RADIO LORE FOR NOVICE AND EXPERIENCED FAN

Radio Designers Bend Efforts Toward Improvement of Parts

Nothing Radical Can Now be Expected, Says Expert. Presents Own Receiver Built for Quality Reproduction and Simplicity of Operation

By J. E. ANDERSON

Radio design has come to a point where nothing radical can be expected. There are a few standard circuits which have held the field for a considerable time because of their inherent superiority. Designers now give their attention to making improvements and refinements in these; and in this field there is a great deal of work yet to be done. New and improved parts are continually making their appearance and in many cases these require a change in the circuit design to take full advantage of the parts. New and special purpose tubes are now available and these require certain changes in the circuit design in order that full advantage of their special characteristics may be obtained. Special purpose tubes and new parts require co-ordination or the result will not be what was expected. But notwithstanding the use of special purpose tubes and co-ordinating parts the trend in design must be toward simplicity of operation and reliability of performance.

Below is a brief description of a simple five-tube receiver built by the writer, in which compactness of assembly, quality of reproduction, simplicity of operation, constancy of performance and economy of operation have been kept in mind. Small tubes are used where small tubes will satisfactorily handle the load, medium-sized tubes where medium-sized tubes will do and power tubes where such tubes must be used. In the interest of compactness small parts have been used wherever such may be used, without sacrificing efficiency.

The circuit diagram followed in wiring up the set is shown in figure 1. Attention is first called to the filament circuit.

It will be observed that the first two filaments are connected in series across the filament battery. This is possible because the first two tubes are 199 types, which required a terminal voltage of three each. This type of tube is a good radio frequency amplifier and it can handle a higher signal voltage than it will ever be called on to handle. It is also a good detector, and it can easily handle all the volume required for that purpose without distortion, provided there is a good audio amplifier following it. For these reasons the first two tubes in the receiver are of the 3-volt, 60-milliampere size. Two of these tubes may be connected across a six-volt storage battery, provided they are in series, and the voltage each tube obtains is just about the correct value, even in the latter stages of the charge of the battery. It is desirable to have some means of controlling the filament current in the first two tubes as a means of adjusting for changes in the battery charge and for volume control. Hence a single rheostat (Rh) is inserted in series with the two filaments. It is placed in the negative lead of the battery in order that the voltage drop in it may be used as grid bias for the first tube. Note also that the filament of the first tube is placed on the positive side of the filament of the detector. This also is done to get a negative bias on the grid of the first tube without the necessity of using a grid battery. If the grid return lead of the first tube is connected to the negative lead to the storage battery the effective grid bias on the first tube is the voltage drop in the detector tube filament and in the rheostat, about three volts. Since the detector requires a positive bias on its grid, the return lead is connected to the line joining the filaments of the two tubes.

The audio frequency tubes are either five or six-volt tubes. Hence the filaments of these are connected in parallel across the battery, and amperites are used to reduce any excess voltage over the required filament terminal voltage. There is a suitable ballast resistor available for every type of tube when working off a six-volt storage battery.

The receiver is designed for use with either a loop or an antenna. To change from one to the other the little switch S-1 is thrown either to point 1 or to point 2. The ground binding post is used for one of the terminals of the loop. The switch, S-1, may be made of two small binding posts or machine screws together with a short but heavy flexible lead provided with a lug at one end. One end of this lead is, of course, connected permanently to the grid or condenser.

The two windings, L-1 and L-2, are wound on two-inch hard rubber tubing with number 24 double silk covered wire. The primary contains 20 turns and the secondary, 71 turns. Instead of using a separate primary a tap may be taken on the 71-turn secondary at the 15th or 20th turn from the ground side, to which tape the antenna should be connected. The three-circuit tuner, L-3, L-4 and L-5, are wound on a small Bruno form with No. 24 double silk wire for the first two and No. 32 double silk for the last. The primary contains 10 turns, the secondary 53 and the tickler 40 turns. The tuning condensers, C-2 and C-4, across the coils, L-2 and L-4, are General Radio .0005 mfd. straight line frequency.

The by-pass condenser C-3 is of .0005 mfd., and the by-pass C-O is of .01 mfd. capacity. The grid condenser, C-1, is an XL variodenser, which is supplied with clips for taking the grid resistance, R-1, which is a one megohm unit.

The volume control potentiometer P is a 500,000-ohm Carter instrument. This is placed across the secondary of the first audio-frequency transformer, and the movable arm is connected to the low potential side. The object of placing it across the first transformer rather than across the last, as is too often done, is to prevent overloading in any of the tubes. When placed across the first the signal intensity each tube is called on to handle is the least for any given output. If it is placed across the last it is possible that either or both of the tubes preceding may be overloaded and the resulting distortion cannot be removed from the signal by any amount of juggling of the potentiometer. A good rule in designing sets is to put the volume control as far forward as possible. The object of connecting the sliding arm of the potentiometer to the low potential side of the circuit is, of course, to shorten the grid lead as much as possible.

Three audio-frequency transformers are used in the set. While ordinarily this is not conducive to good quality, the transformers used in the present set have cores of a special material, have very low ratios, are completely shielded and have adequate primary windings and core area, so that the quality does not suffer.

The last tube should be a power tube, preferably a UX-171, if best quality loud speaker volume is to be obtained. This tube requires a plate voltage up to 180 volts, applied at B-3, and a grid bias of 40 volts, applied at C-2. Other power tubes may be used, but then the voltages should be lower, particularly the grid bias applied at C-2. The first two audio tubes should be of the same type, and their plate voltage, applied at B-2, should be about 90 volts. Since both these tubes have the same characteristics and have the same plate voltage, they should also have the same grid bias, applied at C-1. The plate of the first radio frequency tube is also given a voltage of 90 volts, although its grid bias is only three volts. Sixty-seven volts on the plate would be about the right value to apply to this tube for the three-volt bias, but the difference is not of sufficient importance to bring out a separate binding post to take care of it. The plate of the detector tube is given 45 volts, applied to B-1. The B return is common with the positive of the A battery in order that the extra six volts may be effective on the plates of the tubes.

The layout is on a seven by eight-inch panel. The tickler control knob is at the top middle, the potentiometer at the bottom on the left, the rheostat at the bottom right and the filament switch between the potentiometer and the rheostat.

The baseboard is 7¾ by 17½ by ⅝ inches and is boiled in paraffine to improve its insulating qualities.

The following parts are required: Two .0005 mfd. General Radio variable condensers. One by-pass condenser, .0005 mfd. One by-pass condenser, .01 mfd. One VI. variodenser with clips for grid leak (cond. .00035 mfd.) One megohm grid leak. One 30-ohm Carter rheostat. One 500,000-ohm Carter potentiometer. Three amperites of appropriate capacity. One Carter Imp filament switch, S-2. Two KK dials and one small KK knob. A panel 7x18 inches and a baseboard 8x17½ inches. Eleven Eby binding posts and hard rubber strips. Three meloformer audio transformers. Three large air-gap sockets. Two small sockets. Two brass angles for fastening panel to baseboard. One Bruno three-circuit tuner. One R. E. transformer as described. A cabinet 7x18 inches of sufficient depth to take the 8-inch baseboard. Two UV-188 tubes. Two UV-201-A tubes. One power tube, preferably a UX-171.

