RADIO MAGAZINE

The Daily News

EVERY MONDAY

SAN FRANCISCO, MONDAY, MAY 26, 1924

SHORT WAVES CROSS ATLANTIC

BATTERY CO. OPENS NEW S. F. STATION

The most powerful amateur radio transmitting and receiving station on the Pacific coast operated entirely with storage battery power formally went on the air May 17.

This station is 6RY and it is operated by Julius Brunton & Sons, San Francisco distributors of Willard storage batteries for automobile and radio. It is located in the Brunton-Willard building at 1380 Bush-st, and it is a 10-watt station for both CW and phone transmission. The wave length assigned is 197 meters.

Five hundred volts of battery power are used. This is supplied by 250 cells of Willard rechargeable batteries, type CBR, arranged in groups of 24 cells each. An eight-volt "A" battery and 22-volt "C" battery complete the power equipment.

"By using batteries exclusively instead of a motor-generator set," said Ralph Brunton, a member of the firm, "we are assured of quiet and steady transmission. We escape entirely generator ripple and alternating current hum. Also our battery power makes the operation of the tubes more satisifactory, because they give great output with unvarying characterization."

Uses Four Tubes

Station 6RY uses four five-watt UV-202 tubes, two being used for modulation and two for oscillation. The transmitting equipment uses a hook-up of the grid tickler type.

The antennae is located on the roof of the Brunton-Willard building. It is of the inverted L type. The antennae has a length of 40 feet and consists of four wires, three feet apart, with 12-foot spreaders. These wires are of seven-strand No. 18 silicon bronze.

The antennae masts extend 50 feet above the roof, giving them a height at the top of about 85 feet above the ground. Two poles are used, and these have been built up ingeniously to insure strength with resiliency. A 2½-inch core of pine ex-

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FISHERMAN

Radio fans who want to go fishing, or fishermen who want to enjoy radio at the same time, may do so with the set shown here. It's the design of Sidney Kasindorf, New York amateur, who is shown holding the whole instrument in a portable case. The feature is its "ground" —a long wire wound on a fishing reel.

Communion Broadcast

Rev. A. Edwin Keigwin, pastor of the West End Presbyterian Church in New York, recently broadcast communion services by radio. Listeners-in were permitted to partake of the sacramental wine.

SAVANT ASKS UNIVERSITIES TO BROADCAST

NEA Service

MADISON, Wis., May 26.—Establishment of radio broadcasting stations by universities, for the dissemination of learning by wireless, was recommended by Prof. W. H. Lighty of the University of Wisconsin at the meeting of the National University Extension Ass'n, just held here.

This recommendation was made after a survey in which Prof. Lighty reports he found a general lack of radio interest and knowledge among educators, despite its growing hold upon the younger generation.

"The impression gained from a study of tabulated replies indicates far less understanding and interest among persons engaged in educational work than one was wont to assume," Lighty reports upon a questionnaire he sent to educators in Wisconsin.

"Perhaps this reflects something lacking in a desirable radio audience or listening constituency to make university broadcasting wholly satisfactory," he adds. But he points to the hold it has taken on American boyhood of today.

"Radio communication constitutes one of the outstanding inventions that is destined to profoundly change our social institutions," Lighty says. "The radio once again buttresses home and family-influences. In my boyhood the fireside lure may have been Arabian Nights, but now for my boy it is Radio nights.

"The public school system of a great city, the municipal or the state university and likewise all national universities or private foundations that recognize obligations for service to the times, should have the opportunity to serve their contemporary constituencies with such light and leading as the radio broadcast can freely supply.

"Numerous broadcasting stations in institutions of learning co-operating with one another or supplementing one another may make contributions of inestimable value in the happiness and progress of mankind."

BLIND

Horatio Hendrick, above, is one of the blind inmates of Perkins Institute at Watertown, Mass., who have been building their own radio sets. Horatio is shown with a crystal receiver he had just finished.

Eskimos Get KGO Programs

Eskimo kiddies just don't want to go to bed when radio time comes around. This is what a matron of an orphanage for Eskimo children at Teller, Alaska, wrote to station KGO. She said that when KGO programs are received in their home, Eskimo children are just as hard to keep in bed as any other children. During a recent broadcast of KGO, she said, she found "several of the girls out of bed with their ears to the floor just above the loud speaker, enjoying the program."

