RADIO LORE FOR NOVICE AND EXPERIENCED FAN

European Radio Engineers Seek Efficiency First in Receivers

Balance and Eye Value Have Secondary Place With Foreign Builders.—Compactness Means Little. Expert Describes One Amplifier

ance and eye value, roughly sums up the attitude of your European radio engineer. First he designs his circuit and lays out the parts of the assembly for sheer and downright efficiency. He builds his receiver and satisfies himself that he has every possible bit of radio efficiency from it. After that, and only then, does he turn his eye to the artistic effect and symmetry of

A glance at several of the leading sketch of the circuit. European radio magazines, particularly idea of sacrificing results for compact-

ant to the eye. Seldom is an attempt made at exact and perfect wiring. Rather, each lead is run according to the geometric axiom: a straight line is the shortest distance between two points. The result is that the European enginer and experimenter is get-ting a splendid degree of efficiency, and in many cases, taking tube for tube, securing much better results than we

Americans.
Our tendency is to design the radio receiver with two principal objectives in mind. Efficiency, yes, but with it a well-balanced, neatly wired, compactly spaced assembly, even though we may have to sacrifice a certain bit of radio frequency transfer, or lose somewhat in our audio frequency step-up. our audio frequency step-up.

Only the other day the contrast in terially in eradicating "background"

BY WENDELL BUCK

Efficiency and results first, then balance and eye value, roughly sums up

the attitude of your Furneau radio 45 volts B battery is advised.

Three 1 mfd. filter condensers are

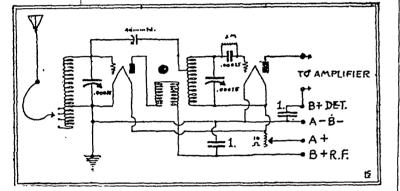
used to by-pass the radio frequency current and prevent it from reaching the audio side or the set. An additional, or fifth connection, marked "Earth." is provided on the case of each Ferranti transformer for grounding connection. The connections for the 1 mfd. condensers (one end indicated as running to the transformer) are shown in the schematic

The parts required are: 2 Ferranti the English, will bring out the point AF3 audio frequency transformers, 3 and marably. Here you find the sets 1 mfd. filter condensers, 1 6 ohm rheospaces freely and openly, with little stat, 1 single jack, 7 binding poets, 2 cushion sockets.

A word or two should be said here The wiring is in many cases unpleas- about the transformers and the method of connecting them in the assembly The four markings on the top of the case vary slightly from the standard markings found on American transformers. The marking +HT is the B+connection as we know it. In connecting bateries to thea mplifier the C minus leads run directly to the terminal marks "Grid Blas" on the transformer. That is 8 wells negative to former. That is, 6 volts negative to the first transformer, and 22½ or 30 to 30 volts to the second, depending on the B voltage used on the 171 tube. Careful construction of the ampli-fier, using the filter condensers and

shown, will give quality of an excep-

transformers exactly as



Ferranti

Fig. 1-Wiring Diagram of Receiver to be Used With the Audio Amplifier Described

American and European methods was noise" in the speaker, the hissing and brought home quite well in a conversa- frying you hear from so many sets tion with a well-known European engineer recently arrived in this country. We were engaged in a free-for-all dis-

bit more. Tone quality, I presume, is the paramount issue in radio. One hears it talked about ever-where. One

My answer was that I had heard several radio sets, new models this year. could get or could ask for. His reply was that fundamentally the ear was the best judge of true radio reproduc-tion, and further, that I didn't know radio reproduction at its best because I had never heard it.

He quickly sketched out a rough schematic diagram. Then he presented

when the set is tuned in but the

As far as actual reproduction goes. cussion of radio methods in general this audio frequency combination gives Kent hour, presenting Mme. Schuand tone quality in particular. remarkable range and definition. Bass mann-Heink, at 9:15 p. m. To-morrow notes boom out as they should. Higher at 10 p. m. the grand opera to be "No doubt," said my European friend,
"quality is the prime consideration in
radio to-day. Experimenters are buying high quality condensers, better
transformers, even though they cost a
ever, that tone quality is not entirely

ever, that tone quality is not entirely dependent upon the audio side of the

can be simply and rather inexpensively constructed for use in combination partment will talk on "Christmas Safeeral radio sets, new models this year. With the audio amplifier described, that had as fine tone quality as anyone Selectivity is variable to meet the reresulting from a combining of the two diagrams, the R. F. stage and detector of exceptional performance. It has the of Brown University. Music will be high selectivity demanded in congested broadcasting areas. There is plenty of me with two transformers. The rest volume—and the tone quality wins

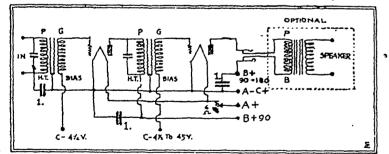


Fig. 2-Wiring Diagram of Model Distortionless Transformer Coupled A. F. Amplifier

of the best available makes. "This amplifier, worked out with the onstants here will give you a new ppreciation of tone. Build it!" These constants here will appreciation of tone.

were his parting words. Connected behind one stage of tuned radio frequency and a non-regenerative detector the results vindicated my European friend's argument. When I went down to the details and fine points of securing a better tone. I got it. I

thought I had the finest only because I had not taken the pains and trouble to work out the little points which make the big difference in final perfind an audio system worked out

diagram of the audio amplifier. Here exhausted. onlytrue quality, but range and volume as well. For best results, two power tubes should be used: a 112 in incandescent wire, or "filament," as it is the first stage and a 171 in the second

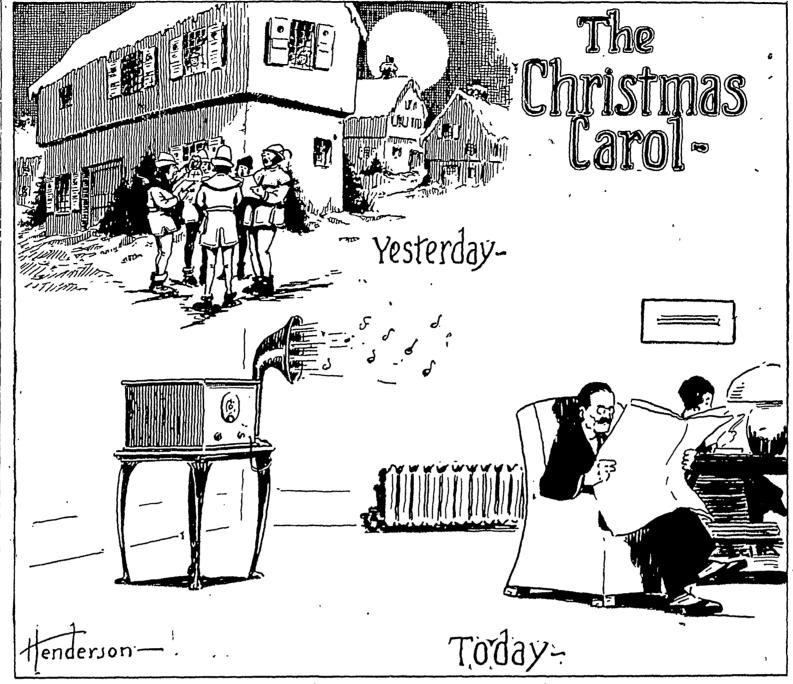
with plate potentials up to 135 volts, the modern tubes, of both the coated with 22½ volts C battery. If you want and uncoated variety, little or no light with 22½ voice Countery. If you want and incoated variety, little or no light more volume and reserve power, and is visible through the glass because of output transformer, about 1 to 1 ratio, the inner coating of mercury which lines may be added and place potentials as the mins. The heaviness of this continuous to 180 volts applied, with C blas of ing varies considerably, as well, therefrom 30 to 40 volts. The addition of fore, the amount of light that penetrates the output transformer is indicated through it, so no significance at all by the dotted portion of the schematic can be attached to the brilliance of the diag am. For all ordinary purposes, the illumination.

of the parts for the amplifier should be hearty approval from seasoned radio experimenters who have heard many many sets.

TUBE INTELLIGENCE.

Amount of Light Does Not Indicate Sensitivity or Real Condition.
The amount of light a vacuum tube gives off is no indication of its sensitheness or general condition. The fact that a tube does emit light is entirely an incidental feature of its operation What is desired in a tube is a flow of little particles of electricity called "electrons," and the easiest way to obtain is to bury certain kinds of wires in Figure 1 shows the schematic wiring glass bulbs from which the air has been The temperature must be uite high in order to make the flow correctly called, emits considerable light. this phenomenon has absolutely no con-The assembly of the amplifier pro- nection with the functioning of the tub added and plate potentials up the bulbs. The heaviness of this coat-

SHORT CIRCUITS



RADIO PROGRAMMES

WJAR follows its regular schedule today with the concert from the Capitol Theatre at 7:20 p. m., and the Atwater presented will be "Tales of Hoffman." On Tuesday, a musical programme will be given at 8:30 p. m., under the direction of Ivy Hustler Whitehead, soprano. sea. Far from it. Don't use this audio hears it talked about everywhere. One sees comparative curves of transformers. One sees new audio frequency systems and modifications of old systems and modifications of old systems presented in large numbers. But in the last analysis are not most builders the superficial and casual in their methods of getting fine tone quality? How many people are conscientiously and laboriously going down to the details of securing the best possible following is shown in Figure 2 This tone?"

Sea. Far from it. Don't use this audio Charles audio frequency and frequency of the seek audio frequency and detector that distort. One sees new audio frequency stage and a detector that distort. Needless to say, distorted output will a series of historical talks, under the auspices of the Rhode Island Society of Sons of the American Revolution. Of Sons of the Mick, tenor Thursday.

Sop p. m.—Studio programme.

Sop p. m.—Squid programme.

Sop p. m.—Capt. Charles Dean Kimball will give one of a series of historical talks, under the auspices of the Rhode Island Society of Sons of the American Revolution. Of Sons of the American Revolution.

Mick, tenor Thursday.