ANOTHER CIRCUIT

Harvard Radio Men Devise One Expressly for Experimenters.

The latest type of set to meet the requirements of the experimenter is the circuit devised by Browning and Drake of Harvard. This is not a manufactured set, but is the result of their long experiments. It consists of a stage of tuned radio frequency amplification combined with regeneration.

This is the combination experimenters have long sought because they all know that regeneration has so many desirable features, it should be incorporated in a set if at all possible, so as to get the most out of the detector tube. In fact, with regeneration, you can dispense with one or two tubes with a great saving in A and B battery consumption as well as space in the radio set, declares Mr. Drake.

It isn't the number of tubes in a set that give it great volume or distance. It is the way they are connected and with what circuit. The combination of tuned radio frequency amplification and regeneration requires but four tubes and consists of a stage of radio frequency amplification, regeneration and two stages of audio frequency amplification. The stage of radio frequency amplification will allow the use of a small aerial and the regenerative feature of the set will amplify these weak signals, while the two stages of audio frequency amplification will give loud speaker volume.

When loud speaker volume is mentioned, it does not mean that every station will come in on the loud speaker, because they will not. No set made today will do that, because there is a certain value of signal strength that does not come in better than the noise level and when you amplify one you amplify the other.

SHORT CIRCUITS

RADIO PROGRAMMES

WEAN begins the new week with broadcasting of this morning's service of the Cathedral Church of St. Paul, Boston, at 10:55 and an organ recital at 7:30 p. m. To-morrow, The Shepard orchestras and regular entertainers will be heard from noon until midnight. Tuesday's special attractions will be a popular concert at 4 p. m. by John Fitzpatrick, a violin recital at 8 p. m. by Joseph Heller, and a special programme by Jennie Clark Simpson and others, beginning at 9 p. m. The specials for Wednesday will be an organ recital at 8 p. m. by Lewis Weir and a radio playlet at 8:30 p. m. Thursday will be devoted to WEAN artists, plus a special organ recital at 4 p. m. Friday and Saturay, the station will continue its own concerts and several relayed from noted New England resorts.

WJAR will broadcast the Capitol Theatre Family concert this evening at 7:20, followed by a special New York relay at 9:15. To-morrow's special will be a studio concert at 1:05 p. m., instrumental trios at 8:35 and 9:15 p. m. and the opera, "The Masked Ball," at 10 o'clock. Tuesday's specials will be a safety council talk at 8:05 p. m., and a tenor recital by Charles Morrison immediately afterward. For Wednesday, in addition to regular WJAR entertainers, there will be a concert at 9:15 p. m. by Frank E. Chadwick, tenor, and two programmes by Alice and Louise McLaughlin, during the evening. Elton B. Cook, basso, will sing Thursday night at 8:35. Friday night, Dick Harrington will be heard twice and Marguerite Mylod, contralto, and Dorothea Johnson, soprano, will also go on the air twice.

WLSI will broadcast programmes tomorrow and Friday nights.

WEAN—THE SHEPARD STORES—367

To-day.

10:55 a. m.—Service of the Cathedral Church of St. Paul, Boston.
7:30 p. m.—Organ recital.

Monday.

11:55 a. m.—Time signals.
12:00 p. m.—Shepard Colonial concert orchestra, Harold Sheffers, director.
12:10 p. m.—Weather report.
12:15 p. m.—Musical programme.
4:00 p. m.—Musical programme.
4:30 p. m.—Weather report.
6:30 p. m.—Dinner dance, Harold Sheffers and his society orchestra.
8:15 p. m.—Metropolitan Theatre studio.
9:15 p. m.—Metropolitan grand orchestra.
10:05 p. m.—Dance music.

Tuesday.

10:00 a. m.—Home service talk by Miss Kathleen Atkinson.
11:55 a. m.—Time signals.
12:00 p. m.—Shepard Colonial concert orchestra.
12:10 p. m.—Weather report.
12:15 p. m.—Musical programme.
4:00 p. m.—Musical programme.
4:30 p. m.—Weather report.
6:30 p. m.—Dinner dance, Jimmie Walsh and his dance orchestra.
8:00 p. m.—Joseph Heller, violinist; Bertha Satkiel, pianist.
8:30 p. m.—Kenmore ensemble.
9:00 p. m.—Jennie Clark Simpson and assisting artists.

Wednesday.

11:55 a. m.—Time signals.
12:00 p. m.—Shepard Colonial orchestra.
12:10 p. m.—Weather report.
12:15 p. m.—Musical programme.
6:30 p. m.—Dinner dance, Arthur Parquette and his Asia Serenaders.
8:00 p. m.—Organ recital by Lewis Weir.
8:30 p. m.—Playlet.
9:00 p. m.—Dance music, Rhodes Orchestra, direction Charles E. Culverwell, broadcast from Rhodes-on-the-Pawtuxet.
10:05 p. m.—Dance music.

Thursday.

10:00 a. m.—Home service talk by Miss Atkinson.
11:55 a. m.—Time signals.
12:00 p. m.—Shepard Colonial concert orchestra.
12:10 p. m.—Weather report.
12:15 p. m.—Musical programme.
4:00 p. m.—Musical programme.
4:30 p. m.—Weather report.
6:30 p. m.—WEAN dinner dance.
8:00 p. m.—Concert.
8:30 p. m.—Victor's band.
9:00 p. m.—Dance music by Al Mitchell and his Arcadia dance orchestra.

Saturday.

11:55 a. m.—Time signals.
12:00 p. m.—Shepard Colonial concert orchestra.
12:10 p. m.—Weather report.
12:15 p. m.—Musical programme.
4:00 p. m.—Al Mitchell and his Arcadia dance orchestra.
6:30 p. m.—Dinner dance by the Asia Serenaders.
8:00 p. m.—Organ recital.

WJAR—THE OUTLET COMPANY—485.

To-day.

7:20 p. m.—Musical programme by Maj. Edward Bowes and the Capitol Theatre Family.
9:15 p. m.—Programme to be relayed from WEAF, New York.

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.
1:05 p. m.—Studio programme by William J. McKenna, baritone; Cecelia Moreau, pianist, Alice McHugh Coughlin, reader.
1:30 p. m.—Weather report.
8:30 p. m.—Baseball scores.
8:35 p. m.—Musical programme by instrumental trio, under the direction of Dorothea V. G. Macdonald.
8:50 p. m.—Musical programme.
9:15 p. m.—Instrumental trio.
9:30 p. m.—Musical programme.
10:00 p. m.—Grand Opera, "The Masked Ball."

Tuesday.

1:05 p. m.—Studio programme.
1:30 p. m.—Weather report.
8:00 p. m.—Baseball scores.
8:05 p. m.—"Character on the Highway," one of a series of safety talks under the auspices of the Providence Safety Council, to be given by G. Irving Tomey.
8:10 p. m.—Musical programme by Charles Morrison, tenor.
8:30 p. m.—Gold Dust Twins.
9:00 p. m.—Everready Hour.

Wednesday.

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.
8:00 p. m.—Concert by the U. S. Army Band, relayed from Washington, D. C. Capt. William J. Stannard, conducting.
8:30 p. m.—Dasie Saxophone Octet.
9:00 p. m.—Baseball scores.
9:05 p. m.—Frank E. Chadwick, tenor.
9:15 p. m.—Musical programme by Alice and Louise McLoughlin.
9:30 p. m.—Frank E. Chadwick, tenor.
9:40 p. m.—Alice and Louise McLoughlin.
10:00 p. m.—"The Perichole," light opera.