"We have 36 Eskimo children here," writes E. H. Dahl, manager of the orphanage. "You cannot imagine the pleasure we get from air programs. We live at Port Clarence, the only harbor on Seward Peninsula. Only ships going into the Arctic stop at our door. They get fresh water from our creek."

Because they have time to enjoy radio programs only after the day's work is done, Mr. Dahl writes, clocks are set three hours ahead to permit listening in on KGO's matinee programs.

BRITAIN GETS SCHENECTADY ON 107 METERS

SCHENECTADY, N. Y., May 26.—Experiments conducted from station WGY here, point to the adoption of short wave transmission for extremely long distance radio communication.

From a small isolated cabin, especially built for the purpose, engineers of the General Electric Co. have been sending out broadcast programs on 107 meters wave length, which have been picked up and rebroadcast on higher wave lengths by eight British stations.

As high as 10 kilowatts were used in sending, which meant taking special precautions against danger to those handling the apparatus. The transmitting station had to be built far from other structures. Persons in the hut could not carry metal pencils or watches, and shoes without nails had to be worn.

The short wave signals were transmitted so clearly that rebroadcasting 3000 miles away was found easy.

Steps have already been taken to establish the rebroadcasting system on a permanent basis.

Once every two weeks it is planned to give British listeners the treat of hearing WGY or KDKA at East Pittsburgh, Pa. The broadcasting will take place between 6 and 7 o'clock, eastern standard time, which is between 11 and 12 at night in England.

The American short wave signals are received at an isolated station about 15 miles from London. They are intensified and sent over a line wire to the broadcasting station in London, from which they are rebroadcast on a higher wave length.

Against Advertising

"Free the air of advertising," is the cry of the American Radio Association. Its members are opposed to advertising by radio broadcasting.

Study World Radio

A special committee to study the question of world radio has been appointed by the League of Nations commission on communications.

TEN COMMANDMENTS OF RADIO FOR FANS

Little things like picking out a wife, selecting an automobile, or buying a new house, are a cinch compared with deciding which radio set to buy or build.

The multiplicity of types of receiving sets available, the extravagant claims made for many of them, and the inability of a large section of the public to select good sets or parts, make the layman's choice of a set a real problem. Often the selection is just a gamble.

Yet no one ever need gamble on such an important matter. The purpose of this article is to list and explain 10 points that should be considered before purchasing or building a set. They constitute a sort of Ten Commandments of Radio.

It is owing to the large number of types of receivers on the market that the layman finds it hard to choose one which will satisfy his or her requirements to the best advantage. So many articles are written, and advertisements published extolling this and that circuit, that it seems pertinent to give a formula by which the merits of each may be judged and possibly rated.

The formula consists of the sum of 10 important characteristics divided by the cost in dollars and equals satisfaction per dollar. The characteristics are:

1. Quality of reproduction.
2. Volume.
3. Range (sensitivity).
4. Ease of tuning.
5. Ease of construction.
6. Non-radiating.
7. Sharpness of tuning (selectivity).
8. Ruggedness.
9. Small upkeep expense.
10. Low cost.

Some of these characteristics can be rated by one who has never seen or heard a radio set, while others need further explanation.

1. Quality of reproduction is given first, for without it a radio set is useless for entertainment. With the proper apparatus and loud speaker or head phones the quality of reproduction is assured. More attention should be given to the apparatus used than the demonstration in the dealer's store, for store demonstrations are usually given under the worst of conditions. If radio had depended on store demonstrations for its growth it would have died of starvation.

The most important piece of apparatus for quality in a radio set, outside of the actual reproducer, is the detector, with the odds greatly in favor of the crystal detector.

Next in importance is the amplification both before (radio frequency) the detector and after (audio frequency) the detector. Radio frequency amplification should always be preferred to regeneration because the vacuum tubes and transformers used are performing only one function and that at their best operating points.

The audio amplifier depends for its amplification without distortion on the audio frequency transformers which should be those manufactured by transformer and radio engineers and manufacturers and should not have a ratio of transformation greater than 4¼ to 1 and should by all means have an air gap in the iron core. Greater ratios than this and closed iron cores produce distortion due to the phenomena of resonance, or greater amplification at some frequencies than others.

