkess Cadman, Gloria Trumpeters.
7:80-9:15 p. m. -- 'Capitol Theater Family.'' Foscha Seidel, violinist.
WGRS--NEW YORK CITY\_216 p. m.-College vesper service. WCCO-ST. I'AUL-416 10:20 p. m.--Classical concert. KTHS-HOT SPRINGS-375 10 p. m.—Arlington Orchestra. 11 p. m.—Baxter's Singing Orchestra. WOAW—OMAHA—526 10 p. m.—Evening chapel service. MONDAY WGBS-NEW YORK CITY-316 m.--Returns from world series. p. m.---Wa.ne.'s Theater p. ogram. p. m.----Wassenet's "Maion." p. m.---Massenet's "Maion." p. m.--New York String Ensemble. 145 p. m.—Helen Ford 145 p. m.—Helen Ford Purcell, songs. WAAM—NEWARK—263 WEAF-NEW YORK CITY-492 45-7:00 and 7:20-7:45 a. m.-Health en erciaea. 0:45 a. m.—Home Service talk. 1:05 a. m.—Musical program. 1:15 a. m.—"The Will Spring," W 1 a. m.-Happy hour program, John WMCA-NEW YORK CITY-341 p. m.—Ben Goldfarb's Orchestra. p. m.—Entertainers. 11:11. a. m.— "The Will Spring," W. Russell.
11:30 a. m.—Music.
11:35 a. m.—Music.
11:55 a. m.—Music.
12 noon—Market and weather reports.
12:40 p. m.—World Series baseball game.
4 p. m.—Harriet Mittelstaedt, soprano.
4:10 p. m.—Waurice Freedman, violinist.
4:25 p. m.—Famous Players Orchestra.
4:26 p. m.—Columbus," Jan J. Carlee.
6 p. m.—Dinner music.
7 p. m.—Ciristopher Columbus,"
7 11:50 p. m.—Columbus," Jan J. Carlee.
7 p. m.—Ciristopher Columbus,"
7 11:50 p. m.—Wausical program from Strand Theater; remarks by Joseph Plunkett; vocal and instrumental artists.
8:30 p. m.—Music by Gypsies.
10 p. m.—Music by Gypsies.
10 p. m.—Music by Gypsies.
11:50 p. m.—Bernie's Orchestra.
WJZ\_NEW YORK CITY-455 . m.—Ben Goldard & Ordaestra. m.—Entertainers. p. m.—The Sport Oracle. m.—Philip Hochberg, violinist. 5 p. m.—Tatk by Vice-President Charle. Dawes from Elizabeth Y. M. C A. m.—Philip Hochberg, violinist. 9. m.—Arline Felker's pupils. 9. m.—Smiles and Giggles. 5 p. m.—Herman Zieglor's Orchestra. WGCP—NEWARK 252 WENY-NEW YOBK CITY-258 WENY-NEW YORK CITY-258 2:45 p. i...-r/solcal-spiritual concert. 2:50 p. m.-Meta Christenson, Irving Quartet. 4 p. m.-Meta Christenson, Irving Quartet. 4 p. m.-Meta Christenson, Irving Quartet. 4:15 p. m.-Meta Enforcement," Emory F. Buckner. 4:30 p. m.-Dr. Reisner, "Cost of Success.". 5 p. m.-New York Quintette, Fideiman, Gunzberg, Stillinan, Ocko and Shuk. 5:15 p. m.-Yatles D. Isanson's concerts from De Witt Clinton High School; Nor-fiet T to. Lon a Lea. Co. nelia Zuccarri and others. WGCP--NEWARK-252 3 p. m.-Andy Pendleton's Band; race re-sults (half hourly). 1:30 p. m.-Eva Rothenberg, planologue. 1:45 p. m.-Joe Ross, harmonica. 1:15 p. m.-Richard Douglas, songs. 1:30 p. m.-Shirley Herman, blue singer. 1:45 p. m.-Ona Welch, planist. 1:45 p. m.-Slivio De Rienzo, planist. 1:45 p. m.-Slivio De Rienzo, planist. 1:40 p. m.-Bob Ward's little Wards. 1:50 p. m.-Radio Hour. 1:30 p. m.-Ritz Orchestra. 1:30 p. m.-Ritz Orchestra. 10 p. m.—"Your Hour."
10 p. m.—Ben Bernie's Orchestra.
10 s. m.—Women's hour.
1 p. m.—Woyer Davis's Mutalc.
2 4. 6:15, 8 and 10:30 p. m.—News.
2 50 p. m.—World Series game.
4 to 6 p. m.—Scores, racing (half hourly)
4 to 6 p. m.—News, baseball, racing.
5:26 p. m.—Market reports
5:26 p. m.—Brinandial summary.
6:01 p. m.—Financial summary.
6:01 p. m.—Bronkard Levilow's Concert.
8 p. m.—Boores, racing returns.
7 p. m.—Boores, racing returns.
8:10 p. m.—Program from Landay Hall.
9:30 p. m.—The State Folice."
9:45 p. m.—Minnie Weil, planist.
10:15 p. m.—Minnie Weil, planist.
10:16 p. m.—Joseph Knecht's Orchestra.
WGBS—NEW YORK CITY—Sig
10:20 a. m.—Fashion talk; plano solos.
1:35 p. m.—Gertrude de Verney, soprano.
p. m.—Toertrude de Verney, soprano.
p. m.—Alous Yan Megen. tenor.
3:20 p. m.—Choir from prologue of "King
3:20 p. m.—Interview with Samson Rai and others. WHN--NEW YORK CITY--361 1 p. m.-Marsh McCurdy, organist. 2:30-3:30 p. m.-Queens County Christian-Endesvor program. 7:30-10 p. m.-Calvary Baptist Church p. m.-Rodeo Entertainers. WOO-PHILADELPHIA-508 WOO-PHILADELPHIA-508 11 a. m.—Organ recital. 22 noom-Luncheon music. 4:45 p. m.—Grand organ; trumpets. 8. p. m.—Musical program from New York Strand Theater. 8:30 p. m.—Rudolph Joskowitz, violinist. 8:45 p. m.—Raiph C. Wentworth. barytone 9. p. m.—Music by Gypsies. 10 p. m.—Ben. Bernie's Orchestra. 11 p. m.—Dance music. WFBH-NEW YOBK CITY-273 m.—Pield Artillery Band. m.—Masonic news. p. m.—Arright Choir Singers. p. m.—Bossert Lumber Jacks. m.—Talk. wBBE—Staten Island...273 WBBE—Staten Island...273 n.-Dance music. WIP-PHILADELPHIA-508 WIP-PHILADELPHIA-505 5:45 p. m.—Setting-up exercises. 1 p. m.—Luncheon music. 5:05 p. m.—Dinner music. 7 p. m.—Bedtime Story (dancing lessons WFI-PHILADELPHIA-595 WHSHL-Staten Island-775 10 a. m.-Watchtower Orchesträ. 10:20 a. m.-Fred Twaroschk, tenor. 10:30 a. m.-Bible lecture, Judge R ford. 11 a. m.—Tenor; orchestra. 9 p. m.—Choral Singers. 9:15 p. m.—String Quartet. 9:30 p. m.—Bible lecture, Judge Ruthe WFI-PHILADELPHIA-596 10:30 a. m.-Solos. 10:40 a. m.-Home Service Talk. 1 p. m.-Tea. Room Ensemble. 3 p. m.-Plane Solos; talk; violin solos. 3/45 p. m.-Concert orchestra. 6:45 p. m.-Concert orchestra. WLIT-PHILADELPHIA-395 12:05 p. m.-Organ recital. ford. 10 p. m.—Quartet; singers. WGCP—Newark—253 WGCP--Newark-253 8 p. m.-Charlotte Trystmann, planist. 8:15 p. m.--Kalph Hersh, violinist. 8:45 p. m.--Milton Yokeman, tenor. 9 p. m.--Mildred Newman, soprano. 9:15 p. m.--Billy. Rhodes, tenor. 9:30 p. m.--Bernstein Trio. 10:15 p. m.--Bernstein Trio. 10:15 p. m.--Evening Service. 9:30 p. m.--Evening Service. 9:30 p. m.--Ben Stad's Orchestra. WIP-Philadelphia-568 WIT-FHILADELPHIA-395 12:05 p. m.-Organ recital. 2:30 p. m.-Concert orchestra. 4:30 p. m.-Calcert orchestra. 4:30 p. m.-Talk; recital. p. m.-'Sequicentennial.' 5:50 p. m.-Scores, sports results. 7:30 p. m.-Dream Daddy. 8. p. m.-Short Agro-Waves. 8:16 p. m.-Concert orchestra. 8:30 p. m.-Artist recital. 9 p. m.-Danice orchestra. 10:30 p. m.-Danice orchestra. 10:30 p. m.-Vaudeville features. 11:45 p. m.-Jimmy Jones's Syncopater WCAU-PHILADELPHIA-278 1:30 p. m.-Leedom Sisters. review WOO-Philadelphia-508 10:45 a. m.-Morning services, 1:40 p. m.-World series game, 2:30 p. m.-Musical exercises, 6 p. m.-Sacred organ recital, WENY-NEW YORK CITY-258 9:45 a. m.—News Flashes. 10:30 a. m.—Women's reducing exercises. 10:45 a. m.—Indian Lore by Princess Littl WCAU-PHILADELPHIA-278 7:30 p. m.-Leedom Sisters. 8 p. m.-Giovanni Pasquale, barytone. 8:50 p. m.-'Music Appreciation.'' 9 p. m.-The Amsterdam Girl. 7:10 p. m.-Danny Dougherty, songs. 9:40 p. m.-Freedman and Travaline, songs. 10 p. m.-Jaffe's Collegians. WPG-ATLANTIC CITY-299 2 p. m.-World series game. 4:30 p. m.-Trea music. 6:45 p. m.-Organ recital. 7 p. m.-Columbus Day talk. 8:15 p. m.-Studio program. 9 p. m.-Gaien Hall Trio. 10:45 a. m.—Indian Lore by Princess Litti Deer.
12:30 p. m.—Eve Rothenburg, planist.
1 p. m.—Warren Burns, harmonica.
1:15 p. m.—Jradith Roth, songa.
4:16 p. m.—Frank Garborino, accordion.
4:30 p. m.—Frank Garborino, accordion.
4:45 p. m.—Jeanette Sterns, planist.
7 p. m.—Whose Birthday To-day?"
7:05 p. m.—Telegraph sport flash.
7:15 p. m.—Code Lesson, Radio Rex.
7:45 p. m.—Ferruci's Orchestra.
8:05 p. m.—Tevolution of Jazz."
8:30 p. m.—Tevolution of Jazz. WIIT-Philadelphia-395 m.-Columbus Day program. WFI-Philadelphia-395 m.-Chapel service. m.-Services. WCAU---Philadelphia-278 n.—Frederick Robinson, soprane. b. m.—Talk, the Rev. John W. Stock-5:85 p. m.-Recital . WPG-Atlantic City-300 2 p. m.-World series game. 4:15 p. m.-Vocal and instrumental recital 0 p. m.—Galen Hall Trio. 0:30 p. m.—Dance orchestra. WHAR—ATLANTIC CITY-275 w.m.—Vocal and instrumental r
 w.MAR—Atlantic City—275
 m.—Short sacred recital.
 m.—Evening service.
 m.—Seaside Hotel Trio.
 m.—Strand organ recital. 8:30 p. m.—Painters' series.
8:40 p. m.—Ferruci's Orchestra.
8:45 p. m.—Jazzing Andante Cantabile.
9 p. m.—"Interficx Circuit."
9:15 p. m.—Music travelogue.
9:45 p. m.—Paul Bernard, violin dances
10 p. m.—The Pbetry Post.
10:10 p. m.—"The Body." by Dr. Bolton.
10:30 p. m.—Florence Gerringer, planist.
10:45 p. m.—Florence Gerringer, planist.
WWGA\_NTEW VORK CITY\_341 WHAR-ATLANTIC CITY-275 2. m.—Seaside Trico 7:30 p. m.—Stories for little folks. 3. p. m.—Seaside Trico WGY-SCHENECTADY-380 2. m.—Asia Orchestra. 1:30 p. m.—Asia Orchestra. 1:30 p. m.—Isla Orchestra. 1:30 p. m.—Isla Orchestra. 1:30 p. m.—Italian program by WGY Or-chestra; Karl Nygren, soprano. Literary Appreciation series. WGY-SCHENECTADY-380 WGY-SCHENECTADY-380 10:80 a. m.-Service. 12:30 p. m.-Rivoli Theater Orchestra. 1:40 p. m.-World series game. 7:30 p. m.-First Lutheran Church. 9 p. m.-Address. "The Daughters of the Revolution." 9:15 p. m.-Broadcast from WJZ of "The Student Prince." 10 p. m.-Godfrey Ludlow, violinist. WMCA-NEW YORK CITY-341 2 (noon)--Olcott Vall's String Ensemble 30 p. m.--Olcott Vall's String Ensemble 30 p. m.--Ernie Golden's Orchestra. WRW---TARRYTOWN, N. Y.---273 05 p. m.--Child.en's stories. 06 p. m.--Musical program. 5 p. m.--Musicale. 6:30 p. m.—Enile Goiden's Orchestra.
7:30 p. m.—Luilaby music.
8:00 p. m.—Talk, Mayo: Dalton.
8:15 p. m.—John McLoughlin, barytone.
8:30 p. m.—Luella E. Burns, soprano.
9:00 p. m.—Lecture on Christian Science.
10:00 p. m.—Mario Alvarez, tenor.
11:30 p. m.—Paul Alcuri, planist.
WI NEW YOPK CHY. 255 WBW-TARRYTOWN. N. Y .--- 273 m.--Sports. . m.--Christian Endeaver prog p. m.-Elite Orchestra. 8:05 p. m.—Services. 10:30 p. m.—Musical program. WGR-BUFFALO, N. Y.-319 10:45 a. m.-Home service talk, 2:30 p. m.-World series game. 6:30 p. m.-Dinner(music, 9 p. m.-Edna Hurd, soprano. 9 j1:5-10:15 p. m.-Choir of church. 11 p. m.-1 a. m.-Supper music, WHAM-ROCHESTER, N. Y.-278 3:30 p. m.-EaSiman Theater Orchestra WGR-BUFFALO-319 2:30 p. m.-World series game. 8 p. m.-Evening service. 9:15-10:15 p. m.-Toscha Seidel, violini WIAR--PROVIDENCE-306 1:40 p. m.-World settes baseball game, 7:20 p. m.-Capitol Theater. 9:15 p. m.-Capitol Theater. WLWL-NEW YORK CITY-288 0 p. m.-Columbus Day commemora 8230 p. 1 30 p. m.—Columbus Day commemors exercises at Carnegie Hall, K. of C. Club. Speakers—John J. Crosby Congressman Frank B. Oliver. WTIC-HARTFORD. CONN.-476 1:40 p. m.-World's series play-by-play. 0 p. m.—Eastman Theater Orchestri p. m.—Eastman Theater organ. . m.—Eastman Theater Orchestra. 0 p. m.—Weather forecast; markets WNYC-NEW YORK CITY-526 30 p. m.—Elementary Germany lesso 00 p. m.—Advanced German lessons. WNAC-BOSTON-280 10:50 a. m.--Morning service. 1:30 p. m.-Concert. 6:45 p. m.-Evening service. 7:30 p. m.—Police alarms. 7:35 p. m.—The Satanic Rambiers. 8:10 p. m.—"Christopher Columbus." WHAZ--TROY, N. Y.-380 D p. m.-Concert by Martha Geiser, so-prano; Georgine Lasher, contraito; Alex-ander Bouchard, tenor; Albert Geiser, barytone; Mrs. James McGiffert, Annette Levesque, accompanists. WEEI-BOSTON-349 1:40 p. m.-World series game. 7:20 p. m.-Capitol Theater Family. 9:15 p. m.-Toscha Seidel, violinist. Firmin. 8:30 p.m.—Commendatore Godono tenor. 8:50 p.m.—Virginia Pinner, soprano. 9:10 p.m.—Commendatore Gadono, tenor. 5:00 p.m.—Virginia Finner, soprano. 9:10 p.m.—Virginia Pinner, soprano. 9:50 p.m.—Virginia Pinner, soprano. 9:50 p.m.—St. George Dance Orchestra. 10:30 p.m.—St. George Dance Orchestra. WHN—NEW YORK CITY--361 0:15 p.m.—Busin Busin Banjate a. m.—Campus Serenaders.
WJAR—PROVIDENCE—306
a. m.—Housewives Radio Exchange.
1:40 p. m.—World series game.
g. m.—Berry spring time.
8:30 p. m.—Musical program.
8:60 p. m.—'American Red Cross."
g. p. m.—A. & P. Gypaisa.
10 p. m.—Othest's selections.
10 p. m.—Tothest's selections. WBZ-SPRINGFIELD, MASS.-333 10:45 p. m.-Church services. 8 p. m.-Holy Cross College program. b. m.—Holy Cross College program, WCTS--WORCESTER.—268
 1:40 p. m.—World series baseball game, 8:45-5:30 p. m.—Address by Dr. S. 1 Cadman; music.
 7:20-9:15 p. m.—Capitol Theater Family.
 9:15 p. m.—Toscha Seidel, violinist. WHN-NEW YORK CITY--361 2:15 p. m.-Evelyn Ryan, planiste 2:25 p. m.-Bob McDonald, songs. 2:35 p. m.-Marcel Doublier, solos. 2:45 p. m.-Judith Roth, soprano. 3:00 p. m.-Albert Rossback, barytone. 3:45-5:30 p. m.-To be announced. 6:30 p. m.-Leslie McLeod, tenor. 6:40 p. m.-Usahine Talks," Billy Van. 7:00 p. m.-Marlboro State Trio. 7:00 p. m.-Marlboro State Trio. 7:00 p. m.-Svanee Orchestra. 8 p. m.-Storage Battery," H. B. Shontz. 5:05 p. m.-Roseland Orchestra. 8:30 p. m.-Perry and Russell, two-man or-chestra. WTIC-HARTFORD, CONN.-476 WCAP-WASHINGTON-409 WTIC-HARTFORD, CONN.-478 2 p. m.-World's series, play by play, 5:30 p. m.-Emil Heimberger's Trio, 5:45 p. m.-Weather report; scores, 7:45 p. m.-Talk, 3 p. m.-Dinner music, WTIC DOCTON 320 m.—Servicos. J. m.—World series baseball game 9:15 p. m.—Toscha Seidel, violinist p. m.—Dinner music. WNAC—BOSTON—280
 p. m.—From the Radio Show, Morey Pearl's Ramblers.
 2:45 p. m.—Columbus Day celebration.
 8:00 p. m.—WNAC dinner dance.
 7:35 p. m.—Jeff Lazarus.
 7:45 p. m.—Copley Plaza Orchestra.
 9. m.—Knights of Columbus program from the Radio Show.

8:30 p. m.—Perry and Russen, two-man or-chestra. 8:50 p. m.—Gertrude Sf. Clair, soprano. 9:00 p. m.—'Lanias Hawaiians." 9:30 p. m.—Philip Krumholtz, barytone. 9:45 p. m.—Mr. and Mrs. Leo Wood, songs. 11:00 p. m.—Marsh McCurdy, organist, 11:30 p. m.—Revue and orchestra. 12:00 p. m.—Ted Lewis's Orchestra.

KDKA---PITTSBURGH---309

. m.—Church service. m.—World series game. m.—Vesper service. m.—Church service.

WCAE-PITTSBURGH-461 m.--People's church services. p. m.-Dinner concert. p. m.--Capitol Theater Gang.

A. A. A.

10:45`a 1:40 p. 3:45 p. 7:45 p.

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WEEI-BOSTON-349 6:45 a. m.—Tower health exercises. 10:45 a. m.—Home Service talks. 2:4 p. m.—Concert from radio show. 6:20 p. m.—Lost and Found; weather. 6:30 p. m.—Hig Brother Club. 7:20 p. m.—'Ima Pickus, soprano. 8 p. m.—Tok Eisenbourg's Orchestra. 8:30 p. m.—Tower health talk. 8:45 p. m.—Crimer Indeximan, soioist. 9 p. m.—Gypsies. WEEI-BOSTON-349 Eastern Standar 8:30 p. m.—"Trip Through a Radio Stz-tion," Fred. J. Turper.
WEAF—NEW YORK CITY—492
6:45-7:45 a. m.—"Tower Health Exer-cises," to WEAF, WEEI, WCAP.
11 a. m. -Musical program to be an-nouncea.
11:25 a. m.—Lecture.
11:25 a. m.—Music
6 .---Gypsies, m --Orchestra. WB2-SPRINGFIELD, MASS.-833 :30 p. m.-Capitol Theater Orchestra. 130 p. m.—Capitol Theater Orchestra p. m.—Program in observance of lumbus Day; Elks' quartet; address Thomas J. Collins; songs. p. m.—Lee Reisman's Orchestra. 11:10 a. m.-Lecture.
11:25 a. m.-Music.
11:35 a. m.-Music.
11:30 a. m.-Music.
12 noon-Market and Weather Reports.
4 p. m.-Frederic Carter, barytone.
4:15 p. m.-Constance Huismann, pianist.
4:30 p. m.-Women's program: Address; Mrs. Ida Bernardick, songs.
6 p. m.-Dinner music. WCTS-WOECESTER-268 10:80 a. m.-Radio chats. 12-2 p. m.-Luncheon music. 7:15 p. m.-Story Teller. 7:45 p. m.-Statistical report. 8 p. m.-Concert. WRC-WASHINGTON-469 Mrs. Ida Bernardick, songa. 6 p. m.-Dinner music. 7 p. m.-Lillian Miller, gypsy songs. 7:10 p. m.-Columbia University Lecture. 7:30 p. m.-Davis Saxophone Octette. 8 p. m.-Financial Eventa. 8:10 p. m.-Ross Gorman's Orchestra. 8:30 p. m.-The Twins. 9 p. m.-Eveready Hour. 10 p. m.-Grand Opera, "Samson and Delliah." 11-12 p. m.-Meyer Davis's Orchestra. WGRS-NEW YORK CITY-216 10 a. m.—Women's Hour from 12 (noon)—Organ recital. 1 p. m.—Shoreham Orchestra. p. m.—Shoreham Orchestra, WCAP—WASHINGTON—469
 6:45-7:45 a. m.—Health exercises.
 7:15 p. m.—Dally market summaries.
 7:45-8:45 p. m.—Gloria Trumpeters; dess by D. S. Pa kes Cadman.
 8:45 p. m.—Health talk.
 9-10 p. m.—Music by Gypsies. 11-12 p. m.—Meyer Davis's Orchestra. WGBS—NEW YORK CITY—316
10 a. m.—Timely Talk with Terese: 10:10 a. m.—Catherine Robinson, soprano. 10:20 a. m.—Thourshold Economy"; songs.
10:40.a. m.—Thrift talk; songs.
1:30 p. m.—Thomasina de Leon, soprano.
2 p. m.—Besthovén program.
3 p. m.—Interview with Helen Spring and John Seymour.
3:20 p. m.—Furniture talk; songs.
3:40 p. m.—Furniture talk; songs.
3:40 p. m.—Furniture talk; songs.
3:40 p. m.—Your talk; songs. KDKA-PITTSBURGH-309 m.—Dinner concert. m.—The children's period. m.—Book chat. m.—Happy Home Hour. WCAE-PITTSBURGH-461 m.-Dinner concert. m.-Uncle Kaybee. -Gypsies. --Loew's Aldine Theater. 1.00 p. m.—Furniture talk; songs.
8:40 p. m.—'Modern Piano Technique" songs.
6 p. m.—Yerkes's Orchestra.
7 p. m.—Concert orchestra.
8 p. m.—Y. M. H. A. Vocational Forum.
9:15 p. m.—Hazel Hildred, soprano.
8:35 p. m.—Hazel Hildred, soprano.
8:35 p. m.—Hazel Hildred, songs.
9 p. m.—Covat Pipe Band.
9:30 p. m.—Edward Lanka, violinist.
9:40 p. m.—Coppola Trio.
10:30 p. m.—Mance Karasik.
10:10 p. m.—Coppola Trio.
11:30 p. m.—Mennes of the Cherry Lane "Polly." WADC-AKRON, OHIO-258 m.-Dinner concert. WEAR-CLEVELAND-390 -Allen Theater program. WTAM-CLEVELAND-398 m.—Dinner music. p. m.—Musical program. m.—Dance music. WKBC-CINCINNATI-326 . m.—Dinner dance. p. m.—Freda Sanker's Orchestra. [midnight]—American Legion program m.—Tneatrical stars; orchestra. WSAI-CINCINNATI-326 p. m.-Music by Gypsies. 0 p. m.-News reviewed. 0:15 p. m.-Artists' recital. WLW-CINCINNATI-422 s p. m.-Dinner concert. 9 p. m.-Violin and barytone solos. 10:30 p. m.-O. Henry play, "The b of Mace." WRNY-NEW YORK CITY-258 WRNY-NEW YORK UTY-200 9:45 a. m.-News flashes. 10:30 a. m.-News flashes. 10:45 a. m.-Duet, Rita Sebastian and Bertha Johnston. 12:30 p. m.-Henry Rogers, planist. 4:15 p. m.-Murray and Ralph Heyman. songs. WJR-DETROIT-517 m.—Orchestra; soloists. p. m.—Goldkette's Serenaders; 12:30 p. m.—Henry Rogers, planist.
4:15 p. m.—Murray and Ralph Heyman, songs.
4:45 p. m.—Y, 12:05 p. m.—Whose Birthday To-day?"
7:06 p. m.—'Commerce of the Day."
7:20 p. m.—Commerce of the Day."
7:20 p. m.—Law sories, "Constitutional League."
7:25 p. m.—Address by Frank D. Water-man.
8:15 p. m.—Kiddy light opera dances.
8:15 p. m.—'How to Avoid Auto Acci-denta."
8:30 p. m.—'Pirates of Penzance," Mme.
9:45 p. m.—Light opera ensemble.
9:45 p. m.—'The Rose Maid" and "The Strollers."
9:46 p. m.—'Badrian Trio.
9:20 p. m.—'The Rose Maid" and "The Strollers."
9:46 p. m.—'Radio, Man's Swiltest Mes-ile p. m.—'Town in Reciter."
9:45 p. m.—'Current Theater."
9:45 p. m.—'Current Theat WWJ-DETROIT-\$53 p. m.—Dinner concert. 8 p. m.—Band and Gypsies. WREO-LANSING, MICH.--256 6 p. m.-Dinner concert. WMAQ-CHICAGO-448 7:80 p. m.-La Salle Orchestra. 7:50 p. m.-Family Altar Legion. WSUI-IOWA CITY-484 8:80 p. m.—College of the Air. 10 p. m.—Faculty of School of Music. WOS-JEFFERSON CITY-441 p. m.-Musical program from Christ College. KSD-ST. IOUIS-545 p. m.—Opening of Radio Show. 0 p. m.—Program from Radio Show. WDAF-KANSAS CITY-366 p. m.-School of the Air. p. m.-"Around the Town." 2:45-2 a. m.-Nighthawk Frolic. 10 p. m.—"Current Theater."
11 p. m.—"Town in Review," Beau Broadway,
WMCA—NEW YORK CITY—341
11-12 a. m.—Ida Allen's hour.
12 noon-Olcott Vail's Ensemble.
630 p. m.—Frank Gibbia's Orchestra.
7 p. m.—Jack Wilbur's "Personalities."
8 p. m.—Daveh Morel, soprano.
8:30 p. m.—Shanuel Shahkman, planist.
9:15 p. m.—Heagney and Steele, songa.
9:35 p. m.—Agnes Macpeake, soprano.
10 p. m.—Sanse Macpeake, soprano.
115 p. m.—Agnes Macpeake, soprano.
12. Lavner, barytone.
13. J. Lavner, barytone.
14.5 p. m.—Ukulele.Bob McDonald.
14 p. m.—Ernik Golden's Orchestra.
15 p. m.—Ukulele.Bob McDonald.
16 p. m.—Ernik Golden's Orchestra.
17 p. m.—Ernik Golden's Orchestra.
18 p. m.—Ernik Golden's Orchestra.
19 p. M.—Ernik Golden's Orchestra. WCCO-MINNEAPOLIS-ST. PAUL-416 7:45 p. m.-F. and R. Family; farm lec ture. 9:15 p. m.—Church organ recital. 11:05 p. m.—Songa KTHS-HOT SPRINGS-375 10 p. m.—Orchestra dance music: soloa 10:45 p. m.—Organ recital WOAW—OMAHA—526 7 p. m.—Organ recital. 7:50 p. m.—Popular song period. 5 p. m.—Orchestra. 10 p. m.—Skeen Trio; orchestra. 9:30 p. m.-Britling's Orchestra. WSB-ATLANTA-428 9 p. m.-Orcuestra. 11:45 p. m.-Concert. 11 p. m.—Ernle Golden's Orohestra.
WLWL—NEW YORK CITY\_235
8 p. m.—Sara Dunn, soprano.
8:15 p. m.—Morine Louden, violinist.
8:30 p. m.—'Question Box," the Rev. M. Gillis.
9:45 p. m.—Organ solos, Father Finn.
p. m.—Sara Dunn, soprano.
9:15 p. m.—Talk, "Citizenship."
9:30 p. m.—Talk. WCAO-BALTIMORE-275 p. m.--Vocal and instrumental music. KPRC-HOUSTON, TEX.-297 3:30 p. m.-Record's Ramblers. 3:30 p. m.-Band. WFAA-DALLAS-476 7:30 p. m.—Ford and Glenn. 9:30 p. m.—Agricultural program. 9:45 p. m.—Talk.
WNYC—NEW YORK CITY—526
7 p. m.—Market high spots.
7:30 p. m.—The Canadians.
7:30 p. m.—The Canadians.
8 p. m.—Inez Reynolds, recitations.
8:15 p. m.—Inez Reynolds, recitations.
8:15 p. m.—Choir of Temple Emanuel: Cantor Sol Fuchs, barytone; Cantor Louis Waldmah. tenor.
10:30 p. m.—Harry Asl.'s Orchestra.
10:35 p. m.—Harry Asl.'s Orchestra.
WHN\_NEW YORK OUND Set TUESDAY WJZ-NEW YORK CITY-455 10 a. m.—Women's hour.
11 a. m.—Women's hour.
11 a. m.—'Housekeeping," talk.
1 p. m.—Nathan Abas's music.
2, 4, 5:15, 8 and 10:30 p. m.—News.
4-6 p. m.—Scores, racing (half hourly).
4:20 p. m.—Bernhard Levitow's music.
5:26 p. m.—Market quotations.
5:26 p. m.—Market quotations.
5:30 p. m.—Namcial summary.
6:30 p. m.—Nasseall, racing returns.
6:30 p. m.—Nasseall, racing returns.
7 p. m.—'Russian Wolf, Hounds.'' Frank Dole, of the Heraid Tribune.
7:15 p. m.—Yanderbilt Concert Orchestra.
8:20 p. m.—'Princeton Football. Team.''
9:20 p. m.—'Princeton Football. Team.''
9:30 p. m.—'Yander Grothestra.
WJY—NEW YORK CITY—405 WHN-NEW YORK CITY-361 WHN-NEW YORK CITY-361 12:30 p. m.-Marsh McCurdy, organist. 2:15-3:15 p. m.-Overture, and vsudeville. 3:15 p. m.-Lexington Theater Grohestra. 4:30 p. m.-Uncle Robert's Pals. 4:45 p. m.-Isidore Levine, violinist. 7 p. m.-Iceland Orchestra. 50 p. m.-Uskland's Chatheau Shanley. 8:00 p. m.-Henrietta Turner, songs. 8:30 p. m.-Male orchestra. 9:30 p. m.-Jack Smith barytone. 11:30 p. m.-Kentucky Revue and Orchestra. 11:30 p. m.-Kentucky Revue and Orchestra. 12:15-3:15 p. m.-Ross WJY-NEW YORK CITY-405 7:30 p. m.-Ambassador Trio. 8:10 p. m.-To be announced. **Dance** Orchestras fo

Time	N	TO-DA	Y	1 8:15		¥, 00 833	TOBER 13	, 11:30	WHN
P. M.	Station	Waye	0				Hector's	1 2 65	THURSD
9:30	WIP			8:20		273	International	7:10	WNYC
10:15		508	Ben Stad's	10:30		278	Billy Hayer's	10:00	WHN
10:45	WGCP	252	Strickland's	10:30		508	Pagoda	10:00	WMCA
10:45	WHN	361	Janssen's	10:30		455	Mayflower.	10:05	WIP
	IONDAY,	OCTOR	REP 19	10:35		526	Harry Ash's	10:80	WGBS
	•			11-12		492	Meyer Davis's	10:80	WPG
7:35	WNYC	526	Stantic Ramblers	11:00		341	Ernie Goiden's	11:00	WHN
8:00	WEEI	476	Eisenbourg's	11:00		861	Rodeo	11:00	WJZ
8:05	WHN	861	Roseland	11:05		273	Oriole	11:00	WEAF
9:00	WGCP	252	Strickland's	12:00	WHN	861	Kentucky	11:00	WMCA
9:50	WNYC	526	St. George	1	WEDNES	DAY.	OCTOBER 14	11:00	WRC
10:00	WCAU	278	Jaffe's	1:30		861	Caravan	11:30	WHN
10:00	WMCA	841	Messner Brothers	7:30	WFBH	273	Arthur Kraus's	12:00	WFBH
10:00	WLIT.	895	Dance music	9:00	WMCA	341	Philmort	10.00	
10:05	WAHG	816	Gienn Smith's	9:30	WEBJ	273	Kalo	1	FRIDA
10:30	WOR	405	Slater's	10:00	WHN	361	Roseland	7:10	WGBS
10:30	WEAF	492	Ben Bernie's	10:00	WLIT	895	Dance music	1 7:80	WJY
10:30	WJZ	455	J. Knecht's	10:00	WTIC	476	Dance music	9:40	WNYC
10:30	WPG .	300	Dance music	10:15	WAHG	316	Zimmerman's	10:12	WCAP
11:00	WHAZ	380	Campus	10:30		455	Virginians	10:00	WGCP
			Serenaders	10:30		508	Dance music	10:00	WLIT
11:00	woo	508	Dance musio	11:00		469	Dance music	10:05	WTIC
11-1	WGR	819	Vincent Loper's	11:00		405	Zit's	10:15	WAHG
11:15	WOR	405	Aronson's	11:00		492	Ben Bernie's	10:80	WCAU
11:30	WHN	861	Dance music	11:00		861	Dance music	10:30	WOO
12:00	WHN -	861	Ted Lewis's	11:05	WRW	273	Koenig's	10:30	WJZ