Thursday.

1:05 p. m.—Studio programme.
1:30 p. m.—Weather report.
8:15 p. m.—Baseball scores.
8:20 p. m.—Charles E. Price, secretary-manager of the Automobile Club of Rhode Island, will talk on "Value of an Automobile Club to the State of Rhode Island." Questions answered.
8:25 p. m.—Eugene S. McKenna, tenor soloist.
8:35 p. m.—Elton A. Cook, bass, accompanied by Miss Myrtle L. Snow.
8:15 p. m.—Musical programme
9:00 p. m.—Clicquot Club Eskimos.
10:00 p. m.—Silverstown Cord Orchestra, under the direction of Joseph Knecht.

Friday.

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.
8:30 p. m.—Baseball scores.
8:35 p. m.—Dick Harrington in programme of popular and semi-popular solos.
8:50 p. m.—Marguerite Mylod, contralto, and Dorothea Johnson, soprano.
9:15 p. m.—Dick Harrington.
9:30 p. m.—Marguerite Mylod and Dorothea Johnson.
10:00 p. m.—Whittall's Anglo-Persians.

Saturday.

1:05 p. m.—Studio programme.
1:30 p. m.—Weather report.

WLSI—THE LINCOLN STUDIOS—441

Monday.

8:00 p. m.—F. C. Hunt Corporation hour.
8:30 p. m.—Chilrite Trio.
9:00 p. m.—Rhode Island Supply Company Serenaders.

Friday.

6:30 p. m.—Port Arthur Dance Orchestra and cabaret.

OUT OF TOWN STATIONS

To-Day

KDKA—PITTSBURGH—309.

7:15 p. m.—Baseball scores.
8:00 p. m.—Orchestra.

KFI—LOS ANGELES—467.

2:00 p. m.—Church services under direction of L. A. Church Federation.
8:00 p. m.—Vesper services arranged by Federated Church Musicians.
10:30 p. m.—KFI special.
12:00 a. m.—Organ recital, Dan L. MacFarland at the console.
1:00 a. m.—Orchestra.
2:00 a. m.—Orchestra.

KFUO—ST. LOUIS—545.

11:15 p. m.—Address and music.

KGO—OAKLAND—361.

3:00 p. m.—First Congregational Church service (San Francisco); Rev. James L. Gordon, D. D., preacher.
10:30 p. m.—Concert.
11:35 p. m.—First Congregational Church service (San Francisco).
1:00 a. m.—Concert.

KGW—PORTLAND—491.

2:25 a. m.—Services of St. Stephen's Pro-Cathedral.
11:30 p. m.—Services of the Hinson Memorial Baptist Church.
1:00 a. m.—Concert.

KNX—LOS ANGELES—337.

2:00 p. m.—First Presbyterian Church of Hollywood, Rev. Stewart P. MacLennan, pastor.
6:00 p. m.—City Park Board musical programme.
8:30 p. m.—Chat by Helene Sullivan, film actress.
10:30 p. m.—Hollywood Unitarian Church.
11:00 p. m.—Concert orchestra.
12:00 a. m.—First Presbyterian Church of Hollywood.
1:00 a. m.—Feature programme.

KOA—DENVER—322.

2:00 p. m.—Service of Montview Presbyterian Church, Rev. William L. Barrett, pastor.
8:30 p. m.—Organ recital from Montview Presbyterian Church, Mrs. Blanche Townsend Chase, organist.
11:00 p. m.—Open-air concert, Denver municipal band, Henry E. Sachs, director.

KYW—CHICAGO—536.

12:00 m.—Services from the Second Presbyterian Church, Rev. Josiah Sibley, pastor.
5:30 p. m.—Studio concert.
11:30 p. m.—Classical concert.

WAAM—NEWARK—263.

11:00 a. m.—Service of First Presbyterian Church, Rev. K. J. MacDonald, pastor.

WBAL—BALTIMORE—246.

8:30 p. m.—Orchestra.

WBBM—CHICAGO—226

1:20 p. m.—Sacred classical concert.
5:00 p. m.—Musical matinee.
9:00 p. m.—Melody hour.
1:00 a. m.—The Nutty Club.

WBZ—SPRINGFIELD—333

8:00 p. m.—Concert.
9:00 p. m.—Golden Rule Hour of the Near East Relief.
10:00 p. m.—K. of P. Male Quartet.

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 daylight saving time.

LOCAL STATIONS

10:55—Church, WBAN, 267.
7:20—Concert, WJAR, 305.
7:30—Organ, WEAN, 367.
9:15—Concert, WJAR, 305.

OUT-OF-TOWN STATIONS

9:00—Children's hour, WJZ 454.
10:20—Church, WFI, 394.
10:30—Sunday school, WLW, 422.
10:45—Church, WGR, 319.
Church, WHAR, 275.
Church, WIP, 508.
11:00—Church, WGY, 379.
Church, WAAM, 263.
Church, WJR, 516.
11:30—Sunday school, WSB, 428.
Church, WHN, 361.
12:00—Church, KYW, 536.
Church, WHAS, 399.
Church, WWJ, 352.
Church, WREO, 285.
Church, WRC, 469.
Church, WLW, 422.
12:30—Organ, WHN, 361.
Church, WSM, 282.
12:50—Church, WCCO, 415.
12:54—Church, WSB, 428.
1:20—Concert, WBBM, 226.
2:00—Church, KOA, 322.
Church, KNX, 337.
Church, KFI, 467.
2:15—Concert, WHAR, 275.
2:25—Church, KGW, 491.
3:00—Orchestra, WWJ, 352.
Church, KGO, 361.
Concert, WOC, 484.
Special, WRNY, 375.
Church, WEAF, 492.
Special, WHN, 361.
3:30—Band, WPG, 299.
Fr. Flanagan's hour, WOAW, 526.
4:00—Religious hour, WRNY, 375.
Band, WLW, 422.
Church, WCAE, 461.
4:15—Band, WHAD, 275.
Community chorus, WPG, 299.
Recital, WIP, 508.
4:30—Concert, WOAW, 526.
Vespers, WEAF, 492.
5:00—Concert, WBBM, 226.
Concert, WFBH 273.
Church, WRC, 469.
5:30—Concert, KYW, 536.
Pianist, WEAF, 492.
Baseball scores, WHN, 361.
6:00—Concert, KNX, 337.
Concert, WJZ, 454.
6:10—Church, WCCO, 416.
6:30—Concert, WCAE, 461.
7:00—Concert, WSB, 428.
Church, WMAK, 266.
Concert, WFBH, 273.
7:05—Church carillon, WGY, 379.
Church carillon, WJZ, 454.
7:15—Baseball scores, KDKA, 309.
7:20—Capitol Theatre Family, WWJ, 352; WEAF, 492; WRC, 469; WOAE, 461; WTAG, 545.
7:25—Orchestra, WJZ, 454.
7:30—Church, WHN, 361.
7:45—Church, WGR, 319.
7:50—Church, WHAR, 275.
8:00—Concert, WBZ, 333.
Vespers, KFI, 469.
Concert, WGY, 379.
Special, WFBH, 273.
Special, KDKA, 309.
8:15—Trio, WJZ, 454.
8:30—Organ, KOA, 322.
Orchestra, WBAL, 246.
Special, KNX, 337.
Organ, WLW, 422.
8:45—Chimes and sermonette, WSAI, 326.
9:00—Orchestra, WPG, 299.
Concert, WBZ, 333.
Concert, WBBM, 226.
Concert, WFBH, 273.
Concert, WHAR, 275.
Band, WCX, 546.
Concert, WJR, 516.
9:15—Atwater Kent hour, WCCO, 416; WGR, 319; WSAI, 326; WWJ 352; WEAF, 492.
Concert, WIP, 508.
Concert, WPG, 299.
9:30—Special, WGBS, 316.
Concert, WGY, 379.
Orchestra, WLW, 422.
9:45—Band, WSAI, 326.
Band, WEAF, 492.
10:00—Church, WOC, 484.
Church, WSB, 428.
Male Quartet, WBZ, 333.
10:15—Special, WFBH, 273.
10:30—Orchestra, KGO, 361.
Organ, WPG, 299.
Church, KNX, 337.
Special, KFI, 467.
Concert, WIP, 508.
Concert, WGBS, 316.
11:00—Orchestra, KNX, 337.
Band, KOA, 322.
Chapel, WOAW, 526.
Song service, WJR, 516.
11:15—Address, KFUO, 545.
11:30—Concert, KYW, 536.
Church, WHN, 361.
Church, KGW, 491.
Organ, WCCO, 416.
Concert, WOC, 484.
11:35—Church, KGO, 361.
12:00—Organ, KFI, 469.
Church, KNX, 337.
Concert, WKRC, 422.
1:00—Dance music, KFI, 469.
Concert, KGW, 191.
Special, KNX, 337.
Orchestra, KGO, 361.
Special, WBAM, 225.
1:15—Jazz band, WKRC, 422.
2:00—Orchestra, KFI, 469.
Popular music, WKRC, 422.