2. Volume is obtained by audio frequency amplification and depends for its magnitude on the make of transformer used and the number of stages. Never try more than three stages of audio frequency amplification with well made transformers.

3. The greatest range can be given to a radio receiving set by radio frequency amplification and when three stages are used produces an amplifier of such sensitivity that distant stations can be heard loud and clear even on a loop.

4. If a set has easy tuning the novice can get the most out of it; women can easily tune in the distant stations loud and clear. Ease of tuning depends directly on the number of controls. For this reason a set using a loop should always be preferred because to tune the set only one adjustment is necessary, namely, the condenser.

5. The great majority of the sets in this country today were made at home and ease of construction is therefore a very necessary characteristic. Choose a set consisting of standard parts and wire it according to a good diagram, easily followed.

6. Build a set which won't radiate and annoy your neighbor, but if you do build a radiating type of set learn how to operate it so that the interference to others will be at a minimum.

7. The number of stations you can get on a receiver depends greatly on its selectivity and the amount of interference in your locality. A loop set can't be beat for selectivity and cutting out interference because a loop and a low loss condenser have such low resistance, and a loop has the property of receiving radio in the plane of its direction some hundreds of times easier than in directions at right angles to this plane. Interference at right angles is therefore eliminated.

8. Ruggedness is a characteristic usually quite apparent but for safety's sake be sure the parts are those manufactured by well known companies who are building for the future, and therefore cannot afford to put out an inferior product.

9. The upkeep expense of a radio set depends on the number of tubes used to meet all the other necessary requirements. Sets using a crystal detector and four amplifier tubes draw only half as much current as sets using a soft vacuum tube detector and four amplifying tubes.

10. The first cost of a radio set is the easiest thing to determine as there are thousands of men quite eager to tell you.

Attention to these "commandments" will pay any fan, for they will enable him—or her—not only to select a good set, but one adapted to his or her own particular needs.

THIS WEEK'S AIR PROGRAMS

Monday, May 26

KPO—Hale Bros., San Francisco (423 Meters)

12 NOON—Time signals; Scripture.
1 TO 2 P M—Rudy Seiger's Fairmont Hotel Orchestra.
2:30 TO 3:30 P M—Trombone solos, The Palms; Then You'll Remember Me; Robert Terrill, Henry Hallstrom, accompanist.
Soprano solos, Caro Nome (from "Rigoletto"); The Swallows; Audrey Farncroft, Harriett Murton, accompanist.
Bass solos, The Horn; Duna; Harlan McCoy, Harriet Murton, accompanist.
Trombone solos, Si Tu Savais; Gypsy Love Song; Robert Terrill, Henry Hallstrom, accompanist.
Soprano solos, Mal d'Amour; Kiss Me Again; Audrey Farncroft, Harriett Murton, accompanist.
Bass solo, For You Alone; Harlan McCoy, Harriet Murton, accompanist.
Piano solos, May Night; Crescendo; Harriet Murton.
4:30 TO 5:30 P M—Rudy Seiger's Fairmont Hotel Orchestra.
5:30 TO 6:30 P M—Children's Hour. Stories by Big Brother of KPO, taken from the Book of Knowledge: The Wonderful Unseen Worker; A Little Game of Thinking; some short stories; The King's Guest. Musical readings, Vacation; It Can Be Done; Sister's Best Fellow, Vincent Healy, 14-year-old pupil of Mrs. Josephine Swan White. Mrs. Josephine Swan White, accompanist.
6:30 TO 7:30 P M—Soloists from Fabello's Orchestra of New Mission and New Fillmore theaters.
7 TO 7:30 P M—Rudy Seiger's Fairmont Hotel Orchestra.
8 TO 9 P M—Organ recital by Theodore J. Irwin, official organist, at the Wurlitzer: March, Entry of Gladiators; overture, Pique Dame; song melody, Roses of Picardy (by request); selected passages from symphonic-poem, "Romeo and Juliet"; Gavotte (from Mignon"); Morning (from "Peer Gynt Suite") (by request); musical comedy selection (from "Irene"); waltz, Tres Joli; The Swan; operatic selection (from "Cavalleria Rusticana").
9 TO 10 P M—Program by Sigmund Anker, violinist, and pupils:
Violin solo, Gypsy Airs, Tillie Brown.
Cello solo, Andante Cantabile. Aurora Cravero.
Soprano solos, What's in the Air Today?; The Star; I Heard You Go By; Carrie Eulass, Irene Miller, accompanist.
Violin solo, Meditation (from "Thais"), Sigmund Anker.
Violin solo, Hungarian Rhapsodie, Frances Wiener.
Baritone solos, Song of the Sword (from "Tofano"); The Old Refrain; Irwin Melbourne.
Piano solo, Paraphrase (from "Rigoletto"), Evelyn Biebesheimer.
Violin solo, Polonaise Brillante, Sarah Kreindler, Lottie Kreindler, accompanist.
Soprano solos, Musetta's Valse Song (from "La Boheme"); I Did Not Know; A May Morning; Carrie Eulass, Irene Miller, accompanist.
Soprano solo, Devil's Drill, Eunice Jurgens.
Baritone solos, Morning; Homing; Irwin Melbourne Johnson.
Violin solo, Song of India, Sigmund Anker. Evelyn Biebsheimer accompanying instrumental numbers.
10 TO 11 P M—E. Max Bradfield's Versatile Band, playing in Rose Room Bowl, Palace Hotel.