**World Radio History** 

Sec. 1	/T3•	8:30 p. m.—Gold Dust Twins. 9 p. m.—Eveready Hour. 10 p. m.—Opera.	WEDNESDAY	6:45 p. mAlice Rinck, violinist: Flor-	WHT-CTIICANO-400
ndard	lime	WNAC-BOSTON-280 10:30 a. mBible readings. 10:40 a. mWomen's Club talk. 12:15 p. mNoon service.	WEAF-NEW YORK CITY-492	ence Yordy, soprano. 3:30 p. mJoe Furtner, zither; Anthony Schreck, guitar.	T n m
	W YORK CFI'Y-273 rnett's Orchesira.	1 p. m.—Concert orchestra. 4 p. m.—From Radio Show; dance or- chestra.	11:05 a. mHazel Dudley, soprano.	WIP-PHILADELPHIA-508 6:45 a. mSetting-up exercises. 10:30 a. mReducing exercises.	WOR-CHICAGO-217 7 p. mArtists. 11 p. mArtists and orchestra.
7:45 p. mMic arias.	chele Bontompo, operati d Talk, Garrow T. Geer.	7:35 p. m.—Talk by Thomas C. O'Brien. 7:45 p. m.—The Somerville Players.	11:15 a. m.—Health Talk. 11:30 a. m.—Hazel Dudley, soprano. 11:40 a. m.—Talk to Mothers.	1:00 p. m.—Lunchéon music. 3:00 p. m.—Artist recital. 5:05 p. m.—Dinner music.	WTAS-ELGIN, ILL303 9 to 11:30 p. mPurple Grackle Boys WSUIIOWA CITY484
8:10 p. mHenr 8:20 p. mInter WHAP	yetta Turner, ukulele. national Dance Orchestra BROOKLYN-240	WBZSPRINGFIELD, MASS333	11:00 a. m.—Hazel Dudley, soprano. 12 (Noon)—Market and weather reports 4-5 p. m.—Ray Nichols's Orchestra. 6 p. m.—Dinner music.	11:00 a. mG. and organ.	8:45 p. m.—College of the Air. WOC—DAVENPORT—484 6:45 p. m.—Chime concert.
12 (noon)-Adam	MOND HILL, N. Y 316 no String Trio.	7 p. mMarket reports. 7:05 p. mMusical program	7 p. m.—Synagogue services. 7:30 p. m.—'Hon Bon Buddies.'' 8 p. m.—Address: "Why the Public Inter	12 (noon)Luncheon music. 4:45 p. mGrand organ and trumpets. 7:30 p. mDinner music. 3:00 p. mDinter music.	8 p. m.—Orchestra. 10 p. m.—Program from WEAF. 11 p. m.—Musical program.
6:45-7:45 a. m 2 p. mReserve	-NEWARK-405 -Gym class. od for World Series game ords Mispronounced."	8:15 p. m.—Charles Hector's Orchestra. 9:30 p. m.—Goldie Shour, violinist. 	est Requires Local Rather Than Federa Regulation of Electrical Public Utilities," Heibert Hoover, 8:30 p. m.— "Pooley Period."	9:00 p. m.— Waterman's Points of Progress. 0:00 p. m.— Organ recital	LA KEND OF YOUTYO WAR
6:17 p. m.—"Spo 6:30 p. m.—"Mai 7 p. m.—Sheiton	rts," Bill Wathey. a in the Moon" stories. dinner music.	5:15 p. m.—Luncheon music.	9 p. m.— Pooley Period. 9 p. m.—Waterman's Points of Progress 10 p. m.—"Ipana Troubadours." 11-12 p. m.—Ben Bernie's Orchestra.	10:30 a. mSolos.	7 p. m.—School of the Air. 9 p. m.—Star's Orchestra. 12:45 to 2 a. m.—Nighthawk Frelic.
3 p. mSongs; 1 3:15 p. mSilvi	-NEWARK-252 race results (half hourly) o De Rienzo, pianist.	WRC-WASHINGTON-469	WJZ-NEW YOBK CITY-455 10 a. mWomen's hour. 1:15 p. mirwin Abrams' Orchestra.	10:40 a. m.—Home Service Talk. 1:00 p. m.—Tea Room Ensemble. 3:00 p. m.—American music by Instrumen-	KFMX-NORTHFIELD, MINN33 10 p. mMusical program.
3:30 p. m.—Lart 3:45 p. m.—Fian 4 p. m.—Sam Sil 1 4:30 p. m.—Wm.	o solo. ver's Troubadors.	1 p. mMayflower Orchestra. 7 p. mShoreham Orchestra.	2-4-5:16-8-10:25 p. m News, 4-6 p. m Scores, racing (half-hourly.)	tal Trio. 3:45 p. m.—Fashion feature. 6:45 p. m.—Concert orchestra.	WCCOMINNEAPOLIS-ST. PAUL-4 8 p. mChurch service. 9 p. mProgram from WEAF. 11:10 p. mDance orchestra.
4:45 p. mDella	-NEWARK-263		5:26 p. m.—Market Quotations, 5:50 p. m.—Emancial summary, 6:51 p. m.—Easebail, income feturns, 6:30 p. m.—New York University Course	WLIT-PHILADELPHIA-395 12:05 p.mOrgan recital; religious serv- ice. 12:30 p.mConcert orchestra.	12:30 p. m.—Organ recital. WOS—JEFFERSON CITY, MO.—441
11:15 a. m.—Coo continued. 6 p. m.—The Bla	king lesson; Happy Hou ackstone Orchestra,	10:30 p. m.—Spencer Tupman's Orchestre. WCAP—WASHINGTON—469	i p. mBeinnard Levilow's Concert. 8 p. mScores, racing returns. 8:15 p. mScores, racing returns.	12-3 p. m. — Concert orchestra; recital, 4:30 p. m. — Talk; recital. 7:30 p. m. — Dream Daddy.	9 p. m.—Address; musical program. KTHS—HOT SPRINGS—375 10 p. m.—Orchestra, cornet, quartet.
7:20 p. mEnte 7:40 p. mHele	n Bataille, soprano.	1:45 p. mWorld series baseball game. KDKA-PITTSEURGH-309	8:80 p. m.—New York Edison Hour. 9:30 p. m.—To be announced 19:30 p. m.—Monte Carlo Virginians.	8:15 p. m.—Concert orchestra. 8:30 p. m.—Artist recital. 10:00 p. m.—Dance orchestra. 10:30 p. m.—Master's Orchestra.	10;45 p. m.—Artists' recital. WSB—ATLANTA—428 11:45 p. m.—Dance music.
8:15 p. mAlice 8:30 p. mManu	Coburger, pianist. Evans. 161 Ravello, tenor. er Coburger, pianist.	7:45 p. m"Modern Physics."	WGBS-NEW YORK CITY316 10 a. mFinery talks with Teress. 10:10 a. mron Clark, songs.	WCAU-PHHLADELPHIA-278 7:30 p. mLew Chapman's Orchestra	WHAS—LOUISVILLE—400 8:50 p, m.—Royal Peacock Orchestra, WCAO—BALTIMORE—275
9 p. mViolin, 9:30 p. mMan 9:45 p. mTalk	harp and plano. nuel Ravelio, tenor. on New Jersey.	10:30 p. mConcert from Grand Theater.	10 40 a m Resulty talk: songs.	8:00 p. m.—Stage dancing lesson. 8:15 p. m.—Puccini Trio. 9 p. m.—Hill Instrumental Trio. 9:30 p. m.—Health talk.	8 p. m.—Vocal, instrumental music. 10 p. m.—Dance music. KPRC—HOUSTON, TEX.—297
10 p. mWill M WOO-PH 11 A. MGrand	cWalters, songa. ILADELPHIA-508 organ.	5:30 p. m.—Dinner concert.	2 p. m.—Hen Hyans, planist. 3 p. m.—Interview with rearo de Cordoba 3:10 b. m.—Robert Aurray, planist; lec.	9:40 p. mEddie Malle's Masters.	9:30 p. m.—Recital. CNRO—OTTAWA—135 8 p. m.—Concert orchestra.
7:30 p. mSaxo	d organ; trumpets.	WATE ATTON ONIO SKE	thre recital on The Classica. 6 p. m.—Uncle Geebee. 6 30 p. m.—Sorey Concert and Dance Or-	WOV SCHENECTADY 200	9 p. m.—Vocal solos; dance music. CFCA—TORONTO—\$56 19:45 p. m.—Watson's Orchestra.
6:45 a, m Settin	" Mrs. Anna B. Scott.	10 p. mTimes-Fress hour.	chestra. 7. p. m.—Norbert Lusk, "Movie Sidelights." 7:10 p. m.—Sorey Orchestra. WHN—NEW YORK CITY—361	7:30 p. m.— Book of Knowledge." WBW—TARRYTOWN, N. Y.—273 10:05 p. m.—Nicolas Koenig's Orchestra.	
6:05 p. mJoe	Ray's Night Hawks call and Birthday List	WEAR-CLEVELAND-390	2:15 p. m.—Jimmy Clarke's Entertainers. 2:45 p. m.—Gladys Hartman, soprano. 3 p. m.—Frank Galassi, pianist.	10:30 p. m.—MacMunn and West. 10:45 p. m.—Taik, "The Tarrytowns." 11:05 p. m.—Koenig's Orchestra.	THURSDAY
8 p. mElliott L 8:15 p. mTalk, 8:30 p. mArtis	S. M. Swaab.	9 p. mLoew's Theater program.	a:ta p. m.—Yama Yama Boys. 4:15 p. m.—Yama Yama Boys. 4:30 p. m.—Herman Streger's Players.	WGR-BUFFALO-319 10:45 a. mHome service talk. 8 p. mAddress by Herbert Hoover.	WJZ-NEW YORK CITY-455 10 a. mWomen's hour. 11 a. mNews.
10:05 p. m*Em 10:30 p. mPag	ovelty by players. no's Movie Broadcast." oda Orchestra.	WSAI-CINCINNATI-326 8:45 p. mChimes concert.	(30 p. m.—Curavan Orchestra. 8 p. m.—Richard Lougias, soligs. 8:15 p. m.—Daly and Foy, entertainers.	9-11 p. mBroadcasting with WEAF. 11 p. m1 a. mSupper music. WHAM-BOCHESTER, N. Y278	11:05 a. m.—Book review. 1 p. m.—Nathan Abas's Orchestra. 2-4-5:15-8 and 11 p. m.—Naus
1 p. mTea Roo	urton Konkle; recital.	10 p. m.—instrumental artists. WLWCINCINNATI-422	8:30 p. m.—Clarence Williams's Trio. 9:15 p. m.—Harold Von der Heide, Charles La Ruffa, banjo. 9:30 p. m.—Hock and Jerome, songs.	3.6 p. m.—Eastman Theater Orchestra. J-6 p. m.—Eastman Theater organ. 7 p. m.—Eastman Theater Orchestra.	4:05 p. mScores; racing returns, 4:05 p. mTony Lyman, pianist, 4:20 p. mTeatime music.
4 p. mY. W. 6 talk. 6:45 p. mConc	C. A. Camp Fire Chorus	9 p. m.—Orchestral novelty; Lyric Quartet. 9:40 p. m.—"Hello Boys."	9:45 p.m.—Isabelle Henderson, soprano. 10 p.m.—Roseland Orchestra. 11 p.m.—Silver Silpper Orchestra.	7:50 p. mWeather forecast; report. WJAB-PROVIDENCE-306 10 a. m:-Housewives Radio Exchange.	5:26 p. m.—Market quotations. 5:50 p. m.—Financial summers
	rman's Orchestra. Twins.		11:30 p. m.—Ted Lewis's Orchestra. 12. midnight—Harry Richman's Enter- tainers.	1:05 p. m.—Studio program. 7:30 p. m.—U. S. Army Band. 8 p. m.—Address by Herbert Hoover	6:01 p. m.—Baseball; racing returns. 6:30 p. m.—New York University Court 7 p. m.—Dinner concert. 7:55 p. m.—'The Road from Rum
10 p. mGrand	opera from WEAF.	9 n m -Sereneders and soloists	WMCANEW YORK CITY-341 12 noon-Olcott Vail's String Eusemble. 6 p. mOlcott Vail's ensemble.	10 p. mMusical program. WTIC-HABTFORD. CONN-478	Ruin." 8 p. m.—Scores; racing returns. 8:05 p. m.—Pan-American program. 10 p. m.—Royal hour of music.
12:05 p. mOrg 12:30 p. mCon	an recital.		5:30 p. m.—Midred Perry, soprano. 7:30 p. m.—Midred Perry, soprano. 8 p. m.—Dr. Geo.ge King's Northminster services.	8:30 p. m.—Dinner music. 6:45 p. m.—Weather report; scores. 7:20 p. m.—Dinner music.	11 p. mJacques Greens's Orchestr Clark's Hawallans.
4:30 p. mTalk 5:50 p. mScore 7:30 p. mDrean	; artist recital. s, sports results. m Daddy.	B n. m Dinner concert	9 p. m.—Philmort Orchestra . 10 p. m.—George Flanders, planist. 10:15 p. m.—Anna Daiy, violinist; William	10 p. mDance music. WEEL-BOSTON-\$49 10:45 a. mHome service talk	WJY-NEW YORK CITY-405 7:30 p. mVanderbilt Orchestra. 8:15 p. mTo be announced. 9 p. mSport talk.
7:30 p. mReci		WHT-CHICAGO-400 7 p. mClassical program. 8:45 p. m. (238 meters)-Melody Masters. 10:39 p. mJeiks Eentertainers.	Bonner, tenor. 10:45 p. m.—Catherine Harvey, soprano. 11 p. m.—Harvey Officer, songs.	2-4 p. m.—Concert from Radio Show. 6:25 p. m.—Lost and Found; weather. 6:30 p. m.—Big Brother Club.	WEAF-NEW YORK CITY-493 6:45-7-7:20 a. mHealth exercises
9:30 p. mHarr	logy, the Rev. Stockwell. y Link, songs.	WMAQ-CHICAGO-448	WENY-NEW YORK CITY-258	7:30 p. m. Henry Volk, violinist, 7:30 p. m. Hon Bon Buddies.	11-12 (noon)—"Housewive's hour"; V Launhurst planist; speakers. 12 (noon)—Market and weather report 4 p. m.—Malabota Pupils; Marie Fs
1:80 p. m Amba	y Hayes's Orchestra. LANTIC CITY-390 assador luncheon music.	7:30 p. mLa Salle Orchestra. 9 p. mLiterary Sidelights; songs. 10 p. mUniversity of Chicago, lecture.	10:45 a. m. News flashes: 10:30 a. m. Women's reducing exercises. 10:46 a. m. Medical address. 11 a. m. J. Van Cleft Cooper, songs.	8:80 p. m.—Earl Nelson's uks. 9. p. m.—Waterman's Points of Progress. 10 p. m.—Ipana Troubadours.	setta, Anthony Cash, Ross Muto, s prano; James Butler. 4:45 p. m.—Book review, John Ferrar
2 p. m.—World 8 6:45 p. m.—Orga 7 p. m.—Trio din 8 p. m.—Fashion	n recital. mer music.	WLS-CHICAGO-345	12'80 p. m.—Luncheon entertainment. 4'la p. m.—Afternoon program. 4'45 b. m.—Emma Keiler, Sopramo.	WNAC-BOSTON-280 10:80 a. mBible readings. 10:40 a. mClub talks. 12:15 p. mNoon service.	6 p. m.—Dinner music. 7 p. m.—Mid-week services; hymns ar songs; address by Rev. Dr. Isa. Ward.
8:15 p. mStudi 9 p. mDual Tri 10 p. mOrgan	lo concert.	KYW-CHICAGO-536 8 p. mDinner concert. 9 p. mMusical program,	7:05 p. mTelegraph sport flash. 7:15 p. mCommerce of the day.	<ul> <li>p. m.—Crchestra.</li> <li>p. m.—Kiddies Klub.</li> </ul>	7:30 p. m.—Serenaders.
WHAR-AT 2 p. mSeaside. 7:30 p. mBook	LANTIC CITY-275 Trio. review.	stam.	iso p. m"Common Sense of Money."	<ul> <li>6:30 p. m.—WNAC dinner dance.</li> <li>7:35 p. m.—Jeff Lazarus.</li> <li>8 p. m.—From Radio Show; concert or chestra.</li> </ul>	<ul> <li>8:30 p. m.—'Touring," George Cooley.</li> <li>9 p. m.—Concert Ensemble and assistin artists.</li> <li>10 p. m.—Silvertown Orchestra.</li> </ul>
WGY-SCI	and organ recital. HENECTADY-380	WGN-CHICAGO-370	3.30 p. m.—'Talk. 3.45 p. m.—A to Z plano classics. 1 p. m.—'Low Wave Broadcasting," W. B.	8:80 p. m.—Program by artists. WBZ—SPRINGF16LD, MASS.—333	11-12 p. mVincent Lopez' Orchestra, WGBS-NEW YORK CITY-316 10 a. mTimely Talk with Terese.
2 p. mWorld g 2 30 p. mOrgan 6 30 p. mDinne	n recital. F program.	11:30 p. mDance music. WOR-CHICAGO-217	Arvin. 115 p. mHarvey Corbett, "Architec- ture."	7 p. m.—Market reports. 7:55 p. m.—W. Edward Boyle's Orchestra. 7:36 p. m.—Radio Nature League.	10.10 p. m
7:45 p. mWGY	overy of Electrona." Orchestra; Frank Erwin,	11 p. mRushmore Ensemble Singers.	<ul> <li>20 p. m.—Francine Vyde, repertoire.</li> <li>30 p. m.—Anna Drittei, cello.</li> <li>145 p. m.—Chev. de Lancellotti's, songs.</li> <li>9:15 p. m.—Biography—"Donisetti"</li> </ul>	8 p. m.—Concerts by artists. 9 p. m.—Alandale hour. WCTS—WORCESTER—265	10:40 a. m.—Readings; plano solos. 1:30 p. m.—Scripture reading. 1:35 p. m.—Leona Borrum, contraito. 2 p. m.—Juliet Strahl, soprano.
chestra.	talk. upman's Mayflower Or- SYTOWN, N. Y273	11 p. m.—Rainbow Skylarks. 2 a. m.—The Ginger Hour.	10:30 p. m.—Becker String Quartet. WNYCNEW YOBK CITY526 110 p. m.—Market high spots.	10:30 a. m.—Radio crat; music. 12 noon-2 p. m.—Luncheon music. 7:15 p. m.—Story teller.	3 p. m.—"Woman in the Home Hour." 6 p. m.—Uncle Gerbee. 6:30 p. m.—Ted Snyder, Bill Heim
9:05 p. m.—Music 9:30 p. m.—Sport 9:40 p. m.—Jack	al program. s. Smiles, monologue.	9 p. mJunior Chorus and artists. WOC-DAVENPOBT-484	1:20 p. m.—Herman Neuman, planist. 1:30 p. m.—Elementary Spanish lessons. 1 p. m.—Advanced Suanish lessons.	8 p. m.—Concert program. WRC—WASHINGTON—469 10 s. m.—Women's hour from WJZ,	songs. 6:40 p. m.—Rosalie Blanchard, Walt Croft, duets.
10:40 p. mJack	ie Brown, violinist. Smiles, monologue.	To p. m Musical program.	30 p. m.—Police alarms. 35 p. m.—Robert F. Campbell, barytone. 30 p. m.—Florence Loftus, soprano 305 p. m.—Lawrence Metcalf, whistle	12 (noon)—Organ recital. 1 p. m.—Washington Orchestra. WCAP—WASHINGTON_469	6:50 p. m.—"What the World Is Doing 7 p. m.—Voltaire hour of music. 8 p. m.—Crystal Palace Orchestra. 8:30 p. m.—"Footilgut and Lamplight
11 05 p. m.—Oriol WGR—1 2:30 p. m.—World 6:30 p. m.—Dinn	BUFFALO-319 d series same.	7:45 p. m.—Aberg's Concert Ensemble. WDAF—KANSAS CITY—366	solos. 20 p. m.—Max Wechsler, violinist. 340 p. m.—Aeolian Waldon, soprano.	6:45 a. m.—Health exercises. 7:15 p. m.—Dally market summaries. 8 p. m.—Address by Herbert Hoover.	9 p. m.—Stamboul Quartet. 10 p. m.—Gertrude Steiner, soprano.
8-11 p. m.—Progr WHAM—ROC	HESTER, N. X278 THESTER, N. Y278 Man Theater Orchestra.	12:45-2 a. m.—Nightawk Frolic. KFMX—NORTHFIELD, MINN,—337	55 p. m.—Max Wechsier, violinist. 15 p. m.—Acolian Waldon, soprano. 30 p. m.—Irwin Hassell, pianist; Joseph	8:30 p. mU. S. Army Band concert. 9 p. m'Waterman's Points of Progress.'' 10-11 p. m:Ipana Troubadours. 11-12 p. mDance music.	10:10 p. m.—String quartet. 10:20 p. m.—Gertrude Steiner, sopram 10:30 p. m.—Arrowhead Orchestra.
7 p. m.—Eastman	an Theater Organ. n Theater Orchestra. ther forecast; market.	7 p. mDinner concert.	Pavloff, barytone. 0:10 p. m.—"Mountaineering," Dr. An- drew J. Gilmour. 0:30 p. m.—Police alarms; weather.	WCAE—PITTSBURGH—461 6:30 p. m.—Dinner concert. 7:30 p. m.—The Sunshine Girl.	WHN-NEW YORK CITY-361 12:30 p. mOrgan recital. 8:15 p. mLexington Thesen Students
WJAR-P1 1:40 p. m. World 7 30 p. m. Music	ROVIDENCE-306 1 series game. cal program.	WOAW-OMAHA-526 7:30 p. mOrchestra.	0:35 p. m.—Pyramid Entertainers. WERL-NEW YORK CITY-273	8 p. m.—Address by Herbert Hoover. 8:30 p. m.—Pooley period. 9 p. m.—Watermann hour.	4:30 p. m Miller, Piotti and Val. 6:30 p. m Leslie McLeod, tenor. 6:40 p. m 'Sunshine Talks.' Billy Val 7 p. m Iceland Orchestra.
8:30 p. m.—Gold 9 p. m.—"E eyres WTIC—HAR	Dust Twins. ady Hour." FFORD CONN476	10 p. m.—Musical program. 1 a. m.—"Rialto Alarm."	:30 p. m.—Kathryn Connolly, soprano. :45 p. m.—Thomas Prytherch, tenor. :46 p. m.—Rudolph Joskowitz, violinist.	KDKA-PITTSBURGH-309 6:15 p. mDinner concert. 7:30 p. mChildren's period.	7:30 p. m.—Kennedy's Quintet. 8 p. m.—Will Oakland's Shanley. 8:30 p. m.—Kennedy Quintet.
2 p. mWorld se 6:30 p. mHub 7 p. mRussell	Restaurant Trio. Besser, tenor	10 p. mDance concert; cello and plano.	p. m. —Orchestra.	7:45 p. m.—Criminology, talk No. 2. 8:80 p. m.—Hour of music. WADC—AKRON, OHIO—258	8:45 p. m.—Perry Bradford's Entertain ers. 9 p. m.—Jimmy Clark's Entertainers.
7:20 p. m.—Dinne 8 p. m.—Male qua orchestra. 9:80 p. m.—Organ	artet, ladies' quartet and	9:30 p. m. Musical program. 12 p. m. — Midnight Frolic.	:30 p. m.—Bob Schaffer, Fred Fisher. p. m.—Jerry Antone's Orchestra.	7:30 p. m.—Postage Quintet. WTAM—CLEVELAND—390 6 p. m.—Dinner music.	9:30 p. m.—Tom Butler, tenor. 9:45 p. m.—Vaudeville entertainers. 10 p. m.—Caravan Orchestra.
6:45 . mTower	-BOSTON-349 Health Exercises.	8:30 p. mEdd'e Rosson's Orchestra. KPRC-HOUSTON, TEX297 8:80 p. mOrchestra.	15 p. mMajestic String Ensemble.	9 p. m.—Organ recital; artists. 10 p. m.—Concert program. 11 p. m.—Dance music.	<ul> <li>10:30 p. m.—Kentucky Revue and Orchestra.</li> <li>11 p. m.—Swanee Orchestra.</li> <li>11:30 p. m.—Revue and orchestra.</li> </ul>
6:25 p. m.—I.ost 6.30 p. m.—Big 1 7.30 p. m.—Eliot	and Found; weather. Brother Clut. Daniel pianist.	9:50 p. m.—Piano solos. WFAA—DALLAS—476 1 9:30 p. m.—Musicians. 77	WAHG-RICHMOND HILL, N. Y316 2 noon-Almon and Bower, violin. :30 p. mJoe Zimmerman, piano.	WKBC-CINCINNATI-422	12 p.m.—Ted Lewis's Orchestra. WNYC—NEW YORK CITY-526
7:45 p. mVerna 8 p. mRoss Go	Ruben, soprano.	12 p. mMajestic. Entertainers.	:45 p. m.—Jean Black, songs. p. m.—Gerlich and Cornish, saxophone :15 p. m.—Judith Roth, soprano.	9 p. m.—Book review. 9:15 p. m.—Dance music. 9:45 p. m.—Studio features. 10:15 p. m.—Dance music.	7 p. m.—Market high spots. 7:10 p. m.—Arcady Orchestra. 7:30 p. m.—Police alarms.
ſ			:30 p. m.—Jean Black, uke and songs, :45 p. m.—Gerlich and Cornish, saxo- phone, 0:05 p. m.—Judith Roth, soprano,	WSAICINCINNATI326 9-11 p. mProgram from WEAF. 11 p. mVocal soloists; quartet.	7:35 p. m.—Arcady Orchestra. 7:45 p. m.—World Series Review, Frederick G. Lieb. 8 p. m.—Neapolitan and Italian fol
s for	This	Week	0:15 p. m.—Zimmerman's Orchestra. WORNEWARK-405 45 7:15 7:45 a m.—Gym. class	WLW-CINCINNATI-422 8 p. mDinner concert. 1 p. mCino Male Ougrtet	songs; Godone, tenor; Gina Santelis soprano; Giuseppe Milano, barytone Irena Vemeroni, soprano; Ada Amaul
11:30 WHN 8	361 Ted Lewis's	10.20 WUN 201 Rodeo	:30 p. m.—Theo. Alban, tehor. :45 p. m.—Talk, Mrs. Gibson Arnoldi. p. m.—Theo. Alban, tenor.	11:30 p. m.—Songs; trio. 12:15 a. m.—Organ concert. WWJ—DETROIT—353	<ul> <li>soprano.</li> <li>9:30 p. m.—Anniversary dinner of th Metropolitan Hospital; speakers, May or Lohn W. Hulan Boyal F. Conland</li> </ul>
T:10 WNYC 5	26 Arcady	10:35 WNYC 526 Colonial		8 p. m.—Dinner concert. 8 p. m.—Orchestra and solvists. 9 p. m.—Dance music.	or John F. Hylan, Royal F. Copeland Alfred J. Talley, Bird S. Coler, th Rev. John L. Davis, Agnes S. Ward, 10:45-Police alarms; weather.
10:00 WMCA 3 10:05 WIP 5 10:80 WGBS 3	41 Manhattan 08 Joe Ray's 16 Arrowhead	11 1 WGR 319 Vincent Lopes's	p, mTopics of the day.	WJR-DETROIT-517 7 p. mJean Goldkette's Orchestra; solo- ists.	WMCA
10:80 WPG 8 11:00 WHN 8 11:00 WJZ 4	00 Dance music 61 Swanee 55 Jacques Green's	11:30 WHN 361 Alabam 11:30 WFBH 273 Fordham	tone. 30 p. mRalph Reichenthal, pianist. 45 p. mBergen Quartet.	9 p. m.—Burroughs Hour. WREO—LANSING-286 8-7 p. m.—Dinner concert.	6:30 p. mJoseph Wetzel, tenor.
11:00 WMCA 8 11:00 WRC 4	92 Vincent Loper's 41 Ernie Golden's 49 Meyer Davis's	7:00 WNYC 526 Dance music 7:30 WOR 405 Van's Collegians	p. m.—Richard MacCarteney, barytone. 15 p. m.—Cadillac Berstein Trio. 15 p. m.—Ralph Reichenthal, planist.	KYW-CHICAGO-536 5 p. mDinner concert. 8:33 p. m"Entertaining Plans."	<ul> <li>7:30 p. m.—Lanson's Orchestra.</li> <li>8 p. m.—Friéda Rochen, soprano.</li> <li>8:30 p. m.—Nickels Trio.</li> <li>9 n. m.—Berghe Doige, soprano.</li> </ul>
12:00 WFBH 2 FRIDAY,	OCTOBER 16	9:00 WEEI 849 Eisenbourg's 1 9:30 WGY 830 Dance music 11 10:00 WEAF 492 Apollo 11	0:15 p. m.—Colvoy Male Quartet. 0:30 p. m.—Talk, Leander.de Cordova. 0:45 p. m.—Colvoy Male Quartet.	9 p. m.—Musical program. 11 p. m.—Midnight revue. WGN—CHICAGO—370	9:30 p. m.—Snedden Weir, barytone. 10 p. m.—Manhattan Serenaders. 10:30 p. m.—Herman Weinstein, violinis 11 p. m.—Ernie Golden's Orchestra.
1:80 WJY 4 9:40 WNYC 5	16 Jule Anzel's 05 Irwin Abrams's 28 Dance music	10:30 WGBS 816 Dance music 10:30 WPG 800 Dance music	WGCPNEWARK252 p. mPianist, race results (half hourly).	3:30 p. m.—Dinner music. 10:30 p. m.—The classic hour. 12:30 a. m.—Dinner music.	WFBH-NEW YORK CITY-273
10:00 WGCP 2 10:00 WLIT 8	195 Dance music	11:00 WEAF 492 Vincent Lopez's 13 11:00 WMCA 841 Ernle Golden's 13	<ul> <li>16 p. m.—Waller-Banks-Razaf Trio.</li> <li>30 p. m.—Frank Gallasi, pianist.</li> <li>45 p. m.—Clarence Williams Trio.</li> </ul>	WQJ-CHICAGO-447 B p. mRainbow Orchestra. 11 p. mMusical program. 2 a. mGinger hour.	2 p. m.—A thu: Kraus's Orchestra. 3 p. m.—Radiovues by Mrs. Owen Kildare. 3:30 p. m.—Johnny Gerhardt's Orchestra
10:15 WAHG 8 10:80 WCAU 2 10:30 WOO 5	16 Ascuitte's 178 Loeser's 108 Dance music	11:05 WRW 273 WRW 11:30 WFBH 273 Bronx	45 p. m.—Charlotte Trystmann, pianiste WAAM—NEW ARK—263	WLS-CHICAGO-345 7:15-11:30 p. mOrgan; story; syncopa- tion hour; community chorus; orchestra	5 p. m.—Mario Alvarez, tenor. 5 p. m.—Flo and Dick Bernard songs. 5:30 p. m.—Aro Brigode's Virginiana.
		12:00 WAHG 316 Benton Harbor	1 a. m.—Happy Hour. p. m.—Elmer Nippes's Orchestra. :80 p. m.—The Sport Oracle. :45 p. m.—Elmer Nippes's Orchestra.	WMAQ-CHICAGO-448 7 p. m.—Organ recital; story. 9 p. m.—Northwestern University lecture,	6:30 p. m.—Sammy Wilson, pianist. 7 p. m.—Eunice Erdley, soprano. 7:15 p. m.—Studio program.
Same Burn I have Burn	100 St.		) a compared in the contraction of the	BOCLUFO,	12 p. mEverglades Orchestra.

### WGY to Use Super- Banks Kennedy, Well Known **Power Twice Each**

16 🐐

thorized by the Department of Commerce to use fifty kilowatts on its antenna twice a week for regular WSM Station at Nashville Has broadcasting. This authorization is granted subject to withdrawal if high power causes interference.

WGY is the first station in the power, beginning October 3.

heretofore have been made under the Miss Bonnie Barnhardt, formerly the cooler weather of the fall, season for her Southern lullables and bed- lowed the popular policy of adapting hour during the period of the year greater distances will be possible time stories. and the effects of increased energy The National Life and Accident Shield Millions," and the new station fect in many communities, returns will be more pronounced generally.

have been made in the transmitter, and with the tests just completed an entirely new antenna system was used. Other changes probably will be made from time to time to transmitter and antenna as the engineers, aided by the 'observations of fans, find that transmission can be improved.

Super-power is only one phase of extensive developmental work in transmission which is being carried out by the General Electric engineers at the developmental laboratory. At this great laboratory, covering fiftyfour acres of ground, engineers and research men are working on problems which it is hoped will result in improved transmission and ultimately in greater enjoyment of broadcast programs by the listeners.

Simultaneously with the work on super-power, engineers are experimenting with short and long waves. Transmitters and antenna systems have been devised for broadcasting on twenty meters and forty meters. There is another transmitter for 109meter signals and a fourth for 1,560. All programs of WGY except noon and evening market reports and Sunday services are broadcast on all these wave lengths and reports are received from special stations throughout the country.

Bureau of Standards Warns **Dealers** About Radio Batteries The Bureau of Standards again warns that dealers and factory representatives must not use its name in connection with the sale of dry batteries for radio receiving sets.

"The attention of the bureau has again been called to the frequent misuse of its name in connection with the sale of dry batteries for radio receiving sets," says the announcement. "Claims have been made by some dealers and factory representatives that the superiority of their particular brands of batteries has been shown by tests made at the Bureau of Standards. Tests of batteries, including dry cell A and B batteries for radio use, are made at the bureau in ac cordance with government specifications. These tests are made to aid the departments of the government in the purchase of batteries and to help each manufacturer to improve his product. The hureau does not publish the results of its tests, nor does it inform any manufacturer of the results of its tests on other manufacturers' batteries. Therefore statements that any make or brand of battery is superior as shown by tests at the Bureau of Standards are unwarranted."

#### Charles Garland, Song Writer,

**Becomes Director of WBBM** Charlie Garland, song writer, barytone and pianist, has been made both program and studio director of Radio Station WBBM, it was announced by Ralph and Leslie Atlass, co-directors of the station.

Garland has been with WBBM since early this year, and "appeared" over other Chicago radio stations, and was a "movie" organist in this city prior to that time.

172

He is the writer of the words and music of several popular songs, including "Mississippi Blues," his latest, "Sweet Mother Mine," and "Want a Little Love."

His latest contribution to radio is a series of radio musical comedies. which he is now writing to be put before the microphone of WBBM, beginning shortly.

Organist, Joins WOK Staff Banks Kennedy, former organist at the Capitol Theater, Chicago, has Week in Future signed up as a regular member of the staff of Station WOK. Kennedy's or-Listeners throughout the country gan playing has long been considered will be able to make further observa- a special feature of the program tions on super-power, its advantages wherever he has appeared, and his tions on super-power, its advantages or disadvantages. WGY has been au-evidence that his popularity will continue.

### Woman Program Director

When WSM, the powerful new-type 1,000-watt Western Electric transcountry to use superpower in reg- mitter of the National Life and Acciular broadcasting, and it was the dent Insurance Company, Inc., Nashfirst station in the world to broad- ville, Tenn., adds its voice to Dixie's cast on fifty kilowatts. The regular broadcasters on Monday night, Octoprograms of Saturday and Sunday ber 5, the station will be unique in evenings will be broadcast on super- that it will have in active charge of programs one of the few women pro-Tests on high power through WGY gram directors in the radio world.

worst possible atmospheric condi- of WSB Atlanta, Ga., has accepted tions. The first series of tests were the post of program director and conducted in July, the second in Au- radio editor of the Nashville station. gust and the third were completed Miss Bonnie is beloved of countless this week. It is expected that with thousands of little folk and grown-ups

the bill be more pronounced generally. Since the initial tests many changes ville a mouthpiece by which the 282.8 meters.

Radio Helps Develop Stars for the Stage

Radio continues developing stars for the stage. Last week while the famous Duncan Sisters, playing in "Topsy and Eva," were singing at station WGN, Chicago, they heard Vernon Rickard, the handsome staff tenor of the studio, rehearsing some ballads. They were so taken with the appearance voice and dramatic possibilities of the young singer that after one try-out he was given a one-year contract with their company to sing the leading role. After filling Middle West engagements, the company goes to London. Rickard. since his graduation from Notre Dame University in 1924, has been assistant announcer and teno soloist at WGN.

world will learn of the city often WGY Programs Return This referred to as "The Athens of the Week to Eastern Standard Time South" because of its great educational institutions.

The National Company has fol- vanced the time of its program one its call letters to its slogan "We when daylight saving time was in ef-

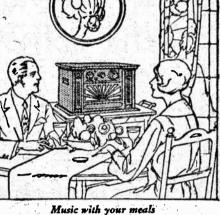
Kansas City for WJR, Detroit will start at approximately 7:30 The "Merry Old Chief" is packing o'clock, instead of 6:30 Eastern Stand-ard time. his bag and good cheer and moving eastward. He is leaving "The Kansas City Star's" station, where as one of the real pioneers he helped to put broadcasting on the map, and

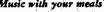
on September 28 he joins the staff of the new Jewett Radio and Phonograph Company's station, WJR, o Detroit and Pontiac, Mich. The "Merry Old Chief," or Leo Fitzpatrick, as he is known outside the radio world, has a personality that has endeared itself to millions of listeners-in. To him is due the amazing growth of that popular radio organization known as the Night hawks. There are now 250.000 of them, and the membership keeps or growing. He organized the Night

bership grew.

Nighthawk Organizer Leaves (27. The evening musical program







to be seen. So clear, so perfect, so easy to

tune. The radio which makes the whole

And-no less important and desir-

able-a set you can pick up and carry

to any part of the house. Always ready,

always dependable-the very finest

quality of radio reception you ever

Hear this marvelous instrument at

your dealer's. Or ask him to bring an

Operadio to your home, where you

may see how it en hances the beauty

World Radio H

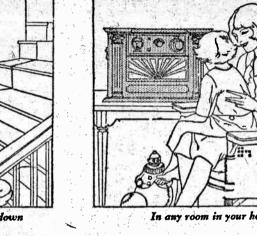
Chicago, Illinois

listened to.

of your drawing room.

CORPORATION

world speak and sing and play to us!



### The CONSOLETTE Bringing Operadio Convenience in a Cabinet of Classic Beauty

The Operadio may be purchased in the mahogany Consolette model shown above, or in a smart looking carrying case, which may be closed and taken with you anywhere. For those who want the beauty of a furniture model combined with the convenience of absolute portability, a distinguished walnut cabinet-The Tudor-is available for housing the portable set in the home.

> Prices without tubes or batteries, Portable \$160; Consolette \$180; Tudor Cabinet (for housing portable) \$68.

> > -----)°

The Operadio idea was conceived sixteen years ago when J. M. Stone built the first successful self-contained radio receiving set, using a kite to carry the aerial wire aloft. The accompanying sketch was made from a photograph taken in 1909.

The advantages-in convenience and awkward horn, no ugly wet batteries in performance—that have made the Operadio so phenomenal a success during the past two years, are now offered in the new Consolette, a semiportable cabinet model.

In your living room

The compactness of this jewel-like set makes it the ideal radio for home. The rich beauty of its dark mahogany case will appeal particularly to women.

Think of it! A completely selfcontained instrument. No wires or connections; no visible touch to mar communion with the invisible. No

> THE OPERADIO 8 So. Dearborn St.



iginal Self-Contained Radio

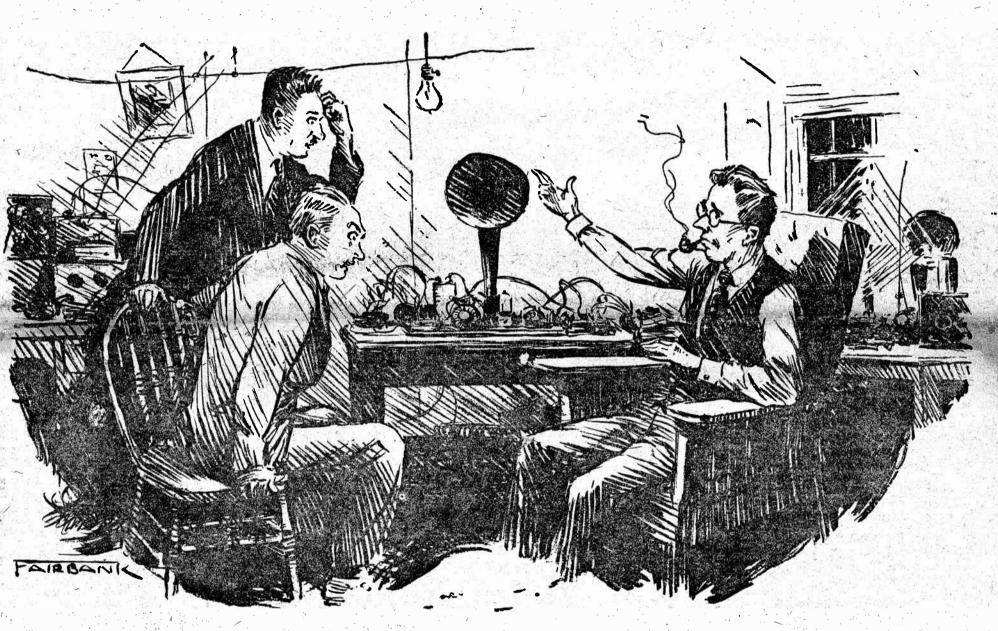
For further information call, write or telephone Operadio Sales Corporation, 1476 Broadway (Times Square), New York



## The Radio Discovery of the Century

Bill Johnson Deve lops a Theory, Puts It Into Practice and Astonishes Two Fellow Fans; "So Simple as To Be Ridiculous," Says One

**By EDWIN KEEN CORTRIGHT** 



"The effect of hearing this quiet inventor casually dicsuss the greatest discovery of the century was simply overwhelming."

**7 HATEVER** the future outcome of work. Of that there can be no doubt, and for its accuracy both Dick Parsons and myself will furnish affidavits. Whether or not it is true that after he secures his patents on the Johnson Electdo-Conductive Switch there will be but one type of radio receiving set used in America must remain to be seen. How it and how he worked out his idea must be | tions. left to better heads than mine to determine. The fact remains that Bill Johnson's one-tube set, equipped with his new switch, consistently brings in such stations as KGO, 2LO and PP.

From early boyhood Bill had always been known as a genius around his home town of Newton Center. At an early age his mechanical ability had been apparent. As he grew older his favorite delight became the overhauling of discarded flivvers and motorcycles. Be assured, in most cases, no matter how decrepit the tin Lizzie, Bill, by some mysterious means, would succeed in restoring much of its pristine vigor.

asting, however, that Bill came into his ondary coil, with one secondary giving | the condenser dial, Bill this matter may be, Bill made it own. Here it was he struck his pace; all his previous existence seemed as a trance in view of his present activity. Coils and condensers, inductances and capacities, henries and ohms, all were easy for Bill. Instinct and nature had so endowed his faculties and constructed his brain that for him every radio set was a case of love at first sight. Subconsciously Bill would was that Bill ever happened on the theory grasp its technical merits and complica-

#### Bill Is a Radio Bug

To estimate how many sets this radio marvel had constructed and repaired would be a most interesting study. To my knowledge he has built more than twenty-five sets for his personal enjoyment. At the present time, however, Bill is satisfied the ultimate has been reached and is convinced from now on most of the experimental work will be done in perfecting the television apparatus in connection with radio reception.

How readily that rainy, foggy evening comes to mind when Dick Parsons and I accepted Bill's invitation to inspect his new set! Only three months had passed It was with the advent of radio broad- since Bill had patented his double see- ment radiated from Dick's face. Shifting

increased voltage and one increased ampere. Consequently the current gossip of some new stunt developed by Bill served as a stimulant to our curiosity.

As we passed to the workshop on the third floor the sound of bagpipes met our ears.

"Black Watch pipers from 2LO," volunteered Bill.

Just then, turning the only condenser dial, he brought in the nasal tones of the Eiffel Tower announcer.

"Station PP," said Bill with a grin.

"I guess they struck it right down at the hardware store when they said you had a new wrinkle, Bill," said Dick after a natisa.

"Well, I don't know but that we have landed something out of the ordinary," Bill drawled; "but come closer and look it over."