WCAE—PITTSBURGH—461

4:00 p. m.—Church service, conducted by Dr. Chapman, pastor Wilkinsburg Christ Church.
6:30 p. m.—Dinner concert.
7:20 p. m.—Capitol Theatre Family.

WCCO—ST. PAUL-MINNEAPOLIS—416

12:50 p. m.—Hennepin Avenue M. E. Church, Minneapolis, Rev. Lucius H. Bugbee, D. D., pastor.
6:10 p. m.—House of Hope Presbyterian Church, St. Paul, Rev. H. C. Swearingen, D. D., pastor.
9:15 p. m.—Atwater Kent hour.
11:30 p. m.—St. Paul municipal organ recital, by Hugo Philler Goodwin.

WCX—DETROIT—516

9:00 p. m.—Band concert.

WEAF—NEW YORK—492

3:00 p. m.—Interdenominational services, under the auspices of the Greater New York Federation of Churches.
4:00 p. m.—Instrumental programme of sacred music, under the auspices of the Greater New York Federation of Churches.
4:30 p. m.—Musical vespers, by the Federation mixed quartet.
5:30 p. m.—Adolph Opfinger, pianist.
6:00 p. m.—Orchestral concert, with Frances Paperte, contralto.
7:20 p. m.—Musical programme, by Maj. Edward Bowes and the Capitol Theatre Family.
9:15 p. m.—Atwater Kent Hour—Allen McQuhae, tenor soloist, with orchestra.
9:45 p. m.—Musical programme.

WFBH—NEW YORK—273.

5:00 p. m.—Sunday forum.
6:00 p. m.—Banjo and piano selections.
6:30 p. m.—Pauline Wilkineon, lyric soprano.
6:55 p. m.—Motor caravan.
7:00 p. m.—Concert.
8:00 p. m.—Gaspar Santo, baritone, and Irene Linday, soprano.
8:30 p. m.—Illuminato Miserendina, violinist.
8:45 p. m.—Miserendina and Francesca Cuce, soprano.
9:00 p. m.—Orchestra.
10:15 p. m.—WFBH staff entertainment.

WFI—PHILADELPHIA—394

10:20 a. m.—Service of Arch Street Methodist Episcopal Church; sermon by Rev. Harold Nichols, D. D.

WGBS—NEW YORK—316

9:30 p. m.—"Richard Strauss, Burlesque," for four kettle drums and two pianos, by Alfred Pease, assisted by Lillian Sacks and Lydia Mason.
10:00 p. m.—Daca; programme of Robert Franz songs.
10:30 p. m.—Recital on two pianos, Andrades Lindsay and Lydia Mason.

WGR—BUFFALO—319

10:45 a. m.—Service direct from the Westminster Presbyterian Church, Rev. Samuel V. V. Holmes, minister.
7:45 p. m.—Service of the Central Presbyterian Church, Rev. R. J. McAlpine, D. D., minister.
9:15 p. m.—Atwater Kent hour.

WGY—SCHENECTADY—379

11:00 a. m.—Service of First Presbyterian Church, Rev. George Alexander of New York, preaching.
7:05 p. m.—Church carillon.
7:20 p. m.—Orchestra.
8:00 p. m.—Miscellaneous programme.
8:30 p. m.—Orchestra.
9:30 p. m.—Miscellaneous programme

WHAD—MILWAUKEE—275

4:15 p. m.—Band concert.

WHAR—ATLANTIC CITY—275

10:45 a. m.—Service of Chelsea Baptist Church, Dr. Thomas J. Gross, pastor.
2:15 p. m.—Short sacred recital.
2:45 p. m.—Sermon.
7:50 p. m.—Service of Chelsea Baptist Church.
9:00 p. m.—An hour with the classics.

WHAS—LOUISVILLE—399

12:00 p. m.—Service of St. Boniface Church.

WHN—NEW YORK—361

11:30 p. m.—Calvary Baptist Church services.
12:30 p. m.—Organ recital, Marah McCurdy, organist.
3:00 p. m.—Inspiration hour.
5:00 p. m.—Dance orchestra.
5:30 p. m.—News flashes, racing and baseball results
7:30 p. m.—Calvary Baptist Church service.

WIP—PHILADELPHIA—508

10:45 a. m.—Service from Holy Trinity Church; Rev. Floyd W. Tomkins, rector.
4:15 p. m.—Community vocal and instrumental recital.
9:15 p. m.—Concert.
10:30 p. m.—Organ and vocal recital.

WJR—DETROIT—516

11:00 a. m.—Service of the First Baptist Church of Pontiac.
9:00 p. m.—Concert.
11:00 p. m.—Special song service.

WJZ—NEW YORK—454

9:00 a. m.—Children's Hour.
6:00 p. m.—Sammy Caserta, violinist.
6:30 p. m.—Turner Male Quartet.
7:05 p. m.—Park Avenue Baptist Church carillon.
7:25 p. m.—Orchestra.
8:15 p. m.—Trio.

WRNY—NEW YORK—375

3:00 p. m.—String Quartet.
3:15 p. m.—McDowell Sisters.
3:45 p. m.—String quartet.
4:00 p. m.—Dr. Relaner's hour of religion.

WKRC—CINCINNATI—422

12:00 a. m.—Classical programme; vocal and instrumental solos.
1:15 a. m.—Jazz band.
2:00 a. m.—Marie Turner, "Blues and Ballads."