KLX—Oakland Tribune (509 Meters)

7 TO 7:30 P M—News items, weather bulletin, market and financial news.

KGO—General Electric Co., Oakland (312 Meters)

1:30 P M—New York stock exchange and weather reports.
3 P M—Short musical program; address in connection with series of talks on "The Health of the Child," given by the Parent-Teacher Ass'n.
4 TO 5:30 P M—Hotel St. Francis dance orchestra, San Francisco; Henry Halstead, leader.
6:45 P M — Stock exchange and weather reports and news items.
8 TO 10 P M—Educational program with musical numbers; courses in agriculture, Spanish, music, economics and literature.
"Opportunities in Agriculture for the Young Man" is the subject selected by C. E. Voorhies, secretary to the dean of the College of Agriculture, University of California, as part of the agricultural course of the KGO Radio College. W. R. Cummings, vice president of the Monroe Calculating Machine Co., New York city, will be heard in the economics course. His subject will be "Co-operation in Business." Lessons in Spanish, music and literature are also in the curriculum.

DISTANT STATIONS

KGW—Portland Oregonian, (492 Meters)

7:30 P M—Baseball scores, weather forecast and market reports.
8 P M—Official Rose Festival Invitational program.
9:30 P M—Program by Gul Reazee Grotto.

WBAP—Fort Worth Star-Telegram (476 Meters)

7:30 TO 8:30 P M—Concert by the Carl Venth Club of Texas Women's College.
9:30 TO 10:45 P M—Concert by the Roanoke Fiddle Band, B. F. Hambright, director.

KFI—Earle C. Anthony, Los Angeles (469 Meters)

8 TO 9 P M—Evening Herald concert.
9 TO 10 P M—Examiner concert.
10 TO 11 P M—Ambassador-Max Fisher's Cocoanut Grove Orchestra.

KHJ—Los Angeles Times (395 Meters)

12:30 TO 1:15 P M—Program presenting E. M. Bonnell, "Uncle Remus." Carl Allen and his Rendezvous Orchestra from Ocean Park.

KFAE—Washington State College, Pullman, Wash. (330 Meters)

8:30 TO 9:30 P M—Violin solos, Raymond Howell, Pullman; Chemistry Applied to Agriculture, Prof. J. L. St. John; flute solos, Percy Severance, Pullman; Value of Cow-testing Tours, Don G. Magruder; soprano solos, Vay Kerns, Palouse; piano numbers, Ivor Melander, Pullman.

KFOA—Rhodes Co., Seattle, Wash. (455 Meters)

8:30 TO 10 P M—A radio recital given by James Hamilton Howe, dean of the American College of Music, assisted by faculty, students and guest artists. The feature of the program will be several groups of octette pianoforte selections; vocal selections by Chester Roberts, Frank Burns, Leo McCoy, Mrs. D. C. Reid, Dr. Lewis Maxson and Corine Munson. Clarinet solos by Roy O. Deaver; the concluding selection will be "Our Washington" (Washington State song) sung by the entire chorus.