Sop p. m.—Squid programme.

Sop p. m.—Capt. Charles Dean Kimball will give one of a series of historical talks, under the auspices of the Rhode Island Society of Sons of the American Revolution.

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Mick, tenor

Thursday.

Sop p. m.—Capt. Charles Dean Kimball will give one of the Rhode Island Society of Sons of the American Revolution. sea. Far from it. Don't use this audio Wednesday at 9:00 p. m. Ex-Governor quirements of various locations and dence Christmas Eve Civic Celebration working conditions. The four-tube set at 8:45 p. m., at which the speakers will be Hon. Joseph H. Gainer, James plus the audio amplifier, is a receiver E. Dunne and Pres. W. H. P. Faunce rendered by the Providence Festival chorus. Saturday Christmas programmes will be heard at 3 p. m. and

4:30 p. m. WEAN broadcasts to-day at 10:45 a. m. the Sunday morning service of the Mathewson Street M. E. Church, music at 1 p. m. and an organ recital at 6.30 p. m. Monday the regular schedale will be followed and on Tuesday a Christmas cantata, "The Prince of Peace," will be sung at 8:30 p. m. Wednesday and Friday the station's reg-ular entertainers will be heard. Thurs-day the special feature will be a Christ-mas programme given by the Carolyn Bongartz groupe. On Saturday at 11 Bongartz groupe a. m. services of the Cathedral Church of St. Paul. Boston, will be broadcast, and at 8:25 p. m. the Canadlan-American League hockey game will be relayed from Boston.

WDWF will be heard at 4:45 p. m. to-day in its regular Sunday recital.

WSLI broadcasts this morning at 10:45 a.m. services of the First Church of Christ Scientist. Monday and Tuesday the usual orchestral programmes will be followed, and on Wednesday at 8:15 p. m. a piano recital will be given by June Russillio Thursday and Friday the regular entertainers will be heard, and Saturday the station will

WJAR-THE OUTLET COMPANY-485

To-day.

7 20 p. m - Musical programme by Maj
Edward Bowes and the Capitol Theatre

Edward Bowes and the Capitol Theatre Family

9:15 p. m.—Alwater Kent hour, presenting Mme. Schumann-Heink.

4 Monday.

10:00 a. m. Housewives' Radio Exchange A department conducted by Mrs. Wood on all matters of household interest All questions submitted will be answered by radio.

1:00 p. m. Sundo programme.

1:00 p. m.—Weather report.

8:00 p. m.—The Colonial Launderliers.

1:00 p. m.—A. & P. Gypsies.

m - Weather report
m.—The Colonial Launderliers
m -A, & P Gypsies
m --Grand opera, "Tales of Hoff-

man" Tuesday.

1.05 p. m—Studdo programme.

1.30 p. m—Weather report.

7.50 p. m—Al Billincoff and his orchestra.

7.50 p. m—One of a series of safety talks sponsored by the Providence Safety

der the direction of Capt. W. J. Stannard, relayed from Washington, D. C. D. m.—Frederick William Wile. 5 p. m.—Balon concert.

D. m.—Davis Saxophone Octet.

D. m.—Davis Saxophone Octet.

D. m.—Px-timernor Charles Dean Kimball will give one of the series of historical talks, under the auspices of the Rhode Island Society of Sons of the American Revolution. Subject, "Back Hopkins, Commander-in-Chief of the Navy, and Stephen Hopkins, Signer of the Declaration of Independence."

D. m.—Musical programme by Ulric Larleau, baritone, and Frank Chadwick, tenor

10.00 p. na—Goodrich Zippers, under the direction of Henry Burr

10.00 a m Housewives Radio Exchange A department conducted by Mrs. Wood on all matters of household interest. All questions submitted will be answered by radio.

1:05 p. m Studio programme.

1:06 p. m.—Waudio programme.

8:00 p. m.—Waudio programme by Miss Mahel Woolsey.

8:30 p. m Wusical programme by Julia Fishe and Gladys E. A. Smith.

8:45 p. m —City of Providence Christmas Eve civic celebration from the Outlet Audiorium. The principal speakers will include Hon Joseph H. Gainer, Mayor of the city of Providence, James E. Dunne, Mayor-elect of the city of Providence Presidence President W. H. P. Faunce of Brown University. The musical programme by the Providence Festival Chorus, under the direction of John R. Archer.

10:00 p. m—Whittall's Angio-Persians.

Saturday.
3:00 p. m -- Christmas programme.
4:00 p. m -- Concert by the South Sea Isl-

anders.

4 20 b. m — Christman programme.
WEAN—THE SHRIPARD STORES—367
To-day.

10:45 a. m.— Service from the Mathewson
Street M. E. Church.

1.00 p. m — Yoeng's Chinese-American Restaurant orchestra.

6.30 p. m — Organ recital.

Monday.

11:55 a. m.— Time signals.

12:00 p. m — Shepard Colonial Concert Orchestra.

12:00 p. m.—Shepard Colonial Concert Or chestra. 12:10 p. m.—Weather report. 12:15 p. m.—Continuation of musical pro-

12.15 p. m —Continuation of managements granime.

4 00 p. m —Musical programme.

4 30 p. m —Weather report.
6 30 p. m —WEAN dinner dance.
7 15 p. m —Metropolitan Theatre studio.
9 15 p. m —Metropolitan grand orchestra.
Tuesday.
10 00 a. m —Home service talk by Miss

10 00 a. m — Home service ta Kathleen Atkinson. 11:55 a. m.—Time algnals. 12:00 p. m.—Shepard Colonial chestra. 12:10 p. m.—Weather report. 12:15 p. m.—Continuation of m

12.15 p. m —Continuation of manager gramme.

4.00 p. m.—Vergan recital.

4.30 p. m.—Weather report.

8.30 p. m.—Weather report.

8.00 p. m.—Concert programme.

8.10 p. m —Christinas cantata, "The Prince of Peace," Phillips Memorial Choral of Peace, Association. Wednesday, 11:55 a. m.- Time alguals. 12:00 p. m.- Shepard Colonial Concert Or-

11 Do a m. Time signals.
12 On p m. Shepard Colonial Concert Orchestra.
10 p. m. Weather report.
12 10 p. m. Weather report.
13 15 p. m. Continuation of musical programme.
4 00 p. m. Weather report.
4 30 p. m. Weather report.
5 00 p. m. Weather report.
8 00 p. m. Weather report.
8 00 p. m. Weather report.
8 00 p. m. Playette, "The Manager."
9.00 p. m. Playette, "The Manager."

Thursday,

10 00 n m—Home service talk by Mis
Kathleen Atkinson.

11 55 a m.—Time signals,
12:00 p. m.—Shepard Colonial concert or
thestra

7 50 p. m—One of a series of safety talks sponsored by the Providence Safety Council.

8 00 p. m—The Vikings.
8 00 p. m—Musical programme, direction of ity liuster Whitchead, soprano soloist.
9 00 p. m—Excready hour.
10:00 a, m.—Houseviver Radio Exchange A department conducted by Mrs. Wood on all matters of household interest.
All questions submitted will be answered by radio.
10:00 p. m—Sudio programme.
10:00 p. m—Weather report.
10:00 p. m—Time signals. 12:10 p. m.—Weather report. 12:15 p. m.—Continuation of musical pro gramme
4:00 p. m.—Organ recital, John Fitzpatrick.
4:00 p. m.—Organ recital, John Fitzpatrick.
4:00 p. m.—Weather report
6:30 p. m.—WEAN dinner dance, Shepard

12:00 p. m.—Shepard Colonial concert or-chestra. 12:10 p. m.—Weather report. 12:15 p. m.—Continuation of musical pro-gramme 7:00 p. m.—Vesner service from St. John's Episcopal Cathedral, 9:30 p. m.—Even-sone service from St. John's Episcopal Cathedral.

12:15 p. m.—Continuation of musical programme.
4:30 p. m.—Musical programme.
4:30 p. m.—Weather report.
6:30 p. m.—Weather report.
6:30 p. m.—Weather report.
7:30 p. m.—Weath dance orchestra.
7:30 p. m.—Weath dance orchestra.
7:30 p. m.—The large was the series of the

WBZ-SPRINGFIELD-333,
10:45 a. m.—Services from the South Congregational Church
6.30 p. m.—Organ music by Edith Lang,
7:00 p. m.—Trio.
8:00 p. m.—Concert.
9:00 p. m.—Music.

WLSI-LINCOLN STUDIOS, INC.-441
To-day,
10:45 a. m.-Service, First Church of Christ,
Scientist.

Beientist,
Monday,
10:00 p. m.—Hotel Biltmore orchestra.
Tuesday,
7:00 p. m.—Hotel Dreyfus orchestra,
Wednesday, 8:15 p. m.—Plano 8:11[o. p.m.—Biltmore Market hour. Thursday. -Plano recital, Miss June

man from Bedford Branch of Y. M. C. A., 6.80 p. m.--Concert Orchestra, 7:20 p. m.--Concert by the Capitol Theatre Thursday,

7.(*) p. m. - Nariaganaett Hotel orchestra.

8.15 p. m -- Little Fur Shop.

8:30 p. m. -- Radio directory.

Priday.

6:30 p. m. -- Port Arthur Restaurant or
hestra. 7:20 p. m.—Concert by the Capitol Theatie Family.
9:15 p. m.—Atwater Kent hour, presenting Ernestine Schumann-Heink, contrato,
10:15 p. m. Concert. Howers Gibson, viol. linst. Elimer Zoller, planist.

WCAT—PHILADELPHIA—228.

11:00 a. m.—Services from First Unitarian Church,
5:00 p. m.—Recital.
5:15 p. m—Church services. 7:45 p. m.—Dr. Irving's talk on "Mouth Hygiene." 9:00 p. m.—Arcadia Ballroom dance or-Saturday. 5:09 p. m.—Recital.
5:15 p. m.—Church cervices.
5:25 p. m.—'And He Shall Turn the Heart" (Malachi), Rev. John W. Stockwell.
5:25 p. m.—Recital, continued.
5:45 p. m.—'The Christmas Heart Break6:45 p. m.—Concert orchestra.
6:45 p. m.—Concert orchestra.
6:30 p. m.—Tenor.
6:30 p. m.—Tenor.