WLW—CINCINNATI—422

10:30 a. m.—Sunday school.
12:00 m.—Y. M. C. A. Church service.
4:00 p. m.—Cincinnati Park Board Concert.
8:30 p. m.—Organ recital by J. Walter De Vaux, organist.
9:30 p. m.—Orchestra.

WMAK—BUFFALO—266

7:00 p. m.—Service of Churchill Tabernacle.

WOAW—OMAHA—526

11:00 a. m.—Chapel service, Rev. R. R. Brown and his associates.
3:30 p. m.—Father Flanagan's Boys home period.
4:30 p. m.—Classical concert.
11:00 p. m.—Chapel service.

WOC—DAVENPORT—484

3:00 p. m.—Old Folks' Musical programme.
10:00 p. m.—Church service, Rev. Daniel Hogan.
11:30 p. m.—Musical programme.

WPG—ATLANTIC CITY—299

3:00 p. m.—Goldman's Band, Edwin Franko Goldman, conductor, Steel Pier.
4:15 p. m.—Community vocal and instrumental recital, St. James Episcopal Church.
9:00 p. m.—Last-minute news flashes and baseball scores.
9:15 p. m.—Operatic recital, Marie Tiffany, prima donna, soprano; Jules Falk, violinist, Steel Pier.
10:30 p. m.—Organ, vocal and instrumental concert.

WRC—WASHINGTON—469

12:00 m.—Church service.
5:00 p. m.—Service at the Peace Cross, Washington Cathedral.
7:20 p. m.—Capitol Theatre Family.
9:15 p. m.—Atwater-Kent Radio Hour.
9:45 p. m.—Vesper Hour.

WREO—LANSING—285

12:00 m.—Service of First Baptist Church, Rev. R. W. Hobbs, pastor.

WSAI—CINCINNATI—326

8:45 p. m.—Chime concert and sermonette.
9:15 p. m.—Atwater-Kent programme.
9:45 p. m.—Goldman band concert.

WSB—ATLANTA—428

11:30 a. m.—Agoga Sunday school.
12:54 p. m.—First Presbyterian Church service, Dr. J. Sprole Lyons, pastor.
7:00 p. m.—Sacred concert.
10:00 p. m.—First Methodist Church service, Dr. Sam T. Senter, pastor.

WSM—NASHVILLE—282

12:30 p. m.—Service of First Presbyterian Church, Rev. James I. Vance, pastor.

WTAG—WORCESTER—545

7:20 p. m.—Capitol Theatre Family.

WWJ—DETROIT—352

12:00 p. m.—Service of St. Paul's Cathedral.
3:00 p. m.—Orchestra.
7:20 p. m.—Capitol Theatre Family.
9:15 p. m.—Atwater-Kent Hour.

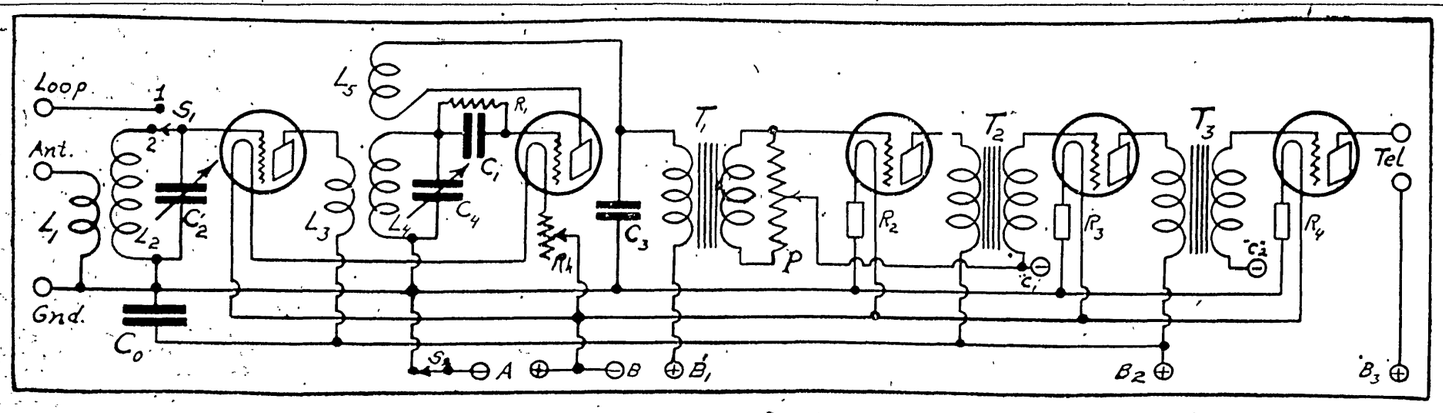
NOISES DIFFER

Various Annoying Sounds Are Usually Due to Trouble in Tubes.

Tubes sometimes produce noise which may be a howl, a squeal, sounds like atmospherics or a put-put-put, and again it may be a steady hum. Howling is usually due to the audio frequency tubes being burned too bright. When tubes squeal it is usually the radio frequency tubes at fault, but this is due to making them oscillate and is corrected by turning down on the rheostat or the potentiometer if one is in the set. Sounds similar to atmospherics are usually caused by a poor connection in the plate circuit and in the majority of cases it is a poor contact between the socket and tube. Bend up the plate contact of the socket so it will make a firm contact with the prong of the tube. When a set emits a sound that is termed put-put-put it is most always due to the detector tube blocking. This means the resistance of the grid leak is too high and a low value should be used. A steady hum is most always due to a poor grid connection, and if the hum is continuous the grid circuit is more than likely open. The prongs of tubes very often become dirty and it is a good plan to clean them with fine sandpaper and at the same time brighten up the socket contacts.

Avoids Charger Trouble.

Disconnecting the aerial and ground wires when charging the battery eliminates the possibility of annoying the neighbors by radiated buzzes and also prevents an accidental short circuit from the charger to the ground.



Russia Holds Good Claim for World Radio Activity Honors

Declare Discoveries of Popoff Preceded Success of Marconi.—Soviet is Advancing Country's Condition by Public Broadcast Stations

BY BORIS S. NAIMARK

History gives more than one instance where a scientific discovery of the first magnitude takes place simultaneously, or with little difference in time, in two or more different countries. In all such instances controversy as to the priority of discovery is quite unavoidable.

The very cornerstone of modern physics, the principle of conservation of energy, is, until this very day, the subject of such controversy between two civilized countries. Germany credits the discovery to the genius of a German ship doctor, Robert Mayer; England, not to be outdone, credits the same discovery to the British physicist, Joule. The discovery of the principle of periodicity of elements is credited by Germany to Lothar Meyer, while the rest of the civilized world seems to be of the opinion that the famous Russian chemist, Mendelejeff, should be credited with this important contribution.

Similarly, there still persists to-day controversy as to who was the first inventor of wireless telegraphy. While a majority of writers and the general public bestow this honor upon Senator Marconi, Russians argue that Prof. Popoff should be given the credit for this invention.

Popoff started to experiment upon wireless in 1894, shortly after the English scientist, Lodge, announced the results of certain of his experiments with the then newly invented coherer. It is in repeating the experiments of Lodge, as well as some of the early experiments of Hertz, that Popoff had struck upon the idea of coupling an aerial and ground to the coherer to make it more sensitive to static discharges, since this was the purpose of Popoff's first wireless installations.