Eagerly Dick and I pressed toward the set. There was very little to see. One variable condenser, one tube, a peculiar arrangement of four metallic strips near the terminals of a multi-cell battery and a loud speaker; that, substantially, was all. And to think that on this one-tube set we had just heard London and Paris! Amaze-

swung from sta tion to station across the United States, bringing in KGO with the clarity and volume of the locals.

As hour after hour went by our curiosity increased more and more. How on earth did he do it? Finally we demanded that Bill shut off the set and give us a detailed account of how he had happened on such a revolutionary change in radio construction.

Stretching himself out in the Morris chair, Bill began:

"Well, you see, for some time past I've had an inkling radio reception was not progressing along the correct path. Being considered an electrical development. t has been handled in the light of our electrical theories derived from our experience with dynamic electricity. As a matter of fact, radio is not an electrical development but an entirely new division of electrical phenomena. Consequently we have been all wrong in building radio apparatus designed from our knowledge of dynamic electricity.

"Heretofore all our efforts have been concentrated on taking a tiny electric current from the air; then, by means of coils, tubes and transformers, amplifying this minute signal until it has strength enough to operate a loud speaker."

While Bill paused, Dick and I ex-

## **Adopting Alternating Current for the Plate** Supply of the Radio Receiver

A Simple B Battery Eliminator May Be Constructed From Toy and Bell Ringing Transformers

been suggested for using rectified and filtered alternating current for the plate currents in radio receiving sets. Many of these ideas are excellent.

There are also a number of factorybuilt rectifiers on the market which are designed for use with the average set. However, most of them are not as flexible as one might wish. They usually supply two voltages, 45 volts for the detector and 90 volts for the amplifiers. Naturally this does not suit every one.

Some of us use as many as four different voltages-45 volts on the detector, 671/2 volts on the radio-frequency amplifiers, 135 volts on resistance coupled audiofrequency amplifiers and perhaps 90 volts on the loud speaker. Perhaps this is an extreme case, but certainly with the popularity of resistance coupling and the advent of the new power tubes for the last audio stage, we do not want our source of plate current limited to 90 volts. This does not mean, however, that the 90 volt tap can be discarded, for some of our amplifying tubes will undoubtedly require this potential.

Many articles have been written and some excellent data given for building a B eliminator and, if a plan is selected which will give an output of 150 volts, a fair substitute for B batteries will probably result. A suitable high resistance can be inserted in the output and taps taken for any voltage desired, below 150. Unfortunately most of these plans in clude the necessity of making a power transformer for stepping up the voltage of the house current before passing it to the rectifying and filtering equipment. This is a task any one without experience may well hesitate to attempt.

### A Simple Eliminator

True, one very simple type of eliminator has been suggested which obviates the necessity of such a transformer, but it is not very satisfactory, in my opinion. In this plan a toy transformer is used to step down the house current to heat the filament of the rectifying tube and the house current of 110 volts is passed directly through this tube and then filtered. The plan is a bit dangerous and in addition, when we only start with 110 volts the drop across the tube and the filter will result in too low a voltage in our output to be at all satisfactory ...

Because of the situation outlined above the writer decided to do some experimenting and discovered that, for a set whose plate current drain is not too heavy, a very satisfactory substitute for B batteries could be built, using a toy transformer more or less as a foundation. These little transformers, generally used to operate electric toys, trains, etc., are readily obtainable and are very useful.

There are, of course, a number of different makes, but they are generally somewhat similar. The one used is rated at 75 watts. A rough sketch is shown in Fig. 1. The primary is connected to the 110-volt house current. The secondary has three taps, A, B and C. There is a lever L, with six possible positions, as shown. These are in effect taps on one section of the secondary. When the lever is placed on tap 1 there will be a potential of 21/2 volts between B and C and 15 volts between A and B. When L is placed on tap 2 these voltages will jump to 5 and 17%, respectively. In other words, the taps increase these voltages in

### By JOHN F. TRAVER

nected to the untapped portion of the secondary, and there will always be a constant potential between them of 12 volts.

### Bell Ringing Transformer Used

Now let us look at the usual two-coil bell ringing transformer. It is usually designed to step the 110-volt house current down to about 8 volts. You have probably learned from your radio experience that the voltage output of a transformer is in proportion, theoretically, with the turn ratio of the secondary to the primary. Therefore, we may esti- This is a 6-volt light, and when connected

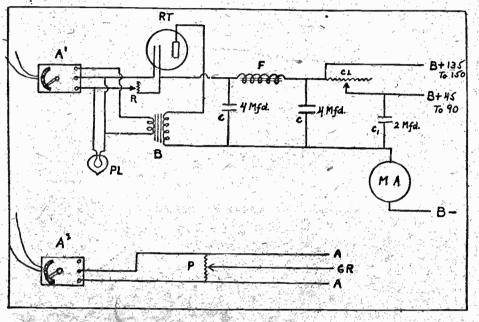


Figure 2-The wiring diagram for the B battery eliminator herein described

ing transformer must be a little over 1 to 13½. If we apply 110 yolts to the primary we take off 8 volts from the secondary. Now, if we reverse this operation, the same rule will apply. If we run 8 volts through the secondary we can take off 110 volts from the primary. In this way we would be running it as a step-up transformer.

the lever L on the second tap we will have a 5-volt potential between B and C. which is sufficient to heat the filament of a tube to be used as a rectifier. We will also have a potential of 171/2 volts between A and B. If we apply this to the secondary of the bell ringing transformer | is in the bell-ringing transformer. Most (using it as a step-up transformer) we will find its primary supplying 240 volts. Of course this is only an approximate estimate.

### Use of Taps

From the above we see that we have supplied the two voltages necessary: the high voltage to be carried through the rectifier and filter to the set; the low voltage for heating the filament of the rectifying tube. Furthermore, these voltages are quite flexible. By shifting the lever to tap 3 we obtain 7.1/2 volts for the filament and 275 volts to be rectified. Or we can make the latter independent of the lever position by connecting the secondary of the bell ringing transformer to A and C, and in this way obtain 165 volts. In most cases, however, the other arrangement, with the lever on tap 2, will be found preferable.

A wiring diagram is shown in Fig 2 The upper section is for supplying the plate currents. A is the toy transformer, B is the bell-ringing transformer. fier. CC are two fixed condensers of 4 mfd. capacity; F is a choke coil, which may be the primary of a second bell-ring-RT the rectifying tube, R a rheostat controlling the filament current of the rectiing transformer. This is all there is to the main part of the device, which will give a resulting voltage of between 135 and 150. To step this voltage down to,

mate that the turn ratio of the bell ring- to the 5-volt terminals of the toy transformer, will not burn to its full capacity and will, therefore, last for a long time. A milliammeter, MA, is also shown. As mentioned above, it is not necessary, but it will indicate indirectly the voltages you are using, and will tell more about the operation of the set. A good looking arrangement is to mount the pilot light just over the milliammeter in your panel.

alternating hum is noticed this condenser

will eliminate it. Of course, still other

voltages may be obtained by inserting

Two other instruments are included in

this diagram which are not at all neces-

sary, but which are, it seems to the writer.

well worth while. When using B bat-

teries, turning off the A battery switch is

all that is necessary when leaving the set.

In this case, however, the house current

also must be disconnected from the unit,

and in order to avoid forgetting this, it is

well to incorporate the pilot light, PL.

other resistances in series with CL.

**Pilot Light Used** 

Other choke coils may be used instead of the one mentioned above. The writer Referring again to Fig. 1: If we place | happened to have an old audio transformer specially designed for very low frequencies and having a heavy core. The secondary winding will make an excellent choke.

### **Possible Cause of Trouble**

The place where trouble is most likely to be encountered in building such a unit of these transformers have a decidedly small output, some even less than 4 watts. Now, 4 watts at 240 volts means less than 18 milliamperes, 3 or 4 of which will probably be taken up in your rectifier and filter.

From this you can see that it is advisable to buy the larger size of bell-ringing transformer.

By substituting a second toy transformer in place of the bell transformer a large output could be obtained, but it is not feasible. The secondary of the toy transformer is built with a low impedence for a large output and if this were inserted into the secondary circuit of the first toy transformer. overloading of the latter would immediately take place. This is evidenced by the shell becoming extremely hot. Such a condition is dangerous and if continued for any length of time would probably burn out the coils.

For the above reason no transformer having an output of more than 20 to 25 watts should be used in this step-up stage.

### **A** C on Filaments

Now, since we have tapped the house current for our plate potentials, we might just as well use it to heat the filaments of our audio tubes, or at least the last audio tube. This will enable us to use a power tube in the last stage.

We have already arranged for a low say, 90, insert a variable resistance, CL, rectifier tube and the natural thought preferable.

GOOD many different ideas have | steps of 21/2 volts. A and C are con- | and a 2-mfd. condenser as shown. The | would be "Why not use this for our audio latter may not be necessary, but if any tubes?" But it cannot be done. A glance at the diagram of the plate current unit will show the reason. The high potential side of the plate current supply comes from the filament of the rectifier tube.

> However, the list price of the toy transformer described above is only \$3.50, so another one of them and a potentiometer is all that is needed.

> The only change necessary in the receiving set will be in the grid returns of the tubes to be operated with alternating current on the filaments. You will readily understand that when so operated the two ends of the filaments become alternately positive and negative. Now, if the grid return were made to either of these points the grid would have an alternating potential impressed upon it which would be amplified by the tube along with the signal. If, however, the grid return is made to the arm of a potentiometer which is across the filament connection, the arm of the potentiometer may be moved until a point s found where the alternating potentials from the two ends of the circuit balance out each other, which will result in no alterations reaching the grid.

In the usual audio frequency amplifier, B batteries are incorporated in the grid circuits; the grid return is made to the C minus and the C plus is connected to the A minus. In order to adapt this to the alternating current arrangement leave the grid return attached to the C minus. but break the connection between the C plus and A minus and instead bring a lead from the C to the center arm of the potentiometer

The bottom sketch in Figure 2 shows the arrangement for supplying low voltage alternating current for the above purpose. A2 is the second toy transformer and P is the potentiometer; giving the two A connections to the filaments, and the counter connection, GR, for the grid return.

We now have what really amounts to two separate units, but there is no reason why they should not be built into the same cabinet. One 7 by 18 inches will hold all of the equipment easily.

Do not think that you have to use composition or hard rubber for the panel. If it is more convenient for you to use wood. by all means do so. This instrument does not handle high frequency currents and special dielectric materials suitable for high frequencies are entirely unnecessary. As a matter of fact the necessity for high dielectrics in panels is greatly exaggerated. Unless taps for radio frequency inductances are to be set into a panel or a grid leak mounted on the panel, there is little to be said in favor of one dielectric. as against another. The only dis tage in using a wooden panel is its tendency to warp, and this can be prevented by proper bracing. Both from the point of view of appearance and cost there is much to be said in its favor.

The best location for the potentiometer would be in the receiving set so that it could be connected directly across the filament of the tube in whose circuit it is

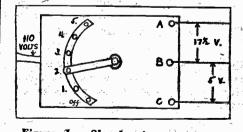


Figure 1 --- Sketch of a typical toy transformer

to be used. The writer has shown it as a part of the separate unit because, in most cases, it will be found inconvenient to add it to a previously constructed receiving set.

In closing let me make one more suggestion: Do not use the usual receiving tube as a rectifier if you can obtain a regular rectifier. The latter is designed voltage supply for the filament of our | for the purpose and will be found

of the receiver are: 195 to 555 meters. stages. late or regenerate. set up uncontrollable oscillations.

World Radio History

all the second

### Improvements On the Neutrodyne **Receiving Circuit**

### By Jack Binns

One of the outstanding features of the New York radio show was the appearance of a completely shielded three-stage neutrodyne receiver with maximum voltage amplification per stage. Incorporated in this instrument are several engineering devel opments of major importance. The design of the receiver is the 12 Big Games on

culmination of eighteen months concentrated experimental work by the engineers in the research laboratories of the Hazeltine Corporation and its licensees. The chief characteristics

Practically uniform amplification over the entire wave length band-

Complete stability through the elimination of all tendency to oscil-Increased over-all selectivity.

The elimination of distortion through the radio frequency circuit design which permits the passage of the audible frequencies.

The new receiver was evolved a the direct result of deliberately planned research. The early experi ments showed that it was not only necessary to shield the radio frequency circuits but also to include the vacuum tubes themselves within the shields. In this respect an interesting fact asserted itself. With the tubes left outside the shields their plates acted as small capacity antenna, collecting energy and passing it into the system through the coupling transformers. This phenomenon destroyed all stability and

This experience showed that even with the circuits shielded but with the tubes exposed it would not be voltage amplification than five per stage with three-stage sets. On receivers employing four or five radio frequency stages the amplification per stage would be less, with the consequence that five tubes would

be doing the work of only three. formers so they would give more unifrequencies involved. This was successfully achieved, so that now the lower and higher wave lengths is 10

recention is obtained.

first radio frequency tube. This is fans." so arranged that an antenna can be lyzing the detector tube on local signals. In this manner it is not necessary to change over aerials to bring

New Program Schedule for Station WMCA Thursday

to 10 p. m.

theatrical celebrities as participants, the tournaments.

### Stations to Go Back to Standard Time To-day

This being the last Sunday in September, broadcasting stations in this country that were using daylight saying time will set their clocks back one hour and start operating on local standard time Also starting to-day, all radi rograms published in the Herald Tribune will be in Eastern stand ard time.

### WEAF Schedule which they were rated.

of the ten per stage in the radio tions in the chain. They include frequency circuits, which is said to some of the biggest games of season, tric and other factors. be the greatest yet obtained over the such as the Harvard-Priceton-Yale contest and others which delight the hearts of the football enthusiasts. A running description of the plays will be broadcast direct from the scene of action.

> Saturday, October 17-Army vs. Notre Dame, Yankee Stadium, N. Y. Saturday, October 24-University of Pennsylvania vs. University of Chicago, Franklin Field, Philadelphia. Saturday, October 31-Yale vs.

Army, New Haven, Conn. Saturday, November 7-Harvard

Princeton, Princeton, N. J. Saturday, November 14-Princeto s. Yale, New Haven, Conn.

Saturday, November 21-Harvard s. Yale, Cambridge, Mass.

Thursday, November 26-Cornell vs.

University of Pennsylvania, Franklin Field, Philadelphia.

Navy, Polo Grounds, N.Y.

### **A New National Fraternal**

**Body of Broadcast Listeners** A national fraternal body of radio broadcast listeners, the first of its a straight-line frequency calibration kind in the country, is being formed curve that changes the tuning of the possible to obtain a greater average by a number of New York radio en- circuit in approximately ten kilocythusiasts, according to an announce- cles for each division on the dial. ment issued from its headquarters in Acolian Hall.

The organization, known as the National Radio Service League, will high-wave-length stations crowded to take an active interest in legislative gether a great deal more than on ormatters, either local or national, of complete shielding the next step millions of owners of radio receiving for hair-line tuning devices and verhearty commendation of prominent the apparent congestion on the lower form amplification at the different people, many of whom have agreed wave lengths. to serve on its honorary committee Among them are Dr. Charles D. Hop Vine Spoils. ratio of amplification between the Isaacson, well known musical impresario and director of Station to 9. where it previously was 14 to 7. WRNY; Alfred J. McCosker, of

a ten-foot antenna average normal apparatus," said W. Howard Judson, supporting a hop vine.

### used without the possibility of para- Medieval Music Selected

On Wednesday evening at 9 o'clock his receiver.

sary to change over Berlais to Dring in distant stations. The receiver, however, is sufficiently sensitive to give satisfactory loud speaker signals without antenna or ground on local without antenna or ground on local will be broadcast from stations titled "Points of Progress." The electrical impulses. essay will be "Magna Charta," a sur-On Thursday Station WMCA's fall vey of that document which was the months' schedule will become effec- very first to recognize the right of magnetism a long time if a piece of tive. The broadcasting hours during the plain people to liberty and the this period will be as follows: Mon- pursuit of happiness, and which day through Saturday from 11 a. m. established a precedent which was to to 1 p. m.; from 2 to 5 p. m. and find real culmination in the American 6-to 12 p. m.; and on Sundays from 11 a. m. to 12:15 p. m. and from 6 Station WMCA has planned for the on Richard the Lion-Hearted and the winter months programs of interest to women, men and children. The tween King John and the feudal morning programs will be devoted barons who forced him to hear the solely to women. Musical and novel voice of the people at Runnymede. events have been arranged for the afternoons and evenings, such as Mr. Hector Fuller, and, like all of the complete operas, playlets, stars from essays in the "Points of Progress" Broadway shows, dinner and dance series, will have as a background music by celebrated orchestras and specially selected music recalling the the Gala Sunday Night Broadway historical period with which the es-Bright Lights' Period with prominent' say deals, the music of chivalry and

## Where Pioneers of

### By Frank Reichmann

Take the matter of variable condensers, for example. The early man- teen meters. At the same time in the of WSAI programs. Through the New ufacturers labeled their product by the number of plates they contained and not by the maximum capacity at

To classify condensers by the num-Football, the great American sport, ber of plates is just like marking barwill have a prominent place on the rels by the number of staves instead football matches which will be broad may have any capacity from zero to and received messages for over an until 4:30. An average voltage amplification cast through WEAF and other sta- infinity, depending on the size of the plates, the thickness of the dielec-

Broadcasting stations are placed on operating range with more than two classic trio, the famous Army-Navy certain wave lengths, and even to-day the position of a station is given in meters, while actually the stations are placed at equal divisions of frequency. The condensers were accordingly made to tune by equal changes in wave length. The frequency difference of two stations on a low wave may be ten kilocycles, yet they both may be located within a band of two meters. If these two stations were located on high waves and separated by ten kilocycles the wave length of the two might be five or six meters apart. This makes the lower wave lengths appear to be very congested when ordinary variable ondensers are used for tuning. -Stations on the high waves are just as close together, and, in fact, every available frequency band has been oc-Saturday, November 28-Army vs. cupied by one or more stations.

This matter is now being corrected by designing condensers that tune by equal variations in frequency, rather than changes of capacity or wave length. The best new condenser has

Stations are spread over the dia equally, with stations on the lower end of the dial separated and the dinary condenser dials. This makes Having demonstrated the necessity which will affect the welfare of the tuning easier and eliminates the need was to improve the coupling trans- sets. The movement has received the nier controls and helps to clear up

### **Radio Reception**

Pittsburgh; WGR, Buffalo; WWJ, of the vine attained a useful age. Detroit, and WCCO, Minneapolis, the The antenna, freed from its load, is second of the historical series en- now doing full duty in intercepting

> A permanent magnet will retain its steel is kept across the poles.



MacMillan's 40-Meter Waves | hour on the forty-meter wave length. Reach Only 1 Station in East although other stations of greater Radio Started on A peculiar phenomenon has been power located in the East at approxobserved by radio amateurs in the expedition's base are compelled to use The Wrong Path eastern sections of the United States the seventeen-meter wave length to as a result of attempts to communi- accomplish the same feat. cate by short-wave radio with the President Reichmann Corporation MacMillan Arctic expedition. With We can low begin to see where the very few exceptions all transmission pioneers of radio started on the east of the Allegheny Mountains has wrong path in a great many things. been carried on extremely short wave lengths, in the neighborhod of seven-Central West the forty-meter wave York hook-up, Paul A. Greene, manlength has proved most effective. Scientists are at a loss to explain this peculiar condition.

the successful exchange of messages widely known scholar, minister and between the polar expedition and the orator, to broadcast from the New Radio Broadcast-Eveready short-wave York studio church services beginprogram of WEAF this fall. The fol- of the amount of material they will Garden City, L. I. Using very throughout the winter. The services lowing is the schedule of the various hold. An eleven-plate condenser low power, that station transmitted will begin at 2:45 o'clock and last

\* 15

Dr. Cadman to Conduct Non-Sectarian Services for WSAI

Non-sectarian church services for Sunday afternoons for the coming fall and winter will be one of the features ager of WSAF, has secured Dr. S Parkes Cadman, pastor of Central The one notable exception has been Congregational Church, Brooklyn, and



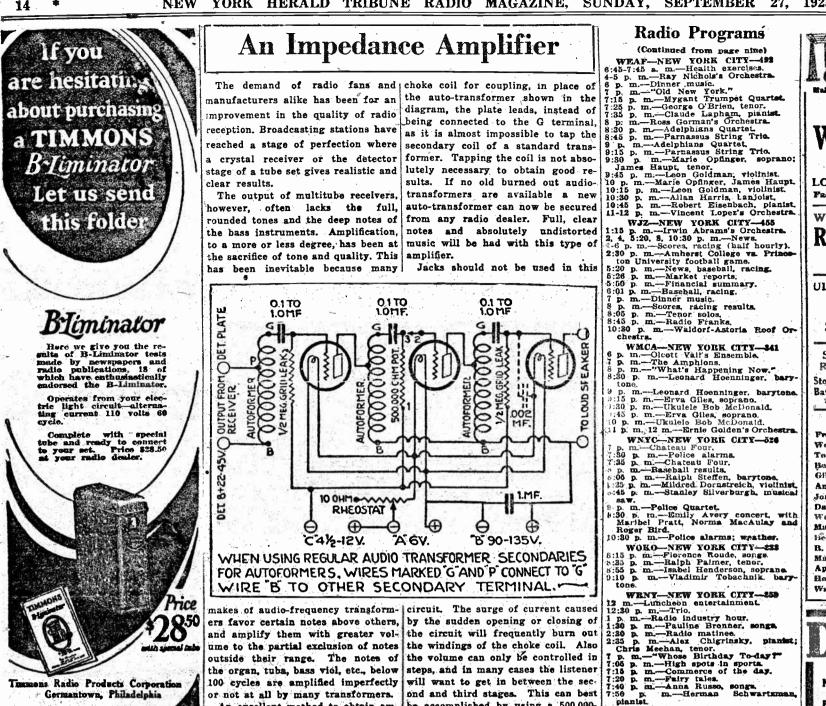
pensive set; super-power broadcesting makes it necessity; Waterbury works, mailed direct \$5; send for literature. G. B. Gardner, 923-A. Hutchinson Court, Brooklyn, N. Y. ERLA SERVICE STATION Authorized by Electrical Research Lab. A limited number of factory built Erla sets at special prices. REPAIRING, REMODELING, REWIRING Authorized BUY DIRECT-FIVE-TUBE RECEIVERS all circuits. Also carry Erla APEX RADIO SERVICE 123 Liberty St. Rector In solid mahogany cabinets with battery compartment; bokelite panels and parts; atented circuit employing regeneration or extreme distance; 135 to 550 meters; Rector 3176.

For Sale

BATTERIES FULLY CHARGED, 35c. Called for and delivered. Batteries rented ind repaired, Plaza 2069. Spencer Battery Service, 888 1st av. (50th). PHONES, LOUD SPEAKERS REPAIRED. remagnetized; sets repaired; weak tubes that light revived, 50c. Roy's, 100 West 46th st. Byrant 0985. INSPECTION, installations, repairs, in radio since 1908; reasonable rates. Mar-don. Dayton 1531, 1309 West Farms Rd.

25 TO 40% off on Brunswick Radiolas, Superheterodynes, Victrolas, Records, Greenberg, 3891 8d sv. (1724). Bingham MEN to build radio sets in spare time. Leon Lambert, Wichita, Kansas.

NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, SEPTEMBER 27, 1925



Germantown, Philadelphia TIMMONS Radio Products

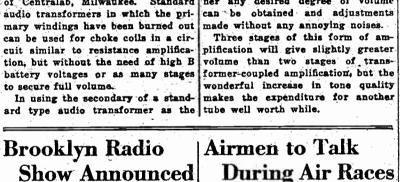
14 \*



When you can get so much for so little-when newstandeasily yours-why be content with less than the efficiency **360° dial**.







More than ordinary interest is mote than ordinary indices is an races to be held at Mitchel Field, WAHG-RICHMOND HILL, N. X.-316 made last week that a radio con-Garden City. L. I., on October 8, 9 12 midnight-2 a. m.-Dance music. made last week that a radio con-trolled airplane, which is perhaps the latest sensational development in this rapidly growing industry, will be shown for the first time to the public at the second annual Radio Regiment Armory, Brooklyn, for one week, beginning October 17. This airplane is seven feet from tip to tip and about five feet beam. Tentative arrangements have heen Tentative arrangements here the tentative arrangements have heen Tentative arrangements here the tentative arrangements here 
itan district.

of everything that is new in radio. little, U. S. A.; Al Williams, U. S. N., Manufacturers, dealers and distribu- and Captain St. Clair Street, U. S. A.

offered by the Remler Twin- and evening on a specially construct- the close of the great conflict he has Rotor Condenser with the ed stage and studio at the end of the maintained his activities in aerothe entire week.

> Saturday afternoon, October 17, by one. Borough President Joseph A. Guider Another who is scheduled for a

position offices

for the best constructed set, the most record. unique type set and the set that is unique type set and the set that is capable of reaching the greatest dis-tance. Amateur speed contests will be held Amateur the set of the speed contests will acrial take care that all kinks and be held Amateur the set of the speed contests will be held Amateur the set of the speed contests will acrial take care that all kinks and be held Amateur the set of the speed contests will be held Amateur the set of the speed contests will acrial take care that all kinks and be held Amateur the set of the speed contests will be held Amateur the speed contests will acriate the speed contests will be the speed contest of the speed contests will be the speed contest of the speed cont tests.

r not at all by many transformers. ond and third stages. This can best An excellent method to obtain am- be accomplished by using a 500,000lification over the entire audible ohm potentiometer in the grid cirrange is pointed out by the engineers cuit of the second tube. In this manof Centralab, Milwaukee. Standard ner any desired degree of volume wonderful increase in tone quality

### During Air Races

trolled airplane, which is perhaps and 10, Station WOR will broadcast tip and about five feet beam. With practically all available space already taken this year's show these talks, and the list includes the one of the speakers who will give these talks, and the list includes Wath-NEWARK-263 WAAM-NEWARK-263 promises to be one of the most suc- Lieutenant Walter Hinton, U. S. N.; 7 p. m. Blackstone cessful radio exhibitions ever held Captain E. Rickenbacker, Lieutenant Leigh Wade, U. S. A.; Lieutenant J. 8:15 More than 60,000 feet of floor space A. Macready, U. S. A.; Lieutenant R. will be devoted entirely to exhibits L. Maughan, U. S. A.; James A. Dootors from all over the United States | Captain Eddie Rickenbacker, said who have progressed in the develop- to be America's greatest ace in the ment of their particular product have World War, has assured WOR offiards of tuning accuracy areso | engaged space in the auditorium. | cials of his presence. Captain Rick-Practically all the metropolitan enbacker was a famous automobile proadcasting stations will broadcast racing driver, and entered aviation from the exposition both afternoon for Uncle Sam during the war. Since

auditorium. Many of the leading nautics, seeking always the medium Broadway radio artists have already providing the greatest speed. He had 3 p. 1 signified their willingness to take many thrilling experiences in his part, and indications are that there aerial combats during the World will not be an idle moment during War, and the relationship of these events and his views on the big air The exposition will be opened meet should be interesting to every

and will be open to the public every | radio appearance at WOR during the | afternoon and evening until the clos-ing, Saturday evening, October 24. Williams. His talk will perhaps be the most interesting of the series, as WRW-TARRYTOWN, N. Y-273 afternoon and evening until the clos- air meet next week is Lieutenant Al All schools, radio clubs and other organizations, together with manu-facturers, jobbers, distributors and the is the holder of the Pulitzer race facturers, jobbers, distributors and facturers, jobbers, distributors and speed record and the American facturers, jobbers, distributors and speed record. He has traight-away speed record. He has applying to the Brooklyn Radio Ex- been selected to fly the special Cur- 2:30-4:30 p. m.-Radio Trades tiss navy racer in the big event and Amateur contests will be conducted will go after a new world speed

also be held Among the exhibits in twists are avoided, and if formed these contests will be specially built they should be straightened out carelow-wave sending and receiving con- fully in order not to weaken the wires.

Orchestra

8 p. m.—Orchestra.
8:15 p. m.—Motion picture series.
8:30 p. m.—Gluseppe Adami, violinist.
8:45 p. m.—Faminine news.
9:15 p. m.—Feminine news.
9:30 p. m.—Bernstein Trio.
9 p. m.—Photographing the Family."
10:15 p. m.—Ti Boncing Essential?"
WFBH—NEW YORK CITY-273
2 p. m.—Stranders.

m.—Bert Lowe's Entertainers. m.—Bert Lowe's Entertainers. m.—Maud Edens, contraito. p. m.—Scores (quarter hourly). p. m.—Montana Ramblers. p. m.—Surane Hacket, soprano; ton Yokemano, tenur, Renee Schie-soprano.

ber, soprano. 6 p. m.—Southern Serenaders. 7 p. m.—Friedman and Finch, songa. p. m.—Syncopators. p. m.—Bronx program.

WHAP-BROOKLYN. N. T .-- 240 p m.-Dinner music. WBBE-STATEN ISLAND-273

8 p. m.—Malcolm Carment, clarinetist. 8:10 p. m.—L. Brown, soprano. 8:20. p. m.—Bible questions and an In connection with the New York 8 40 p. m .-- Soprano, clarinet solos.

-Alice Laurie, soprano. 8:30 p. m.—Thad. H. Conick, tende, 8:50 p. m.—Alice Lautie's Trio. 9:05 p. m.—Bioomfield Ridge Boys. 9:30 p. m.—Manuel Ravelo. 9:50 p. m.—Hanuel Ravelo. 10:20 p. m.—Hartley Joy Boys. WGCP-NEWARK-252

WGCP-DEWARK-252 2:45 p. m.-Vocal and instrumen cital; race results. 4:30 p. m.-Indianans Orchestra. 

.—Orchestra. —Navy Yard Band. —Radio Show program. —Studio program. 

m.—Concert orchestra; recital p. m.—Dance music, p. m.—Concert orchestra. WOO-PHILADELPHIA—508 4:45 p. m.-Grand organ; trumpets. 7:30 p. m.-Dinner music. p. m.-Dinner music. WIP---PHILADELPHIA---508

p. m.—Football game between Univer-sity of Pennsylvania and Swarthmers. p. m.—Dinner music. m.—Bedtime Story. m.—Lou Young, football coach. p. m.—Song recital. p. m.—Mandolin Club.

. m.-Dance music p. m.—Organ recital WHAR—ATLANTIC CITY—275

p. m.—Lecture Period. m.—Seaside Trio. WPG—ATLANTIC CITY—308 1.---Evening concert.

Concert. WHAM-ROCHESTER, N. Y.-278

-6 p. m.—Theater organ. p. m.—Theater organ. :30 p. m.—Scores; weather. :30 p. m.—WNAC Dinner Dance.

8:15 p. m.--Musical program. 10:30 p. m.---'Crandall's Saturday Nigh KDKA-PITTSBURGH-309

6:15 p. m.—Dinner concert. 8:30 p. m.—Westinghouse Band.



Use the Radio Exchange Column if you want to Buy, Sell or Exchange anything in Radio

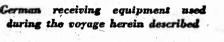
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river.

## The First Commercial Trip of the Leviathan **Under the Stars and Stripes**

Writer Depicts Thrill of Being One of the First American Operators Aboard the Liner

By ROBERT H. HORNING



HE Leviathan was actually slipping out of her berth in the North River. Without ceremony, the big craft slid as easily from her long resting place as she had slid in, years before, exploding rumors of long standing that she could never be moved; that she had so far rusted that her engines could never be turned over; that the mud had settled in about her hull, that this and that was so, wellshe never could be moved, that was all! People actually believed all this, but she was moving and her own engines were moving her out of her berth.

This all happened on the rather dull and most unauspicious morning of April 7, 1922. The sun was hidden behind early morning thunder clouds which formed a serene background for the lofty lower New York skyline. So at two bells the ropes holding the mighty craft to her drab army dock in Hoboken were loosed, and without a quiver the former pride of the German merchant marine began to move. Slowly, almost imperceptibly, the pier began to recede, then faster and faster, and of a sudden the realization

### First American Crew

Thus began a voyage which will linger in the memories of each of the 1,000 members of the crew of the Leviathan. Each was an American, and each had a particular duty assigned him to perform. That was his part of the taking of that giant vessel on its first trip as a commercial vessel under the Stars and Stripes from the port of New York to the port of Newport News, Va. At Newport News is situated the plant of the Newport News Shipbuilding Company, to which the contract for redecorating and rebuilding the Leviathan had been let, after years of uncertainty as to the disposition of the craft.



Above—The operating staff of the present-day Leviathan. Below—The radio room as it now appears. The panel in the background houses the tube transmitter.

the vessel in the active list. But in order to deliver the giant to the shipbuilding company there were certain obstacles to vercome.

The draft of the Levisthan is in the neighborhood of thirty-six feet, light. The harbor at Newport News, Va., could not permit a vessel of this draft to enter without first dredging a channel. This operathat the ship was in the center of the | tion took months, and not without a con siderable expense.

How was the Leviathan to be got into the harbor in the first place? To have towed a steamer of that size would have presented tremendous problems, always with the danger of the tow lines breaking and of leaving the huge craft at the mercy of the sea.

There remained, however, American ability to man and run the Leviathan under her own steam! The engines hadn't been turned over in years, true. The steam pipes would leak, the water pipes would leak, the electrical controls had to be thoroughly gone over, the oil steering apparatus needed attention, and there were a thousand and one other details.

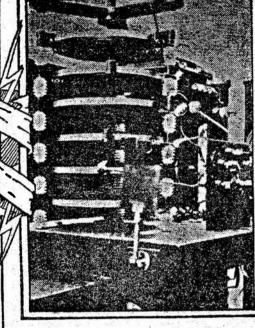
As one of the first three commercial

Congress had at last consented to place ; operators assigned to the Leviathan's radio staff it was our privilege to view the vessel after years of inactivity, following upon a mighty and most commendable war career. None of the ship's equipment had as yet been transferred to American manufacture, and each piece of apparatus still bore the German name plates, just as the Germans had installed them, prior to that memorable August of 1914.

It must also be admitted that a feeling of pride crept over one to know that both above and below and in each corner of that tremendous boat there was an American on the job, each thoroughly trained in his particular duty.

### Sails After Four Years' Rest

So, on April 7, 1922, just four years to the day since the entry of the United States into the World War, we of the radio department, and it might equally be said of the other officers and crew of the United States steamship Leviathan, that our hearts beat just a trifle quicker with the thoughts that the new pride of the American merchant marine had been intrusted to us, to take safely to Newport News,



The original spark transmitter aboard the Leviathan

Va., to be redressed and decorated, as was her aus. Suddenly, yes, positively suddenly, and without warning the Levisthan was out in the middle of the Hudson River. The movement had been so slow, so imperceptible, that of a sudden there we were!

Small tugs, like leeches, seemed swarmed about the sides, and just as imperceptibly as we had swung out into the river, we were turned around and headed toward the broad Atlantic, amid the deep throated little harbor craft which had gathered in early morning in anticipation of the big ship's departure. Most of them were doomed to a ducking, however, as a sprinkle of rain greeted our entrance into the Narrows, the banks of thunder clouds emitting parting peals and brilliant streaks, all of which added to the weirdness of it all. Owing to the extreme earliness of the hour of departure, only a few of the early morning New Yorkers and commuters from New Jersey, viewed the Leviathan as she majestically steamed past the ferry slips, lower New York, and finally the Battery. On all sides of the big ship were tugs, steaming apparently for all they were worth, in a vain endeavor to keep abreast of the boat. One or perhaps several of the smaller craft bore batches of newspaper men, and one could see plenty of camera men trying to snap the big craft in the early morning haze of the Lower Bay. Most of these men must have been terribly disappointed, hard luck seemingly following them from the start. First, it was too dark; then when everything seemed to be going fine, a stiff breeze sprang up, coming in directly from the sea, causing something of a fog. and also causing the tops of the rather heavy swells of "the bay to be wafted directly over the tugs. The last tug turned back after a while of fruitless pursuit of a hidden sun and with a last deen toot, as of bon voyage, we were off! But alas-after rounding the tip of Fort Hancock, better known as Sandy Hook, where Uncle Sam stores some of his champion loud speakers, the fog grew thicker, and in an amazingly short interval resembled something of a London pea soup variety. This caused a halt in further operations, and rather than take unnecessary chances Commander W. J. Bernard, U. S. N., in command. ordered the anchor into the deep.

### Halts for Fog

Most fortunately, the anchor went over just in time. Due to the breeze which had sprung up from the east, the fog lifted after a halt of perhaps two hours, and much as a curtain on the stage would lift to reveal the chorus, there were stretched out in front of us, hardly a quarter of a mile away, batches of small fishing dories, sprinkled here and there with larger excursion fishing smacks. These craft lay directly in our path, and though we may have wormed our way through them with-

# The First Commercial Trip of the Leviathan

out incident-our whistle sounding regularly--it seemed well worth the while to have anchored, especially as the Leviathan is so enormously large.

**T** 🖄

Once the curtain of fog had lifted sufficiently to permit further safe navigation, the anchors were immediately hauled in and the trip resumed. There were numerous rumors aboard that Commander Bernard would try something at speed. These were soon dispelled when an unofficial statement was reported giving the speed as eighteen knots, and that speed would be maintained throughout. The statement continued to state the motors as working perfectly, the steering apparatus working perfectly and everything as satisfactory. Unfortunately, the entire trip was made under leaden skies, and most uncomfortably cool ocean breezes. The entrance to Newport News, however, was harpily accompanied with warm sunshine.

### Value of Radio Bearings

Due to the inability of the deck officers to observe the sun, or "shoot the sun," as it is popularly known at sea, in order to determine the exact position of the vessel, it was necessary to call upon the radio department for frequent bearings from the land compass stations. The land compass stations dot the shores of the United States and are maintained by the Navy Department. By means of these stations a vessel plying up and down the coast is constantly aware of its position, regardless of the weather conditions. The use of the radio compass stations is not necessary, when the deck officers can observe the sun or any of the more important stars. In foggy or inclement weather conditions the radio bearings, no doubt, have averted numerous collisions and have warned many a vessel commander of his proximity to shore. Commander Bernard was not taking any chances with his charge, judging by the number of bearings taken.

Inasmuch as the Leviathan was still under a Shipping Board classification. most of the measures received and transmitted were headed S. B., or Shipping Board, and indicated that they were "riding" free, Regardless of whether or not they were free, there were no words left out which may have confused the reading of those messages consequently each, sent or received, with the usual exceptions, numbered over 100 words. Most of these messages pertained to the condition of the tide, weather, channels, winds, barometric pressures and other information essential to the safe operation of a skiff the size of the former Vaterland.

After the ship had been successfully moored at its Newport News home Commander Bernard personally congratulated and thanked the radio personnel for the efficient and expedient manner in which they had handled messages to and from the vessel especially the radio bearings. upon which he had apparently relied so much and had set his course.

### **Preparations** Before Sailing

For two weeks prior to the actual sailing of the Leviathan we were told to little windows to peer through. Evidently ing shoreward, the entire city waterfront breakage of this necessary item is highly hold ourselves in readiness for a mo- intended to be soundproof. They were. was, to put it mildly, simply lined. These essential to a ship at sea.

### (Continued from page three)

ment's call. The delay in the actual sailing of the big ship was due to Newport News dredging operations which were undertaken to provide a channel which would permit the Leviathan to enter withcut fear of grounding. Even so, careful measurements of the tide had to be taken, and the entrance of the Leviathan into the harbor was carefully planned to take place at a certain time. How well this was planned is indicated by the fact that there was no delay whatsoever, from the rounding of the first sea buoy till the time the giant was finally berthed.