SAVE THIS COMPLETE SCHEDULE

This is the only COMPLETE broadcasting program published by a California newspaper. Radio fans are urged to preserve this magazine for reference during the week. Its small page size makes The Daily News Radio Magazine a handy accessory to your receiving set. Phone the Circulation Department if you desire another copy. Tell your friends about it.

Tuesday, May 27

KPO—Hale Bros., San Francisco (423 Meters)

12 NOON—Time signals; Scripture.
1 TO 2 P M—Rudy Seiger's Fairmont Hotel Orchestra.
2:30 TO 3:30 P M—Organ recital by Theodore J. Irwin, official organist, at the Wurlitzer: Fox trot, Mr. Radio Man; light opera selection, Iolanthe; Sizziletta; Au Matin; Idilia; Serenata, Hasti Manana; operatic selection, Martha; fox trot, Secrets.
4:30 TO 5:30 P M—Rudy Seiger's Fairmont Hotel Orchestra.
5:30 TO 6:30 P M—Children's Hour. Stories by Big Brother of KPO, taken from the Book of Knowledge: Homes Not Made With Hands; The Story of Midas; The Lonely Shepherd Boy.
6:30 TO 7 P M—Program by Cleveland Six Orchestra of the Chandler-Cleveland Motor Co., under direction of Wilt Gunzendorfer: Why Did I Kiss That Girl; Blue Grass Blues; It Ain't Gonna Rain No More; What'll I Do; Mandalay.
Saxophone solo, Celita Lindo, Wilt Gunzendorfer.
I Don't Know Why; Sunrise and You; She's Everybody's Sweetheart.
7 TO 7:30 P M—Rudy Seiger's Fairmont Hotel Orchestra.
8 TO 10 P M—Stanford night. Band program (subject to change): Alma Mater, Raymond.
Cornet solo, Addah, John Willets.
Berceuse (from "Josselyn") (featuring the reeds); ballet music (from "Faust"); Moonlight on the Nile; Dance of the Goblins; The Animal Fair; Creme de la Creme; Stanford Serpentine March.
Glee Club program: Now Let Every Tongue Adore Thee; Improperia; My Bonny Lass; Morning Hymn; John Peel (old English); Bon Jour Ma Belle; Neapolitan songs by Mr. D'Andrea; Volga Boat Song (Russian folk song); Drake's Drum.
Solo, Pirate Dreams, Mr. Stratton; accompanied by the club.
Three Sea Chanties: 1, Eight Bells; 2, Away to Rio; 3, Old Man Noah.
10 TO 11 P M—E. Max Bradfield's Versatile Band, playing in Rose Room Bowl, Palace Hotel.

KLX—Oakland Tribune (509 Meters)

3 TO 5 P M—Baseball scores, all leagues, given inning by inning; local Pacific Coast League game, or game in which Oaks participate, given play by play.
7 TO 7:30 P M—News items, weather bulletin, market and financial news.

KGO—General Electric Co., Oakland (312 Meters)