According to material recently published in the "Telefonia i telegrafia bez provodov," a Russian radio publication equivalent in its scope to the "Proceeding" of the Institute of Radio Engineers, Popoff made public his first radio installation as early as May 7, 1895. On that date, in a paper presented before the Russian Physical and Chemical Society, Prof. Popoff among other things said: "In conclusion I want to express the hope that my apparatus, when properly developed and perfected, could be made use of for the transmission of signals at a distance by means of high-frequency electro-magnetic oscillations, once a source of such oscillations has been found."

As already mentioned, the purpose of the arrangement was to record static discharges in a manner not unlike that even to-day used by the New York Edison Company at its immense Waterside power generating plant for the purpose of predicting impending storms and periods of darkness.

The purpose of the above discussion is to establish the fact that Russians were pioneers in radio developments, rather than to prove that Popoff was the first would not be within the scope of this article.

It was not until December, 1899, that Russian wireless telegraphy was properly evaluated by others than those who were responsible for its development, and it was prompted by the following incident: The Russian armor-clad ship Apraksin suffered a damage near the shores of the Gulf of Finland just at the time when the sea began to freeze. Wireless was the only conceivable way or means for direct communication which was necessary if the ship was to be saved.

The design of the transmitting and receiving apparatus was entrusted to Popoff and his associates. In January, 1900, the stations were completed and communication began. The distance covered was about 40 miles. It is significant, indeed, that the very first messages transmitted through these stations contained news about some fishermen who had drifted to sea. The news came just in time so that a steamer was sent out to their successful rescue.

In 1904 and 1905 Russians resorted to radio in their conflict with Japan. At that time the distance covered by the special portable stations was about 70 miles. A wave of 500 metres was used.

Those were the primordial days of Russian radio.

To-day, according to personal correspondence, dispatches of the Russian Information Bureau at Washington and Russian radio periodicals on this writer's desk, "Uncle Ivan" has completely succumbed to radio.

A. B. Vinogradov, chief of the Radio Bureau of the Moscow Provincial Council of Trade Unions, in a recent statement said: "The revolution woke the Russian village from its primeval slumber and the radio is giving it a rapid cultural development."

Radio has indeed changed the cultural aspects of life even in the backward Russian villages. The natives of Siberia and Russian central Asia, the natives on the Arctic coast and on the shores of the Black and Caspian seas are all listening in on the thousands of sets that are constantly used in the village and town reading rooms and in workers' clubs. Each of these radio centres are patronized by hundreds of BCL's. It has been estimated that several million persons listen in on the programmes daily.

The use of private receiving sets was not authorized by the Government until the fall of 1924. However, where there is a will there is a way. "Bootleg" sets made their appearance and found a ready market. According to the statistics of the Russian Information Bureau at Washington, "before the Government legalized private receivers it is estimated that 20,000 persons in Moscow alone had acquired 'bootleg' sets and were listening in on whatever they could get out of the air.

"Immediately after the decree of July 28,1924, that has given the Russian people the freedom of the ether the number of private radio receiving installations has more than doubled. Parallel with this development has grown the thirst of the populace for radio knowledge. To satisfy this demand over 40 books and pamphlets had appeared upon the market by May, 1925; several radio magazines also appeared and some of these, practically overnight, have reached a circulation of 50,000 and over.

It must be said at this point that the number of radio receivers registered by no means represents the actual number of sets in daily use. A license fee is required for the privilege of using privately owned receivers. To evade the payment of the license fee not less than five-sixths of the BCL's in the metropolitan districts still use "bootleg" receivers, a condition which is not quite unlike that prevailing to-day in England, where a license fee is similarly required.

Loud-speaker installations are comparatively few and are generally owned by organizations, in whose reading and club rooms they are available for the entertainment and education of the entire membership.

According to the advices received here at the beginning of this year, there were upward of 225,000 radio sets registered and in use in the Soviet union. The number of sets in use was increasing at the rate of 25,000 per month. The Low Current Trust, which has virtually a monopoly in the manufacture of a radio apparatus in Russia, is having difficulty in keeping up with the demand. Its plans provide for 1,300,000 receiving sets during the next few years. This year's programme calls for an output of 27,000 tube sets, as against 6500 produced last year, and 48,000 crystal sets, as against 30,000 produced last year.

The Federal Low Current Trust has three plants in Leningrad, one in Nizhni-Novgorod and one in Moscow. The latter is now one of the largest and most up to date in Europe.

Moscow is no doubt the radio centre of the Soviet Union. It is in Moscow that one finds nearly 400 radio clubs, with a membership exceeding 20,000. It is in a Moscow suburb that one finds Russia's premier broadcasting station (we are referring to the Sokolniki station). It is in Moscow that the radio exhibition of June 6, 1925, was held.

The Sokolniki station, under favorable conditions, reaches a host of listeners within a radius of 1800 miles. The concert studio of this station is located in the Trade Union Hall, in the centre of Moscow, and is equipped with microphones and other apparatus manufactured in the United States.

Several American firms participated in the radio exhibition held in Moscow on June 6, 1925. It is said that the American exhibitors have won one of the four highest awards, diplomas of honor that were offered at the exhibition. During the several weeks of the exhibition over 50,000 fans visited the Polytechnic Institute to see the show, a significant indication of radio's popularity.

In addition to the Sokolniki station mentioned above, the Commissariat for Posts and Telegraphs has on its inventory about 52 broadcasting stations. Of these nine were built within the last year and were installed in provincial towns, such as Sverdlovsk, Kharkov, Ekaterinoslav, Rostov-on-Don, Astrakhan, Petrozavodsk and others. The equipment was constructed in the Leningrad factories of the Federal Low Current Trust.

Russian broadcasting programmes do not differ from American broadcast programmes in any radical manner, except that they are marked by a nearly total absence of jazz. The radio newspaper is perhaps one of the most unusual features of the Russian programmes. These are usually broadcast in two editions. The first edition coincides with the mid-day recess periods in the factories and mills, so that the workers may gather around the loud speakers and get the news of the day. The evening edition contains practically all the features and departments of a regular newspaper, including news, special articles, short stories and dramatic and motion picture reviews.

The radio newspaper and the radio concerts are the principal type of broadcasting. The radio concerts include cycle concerts by eminent composers, with explanatory lectures, operas from the Grand Theatre in Moscow and symphonic and chamber music.

However, the most constructive part of the Russian broadcast programme consists of the lectures on scientific and technical subjects that are regular features of the Russian broadcast activities. It is through these lectures that the peasant and farmer get first-hand information with regards to their pressing farming problems.

It must be said here that until this very day there are no licensed amateurs in Russia. The privilege of experimental and amateur broadcasting and code transmission is granted only to scientific organizations, radio clubs, universities, etc. Of all the experimental stations the one best known to amateurs in this country is that of the Nizhni-Novgorod Radio Laboratory. This station as well as the experimental station of the University of Tomsk (Siberia) have recently done, and are still doing, some remarkable work in short-wave transmission. Russian radio periodicals of recent date contain descriptions of some of the experimental results of these stations within a wave-length range of from 17.5 to 100 metres, and one can readily judge that the results were more than gratifying.