WDWP-DUTER WILCOX PLINT-411 4:45 p. m.—Recital.

OUT OF TOWN STATIONS

CKAC-MONTREAL-411 2:45 p. m.-Capitol Theatre Symphony

KDKA-EAST PITTSBURGH-309 11:00 a. m.—Bervice of the Dalvary Episco-pal Church.

4:00 p. m.—Organ recital, by Dr. Charles Heinroth

4:45 p. m.—Venner service of the Shady-side Presbyterian Church, Pittsburgh.

6:50 p. m.—Symphony orchestra.

7:45 p. m.—Service of the East End Chris-tian Church.

KFI-LOS ANGELES—167

1.09 p. m.—Services under the direction of Los Angeles Church Federation,
2.00 p. m.—Temple Baptist Church,
5.45 p. m.—San Francisco Symphony O.
5.20 p. m.—KFI special,
6.20 p. m.—Music appreciation chat
10.00 p. m.—Organ gecital, Alex Reilly of the console the console, 11:00 p. m.—Classic hour, 12:00 p. m.—Dance orchestra. 1:00 a. m.-Orchestra.

KFI 0-ST. LOUIS-345
4.37 p. m - Address (German), "Christ, the Promized King"
10.15 p. m - Address. "The Judge of the World." Music KGO-OAKLAND-361 Methodist Episcopal

200 p m - First Methodist Episcopal Church service, Strophony Or-chestra, p. m - San Francisco Symphony Or-chestra, p. m - Vesper service, Grace Cathedral. neerra.

7 M p. m.—Vesper service, Grace Cathedral.

8.30 p. m.—Symphony orchestra.

10:35 p. m.—First Methodist Episcopal KMTR-HOLLA WOOD-370

9:20 p. m.-Lella Castberg's half-hous
"How to Stay Young."

10:00 p. m.-Concert orchestra.

11:00 p. m.-Orchestra.

WFAA-DALLAS-475. WPAA—DALLAN—475.

3:30 p. m.—Farinera' hour, address, music
7:00 p. m.—Biblo class,
8:30 p. m.—Presbyterlan Church,
9:30 p. m.—Symphony Orchestra.

12:00 m.—Recital. KNX-1.08 ANGELES-337 m.-First Presbyterian Church se WFI-PHILADELPHIA-394,

p. n.—Chapel service.
p. m.—Service from Arch Street
Presbyterian Church.
p. m.—Atwater Kent hour. Mme.
Ernestine Schumann-Heink, contraito. WGBS-NEW YORK-316.

WBAI BALTIMORE-246.

WBBM-CHICAGO-226.

WCAE PITTSBURGH-461 m.—Bible class. m.—Service from Rodef Shalor

WCCO-ST. PAUL-416,
11 50 s. m.-Plymouth Congregational
Church.
5:10 p. m.-House of Hope Presbyterian

5:10 p. m.—House of Hope Prespyterian Church. 7:20 p. m.—Second Church of Christ, Sci-entist. 9.15 p. m.—Atwater Kent hour. 10:15 p. m.—Musical programme. 11.00 p. m.—Organ recital by Hugo Philler Goodwin.

WDRC-NEW HAVEN-268, 11.00 a. m.-Services of the Church of th Redeemer.

WEAF-NEW YORK-402.

WEAF—NEW YORK—402.

p. m.—Interdenominational church services.

3.00 p. m.—Young People's conference from the Marble Collegiate Church. Address by Dr. Daniel A. Poling, "Fear of the Unknown."

4:00 p. m.—Men's conference in the Bedford Branch, Y. M. C. A., Brooklyn. Address by Dr. S. Parkes Cadman.

5:30 p. m.—Paul Jelenek, pianist.

6:00 p. m.—"Problems of a Mother-in-Law" by Sarah Truax.

6:15 p. m.—Orchestral concert, Gluseppe di Benedetto, tenor.

Benedetto, tenor.
7:20 p. m.—Musical programme by Major
Edward Bowes and the Capitol The

atre Family.

9:15 p. in.—Atwater Kent hour, featuring Mme, Ernestine Schumann-Heink, con-

traito.

10:15 p. m.—"The Guest of the Shepherds," a Bible stery with musical setting.

THEMC-BERRIEN SPRINGS-316.

2:00 m.—Church services.
3.15 p. m.—Lighthouse Choir.

WENR-CHICAGO-266.

3.60 p. in.-liour of better music.
4.00 p. in.-Classical programme.
10.30 p. in.-Cric.
11:30 p. in.-Orcliestra.

4:00 p m — The Little Church Around the Corner,"

9.50 p m — The Old-Time Minstrela.

10.30 p. m.—Symphony orchestra.

To-day's Programmes in Brief

For the convenience of radio fans, the following hourly schedule of broadcasting to-day is given in brief form, the complete programme being given under the regular listing of announcements. Figures following stations denote wave length.

The hours are based on Eastern Standard Time.

LOCAL STATIONS

6:30—Orchestra, WHN, 361.
Concert, WCAE, 461.
Concert, WEAL, 246.
Concert, WEAL, 246.
Concert, WEAL, 248.
6:45—Orchestra, WCAU, 278.
6:36—Vespers, WIC, 469.
7:00—Carillona, WZ, 454.
Orchestra, WYAM, 389.
Trio, WBZ, 333.
Bible class, WFAA, 476.
Quariet, WOR, 403.
Orchestra, WMCA, 341.
Bible class, WFAA, 476.
Quariet, WGA, 361.
7:15—Ohurch, WIP, 508.
Concert, WHAP, 431.
Church, WCCO, 416.
CAPICO, 361.
7:20—Duo, WOR, 405.
Quariet, WZ, 454.
Church, WCCO, 416.
CAPICO, 461.
CAPICO, WAS, 374.
Church, WGA, 341.
Church, WF, 304.
Chait, WMCA, 341.
Church, WF, 304.
Chait, WMCA, 341.
Church, WIN, 374.
Church, WIN, 422.
Church, WGA, 341.
Ghise leading, WGA, 341.
Ghise leading, WGA, 365.
Church, WGR, 318.
Concert, WIZ, 454.
Sermon, WSA, 325.
Church, WGR, 331.
Address, WINL, 384.
Concert, WIZ, 454.
Sermon, WSA, 326.
Church, WGR, 318.
Concert, WIZ, 454.
Sermon, WSA, 326.
Church, WGR, 318.
Concert, WIZ, 454.
Sermon, WSA, 326.
Church, WGR, 319.
Carols, WBAI, 226.
Church, WGR, 318.
Concert, WIZ, 454.
Sermon, WSA, 326.
Church, WGR, 319.
Carols, WBAI, 226.
Church, WGR, 319.
Cracles, WBAI, 226.
Church, WBA, 225.
Church, WBA, 225.
Church, WBA, 225.
Church, WBA, 226.
Church, WBA, 326.
Church, WBA, 327.
Concert, WIZ, 454.
Sermon, WSA, 326.
Church, WBA, 327.
Church, WGA, 341.
Music, WHAR, 275.
Secolution, WBB, 428.
Music, WHAR, 275.
Secolution, WBB, 428.
Music, WGC, 361.
Secolution, WBB, 428.
Music, WGC, 361.
Secolution, WGB, 319.
Concert, WBA, 326.
Church, WGB, 319.
Concert, WBA, 327.
Concert, WBB, 228.
Church, KNA, 389.
Concert, WBB, 228.
Orchestra, WPG, 290.
Church, KNA, 387.
Orchestra, WPG, 290.
Church, KNA, 387.
Orchestra, WPG, 290.
Church, KNA, 387.
Orchestra, WGB, 361.
Secolar, WGC, 361.
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Secolar, WGC, 361.
Concert, WGC, 361.
Concert, WGB, 363.
Orchestra, WGB, 364.
Concert, WGC, 361.
Concert, WGC, 362.
Concert, WGC, 363.
Concert, WGC, 363.
Concert, WGC, 363.
Concert, 10:45-Church, WEAN, 367. 6:30-Organ, WEAN, 367. 7.20-Concert, WJAR, 485. 9:15-Concert, WJAR, 485. OUT-OF-TOWN STATIONS 9:00-Children's hour, WJZ, 454. 9:30-Sunday school, WLW, 422. Bible class, WCAE, 461.
10:00—Chapel, WOAW, 526.
Church, WWJ, 352.
10:25—Church, WMAIK, 265.
10:50—Sunday school, WSB, 428. Church, KPI, 467.
Church, KNA, 337.

1:30—Concert, WBBM, 226.
2:00—Church, KGO, 361.
Church, KGO, 361.
Church, KGO, 361.
Church, KFI, 467.
Church, WAR, 275.
2:30—Sinday school, WOO, 508.
Concert, WHAR, 275.
Onchestra, WIAR, 275.
Orchestra, CKAC, 411.
3:00—Recital, WIAW, 422.
Address, WEAF, 492.
Concert, WGY, 379.
Music, WTAM, 389.
Organ, WCAE, 461.
Music, WTAM, 389.
Organ, WCAE, 461.
Music, WMAK, 265.
Music, WMAK, 266.
3:15—Organ, WPG, 209.
3:30—Special, WMCA, 341.
Music, WFAA, 476.
Orchestra, WWI, 352.
3:45—Chimes, WSAI, 326.
3:55—Vespers, WJZ, 454.
4:00—Dr. S. Parkes Cadman, address, WEAF, 492; WTAG, 545;
WSAI, 326.
Evensong, WGBS, 316.
Church, WRO, 469.
Organ, WGO, 469. 4:00—Dr. S. Parkes Cadman, address, WEAF, 492; WTAG, 545; WSAI, 326. Evensong, WGBS, 316. Church, WRO, 469. Organ, KDKA, 309. Lecture, WIP, 608. Music, WRNY, 374. Address, WCAE, 461. Music, WRN, 266. 415—Music, WENR, 266. 415—Music, WRN, 381. 4:30—Address, KPUO, 545 Music, WRN, 374. Organ, WG, 379 Orchestra, WCM, 405 Chapel, WFI, 394 Organ, WG, 379 Orchestra, WSB, 428. 4:45—Vespers, IDKA, 309. 5:00—Orchestra, WBM, 220. Music, WAU, 278. Orchestra, WHN, 361. Music, WMOA, 341. Community chorus, WRNY, 374 Community chorus, WRNY, 375:10—Church, WCO, 415. 5:15—Church, WCAU, 278. 5:25—Address, WGAU, 278. 5:30—Orchestra, WRN, 331. Planist, WEAF, 492 Evensong, WHAS, 399. Soloists, WMCA, 341. 5:35—Music, WCAU, 278. 6:45—Talk, WCAU, 278. 6:00—Concert, KWTA, 331. 5:40—Orchestra, KGO, 361. 6:45—Talk, WCAU, 278. Orchestra, WGAI, 361. Sacred music, WSB, 428. Talk, WEAF, 492. 6:15—Tenor, WEAF, 492.