The call to duty aboard the Leviathan came on April 5, 1922. As was to be expected, the apparatus aboard consisted of a five-kilowatt Telefunken spark transmitter, with a sealed resist ince at two kilowatts, which somewhat handicapped us, in ismuch as the big antenna had been dismantled and a dummy had been strung from the rear smokestack to the middle stack, this fairly short antenna probably feeling most of our antenna input directly back into the steel work of the ship. For receiving, the former Telefunken cryscal receiver, with its myriad of different value coils, inserted to receive either long or short frequencies, acted as a last resort. For our more commercial and modern purposes, a navy type, long and short wave receiver, together with an open core type two-stage audio frequency amplifier, was utilized.

At our backs, mounted on the wall, was small auxiliary half-kilowatt spark transmitter, of undoubtedly Telefunken manufacture. This machine was somewhat out of order and more or less dilapidated in condition. No attempt was made to put this machine in operation, since all of our combined energies were needed to clean the apparatus, which had had no care whatsoever for nearly three years. It was stated some of the officers stationed aboard during the ship's period of inactivity were in the habit of using the crystal receiver to listen in on some of the local radio concerts.

The first arduous task which befell the radio man was that of cleaning off verdigis and other oxidation transforming highly polished copper leads into sordid black bars. This chore was accomplished with much rubbing with sandpaper and an eventual polishing rub-down. High overhead was the skylight through which the lead-in from the antenna entered, and directly underneath were some huge knife switches rigged up with ropes attached to handles and pulleys, reminding one somewhat of a barn with a hay hoist. These "jiggers" proved a most trying bit of apparatus to clean, but, like everything else, were eventually conquered, oiled and finally one could tug again at a handle and have the switches above open and close at will.

The room inclosing this mysterious apparatus resembled a butcher's refrigerator, just about as thick, and having handles just like those big brass things and

At our backs, as we sat facing the receiving equipment and desk, were the controls and telephone connections with the bridge and other departments of the ship. They were most conveniently located and were in perfect working order, as was the apparatus, although a trifle dusty. Power to run the transmitters was furnished by a German motor generator, located in a peculiar room, full of big motors, directly in back of the operating room. To get into this room one had to crawl on all fours through a small aperture. He then found himself in a dimly lighted motor coom. Just what all the motors were for we never found out; in fact, it took considerable time to discover which one belonged to the radio department. They were all of German manufacture, and. naturally, hardly resembled anything we know even in outside appearance. Finding our machine to be in perfect running condition, we replenished its supply of oil and it was not necessary to revisit it again

A neat hand-controlled reactance regulated the speed of the machine and a most clever German frequency meter indicated when the machine reached a 500-cvcle pitch. Little black beads appear to rise from a straight line under the frequency indicating the velocity. A maximum radiation of nine amperes was noted in the antenna circuit at sea, although more were registered at dock in Hoboken. The steel pier was probably absorbing the extra current. Everything about the apparatus was thoroughly German. The leyden jars, several in number, were several feet in height and much narrower than the American type. It must be said, however, that German apparatus is well built and designed with a view toward accessibility. The personnel of the radio department

of this memorable voyage consisted of Messrs. Kay, Newell and Horning, Kay acting as chief and deserving a lot of credit for efficiency. Before leaving New York watches were drawn, in which the 12 to 4 was drawn by Horning, the 4 to 8 by Newell and the 8 to 12 by Kay. Receiving watch was started at 12 midnight of April 6 while the ship still lay at her berth in the North River. Watch was closed shortly after her arrival at the pier

in Newport News Shipbuilding Yards. The entire trip was most enjoyable from all angles. The first night after leaving the city found Kay and the writer, after dinner in the main dining saloon, pacing the promenade deck, once around which is equivalent to a quarter mile. How many times we paced this deck is a conjecture; sufficient to state that the wind was tearing through most everything, and a most bracing sea air it was!

Upon entering the harbor of Newport News we were accorded a rousing reception, in which all the harbor craft joined in a vociferous welcome. We were met near the entrance by a fleet of tugs and several aircraft, and from the decks, lookpeople realized that the contract garnered by the local shipbuilding plant was to prove a lifesaver for most of them. They are nearly without exception all workers in the shipyards, and work had been scarce for a long time. How well they did their job can be gleaned from a tour of inspection of the mighty Leviathan at her New York pier, near Eighty-sixth Strect.

### Description of Photographs.

In the views accompanying this article, the writer was fortunate in obtaining a recent photograph of the Leviathan's chief radio officer, Mr. Pickerell, who may be seen standing alongside of the very latest type equipment with which the vessel is equipped. Both long and short wave lengths are now used, together with a complete broadcast transmitter. Along the shelf in the foreground are the receiving instruments, direction finding equipment, and typewriters, by means of which the operators transcribe from code to words in one operation. To the right of Mr. Pickerell's head are located relays, while over his head is suspended a spark transmitter with its quenched gaps protruding. Directly in back is the highpowered tube transmitter which does most of the actual work in transmission. The radio room is located on the top deck, between the first and second funnels.

The group of officers standing on the promenade deck constitute the present day personnel of the radio department of the Leviathan. This is somewhat in contrast to the first trip with but three officers assigned to this duty.

It is interesting to note the difference in the apparatus. In April of 1922 all of the former German apparatus was still aboard and in use, as the accompanying photographs show. The view of the receiving apparatus shows an American Navy type long and short wave receiver, a De Forest navy type amplifier located atop the receiver. This was installed in as much as the German receiver visible on the left operated by the old fashioned crystal, and was not stable in operation. Over the top of the receiver are four large German high frequency meters mounted on the wall and indicate the power supply to the transmitter.

Though we would consider most of this apparatus of antiquity to-day, it was never out of order on the entire trip, and really did remarkable work. In the view of the transmitter the tuning helices of Telefunken manufacture occupy the most prominent view, though to the right may be seen the wave change over switch, and directly in back, like long four-inch pipes, are the Telefunken condensers. These are also known as Leyden jars, and are peculiar because of their length, about five feet tall. They are made of glass jars and coated with copper both inside and out. There were six of these large condensers. It is possible to build a condenser with greater efficiency to-day, occupying a space of approximately half foot square and which is not breakable. Space and

The Radio Discovery of the Century

changed glances, each "eager to learn where this tide of thought was carrying the other.

"Did you read last week of that large blast at Chimney Rock Quarry?" suddenly queried Bill.

"Sure was some blast," commented Dick.

"Ten tons of dynamite were exploded when the foreman applied the current." "But, Bill, why the dynamite in con-

nection with radio?" I ventured. "Not too fast, Jim; give me a chance,"

retorted Bill. "What I am anxious to get into your head is that the results of this dynamite blast were-in no wise in proportion to the foreman's physical effort in applying the electric current to explode the dynamite. The electric current was simply the means by which the explosive force of the dynamite was liberated. Generally speaking, the force of the blast was dependent only on the amount of explosive used.

tween the dynamite and our radio. The means to operate my electro-conductive former corresponds to the voltage impressed on the loud speaker and the elec- the switch is sensitive enough to operate tric current used to explode the dynamite on a signal received from Paris; after

### (Continued from page one)

operate a loud speaker with great volume is very small. In fact, an ordinary battery has sufficient energy to operate a loud speaker over a long period. Please notice, then, the entire problem resolves itself around the possibility of working had fallen and he was staring at Bill in out a switch device capable of opening and closing a battery circuit in the same ratio as the alternations or frequencies of the incoming signal."

"Bill," I insisted, "do you mean to tell me your set uses only that small battery unit standing there to bring in London and Paris?'

### Uses Mighty Little Juice

"I certainly do," asserted Bill. "In fact am compelled to use a small shunting device to reduce the current sent to the loud speaker. What I want you to understand clearly, Jim, is the fact that I use "Now, then, Jim, for the analogy be- the weak incoming signal simply as a switch. As you have seen demonstrated,

through the aerial. As you fellows well | loud speaker size as to what volume can know, the number of watts required to | be produced. Give me the proper materials and I can make that London pro-

gram heard all over Newton Center." Frankly, beads of perspiration covered my forehead. Feeling mentally faint, I cast a helpless look at Dick. His lower jaw bewilderment. We were taken off our feet. The effect of hearing this quiet inventor casually discuss the greatest discovery of the century was simply overwhelming. Several moments of silence elapsed, then Dick recovered sufficiently to remark:

"Say, Bill, assuming what you say is true, where on earth did you discover a switch delicate enough to operate on a millionth of a volt?"

As Bill quietly knocked the ashes from his pipe, a broad beam of satisfaction settled on his face.

"Dick, have you ever heard of the wonderful apparatus these astronomers use? Their thermopiles are so sensitive they measure the heat given off by a candle two miles distant? Their spectroscopes, equatorials, in fact, all their instruments, operis the tiny signal brought into your set | that it is simply a question of battery and | ate with an accuracy of one in a million.

Can you suggest any reason why the same accuracy and sensitiveness cannot be obtained with radio apparatus?

"But to get back to our story. Of course we all know that different metals possess different intrinsic characteristics such as weight, specific heat, melting point, coefficient of expansion and, most important from our point of view, different electrical conductivity. Several months ago the idea occurred to me that this quality of different electrical conductivities could be used as a basis for the switch I had in mind. Since then I have made literally hundreds of experiments in connection with the opening and closing of high frequency circuits through the juxtaposition of different metals with various conductivities. Certain results early in my experiments led me to believe I was on the right track. Had it been otherwise I can assure you discouragement would have conquered me. Later in my experiments I became convinced by the voltmeter action that cadmium and zinc were the proper metals for the positive terminals and ground connection. But how on earth to find the others? At length,

(Continued on page siz)

on the direct invitation of the French government. The International Telegraph Convention is a general treaty which has been enforced in one form or another since 1879 throughout nearly all the world, except, as I have said, in the United States. The treaty discharges to the detector tube), and itself provides for further conferences to be held at intervals to make connect them to the antenna and the necessary modifications, but due to the war there was no meeting ground. We thus have an ordinary between 1908, which was held in Lisbon, and the coming Paris meeting. three-circuit tuner with two steps of

By Herbert N. French

Due to the widely varying reports

received by me relative to results

obtained on the 7-tube receiver I

Tribune Radio Magazine, July 5, 1925,

Some builders of this set state

that it far surpasses any claims, and

others that they can barely get locals.

No one yet has reported merely in

Some of the complaints are as fol-

lows: No distance. No volume on

locals. Uncontrollable squealing. No

My first and most important sug-

restion is to disconnect the two ends

of the primary, or small winding, of

different results.

Nations May Discuss Wireless More Information **Problems at Paris This Fall** On the Seven-Tube Super - Heterodyne

The International Telegraph Conference at Paris and the Washington International Radio Conference Both to Discuss Same Problems

By P. E. D. Nagel

Assistant Chief Transportation Division; Chief Communication Divi- I feel that a few remarks are in sion, Bureau of Foreign and Domestic Commerce, United States order. Department of Commerce

The United States government accepted the invitation of the French government to attend the International Telegraph Conference now in session at Paris and the following information has been prepared to show the relation this conference has to radio.

THE Paris Conference is a regular meeting of the International squealing. Condensers do not tune. Telegraph Union of which nearly all of the principal countries One neophyte was sure his tuner of the world and most of the smaller countries are members. oscillated all night, but couldn't make The United States is not a member of the union and is attending only it squeal!

In general the treaty is designed >to provide standard methods for the! exchange of cablegrams and tele-

grams throughout the world. The delegates are always government officials; that is, representatives of the signatory governments, but private operating companies are requested to attend and to make suggestions or recommendations, although the United States, not being a member of the Telegraph Union, is not bound by the treaty and its private cable and telegraph companies are not obliged to comply with it. The general provisions of the treaty are followed as a matter of business practice by the American companies themselves. It is obvious that there must be some recognized international standard so that a message originating in the United States will be treated the same way in any distant foreign country as would a message originating in any other part of the world, and conversely messages filed abroad

must be treated in some standard method in the United States. This is value of the telegraph treaty. Now in regard to radio, at the time

national Radio Conference at London produced an International Radio Congraph convention and quoted verbaandertaking.

Transoceanic radio telegraphy and

Washington. many nations in replying to the invi- set for the spring of 1926. tation submitted proposals for the modification of the telegraph convention which included various phases of radio. The handling of international

each part of the service. tensive in a radio convention.

WHT to Maintain Staff **Of Radio Reporters** 

A staff of radio reporters, or expert receptionists, located in every arge city in America, is being rganized by station WHT through ts engineering research department, in charge of Chief Engineer Reeve O. Strock, for compilation of technical data to aid in correctng faulty transmission and to inure uniform quality of reception throughout the dominant broadasting range of the station.

Each WHT reporter will for ward a weekly report to the research department and these reports will be checked one against the other at the weekly conference of the WHT operators and it is beieved that much valuable information will be obtained.

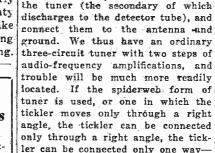
that in the first class would come such a provision as "The governments back and forth, moving it less and Now in regard to radio, at the time signatory to this treaty agree to take less each time until the best set-few ships. In 1912 the first Inter- an article as "The sender of any obtained: message may prepay the reply in If. on the other hand, no station be placed at the head of the message wrong, an easy mistake to make, as telegraph convention. Inis radio would appear the provision that sibly the fixed condensers are shorted. 3.000 meters).

really come into existence only since Paris will deal only with those ques- any convenient way. the war. An attempt was made in tions in regard to radio which re- If your detective work has been 1920 to combine the radio and tele-graph conventions in a single docu-ment with the title of the Universal Electrical Communication Union. For various reasons, however, una- the meaning of the different symbols for condenser sizes used. Also poor For various reasons, nowever, una-nimity of opinion could never be and abbreviations placed on messages, tubes or not burning them bright nimity of opinion could never be and arrangement for prepaid mes-secured among the nations, and it secured among the nations, and it sages, collect messages, repeat mes- uncontrollable squealing had, no was many decided to note the tele sages, etc., are in the nature of stand- doubt, too much tickler coil, with the ance with the provisions of the tele- and international rules applicable for result that his detector oscillated ance with the provisions of the tele-graph convention and later to hold an the greater part to radio messages as continually. The RF tubes cannot international radio conference at well as cable messages.

Regardless of any action taken at It will save a lot of time and

### A Novel Device

messages at the present time involves Gardner, a Brooklyn printer. It con- the time spent. the use of cables, telegraph lines and sists of a black dial, calibrated in radio telegraph stations for the same hours, the same as an ordinary clock. message in so many cases that it is On the black clock dial is a smaller difficult to make distinct rules for rotating dial calibrated in the times into three parts, the first being gov- compares with that of any part of half way around the world. ernmental, political and economic in- the United States, the rotating dial terests, etc.; the second, matters of is set at standard time in the time general policy and standard methods zone it is being used. By looking at for the exchange of business, and the the rotating dial it is possible to tell ing set to headphones in another third purely technical operating ques- the hour at any other point in the room it is possible for persons some tions. The third section of a tech- world. Inasmuch as the minutes are distance from the set to enjoy con-nical nature would be very limited in the same in all zones, it is possible to certs. When confined to bed by illa telegraph convention, but very ex- tell the exact minute of the hour at ness or permanent injury this is an a place on the opposite side of the excellent means of bringing enter-As examples of regulations to these giebe.



the right way. If the detector refuses to squeal, reverse these leads. With such tuners, in which the tickler can be continuously rotated, the whiler can be connected either way. Audio-frequency difficulties have been too frequently discussed to necessitate my going into them here. If this connection works satisfac-

torily, and, the condenser covers the wave-length range, reconnect the tuner primary as shown in the original diagram, and disconnect the primary of the second spiderweb coil, connecting antenna and ground to its loose ends. The builder should now read carefully the operating instructions I gave in my article. If the last three tubes have been checked as above, and are working satisfac torily, a local should be heard. In the general purpose and the chief three different classes I might say tuning the spiderweb's condenser for maximum squeal, swing it smartly

which case the letters RP followed can be heard, it is possible that the vention along the lines of the tele- by the number of words prepaid shall builder has connected the spiderweb graph convention and quoted versa-tim many of the provisions of the before the address." In the third it is difficult to distinguish the leads tim many of the provisions of the section under a radio convention from the inside of this coil. Posagreement, however, related only to stations engaged in international tele- Test in the usual manner. Check saip to shore communication, trans-oceanic radio telegraphy being then graph service between fixed points socket contacts and turn bulbs way oceanic radio telegraphy being then shall use frequencies of less than 100 up. As I stated in my article, it is non-existent and radio telephony kilocycles (wave lengths in excess of almost impossible to go wrong, as fixed condenser, variable resistance There is every reason to believe and choke-evil values are not at all Transoceanic radio telegraphy and that the telegraph conference at critical, and the wiring may be done

the war. An attempt was made in quire an international understand successful up to this point, reconnect

oscillate, so don't look there.

Paris, it is probable that everything trouble to buy, ready wound, induc-The decision to hold a telegraph in any way connected with radio will tances designed expressly for the conference, however, was reached con-be taken up at the International size condensers you are using. That siderably in advance of the arrange- Radio Conference at Washington, the element of uncertainty is eliminated, ment for a radio conference, so that date for which has been tentatively and other possibilities of trouble are few and easily met.

Let me repeat: This set is worth the trouble. Check up your wiring A new novel time-finding device has and parts carefully, and tune per in-recently been devised by George B. structions, and you will not regret

### Amateur Makes Record

Gerald Marcuse, an amateur radio operator in Gaterham, England, says of the various parts of the United he has talked from his home with a In general, any world-wide treaty States, as well as London, Hawaii and radio operator on board the United to govern either telegraph or radio Alaska. To determine how time in States cruiser Seattle while the vessel telegraph separates itself naturally any of the above-mentioned places was approaching Australia, virtually

### **Entertainment for Sick**

By running a wire from the receivtainment to the bedside.



\* 13

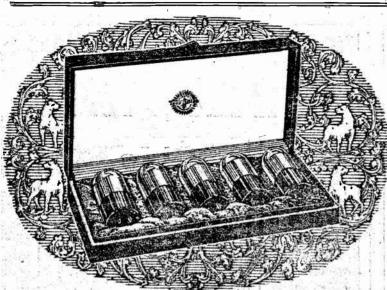
but it is unlikely.

South Pole.

there is little or no resistance.

Power of Radio Impulses

course is usually vertical and not



12 \*

## BRIGHTSON TRUE BLUE **RADIO TUBES**

WORD-OF-MOUTH endorsements have played an enormous part in making radio sales. The numerous technical radio terms combined with the plentiful claims for "marvelous, outstanding, wonderful achievements in radio" have left the radio purchaser in a daze amid a heap of radio literature. So he's gone to his neighbors and his friends and purchased radio equipment on their advice because he knew the value of their word.

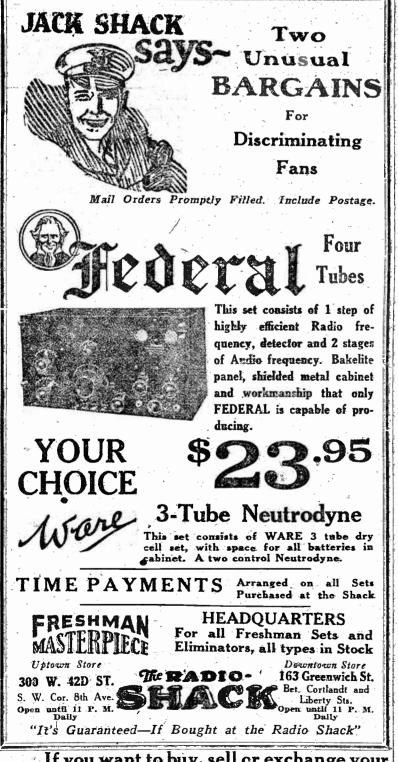
When True Blue Tubes were first advertised "The Finest Radio Tube in the World" no cne could prove such a claim. It was necessary to have faith in the product.

Today an ever increasing army of True Blue users will testify to the truth in True Blue advertising. Ask your neighbor True Blue user-he knows the value of our word. Price \$3,50 each.

BRIGHTSON LABORATORIES, Inc. 16 West 34th Street, New York City

his Office: 50 N. Eleventh St., Philadelphia, Pa

the light air and free space above? THE FINEST RADIO TUBE IN THE WORLD horizontal. It is true that radio im-



If you want to buy, sell cr exchange your that it reaches during the night be- casting depends for success on a decline the invitation to act as a radio sets or parts the Radio Exchange will fore descending to us. On this as- happy union of atmospheric condi- matrimonial agency. But the rehelp you.

1.20

V . -

## The Relation of Air and Atmosphere to Radio Waves

Radio Signals May Possibly Rise to Great Heights Above the Earth Before They Are Picked Up by the Antenna

### By Howard G. Lapsley

ADIO reception tests in New York City and nearby vicinity have of particular interest, only to be demonstrated the notably local characteristics of static. Broad- greeted by a flood of jumbled harshcast programs that have been literally smashed to pieces ness belching from the horn of the have been received with but slight static disturbance in adjacent towns, loud speaker? It interferes with the and programs which were practically impossible of reception in these program, it grates upon the nerves nearby towns were reported as being well received in New York. These of the listener and tries the patience contrary conditions obtained, not for short periods of three or four of those people who desire quality minutes, but for an hour or two. As these tests were made twenty reception unaccompanied by this obto twenty-five miles apart by air line, and as the broadcasting was jectionable noise. from New York City stations, two conditions have been demonstrated; By understanding the reasons for First. that static disturbances are sometimes definitely localized; sec- the various noises, you may obviate ond, that static interference apparently affects reception from the air, disappointments and obtain a quality rather than delivery into the air, of radio messages or music. It is always easy to wander from

the realm of physics into the realm during the daytime which it is capa-

of metaphysics and to turn from a ble of at night. page of definite data to a mystic If we accept the theory that radio signals start up vertically into space First, we have the studio noises, dream of indefinite hypothesis, so we must wander off into the indefinite, the question arises: What brings them mospheric electricity. and short courses. Maybe the impulse

does take the short, straight course, The path of least resistance is which created it. Radio impulses are appears. Air is reasonably heavy on the sur- minutely divided forms of electricity face of the earth and very, very light to start with, and possibly they are medium may be defined as those above it. Now, the question is, will still more minutely divided by the sounds which are caused by electrical radio impulses spend their slight air or atmospheric electricity which disturbances between the broadcaststrength, in piercing the thick sur- they pass through. Electricity in- ing station and the receiver itself. face stratum, or will they follow the herently resists all confinement and In this group are found the disturbine of least resistance and rise into restriction. It seeks immediate ac- ing influences of high tension power tion, whether controlled or uncon- lines, violet and X-ray machines, trolled. Electricity may not be life leaky transformers, electrically oper-

life spells expansion. through fifty feet of coal strata, earth.

### Cause of Static

but the audibility has fallen off rapidly as this distance was increased. Also there is little or no directional months the air, becoming warmer throughout the summer months. control of radio signals, and, while and warmer, rises to unknown Many satisfactory programs are sudthey will penetrate, they also pick heights. The frigid upper spaces red denly broken up by a series of untheir own route. Some radio signals sent the intrusion of this warmth familiar clicks and in many cases sent from Nauen, Germany, to Aus- into the domain of coldness, and it is are interrupted entirely for short tralia have apparently gone by way driven back to earth forcibly, by periods. Those are caused by imof the North Pole, while other signals lightning and thunder. Three-quar properly operated regenerative and have apparently gone by way of the ters of our thunder storms occur in super-heterodyne receivers. these three hot months. Sometimes

Clear spots and dead spots of re- [the sullen, sultry summer air is hotception are of common occurrence. ter than before the electrical storm, or less suppositious. The regularity spoils of the atmospheric battle, a with which the signals from certain little of the coolness of the upper

The sea of air at the bottom of The more one ponders on science, which we live rises in sharp peaks either pure or apprice, the most out and descenas in deep valleys of make a statement with and low pressure. The radio signal taken of each individual cell. Any air of finality, but it does seem if our conception of its rise is corto some listeners who have spent many hours at the midnight radio cension, is forced back to earth. In identical in appearance, it sometimes dency to be purely local. A careful Diving toward earth in a parabola tion is found. study of your barometer may indi- the radio signal would pass through cate 29.86, with severe static inter- vortices of low resistance and peak Of Possible Interest to a ference. The barometer near the sreas of high resistance, mixing in sending station may indicate 30.66- its course with atmospheric electricbarometer reads 30.04 may have no electrical sound impulse.

the barometer may give us more air are fairly regular in area and al- to find him a suitable wife. The knowledge than we now possess about ternate high and low resistance the only stipulations were that the girl atmospheric electricity. The differ- radio signal comes through with what should be good looking, and very ence between mid-day and midnight appears to be a definite, recognizable lonely. Probably she needed prereception may be accounted for by beat.

rays stretches the elastic belt of air radio impulse traverses before it ful- posed for her. around the earth's surface to twice fills its mission in our machines it is WCCO is not prepared to admit its nightly proportions, forcing the hard to conceive. Regardless of its that there is anything it cannot do, radio signal to reach twice the height course, however, present-day broad- but for reasons of policy it had to sumption the average receiving set tions as demonstrated by the barom- quest suggests infinite possibilities would get about half the distance eter and thermometer.

### **Cause of PoorRadio Reception Laid to Induction Noises**

Radie reception has not yet reached that foolproof stage where it is only necessary to turn a switch to secure continuous satisfactory production.

How many times have you looked forward to some broadcast program

of tonal value that will be a continual delight, says the service department of the Freed-Eisemann Radio Corporation

Let us consider the sources of thes noises.

when we ask: where does the radio back to earth and our earthly antenna? which originate at the broadcasting message or music go, when it leaves To every action there is an equal station. Noisy microphones cause a and opposite reaction, so there is steady hiss which often blurs the tion, before it comes home to us on some etherial reaction which brings voice of the artist. Programs picked the headphones or loud speaker? Does these man-made impulses back to up outside of the studio and carried it reach heaven before it reaches our earth. This reaction may be gravity, overland by wire for broadcasting but it is difficult to conceive of grav- are usually excessively noisy by intrators picture: the radio flashing ity affecting either man-made or at duction from neighboring wires a steady, rushing sound, especially no-Air has the electro-chemical power ticeable when the receiver is funed to divide liquids and solids into the to resonance, is caused by the genmest minute particles. Air has the erator which supplies the plate poadditional power to hold these par- tential to the transmitter tubes. This. natural to electricity as well as man, ticles in suspension almost indefi- noise is more or less pronounced on. so we may assume that radio im- nitely. Moisture may be in the air all stations, and continues until the pulses follow this course, and instead months before it descends as rain. broadcasting is finished and the staof zooming along the earth's surface, Volcanic dust has been known to fail tions sign off the air. When this ocby up into the thin, high ether, where a year or two after the cruption curs the rushing sound suddenly dis-

Noise contributed by the etker It is fair to assume that their but it is the antithesis of death, for ated elevators, sparking motors and generators, trolley and elevated rail-Man produces electricity generally way systems and telephone and telenorizontal. It is true that radio im-pulses will penetrate practically any-thing. In coal mine experiments ra-letricity by means of cold. Air re-from those undesirable sources dio signals have been distinctly heard sents the escape of heat from the usually occur at short wave lengths and are picked up by sensitive receivers. Static also comes in this In June, July and August-our hot class and is more or less prevalent

In the third class are the noises which are caused by the receiver itself or by the equipment which is ception are of common occurrence, ter than before the electrical storm, used in connection with the same. but the whys and wherefores are more and sometimes it brings to earth, as Discharged B batteries become noisy and are usually the cause of a high stations surge and fade away causes regions. However, the so-called vaone to wonder if all the messages cant spaces above us always appear operating on the second audio stage. and music we receive on our machines to win the argument, and the hot These batteries should be discarded does not travel a long, arcing route through the high spaces before it reaches us. this case are caused by one or more either pure or applied, the more one and descends in deep valleys of high tected unless a voltmeter reading is

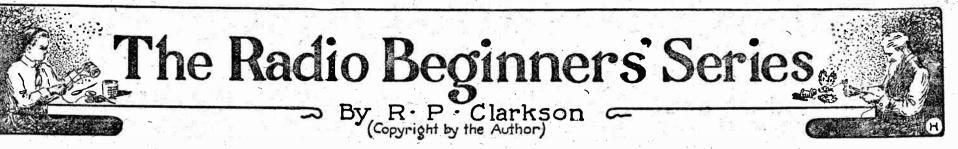
vigil, with acutely sensitive ears, that the downward descent it must sink happens that their internal elements radio signals may possibly rise to readily into these valleys of low- are not rigidly supported, and any radio signais may possibly lise of readily into these valleys of low are not rigidly supported, and any great heights above the earth before, pressure space with little resistance disturbance in the vicinity of the resulting in a strong signal, or, penerotation down on our antenna, like a drop of trating through a high peak of air vibrate. This defect in construction down on our antenna, me a drop of trating through a high peak of an vibrate. This detect in construction dew, which we must magnify in our with greater resistance, deliver to us produces a bell-like sound which may able splash of sound. In this supposition may he part immediately overhead and a high by shifting the tubes about in the of the answer to static and its ten- barometer would indicate an air peak. sockets until a satisfactory combina-

Good Looking, Lonely Girl There is no' apparent limit to what a difference of 20 points. Another ity which may entirely demolish or radio broadcasting is expected to acreceiving set in an area where the render unrecognizable the original complish nowadays. The other day a request came to CCO from a man static disturbance. A close study of When these peaks and vortices of in western Canada asking the station vious experience with Ioneliness in the theory that the heat of the sun's How high the arc may be which the order to be fitted for the life pro-

for the future.

# Up-to-the-Minute News of Radio in Pictures





HERE was nothing radically new shown at the shows, as we prewould be the case last dicted spring. Storage and dry batteries for tube filament heating and for plate voltge are still the rage, but there were many types of devices for using the lighting circuit for tube operation. A number of sets were shown again, as many were a year ago, for operation from lighting circuits. In every case, however, such a set is merely some convenient and compact combination of the ordinary set, with one or more of the ordinary battery eliminators. It is a case of putting the whole works into one cabinet.

The thing which most impresses me in looking over commercial sets is the tendency to put everything in one basket. set, batteries, speaker. Some three or four years ago two or three manufacturers did this. In fact, back in 1920 there was a set which combined everything in a single cabinet, the first model (and the last, I believe) which that manufacturer brought out. That idea died out completely and was revived by the multitude of portable sets which came into being a summer or two ago. Strangely enough, several of the portable sets have abandoned the compact idea and home sets are fast taking it up. It seems to me that it has become more popular than the low price console type of set, the latter arrangement being reserved for high priced outfits.

### Modern Tendencies

Another tendency is to do away with the mechanical or machine appearance of the front of the set. In many cases everything is wiped off the front of the cabinet except the outlet for the speaker. In one case, and approximately in several others, the controls are hidden away in the scrolls and fretwork of the speaker mouth, so that the entire set looks like simply a cabinet speaker. In spite of this tendency there was a complete absence of freak cabinets, no sets disguised as clocks. lamps, lighthouses, Eiffel towers or Woolworth buildings. I'm sorry about this. I always had a desire to see some one bring out a set disguised as a train of cars and so arranged that you could crawl into the cab of the locomotive to work the controls, while the tender behind carried the storage battery, the smokestack gave out speech and trailing along one by one were the box cars, each carrying a block of B batteries, all connections being made through the track, and perhaps overhead trolleys.

In parts there was nothing new and little of interest. The tendency seems to be to make the regular standard stuff, but to make it better, more dependable, lower priced and sometimes a little more compact. There were coils wound on forms. self-supporting coils and coils imbedded in various materials, mostly transparent. Spaced winding is more frequently used. Large sized wire is even less used than a year ago. There was little appeal to the broadcast listener by any low wave material. although it showed occasionally. Loops have undergone no change, and it seemed to me, and I may be wrong about this, that there were fewer loop sets than at any show of recent years. I wonder if loops are not making the headway we expected. Certainly it is the ultimate aim to have a completely self-contained set, whether with batteries or lamp socket operation, and for this the loop is essential. Possibly the reason is the number of tubes required, unless reflex is used, and, strangely enough, the five and six

tube sets seem to be the limit, in spite of | don't all mold them, as they do loud | There are a tremendous number of gang speaker horns.

**Changes in Sockets** 

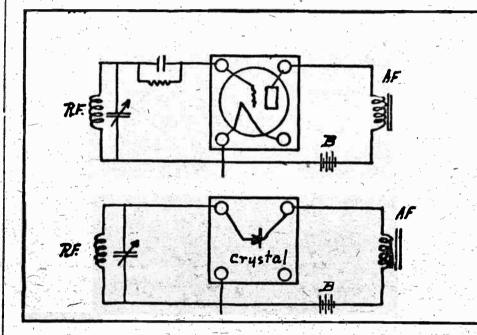
tubes cheapening in price.

In sockets at last there are a number of radical changes, and mostly for the better. Interrupted bases, forming an air gap between plate and grid; elimination of the metal shell in favor of a narrow support- in a self-inclosed set. Most of the sets ing ribbon; better support for the contact where everything is in a single cabinet springs, and several minor changes, all used the horn type, as do all of the cabispell greater socket values. To take a net speakers, I believe. leaf from the stock market reports, we might say "Prices remain firm."

ers. grid leaks, condensers, binding posts and small parts generally show no external change and no more than expected increased perfection in manufacture. Panels seem to be wavering. Metal panels

Speaking of loud speakers, few new models were shown. Horns are still in evidence and make up most of the models. Cones and barrels are constantly increasing, however, and decorative models are many. I saw only one cone type speaker

In dials I received the impression that every one was making a vernier type. Rheostats, potentiometers, transform- | There must have been twenty or thirty, all pretty much alike and all very attractive. One, at least, was devised to perforr the astounding feat of changing a straight line capacity condenser into a straight line frequency type, by some and metal backed panels are talked of, but | method of friction cams or gears.



The method of substituting a crystal for a vacuum tube detector

hard rubber and phenolic compounds still seem to hold their own for the present. Subpanels of insulation are universal. Hardly any one builds on the base of the cabinet. Even the cabinets are molded in

Condenser of the variable tuning variety were prominent, but sets, of course, overshadowed parts. Straight line frequency and straight line wave length types were most frequent, but it did not seem to me a few instances. I do not see why they | that the majority of sets were using them.

### The Radio Discovery of the Century

(Continued from page four)

after many weary hours of work, a fortunate combination of cadmium, silver. lithium and zinc gave the desired result. The problem was solved.

"As for the remainder of the set, as von already know, it is simplicity itself and that, gentlemen, in a nutshell is the story of the Johnson Electro-Conductive Switch."

Dick drew a long breath and a look of relaxed tension crossed his face.

"Bill, your fortune is made."

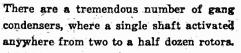
"Well, boys," Bill smiled, "I wouldn't want it known, but the Inductance Corporation has made me an offer of one thousand grand per year during the life of my patents."

teresting evening. As I left Dick in front of his home he remarked again on the simplicity of Bill's new switch.

"Dick." said I. "it strikes me the whole affair is so simple as to be ridiculous."



Two large transmitting vacuum tubes which are now on exhibition at Albert Hall, London, England. These are the tubes used at the new Station 5XX, Daventry. They are known as the Holybdenus Electro Valves, have a power of 1 kilowatt, and cost £60.



I think the general conclusion of observers is that to a large extent the shows from now on will be, like the auto shows, a yearly display of new models of sets. Of course, we all know that during the last two years the set business has grown from being 20 per cent of the business to being 80 per cent of the industry. The business has grown, too, and while parts are now only 20 per cent, the total value of parts sold yearly has increased. Parts sales to manufacturers have increased, but this is not taken account of here.

So much for the new parts and new tendencies. What about hook-ups? The answer there is the same. Not a new hook-up has raised its head in many moons. Commercial sets are all tuned radio-frequency. I say all. That isn't strictly true, but just an impression. Actually there are some regenerative sets, some reflex sets, some super-heterodynes. There is an occasional set using one or two stages of R. F. fixed transformer coupling, with perhaps one of tuned radio frequency.

With this condition we have no quarrel. It does not indicate anything at all. Many fans have the idea that because almost every one is making tuned radio frequency it must be best. But they have forgotten the patent situation. Admittedly the patent situation on circuits is hopelessly muddled, but the fact remains that if a manufacturer makes a set using regeneration or super-heterodyne he is almost sure to be mixed up in litigation because some one owns those patents and licenses are not granted. The tuned R. F. in its ramifications seems to be completely owned, and into this opening most of the manufacturers who have recently gone into set building have forged.

The fan who builds his own is not handicapped by any patent fear. He can make any set he likes so long as the patent owners maintain their present atti tude, and the fan usually has something regenerative about the house. Many have super-heterodynes which they have made. Many have reflex sets. Many have crystal sets and thousands have four, five and six tube R. F. sets, tuned and untuned.

No matter what your set. the audiorequency side of the detector is the same. That is, all audio amplifiers are identical. regardless of what detector and R. F. hook-up they are used with. We have Congratulating Bill, we pulled on our | finished with amplifiers until something coats after thanking him for a most in- | new turns up. Now, let us turn to detectors.

For a detector you have two choices a crystal or a tube. There are a number of different crystals and there are a number of different tubes. There is only one main crystal hook-up, of the crystal itself, but there are two ways of using the tube as a detector, one regenerative and one not. Wherever you use a tube as a detector and it is not regenerative you can substitute a crystal to advantage in some particular and to some disadvantage in other particulars. Any one using a tuta as a detector should try a crystal. It can usually be done by taking out the tube and not disconnecting the socket, but connecting the crystal across from grid to filament, using a crystal which will stand the B voltage and short circuiting the detector grid condenser. The result will be as indicated briefly in the diagram.

The way to tell whether or not your tube detector is regenerative is to look in the plate circuit. If the plate terminal of the detector tube goes direct to the audio transformer without passing through some form of coil, such as a variometer or a tickler, then it is non-regenerative. In some sets, of course, it will go to the jack and then to the transformer. That is a mere convenience. No detector is regentrative without some form of coil in the plate circuit.

SK any radio fan if he ever heard of the words "volt," "ampere," "ohm," "farad" and "henry," and he will immediately respond them are eliminating all jacks and with, "Sure; what radio bug who reads a radio publication providing binding posts in the rear hasn't?" Ask him if he ever heard of gentlemen by the names of of the set for the loud speaker connections. Alessandro Volta, Andre Ampere, Georg Ohm, Michael Faraday and The elimination of plugs and jacks Joseph Henry, and he will look you blankly in the face and shake his s ridding receivers of two very com head in negation. If given a moment or two to compare the words and mon sources of trouble. the names, he will forthwith appreciate that there is some connection Any receiver is better off without between the two apparently irrelevent questions. jacks, for that matter. Wiring is The history behind the derivations

urement, so commonly employed in radio practice of all kinds, is but infrequently recounted, yet it invariably proves interesting to the radio enthusiast because he probably has been frequently puzzled by them. It incidentally brings to light some little known facts about the very earliest scientific knowledge of wireless communication and of certain the effects of electricity on non-con- fine wire used in winding the transphases of other epoch-making accom- ducting mediums; in other words, the former core. plishments. Encyclopediac research yields the fact that the "volt," the unit of electrical pressure, was designated in electric arc and for a substance which honor of a famous Italian physicist is the base of aniline dyes. named Count Alessandro Volta, who taic battery," he announced to the Franklin and Edison not excluded. Royal Society of England early in ly thereafter a learned member of the fundamental idea of an earlier

electricity.

very time a handful of British col-

How Electrical Terms Used in **Radio Received Their Names** 

Units of Standard Value Called After Prominent **Experimenters:** Joseph Henry Responsible for Foundation of Present-Day Radio

### By Sidney Elbert

of these five units of electrical meas-

### Volta's Experiments

man to burn gases in a closed cham- been possible. ber by means of an electric spark. This he succeeded in doing just at the

would not appear for 125 years.

scholar and physicist for whom the

was adopted in 1881 as the unit of the resistance of electricity-conducting materials. The unit "mho" (pro-

### Life of Faraday

The "farad," and its hybrid, the microfarad," or "mfd.," is a shorten-

the great laboratory of the worlds best known for his discovery that becoming more and more popular, in measurement of condensers. The period of his work was about 1831.