Russian radio engineers are very active just now and their excellent work is well known to all leading radio engineers of this and other continents. It may be of interest in this connection that in the June, 1926, issue of the Proceedings of the Institute of Radio Engineers appears a very excellent article on radio stations, and the choice of power for same, prepared by two members of the Russian Society of Radio Engineers.

There is no doubt but that in the years to come the history of Russia will be closely interwoven with its radio developments and activities.

Vagrant Waves of Interest to Fans

There are 800,000 receiving sets in use in France.

One hundred and thirty-two newspapers in the United States are broadcasting by radio.

It is predicted that within a few years radio will be among the first five of the biggest industries in the United States.

Pennsylvania, with 14,953, leads in number of radio sets on farms. California has 13,254; Oregon, 3251; Tennessee, 1970, and Washington, 2691.

When a bull terrier, owned by Charles Tinkle, of Fargo, N. D., heard dogs and cats over the radio, the canine demolished the loud speaker.

An uninterrupted wireless phone conversation was held recently between passengers on the steamships Paris and France, going in the opposite direction, and 300 miles away. The talk lasted 25 minutes.

The British Broadcasting Commission has 12 stations. It is estimated that 90 per cent. of the total population of the British Isles are within crystal range of one or another of these stations.

There is no difference between wireless and radio.

A buried metal plate or pipe driven in moist earth can be used as the ground.

Metal dials usually increase the capacity of a circuit three or four microfarads.

A common cause of distortion in audio amplification is poorly designed transformers.

The length of the aerial is measured from the extreme end, and includes the lead-in and ground wire.

Radio signals are better 600 miles from a broadcast transmitter than they are 300 miles, because fading is less and the signal strength is slightly greater.

One way to stop a radio nuisance—a neighbor who permits his set to oscillate continually—is to have a petition signed and sent to the Supervisor of Radio in the district.

If the polarity of your B battery is reversed you will not hear signals.

Most sets require a little skill and patience to get the most out of them.

You can hear local stations without a B battery if the positive A is connected to the telephone circuit.

This is the best time of the year to get distance.

You can eliminate interference with a small aerial much easier than with a large one.

Do not load up the primary of your coupler without loading the secondary too.

Buying cheap transformers is a waste of money.

It is not necessary to ground metal antenna poles.

The size and weight of a storage battery are no indication of its electrical efficiency.

By merely twitching the tubes around in different sockets the efficiency of a set will be increased from 50 to 75 per cent.

A potentiometer is a device which permits a lower voltage to be obtained than that of the source of the current. It is connected across the A battery, and its movable arm goes to the grid connection.

Interference can be reduced greatly by substituting a counterpoise for the usual water pipe ground connection. This is done by running a wire around the room over the molding, about 50 feet, and connecting the end to the ground terminal of the set.

Argentina and Brazil have organized radio trade associations.

There are nearly 1,000,000 radio sets on farms in the United States.

Edward Adler, a wireless operator of Brooklyn, N. Y., holds all records for speed receiving. His time is 58 words per minute.

WHEN THE SET BALKS

Intelligent Diagnosis of Trouble Should Be Within Owner's Ability.

Like an automobile, your radio set will fail to operate one of these nights, or may start and then stop. This, of course, means there is something wrong with some part of the set—but the thing is which part.

New sets should not give trouble but if they do it is probably a defective tube; defective batteries; burned out transformer or loose connection in the telephone cords or loud speaker. Where a set has been in use several months and has been operating satisfactorily, but with slight decrease in volume, it will be found that either the A or B batteries are getting low. If the set is about a year old, either of the foregoing things may be wrong or it is possible that one or more of the tubes have gone bad. Where the filament still burns the tube may be reactivated unless it has sagged against the grid.

In a set that has been in use for a season and noise develops it may be due to a faulty connection at the batteries or dust between the variable condenser plates. Sometimes a soldered connection becomes broken due to corrosion. Noise picked up by the aerial is not being considered and can very easily be determined by disconnecting both aerial and ground. Noises that continue are in the set.

In an old set, noise often develops due to worn mechanical parts such as variable condenser. Noise most always develops much sooner in a cheap radio set than in an expensive one. The first thing to look for when your set stops altogether is a defective tube.

TRANSFERS AND MORTGAGES

Friday, Aug. 20.

DEEDS

Charles A. Hansen to Oliver H. Juckett et ux., Ethel M., lot and buildings on the northerly side of Roger Williams avenue; consideration $10.

Robert L. Lamb et ux., Anna A., by mortgagee, to Henry P. Stone, lot and buildings corner of Lester and Saunders streets; consideration $823.

Calvin H. Brown to Walter L. Daigneau et ux., Alma B., lot and buildings on the southerly side of Gallup street; consideration $10.

Todd-Mellor Company to George T. Foulkes, lot and buildings corner of Washington and Franklin streets; consideration $10.

Louis Lamaze et al. to Adele Lamaze, two lots and buildings on the southerly side of Sterling street; consideration $1.

Movses Mousigion et ux., Annie, to Hyman Brill et ux., Sarah, lot and buildings corner of Public and Plain streets; consideration $10.

Samuel Bornstein to Eugene E. Peters et ux., Katherine F., lot and buildings on the southerly side of Calla street; consideration $10.

Jeduthan R. Champlin et ux., Marie L., to Wallace R. Chandler, Jr., undivided fourth of lot on the westerly side of Benefit street; consideration $10.

John B. Miller to Stephen C. Miller, lot and buildings on the southeasterly side of Holmes street; consideration $10.

Stephen C. Miller to Abbie E. Miller, lot and buildings last above described; consideration $10.

James J. McGovern et ux., Annie J., to Fred B. Perkins, lot and buildings corner of Hope and Whiting streets; consideration $100.

James J. McGovern et ux., Annie J., to Fred B. Perkins, lot and buildings on the easterly side of Hope street; consideration $100.

Fred B. Perkins to James J. McGovern et ux., Annie J., as joint tenants, lot and buildings corner of Hope and Whiting streets; consideration $100.

Fred B. Perkins to James J. McGovern et ux., Annie J., as joint tenants, lot and buildings on the easterly side of Hope street; consideration $100.

Charles H. Long et ux., Margaret E., to Paul A. Jacobson, lot on the northerly side of Ray street; consideration $100.

Max Shore et al. to Barnet Fain et ux., Ida, lot and buildings on the easterly side of Pinehurst avenue; consideration $10.

Addie E. Thornton to Gunder O. Haskins et ux., Catherine A., lot and buildings corner of South Angell street and Cozzens row; consideration $10.

Jacob Horowitx et ux., Gussie et al., to Antonio Lima et ux., Mary, lot and buildings on the northerly side of Transit street; consideration $10.

Perfecto Costantino to Pasquale Costantino et al., all interest in four lots and buildings corner of Hartford avenue and Privet street; consideration $10.

Luciano Manglacapra et ux., Anna, to Michele Morso, lot and buildings corner of Spruce and Murphy streets; consideration $10.

Daniel Hearn to Zack Pina et ux., Pearl, lot and buildings on the easterly side of Clorane street; consideration $10.

Salvatore Esposito et al., by sheriff, to John M. Clifford, three lots on the northerly side of Clym street, lot on Eagle Park street, four lots on the westerly side of Cumberland street; consideration $30.