11:00 a. m.—Service from Rodef Shalom Synagone.
2:00 p. m.—Service, Ashbury Methodist Episcopal Church.
3:00 p. m.—Organ recital by Casper P. Koch.
4:00 p. m.—Addiens by Pr. S. Parkes Cad09:15 p. WGR-BUFFALO-318.

10:45 p. m.—Service from the Westminster Presbyterian Church.

7:45 p. m.—Service from the Central Presbyterian Church.

0:15 p. m.—Atwater Kent hour.

WGY-SCHENECTADY-379. 11:00 a. m.—Service, All Souls' Church, 3:00 p. m.—Musical programme. 8:00 p. m.—Service of All Souls' Church. m .-- Concert.

WHAP—NEW YORK—431, ip. m.—Concert of sacred music. ip. m.—Selections from the Bible and Science and Health with Key to the Scriptures by Mary Baker Eddy, read by Augusta E. Stetson, C. S. D. ip. m.—Organ recital, Mary Ray Pinney.

WHAR-ATLANTIC CITY-275.

m.-Service, Chelsea Baptis WHAR-ATLANTIC CITY-275.

10:45 a. m.—Service, Chelsea Baptist Church.

2:15 p. m.—Recital.

2:45 p. m.—Sermon by Rev. Walter Bruggeman,

7:45 p. m.—Service, Chelsea Baptist Church.

9:00 p. m.—An hour with the classics.

WHAS-LOUISVILLE-309.
. m -Services of the Broadway 11:00 a. in —Services of the Broadway Christian Church. 5:30 p. m.—Choral evensong service from Christ Church Cathedral.

WHN-NEW YORK-361.

12:30 p. m — Organ recital, Marsh McCurdy, organist.

4:30 p. m.—News flashes and sport events.

5:30 p. m.—Dance orchestra.

6:30 p. m.—Orchestra.

10:00 p. m.—Orchestra.

11:00 p. m.—Orchestra.

12:00 p. m.—Orchestra.

WIP-PHILADELPHIA-508.
4.00 p. m.-"Christmas Eve in Bethlehem," lecture by Dr. William T. Ellis.
7.15 p. m.-Service from Holy Trinity Oburch.
10:00 p. m.-Symphony orchestra.

NJZ-NEW YORK-454.

1:00 a. m.—Children's hour.

11:00 a. m.—Park Avenue Baptist Church service.

2:55 p. m.—Vesper service.

service.
7.00 p. m.—Vesper service.
7.00 p. m.—Church carlion.
7:20 p. m.—'Cello quartet.
8:00 p. m.—Concert.
9:00 p. m.—Concert orchestra.
9:45 p. m.—Eva Glies, seprano.
10:00 p. m.—Godfrey Ludlow, violinist.

WERC-CINCINNATI-422

WLW-CINCINNATI-122 9:30 a. m.—Sunday school. 11:00 a. m.—Service from the Seventh Pres-byterian Church. 3:00 p. m.—Organ recital by Walter De-

vaux.
7:30 p. m.—Services of the First Presbyte-rian Church, Walnut Hills.
8:30 p. m.— Getting Acquainted with Bee-thoven."
8:50 p. m.—Orchestra.

WLWI_NEW YORK 384
8:00 p. m.—"What Think Ye of Christ?"
Rev. John II, Sullivan, C. S. P. Paulis choir. WMAK-BUFFALO-266

WMAC—NEW YORK—341

m.—Christian Science services,

m.—Gloomchasers,

m.—Concert,

m.—Chinatown Rescue Society serv 2:30 p.

5:00 p. m.—Music. 5:30 p. m.—Soloists. 6:00 p. m.—Concert. 7:00 p. m.—Corchestra. 7:30 p. m.—Broadway 'chat. 8:00 p. m.—Music. 9:00 p. m.—Music. 10:00 p. m.—Orchestra.

WOAW-OMAHA-526 WOAW—OMADIA—526

10:00 a. m.—Chapel service.

2:30 p. m.—Father Flangan's Boys' Homs

7:00 p. m.—Bible study period.

10:00 p. m.—Chapel service.

WOC—DAVENPORT—484

2:00 p. m.—Old folks' musical programme,

7:30 p. m.—Church service, United Presbyterian Church, Monmouth, Ill.

9:15 p. m.—Atwater Kent hour,

11:00 p. m.—Musical programme, WOR-NEWARK-405 m.-Studio programme. m.-Studio ensemble.

7:20 p. m.—Gerald Herzman, planist, and Nicolas Globatcheff, basso. 7:45 p. m.—Concert. WPG-ATLANTIC CITY-290 WPG-ATLANTIC CITY-299
3:15 p. m.—Corgan recital.
4:15 p. m.—Community.
5:30 p. m.—Concert orchestra.
9:00 p. m.—Last-minute news flashes.
9:15 p. m.—Concert orchestra.
10:00 p. m.—Musicale.

WRC-WASHINGTON-160 11:00 a. m.—Church services.
4:00 p. m.—Services from Washington
6:50 p. m.—Vesper concert.
7:20 p. m.—Musical programme from the
Capitot Theatre.
9:15 p. m.—Aiwater Kent hour.
10:15 p. m.—Concert.

WRNY-NEW YORK-374 m.-St. Matthew Lutheran Church

11:00 a. m.—St. Matthew Lutheran Church sorvices.
4:00 p. m.—Rose Becker, recital,
4:30 p. m.—Operatic ensemble,
5:00 p. m.—Twilight hour,
7:20 p. m.—Bible class.
7:30 p. m.—Chelsea Methodist Episcopa' Church services. WSAI—CINCINNATI—326

11:00 a. m.—Services from the Presbyterian
Clurch of the Covenant.
3:45 p. m.—Chime concert.
4:00 p. m.—Address by Dr. S. Parkes Cad-

8:00 p. m —Sermonette. 9:15 p. m.—Atwater Kent hour.

WSB-ATLANTA-428 m.-Sunday school. m.-First Presbyterian Church serv-

11:04 a, m.—rost close 6.00 p, m.—Vesper services from the Church of the Redeemer. 9:00 p, m.—North Avenue Presbyterian Church service. WTAG-WORCESTER-545

WTAG-WORCESTEK-545
4:00 p. m.—Men's Conference from
Branch, Y. M. C. A., Brooklyn.
7:20 p. m.—Capitol Theatre Family,
9:15 p. m.—Atwater Kent hour.
10:15 p. m.—Daily news bulletin. WTAM-CLEVELAND-389

WTAM—CLIPVELAND—3
11:00 a. m.—Church services.
3:00 p. m.—Musicale.
6:00 p. m.—Orchestra.
7:00 p. m.—Theatre orchestra.
8:00 p. m.—Church services
9:15 p. m.—Atwater Kent hour.
10:15 p. m.—Orchestra.

WWJ-DETROIT-352 www-DEFROIT-352

10:00 a. m.—Church services from Fir
Prechyterian Church,
3 30 p m.—Detroit Symphony Orchestra,
7 20 p. m.—Capitol Theatre Family,
9:15 p. m.—Atwater Kent hour,

ROA-DENVER-322,
1.00 p. m.- Service of St. John's Episcopal
Cathedral.

11.00 p. m.—Concert orchestra. 12.00 p. m.—Feature programme

3:00 p. m.—Musicale. 7.50 p. m.—Service, First Church of Christ, Scientist.

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quency amplification. In the former case they should get the correct file-

plification do not require burning as later, mixer or first detector, two or bright as those used for audio fre- three stages of intermediate frequency

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RADIO OBSERVES OCEAN SPANNING

First Transatlantic Signals Effected 25 Years Ago

ship in motion. This was done in 1897. His opportunity to prove how useful Marconi Caught English Wireless his newly developed art really could Station Signals at Newfoundbe came in July, 1898, when he wire-lessed the results of the Kingston reland in December, 1901,-World gatta from a shipboard station on the Refused to Believe Fent .--- Used Flying Huntress. The Daily Express was able to print full reports of the Kites and Balloons yacht race long before the telescopes of land observers could know the news.

BY LLOYD JACQUET.

Twenty-five years ago the world was told that Marconi had succeeded in spanning the Atlantic by wireless, and the world didn't believe it. Yet the by wireless from his station in South claim was true and eventually the non-Foreland, County of Kent, England, to believers were forced to acceptance as a new era of communication dawned upon civilization.

On Dec. 12, 1901, Marconi and his assistants, experimenting on top of Signal Hill, at the entrance of St. John's Harbor, in Newfoundland, sent up a kite, to which was attached a wire, called an "aerial," and heard distinctly the first wireless signals ever to be received across the Atlantic ocean.