The most interesting story is that The Count, who received his title "henry," the unit of coil size, is from the illustrious Napoleon Bona- named. Henry, an unpretentious nafrom the illustrious Napoleon Bolla- named. Henry, an unproved by the tubes operating at their most parte because of his great discoveries. tive of Albany, ranks with Faraday efficient setting of the rheostat, is was one of the earliest experimenters as a founder of this age of electricity. with electricity, and is known to pos- yet he is comparatively unknown. He terity as the inventor of the electric certainly did more to develop the cell. This device, first called a "vol- science than any other American.

It was Henry who developed the the year of 1800, and following short- electro-magnet, improving greatly on that erudite organization voiced the Englishman. He wound bars of iron conviction that the "voltaic battery with copper wire insulated with strips was an alarm bell to experimenters of silk his wife tore from her wedin every part of Europe." It was ding gown, and he obtained magnets more than that: it supplied the elec- stronger than any ever dreamed of. output of the last tube, proving entricity for many of the startling in- In 1831 he sent a current of elecventions that changed the entire life tricity through a mile of wire and regulation is secured. of the civilized world. Volta's orig- caused an electro-magnet to actuate high school sophomores immerse boon to humanity, but it was Henry center contact like a potentiometer, plates of zinc and copper in beakers who really was responsible for it connecting this contact to the grid of sulphuric acid as their first phys- Morse had an idea, but he made no of the next tube. Approximately ics experiment in the generation of headway on it until he read of the 500,000 ohms puts the proper load on inventions of Henry and applied the the transformer for best results. latter's electro-magnets. Henry, fur- while the variable arm must have thermore, was the inventor of the perfectly smooth regulation from As an interesting sidelight it might telegraph relay, without which long- zero to the maximum resistance. be mentioned that Volta was the first distance telegraphy would not have

### Henry Responsible for Motor

Henry's greatest contribution was onists in a far-off land known as his discovery of a system of produc-America were signing a brazen docu- ing electricity with the aid of mag- ance is a graphite ring upon which ment called the Declaration of Inde- netism, in this labor antedating the a metal disc is pressed to make conpendence; he little realized that he famous Faraday by several years. All was giving unborn automobile en- the generators and transformers emgineers a dependable ignition system ployed in electrical and radio practice for self-propelling vehicles that operate on the principles he set forth. Henry also is authoratively credited A contemporary of Volta was Andre Marie Ampere, a distinguished French

scholar and physicist for whom the "ampere." or unit of electric flow, is named. Radio is indebted to Ampere for his observations on the relation of this state in the fact that it comes between the metal disc and was he, in 1842, who discovered that pressure arm, which does not make and electricity, and the electrical discharge of a Leyden the electrical contact and therefore of magnetism and electricity, and the electrical discharge of a Leyder the electrical content of the electrical discharge of a Leyder the electrical content of the electrical discharge of a Leyder the cannot cause noise even after long service. The resistance strip reinventor of a device on which the duce similar discharges in circuits a mains unbart by the pressure con-considerable distance away; this, in tact of the disc, whereas the usual ern electrical meters is founded. "Ohm's law," familiar to every man ciple of wireless telegraphy. Henry from the direct friction of the conwho passed through high school, is mamed for Georg Simon Ohm, a Ger-dous importance of his disclosure, When connected in an aud man scientist, who followed slightly but at any event he anticipated a fying circuit, as shown by the acwith which they carried electricity, and it now aerres as the basis for all oscillatory discharge he naturally Sectrical theory and measurement. Ind the rock-bottom foundation for Mechanics Institute Opens In the German's memory the "ohm" radie as we have it to-day.

### Head Phone Ohms

terials.

### **Connect in Series**

started his career as an assistant in siderable size.

### How to Control The Volume of A. F. Amplifiers

The general use of multi-tube reivers and superpower broadcastng station has done much to liminate the old system of using several jacks in a radio set. The latest receivers are using only one iack at the most, to which the lond speaker can be connected. Many of

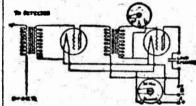
greatly simplified, capacity of the wiring is reduced, and the front panel enowed Royal Society, and displayed is improved in appearance. The use uch genius that he finally rose to of jacks where any sudio transhe exalted position of director. His former is used with high primary imchievements in the field of chem- pedence, such as the high quality, stry alone were prodigious, but he low ratio audio transformers that are a magnet moving inside a coil of wire hazardous. The sudden surge of curproduces a current of electricity in rent caused by the opening or closing that coil and for his measurement of of a jack circuit is likely to burn out

A serious problem presents itself Faraday also is responsible for the The volume of the receiver must be however, when jacks are eliminated. controlled. If the rheostats are tarned low, volume will be reduced. was born in 1745 and died in 1827. of Joseph Henry, for whom the turned too low, distortion results. Partially detuning the receiver, with the tubes operating at their most often done. In this day of congested broadcasting, however, such a procedure will result in interference between stations.

Engineers have been working to de vise means of softening the tone without destroying quality. Resistance across the primary and secondary windings of transformers are sometimes used, as well as a bank o fixed resistance in series with the tirely satisfactory except that poor

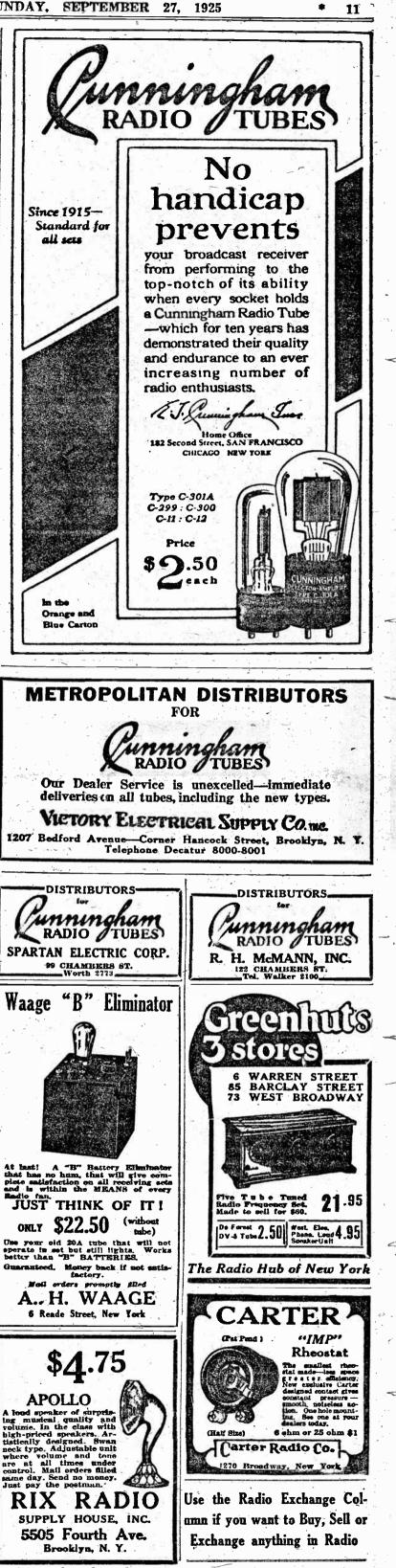
Best tone quality is maintained inal battery in its fundamental aspect a signal bell, thereby creating the with a fixed resistance across the has survived through a century and first telegraph. Morse is generally secondary of the transformer, and a quarter of time, and even now regarded as the inventor of this great volume controlled by using a variable

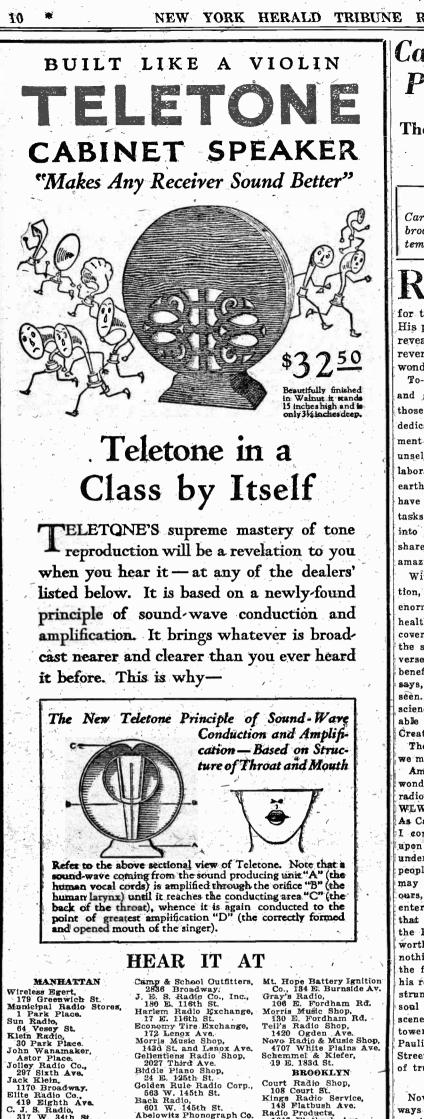
> A resistance such as the Centralab Modulator may be used for this purpose. This is supplied with three terminals, precisely like a potentiometer except that the resist-



When connected in an audio ampliafter Volta and Ampere. He evolved similiar discovery on the part of the companying diagram, the modulator the law while experimenting with better-publicized Hertz by at least gives noiseless adjustment to any devarious metals to determine the case thirty years. With his other work sired tone volume from a whisper to

Radio Class Again This Year Again this year the radio class at the Mechanics Institute, 20 West Many people have the mistaken no- Forty-fourth Street, will be in charge nounced "moe"), so frequently seen in tion that the resistance of head- of R. P. Clarkson, well known to connection with vacuum tube ratings, phones is a measure of their quality. Herald Tribune readers through his is simply "ohm" spelled backward. Actually, radio headphones of 2,500 Radio Beginners' Series. The Meand mathematically is the reciprocal ohms resistance may be much better chanics Institute School was started of the ohm. The latter term is in than others of 5,000 ohms resistance. in 1820, and the present year is the everyday use as a designation for The resistance is determined by the 105th of its operation by the General rheostats, potentiometers and grid length, size and kind of wire used in Society of Mechanics and Tradesmen, leaks; for the last named the "meg- their construction. Their perform- which this year celebrates its 140th ohm," or million-ohms, is more con- ance is a matter of proper engineer- birthday. Tuition is free to any male venient for the rather high values ing design and the use of good ma- employed during the day. Classes in all subjects taught opened this week, the first meeting of the radio class being Friday night at 7:20. Several speakers may be used at A library of over 100,000 volumes is ing of the name of Michael Faraday, one time by connecting them in available to students and others. Approbably the most brilliant scientific series. In this way dance music may plication for information or enrollexperimenter of all time. The son of be received sufficiently loud to be ment should be made to the secretary a humble Loudon blacksmith, Faraday heard all over a dance hall of con- by mail or in person at the institute building.





W. 34th St. N. 34th S 21 E. 40th S Blan the Radio Man, 145 E. 42d St. 145 E. 42d St. Wurlitzer, 120 W. 42d St. Herbet & Huesgen, 18 E. 42d St. Chas. W. Down Radio, 711 Eighth Ave. G. F. Akert, 118 W. 42th St. H. Roy.

Battery Owner's Service, 2760 Broadway,

17 E. Hefth St. Economy Tire Exchange, 172 Lenox Ave. Morris Muske Shop, 143d St. and Lenox Ave. Gehentiens Radio Shop, 2027 Third Ave. Biddle Plano Shop, 24 E. L25th St. Golden Rule Radio Corp., 563 W. 145th St. 
 BROOKLYN

 24 E. 125th St.

 Golden Ruie Radio Corp.

 563 W. 145th St.

 Bach Radio,

 601 W. 145th St.

 17ine Radio Co.,

 1538 St. Nicholas Ave.

 Inweod Radio,

 601 W. 297th St.

 601 W. 207th St.

 Fink. & Schmidt,
 4147 Broadway. Wm. T. Baxter, 4234 Broadway. BRONX Harlem Radio Exchange, 2067 Third Ave. Nassau Radio & Bat. Co., 909 Westchester Ave. 118 W. 44th St.909 Westchester Ave.118 W. 44th St.909 Westchester Ave.H. Roy,362 Willis Ave.Uneeda Radio Shop,7remont Radio Phone Cc.852 Eighth Ave.514 E. Tremont Ave.Flex-O-Dyne,F. Parr.Broadway and 52d St.531 E. 166th St.Marconi Bros, Music Shop,126 E. 59th St.2019A Broadway.533 E. Tremont Ave.Horan Rale. Supply Co.,2050 Broadway.2050 Broadway.1305 Weebster Ave.Bit Amsterdam Ave.1245 So. Boolevard.200 W. 84th St.200 W. 84th St.West End Radio Co., Inc.,2471 Broadway.2471 Broadway.511 W. Fordham Rd.West End Radio Co., Inc.,81 W. Fordham Rd.2471 Broadway.1322 So. Boulevard.8106 Amsterdam Ave.81 W. Fordham Rd.200 W. 84th St.81 W. Fordham Rd.West End Radio Co., Inc.,81 W. Fordham Rd.2671 Broadway.1312 University Ave.Mielke Eberhardt,513 University Ave.1263 Lexington Ave.4387 Third Ave.Battery Owner's Service,2041 Davidson Ave.2760 Broadway.2041 Davidson Ave. Willis Radio Co., 362 Willis Ave. Fremont Radio Phone Co., 541 E. Tremont Ave.

2525 Webster Ave. Mogul Bros. 177th St. and Boston Rd. Freeman Music & Radio, 1214 So. Boulevard. Billig's Auto Supply Co., 1322 So. Boulevard. Robert M. Richter, 81 W. Fordham Rd. Varsity Electric Shop, 1731 University Ave. Fordham Auto & Radio, 4387 Third Ave. Burnside Radio Shop, Burnside Radio Shop, 2041 Davidson Ave.

BROOKLYN Fink & Schmidt, ~ 1260 Nostrand Ave, Laura Electric Shop, 1798 Nostrand Ave. P. J. Riley & Co., 6743 Third Ave. P. J. Riley & Co., 3705 Third Ave. B. Elumenstein Blumenstein, 651 Manhattan Ave. Creedman Music Shop, 4502 13th St. R. H. Jones, 566 Leonard St., (G'p't. Halpern Radio Sh 2914 Stiflwell Ave. Coney Island LONG ISLAND Tirst Electric Co., 33 Vernon Ave. Stahl Bros., 14 Astoria St., Astoria. Garam Bros., 295 Ditmas Av., Astoria.

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Use the Radio Exchange Column if you want to Buy, Sell or Exchange anything in Radio

## Cardinal Hayes Opens the New **Paulist Fathers' Radio Station**

There Is a Large Opportunity Nowadays for the **Broadcasting Station to Offer Moral and Spiritual Service to Listeners** 

The following is an abstract from the address delivered by Cardinal Hayes on the occasion of the opening of WLWL, the new broadcasting station of the Paulist Fathers, New York City, September 24.

R ELIGION to-night, in the dedication of this new station of the Paulist Fathers, WLWL, willingly and gladly wishes to pay tribute to science. Religion praises the Creator of the universe for the advance and broadening vision of science and rejoices that, in His providence, another page of the Book of Nature has been unrolled revealing to mankind the wonders of the radio. Religion and science reverence profoundly the truth that revelation after revelation of God's conderful handiwork in creation will continue until the crack of doom. To-night we offer a tribute of praise @-

dedicate their lives to the advance- regard to them, is part of the comment of human knowledge. Patiently, give the public. Probably when the unselfishly, perseveringly, in the unwritten chapter of human service laboratory and the machine shop, on comes to be published we shall find earth and sea, and in the air, they win the younger members of the famhave toiled at their self-imposed ily back to the fireside for their rectasks that all mankind might enter reation, to keep them off the streets into the fruits of their labor and to give them (and, perhaps, their share the secrets of their new elders also) an attractive substitute We come now to a consideration for questionable amusements and which I trust lies close to the heart amazing knowledge.

Within the memory of this generaion, physical science has contributed Treator.

e must make.

radio, and therefore the new station, WLWL, which we are opening to-day. As Cardinal Archbishop of New York, special opportunity. With regard to soon forgotten. Yet I believe that upon the great work which they have listers, whose singing we have just progress still to be made, progress undertaken. I congratulate also the istened to, will surely render for us which I trust will be aided through people of this immense city and, I in Enished lashion some of the internet in the instrument of the people of this immense city and, I blest musical compositions ever pro- I am given to understand that you may say, of this whole country of ours, upon the inauguration of an enterprise so admirable. May I add Also in matters more strictly aca- ment number quite certainly hunthe Paulists have shown themselves much help. Especially it can assist bility more than a million. Consider worthy sons of their founder; for nothing was more characteristic of far removed from the resources com- this present experience. Is it not the first Paulist, Isaac Hecker, than monly accessible in cities and uni- clear that similar experiences, conhis readiness to utilize every new in- versity towns. The science of peda- stantly recurring, will tend to affect scene—the dedication of the twin the teacher reinforces the lesson of

of truth and wisdom!

Power vs. Responsibility vays involves responsibility, and the spised. gravity of our responsibility is meas- In the things of the spirit as well according to a prominent San Frantion.

sea in all directions; it penetrates influence on the listening millions. A woman's talk on fashions or cosevery public auditorium and every private home, in the crowded cenprivate home, in the crowded cen-ters of civilization and in the far away corners of the earth. The en-of mankind the broadcasting station away corners of the earth. The energy which can do this is immeasur- which opens to-night is dedicated in of that stuff in my house, is just as ably great; no less is the responsibil- a special sense. There is large op- | OI that stun in my nouse, is ju ity of those who use it. If for the portunity nowadays for such service. spoken word and the printed page man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account, are being constantly discussed in man must one day render an account are being constantly discussed in man must one day render an account are being constantly discussed in man must one day render an account are being constantly discussed in man must one day render an account are being constantly discussed in man are being constantly discussed in the being constant are being and must one day render an account, are being containing the second seco

sponsible for our use of it. We must problems are submitted to the judg- certain amount of pleasure to everytake care that we use it not for ment of the average reader. "Why body. harm; but, further, we are strictly should I be moral?" "What sanctity bound to use it for good, to make it attaches to the existing social fruitful. Whoever would be great order?" "Is there any solid basis for must serve. He who has power must the principle of 'authority?" "Are gineers throughout the country it has must serve. He who has power must the principle of actions, for geneers throughout the country it has turn it to the welfare of his fellows. Let us consider what a broadcast-ing station such as this might aim to achieve.

letic sports, games, puzzles-things They need counsel. Obviously those the panel, cut a piece of mica and such as these have their places in who speak to the public on the radio place between the rheostat and the he average normal life. To promote should minister to this need.

nd gratitude to our scientists, to interest in them, to stamp them with those devoted servants of truth who approval, to convey information with mon daily service which radio can dangerous associations.

### Cultural Influence

enormously to human comfort and opportunities of radio are innumer solved. We have high ideals of pahealth and life. Indirectly our dis- able. This very week we have read triotism and good citizenship with covery of the buried history and of in the public press that during the which we must familiarize the young. the secret laws of the physical uni- coming season the most distinguished Mora important still, there are verse has brought us even greater artists of every nation will broadcast lessons of sympathetic understanding, penefits. Things seen, as St. Paul the best music in the world. This is of mutual good will of tolerance and says, are an evidence of things un- good news. I am convinced that the charity that all of us must learn. seen. Each fresh revelation of public has a need, and has a right, And here, perhaps more than in any science makes it less and less reason- to be made familiar with what is best other field I mention, this new broadable to deny the existence of the in human culture. Standards must casting station should have a disbe set, the critical faculty must be tinctive function. The history of the There is a further acknowledgment trained, taste must be instilled. Can United States shows that in this you imagine any instrument that will climate intolerance and bigotry do Among the most recent and most do this on a larger scale or do it more not strike deep root or live long. wonderful gifts of science comes the effectively for the many than radio? Every fresh attempt to set class

congratulate the Paulist Fathers music, for example, the Faulist Chor- in this respect also there is much isters, whose singing we have just progress still to be made, progress in finished fashion some of the no- the instrumentality of radio. duced by man.

that in the building of this station demic and intellectual radio can give dreds of thousands and in all probathose readers and students who are the influence on you and on me of strument of good. How his noble gogy proclaims the advantage of the inner consciousness and then the soul would rejoice to witness this teaching the pupil through more than external conduct of tens of millions one of his five senses. The voice of of our fellow countrymen? scene-the dedication of the the the teacher reinforces the lesson of the printed page, stimulates the memory. Music as a Radio Street—as an agency for the spread Instruction by radio, therefore, repeating and confirming what the solitary student reads in his book, is an Now, the possession of power al- educational instrument not to be de-

ured by the greatness of our power. as in things practical man needs cisco radio dealer in a letter to KGO. This is, of course, an old familiar stimulus, encouragement, guidance. of morals, but men may not Those who have been graduated in store to buy a receiver," he wrote, "I yet fully appreciate the bearing of the school of experience, those who always size him up to see if he is a the old principle on the new situa- have absorbed the wisdom of the 'jazz hound' or not, and when demages, can be of no little help to the onstrating a set I try to tune in the Here, harnessed in our service and young, the undisciplined, the over- thing he likes. I have found that the bedient to our command, is a force venturesome. Here, more than in any man who dislikes jazz may refuse to that seems to recognize no barrier other respect, perhaps, we may look buy if jazz happens to come along at and no boundary. It crosses land and for the radio to exercise a beneficent a moment when he is still in doubt.

### Spiritual Service

sage which he broadcasts over the riage, the right of her, free will, the pleasing in itself, but has the merit wide world to millions and millions man, suicide, education, free will, the pleasing in itself, but has the merit of immortal souls. We who employ radio, then, are re- matters involving complex moral versal. It hurts no one and gives a deeper consideration than can be door aerials are from 10 to 15 per Among the useful functions of a given by the average busy man or cent as efficient. roadcasting station is that of con- woman. And you perceive at once tributing good, clean and wholesome that under penalty of grave disaster entertainment for the individual and men and women must be prevented for the family. Harmless fun, ath- from jumping to rash conclusions. rheostat shorting on the shield on

# Song at Same Time

One of the metropolitan radio audience happened upon an unusual coincidence in broadcast programs and in recognition of the feat demands the award of the "brown derby." His letter, which explains the incident in detail, is

2 Stations Play Same

as follows: "I was enjoying, on WJZ, an offering entitled 'June Brings Roses.' I tuned in on WEAF for a moment and heard June Brings Roses.' By tuning back to WJZ and humming the air in WEAF's tempo during the operation. landed precisely on the same note at WJZ: I repeated, going this time back to WEAF with the same result. A difference of only a few seconds delay in WEAF's announcer from WJZ's permitted me to hear that each had been an encore. If you will be kind enough to check me up, and in the event that this occurrence. was not manipulated, will you be good enough to award me the brown derby' for picking up the unusual n programs?"

Let it be said that the check-up has been made and that the incident was not intentional and the brown derby" has found its proper owner.

We come now to a consideration of every one of you-the service which radio can perform for our country as a whole. We have puzzling Again, as a cultural influence the social and industrial problems to be I hope that in the field of culture against class and religion against rethis new station WLWL will find a ligion has perished quickly, has been

who are listening to me at this mo-

# Sales Assistant

A radio program, coming in at the moment a set is being demonstrated has a lot to do with making the sale, "When a customer comes to my metics may ruin the sale to a man.

### Loop Aerials

From the experience of radio en-

### **Preventing Shorts**

If there is a possibility of the metal shield.

# Popular American Broadcasting Stations reported hearing WHAZ programs on seven successive Monday nights last winter, and sixteen listeners in dif-No. 10-WHAZ, Troy, N. Y.

day evening, September 14. It is Europe.

general broadcasting, February, 1923, of the first in America to be heard many others.

telegraph and radio, and the first unique not alone from the fact that This station had not been on the radio pageant on the sesqui-centenit established in the early days of air many weeks when it became one nial of the Revolution were among

around the earth, nearly 10,000 miles ly, in December following. Two- ups," in which the call letters were muda. "Personality" is put into the to the variable condensers in a re-

ferent English towns reported fairly complete logs of the program on the same night. A Boy Scout commis-NIQUE among American a year for the last three years. This as Peru, first Far East program by Sioner on a steamship en route to Cuba listened to a program he ar Every radio fan has heard of "body" NIQUE among American a year for the last three years. Inis as reru, first rar hast program by broadcasting stations is ra-broadcasting station has been heard with great dients, first concert by all blind per-diophone WHAZ at the Rens-diophone WHAZ at the Rens-station has been heard messages attest. Chinese, Japanese and Siamese stu-formers, the ringing before the heard on shipboard in the South has had his own troubles with it. selaer Polytechnic Institution, Troy, 30,000 letters and messages attest, microphone of the same bell with Seas, 5,000 miles from Troy. The Most of them would have better luck N. Y., the first of the Class B sta- from coast to coast, from Alaska to which Professor Joseph Henry in postmaster at Wailuku, Hawaii, and if they had a better understanding of observed its third anniversary Mon-America, England and Continental magnet, forerunner of the telephone, friends on magnet than an a graduate with his family in the what it really is. What is this mys-terious force that often upsets the vessels often report concerts heard effects? while passing through the Caribbean Body capacity, or hand capacity, is general broadcasting, February, 1923, the long distance transmission record of more than one third the way in continental Europe, France and Belgium, in November, 1922, and in Hawaii, at four points simultaneous-WHAZ are not mere chance "pick-bea, and on occasion on program has been reported from every state and territory of the Union, seven provinces of Canada, Cuba and Ber-is not a good condenser. Compared to the way to New Zealand, accomplished under way radio telephone communication made out laboriously and the rest station by the program and partici. ceiving set it has an extremely small are mads as continuous as possible.

### Student Broadcasts

Naturally the programs by the stuof each month, with a midnight pro- know too well what happens. gram on the second Monday, have become a popular feature of WHAZ broadcasts, with the Symphony Or- with modern vernier knobs for rotat-Orchestra, Glee Club and individual students participating. While the purpose of this radiophone is not very fine adjustment of the total inmerely to entertain, it has done that ductance is obtained by rotating the so well as to receive the commenda- parts of the coils which supply nearly tion of every type of radio listener all of the inductance in the circuit. through its always varied and unu. Thus these two elements in the set casts in a way that makes them interesting as well as instructive. Members of the faculty contribute prac-build anything from a pocket crystal tical and non-technical talks on sub- set to a superheterodyne, do not jects of current interest in the scientific and engineering field, and promi- capacity and inductance values is so nent speakers are frequently heard on important in its effect on reception. topics of the day. The station fur- The reason, technically, is that when nishes no regular news, sports or market services.

sufficient to state that it is the equivalent resistance, of the circuit standard Western Electric 500-watt is reduced to he minimum. As the outfit, complete in every detail, and voltage supplied to the set by batwas installed through a gift of the teries or lighting circuit is constant, Roeblings, graduates of the Troy minimum resistance means maximum Tech, famous as builders of the current. With the maximum current Brooklyn Bridge. WHAZ is under flowing through the set you have the direction of Professor Wynant reached the point of resonance the J. Williams, associate professor of point at which signals are strongest. electrical engineering in charge of Attempts have been made to elimthe course in communication engin- inste body capacity by various methoperators, Harry B. Mimno, Hiram B. the protection of the panel, or, in Harris and Bertram H. Cramer jr., some cases, of individual parts of each of whom has been engaged in the set, with a metallic shield. radio experimentation from boyhood. In order to make shielding thor-In physical equipment station WHAZ oughly effective care must be used in is similar to many other leading making connections in the circuit. broadcasting stations of the country. The grid and plate terminals are most Its ideal location on the top of the sensitive to body capacity effects. big Sage building, one of the largest Keep the parts of the coil or appacollege electrical and mechanical ratus to which the grid or plate is laboratories in the country, at the connected as far as possible from the crest of the beautiful hilltop campus, panel. The filament circuit must be overlooking the Hudson River at the properly grounded. head of tidewater navigation, 150 miles from New York, is most ad- circuit, the stator end is connected vantageous. The remarkable success to the grid; in the plate circuit the of the station is credited chiefily to stator end is connected to the plate. the superior skill of the engineering Where a tickler is at the end of an experts in charge of its operation. inductance, which is the case with The studio is attractive and in excellent taste, its walls being covered coil farthest from the tickler end with soft gray draperies, floor heav-ily carpeted and ceiling with a dou-In locating the sockets keep

a fine plano and other necessary musical and pick-up devices. Ruthmusical and pick-up devices. Ruth-erford Hayner has been the sole  $pro_{-}$  fected by body capacity. It is helpgram director and announcer since the station was opened. -

electrical and communication engineering is one of the major courses, and the negative side of the B batdio department has a remarkable equipment embracing practically every variety of apparatus. There are numerous long and short wave every regular Class B broadcasting more than 2000 miles overland, a feat an unintelligible jumble. Four suc- transmitters and receivers. Trans-

## Effects May Be **Reduced in Sets**

a graduate with his family in the what it really is. What is this mysfriends on more than one occasion finest tuning with unruly squeals, and with programs from WHAZ. Navy what is the best way to prevent its

has been reported from every state the human body which makes it act pants rather than the announcer, capacity. The trouble is that even an who merely tries to make what is extremely small variation in either going on in the studio intelligible capacity or inductance of a set can o the audience, and the programs throw fine tuning out of adjustment. Each time the operator's hand takes hold or lets go of a knob in the process of tuning the capacity of the set varies by a small amount, belents of the Rensselaer Polytechnic cause some of the body capacity is Institute on the last Monday evening hand is in contact with it. Then you

A very fine adjustment of the total capacity of a set can be obtained chestra, Campus Serenaders' Dance ing the parts of the condensers, which supply practically all of the capacity of the circuit. In the same way a sual programe. Educational features itself can be very closely controlled. find an important place in the broad- Body capacity, while small enough in itself, is quite beyond control.

Some radio enthusiasts, who can know just why this adjustment of these values are properly related to each other for any given wave length Of the broadcasting apparatus it is the equivalent resistivity, or total

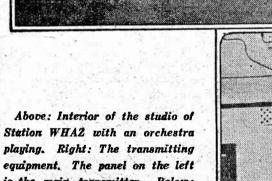
eering, with a corps of instructor- ods, but the most effective has been

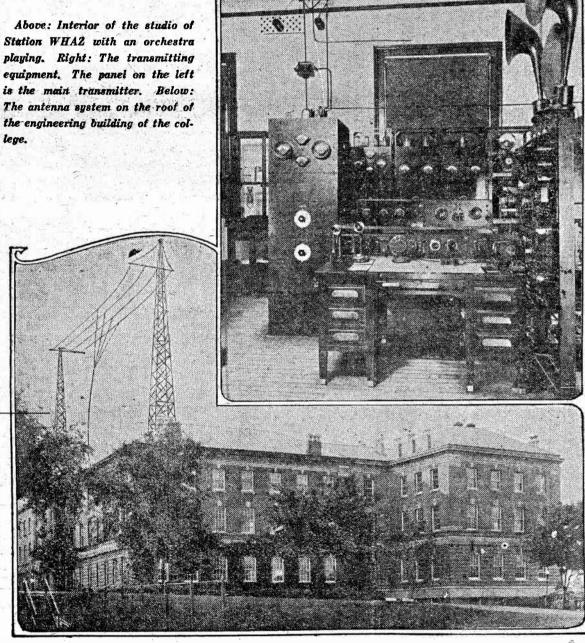
With a variometer in the secondar many variocouplers, the end of the

In locating the sockets keep the ble perforated covering preventing grid and plate terminals farthest from the panel and place the filament condenser of .001 or .002 mfd. ca-As an engineering college in which connect a fixed condenser across the plate terminal of the detector tube tery. In neutrodyne circuits it is very desirable to shield the neutroformers to avoid intercoil coupling.

There are several ways in which a body capacity. One is by placing condition at its regular wave length of 379.5 meters and with only 500 watta power, but through a long every Monday evening, aside from first Boy Scouts program, first pro- the public of his native city, San finite variety of apparatus that has hard rubber panel with a metal shield

tained, the shield must be grounded.





condition at its regular wave length not duylicated, was carried at the cessive broadcasts were heard in New mission and experimentation is alwatts power, but through a long Canada, in January, 1923. The pro- quested a special program by the equipment ever sold-an old DeFor- tuning dials. These disks may be series of unusual radio tests carried gram director has always sought un- Campus Serenaders, students' dance est set-by means of which Professor cut from aluminum and should be out by the electrical communication usual programs and unique features orchestra, and sixty Indians danced Williams delivered a lecture to stu- about 4 inches in diameter. It is also department of the oldest college of in radio, as becomes a college 'ex- to the music at the ranch. A college dents as far back as 1910, long be- important that they be connected department of the oldest college of m ratio, as becomes a conge car engineering and science in America, numerous experiments has intro-Islands, danced to music from the thing of radio broadcasting. There tive of the B battery. For more comwhich cevebrated its centennial last duced many novelties, some now be. Troy studio, and at another time-a is a Marconi wirelers telegraph set plete protection against body capacity October. Although regularly "on the come regular features of radio pro- group of cowboys in western Ne- of 1902, including a coherer of the effects the entire panel may be air" only from two to four hours grams. The first minstrel show braska. One graduate of the insti- original type, a German Telefunken shielded with a metal plate or an broadcast was in the WHAZ studio, tute makes it a point to entertain system wireless outfit, and all the in- "anti-capacity" panel, which is a its elaborate experimental work, this gram of old-time songs, one of the Salvador, Central America, with stu- been developed in the intervening vulcanized in place, may be used. station has earned the title of the earliest radio plays and introduced dent programs from his alma mater years down to the very latst im- When any of these methods are "Transcontinental and International the "Hearies," in which the play was by means of a loud speaker. A proved devices. Many radio ama- used it is essential that none of the "Transcontinental and International the fleates, in which the play was by means that it is for the set come in direct con-Radiophone" from the fact that its it is for the "movies," first all-Span- tives in Scotland that he would sing abroad are familiar with the call let-it is for the metal of the shield, and broadcasts have spanned the con- ish program by Latin-American stu- on a certain night, and they heard ters of the institute stations, 2XAP, also, if best results are to be obtinent for approximately forty weeks dents which was heard as far south him. Receivers in the British Isles 2SZ and 2CDC.