1:30 P M — Stock exchange and weather reports.
4 TO 5:30 P M—Concert orchestra of the Hotel St. Francis, San Francisco; Fermin Cardona conducting.
6:45 P M — Stock exchange and weather reports and news items.
8 TO 10 P M—Instrumental selections: Selections from "Faust;" Slavonic Dance, Arion Trio; vocal selections, Ave Maria; three-part song for women's voices and soprano solo, with piano, organ and violin.
Serenade (Sing, Smile, Slumber), California Ladies' Quartette; Claire Upshur, first soprano; Laura Broderick, second soprano; Eva Gruninger Atkinson, first alto; Ruth Waterman, second alto.
Baritone solo—Toreador Song (from "Carmen"), Marion Vecki.
Soprano solos — Come, Dance the Romaika, Such a L'il Feller, Claire Harsha Upshur.
Piano solo—Mazurka, Joyce Holloway Barthelson.
Reading—Something More (Smith-Digby Company, Tacoma), Guy B. Kibbee.
Bass solos—Rolling Down to Rio; In the Harbor of Home, Sweet Home, E. Scott Beebe.
Contralto solos—The Danza; Ever of Thee, Ruth Waterman.
Instrumental selections—Medley of Old Favorites, March of the Wooden Soldiers, Arion Trio.
Baritone solo — Serenade (from "Don Juan"), Marion Vecki.
Vocal selections—Who Is Sylvia?; Bonnie, Sweet Bessie, California Ladies' Quartette.
Soprano solos — Parla, Kathleen Mavourneen, Laura Broderick.
Lecture—The Science of Properly Raising Children, Max Horwinski.
Duets for soprano and contralto—Whispering Hope; Nearest and Dearest (Tuscan folk song), Claire H. Upshur and Ruth Waterman.
Mezzo-soprano solo — In an Old-fashioned Town, Eva Gruninger Atkinson.
Bass solos—In Cellar Deep; Sierra Sue, E. Scott Beebe.
Vocal selections — Lost Chord; Aloha Oe, California Ladies' Quartette.
Instrumental selection — Sizilietta, Arion Trio.
10 P M TO 1 A M—Hotel St. Francis dance orchestra, San Francisco; Henry Halstead, leader.

DISTANT STATIONS

KGW—Portland Oregonian, (492 Meters)

7:30 P M—Baseball scores, weather forecast and market reports.
7:45 P M—Talk for farmers, Oregon Agricultural College extension service.

WBAP—Fort Worth Star-Telegram (476 Meters)

7:30 TO 8:30 P M—Concert by the band of Josephine, Tex., D. G. Coffman, director.
9:30 TO 10:45 P M—Concert arranged by Carl Venth and E. T. Croft.

KFI—Earle C. Anthony, Los Angeles (469 Meters)

6:45 TO 7:30 P M—Vocal concert by Gage Christopher.
8 TO 9 P M—Ambassador-Max Fisher's Cocoanut Grove Orchestra.
9 TO 10 P M—Examiner concert.
10 TO 11 P M—Fullerton radio broadcasters.

KHJ—Los Angeles Times (395 Meters)

6 TO 6:30 P M—Art Hickman's Concert Orchestra from the Biltmore Hotel.
6:30 TO 7 P M—Music memory contest conducted by Fitzgerald Music Co., arranged by Raymond Harmon.
7 TO 7:30 P M—Children's program presenting Prof. Walter Sylvester Hertzog. The weekly visit of the Sandman and Queen Titania. Melba Dutcher, singer, 13 years old, pupil of Janie Bolen. Elizabeth Biggs, pianist, 11 years old, pupil of Lillian Norman Duncan. Bedtime story by Uncle John.
8 TO 10 P M—Program arranged through the courtesy of Floryane Thompson, soprano.
10 TO 11 P M—Art Hickman's Dance Orchestra from the Biltmore Hotel.

Wednesday, May 28

KPO—Hale Bros., San Francisco (423 Meters)

12 NOON—Time signals; Scripture.
1 TO 2 P M—Rudy Seiger's Fairmont Hotel Orchestra.
2:30 TO 3:30 P M—Piano solo, Arabesque I, Gladys Tilton-Steele.
Duet, Awake, Dearest One; O Wert Thou in the Could Blast; Elaine Spencer, soprano; Elizabeth Huyck, mezzo-soprano; Mabel Jones, accompanist.
Soprano solos, Magic Month of May; Forgotten; Elaine Spencer; Mabel Jones, accompanist.
Mezzo-soprano solos, La Poco de Pepita (Song of the Pyrennes); Out Where the West Begins; Elizabeth Huyck; Mabel Jones, accompanist.
Duet, When Irish Eyes Are Smiling, Elaine Spencer, Elizabeth Huyck; Mabel Jones, accompanist.
Soprano solos, Love's a Merchant; Will o' the Wisp; Elaine Spencer; Mabel Jones, accompanist.
Solos, Teresita Mia; Spring; Elizabeth Huyck; Mabel Jones, accompanist.
Piano solo, Waltz, Gladys Tilton-Steele.
Duet, I Know a Bank, Elaine Spencer, Elizabeth Huyck; Mabel Jones, accompanist.
4:30 TO 5:30 P M—Rudy Seiger's Fairmont Hotel Orchestra.
5:30 TO 6:30 P M—Children's Hour. Stories by Big Brother of KPO, taken from the Book of Knowledge: Digging the Panama Canal; The Man Who Is 12 Years Old; answers to questions; The Hundred Thousand Monkeys.
6:30 TO 7 P M—Orchestra from the S. S. Columbia, Marshall Rosenthal, director; Hawaiian music; Blue Grass Blues; Since Ma Is Playing Mah Jongg; Before You Go; violin solo, Song of Songs, Clarence Carey; San; Glad; Papa Doesn't Two-time No Time; Waiting for the Sunrise and Poor Butterfly; California, Here I Come.
7 TO 7:30 P M—Rudy Seiger's Fairmont Hotel Orchestra.
8 TO 8:05 P M—Talk, "Your Boy and Mine and the Smith-Hughes Act," by William T. Elzinga.
8:05 TO 11 P M—E. Max Bradfield's Versatile Band, playing in Rose Room Bowl, Palace Hotel.
During the intermission Claire Gazley, soprano, will sing old ballads, accompanied by Sallie Mathews. Mort Harris will sing popular songs.