Between 11:30 a. m. and 2:30 p. m. St. John's time, on that memorable day the telephone headsets with which Marconi and his assistants had provided themselves brought to their ears the series of three dots, at frequent intervals. These dots formed the let-"s" in the Marconi code, and so clearly were they heard by all that there was no longer doubt in Marconi's mind that actual reception of the wireless signals across the ocean had been

Marconi's experiments in Newfound-land were ostensibly not for the purpose of establishing communication with England. He went to St. John's with England. He went to St. Johns at first to select a spot for the erection of a station with which he might carry on communication with the transatiantic liners, 300 miles out at sca, just as they reached the Grand

He brought with him, besides delicate receiving gear, several balloons and kites, for the purpose of sending up the aerials which he was to use in this work. His theory was at that time that the higher the aerial the greater

the receiving distance. steamship Campania, in May, 1904, in For more than a week Marconi and which he endeavored to keep in comhis assistants worked at installing the station and preparing the antenna systems for the kites. They had had equipped with the most powerful installed with the stallation affoat at that time, and was the stallation affoat at the stallation affoa

Before leaving England, Marconi had made arrangements with the station in Poldhu, Cornwall, then considered a very powerful installation, to transmit signals daily, as soon as the word should be received from him by cable.

The cable was sent on Monday, Dec. 9, 1901. On Wednesday, when he had succeeded sending up a kite for a long period of time, he and his assistants heard what they were convinced to be signals from the Poldhu station in Cornwall. However, as he had equipped the field receiving station with telethe field receiving station with tele-phone head-sets, which were more sensitive than the recording apparatus usually used for such purposes, no pos-itive evidence could be shown, and he further listened on the following day,

Thursday.

Thursday. genuine wireless messages from his Cornwall stations, sent as prearranged

Cornwall stations, sent as prearranged with his chief operator.
So carefully had he guarded his intentions from the world that it was quite startled when he made his first simple report to his officials in London by cable, on Saturday night.
So great was the scepticism about his estual regults heaving of the other careful regults beginning the careful regular security of the careful regular security and the careful regular security of the careful regular security of the careful regular security and the careful regular security of the careful regular security and regular security and the careful regular security and regular security and the careful regular security an

his actual results, because of the absence of a recording tape, which was usually used by him for recording purposes, that it took the famous tests he made on board the U. S. Philadelphia, a year later, to prove that such a long distance reception experiment was thoroughly possible.

The Cornwall transmitting station

was situated 1700 miles from the perimental receiving installation in Newfoundland.

Marconi was hardly 30 years old when he accomplished the wonderful feat of sending messages through space across

This was only one of the steps of his amazing career. Born in Bologna of an English mother and a native Italian father, he early professed a strong liking for things scientific. At 8 years of age, he was already inventing; at 12, the tutor his parents had provided him attempted, it is said, to take away from him a device which he had assembled himself, and even when he sembled himself; and even when he reached 16 his only studies were mathematics, chemistry and electricity.

He was only 20 when he began his experiments on telegraphing without wires. Although his parents and his friends looked upon him as a "boy genius," they were startled and frankly incredulous in his wild ideas of projecting messages through mountains, and over lakes. But he succeeded in sending a tiny message from one cor-ner of a large room of the Marconi homestead, to the other. That was his first real success. Then he signaled several yards, then a few hundred, and,

finally, more than a mile.

This all happened between 1894 and 1895.

In 1896 he decided to go to England

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Again, on March 28, 1899, Marconi

succeeded in establishing the first com-

munication ever held between two

Boulogne, France, for hours at a time.

ord up to that time. The greatest previous record had been 18 miles.

Thus, Marconi had practically doubled

messages had been heard across the

doubtful of the accuracy of Marconl's

from England. However, all doubt was dispelled fol-

lowing his receiving reports while on

board the steamship Philadelphia, on March 2, 1902, when he heard, and had

verified by the ship's officers, signals from his powerful Poldhu station, 1551

miles away. This was the greatest dis-

tance messages had ever been heard on

This distance was increased the day

after to 2099 miles, and was carefully checked by the navigating officers, on

the charts of the voyage, which Mar-

coni kept for conclusive proof. These

ship experiments were his most important marine ones, and no doubt did more than anything else to prove the

value as an aid to shipping.

His next important trip was on the

a ship at sea.

Of course, there were many skeptics.

The distance was 32 miles, the rec-

He was then only 26 years old.

and carry on his experiments in cooperation with W. H. Preece, then chief
electrician of the British Postal System and very much interested in the
results of the young Italian inventor.

He knew that he could wireless between points on land, and some of his
earliest experiments in England were
principally concerned with the possibillites of wireless telegraphy between
shore and ships at sea.

To Marconi also goes the credit of
having been the first one to establish

To Marconi also goes the credit of
having been the first one to establish

and carry on his experiments in cooperation with W. H. Preece, then chief
iance of 150 to 175 miles. His receivhave been profitable. The genius which
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have been profitable. The set wi

having been the first one to establish communication between land and a one of the first ever dispatched in this

for message. Undertook Thanks voyage for purpose ascertaining requirements on shipboard for daily news plied to your tubes. There is no dan ment voltage for best results and the quirements on sniphoard for daily news ger of hurting the tube if the voltage will depend on the wave length the mediate inauguration.

(Signed)

MARCONI. mediate inauguration.

(Signed) MARCONI. this voltage is too high. It may not quency tubes to be burned a little regular service of every ocean liner, water or paralyze them. no matter where it is at sea, had its inception at this time.

vate or paralyze them, which makes cheap voltmeters are not accurate one or more of them inoperative. enough for testing and only a high if you have all good tubes in your grade voltmeter should be used and After a quarter century of work, of perfecting, inventing and developing radio, Marconi has just inaugurated the new beam transmitter. The first transatlantic beam was turned on the Canadian receiving station only month ago. Others will tle-up Grea Britain with every one of its colonies no matter how far away. This is the cumulation of Marconi's visionary dream—the linking up of the British

the range of his strange apparatus in less than two years! Empire by wireless.

The little shack at St. John's, Newfoundland, where the early recelving But the crowning achievement came with his announcement that December station was established, has been disafternoon, 25 years ago, that at last mantled. In fact, all of the old historical places, which saw the first ef-forts in the establishment of transoceanic communication will soon be And scientists, engineers, men who really should have known, were frankly to be on the edge of the sea to receive messages from across the world! The stations are moving inland, near Monreports on his long-distance receptions treal, nearer the great centres of joinmercial activity.

Marconi nas already contributed much to the world in the wireless

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MAKING SCENERY SOUNDS BIG JOB

Atmosphere Are Exacting

Creating the atmosphere for radio plays and playlets is probably the most difficult job of the ether drama director. Costumes and scenery bother him not Indoor the control of the cost plays and playlets is probably the most difficult job of the ether drama director. Costumes and scenery bother him not. Indeed, it is unnecessary for his players to memorize lines or the usual stage "business." A couple of rehearsals and a little study enable them to read their parts as well as their discrete. It the movies the spectator sees the locomotive, and the supplementary sounds produced in the orthests of the security to them to read their parts as well as their stage cousins might speak them. But the biggest and most difficult part of the entire producton is the atmosphere, the entrances and exits of the actors. Sound scenery must be developed and operated so effectively that the thousands of fans, listening in all over the country, may follow the play's action

not only with understanding but enjoyment.

For example, says the New York
Times, the British Broadcasting Company placed a microphone at a busy the production of the sound of a London street corner and produced speeding express train. This particular London street corner and produced these sounds as a background for the lines of the playing cast. There are effects, however, that might be difficult of importation. For example, a forest fire might not always synchro-nize with a play. At WGY some time ago a most realistic forest fire was created by the use of a plumber's blow torch for the sound of flame and wind

to be squeaky affairs and the siam-

ming of doors which has won many a engine. A flour sleve helped to define boy or girl a corrective word from par-ents becomes a necessity.

Ten Eyck Clay, director of the WGY

Then came the problems of produc-

rents becomes a necessity.

Ten Eyck Clay, director of the WGY players, is a seasoned actor of the lng the roar of the passing train and the proper in the pounding or bumping of the wheels on uneven track. A metal panel, 5 drama, demanding most in time and the production of sound-Radio Drama's Demands for Selves into character and in the radio production of sound-scenery. Actors readily throw themselves into character and in the radio production it is not necessary to memorize lines. At most two rehearsals of a cast are sufficient for a worthy

radio performance. The scenery, according to Mr. Clay, is another question entirely, for the obvious sound is not always the most suitable to produce a certain effect. Hours and hours are sometimes devoted to devising a fairly accurate sound production. After the "props" necessary to create the sound have been found or built radio rehearsals must be held in co-operation with the

chestra pit need not be accurate to emphasize the effect. The picture has registered in the mind of the specregistered in the mind of the spectator. On the stage also "prop"-produced noises are often poor imitations of the real thing. The radio microphone is so sensitive that the motion picture theatre or stage props are practically useless. The passing train must sound like a train and not a

train was supposed to be on a one-track road, where the roadbed was none too smooth and where a flat wheel or two was not considered an wheel or two was not considered an offence. The player-director proceeded to make a sound study of rail-road trains and after he was satisfied that he had learned all the sounds in their proper sequence he tackled the problem of producing these sounds so the fully that the listener many miles.

and by breaking up matches to simulate the sound of cracking, breaking.

burning tree limbs.

Since the listener is unable to see any one enter a scene, the character's presence is generally denoted by the closing of a door or by the lines. For this reason the doors in all the homes of the radio drama characters are apt to be squeaky affairs and the simulation of the radio drama characters are apt to be squeaky affairs and the simulation of the radio drama characters are apt to be squeaky affairs and the simulation of producing these sounds so faithfully that the listener many miles away would know that he was listening to the passing of a steam engine drawn trains.

A real locomotive bell and a creditable whistle were readily produced. To these were added boards covered with each of the covered with the sample of producing these sounds so faithfully that the listener many miles away would know that he was listening to the passing of a steam engine drawn trains.

A real locomotive bell and a creditable whist were readily produced. To these were added boards covered with the listener many miles are appropriately and the passing of a steam engine drawn trains.