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	· · · · · ·	TO-DAY	MONDAY	WOR-NEWARK-405 6:45-7:15-7:45 a. mGym class. 2:30 p. mSanuel Tinney, tenor,	WJY-NEW YORK CITY-405 7:30 p. mAmbassador Trio. 8:15 p. mZoological Society series.	
	wj	JZ-NEW YORK CITY-455	WEAF-NEW YORK CITY-492	2:45 p. m.— 'Mankind Listening In.'' 3 p. m.—Al Wilson's Playmates. 3:15 p. m.—Samuel Tinney, tenor. 3:30 p. m.—Al Wilson's Playmates.	9:15 p. m.—Sport talk. WGBS—NEW YORK CITY—316 10 a. m.—Timely talks with Terese.	Eastern Standa
	stories. 11:00 a.	mEpiscopal Church services.	6:45-7:45 a.m.—Health exercises. 10:45 a.m.—Home service talk.	3:43 p. in.—Talk on "Draperies." 6:15 p. m.—"Words Mispronounced." 6:17 p. m.—Shelton Ensemble.	10:10 a. m.—Catherine Robinson, soprano. 10:20 a. m.—Home economies talk; songs. 10:40 a. m.—Talk on furniture; songs.	WFI
	Chas. 1 8:30 p. n	m.—Sunday Radio Forum; Dr. L. Goodell; basso and tenor solos n.—Miles Kastendieck, piauist.	11:05 a. m.—'Getting Ready for Winter''; plano. 11:40 a. m.—'Talk, Etbel Peyser. 12 noon—Market and weather reports	7:15 p. m"Sports," Bill Wathey. 7:80 p. mRalph Reichenthal, pianist. 7:45 p. mAlbert von 'Filser, songs.	1:30 p. m.—Scripture reading. 1:35 p. m.—Blossom Heath Serenaders. 3 p. m.—Interview with Joyce Bushel. 3:10 p. m.—Hattie Strauss, soprano.	10:30 a. m.—Solos.         10 a. m.           1 p. m.—Orchestra.         10:10 a.           3 p. m.—Talk; solos.         10:20 a.
	Fried, Johanr	m.—Arion Male Chorus; Anna ýiolinist; Elza Nicolini, soprano; nes Heringa, barytore. m.—Nathan Abas' Orchestra.	4 p. m.—Joseph Bier, barytone. 4:15 p. m.—'Religious Education." 4:30 p. m.—Milton Gershenson, pianist.	8 p. m.—Ralph Reichenthal, planist. 8:15 p. m.—'The Forty Immorals." 8:30 p. m.—''Al Reid's Hour." 9:33 p. m.—Edward H. Bjørstadt. "Troy."	3:20 p. m.—Plano lessons; songs. 3:40 p. m.—Plano lessons; songs. 6 p. m.—Uncle Geebee.	3:45 p. m.—Fashion feature.         10:40 a.           6:45 p. m.—Concert orchestra.         1:30 p.           8-11 p. m.—Program same as WEAF.         1:35 p.
; .	8:00 p. m William	n.—"Reminiscences of a Reporter," m H. Crawford. m.—Dixie Jubilee Singers.	6 p. m.—Dinner music. 7 m.—Dinner Male Chorus.	9:45 p. m.—Edward H. Blefstadt, "Troy." 9:45 p. m.—Madelaine Cefes, pianist. 10 p. m.—Rose Binder, soprano. 10:15 p. m.—Madelaine Ceres, pianist.	7 p. m.—Arrowhead Orchestra. 8 p. m.—Miss Crump. Negro spirituals.	WLIT-PHILADELPHIA-395 11 a. mOrgan recital. 12:30 p. mConcert orchestra. 22-3 p. mConcert orchestra. 3:00 p. 3:20 p.
	10:00 p. 10:30 p.	m.—Godfrey Ludlow, violinist. m.—News. JY—NEW YORK CITY—405-	7:15 p. mMusical program from Strand Theater; remarks by Joseph Plunkett; vocal and instrumental artists.	10:30 p. m.—Slater's Dance Orchestra. WIPPHILADELPHIA508	8:30 p. m.—China Society program. 6:30 p. m.—Kathering Connolly, soprano. 9:40 p. m.—Ruth Friedman, planist.	4:30 p. m.—Artist recital. 7:30 p. m.—Dream Daddy. 6:30 p. m.—Dream Daddy.
	8:15 p. r 8:30 p. n	m.—Frank Gostovsky, tenor. n.—To be announced.	8:30 p. m.—Health talk. 8:45 p. m.—Irwin Hassell, planist. 9 p. m.—Music by Gypsies.	6:45 a. m.—Setting-up exercises. 1 p. m.—Luncheon music. 3 p. m.—Artists' recital.	9:50 p. m.—Joe Flanagan, solos. 10 p. m.—Ruth Friedman, pianiste. 10:10 p. m.—Katherine Connolly, soprano.	7:50 p. m.—Chat on plays. WCAU—PHILADELPHIA—278 7 p. m.— 7:30 p. m.—Recital.
	. WE	n.—Frank Gostovsky, tenor. CAF—NEW YORK CITY—492 ) p. m.—"Sunday Hymn Sing."	10 p. m.—Joseph Diskay, tenor. 10:15 p. m.—Irwin Hassell, pianist. 10:30-11:30 p. m.—Ben Bernie's Orchestra.	6:05 p. mDinner music. 7 p. mBedtime story; roll call. WOOPHILADELPHIA508	10:20 p. mJos Flanagan, Charley Bender. 10:30 p. mArrowhead Orchestra.	9 p. m.—Rev. John W. Stockwell. 9:80 p. m.—Harry Link, songs. 10:30 p. m.—Billy Hayes's Orchestra. 4:30 p.
	4:00-5:00 ices; A Federa	) p. m.—Interdenomination serv- Address by Rev. Charles W. Dane; ation Quartet; Aida Brass Quartet.	WJZ-NEW YORK CITY-455 10 a. mWomen's hour.	12 noon-Luncheon music. 4:45 p. mGrand organ; trumpets. 7:30 p. mDinner, music. 8 p. mMusical program from New York	WNYCNEW YORK CITY526 7 p. mMarket high spots. 7:10 p. mThe Canadians; police alarms.	WPG—ATLANTIC CHTY300         4:45 p.           1:30 p. m.—Luncheon music.         5 p. m.           8:40 p. m.—Scores; organ recital.         7:15 p.
÷. ;	9:15-10:1	5 p. m.—"Capitol Theater Gang." 15 p. m.—Symphony Orchestra. 388—NEW YORK CITY—316	11 a. m.—News. 1 p.m.—Meyer Davis's Orchestra. 2. 4. 5:20, 8, 10:30 p. m.—News.	Strand Theater. 8:30 p. m.—Arion Male Chorus. 8:45 p. m.—Irwin Hassell, pianist.	<ul> <li>B. m.—Knotty Baseball Problems."</li> <li>8:15 p. m.—Jeanette Uhle Quartet.</li> <li>8:45 p. m.—Neapolitan and Italian songs</li> </ul>	7 p. m.—Dinner music, J. Leonard Lewis. 7:30 p. director. 7:45 p. 8:30 p. m.—Hall Dual Trio. 8 p. m
	8:30 p. n ter.	m.—Program from Warner's Thea- -Gay's Famous "Beggar's Opera."	4-6 p. m.—Scores and racing (half-hourly). 4:10 p. m.—John Daniel, readings. 5:28 p. m.—Market reports.	9 p. m. — Music by Gypsies. 10 p. m. — Joseph Diskay, tenor. 10:15 p. m. — Irwin Hassell, pianist.	9:30 p. m.—Herman Strager's Players. 10:30 p. m.—Police alarnis: weather	9:30 p. m.—Banquet of American Women 8:30 p. Bankers' Association. 10:30 p. m.—Organ recital; male quartet. 8:55 p.
×. '	9:15 p. n 9:30 p. h	n.—Werner Janssen, songs. n.—Gusinan String Quartet. HN—NEW YORK CITY—361	5:50 p. m.—Financial summary. 6:01 p. m.—Baseball, racing returns. 7:25 p. m.—Organ recital.	11 p. mDance orchestra. WFIPHILADELPHIA	WORO-NEW YORK CITY-233 8:30-11 p. mBike races; band. WHN-NEW YORK CITY-361	WHAR-ATLANTIC CITY-275         9:10 p.           2 p. mSeaside Trio.         9:20 p.           7:80 p. mBook review.         9:45 p.           9 for New York         10 p. m.
· ·	1 p. m	Marsh McCurdy, organist. 0 p. mChristian Endeavor pro-	8:00 p. m.—Scores and racing. 8:10 p. m.—'The Texans.'' 8:30 p. m.—Landay Hall program. 10:35 p. m.—Waldorf-Astoria dance music.	3 p. m.—Orchestra. 3 p. m.—Recital. 3:45 p. m.—Fashion feature	12:30 p. m.—Marsh dv. o gavist. 2:15 p. m.—Overture and vaudeville. 3:15 p. m.—Lexington Theater orchestra.	11:15 p. m.—Strand organ recital. WGY—SCHENECTADY—380
• .	7:30-10 p	Roseland Dance Orchestra. p. m.—Church service. 15 p. m.—Janssen's Orchestra.	WGBS-NEW YORK CITY-316 10 a. mTimely talks with Terese.	6:45 p. m.—Concert orchestra. WLIT—PHILADELPHIA—395 12:05 p. m.—Organ; concert orchestra.	7:30 p. mOncle Robert's Pals.	2 p. mMusic; talk; "It Might Happen." 7 p. m by players. 2:30 p. mOrgan recital; 7:30 p.
	8:50 p. m	NYC-NEW KORK CITY-526 Baseball results -Program from stage and studio of	10:10'a. m.—Jack Cohen, pianist. 10:20 a. m.—Feducing talk; pianist. 10:40 a. m.—Fashion talk; pianist.	2-3 p. m.—Concert orchestra recital. 4:30 p. m.—Magazine corner; songs 5 p. m.—Educational talk. 7:30 p. m.—Dream Daddy.	8 p. m.—Chris Meehan, tenor. 8:15 p. m.—Isabelle Henderson, soprano. 8:30 p. m.—Miller, Piotti and Val, songs. 8:45 p. m.—Royal Jazz Band.	0:30 p. m.—Dinner program.         7:35 p. 1           7:35 p. m.—WGY Orchestra.         7:55 p. 1           10 p. m.—Travel talk.         8 p. m.
• •	Brookl WM	lyn Strand Theater. ICA—NEW YORK CITY—341 12:15 p. m.—Christian Science Berv-	1:30 p. m.—Scripture reading. 1:35 p. m.—I.ee Graber, planist. -2 p. m.—Willard Robison.	8 p. m.—Short Agro-waves. 8:15 p. m.—Concert orchestra; recital. 9 p. m.—''Movie'' review	9:15 p. m.—Della Riordon, barytone. 9:30 p. m.—"Talisman Trio."	WRW-TARRYTOWN, N. V. 273 9 p. m. 9:05 p. m Wusical program scores 9:20 p. m.
	6 p. m	Roemer's Homers. Ernie Golden's Orchestra.	8:10 p. mCaroline Rea, soprano.	9:10 p; m.—Stanley Theater overture: or- gan recital. 10 p. m.—Arcadia Dance Orchestra	10:15 p. m.—Edgar Duffy, sovrano. 10:30 p. m.—William West's Orchestra. 11:30 p. m.—Club Rodeo.	9:40 p. m.—John Fulton, tenor. 10:05 p. m.—Eleanor Ward, soprano; songs. 10:30 p. 11:05 p. m.—Oriole Orchestra.
	7:35-8 p. WH	m.—Olcott Vail's String Ensemble. <b>NYNEW YORK CITY259</b> nPhysical-Spiritual Sunday con-	3:20 p. mDancing lessons. 3:30 p. mCaroline Rea, soprano. 3:40 p. mLeague of Women Voters.	WCAU-PHILADELPHIA-278 8 p. mRecital.	12 midnightembentucky Orchester	WGR-BUFFALO, N. Y319         12 noon           6:30 p. mDinner music.         6 p. m 6:30 p.           7:45 p. mFashion talks.         6:30 p.
	cert. 2:50 p. m	Hulsman's talks. Ladies' Quartet.	3:50 p. m.—Caroline Rea, soprano. 6 p. m.—Uncle Geebee. 6:30 p. m.—Premier Orchestra. 7 p. m.—"The New Astrology."	9 p. m.—Danny Dougherty, songs. 10 p. m.—Dance music. WPG—ATLANTIC CITY—300	12 (noon)-Olcott Vail's Ensemble.	8-11 p. m.—Program same as WEAF. WHAM—ROCHESTER, N. Y.—278 3:30 p. m.—Eastman Theater Orchestra 5-6 p. m.—Theater organ. 3:30 p. m.—Sastman Theater Orchestra 3:30 p. m.—Yata (Sasta) 3:30 p.
and a second	8:30 p. m 8:45 p. m 4 p. m.—	n.—Edith Spieler, pianist. h.—Ladies' Quartet. Dr. Christian Reisner: "Value of	7:10 p. m.—Premier Orchestra. WHN—NEW YORK CITY—361	4:30 p. m.—Tea music. 6:40 p. m.—Baseball scores; organ recital. 7 p. m.—Dinner music. 8 p. m.—Baséball scores.	8 p. m.—Alfred Orner, tenor. 8:30 p. m.—Sheppard Knapp Musicale	5-6 p. m.—Theater organ. 6:15 p. m.—Dinner concert. 7 p. m.—Theater organ. 7:30 p. m.—Scores; weather; market. 9:15 p. 9:15 p.
•		lties." .WINEW YORK CITY-288 Church services; sermon; choris-	2:15-3:15 p. m.—Musical program. 3:45 p. m.—Francis Capouilliez, barytone. 4 p. m.—Songs by Frank Galassi, Morris	8:05 p. m.—Margaret Irwin, pianiste. 9 p. m.—Concert orchestra	9:15 p. m.—Heagney and Steele, songs. 9:30 p. m.—Samuel Shankman, pianist	WJAR         PROVIDENCE         306         9:30         9:35
e se	ters, WF	BHNEW YORK CITY273 104th Artillery Band.	<ul> <li>L. Welss, Jack Smith and Alice Harvey.</li> <li>4:45 p. m.—Old-fashioned songs.</li> <li>5 p. m.—Al Wilson's Playmates.</li> </ul>	10:30 p. mDance orchestra.	10 p. m.—Philmort Orchestra.	8 p. m.—Safety Council. 8:10 p. m.—Elton Cook, soloist
	6 p. m. 6:15 p. m	Magonic news	8 p. m'Storage Battery Talk."	7:30 p. m.—Stories for littlé folks. 8 p. m.—Seaside Trio. WGY—SCHENECTADY—380	WLWI-NEW VORK CUTY 980	9 p. m.—"Eveready Hour." 10 p. m.—Al Mitchell's Orchestra. WTIC—HARTFORD, CONN.—476 8 p. m.–
	7 p. m. 7:05 p. m	Talk, a.—Orchestra. BBR—STATEN ISLAND—273	8:05 p. mRoseland Dance Orchestra. 8:35 p. mFred Steele, Billy Hegmey, songs.	10 a. m.—Services. 2 p. m.—Music; talk. 2:30 p. m.—Asia Orchestra	WEBJ-NEW YOBK CITY-273 7 p. m.—Dan Barnett's Orchestra. 7:45 p. m.—Carrie Cohen, pianist.	5:30 p. m.—Dinner music, 7 p. m.—Tenor and bass solos. 7:20 p. m.—Dinner music; solos. 8:35 p.
÷	10	Watabtamani Orahantar	<ul> <li>8:45. p. m.—Harriet Turner, songs.</li> <li>9 p. m.—Billy Woods, Charles Zettler and Billy Daly, songs.</li> <li>9:15 p. m.—Marconi Prothers, accordions.</li> <li>9:30 p. m.—John Haffnedy, tenor.</li> <li>9:45 p. m.—Marconi Articles, according.</li> </ul>	6:80 p. m.—Dinner program, 7:15 p. m.—Address, "Marketing of Wool." 7:35 p. m.—WGY Orchestra; Mary Nally,	8 p. m.—Railroad talk, Garrow Geer. 8:10 p. m.—A. Wayne, entertaining re- porter.	9:30 p. m.—Organ recital. WEEI—BOSTON—349. WEEI—BOSTON—349.
(	9 p. m	Choral Singers.	9:30 p. m.—Marconi protners, accordions. 9:45 p. m.—John Hartnedy, tenor. 9:45 p. m.—Marsh McCurdy; organist.	contraito. WRW-TARRYTOWN, N. Y273 7:05 p. mChildren's stories; music. 9:05 p. mMusical program; scores and	8:25 p. mKayo Syncopators. WRNY-NEW YORK CITY-259 12:02 p. mTrio	7:20 p. m.—Lost and Found; Scores. 7:30 p. m.—Emily McKenzie, soprano.
• • •	9:20 p. m 9:30 p. m	n.—String Quartet. 1.—Fred Franz, tenor. 1.—Bible lecture, Judge Ruther-	11:30 p. m.—Silver Silner Revne, 12 midnight—Ted Lewis's Orchestra, WMCANEW YOBK CITY-341	sports. 10:05 p. m.—Entertainment. 11:05 p. m.—Elite Orchestra.	F. p. m.—Radio industry hour. 1:02 p. m.—Sports. 1:10 p. m.—Studio program	WNAC-BOSTON-280 1:10 p. 1 p. mConcert orciestra. 1:50 m m. Morey Pearl's Ramblers 7 p. m. 705 p. t
1		-Singers; quartet; singers. WGCP-NEWARK-405	12 noon—Olcott Vail's Ensemble. 6 p. m.—Olcott Vail's Ensemble.	6:30 p. m.—Dinner, music. 9-10:30 p. m.—Buescher Sayanhone Band	7 p. m.—"Whose Birthday To-day?" 7:05 p. m.—Sports; commerce reports. 7:20 p. in.—Law series.	2:50 p. m.—Ray Sinatra, planist, 7:15 p. 4 p. m.—Dance orchestra, 6:30 p. m.—WAC dinner dance, 7:45 p.
47	8:15 p. 1 8:30 p. 1	Charlotte Trystmann, planist. mRalph Hersh, violinist, mVincent Laine, tenor, mStrickland's Orchestra.	6:30 p. m.—Ernie Golden's Orchestra. 7:30 p. m.—Lullaby music. 7:50 p. m.—'Humorous Anecdotes." 8 p. m.—Lecture on Christian Science.	WHAM-ROCHESTER-278- 3:30 n	7:30 p. m.—History of the world. 7:45 p. m.—Pierre Remington, basso. 8 p. m.—Roosevelt Orchestra.	<ul> <li>8:30 p. m.—WNAC dinner dance.</li> <li>8 p. m.— ers.</li> <li>8:15 p. m.—Organ recital:</li> <li>8 p. m.— Dance music</li> <li>8 p. m.—Organ recital:</li> <li>9 p. m.—</li> </ul>
	9 p. m 9:15 p. 1	m.—Billy Segal, tenor. m.—Billian Gordone, contraite. m.—Billy Rhodes, tenor.			<ul> <li>8:15 p. m.—Opera minature, "Mikado."</li> <li>8:30 p. m.—"Avoid Electric Shocks."</li> <li>8:45 p. m.—Opera ensemble, "Mikado."</li> <li>9 p. m.—Sadrian Trio.</li> </ul>	WBZ—SPRINGFIELD, MASS.—333 6:30 p. m.—Lenox Ensemble. 9:00 p. — Evelyn Marcil contraiter 9:30 p.
، مەربىيە ت	9:45 p. 1 10:15 p.	m.—Bernstein Trio. m.—Strickland's Orchestra. /IP—PHILADELPHIA—508	10 p. mCarl Tannert, cellist; Frederick Seifer, havytone	8:15 p. m.—Ruth Madsen, soprano; Ar- thur Berger, violinist: 9:30 p. m.—Winter's Dance Orchestra	9:10 p. m.—"The Pink Lady." 9:15 p. m.—"Theater. Magazine." 9:30 p. m.—Sadrian Trio.	8180 p. m.—Copley Plaza Orchestra. 9 p. m.—George Albanese, ukulele. WCTS-WORCESTER, MASS.—268 10:30 p.
	-7:45 p. 1	m.—Evening service. OO—PHILADELPHIA—508 m.—Morning services.	10:30-11:30 p. mMessner Dance Orches- tra. WRNYNEW YORK CITY-259	WJAR-PROVIDENCE-306 10 a.mHousewives' Exchange. 1:05 p. mStudio program.	9:40 p. mAlexander Zeitlin, sculpture.	10:30 a. m.—Radio chats. 12-2 p. m.—Luncheon music. 5:15 p. m.—Story Teller, acores. 3-4 p. n
	2:30 p; 1 6 p. m	m.—Musical exercises. —Sacred organ recital. /FI—PHILADELPHIA—395	12:02 p. mTrio.	8 p. m.—Berry Time. 8:50 p. m.—Mrs. Harrop. 9 p. m.—Músic by Gypsies.	WFBH-NEW YORK CITY-273 2 p. m.—Studio program. 4 p. m.—Scores (quarter hourly).	8-11 p. m.—Program same as WEAF. WRC—WASHINGTON—469 12 (noon)Organ Recital. p. mMayflower Orchestra. 4 p. m 4:05 p. 5 p. m 6 p. m 6 p. m
Ś.	4:30 p. r 7:30 p. r	m.—Chapel service. m.—Services. LIT—PHILADELPHIA—395	1:10 p. m.—Studio features. 1:45 p. m.—William J. Reits, songs. 7 p. m.—'Whose Birthday To-day?"	10 p. m.—Orchestra selection. WTIC—HARTFORD, CONN.—476 6:30 p. m.—Dinner music.	4:05 p. m.—Johnny Baselones's Orchestra. 5 p. m.—Leo Ford's Entertainers. 5:30 p. m.—Orchestra.	1 p. m.—Mayflower Orchestra,         6 p. m.—           7 p. m.—''Over the Seven Seas.''         6:15 p. 1           7:30 p. m.—Shoreham Orchestra,         6:50 p. 1           8:30 p. m.—'The Political Situation.''         7 p. m.—
	6-7 p. m W	CAU PHUI ADEL PHUA 278	7:15 p. m.—Commerce of the day. 7:20 p. m.—Code lesson	6:45 p. m.—Weather; scores. 7:45 p. m.—Talk. 8 p. m.—Dinner, music. WEEI—BOSTON—349	6:30 p. m.—Radio talk. 6:30 p. m.—Bossert Lumber Jacks. WHAP—BROOKLYN—240	5.50 p. m.—Musical Program. 10 p. m.—Tupman's Mayflower Orchestra. KDKA.—PTTTSBURGH—309 The Imi
	5:15 p. Church 5:35 p. 1	m.— Undenominational Radio 1. m.—Recital.	7:45 p. m.—Geography, 8 p. m.—Ferrucci's Orchestra. 8:10 p. m.—"Evolution of Jazz."	6:30 p. m.—Big Brother Club. 7:20 p. m.—Lost and Found; scores. 7:30 p. m.—Ray Corcoran, Edna Clucas.	6-7 p. m.—Dinner music. WAHG—Richmond Hill, N. Y.—316 12:05 p. m.—Harry Dudley, songs.	2:30-6 p. m.—Scores (half hourly). 6:15 p. m.—Dinner Concert. 12:05 p.
1	W	-Concert orchestra. PG-ATLANTIC CITY-300 nVocal and instrumental recital.	8:20 p. m.—Oldtime medley. 8:30 p. m.—Painting series. 8:40 p. m.—Ferrucci's Orchestra. 8:45 p. m.—'Jazzing Fantaiste Oriental."	songs. 8 p. m.—Eisenbourg's Orchestra. 8:30 p. m.—Program from WEAF.	WOR-NEWADE AOX	7:30 p. m.—Children's Period. 8:30 p. m.—Mandolin Club. 10:30 p. m.—Grand Theater Concert. 8:15 p. 1 8:15 p. 1
.' '	9 p. m.— 10:30 p.	-Concert band. mOrgan recital. HARATLANTIC CITY275	<ul> <li>9 p. m.—"Mentality of Inventors."</li> <li>9:15 p. m.—English Speaking Union Dinner in honor of the British Delegation.</li> </ul>	10:10 p. m.—Marimba Band. 10:10 p. m.—Marimba Band.	2:45 p. m.—Emanuel Ritter, tenor. 3 p. m.—Mrs. A. Ermoloff, soprano. 3:15 p. m.—Emanuel Ritter, tenor.	WEDNESDAY 9 p. m. 9 p. m. 9 p. m.
	2:30 p. 1 2:45 p. 1	mShort sacred recital. mSermon, Rev. James Lord. mEvening service.	WNYC-NEW YORK CITY-526 7 p. mMarket high spots	WNAC-BOSTON-280 10:30 a. mBible readings; club talks. 1 p. mConcert orchestra. 4 p. mCopley Plaza Trio.	3:30 p. m.—"Stories and Recitations." 3:45 p. m.—Mrs. Ermoloff, soprano. 6:15 p. m.—"Words Mispronounced."	WEAF-NEW YORK CITY-492 6:45-7:45 a. mHealth exercises. 10:45 a. mHome service talk. 10:15-11
	9 p. m 11:15 p.	-Seaside Trio. mStrand organ recital. W-TARRYTOWN, N. Y273	7:10 p. m.—Stony Brook Orchestra. 7:30 p. m.—Police alarms. 7:35 p. m.—Stony Brook Orchestra. 7:55 p. m.—Stony Brook Orchestra.	6 p. m.—Kiddies' Club. 6:30 p. m.—WNAC dinner dance. 7:05 p. m.—Male chorus.	6:17 p. m.—"Sports," Bill Wathey. 6:30 p. m.—"Man in the Moon Stories." 7 p. m.—Shelton Ensemble.	11:05 a. m.—Hessie Dodge, soprano. 11 a. m.—Home service talk; songs. 11:15 a. m.—Health talk; sings. 2:30 p.
•	8:05 p. n 10:30 p.	m.—Services, m.—Studio program. m.—Musical program.	8 p. mLessons in German.	7:35 p. m.—Ray Stewartson's Orchestra. 8:15 p. m.—Opera, "Aida." 9:15 p. m.—Babe Herman and Honeyboy	WGCPNEWARK-252 2:45-5 p. mVocal and instrumental re- cital; race results (half hourly);	11:35 a. m.—"Educational High Spots," 2:45 p. W. H. Allen. 3 p. m 12 noom-Market and weather reports. 3 i.15 p.
-100	12 noon-	VGY-SCHENECTADY-380 -Service. -Yom Kippur service.	9:15 p. m.—George King, planist. 9:30 p. m.—Bergen Male Quartet. 9:45 p. m.—Haskell Property and the second	WBZ-SPRINGFIELD, MASS333 6:30 % mCapitol Theater Orchestra	WAAM-NEWARK-263 11 a. mHappy hour; cooking school. 7 p. mAlice Dowds, contralto.	4 p. m.—Ray Nichols's Orchestra. [6:15 p. 4:15 p. m.—Talk to parents, "Religious 6:17 p. Education."
	9 p. m	Godfrey Ludlow, violinist. WHAM-ROCHESTER-278 mRadlo Chapel services.	10:15 p. m.—Inez Keene contralto. 10:30 p. m.—Police alarma: weather	8:30 p. m.—Violin and plano recital. 9 p. m.—H. F. Keeney, hamonica. 9:30 p. m.—D. Edwards, barytone. 10:20 p. m.—Brunswick, Orchestra.	7:25 p. m.—Blue Diamond Orchestra. 8:10 p. m.—Ella Dawds, soprano. 8:20 p. m.—Alice Evans, "Pictures." 8:35 p. m.—Ella Dowds, soprano.	4:45 p. m.—"Dahatas," Dr. M. A. Howe.       7:30 p.         6 p. m.—Dinner music.       8 p. m         7 p. m.—Synagogue services,       8:20 p.
	.8 p. m	WGR-BUFFALO-319 	10:35 p. m.—St. George Orchestra. WOKO—NEW YORK CITY—233 8:15 p. m.—Queen City Four.	WCTS-WORCESTER, MASS268 10:30 a. mRadio chats. 12-2 p. mLuncheon music.	8:45 p. m.—Bob Marcy, ukelele. 9 p. m.—Violin, harp and plano. 9:30 p. m.—Frank Chapman, tenor.	7:30 p.m.—Foremost Four. 8:30 p.m.—Foremost Four. 8:30 p.m.—Pooley Period.
."	7:20-9:15	<b>VJAR</b> -PROVIDENCE-306 5 p. mCapitol Theater program	8:55 p. in.—Marguerite McCann, soprano. 8:55 p. m.—Queen City Four. 9:15 n. m.—Bill Mubler Contained	7:15 p. m.—Story Teller; scores, 8 p. m.—Concert. WRC—WASHINGTON—469	9:45 p. m.—Transcontinental tour. 10 p. m.—Jimmy Shearer, songs. WOO—PHILADELPHIA—568	9 p. m.—Waterman's Points of Progress.         9:30 p.           16 p. m.—Ipana Troubadours.         9:45 p.           11 -12 p. m.—Ben Bernie's Orchestra.         0 p. m.           WJZ—NEW YORK CITY—455         10:15 p.
	10:50 a.	m.—Musical program. WNAC—BOSTON—280 m.—Morning service.	9:30 p. mMabel Webb, soprano. 9:45 p. mBill Hubing's Orchestra. WFBH-NEW YORK CITY-273	10 a. m.—Women's hour, from WJZ. 1 p. m.—Organ recital. 2 p. m.—Shoreham Orchestra.	12 noon—Luncheon music by Golden's Crystal Tea Room Orchestra.	WJZNEW YORK CITY-455         10:15 p.           10 a. mWomen's program.         10:30 p.           11 a. mNews; book review.         10:45 p.           1:15 p. mKnickerbocker Orchestra.         11 p. m.
	6:45 p.	m.—Concert. m.—Evening service. WEEI—BOSTON—349	2 p. m.—Studio program. 3 p. mBob Ferone's Orchestra. 4 p. m.—Scores (half houriv)	WCAP-WASHINGTON-469 7:30 p. mWelcome banquet to Washing- ton team. 8:30 p. mHealth talk.	4:45 p. m.—Grand organ; trumpets. 7:80 p. m.—Dinner music. WIP—PHILADELPHIA—508	4.6 p. m.—Scores, racing (half hourly). 11 a. m
`	9:15 p.	m.—."Capitol Theater Gang." m.—.Musical program. Z—SPRINGFIELD, MASS.—.333	<ul> <li>i.03 p. m.—Studio program.</li> <li>j. m.—Hauser and Cross, two planos.</li> <li>j. m.—Matestic String Ensemble</li> </ul>	2:30-6 p. m.—Nusic by Gypsies, KDKA—PITTSBURGH—326 2:30-6 p. m.—Scores (half hourly).	6:45 a. m.—Setting-up exercises. 1 p. m.—Organ recital. 3:15 p. m.—Ed Brown's Ramblers. 6:05 p. m.—Dinner music.	4:10 p. m.—Joan Daniei, readinga.       7 p. m.         5:26 p. m.—Market reports.       "Spor         5:50 p. m.—Financial summary.       8 p. m.         6:01 p. m.—Baseball, racing returns,       8:20 p.
	8 p. m Knox.	m.—Church services. —Vincent Spolzino, tenor; Lena B. organist.	1:45 p. m.—Baseball resume. 3:50 p. m.—Majestic String Ensemble. 1:30 p. m.—Alvin Hauser's "At Home Party."	6:11 p. m.—Dinner concert. 9:30 p. m.—Happy Hour.	7 p. m.—Roll call; birthday list. 8 p. m.—Elliott Lester, critic. 815 p. m.—Kurtz's pupila.	8 p. m.—Baseball, racing returns. 8:15 p. m.—'Dahlias,'' George Stillman. 8:30 p. m.—Edison hour. 9:30 p.
	'9 p m WC1	m —Southern melodies. —Organ recital. ISWORCESTER-MASS.—268	WHAP-BROOKLYN-240 7-8 p. mDinner music.	TUESDAY	9:15 p. m.—Artist recital. 10:05 p. m.—'Emo's "movie" broadcast. 10:30 p. m.—Pagoda Orchestra.	9:80 p. m"Bugs" Baer, humorist. 9:45 p.
;	9-11 p. z V	m.—"Capitol Theater Gang." m.—Symphony orchestra. WCAP—WASHINGTON—469	WBBR-STATEN ISLAND-273 9 p. mIrene Kieinpeter, soprano. 4:10 p. mHealth talk.	WJZ-NEW YORK CITY-455		
	11 a. m 4 p. m 7:20-9:10	n.—Church services. —Service. 5 p. m.—Capitol Theater program.	3:30 p. m.—Charles Rohner violinist. 4:45 p. m.—Bible instruction. WHAGRICHMOND HILL, N. Y316	11 a. m.—News. 1 p. m.—Luncheon music. 2, 4, 5:20, 8 and 10:30 p. m.—News.	Dames	Orichastras
	9:45 8.	mTo be announced. KDKAPITTSBURGH309 mChurch service.	2 (noon)—Musical program. 7:30 p. m.—Sport talk. 7:45 p. m.—Uirich, Frendergast and Webb.	1-6 p. m.—Scores, racing (half hourly). 5:26 p. m.—Market reports. 5:50 p. m.—Financial summary.	<b>Dance</b>	e Orchestras f
	5 p.m 6:45 p.	-Baseball scores (half hourly). mChurch service. WCAE-PITTSBURGH-461	songs. 5 p. m.—Harry J. Caffrey, tenor. 5:15 p. m.—Synchrophase Trio.	<ul> <li>6:01 p. m.—Baseball and racing.</li> <li>7 p. m.—"Scottish Terriers," Frank Dole, of the Herald Tribune.</li> <li>7:15 m.—Wandarbilt Occharge.</li> </ul>	TO-DAY	TUESDAY, SEPTEMBER 29 110:35
	6:30 p. 7:20 p. 9 p. m	m.—Dinner concert. m.—Capitol Theater program. —Symphony Orchestra.	3:45 p. m.—Horace J. Taylor, readings. ) p. m.—Harry J. Caffrey, tenor. 1:15 p. m.—Ulrich, Prendergast and Webb.	7:15 p. m.—Vanderbilt Orchestra. 8 p. m.—Scores, racing results. 8:10 p. m.—Musicale. 9:10 p. m.—Leon Carson tenor	Time Wave P. M. Station Length Orchestra	8:00 WEAF 492 Ross Gorman's 11:00 8:25 WEBJ 273 Kayo 8:45 WHN 861 Royal Jasz Band 11:00
	8 p. m	WEAR-CLEVELAND-390 Theater orchestra. Safety Congress reception dinner.	songs. 5:30 p. mSynchrophase String Trio. 0 p. mSmith's Orchestra. 12 midnight-2 a. mDar 2 music.	9:10 p. m.—Leon Carson, tenor. 10 p. m.—''Over the Seven Seas.'' 11 p. m.—Mayflower Orchestra. WEAF—NEW YORK CITY—492	8:45 WGCP 252 Strickland's 10:15 WGCP 252 Strickland's 10:45 WHN 361 Janssen's	10:00 WJAR 806 Al Mitchell's 11-1 10:00 WRC 469 Tupman's 11:30 10:30 WGBS 816 Arrowhead
	9 p. m	WLW-CINCINNATI-422 Concert. WKRC-CINCINNATI326	WAAM-NEWARK-263	WEAT-NEW YORK CITY-492 6:45-7:45 a. m.—Health exercises. 11 a. m.—Henry Dart, planist. 11:10 a. m.—Lecture: plano solos.	MONDAY, SEPTEMBER 28 8:05 WHN 361 Roseland	10:30 WHN 361 William West's 10:30 WIP 508 Pagoda Rami 11:00 WJZ 455 Mayflower Large
	11 p. m	m.—Songs and service. n.—Classical program. night—McKay's Orchestra. WSAL CUNUNATE 292	7 p. mRhy's Orchestra; sports. 8:10 p. mJosephine Swanwick, soprano. 8:30 p. mSweet Marie; Buttercup. 9 p. m'Smiles and Giggles."	11:33 a. m.—Motion picture forecast; plano. 12 noon—Market and weather reports. 4 p. m.—Julius Behrendt, barytone.	9:15 WOKO 233 Hubing's 9:30 WHAZ 380 Winter's 10:00 WGCP 252 Strickland's	11:00 WEAF 492 Meyer Daviss Arca. 11:00 WMCA 341 Ernie Golden's Manh 11:05 WRW 273 Oriole Danc 10:00 WHW 261 Easticker Danc
	· · ·	WSAI-CINCINNATI-326 —Sermonette: chime concert: WWJ-DETROIT-353 mCapitol Theater program.	9 p. m.—- Smiles and Giggles. 9:20 p. m.—A. Brown, barytone. 10 p. m.—Fred Frey's Sirens. WGCP—NEWARK—252	4:15 p. m.—Jahk to parents, "Religious Education." 4:30 p. m.—Women's program; Abe Rosen-	10:00 WAHG 316 Smith's 10:00 WLIT 395 Dance music, 10:20 WBZ 333 Dance music	WEDNESDAY, SEPTEMBER 30 St. G.
۰.	7:30 p.	MLS-CHICAGO-345 mOrgan solos. -Little Brown Church.	2:45 p. m.—Vocal and instrumental songs; race results (half hourly). 3:30 p. m.—Louisville Jazz Band.	thal. tenor; talk on "Succoth." 6 p. m.—Dinner music. 7 p. m.—Florence Johnson, contralto.	10:30 WOR 405 Slater's 10:30 WMCA 341 Messner's 10:30 WEAF 492 Ben Bernie's	9:20 WEBJ 273 Seibert's Ernie 9:30 WTIC 476 Dance music Arrov 9:45 WMCA 341 Serenaders Seren
1	9 p. m	CBD-ZION CITY, ILL345 -Celestial bells; male chorus. WHT-CHICAGO-400	4 p. m.—Songs. 8 p. m.—Half hour of music. 8 30 p. m.—Lou Lefebyre, jazzologist.	7:10 p. m.—Columbia University lecture. 7:30 p. m.—Jessie Covington, pianist. 7:45 p. m.—Florence Johnson, contralto.	10:35 WJZ 455 Waldorf-Astoria 10:35 WNYC 526 St. George's '1-1 WGR 319 Statler WWN 961 Test Lawie's	10:00 WLIT 395 Dance music Roder 10:00 WHN 361 Roseland 10:05 WRW 273 Koenig's 10:15 WAWG 216 Zimmenzis
	10:15 p.	m.—Tabernacle band and choir. m.—Request program. m.—Back Home hour.	8:45 p; m.—Vincent Laine, tenor. 9 p. m.—Lillian Gordone, contraito. 9:15 p. m.—Kennedy Harmony Quintet.	8 p. m.—Ross Gorman's Orchestra. 8:30 p. m.—The Twins. 9 p. m.—Eveready hour.	12-2 WAHG 316 Dance music	10:15 WAHG 316 Zimmerman's 7:30 10:15 WGCP 252 Strickland's 9:45
		WQJ-CHICAGO-448	9:30 p. mSongs by artists.	10 p. mGala concert.	the second s	

Bducation." and the particle, fitting of Bducation."
4:30 p. m. — Women's program; Abe Rosenthal, tenor; talk on "Succoth."
6 p. m. — Dinner music.
7 p. m. — Columbla University lecture.
7:30 p. m. — Jessie Covington, planist.
7:45 p. m. — Florence Johnson, contralto.
8 p. m. — Ross Gorman's Orchestra.
8:30 p. m. — The Twins.
9 p. m. — Eveready hour.
10 p. m. — Gala concert.
11-12 p. m. — Meyer Davis's Orchestra.

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WKRC-CINCINNATI--326 7:45 p. m.-Songs and service. 11 p. m.-Classical program. 12 midnight--MCKay's Orchestra. WSAI-CINCINNATI--326 4 p. m.—Sermonette; chime cone WWJ—DETROIT—353 7:20 p. m.—Capitol Theater program. WLS—CHICAGO—345 WGCC-NEW ARG-2007 2:45 p. m.-Vocal and instrumenta race results (half hourly). 3:30 p. m.-Louisville Jazz Band, 4 p. m.-Songs. 8 p. m.-Half hour of music. 7:30 p. m.—Organ solos. 8 p. m.—Little Brown Church. WCBD—ZION CITY, ILL.—345 9 p. m.—Celestial bells; male cho WHT—CHICAGO—400 8 p. m.—Half hour of music.
8:30 p. m.—Lou Lefebvre, jazzologist.
8:45 p. m.—Vincent Laine, tenor.
9 p. m.—Lillian Gordone, contraito.
9:15 p. m.—Kennedy Harmony Quintet.
9:30 p. m.—Strickland's Orchestra.

WHT-CHICAGO-400 7:30 p. m.-Tabernacle band and choir. 10:15 p. m.-Request program. 11:30 p. m.-Back Home hour. WQJ-CHICAGO-448 9-11 p.m.-Rainbow Gardens Orchestra

**World Radio History** 

WJZ WOO WEAF WOR WGR WHN

Ramblers Lanson's Arcady

Manhattan

Kentucky

Dance music California

St. George Ernie Golden's Arrowhead Serenaders Rodeo



a p. m.—Artists' recital.
b p. m.—Pagoda Orchestra.
f p. m.—Roll call; birthday list.
g p. m.—Illustrated music talk.
g a p. m.—Recital.
g a p. m.—Recital.
g b m.—The Melody Trio.
g p. m.—The Melody Trio.
g p. m.—Dance music.
WFI—PHILADELPHIA—395
0:30 a. m.—Solos.
p. m.—Orchestra p. m. --- Orchestra. m.—Orchestra. p. m.—Agricultural reports. m.—Talk by Mrs. Elmer E. Melic p. m.—Eleanor Gunn fashion featu p. m.—Reof Garden broadcast. m.—The "Larkinites." p. m..—Thor "Concert. m.—Atwater Kent Radio Artists. ) m.—The Silvertown Cord Orchest m.—The Silvertown Cord Orc WLIT—PHILADELPHIA—395 What -- F HALAD FLIT FILA-395 p. m.-Organ recital: orchestra; m.-Concert orchestra; recital. p. m.-Artist recital. p. m.-Dream Daddy. WCAU-PHILADELPHIA-275 D. m.-Billy Have's Orchestra WCAU-PHILADELPHIA-278 :30 p. m.-Billy Hayes's Orchestrs. :30 p. m.-Snellenburg's Trio. p. m.-Instrumental artists. p. m.-Barry O'Moore, tenor. :30 p. m.-Frank Cook, songs. 0 p. m.-Sesqui Hour. WPG-ATLANTIC CITY-300 10 p. m.—FTARK Cook, songa.
10 p. m.—Sesqui Hour.
130 p. m.—Luncheon music.
130 p. m.—Chalfonte-Haddon Trio.
130 p. m.—Taymore Dinner Music.
131 p. m.—Taymore Dinner Music.
131 p. m.—Taymore Dinner Music.
131 p. m.—Taymore Dinner Music.
132 p. m.—Taymore Dinner Music.
133 p. m.—Ambassador Concert Orchestra.
130 p. m.—Ambassador Concert Orchestra.
130 p. m.—Dance orchestra.
141 p. m.—Chalfonte-Haddon Trio.
15 p. m.—Taymore Dinner Music.
15 p. m.—Taymore Dinner Music.
16 p. m.—Red Lion Orchestra.
17 p. m.—Margier La Valle, soprano:
10 p. m.—Red Lion Orchestra.
10 p. m.—Red Lion Orchestra.
115 p. m.—Dance orchestra.
115 p. m.—Ret Lion Orchestra.
115 p. m.—Ambassador Concert Orchestra.
115 p. m.—Ret Lion Orchestra.
115 p. m.—Dance orchestra.
115 p. m.—Ret Lion Orchestra.
115 p. m.—Chalfonte-Haddon Orchestra.
115 p. m.—Chalfonte-Haddon Orchestra.
115 p. m.—Chalfonte-Haddon Orchestra.
116 p. m.—Chalfonte-Haddon Orchestra.
117 p. m.—Ret Lion Orchestra.
118 p. m.—Dance orchestra.
118 p. m.—Dance orchestra.
118 p. m.—Dance orchestra.
118 p. m.—Dance orchestra.
119 p. m.—Ret L

Word."
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Trafford, soprano.
8 p. m.—"Better Reception."
8:50 p. m.—Melo Dance Orchestra.
8:50 p. m.—"Traffic on Broadway."
9 p. m.—Hardman hour; Marguerita Calledo, Count Paul von Ehrenfels, duets; Bernard Mann, planist, and trio.
10 p. m.—"How to Drive Automobiles."
10:30 p. m.—Asciatio's Dance Orchestra.
11:5 p. m.—Donald Flamm, critic.
WEBJ-DEW YORK CITY-273

WOKO---NEW YORK CITY-233 8:30-11 p. m.-Bike races; band,

WOCL<sup>11</sup> p. m.—Bike races; band, WMCA—NEW YORK CITY—341 12 noon—Olcott Vail's Ensemble, 8 p. m.—Olcott Vail's Ensemble, 8:30 p. m.—Ernie Golden's Orchestra. 7:30 p. m.—W. C. Nicholson, 'The Ri Word.''