REAL ESTATE MORTGAGES

Oliver H. Juckett et ux., Ethel M., to People's Savings Bank, lot and buildings on northerly side of Roger Williams avenue; $3600.

Oliver H. Juckett et ux., Ethel M., to Providence Mortgage Corporation, lot and buildings last above described; $1500.

Walter L. Daigneau et ux., Alma B., to Henry P. Stone, lot and buildings on southerly side of Gallup street; $3460.

Sam Beaumont et ux., Mary A., to Providence Mortgage Corporation, lot and buildings on northerly side of Pocasset avenue; $2700.

George T. Foulkes to Todd-Mellor Company, undivided half of lot and buildings on corner of Washington and Franklin streets; $7500.

David Greenberg et ux., Clara, to The Hamilton Company, lot and buildings on southerly side of Dudley street; $1600.

Frank H. Couture et ux., Jennie, to Rhode Island Discount Corporation, lot and buildings on westerly side of Chambers street; $1000.

Nicolo Amoroso et al., to Citizens' Savings Bank, lot and buildings on easterly side of West River street; $8000.

Nicolo Amoroso et al., to Reliable Real Estate and Mortgage Corporation, lot and buildings last above described; $4000.

George T. Foulkes to Title Guarantee Company, lot and buildings on southerly side of Tenth street; $4000.

Antonio Gasbarro to Rhode Island Hospital Trust Company, lot on Croom and Ridge streets; $6500.

George T. Foulkes to Title Guarantee Company, lot and buildings on southerly side of Tenth street; $4000.

John Turcone et ux., Amelia, to Industrial Trust Company, lot and buildings on easterly side of Courtland street; $5000.

Daniel J. Kavanagh et ux., Elizabeth A., to Old Colony Co-operative Bank, two lots and buildings on the easterly side of Longwood avenue; $3000.

Albert J. Bressette et ux., Elizabeth, et al. to Roger Williams Savings Fund and Loan Association, lot and buildings on the westerly side of Carleton street; $1000.

Bellarmin J. Morrissette et ux., Albina, to Old Colony Co-operative Bank, lot and buildings on the westerly side of Erastus street; $1500.

Thomas J. Bailey et ux., Clara E., to Old Colony Co-operative Bank, lot and buildings on the easterly side of Miner street; $1500.

Eugene S. Peters et ux., Katherine F., to Samuel Bornstein, lot and buildings on the southerly side of Calla street; $2000.

R. Z. L. Realty Corporation to Allie Zura et al., lot and buildings extending from Weybosset to Middle street; $60,000.

Stephen C. Miller et ux., Abbie E., to Providence Permanent Firemen's Relief Association, lot and buildings on the southeasterly side of Holmes street; $2000.

Domenic Annotti et ux., Marianna, to Walter J. Crompton, two lots and buildings on the westerly side of Grosvenor avenue; $1000.

Paul A. Jacobson et ux., Anna L., to Industrial Trust Company, lot and buildings on the easterly side of Ray street; $8000.

Paul A. Jacobson et ux., Anna L., to Mary E. Coen, lot and buildings last above described; $3000.

Charles H. Long et ux., Margaret E., to Charles H. Philbrick, Inc., lot and buildings on the northerly side of Ray street; $8000.

Osterman Realty Corporation to Citizens' Savings Bank, lot and buildings on the northerly side of Duncan avenue; $6400.

Osterman Realty Corporation to William C. H. Brand, lot and buildings last above described; $3500.

Luciano Manglacapra et ux., Anna, to Alfred Roy, lot and buildings at the corner of Spruce and Murphy streets; $3000.

Osterman Realty Corporation to Henry C. McDuff Estate, lot and buildings on the northerly side of Duncan avenue; $1100.

Pasquale Costantino et al. to Union Trust Company, seven lots and buildings on Hartford avenue and Privet street; $3000.

Giuseppe Tammaro et ux., Rosina, to Providence Institution for Savings, lot and buildings on the northerly side of Barstow street; $3400.

Michele Morso to Luciano Manglacapra et ux., Anna, lot and buildings at the corner of Spruce and Murphy streets; $1646.

Zack Pina et ux., Pearl, to Carter Realty Company, lot and buildings on the easterly side of Clorane street; $3500.

DISCHARGES OF REAL ESTATE MORTGAGES

Charles A. Hansen by Gerda Anderson; $3500.

Sam Beaumont et ux., Mary A., by Domenico Capone; $2000.

Sam Beaumont et ux., Mary A., by Providence Mortgage Corporation; $2500.

David Greenberg et ux., Clara, by The Hamilton Company; $1000.

Paul D. Stewart et ux., Maude D., by Lizzie A. Aronofsky; $8000.

Carmine Buonaiuto et ux., Rosina, et al., by Natale Cannata; $1200.

Costantino Lombardi by Henry A. Greene; $2000.

Adelard Therault et ux., Mary, by Old Colony Co-operative Bank; $4500.

Raffaele Capasso et ux., Maria, by Anna Lanagna; $3000.

Raffaele Capasso et ux., Maria, by Amedeo Lonardo; $2500.

Charles H. Long et ux., Margaret E., by Joseph Kraemer et al.; $7500.

Charles H. Long et ux., Margaret E., by Charles H. Philbrick, Inc.; $7500.

Luigi Fiori et ux., Teresa, by Rinardo Fiori; $700.

Wolf C. Sharp et ux., Fanny, et al. by James S. Chaffee; $6340.

Walter W. Osterman et ux., Ethel, by Clara E. M. Tessmer; $2500.

Walter W. Osterman by William C. H. Brand; $400.

Walter W. Osterman et ux., Ethel J., by Henry C. McDuff estate; $4500.

ATTACHMENTS

Robert M. Rollins by James E. F. Henry, lot and buildings corner Huntington avenue and Puritan street; $300.

Samuel D. Samson by the Miles Tire & Rubber Company, lots 368, 23, 24 and 25 on Assessors' Plat 23; $1200.

Nicotine From Relighted Cigar.

The peril of smoking is the nicotine in the tobacco, as everyone knows but the fellow who lights and re-lights the same cigar repeatedly gets a greater dose of the nicotine than the man who completes his smoke at one lighting. It has been found that the smoker who re-lights his pipe or cigar consumes 10 times more nicotine than the other. The determination of what is the least harmful smoke dpends not only on the content of nicotine, but also on the rate of combustion. Thus, while cigarette tobacco contains twice as much nicotine as Manila cigar tobacco, the smoke of the latter ontains more than double the nicotine of the cigarette smoke.

The smoke of one cigar contains as much nicotine as 12 to 18 cigarettes. The amount of nicotine in cigarette smoke is much less than that in the smoke of pipes.

Alabama Power Plant.

Five hundred and thirty billion gallons of water from the world's largest artificial lake are about to go to work in the service of the people of Alabama. This volume of water will soon be backed up behind a new dam 1200 feet long and 150 feet high on the Tallapoosa river at Cherokee Bluffs in the heart of the State. The weight of controlled flow from the reservoir behind the dam—40,000 acres will be covered and the lake rim will measure 750 miles—will run three water turbines driving generators that will produce 126,000 horsepower of electric energy. A fourth generating unit may be added later. This new power development goes to work some time in July.