A real locomotive bell and a creditable whist were readily produced. To these were added boards covered with the listener many miles are appropriately as a steam engine drawn trains. be described as the chug-chug of the

skates speeding over the uneven sur-face of the sidewalk suggested the roll-ing stock and a pair of roller skates was utilized as a train. In the first rehearsal, Russell Hoff, chief of the control rooms crew, suggested that a couple of heavy cords be stretched over the metal panel. As the roller skates passed over the panel one couldn't tell the sound from that of a control room. The listener first heard the distant whistle and the muffled roar and each second the control room crew built up the volume until the heavy train veritably thundered past the little country railway station. An added effect, familiar to those who live near passing trains, was the rattling of window glass. Five people were required to produce the train effect, one to whistle, one to chug, one to operate the roller skates, one to make win-

is: Two short pieces of wood covered with sandpaper, a flour sleve, a pair of roller skates, a metal panel, a

whistle, a bell and two pieces of heavy

WIRING TIPS

Keep Wires Between Grid Posts of Tube

Sockets and Related Parts Free.

The only important wires which must be kept short and free of all

others are those running directly from

dows rattle, another to sound the bell and the sixth, the control room operator, to control the sound volume.

The best recipe for a fast train, then,

wire to use for an aerial, it will depend on where the aerial is to be erected. For an indoor one, not exposed to the weather, any kind of cop-per wire will answer the purpose. Even wire as small as No. 30 can be used and it may be along the moulding, out of sight. For an outdoor aerial, it should be strong and not less than No. 14, or stranded wire. The small

take a few twists or lie across some

other wires they will not seriously af-fect the operation of the receiver, as

similarly mistreated wires in the radio-

frequency magnifiers are certain to do.

All the other wires in a set, including the filament returns, the "A." "B" and "C" battery and rheostat and switch

leads, may be bunched together into one cable without harming the outfit

in the slightest. There is no need at all for stiff busher and carefully sepa-

rated connections; insulated solid or flexible No. 18 wire is just as good

and can be handled much more easily

VALUE OF INDOOR AERIAL

An attic is the best place for an in-door aerial. This type is just as good day it was put up. There is no dan-

roof. Due to its not coming in con-

tact with nature's elements, it can be

small wire because there is no strain

on it and it does not corrode. With the indoor aerial that is properly erect-

ed the results are the same on rainy

WIRES FOR AERIALS

nights as on dry nights.

Marshall & Co. Where They KNOW The Neutrodyne R-A-D-I-O Exclusively Dourance Street Opp. Narragansett Hotel POLARITY OF PHONES.

All good telephones have a colored properly. The red or brown tip (the speaker terminals,

regular cord has a red or brown strand in it) should go to the positive from the "B" battery and the other cord to cord to designate polarity. They will the other contact. The majority of give louder signals when connected sets are marked plus on the loud



the Arrow l'ointing to the Right



Right Entrance.

the Arrow

EXCEPTIONAL RADIO VALUES FOR MONDAY



201A or

199 Type Type II Power De-

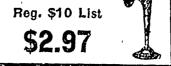
\$1.97

Manhattan Jr. Loud Speaker Reg. \$10 List

PHONES

Reg. \$5 List

\$1.39





Radio

WITHOUT BATTERIES

GAROD ELECTRIC RADIO

Hear clear, natural music, with tone quality unsurpassed, from an unfailing source of current supply. Ask one of the dealers listed below for demonstration.

> **PROVIDENCE** Blanchard Radio & Elec. Co. Woolworth Bldg **PAWTUCKET** E. & A., Inc. 27 High Street WOONSOCKET E. B. Hunt Supply Co. 247 S. Main Street NEWPORT Radio Exchange, Inc.

Broadway

A Radio for Xmas! Buy It At

See the Polleroyal Radio Set!

A. L. Castritius Co. Railroad Avenue WARREN A. J. Heon 347 Main Street BRISTOL Herman Kempf 687 Hope Street WAKEFIELD W. I. Main

WESTERLY

WHOLESALE DISTRIBUTORS

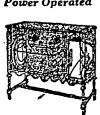
GEO. L. CLAFLIN COMPANY

70 NORTH MAIN STREET

SCATTERGO

PROVIDENCE, R. I.

Thorola Model 59 De Luxe



New Horn and Cone Speaker Combination Brings the Artist Into Your Home HIS ingenious new com-

bination bridges the gap

between musician and music

lover. Delightful tonal qualities, finer shadings hitherto inaudi-

ble, are brought out by this combination of Horn and Cone

working in unison. It is an

exclusive Thorola feature. Have a demonstration before you buy.

> Your neighborhood dealer considers it a pleasure to

Speakers Working in Unison— An Exclusive Thorola Feature

demonstrate Thorola Distributed by NARRAGANSETT

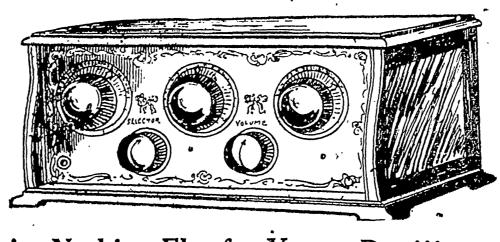
RADIO CORP. Wholesale Distributors 133-135 Dyer St.

AUTHORIZED THOROLA DEALERS:

CENTRAL FALLS, R. I. H. T. Himeon, 508 Broad Street GREENE, R. I. Pardon Brown WAKEFIELD, R. I. W. I. Main WESTERLY, R. I. R. C. Duguid & Company

WOONSOCKET, R. I.
A. & R. Auto Electric Service Co.
77 North Main Street
Kenneth R. French.
201 Woonsocket Call Building
R. I. Electrical Supply Co.,
99 Main Steet NEW LONDON, CONN. Thomas J. Falahan, 51 Main Street MYSTIC, CONN.
S. A. Boylen,
East Main Street 7 East Main Street

BLACKSTONE, MASS,
W. F. Flynn Hardware Co.,
FAIRHAVEN, MASS
George L. Hiller,
30 Center Street
NORTH ATTLEBORO, MASS.
Armington Battery Service,
166 Park Street
TAUNTON, MASS,
R. H. Smith Radio Supply Co.,
186 Highland Street
UNBRIDGE, MASS.
Atamian's Radio & Battery Service
WORCESTER, MASS.
Superior Motor Supply Company,
193 Commercial Street



Nothing Else for You to Buy!!! All Complete!



Latest Polleroyal 5-Tube Set Nationally Known Cone Speaker, complete with plug

5 Tested and Guaranteed Tubes 2 45-Volt Tested "B" Batteries

1 Storage "A" Battery Complete Antenna Equipment Complete Ground Equipment

All Accessories Guaranteed Perfect. All Tested Before They Leave Our Store! Free Installation!

Make This a Radio Christmas in YOUR Home

Visit Our Newly Enlarged Radio Dept.



210 WEYBOSSET STREET

Sets at the Right Prices

Dependable

The Walter W. Massie

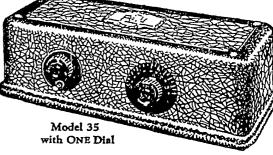
Radio Sales and Service Bureau 16 Windsor Road, Edgewood-Telephone Broad 0507

Recent Radio Developments

make it possible to operate any set on house-lighting current. I am prepared to give this advantage to those who buy an instrument through me. My unlimited servicing includes this latest feature.

WALTER W. MASSIE, Director

ATWATER KENT RADIO



Read the headlines of the air

Just as you scan your newspaper, selecting what you want to read and passing over the rest-so you sample the broadcast programs and select what you like, with an Atwater Kent ONE Dial Receiving Set.

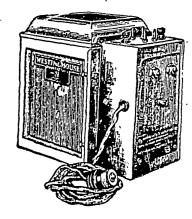
For swift ease of operation, com-bined with wonderful tone quality, power, selectivity, beautiful appearance, reliability and sensible price, you can't beat Atwater Kent Radio. Let us show you.

> \$70.00 Sold on Easy Terms

John M. Dean Co.

785-795 Westminster Street

Bring your radio
up to date-buy a
Westinghouse Radio A AUTOPOWER



Complete ^{\$}30

Builtion; an Tentirely inew principle, by Westinghouse. Battery and charger combined in one unit—both four and six volt sizes.

Simply plug into the light socket. Get never-failing "A" power night after night all year, long. Absolutely automatic.

No special wiring. Nothing to get out of order. No tubes. No adjustments or replacements. No liquids in charger. Costs less to operate than a single light bulb. Noiseless, non-pulsating. Absolutely no hum. Get an "A" Autopower and guarantee the best your set can give. See it today.

At radio dealers and Westinghouse battery service stations. everywhere.

FACTORY WAREHOUSE

96 Broadway, Boston, Mass.—Telephone Hancock 5760 WESTINGHOUSE UNION BATTERY, CO.

Manufacturers of Automobile, Radio Batterles and Autopower Pittsburgh, Pa.

WETMORE-SAVAGE ELECTRICAL SUPPLY CO.

WHOLESALE DISTRIBUTORS

PROVIDENCE, R. L. 51-53 PINE ST.

Woonsocket, R. I. Authorized Stewart Warner Dealer

Open Friday and Saturday Evenings-Other Evenings by Appointment

TELEPHONE WOONSOCKET 2039-W

A Gift

for the

Whole

Family

1927 RECEIVERS **WILL COST MORE**

Early Models Indicate Increase in Price, Weight and Tubes

Completely "Sold" to Public.

Radio sets designed and built for the 1927 radio season weigh more and are 1927 radio season weigh more and are larger than those offered for sale to the public during the 1926 season. The price is greater than last year's model and the number of tubes is on the increase. All of this information was gathered from an analysis made from more than 200 representative and diversified sets, which have just been exhibited at the many radio shows by

hibited at the many radio shows by tune and take care of than leading manufacturers throughout the country.

By taking all of the averages of dimensions, weight, prices, number of mensions, weight, prices, number of controls, number of radio and audio substantial, permanent product, which tubes and other facts about these sets will not have to be radically changed it was possible to "build" the average radio set for 1927.