SATURDAY WGBS-NEW YORK CITY-Sis a. m.-Timely talks with Terese. martin 1

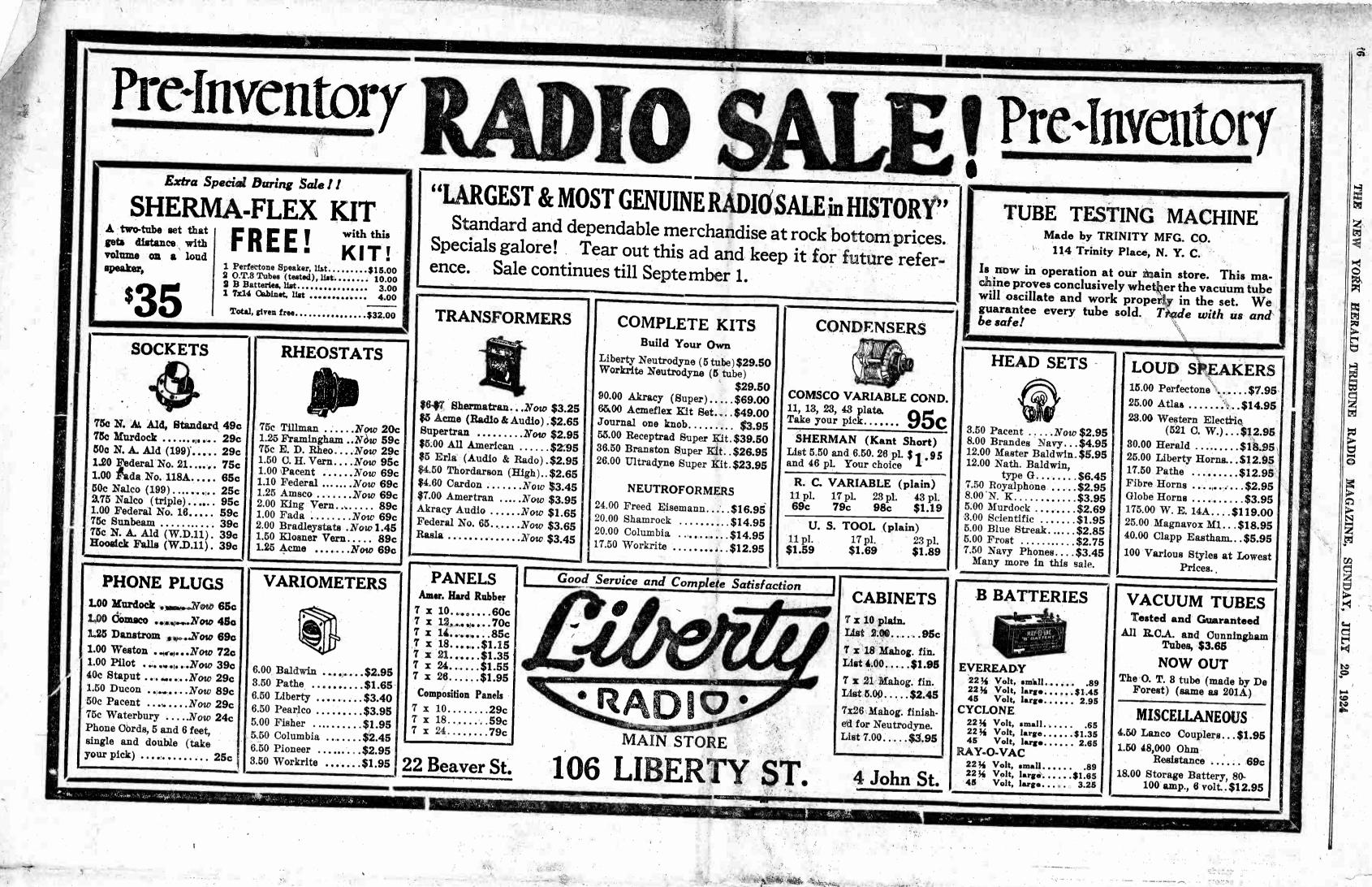
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10-12 p. m.—Dance program. KDKA—PITTSBURGH—326 6:15 p. m.—Dinner concert. 8:30 p. m.—Concert.

10 a. m.—Timely talks with Terese. 10:10 a. m.—Kiddie Klub program. 10:40 a. m.—Ethel Brophy, soprano. 10:50 a. m.—Fashion talk. 1:30 p. m.—Arthur koffman's Serenaders. 2 p. m.—Arthur Koffman's Serenaders.

p. m.—Arthur Koffman's Serenaders.
 p. m.—Spanish lessons; plano.
 3:20 p. m.—Auto driving lessons; plano.
 3:40 p. m.—Furniture talk; plano.
 6 p. m.—Uncle Geebee.
 6:30 p. m.—Dulcimerian's Orchestra.
 7 p. m.—Psychology talk.
 7:10 p. m.—Paul Porchesi, Mme. Porchest, songs.





orld Radio Histor

Oh, I took me to the northern shore, Where the beach gleams long and white, Where the surge of the sea sang in my ea And pavements were out of sight; I hiked and swam the whole day long,

Oh, I rambled far of a summer month With a kit, a tent and a car, And wherever the nighttime found me I camped with the evening star; And many a virgin trail-I found Whose ways few come to know, on Old Broadway

and speeches and now SSITY *y* forced from mind; *I* take them with me, orchestras and such 80 heights

the mountain

radio

(a)

here was a time when I w hat I left the good behind I went away

Over the radio

radio!

when the

Sun

was

10W

the songs of home

# **Constructing a Unit From Which Any Circuit May Be Obtained**

## By Means of Phone Tips and Jacks Connections May Be Made Which Will Give Any **Regenerative Tuner**

**By JAMES E. CARTIER** 

pend upon new things to keep the nterest of the radio fans centered. upon those magazines it is necessary for them to obtain and print articles describing new circuits, or old circuits revamped. And because of this demand for new circuits and other new things in the radio field, the radio men who are supplying the magazines with copy are continually experimenting with new circuits to place before the radio public.

As a consequence of all this experimenting better circuits are constantly being developed and given the fan to build and use. Many of these circuits are better than those being used by the fan. But to build the new set means a few new parts or at least a new panel. Therefore, the purpose of this article is to describe a method of making a set that can be changed to any circuit which the constructor may wish to have at any time. It also will be possible for the owner of such a set to develop his own circuits, as will be seen later on.

The only drawback to this set is the original cost, but when the changeability cost is really nothing, because the first cost can be the last cost. Of course, adaptations can be made to the set that will but will be mentioned, and also those that will occur to the constructor in the course of construction.

### Panel Size

The panel for a one-tube unit of this type should be seventeen inches high by twenty inches long If a two-step amplifier is to be incorporated into the unit, as | Sometimes it will be necessary in some will be suggested later, then increase the length of the panel to twenty-seven inches.

For a unit that will take care of nearly every regenerative circuit that could be thought of that would use standard parts two variable condensers, having a capacity of .0005 mfd. two large variometers and a standard variocoupler should be obtained Another coupler having an untuned primary and fixed coupling should also be obtained as its uses are manifold. This may be made at home or procured at any radio store.

To make this unit at home use a threeand-one-half-inch tube for winding the primary, twenty turns, and the secondary. forty turns, coils on. The tickler coil should have thirty-six or forty turns wound on a tube that will rotate inside the other; about two and five-eighths inches is right.

### How Set is Used

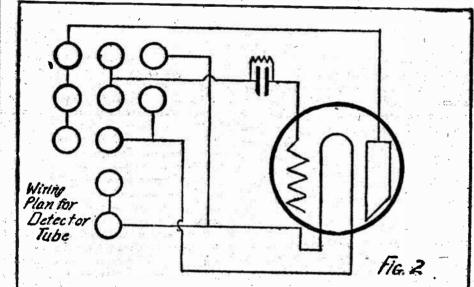
the set will be given. The main idea is that no circuit is reade in the set. Each part is mounted on the panel and connections to the terminals of each part are made to the panel by means of the phone tip jacks that can now be bought in any radio store. Thus each instrument is separate from the rest and can be connected to any other instrument by means lead and connect it to one of the phone posts and to the other variometer jack. This would place a variometer in the plate circuit of the detector tube.

Each instrument will have a certain number of jacks to make the required connections. For variable condensers two jacks will be necessary, for fixed condensers, two; for variometers, four: couplers, six, and for the special coupler mentioned, eight. Rheostats require two jacks, binding posts each one jack, two for the "A" battery posts.

The detector tube requires quite a few jacks, as will be noted. The plate, three; the grid, two, and the filaments, three jacks. For connectors between instruments a half pound of flexible stranded double cotton covered wire, equal to number eighteen B & S gauge in size should be obtained. Two phone sips are necessary for each connector. About ten connectors will be required for most circuits;; it would be therefore advisable to make several extra ones. The length of each will depend upon its use. Those of the unit is taken into consideration the | for battery and phone connections and other standard uses should be cut to fit the distance between the jacks and then used for that only. As these connectors not be entered into constructionally herein | will wear out in time, keep the extra wire on the spool to make new ones with.

### Mounting Parts

Mount the parts on the panel, as shown in Fig. 1. Then drill for the jacks, as suggested in the drawing, the jacks being represented by circles near the dials. exceptional freakish circuits to use more | four for the secondary, named S in



Before drilling the panel the idea of than the given number of connections ; figure, and two for the rotor, named to one instrument. In this case it will be simple to drill for another jack and connect it in parallel to those already in

> In connecting up the variable and fixed condensers one jack is connected to the rotor plates and one to the fixed plates. The variometers should be changed from the way they are bought, so that they

in figure, which can be used as a tickler coil, left out (short-circuited at this time) or used as a coupling device.

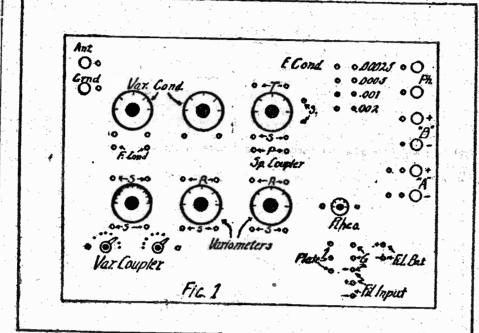
The connections for the detector tuba are given in the diagram in Fig. 2. Plenty of space is left around the inserted packs so that at any time more may be added for circuits that are radical departures from the standard.

Jacks are noted on the panel marked fixed condensers. These have a manifold purpose. That under the first condenser to the left of the panel is for raising the capacity of this condenser by connecting the two in parallel, and has a capacity of .0005 mfd., whenever a .001 mfd. condenser is necessary for some circuit. Another fixed condenser may be placed below the second condenser if the constructor wishes

Those jacks marked down the right densers are of various capacities from .00025 to .002 mfd. A .005 may be added if the constructor desires. These may be connected in the circuit at any place that a circuit calls for a fixed condenser.

In order to facilitate the wiring of the parts several schematic diagrams are given showing how the condensers, couplers and variometers are connected to the

ECAUSE all radio magazines de- be only necessary to take another flexible | figure. That is, the rotor and stator are | A two-step amplifier may be added separated and connected separately. either in the set or on a separate When used in the circuit as straight | cabinet. Do not attempt to add radio tuning variometers, one rotor jack and | frequency to the set and make connections



one stator jack are connected together, 1 to the various parts by means of the the other two jacks being used to connect the variometer in the external circuit.

Variocouplers are connected to six jacks, as shown. Four are connected to the rotor coil, named S in figure, and two to the switch levers. The switch points being soldered to the taps on the stator in the standard manner.

The special coupler has eight jacks. two for the primary, named P in figure;

plug and jack system. It will not operate efficiently.

### **Detector** Tube

The parts used in the set should be of the best. For the detector tube any type may be used. However, care must be taken to get the proper rheostat for the tube used and also that the proper "A" and "B" battery voltages are used

The two-variometer circuit is very easy to construct from the set. We will use this as an example to show how the set is connected up. First. a connector is plugged into the aerial post, then the other end is plugged into the jack connecting to the ten-turn tap switch on the coupler. The ground post is connected to the unit tap switch in the same manner.

One jack of the secondary of the coupler is then connected to one of the rotor leads of the nearest variometer. A connector is used to connect one rotor and one stator together. The other jack to this variometer is then plugged into the jack connecting to the grid condenser and grid.

Another jack on the coupler secondary is then connected to the jack on the filament of the tube, either negative or positive, whichever works better for the tube used.

The other variometer has one jack connected to the plate and another to the phones, a connector being used to connect the rotor and stator coils as before. The other phone jack is then connected to the "B" battery positive. The "B" battery negative is then connected to the "A" battery, either positive or negative.

The rheostat jacks are connected into the circuit with two connectors, one to the negative "A" jack and the other to the negative filament jack. The positive filament jack is then connected to the positive "A" battery jack. The set is then wired up and when the aerial, ground, batteries and phones are connected to their respective binding posts the set will be ready to bring in music.

In this manner it is easy to change the circuit in a few minutes to any one hand side of the panel as fixed con- that the constructor desires to favor with his attention for a while. If one does not work well, then another one can be tried without much loss of time.

Before closing the article the author wishes to state that only the bare necessities for a simple set of this type have been given. It is for the constructor to add such improvements as he sees fit. Additional parts may be added at any time if the panel is made larger than at the right hand end of the panel for them.

broadcast, and for this reason we Washington several months ago ting station, the truck may be sent A. B. R. L. headquarters that the first mention a concert to be given by the placed into effect a plan of wave- out to the scene of the program- transmitting period will be from Au-Filiping orchestra of the S. S. Levia- length distribution which has re- church, theater or public hall. It is gust 10th through the 20th, and the than. It will be a forty-five-minute sulted in a great improvement in the there connected to the amplifying second from September 7th through minute too long for those who like a dash of the weird music of the East.

We have always said that it takes a good soprano to draw complimentary comment from us. Those who like sopranos over the air-we don't -will probably enjoy Dorothy Heyden, soprano, who sings from WOR on Tuesday afternoon.

When Georges Carpentier and Gene Tunney have their clouting match on Thursday, July 24, Major J. Andrew White will be at the ringside to give his always interesting account of the dividual votes, the letters having tween church, hall or theater and the

We do not besitate in saying that the U. S. Marine Band offers the best

whom we would put down on a list formers. Counterfeit dialect is a ply, to check the claims of Mr. Dalof the ten best radio technical men pitiful thing to listen to on the radio ton. The South African heard 2XI in the United States to-day, broad- or any other place, for that matter. from 2:45 to 5:30 a. m., his time. coated technics for the less able of Chelmsford, England, High- reception I have ever had. It was the the listeners. He ended the series Powered Station on the Air best I have yet experienced, both as with a promise to return at a later The B. B. C. high-powered station regards clarity and strength. We nodate with data on interference and its prevention. Here is what WEAF's excerimental work on July 9. The muffled or musky. The same also ap-

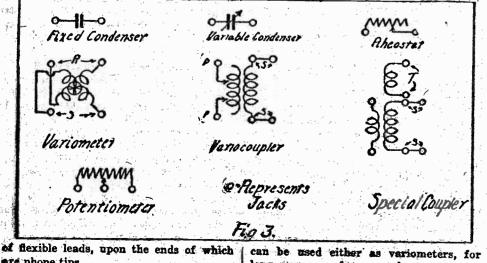
yielded very valuable figures regard- disteners are cordially invited to coming signal. ing the problems to be met before Masen for this station and write to Johannesburg is 8,043 miles from radio's ills are entirely cured.

The sources of greatest interfer giving details of their results,

ence were spark telegraph sign-le interference from other broadcastics, regular program. stations). 29.6 per cent, Radio listeners ware also requested . F. E. Passonnio at WEAF

to indicate their second and third Frank E Passones, Socialist can be broadcast by WOR will be sent to indicate their second and third Frank & Passones Socialist can-choice as to the most troublesores diate for the Governor of the State sources of interference. Whistles as Mere York, will address WEAF's the Newark Philhermonic Concert were the second cause of interference and interference on Tuesday evening. Mr. Band of figures news of State State. N. Y. City. were the second cause of interfarence and inner on Tuesday evening. Mr. Band of fifty-two pieces plays a conon 43 per cent of the questionnaires. Passiano is making a very active cert from Branch Brook Park, Newspark on 37 per cent and cross talk campaign throughout the state and ark, under the direction of Carl D. on 20 per cent. Third choice was as expects to poll a very strong vote as Bethel. The concert will be broadsigned to cross talk by 60 per cost, an indication of support of the poli- cast from 8:15 to 9:15 p. m. and will

**World Radio History** 



are phone tips. Thus when one end of a flexible lead is plugged into the jack connected to the

long waves or for very short waves, or as coupling devices. Four connections to each variometer plate of the tube, as shown in Fig. 2, and are shown, two jacks are connected to jacks. When more jacks are needed that specified and plenty of space is left

the other into one of the jacks connected | the rotor coil, named R in the figure, and | they are connected in parallel to those to one of the variometers, it will then I two to the stator coil, named S in | already in use,

The New Week on the Radio By Pioneer

wid dis aftanoon?" is the questionnaire.

WOR has never broadcast out-of. interference. studio events through the remote harmonic Concert Band will play first and second choice.

the evening of July 25. The Breau second place in the second choice and licenses and wave lengths.

control system. Perhaps there is not length were made cross talk was, 2XAZ, operating on 160 meters. a great deal of opportunity for such perhaps, the mast serious dufficulty, work in Newark. However, there is but improvements in the design of going to be an opportunity for it sets and increased experience on the use practically any power up to ten and of the year. All of the trans-hereafter, for we are informed that part of those operating them has kilowatts, and has used that power mission will be carried on with very

weekly in the Bound Brook Park. Arrangements are being made with WOR, at last coming out of its stu- the principal radio telegraph compa-

turns follows:

First place: Second place:

Third place: 

fracas. This is an extra brilliant come from practically the entire control room. In other words, there Eastern half of the United States.

The B. B. C. reserves the right to was the more remarkable because of which were rated as the worst source cancel or change these arrangements the warm weather at the transmitof interference by 39 per cent at in any martheular, as it is to be ting end and the heavy static that those complying with Mr. Hogan's re- whderstood that these transmissions has to be penetrated to reach southquest. Whistles came second, which are purely of an experimental char- lern Africa, now experiencing the win-ST.4 per cent, and cross talk (that is, deter. They are not a part of the ter season.

## WGY Has a Portable Radio Transmitter

66 TH / HO'S dat lady I seen you by 17.5 per cent of those replying to Few radio fans are aware that the

that evening. We never have listened are being taken to reduce this source operates on a development class to them, but Hellywood McCocker interference to a minimum. Al-the short-wave station 2XI, which radio contest with the experimenters real DX There that they study the code and suggest that they study the code and swears that they are good, and we place in the first choice, the analysis goes on the air with 107-meter waves, in Australasia and New Zealand. Two code can regularly receive signals are consequently risking the men-shows them to be quite preponderant broadcasting the same programs that ten-day periods, one in August and from the Eiffel Tower and from as the second worst cause of trouble, are put on the air from WGY. The the other in September, have been set Nauen, Germany. Signals from Educational campaigns are necessary third station, familiar only within a aside. For some reason unknown to us to remove the cause of this source of radius of fifty miles of Schenectady. This test is being arranged by the easily be picked up. Ships thousands and then only to owners of sets American Radio Eelay League at the of miles away can be copied at regu-When the first changes in wave capable of picking up short waves, is request of C. D. Maclurcan, president lar intervals. We ask you where is

Transmitter Goes to Concert

successfully in long distance trans- short waves. mission on short wave lengths. 2XAZ While transmission on wave Oriental music has not been over- The wave length conference in of twenty-five miles of the transmit- Announcement was made at the ceoiving set and from that point While the amateurs in the United tus, which puts these on the air on

This is a summary of over 5,000 in- usual practice in remote control beis a radio link in place of a wire

Experiments by 2XI on the shor We have never heard of the Navy wave length and by the use of high music of the kind that we can ever Band of the Virgin Islands, but WJY power have produced some very un-

be in order. We can only hope that publication was interested to such WJY will live up to the spirit of its an extent that they cabled the Gen-Some time ago John V. L. Hogan, promise by having only colored per- eral Electric Company, prepaying re-

Mr. Dalton stated: "It is the best publicity man has to say about his hours of transmission provisionally plies to the choral singing, but the final talk to be given from WFAD, fact are 11:30 a. m. to 12:30 p. m.; solo and duet voices were particularly find the the solution of the choral singing is the solution of the choral single is the solution of the choral single is the solution of the solution of the choral single is the solution of the solution 4 to 5 p. m., and 7:30 to 8:30 p. m. good; throughout we could distin-The final talk of the series by John The morning and afternoon programs guish the text." The Johannesburg guish the text." The Johannesburg man also picked up 2XI April 22 and May 15. He used a four-valve set, one high frequency detector and two low frequency. but the shearen and two shearen are the set of the shearen and two low frequency. But the shearen are the set of the set of the shearen are the set of th V. L. Hogan, consulting radio engi- w ll be mostly speech, but it is hoped man also picked up 2XI April 22 and neer and past president of the Institutes; some music will be played dur. May 15. He used a four-valve set, tute of Radio Engineers, beidro in the evening. WEAF's microphone, concluded with Fne wave length will be 1,600 me- low frequency, but the absence of a request for specific data regard at the wave length will be 1.600 me. 10W Irequency, but the absence of a pound. SEE JAY. interference difficulties experienced later; it will not be less than 15 was able to use an additional high difficulties wave bench interference difficulties experienced later; it will not be less than 15 was able to use an additional high OPEN EVENTINGS UNTIL 10 P. M. by WEAF's listeners. These have biowatts. The station call is 5-XX. frequency valve to build up the in-

> the British Broadcasting Company Scheneetady. This is a record distance for the station. The reception

WOR Uses Remote Control The first remote control feature to whistles by 22.5 per cent and spark, class which his party stands for. | consist largely of operatic music.



Having communicated in both disame radio program may frequently rections with amateur radio telethe time-honored inquiry quite notable, spark interference three different General Electric sta-traine from WOR on the consistency of these figures is be heard from Scheneetady from graph operators, in South America, the time-honored inquiry quite notable, spark interference three different General Electric sta-that will surely come from WOR on holding first place in the first choice, tions operating on three different amateurs of the United States and can be received on a given number Canada are now turning their atten- of tubes. The farther away a & Tobias Minstrels will broadcast on third place in the third choice. Steps The familiar station is WGY, which tion to the Pacific Ocean for the pur- station is that has been received the

> of the Australian Radio Relay there a greater thrill for the DX League, in a determined effort to es- hound? 2XAZ, like 2XL is an experimental tablish two-way radio contact with license. Station 2XI is licensed to North American operators before the

is the portable radio station, using lengths in the vicinity of 100 meters die shell, will broadcast the event on nies for reducing the amount of traf- but 250 watts. Transmitting set and in somewhat restricted from the dio shell, will broadcast the event on much for reducing the market which are tower, the latter of a telescope type standpoint of United States and the streets of it is expected that there will be a sical event if WOR'S first attempt at ception. Considerable progress has truck. The truck is used in connect operators on the air to make the test ouside work is successful, and we been made and transmitters of coast tion with what is termed remote con- successful. Many American amateurs stations located near metropolitan trol. When programs originate out- are being heard in Australia on the

unit, which in turn is connected to the 16th. Australian and New Zea-A tabulation of Mr. Hogan's re- the microphone used to pick up land amateurs will listen from 3:00 speech or music. The portable sta- to 3:30 a. m., E. S. S., and they will tion then transmits by radio the elec- transmit from 3.30 to 4:50 s.m., 

Australian and New Zealand operators will be working their stations about 6 p. m. The transmitting bours will be the same each day. It Planned is suggested that all operators use a code word for purpose of indentification.

**Code Brings Real DX** 



Radio Exchange Rate, 35 cents a line; minimum, 3 lines. Agate caps and white space only display permitted. Ads. accepted until 4 P. M. Friday.

PHONE PENNSYLVANIA 4000

### Parts and Equipment

music of the kind that we can ever expect to hear on the air. Although it plays in a park near the Potomac River in Washington, its notes seem to suffer little for their journey over the 200 miles of telephone wire con-necting that point with WEAF's local studio. The band will give another program on Monday evening. Serious Histeners who like popular lectures of science might enjoy Pro-fessor Gharles L. Harrington when and a Very Large Star" from WEAF Tuesday morning. This should be on the evening program, but we will probably have to histen to tips on the making of salad dressing instead. Some time age John V. I. Hearst

### TROUBLEST

- GUARANTEED ST SUPER-HETERODYNES
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Radio

"B" BATTERY WIRE for beliding storage "B" batteries Gesuine nas-corrosive, size Na. 26. H. BOKER & CO., INC., 161 Duans st., New York City.

THOLESALE RETAIL EDISON Elements for "B" Batteries All ether parts in stock, Mail arders filled ROMCO STORAGE BATTERY CO., 144 W. 68th St. Phone Columbus 2253.

### Instruction

### Cabinets

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BARGAINS GALORE! -TUBE NEUTRODINE. -TUBE JOURNAL -TUBE JOURNAL -TUBE JOURNAL -TUBE JOURNAL -State State Stat WAVE METERS CALIBRATED. From Precision Standard. HIGH FREQUENCY RESISTANCE DESIGNING and TESTING ROSSITER, TYLER & McDONELL 61 Vesey St. Cortland 251 PHONES.....SETS REPAIRED REWIED Old sets remndeled up to date. FREE TESTS Unfinished work completed. All work guaranteed and demonstrated. ROF'S STORE 100 West 46th Street. OPEN EVENINGS BRYANT 6865 SPECIALIST ON NEUTRODINE Repair and install REDEX REGENERATIVE REFLEX Repair and install REFLEX REGENERATIVE Sets built to your design: workmanshig guaranteed; price very reasonable. F. WUNDSAM Former Supt. of the DeForest Co. 647 THIRD AV. NEAR 42D ST. Telephone Murray Hill 9332. PHONES MAGNETIZED, REPAIRED, KEYSTONE BATTERY 229 East 14th SL Lexington 3662. 5 For Sale

Service

ADD THREE stages of RADIO FRE-QUENCY to your set. Radioiz A. R. made by Westinghouse especially for R. C. set (wave lengths from 200 to 766 me-ters), will increase volume and bring in distance on loud speaker. Can operate with loop. Brand new. Full directions. LIST \$80.00 SALE PRICE: \$25.66 FERRAR RADIO CO., 349 B'way, M. T. BLECTRODYNE, five tobes, \$128; "pr-pert-bilt" by Marconi assistant. Don't buy an apology set. 201 Jay Street, Brocklyn.

EDISON Elements for "B" Batteries, 6c. per pair. All other parts in stock. Mail orders filed. ROMCO STORAGE BATTERT CO... 246 W. 68th st. Phone Columbus 1854. BRAUTIFUL 3-tube set; bests newtre-dyne; cost \$75; seff \$32; cannet be do-plicated. Cehen, 1205 43d St., Brookin.

## Batteries

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RADIO BATTERIES, special sub-price, 126 ampere; U. S. L. batteries THALER BATTERY SERVICE, N. L. Distributors, 208 West 68th St. Colum-bus 1822.



ND THE PANEL

A DEPARTMENT OF POPULAR DISCUSSION OF TECHNICAL POINTS USUALLY CONSIDERED TOO INTRICATE FOR GENERAL EXPLANATION

0)

HAT the average radio set works at all is a never ending source of amazement to me! It is, of course, unique among the playthings of man in that it has no moving parts except those movable for adjustment or tuning. It is. to that degree, unlike the phonograph, player piano, automobile, motor cycle, bicycle or motor boat. These things are simplicit. themselves compared with a radio set and they deal with known things that you can see. With an automobile or a motor boat, for example, the fundamental problem is the gasoline engine. The requirements for its performance are a proper mixture of gasoline vapor and air and an electric spark at the right time. All of this is physical. You don't have to guess any of it. You deal in facts that you can verify. You

none was ever advertised—one the basis of low B battery renewal costs.

The one-fourth ampere tubes were hailed with delight as cutting down the cost of current for the radio set. They do cut the cost materially, but the A battery upkeep cost does not begin to compare with the B battery upkeep. Investigation of several thousand five-tube sets shows that the average B battery cost is about twice that of the A battery cost, even when allowing for depreciation, repairs and payments to a charging station for recharging and for rental of a loan battery.

There are, of course, all kinds of meters on the market of various types and for various purposes. Meters, like all measuring instruments, are devices which compare two quantities by showing their relacan see the gasoline and when it flows. Even a scale for measuring length en- mensely, so that there was no need for

inclined to stop it, and when you can see, the force required to turn the needle for yourself what difference in economy | through varying degrees may be readily there is between various devices and various adjustments you are inclined always to the most economical. When you can't see waste you become careless in spite of printed warnings. I think it was a town in Connecticut where the growth of the town was so great that the matter of water supply became serious. Any one could have water piped to his house and use all he liked at a flat sum per year or per quarter. When the water question took on this new aspect it was decided to put meters in each house, so that those who used more should pay more in proportion, and thus the town could find the money to extend the supply. This was done, but the surprising thing was that when the meters were installed can see the spark and when it occurs. You | tive amounts, not their absolute values. | the consumption of water dropped im-

measured. Knowing this force, we know the force of the field, and the strength of the current producing the field may then be very easily calculated. We do not need to do this, however, as we can place a scale on the device over which the needle can be arranged to move. Then, by sending currents of known strength through the wire, we can calibrate the scale by marking on it the position of the pointer and the strength of the current at that time

- COPYRIGHT BY -

R-P CLARKSON

The use of a needle in an instrument c this kind requires that when no current flowing the instrument must be set so th. the needle is along the wire. To do this the wire must be in the magnetic meridian, because the earth's field will attract the compass needle. In order to be more independent of outside forces the needle may be replaced by a coil and a stationary

AI. Current Ammeter Current ) wire direction compass pointer. Shunt S Spring or Wain magnetic weight flux Ammeter always in series Scale HOT WIRE METER THE GALVANOSCOPE Yolt meter always across line.

the adjustment. You can see the engine go and can see what happens to it as various changes are made. But, go around any boat club in the spring of the year, or, in fact, almost any time, and watch the struggles and efforts made to start some motor boats. It is no unusual thing to work several days to make an engine run when the boats are first put overboard. It is no unusual thing to have to spend an hour or two any time to start a motor boat. Not always, of course, and not all boats, but the cases

In view of these things, isn't it little short of miraculous that a radio set dealing in quantities and matters that can't be observed in any way by the human enses, subject to troubles that we can't perceive, affected by a multitude of conditions we know nothing of, having no action to be observed and corrected, reaching out for something the presence of which we can't determine and which, when it is present, is controlled and adjusted by other human beings in some far off stations-isn't it marvelous that such a device can be put in the hands of almost any one without education or training and often lacking entirely in intelligence, and the radio set performs nearly always to his or her satisfaction? Milliameter Needed

The meter most needed, it seems to me, on a radio set is a milliameter in the plate circuit of each tube or, as that is expensive, in the common lead from the B battery negative post, so as to measure the entire drain from the B batteries. I venture to say that if sets were sold on the consumption of B battery, which is the upkeep cost of most sets, just as cars are compared on the basis of miles per gallon of fuel, there are many varieties of radio sets which would disappear from the busy marts of trade. Who would choose a set consuming 60 or 70 milliamperes from the B batteries, as against another set using less than a third as much with as great an ordinary range of distance and substantially the same volume, even if the

for our standard some agreed upon length, such as what we call a foot or a yard or a mile. For comparison purposes, it makes no difference whether our scale is exactly a foot or a yard. We can get the relation between any two lengths we measure. To tell others, however, either our measure must be exactly a foot or we must know just how far short or long it is. The reading can then be multiplied by some number to give the correct result in feet, just as we can get the exact time from a watch that is slow or fast if we know how much it is out of the way.

I am inclined to think that there is a certain quality which may or may not be found in people we class as intelligent or in people we characterize as "dumb" which has no apparent connection with education or knowledge. This is a sort ) ments are apt to be of this nature. of perception, a combination of close observation and perfect freedom of responsive action. You see it in the worker around your car, your boat, your radio set. You see it in the young fellow who acquires a local reputation as a genius because he can fix any balky set. He simply goes ahead and makes the changes that suggest themselves to him without any thought of what difference those changes may make. While you and I are arguing with ourselves and have finally concluded the thing is impossible he has tried it and made it work. Radio sets work for him as well as or better than they do for us.

A still more surprising feature of radio sets is the fact that, although they deal with electrical phenomena and with unseen forces-things that we can to a certain extent measure but cannot otherwise perceive-it is rare, indeed, to find any kind of measuring instrument on any set built for public consumption. I presume cost is the thing that keeps the manufacturer from supplying instruments, and lack of knowledge of their value is what prevents the public from demanding them It is a fact, however, that meters properly chosen will enable you to operate your set latter set cost more? Yet I venture to more economically for several reasons.

You can see the carburetor action and see | ables us merely to compare lengths, using | any extension of the supply. The people could see that their pocketbooks were affected by leaving the water running.

No instrument can be considered as giving accurate readings at all times, no matter how good it is. Even the finest devices made have their calibration curves to give due allowance to temperature, humidity, pressure, nearness of other objects, drafts and many other effects, depending on the instrument and the degree of accuracy for which it is to be used. In the ordinary radio set great precision is not worth while. On the other hand, the instruments must be good enough so that they will give the same reading continuously under the same conditions. They must be, also, such that the instruments themselves do not consume so much current as to make the results misleading. The cheaper instru-

Electrical measuring instruments, of whatever nature they are, are merely devices for comparison of electrical currents by comparing the effects produced by the flow of the currents. We know that a current flowing has a magnetic effect. We know it has a heating effect. We know if the current passes through an electrolyte it has a chemical effect. Hence, our electrical instruments must utilize one of these three effets. The magnetic effect is most used and the instruments are called electromagnetic instruments. They are usually designed for either d.c. or a.c. separately. Those instruments depending on heating effect are called hot wire instruments and are usually independent of either the alternations or oscillation of the current. The third class of instruments, the electrochemical type, are not normally met with in connection with radio receivers.

In its elementary form each type of instrument is extremely simple. The electromagnetic type as shown is merely a compass needle which when placed in an electromagnetic field tends to point in the direction of the field. The stronger the current the greater the force which will tend to turn the needle in the direction of the field. The needle can be so arranged that it is turned against the pressure of a say that no set was ever sold-certainly | When you see waste going on you are | spiral spring to which it is connected, and | circuit with which they are in parallel.

magnet used. This is the construction of the most accurate and sensitive galvanometers such as the D'Arsonval type, and is the practice in commercial instruments. The coil is suspended between the poles of the magnet, the field of the permanent magnet being undirectional.

A hot wire instrument is of similarly simple construction and, with care, can be readily made in any one of a multitude of varieties. The idea is that a current sent through a wire will have a heating effect. The rise in temperature of the wire willcause an increase in its length proportional to the rise in temperature. This will cause a deflection by the pointer on the scale.

The instrument, which consists merely of a compass needle ever which a wire measures the presence of a curren and is called a galvanoscope. When fitted with a scale it becomes capable of comparison effects and is called a galvanometer. the oldest instrument used for electrical measurement. Put in portable form it becomes an ammeter, if designed for current measurement, and a voltmeter, if for the measurement of electromotive force. As a matter of fact, all instruments measure current. Obviously, however, the current through any instrument having a constant resistance is proportional to the voltage at the terminals of the instrument, and if the instrument is calibrated for that purpose the reading can be in volts.

Ammeters, being always used in series in a circuit, always are of very low resistance, so that little power is wasted in them, and their use does not change the electrical characteristics of the circuit. Sometimes shunts are employed to accomplish this, the shunt being placed in the circuit and the ammeter arranged in parallel. With an ammeter of resistance A and a shunt of resistance S, the proportion of the total current going through the ammeter is S divided by A+S. Then the actual flow in the circuit is A+S divided by S multiplied by the ammeter reading.

Voltmeters, being always in parallel in the circuit, are made of very high resistance to prevent any great flow of current through them and around the part of the

# **General Directions for Checking, Adjusting** And Operating a "Super"

### By LAWRENCE R. BLACKHURST

Part II of an Article Describing a 45,000-Cycle Super-Heterodyne

Herald Tribune Radio Magazine general eight-tube 45,000-cycle super-heterodyne. This article is a continuation of the former and gives information relative to checking, adjusting and operating the receiver described

**NONNECT** the loop to the three binding posts on the left end of the panel. The center tap of the loop must be connected to the center binding post. One of the outside loop terminals should be connected to the top binding post and the other to the lower binding post. These two connections may be reversed without affecting the operation of the set.

The B battery unit may consist of two 767 Eveready 45-volt batteries connected in series. Connect the negative terminal of this unit to the binding post marked -AB, the positive 90-volt terminal to the binding post marked 90B and the 45volt terminal where the two batteries are connected in series to the binding post marked +45B.

After this has been done and before the A battery has been connected, plug in the phones and the loud speaker in the jacks provided. Close the filament switch, located on the panel under the voltmeter, and turn the rheostat up a few degrees. Any deflection of the voltmeter indicates an error in the wiring of the filament or B battery circuit. If such an error exists the trouble must be located and eliminated at once. If the voltmeter is not deflected the A battery can next be connected to the terminals marked + 41/4 A and - AB, Fig. 6.

Again turn on the filament switch and note the voltmeter reading, which should be 41/2 volts. If this reading is obtained the wiring of the A and B battery circuit is correct. If the meter should fail to read it is because the filament circuit is open. If the needle is deflected to the end of the scale the B battery voltage is shorted through the filament circuit.

The tubes can now be inserted. First see/that the filament rheostat is turned to the off position and that the volume control rheostat on the right hand end of the panel is turned clear to the right; also that the filament circuit switch is open and that the terminals of all the tubes and the contacts in the sockets are clean. Close the filament switch and turn the filament rheostat until the voltmeter indicates a filament potential of exactly three volts. This value should never be exceeded, as doing so will shorten the life of the tubes and may cause permanent injury to their filaments.