KLX—Oakland Tribune (509 Meters)

3 TO 5 P M—Baseball scores, all leagues, given inning by inning; local Pacific Coast League game, or game in which Oaks participate, given play by play.
7 TO 7:30 P M—News items, weather bulletin, market and financial news.
8 TO 10 P M—Studio program:
Group 1—
The KLX Concert Trio
Vocal solos—
(a) The Awakening .....Mason
(b) A Gift for You.....D'Hardelot
Minna C. Carter
Violin solo—Selected.
Harriet French
Vocal solos, with violin obligato—
(a) The Deathless Army....—Trotere
(b) The Dawn.....D'Hardelot
Charles A. Steel
Piano accompaniment by Mrs. James Hays; violin obligato by Mr. James Hays.
Vocal solos—
(a) Fallen Leaf .....Logan
(b) The Spring Has Come.....White
Alice M. Rice
Martharayne Hollis, accompanist
Instrumental selections—
Group 2
The KLX Concert Trio
Vocal solos by Minna C. Carter—
(a) I Love Thee .....Mildenberg
(b) As We Part .....Iglenfritz
Overture by the American Theater Orchestra, Owen Sweeten director.
Cello solo—Selected.
Joziena Vander Ende
Vocal solos—
(a) The Lilac Tree .....Gartlan
(b) The Little Damozel.....Novello
Alice M. Rice
Martharayne Hollis, accompanist
Piano solos—
(a) Andante Finale de Lucia di Lammermoor .....Leschetizky
(b) The Whispering Wind.....
.....Wollenhaupt
Madalene Schroeder
Vocal solo—A Little Song.
Minna C. Carter
Instrumental selections—
Group 3
The KLX Concert Trio
Piano solos—
(a) Moonlight on the Hudson..Wilson
(b) Souvenir .....Drdla
Madalene Schroeder
Organ numbers—Selected.
Clement Barker
on the American Theater organ

KGO—General Electric Co., Oakland (312 Meters)

1:30 P M—Exchange and weather reports.
3 P M—Short musical program; address by Leila A. Wilson on the subject "The Establishing of Habits of Health in Children."
4 TO 5:30 P M—Concert orchestra of the Hotel St. Francis, San Francisco; Fermin Cardona, conducting.
6:45 P M—Final reading stock exchange and weather reports and news items.
8 P M—Special program.

DISTANT STATIONS

KGW—Portland Oregonian, (492 Meters)

7:30 P M—Baseball scores, weather forecast and market reports.
8 P M—Concert by Columbia Theatre All-Artist Orchestra, Harry Linden, director.
9 P M—Alexander Hamilton Institute business talk by James Albert.
10 P M—Dance music by George Olsen's Metropolitan Orchestra of the Hotel Portland. Intermission numbers by Maybelle McNutt, pianist.

WBAP—Fort Worth Star-Telegram (476 Meters)

7:30 TO 8:30 P M—Concert by the R. E. Lee Society of Denton, Tex.
9:30 TO 10:45 P M—Concert by Dick Gaines' dance orchestra.