Actually, the average set measures 28 inches in length, 17 inches in height and 20 inches in width. It is much larger than the 1926 model, which was according to figures gathered and made public by Radio Retailing last season only 11 by 10 by 24. Thus the mod-

orn radio set is growing.

There has been a gain, or rather considerable increase, in weight. Whereas the 1926 average set weighed but 23 pounds, the new 1927 model reaches 61 pounds.. This is easily explained, since a great deal more metal in transformers, chassis, panels, shields and elsewhere has been introduced in the construction of the modern radio receiver. tubes, the indications are that a greate

number are included in the 1927 type of set. Last year the number was five. This year the figures give an average of a little more than 5½ tubes a set. Of course, the "half" tube is largely an indication that there are more six seven and eight tube outfits and fewer one, two and three tube sets than previously. Inasmuch as the fraction is over the half, it would probably be cor-rect to assume that the average num-

ber of tubes for 1927 set is six.

These tubes are divided into radio frequency and audio frequency tubes, each set needing besides, a detector tube. The findings are rather interesting in that they show a tendency to increase both the radio and audio stages of amplification, but in uneven

The number of controls seemed to decrease with the increase in prices. They numbered at least three in the \$30 to \$80 group, and were reduced to two in the \$100 to \$400 group, and average between the increase, as the average tube value a set of radio-an-plifier tubes is nearly 10 per cent. larger than the increase in audio tubes. Curiously enough, the survey does not show the tendency of quite a few manufacturers to include the extra "power" stage in the audio-frequency end of the receivers now being sold.

This compares as follows with the 1926 set: Radio-frequency amplification, two tubes; single detector tube; audio frequency, two tubes; total, five tubes

audio frequency, two tubes; total, five tubes.

Practically the only thing which remains unchanged in the 1926 and 1927 average set is the matter of controls, or knobs and dials. Our 1927 average set shows two main dials for tuning and two or three smaller knobs for rheostats and switches. There has been somewhat of a change, however, in the design of these controls. While many sets still make use of the dials, the tendency is decidedly towards the flush tendency is decidedly towards the flush type of "window" control by means of a small knob only.

More of the 1927 sets have calibrat-

ed dials, with illuminated scales, and wave lengths are indicated, instead of numbers, in a number of cases. These are small refinements which merely show how the appearance of the sets

has changed over a period of a year. It is in the matter of the price that the greatest surprise comes, however. Last year's survey showed that a set would cost, on the average, about 880. Very evidentily, the radio public has had a great deal more money to spend on radio, or has become completely "sold" on it, as to-day there are sets that sell for as much as \$5000.

Our average 1927 set has a sale price of \$184. This is practically \$100 more than the 1928 model.

than the 1926 model.

Unquestionably, the radio buyer is getting more for his money than he did last year. In this great advance in price, it must be considered that a great number of sets have fine cabinets, with elaborate woodwork, which naturally add a considerable amount to the price of the instrument.

While the average 1927 set is still in the "table type" class, it is competing flercely with the console model. It is in fact, the console which has brought up its average price to such a high level, because there are sets listed on the 1927 list which reach down to \$9.75, a price never before attained in tube sets, and consoles costing \$500 or

It must be remembered too that a great deal of workmanship is necessary in the new chassis type of construc-tion, which has been adopted by quite a few of the 1927 set manufacturers. Shielding has added to the cost, as has the introduction one and two in the high price sets. The higher priced sets had a large number of loop equip-ments and were naturally housed in beautiful cabinets, which added considerably to the average price, as finally calculated for the average set.

Greater care, too, has been exercised in the design and finish of each individual part entering into the assembly of the final set. There are innovations in variable condensers, tuning dials with "gang" combinations, and single control possibilities, which require exquisite workmanship for

smooth operation. Almost every set is equipped with

Radiotrons, Tungars and

Radio Batteries-Flashlights Prompt Delivery—Fresh Stocks Union Electric Supply Co. 60 Pine St., Providence, R. L. WHOLESALE ONLY

vernier type of tuning control. Sensing no doubt the necessity for a large degree of selectivity in the radio sets of the year, anticipating the chaotic condition of the air, the average set is quite selective. Tuned radio frequency circuits are still the most popular, with the use of power stages in the audio end growing into favor Practically every 1927 set will work

are quite a few—enough to mention them—which operate from a loop, and

With very few exceptions, the tube sockets were designed to receive the standard five-volt tubes. A few sets

Not many have a built-in loud speaker. The speakers are more com-

The single control set, which seemed

to be so popular among the manufacturers a year or so ago, has practically

been abandoned. To-day, the sets have arrangements which can be made

into single control, but which allow

Altogether, the average set of 1927 is a'superior set. It is more selective, has better quality, and is easier to tune and take care of than

have been designed for both the five

and three-volt tubes.

in a console.

SIR OLIVER HAS **HOWL-PROOF SET**

on an aerial and ground, but there English Scientist Presents Own . Invention to Public

Sir Oliver Lodge is again in the limelight, this time through his invention of a new radio receiver which he claims is howl proof. He has named it the "N" circuit and declares that if it were mon as an integral part of the set universally adopted there would be an when the entire installation is housed

"In designing the receiver which has now become known as the N circuit my object was first to provide a wire-less set that would not oscillate or cause interference with neighboring sets (and this is very necessary if we are all to enjoy the broadcasting, just as traffic control on the roads is necessary if we are to have safety); sec only, to provide a set which would be perfectly simple to operate and yet vould receive programmes from local stations as well as the distant stacent article in the New York Times.

end to the oscillation nuisance. The receiver was presented to the English public at the beginning of the present

From this short statement it will

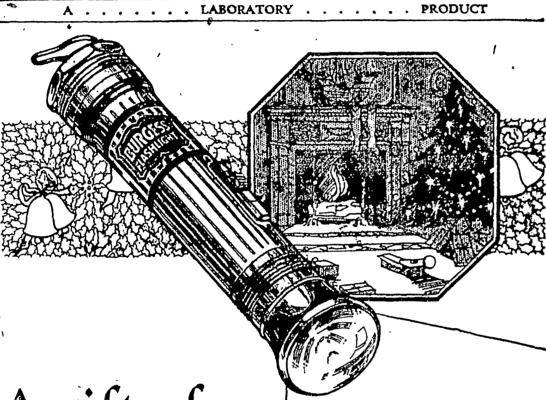
Freed Eisemann-Grebe Radiola—Crosley Radios

We are authorized agents for these high grade radios

People's Hardware Co. 39 Plainfield Street, City

MELLOR SALES CO.

WHOLESALE DISTRIBUTORS BURGESS BATTERIES



A gift of year-'round usefulness!



A BURGESS FLASHLIGHT is A something everyone can use—and use often. That's why it is always appreciated as a Christmas gift.

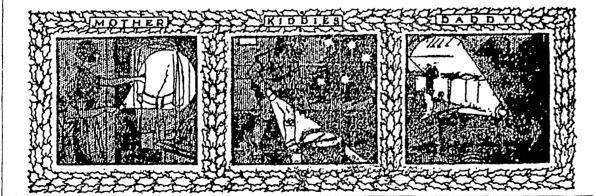
Made in a wide variety of sizes and styles, you are sure to find just the Burgess Flashlight that will please most. And the prices -from \$1.25 complete, to \$5.00 complete-make a suitable gift for anyone. Why not remember some one Christmas,

Burgess Batteries are standard makes of flashlight cases. Use them to "pep up" your old

BURGESS FLASHLIGHTS and BATTERIES

with this gift of lasting usefulness?

BURGESS BATTERY COMPANY GENERAL SALES OFFICE: CHICAGO



Complete Line of Burgess Batteries ON SALE-STREET FLOOR

THE SHEPARD RADIO STORE

STEINERT

BURGESS BATTERIES

STEINERT BUILDING

495 Westminster Street

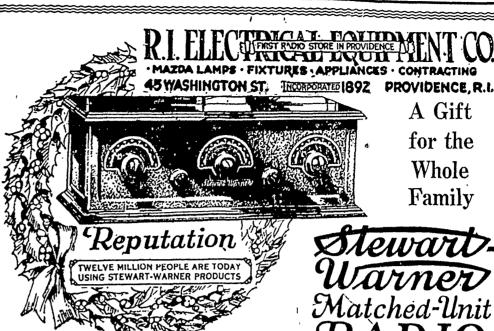
seen that the scientist's prime object has been to eliminate the "blooper." Regenerative circuits because of their excellent amplification have always been popular, but their use has been coupled with the "howling" nulsance. The fundamental principle of the circuits. circuit is the employment of a single connection between the antenna and detector tube. It is nothing more or less than a closed oscillating circuit. The antenna circuit itself need not be a tuned circuit, but can be of the aperiodic type, and is heavily damped The "N" circuit has a very low resistance, so that comparatively high volt-

ages can be generated by small voltage

good quality of reproduction there should not be more than one tuned circuit, as, if two tuned circuits be employed, there is a great liability to distortion owing to heterodyning between In the "N" circuit the coil is made of a fairly high inductance value and

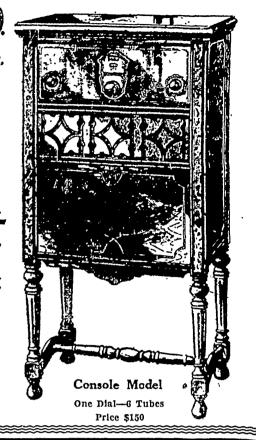
the capacity of the condenser small. Owing to the much greater length of the antenna system, and to its damping, it is impossible for radiation from the antenna to occur. The ground is also connected to the

ges can be generated by small voltage plate of the detector tube, and there is a small resistance between the grid and the formal resistance between the grid and the filament circuit.



FIRST RADIO STORE IN PROVIDENCE

We carry the complete line of famous Stewart Warner Radios. Make your selection early this week for Christmas delivery. Sold on easy terms if desired. Store open until 9 o'clock every evening.