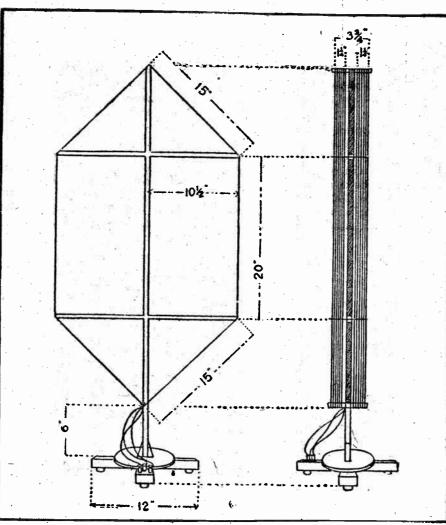
### Adjusting and Operating the Set

The set is now ready for an actual operating test. This should be done at a time when it is known that a broadcasting station of medium or high power is operating within a range of 100 miles. In normal coeration there are only two variables to Edjust, condensers C1 and C2. The rotor of the coupling unit and value of condenser C3 require initial adjustment, but, once set, will probably not need further attention. Set condenser C3 at the position for minimum capacity; that is, so stator and rotor plates are not interspaced. Its final adjustment follows later. Set the rotor coil of the coupling unit half way between the maximum and minimum coupling positions.

To locate a broadcasting station with the tuning controls set the loop condenser, which is the one at the extreme left end of the panel, to the five-degree position, then slowly turn the oscillator condenser from zero to 15 degrees. If no signal is intercepted change the loop condenser setting to 10 degrees and again slowly turn the oscillator condenser from 0 to 20 degrees. This process should be continued until a station is intercepted, changing the setting of the loop condenser about 5 degrees each time and slowly turning the oscillator condenser from a point at least 10 degrees below the loop setting to 10 | phragm being controlled, either directly or

IN THE July 6 issue of The New York | tuning distant stations the same procedure | or spark transmitters it will often be | tuning in the same station at another applies, only it will be necessary to make directions were given for building an loop settings every two degrees or even every degree if the signal strength of the station to be received is weak.

less interference than the other. If the station received is within a radius of four or five hundred miles the ampli-



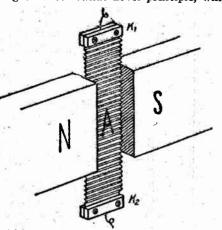
When a station is picked up it will be | fication obtained in the intermediate amnoted that it can be received at two set- riffer will probably be so great that the tings of the oscillator condenser, the lowest one on the dial being the adjustment of the oscillator that gives a frequency 45,000 cycles higher than the frequency of the incoming wave. The setting highest on the dial is for the frequency of the oscillator that is 45,000 cycles below the frequency of the incoming wave. Signals should be received with about the same intensity at either of these settings, hut sometimes under conditions of inter-

audio-frequency amplifier tubes will be overloaded. This undesirable condition can be corrected by turning the volume control rheostat to the left until the volume is sufficiently reduced and distortion eliminated. After one station has been received it

will be fairly easy to pick up additional stations. Each time a station is tuned in its location on both the loop condenser and the oscillator condenser should be ference from other broadcasting stations noted. This is important not only for

### Loud Speaker Operates on a Novel Principle

very much to the fore at the present time | vibrating at frequencies corresponding to and interests every one associated with the frequencies of the speech currents, broadcast receiving, the following notes on a recently produced loud speaker, operating on a somewhat novel principle, will



te of general interest, says "The Wireless World and Radio Review," London.

The apparatus here described is constructed by the well known firm of Siemens & Halske and has been developed in Germany by two engineers of that company, K. W. Wagner and Luschen.

Nearly every type of loud speaker which has been developed and is of practical value depends for its operation on some means of influencing a diaphragm, the dia-

As the subject of loud-speaker design is | In addition to having to set the diaphragm there is an expenditure of energy in overcoming the inertia of the diaphragm, and also in moving the mass of air which the diaphragm displaces in vibrating.

Professor Schottky, who has made a theoretical study of the problem, has proved that to obtain maximum efficiency the mass of the diaphragm must not exceed that of the air moved by it, and that it is preferable for the mass of the diaohragm to be less. Hence the necessity arises for the diaphragm itself to be extremely thin and light. In the present loud speaker an arrangement has been adopted which resembles the principle of the Sykes-Round microphone, for, instead of the more usual method of influencing a magnetic field by means of the speech currents and so controlling the movement of the heavy diaphragm, the speech currents are led through the diaphragm itre'f, which is placed in a powerful magnetic field. In the loud speaker illustrated herewith this principle has been adopted. Between the poles of the powerful electromagnet, N S, is stretched an extremely thin waved aluminum foil "A," and the output connections of the radio receiver cr amplifier are made to K 1 and K 2. A current carrying conductor placed in the magnetic field is deflected vertically to the direction of the magnetic field, and consequently the aluminum foil will oscillate degrees above the loop setting. When | indirectly, by the received speech currents. | quency of the currents passed through it. | and the remaining one to the botton post.

found that one gives better results and | time, but to facilitate the location of stations whose wave lengths are known to be slightly above or below the station for which settings were recorded.

When a station at least 1,000 miles distant has been tuned in the rotor of the coupling unit should be adjusted to as near the minimum coupling position as is possible without causing a decrease in signal strength. Once this adjustment has been made the rotor may be locked in place with the set screw provided for that purpose and need never be changed again throughout the life of the oscillator tube. When a new oscillator tube is inserted in the socket it will be well to readjust the setting of the rotor.

The adjustment of condenser C-3 should be made while a station of low wave length, between 300 and 350 meters if possible and located at a distance of several hundred miles is being received. Under these conditions increasing the capacity of the condenser will cause considerable increase in signal strength. This capacity may be increased as far as possible without causing the first detector tube to oscillate or cause distortion of the received signal. When this adjustment is once made it can remain fixed for the reception of all stations on any wave length.

If, after carefully following these instructions for tuning the circuit, no signais can be received and at a time when it is known that a local broadcasting station is operating, a test should be made to determine whether or not the oscillator tube is oscillating. A good method of doing this is to touch the grid terminal of the oscillator tube or socket. If the tube is oscillating a click will be heard in the phones when the finger touches the terminal and again when it is withdrawn. If it is not oscillating a click will only be heard when the terminal is touched and not when the finger is withdrawn. Failure of the tube to oscillate may be due to incorrect wiring of the oscillator circuit; tube terminals may not be making contact with the socket prongs; or to the use of an old tube that is inoperative. Remedies for such conditions are obvious.

The range of reception depends largely upon the power of the broadcasting station. When the operator has become familiar with the tuning of this set little difficulty will be experienced in receiving 500 watt stations up to a distance of 2,000 miles. Under favorable atmospheric conditions the set is capable of reception across the continent.

### Shielding

When the set is to be operated in a radius of a mile or two of a high-powered broadcasting station it is sometimes found advisable to increase selectivity. Static such as is caused by high-tension lines, streetcars, elevator motors, etc., is also considerably lessened by shielding.

The entire inside of the cabinet may, in extreme cases, be shielded. The shielding should be No. 34 guage brass or copper cut into exact sizes to fit bottom, ends. top and back and tacked into place with small flat head brads or brass tacks.

A template should be made to conform with the panel drillings used in mounting the panel instruments. Cut the holes in the shield sufficiently large to clear the condenser and rheostat shafts and any other parts that might cause short circuits. For the jack cut a 1-2 inch hole and insulate the jack from the shield with a thin fiber washer. Since the shield is connected with the negative A and B battery terminals extreme care must be taken to insulate all parts of the mounted apparatus that are common to any part of the circuit other than the negative battery leads below the rheostats.

### The Loop

While it is not essential that the exact form of loop shown shall be used, it is important that the general dimensions be adhered to as well as the number of turns and spacing between turns.

It is neessary to take off a center tan which connects to the center binding post on the panel. One of the outside loop in a vertical direction at the rate of fre- | terminals connects to the top binding post

receiver that operates very well ex-cept for the fact that regeneration should be obtained. Because of this of force increase or decrease acis rather difficult to handle. It will these subjects will be taken up cordingly or, as can be stated in anstop and start at the most incon- briefly but clearly in the next few other manner, as the current invenient times. How can this be rem- articles of this series. Anwer-This starting and stopping of oscillations probably is caused by article, if a wire carrying a current upon the wire. the size of your tickler coil or the is placed close to a compass needle If a coil is wound around the legs

radio section, to this set? Answer-The resistance coupled tion in each case.

visable?

Answer-Five stages of straight The magnetic fields around two audio-frequency amplification would parallel conductors are either mutube of no advantage, for many rea- ally attractive or repellent, according magnetic force in the coil have magsons, chiefly because distortion and to the direction of current flow in tube noises would so garble up the each. If the current in two parallel signals as to make them unintelligi- conductors is flowing so that in one

the tuning coil.

covered wire wound on a composition tube three inches in diameter. The coil should be tapped every ten turns. Loop Construction G. M. Launsberg-I have a super-betorodyne receiver for which I should the furmer through the coil will unite. If a number of turns of wire are wound in a spiral, or helix, such as in an ordinary radio receiving or transmitting coil, the lines of force generated around each wire by a flow the tore the fux are different their and since the flux are different their And since the flux are different their the coil will unite. If a number of turns of wire are seach other and a battery the fluxes will have opposite directions due to the different flow of current in each as the coils are wound opposing. And since the flux are different their Erla ...... 2.60 magnetic fields are repellent. There like to build a loop aerial. I have That is, the lines of force around the form made. It is of the box type each turn will unite with those of resultant magnetic field will be fore if the two are telescoped the and is three feet in diameter. How the adjacent turns. nearly destroyed. many turns should I use, and what This uniting of the lines of force should the spacing be between turns? tends to form several long lines, con then be regulated by the varia-Answer-The correct number of since the direction of current in each tion of the telescoping of the coils. turns to use depends upon the size wire is the same. These long lines This property is made use of in the of the condenser, employed to tune are said to pass through the entire variometer that is so much in use the loop. For a condenser having a helix. These lines pass out of the to-day in the radio receivers. capacity of .0005 mfd. twelve turns a coil at one end and enter at the other meter diameter are put on a loop; end, as was demonstrated with bar **A Novel Vernier** that is, twelve or thirteen turns are magnets. used on a loop having a diameter of If the general direction of the lines It is a well known fact that when a three feet. The turns should be of force inside this coil is from right set is tuned to exactly the wave snaced about half an inch apart.

me how.



Radio-Frequency Choke Coil F. Robbons-I wish to construct a Reinartz receiver, and have procured all the parts for same, with the exception of the radio-frequency choke coil. Please give me the value of this coil. Will a honeycomb coil do? Answer-It is possible to use a honeycomb coil of large inductance value, but it is suggested that you wind a single-layer coil of 250 turns on a tube two and a half or three inches in diameter. The wire used may be of any size that is handy, though the smaller the better, be-Smooth Regeneration

the grid leak to some extent.

### Dead Batteries

the "B" batteries in the set are dead. direction.

Adding Amplification

Five Audio Stages audio-frequency amplifier. Is this ad- clockwise.

**Tuning Coil Data** 

Answer-This coil consists of

covered wire wound on a composition

Efficiency Test

efficiency test of parts if care is taken in the testing. The way to test a A Simple Explanation of the Magnetic Fields **Coils When a Current Flows Through Them** 

### By L. G. Ingram

**Electromagnetic Principles** 

two main electrical principles upon which radio communication is the insertion of an iron core er founded. For the student of radio bar of soft iron within the coil. ing of radio a good fundamental flow of current is fully established

A. B. Hanshofo-I have a three- that a magnet suspended so that it is connected, will be the north pole Answer-It is highly probable that around the wire which has a definite magnet.

amplifier as described in the radio Thus, if the current flow in a con- simple solenoid. section may be added to any receiver. ductor is away from the reader, then J. L. Eyer-I have a four-tube set, the conductor will be in the direc- magnets and in the excitation of the three stages of audio-frequency am-plincation, to which I should like to If the current flow is toward the add two more tubes in a separate reader the lines of force are anti-

### **Magnetic** Field

the current flows towards the reader upon the direction of flow of cur-F. J. Eller-I should like to build reader, then the lines of force surthe radio-frequency amplifier as rounding each wire are in opposition shown in a diagram in Mr. Meyer's or repulsion, but if the current in article printed on June 22. Please each is following in the same direcgive me the constructional data on tion, then the magnetic fields will aid each other and the lines of force

will have not only the same direction eighty turns of No. 22 single cotton-but will combine and coalesce.

M. Blackburn-I have a receiving set south pole. The polarity of a coil of new parts in some way that will direction of current is known.

easy for you to get an approximate the other end being the north pole. this vernier one complete revolution **Definition of Solenoid** 

set as a comparison. Tune in a sta- flows is known as a solenoid. And gree variation on the tuning contion. Make note of the tickler or it can easily be seen from the above denser or variometer. variometer setting when station is at paragraphs that a solenoid has the This vernier consists of a loop o

, tromagnetic induction are the of turns of wire in the solenoid, but the magnetizing power of it can be increased from 200 to 2,000 times by

telegraphy the importance of these If a direct current of unvarying two things cannot be too strongly noid the lines of force surrounding cause it will not take up much room. emphasized. For a clear understand the coil will stand still when the A. Williams-I have a three-tube grounding of these two subjects But if the rate of flow of current creases the lines of force move away As was explained in the first decreases the lines of force collapse from the wire, and as the current

resistance of the grid leak. Suggest the needle will be materially affected of a horseshoe magnet and a current that you try fewer turns on the tickler and increase the resistance of by the wire as long as there is a tickler and increase the resistance of current flowing through the wire. It coil through which the positive side has also been previously mentioned of the battery or current generator honeycomb-coil tuner with two stages is free to move will tend to place The other leg will be the south pole of amplification. The set worked per- itself parallel to a given magnetic of the north leg of the magnet and fectly up until a week ago. Upon re-turning from a week-end trip I tried field. Hence it follows from the above enter the south leg. If a small the set and there was no volume there experiment with the compass needle at all. Charged the "A" battery, but that the flow of current in a wire flowing through the coil the piece of the set and there was no volume there experiment with the compass needle piece of soft iron is placed near the no difference. Can you tell me what must have set up a magnetic field iron will be attracted forcibly to the

If a resistance is placed in series the "B" batteries in the set are used. If the current in a horizontal con-before you attempt making any ductor is flowing toward the north increased from zero to a very high changes in the set. Any radio store and this wire is placed over a com- value the attracting power of the pass the needle will be deflected, so magnet is decreased as the resistance that the north pole of the needle is is increased. Thus demonstrating Adding Amplification H. P. Boardman-I have a three- pointing toward the west. If the that the amount of current flowing tube neutrodyne receiver. Will it be wire is under the compass the needle through the coil controls the strength possible for me to add the resistance will be deflected toward the east. If of the magnetic lines of force and coupled amplifier, as described in the the current is reversed, then the the number of the lines emanating needle will take the opposite posi- from the legs of the magnet. This also holds true in the case of

> This property is utilized in practhe lines of magnetic force around tical work such as in large electromagnets of a dynamo or motor.

If a tempered steel bar be placed inside a solenoid, through which a current is flowing steadily for a few seconds, it will be found upon removal that the bar has become permanent magnet. The lines o netised the bar.

As the direction of the magneti field around a conductor depends and in the other away from the rent it is clear that if the current flowing through the above mentioned horseshoe magnet be reversed the polarity of the legs will be also reversed.

The strength of the magnetic field about a solenoid can be varied by fluxes of opposite direction. Thus, i two solenoids, wound in opposite di If a number of turns of wire are rections, are placed in series with

to left, the left hand end will be a length of a transmitting station the north pole, the other end being a signal strength is at its highest and should like to test the efficiency can always be determined. if the value. To accurate tune a set, verniers are necessary. Small eliminate expensive testing equip- The rule is as follows: If, when vernier condensers are helpful, but ment. If this can be done, please tell looking at the end of a coil the cur- an even finer venier is better. One ment. If this can be done, please the rent flows around the coil in a of the simplest and most efficient Answer-If your receiver is a re- clockwise direction, the end nearest verniers that can be usel is the one generative set it is comparatively the observer will be the south pole, that will be described herein. With of the dial through a ninety degree A helix consisting of a number of arc will give the same wave length part is to use the part now in the turns of wire through which current variation as that given by a one de-

greatest volume; also leave coupling same properties as a natural magnet, No. 14 double cotton covered wire control "as is." Then try new part i. e., a north and south pole and made small enough to rotate inside in circuit and again tune in same magnetic lines of force. the tube holding the secondary tuning station as quickly as possible. Re- The advantage of a solenoid over coil. This loop should be mounted cord plate control setting. The part a magnet is that the magnetism of on a wooden shaft cut from a quarter giving the lower setting is the better the solenoid can be placed under con- inch dowel pin. The loop is connected of the two. If this test is made with trol. The strength of the magnetic in series with the end of the coil that care and all new parts properly wired field around a solenoid is propor- it is nearest to. To operate the it will be fairly accurate. I tional to the strength of the current vernier the loop is rotated.

**GETS MORE STATIONS** 

LOUDER AND CLEARER THAN

ANY COIL ON THE MARKET

SYCO RADIO PRODUCTS CORP. 440 Drexel Bldg., Philadelphia

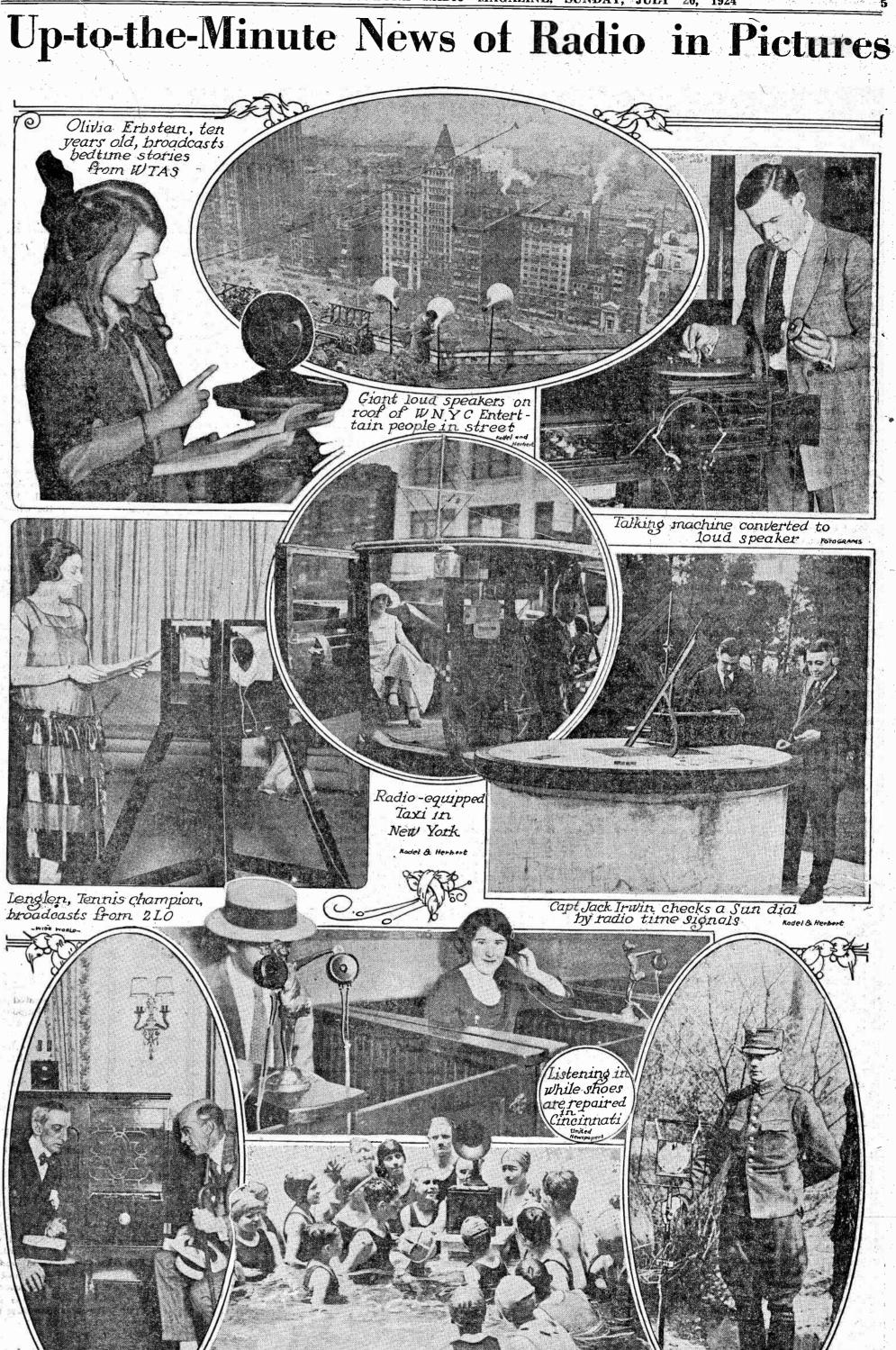




THE NEW YORK HERALD TRIBUNE RADIO MAGAZINE, SUNDAY, JULY 20, 1924

urned to brass pounding again with ably this accounts for the reason the ones upon which the receiving

new interest. He is still using the this station reaches out so well. I range should be based.

and the state of the second state of the second 


Delegates to London advertising convention listen in abourd S.S. Republic,

Radio Receiver in Wardman Preparing to transmit nightin-Park swimming pool Washington D.C. gale's song from Danish forest

# The Radio Telescope—Using an Indoor Loop for Directional Receiving

Coil Aerial Receiver Is Portable, Convenient to Install and Gives Directional Selectivity

By ALFRED N. GOLDSMITH, Ph. D.

Chief Broadcast Engineer, Radio Corporation of America

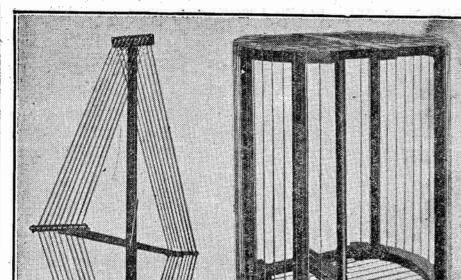
T HAS been pointed out that radio waves are an invisible sort of light waves. They travel outward in all cirections from the transmitting station just as the light from a powerful beacon reaches to all quarters of the horizon. For broadcasting purposes this is a great advartage since it enables the radio waves to cover all the territory around the transmitting station practically impartially. (There are some regions around a transmitting station which may be partially shielded from the radio waves by great groups of steel buildings, hills containing metallic ore deposits and the like, but otherwise the waves travel fairly indifferently in all directions and are capable of rendering equally good service at all points which are at the same distance from the transmitting station). It is this feature which gives radio broadcasting its peculiar adaptability for covering an area in contradistinction to wire communication, which, by its nature, is readily adaptable to the connection of two fixed points on land. While it is possible to transmit radio messages, particularly on the higher frequencies or shorter wave lengths, in particular directions, so that they can be received readily only within certain regions or sectors, yet this method of transmission has not been employed up to the present for broadcasting and it is not known whether it would prove practically useful in this field.

**Can Receive From Any Point** 

In view of the way in which radio waves travel in all directions, it is possible for an ordinary receiving station using a wire antenna to receive messages coming from any point of the compass. Every broadcast listener has noted and appreciated the fact that the concerts from cities in all directions can be received equally well on occasion. He has, however, also noticed that messages coming, say, from a land or ship spark station in one direction can easily interfere with concerts on a nearby frequency or wave length coming from a different direction. If one had available a form of radio receiver which could receive messages from a desired direction, instead of being open to reception of messages from all directions, it might be possible to eliminate undesired signals, and net, as usual, by tuning only, but by the use of this directional receiver.

Such a receiver, which would broadly receive messages from a definite direction and fail to respond at all to messages from some other direction, would be a convenient kind of "radio telescope" and would have interference-reducing capabilities. The simplest form of such a radio telescope is the loop or coil aerial. It consists of a number of turns of wire wound, generally, in square form for convenience and mounted on a frame which can be readily rotated. The side of the square is from about one foot to as much as five or six feet but the smaller sizes are by far. the more convenient. The terminals of the coil are connected in place of the "antenna" and "ground" connection, but an ordinary receiving set will generally not be satisfactory for use with coil aerials hecause it is not sufficiently sensitive. As a matter of fact, the signal strength which can be delivered by a coil is only a small fraction of what can be obtained by a suitably proportioned antenna system of the straight-wire type, and the difference must be made up by the use of additional amplification in the form of several more radiotrons, since otherwise strong signals will not be obtained.

The accompanying drawing shows how



tated. It is supposed that the signal comes from the north. When the loop points north the signal is loud, and as the loop is rotated to the east the signal dies down until, when the loop points due east the signal in a well designed and properly used set of this type has almost entirely disappeared. As the loop is again turned to the south the signal comes back with full strength, to disappear once more when the loop is turned to the west. Three

1. The loop receives the strongest signals when it points in the direction of the incoming waves (which, at times, and especially in city locations, may not be the direction of the station which is being received, since the incoming waves may be get rid of the undesired station. swung out of a straight line of travel by obstacles or reflection).

facts are at once evident:

2. The loop receives little or not at all when it points at right angles to the direction of the incoming waves.

on a coil aerial changes as the coil is ro- a station loudly, as a matter of practical operation after having picked it up, is to swing the loop until the desired signal disappears, and then to swing it exactly at right angles to the disappearing position. This will be found a little more definite and positive than the more obvious method of pointing the coil by trial in the direction giving the strongest signal. In order to get rid of an undesired station the loop is merely swung until the undesired signal disappears. If the undesired signal comes from a very different direction this method will work; but if the desired and undesired signals come from nearly the same direction, this method of reducing interference will not be effective. Of course, normal tuning is also used to

Set-up Indoor Receiving

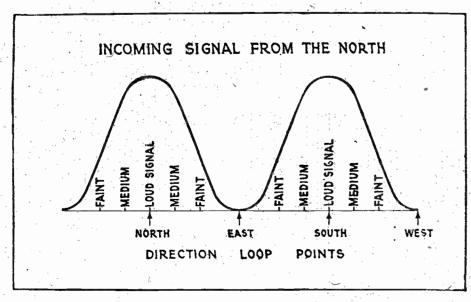
Loop (on left) and Small

Loop Removed From Ra-

diola Super-Heterodyne

Case

The coil aerial receiver has the advantage that no antenna wires need be strung, either outdoor or indoor. This simplifies the installation of the set and enables it to be used in almost any desired 3. It is possible to tell only the line of i location. In steel-frame buildings it is



### How the signal changes when the coil rotates

direction of the incoming waves from the | advisable to keep such sets near the winscribed that the signals are coming from the north or the south, but one cannot tell whether the true direction is north cr south. Generally this indefiniteness will not cause any practical difficulty.

the signal strength of a concert received | Accordingly, the simplest way to get | them.

loop direction, but not the actual direction. dows and not in back of steel columns or Thus one can tell in the case just de- long sections of wall. Stronger signals given. are generally obtained in the more open locations. Coil aerials also enable portable sets to be readily employed and transported, with minimum delay and inconvenience in setting them up and using

In ordinary antenna sets, because of the different sizes of the antennas employed in various installations, it is not possible to mark on the receiver exact settings for every frequency which will be correct for all users. Using the coil aerial, however, such universally applicable markings or calibrations become possible, with a resulting increase of convenier -> in the handling of the receiver.

The coil system of loop receivers may be either external to the set itself or it may be inclosed in the cabinet of the set. A type of rotating loop of high efficiency which is used for external operation with Radiola Super-Heterodyne (and which is also permanently included within the cabinet of Radiola Super-VIII) is shown in the accompanying illustration. This loop is readily rotated by hand manipulation when placed outside the set, or is rotated by a geared control and knob on the operating panel when it is inclosed in the Radiola Super-VIII receiver cabinet. An internal loop, fixed in position, is included within the cabinet of Radiola Super-Heterodyne, and this is the smaller rectangular loop also shown in the illustration. It requires no manipulation. Occasionally the entire set may be shifted slightly to pick up some particular station which happens to be in an unfavorable direction in the usual position of the set. Generally this is hardly necessary.

### Loops Get Distant Stations.

Another interesting point in connection with loop receivers is that it has been found possible by actual trial to listen to stations many hundreds of miles away, operating on practically the same frequency or wave length as a powerful local broadcasting station by utilizing the difference of direction only. We thus realize not only "tuning selectivity" of the ordinary kind, but also "directional selectivity."

A few rather curious and interesting effects will be found in the use of such receivers. In the interior rooms of steelframe buildings it will sometimes be found that all signals seem to come from the same direction. The reception is fairly good, but the directions of all signals are the same. This is because the reception is chiefly from the magnetic fields of currents induced by the traveling waves either in the steel or in the electric wiring system of the building.

A nearby wire antenna of considerable length will increase the signal strength on a coil receiver when both are tuned to the same frequency. If the long antenna has a regenerative receiver connected to with the tickler or intensity control brought well up the scale, it will very greatly increase the strength of the signals on the coil receiver, because regenerative reception actually strengthens the local field of the incoming radio waves.

### **Coil Receiver Overcomes Fading**

Sometimes at night, and particularly in certain country locations, signals from stations roughly a hundred miles away fade markedly and vary rapidly in intensity. When using an ordinary long wire antenna receiver nothing can be done about the fading effect. With the coil receiver, however, it will sometimes be found that when such a signal fades rapidly. swinging the coil approximately 90 degrees to a new position at right angles to the original position will bring the signal back again. This is sometimes a useful way of following the fading effects of an incoming signal, since it has the advantage that it enables holding the signal at a critical moment-for example, when some important statement is being broadcast or when the station signature is being

In view of its portability, directional selectivity and general interest and convenience of installation, the coil aerial receiver or radio telescope is sure to be widely used in modern sets and to have a i real sphere of usefulness.

can Radio Relay League. The selection of Page has been approved by Captain A. J. Dukan, who will be in command of the vessel, following his recommendation by local representatives of the A. R. R. L. He will have for his equipment radio apparatus capable of working on both commercial and amateur wave lengths, including the shorter waves. Page expects to communicate regularly with amateurs. The official radio call assigned to the vessel

WHU. Australia.

### New Zealanders Dance

Saturday night.

## Amateur Radio Off for South Sea Adventure

CHICAGO. Ill .- Having penetrated an adventure in the South Seas.

is preparing to sail from this city in length of 286 meters. amateur and member of the Ameri-

From a radio standpoint, much interest is being taken in the expedition, which is being organized and outfitted under the supervision of William Hale Thompson, former Mayor of Chicago. It will offer an opportunity to study the efficiency of the shorter wave lengths in the climate peculiar to southern waters. The vessel, which has a crew of

seven men, will proceed down the Mississippi River, through the Panama Canal, and from thence around the world. It is expected that in addition to operators in the United States, consistent radio communication will be maintained with amateurs in South America, Europe and

**To KGO Orchestra** Although situated on opposite sides of the earth from each other, groups of radio listeners now sway, step and glide in unison to dance music played at KGO. This is shown to-day by letters received at the General Electric Pacific Coast station.

From Waimate, South Island, New Zealand, almost 4,000 miles south of the Equator, comes a letter of appreciation. "Every Sunday evening," writes F. D. Blackwood, "the family dances on the front lawn to KGO music reproduced by our loud speaker. We always look forward to hearing KGO, and there is a disappointed household when the atmospherics are bad," Owing to nineteen hours' difference in time between New Zealand and the United States, music received by the Blackwood family Sunday evening is played at KGO

From the Far North, within fifty miles of the Arctic Circle, another letter has been received. "We have danced to music from KGO on several occasions," writes G. H. Hillman, of Candle, Alaska. "It is certainly great to have dance music carried into the Arctic." Mr. Hillman is the operator of the Candle radi station. "The wireless station installed here this summer," he continued, "is a new thing to people in this section. Most of them have not been outside for twenty-five years and it is hard for them to realize that KGO voices and music come from a distance of over 4,000 miles."

Station WHAR on the Air Station WHAR, Atlantic City, N.J., placed its initial concert on the air

June 26. The station, owned and operated by the Seaside House, of Atlantic City, has been experimenting for over a year with a small transmitter to determine the success of radio at the shore. The result was so gratifying that the present equipment was installed-a 200-watt Westinghouse type transmitter, licensed under the patents of the American Telephone and Telegraph Company. The wave length has been raised from 231 to 275 meters. Remote controls are to be installed in the city so as to broadcast events that have made the resort famous.

WHAR bears the distinction of being the only radio .tation in Atlantic City. The following is the daily program, except Sunday and Wednesday afternoons: 2 to 3 p. m., instrumental music, Seaside House orchestra; 7:30 to 8 p. m., market reports, press news, etc.; 8 to 9 p. m., instrumental music, Seaside House orchestra; dance programs, late concerts and special features to be announced.

# Radio-Equipped Police Autos

amateur radio is now about to take the radio-equipped police automobiles ors.

Commission on a two-year trip that many respects, and were designed The neutrodyne system was adopted manently in its compartment back of New York Philharmonic Orchestra as will ultimately take it around the world will have as its adding the round the Since their advent they have practi-exhaustive tests which, it is claimed, located close to it.

the scene of a crime within a few under the difficult circumstances in- glass. Two gun-racks are installed minutes after receiving the broad- volved. The neutrodyne receiver in the cars fitted on the heel-boards cast from KOP. In each of the three tested successfully went down to the of the front and rear seats. Sawed above instances a telephone alarm to low wave-lengths and gave clear, off shot guns are carried in them. Catch Hold-Ups broadcast by radio to the police cars, the other local broadcast stations service twenty-four hours a day. Three separate gangs of hold-up at the scene of the attempted erime From outward appearances there is justed to station KOP. Loud speaker the Polar regions with MacMillan, men have been caught redhanded by in time to apprehend the perpetrat-

the opposite extreme and set forth on of Detroit. These new cars, capable \ The automobiles are equipped with to the concealed aerial. The antenna it is broadcast. of a speed of eighty miles an hour, special five tube neutrodyne receiv- consists of four wires stretched back are in constant touch with the police ers installed in the back of the front and forth inside the automobile top, The auxiliary ketch, Big Bill, which broadcasting station KOP on a wave seats. The aerial is concealed in the which is of the touring car type. permanent top, and the body of the Each of these four wires is nine feet mous conductor of the Cincinnati the interests of the Deep Waterways The automobiles are remarkable in car acts as a counterpoise ground. long. The receiver is fastened per- Symphony Orchestra, will direct the

unusual in any manner. This is due crew can hear an alarm immediately

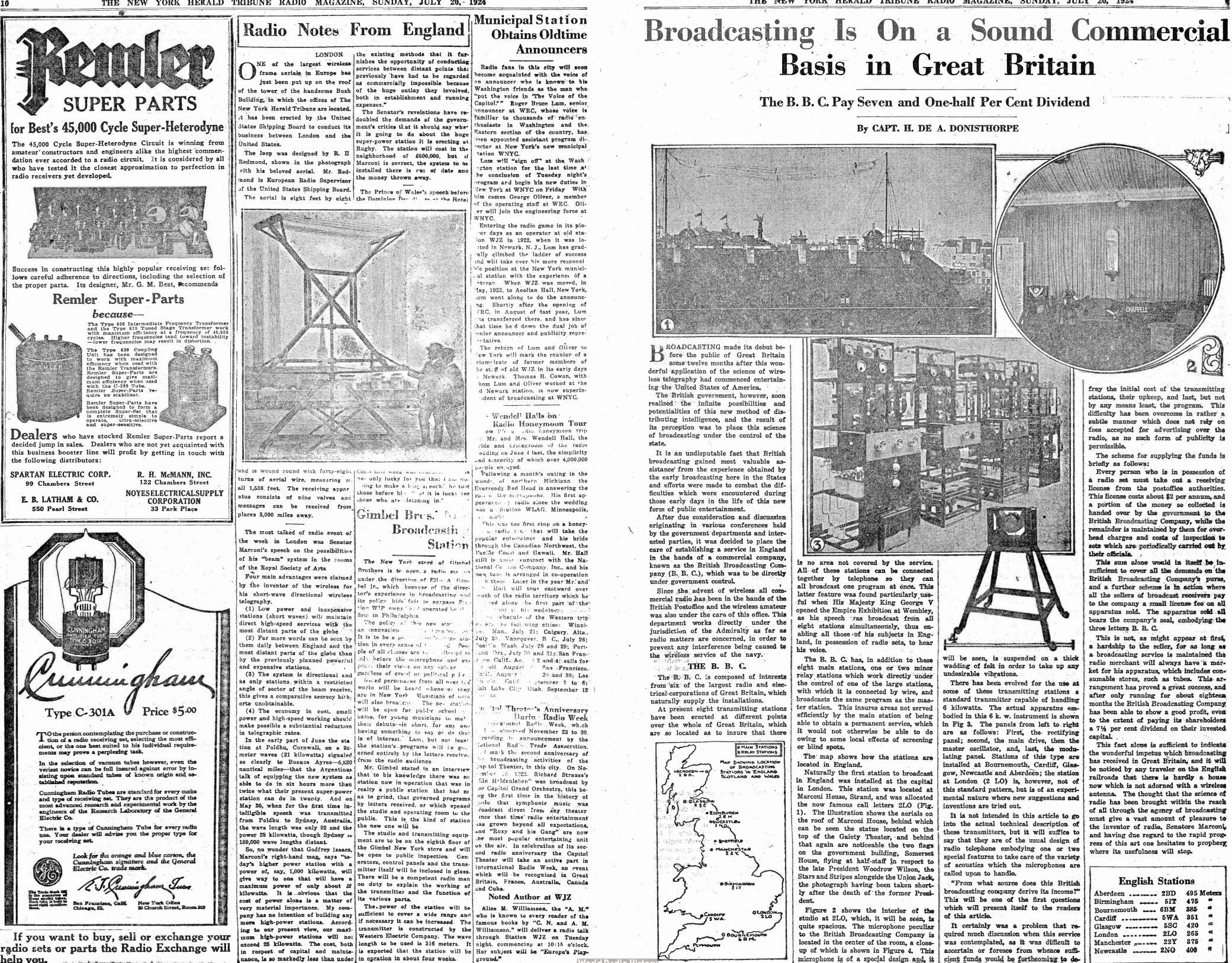
### Fritz Reiner at WJZ

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help you.

World Radio Histor

microphone is of a special design and, it | cient funds would be forthcoming to de-

stations, their upkeep, and last, but not by any means least, the program. This difficulty has been overcome in rather a subtle manner which does not rely on fees accepted for advertising over the radio, as no such form of publicity is

The scheme for supplying the funds is

radio set must take out a receiving license from the postoffice authorities. This license costs about \$2 per annum, and a portion of the money so collected is handed over by the government to the British Broadcasting Company, while the remainder is maintained by them for overhead charges and costs of inspection to sets which are periodically carried out by

sufficient to cover all the demands on the British Broadcasting Company's purse, and a further scheme is in action where all the sellers of broadcast receivers pay to the company a small license fee on all apparatus sold. The apparatus sold all bears the company's seal, embodying the

a hardship to the seller, for as long as a broadcasting service is maintained the radio merchant will always have a market for his apparatus, which includes consumable stores, such as tubes. This a rangement has proved a great success, and after only running for about eighteen months the British Broadcasting Company has been able to show a good profit, even to the extent of paying its shareholders a 7½ per cent dividend on their invested

the wonderful impetus which broadcasting has received in Great Britain, and it will be noticed by any traveler on the English railroads that there is hardly a house now which is not adorned with a wireless antenna. The thought that the science of radio has been brought within the reach of all through the agency of broadcasting must give a vast amount of pleasure to the inventor of radio. Senatore Marconi. and having due regard to the rapid progress of this art one hesitates to prophesy,

English Stations						
Aberdeen	495 Meters					
Birmingham	475 *					
Bournemouth 6BM	885 🗳					
Cardiff 5WA	851 🧖					
Glasgow 5SC						
London 2LO	265 🥌 🗎					
Manchester 22Y						
Newcastle 2NO	400 🥂					