STEWART-WARNER Matched-Unit Radio



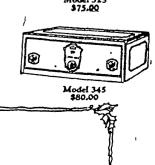
other gift at anywhere near the same price. Beginning with the beautiful Christmas carols that will come to you out of the air on Christmas morning on into the New Year, and for years to come, you will find enjoyment at your finger tips. If you have never experienced the fascination of turning dials and bringing in entertainment from all over the country, you have something unusual to look forward to.

> A Stewart-Warner product has behind it the manufacturer's experience of twenty years and a wonderful organization that is ready to serve you at any time.

> Any one of our Blue Ribbon Dealers will be pleased to demonstrate to you the life-like tone, surprising volume of this receiver that also possesses extreme selectivity—the ability to separate stations.

Assure Christmas delivery by calling your nearest dealer now. STEWART-WARNER SPEEDOMETER CORPORATION

CHICAGO . U. S. A.



STEWART-WARNER PRODUCTS SERVICE STATION, 110 BROADWAY, PROVIDENCE—Wholesale Distributors

Vagrant Waves of Interest to Fans

Dry "B" batteries are renewed more than any other parts of a set.

Lessons in English are now broadcast from a radio station in Tokio, Japan.

Some interference can be tuned out by using small variable condensers and

It is much better to build your own set than to try and improve on a manu-

The operating costs of broadcasting stations in New York city run to nearly \$3,000,000 a year.

Wireless telephone equipment is to be installed on 36 express trains in Germany, where telephone subscribers throughout the country will be able to get into prompt communication

As a rule, loud speakers are not am-plifiers, and they require a strong signal to work them.

There are from two to 50 persons employed on various broadcasting stations n the United States. A long outdoor aerial picks up more ergy than a short one, but most any

Sulphate forms on the plates of a storage battery when it has run dow and not been charged.

kind will get locals.

The effect of the fixed

half of which are tube sets,

series with the lead-in is the same as shortening the antenna, St. Paul, Minn., is the first city to inroduce radio service in the homes over

the regular telephone wires Denmark has 70,000 receiving sets. There are 49,000 in Copenhagen, nearly

The radio industry in the United States now employs 300,000 persons in 1200 plants and 40,000 dealers' stores.

relatives and friends travelling on any political speeches is forbidden in Engone of the trains.

rime and detection of criminals is soon to be employed extensively in Cleveland, O. Small sets with headphones are to installed on every squad car and

The first and only time Thomas A. Edison, the inventor; ever spoke over the radio was in Atlantic City. N. J. All he said was: "I have never spoken over the radio before—good night." He tight once announced that he would never ened.

Radio messages frequently travel together and grounding them will some ing set over two entirely separate paths. One path is along the surface of the ground. The other path is through the lent emergency insulator for an aerial high levels of the air, 50 or 100 miles until a regular insulator can be in-

For advertising on the air, broadcast-without an aerial by merely changing ing stations in New York city ask \$400, the ground wire over to the regular an hour; Beston, \$250; Philadelphia, aerial binding post. \$200: Detroit, \$200:

casting of the King's speech at the with a coil, the wave length is in-opening of Parliament. coll, the wave length is reduced.

Soft tubes should be mounted on soft

A large condenser requires more care in tuning than a small one does. A good set should always, get good results, while a cheap set may and may

High, strong winds cause aerials to

If a condenser is placed in parallel man in the caboose and the engineer or with a coil, the wave length is inmade up of 100 cars.

If possible, avoid running the lead-in Every school in Atlanta, Ga,

equipped with a receiving set. The entire equipment is worth \$13,000. A "C" battery replaced every six months not only keeps the "B" battery hills down, but gives clear reproduc-

Radio is to be used for the transmis-

sion of orders for movements of trains in the yards of the St. Paul Union Depot, in St. Paul, Minn. Good tube sockets are made from good insulating material and contain high-grade springs, which are so con-structed that a tube fits snugly.

Never try to charge a battery in few hours. A slow charge will give better results, and it is not advisable to exceed a 5-ampere charging rate,

A variable condenser is placed in the set to vary the wave length of the various circuits so as to adjust

S200; Pittisburgh, S200; Detroit, \$200; Minneapolis, \$250; St. Louis, \$250, and Successful tests have been made of the various circuits Chleage, \$350. To broadcast over a two-way radio telephone communication or tune them to reach the control of the stations it costs \$330 an on freight trains for the exchange of incoming radio wave. RADIO CORP.

This Famous \$25 MAGNAVOX Loud Speaker INCLUDED

With Complete Set

Over 400,000 of these famous Magnavox Speakers sold! List price \$25.00—we include it without any extra charge with each new 1927 WORLD set complete. This is a special Introductory Offer to give our wonderful advanced improved 1927 Model a GRAND "Send-off" in our New England

Description of Speaker

These famous MAGNAVOX Loud Speakers are big, handsome, attractive—stand 30 inches high-heautiful crackle finish-ornamental base-extra wide mouth for full, rich. resonant volume Amplify reception SWEETLY, FAITHFULLY, CLEARLY Have super-sensitive extra size unit List

This MAGNAVOX Offer for THIS WEEK ONLY

MAIL ORDER COUPON

WORLD RADIO CORP. 103 EMPIRE ST.

Gentlemen-I enclose \$ FIRST PAYMENT for the "World" 1927 Model. I will pay the balance weekly or monthly as advertised. Of course the \$25 Magnavox 13 included.

NAME The state of the s

ADDRESS E. M you haven't received a copy of our like Carolog mer Radio Log-eill or write for YOUR copy-TODAY!

Here's the Figures

List Price of New World 5-Tube Receiver\$45.00

(2) 45 Volt W. R. C. "B" Batteries 6.50 W. R. C. 201 A Tubes . . , 7.50 160 Amp. W. R. C. Stor-

age "A" Radio Battery 14.50 Complete Antenna and Ground Outfit (1) Nationally Advertised

\$25 Magnavox Loud

Speaker 25.00 Total\$101.00 Astounding Value! \$101 Set for



ns listed (\$25 Magnavox Speaker included) \$5 FIRST PAYMENT. Balance on YOUR Terms.

This NEW 1927

d TUBE Receiver

—A Marvel of Tone, Beauty and Volume

ilere it is-The Radio Wonder Set of the Year-a year ahead of its time in construction, improvements, latest radio inventions and discoveries. You'll be AMAZED at its sensitivity, selectivity, remarkable distance-getting ability, and ease of "tuning in" station after station with ASTOUNDING RAPIDITY Beautifully constructed cabinet, finished in a rich walnut

Picture barely hints of fine gram and plumed walnut panels. An ideal set for ANY HOME, Receivers of this type retail for a much higher price. MASS PRODUCTION, and MASS DISTRIBUTION, enable, the World Radio Corp. to sell this receiver at this low price—\$45. \$1 DOWN PAYMENT Price of Set COMPLETE with all accessories (and \$25 Magnavox included) \$79.50. \$5 FIRST PAYMENT

Can You Imagine a Finer Gift for the Family on Christmas Day Than This Glorious Set?

BOSTON PROVIDENCE

MANUFACTURERS OF

WORLD RADIO PRODUCTS 103 Empire Street

Feature Points:

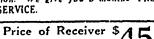
-Special condensers of HIGH quality separate stations of similar wave-length.

-New dial construction makes tuning in almost micromatic precision. -Over 50 Factory Tests. -Cords with carefully marked strands make connections to batteries and accessories a simple

We make NO CHARGES for installation. We give you 3 months' FREE SERVICE.

Price of Receiver \$45 alone SI FIRST PAYMENT
The Balance on NOUR Terms!

Open Saturday Until 9 P. M.





LAST CALL FOR **CHRISTMAS**

WE WILL BE OPEN EVERY EVENING THIS WEEK UNTIL 9 O'CLOCK

We Sell Nothing But Standard Proven Merchandise

When buying a Radio set consider the following carefully: 1. Reliability of Manufacturer and Dealer. 2. Second hand value of set. (This is very important). 3. SERVICE. (This is most important of all.) It you buy an automobile your decision is based upon the above. Your Radio Set deserves the same careful judgment. .

Radio Provides Entertainment the year round—it is not used for a short time and then laid aside. A Radio Set must be properly installed and balanced in your home to give satisfaction. This cannot be done properly during the Christmas Rush of the last few days.

MAKE YOUR APPOINTMENT NOW FOR DEM-ONSTRATIONS, have your selection of sets brought to your home for approval—and then properly balanced and installed..
AVOID UNKNOWN SETS and OBSOLETE MOD-There are no "miracle sets" or BAR-

You get just what you pay for and no FOR THE BEST IN RADIO WE OFFER

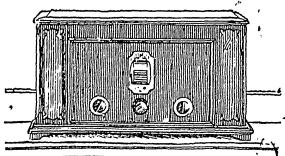


Built-In Speakers Covering full range of audible tones, electrically equipped to run from light socket-Complete with tubes

TABLE MODEL \$155

Other Console Models From \$190 to \$1600

These Sets, Properly Equipped and Installed will give the finest Radio Reproduction ever heard-they incorporate everything that is now known in Radio. NOTHING MORE CAN BE ADDED.



New 6-Tube **KOLSTER**

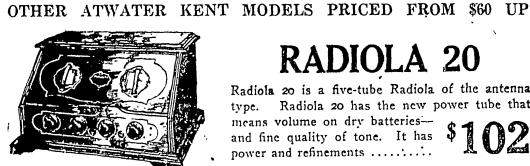
This beautiful set is extremely powerful, selective and very fine qualityit compares favorably with any set on the

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Model 35-6 Tube-1 Dial

One hand is all that is needed to operate an Atwater Kent One Dial Receiver, and it is not even necessary to look at the dial when changing from



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Radiola 20 is a five-tube Radiola of the an type. Radiola 20 has the new power tube that means volume on dry batteriesand fine quality of tone. It has power and refinements

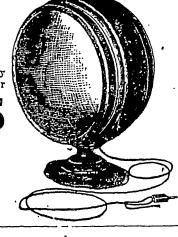
OTHER R C A MODELS PRICED UP TO \$575

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