KFI—Earle C. Anthony, Los Angeles (469 Meters)

6:45 TO 7:30 P M—Nick Harris Detective Stories and concert.
8 TO 9 P M—Evening Herald concert.
9 TO 10 P M—Examiner concert.
10 TO 11 P M—Hollywood Community Orchestra.
11 P M TO 12 M—Ambassador-Max Fisher's Cocoanut Grove Orchestra.

KHJ—Los Angeles Times (395 Meters)

6 TO 6:30 P M—Art Hickman's Concert Orchestra from the Biltmore Hotel.
6:45 TO 7:30 P M—Children's program presenting Prof. Walter Sylvester Hertzog. Pupils of Mabel M. Hamer, piano, songs and readings. Bedtime story by Uncle John.
8 TO 9 P M—Program arranged through the courtesy of Bruce A. Findlay.
9 TO 10 P M—Program presenting Dr. Mars Baumgardt, lecturer. The Studebaker Radio Orchestra of Long Beach, through the courtesy of the Glenn Thomas Co.
10 TO 11 P M—Art Hickman's Dance Orchestra from the Biltmore Hotel.

KFOA—Rhodes Co., Seattle, Wash. (455 Meters)

8:30 TO 9:30 P M—Seattle Chamber of Commerce program consisting of vocal and instrumental selections and featuring some interesting talks by members of the chamber.

Thursday, May 29

KPO—Hale Bros., San Francisco (423 Meters)

12 NOON—Time signals; Scripture.
1 TO 2 P M—Rudy Seiger's Fairmont Hotel Orchestra.
2:30 TO 3:30 P M—Program by T. Eugene Goudey and pupils: Piano solos, Morceau en Forme d'Etude; Waltz; Minuet; Charlotte Agnes Ulitzka.
Tenor solos, Vale; I Hear You Calling Me; Smilin' Through; Fred Nodder.
Mezzo-soprano solos, Friend o' Mine; Where My Caravan Has Rested; The Bells of St. Mary's; Mrs. Clarice Olson.
Piano solos, Scherzo in E Minor; Grand Etude de Concerto "Tremolo"; E. Eugene Goudey, concert pianist.
4:30 TO 5:30 P M—Rudy Seiger's Fairmont Hotel Orchestra.
5:30 TO 6:30 P M—Children's Hour. Stories by Big Brother of KPO, taken from the Book of Knowledge: The Man Without a Country; The House That Jack Built; The Life of Young Animals.
Piano solos, Shadow Dance; Fantasie; Butterfly; Ivy Roberts, 13-year-old pupil of Jeannette Mulford.
7 TO 7:30 P M—Rudy Seiger's Fairmont Hotel Orchestra.
8 TO 9 P M—Organ recital by Theodore J. Irwin, official organist, at the Wurlitzer: Swedish Wedding March; overture, William Tell; Andante Movement (from "Death and the Maiden"); waltz, Roses from the South; Seraphs' Strain; Carillon; Melody; Pas de Deux; old time popular favorites, selection; song melody, The Temple Bells Are Ringing.
9 TO 10 P M—Soprano solos, A Heart That's Free; The Cuckoo; Neyda Burnett Houx.
Tenor solos, Sweetest Story Ever Told; Thoughts Have Wings; James O. Greenwell. Theodore J. Irwin, accompanist.
Flute solos, Humoresque; Old Kentucky Home (with variations); Annie Laurie (with variations); Sam Schildkret, playing his own arrangements.
Contralto solos, Dawn in the Desert; Yohrzeit (In Memorium); Annae K. Blotcky.
Tenor solos, Blest Are the Pure in Heart; Morning; James O. Greenwell. Theodore J. Irwin, accompanist.
Soprano solos, Song of the Robin; My Garden of Memory; Neyda Burnett Houx.
Piccolo solos, La Paloma; Rumanian Shepherd Music; Sam Schildkret.
Contralto solos, Goin' Home (from largo—"New World Symphony"); Happy Song; Annae K. Blotcky.
10 TO 11 P M—E. Max Bradfield's Versatile Band, playing in Rose Room Bowl, Palace Hotel.

KLX—Oakland Tribune (509 Meters)

3 TO 5 P M—Baseball scores, all leagues, given inning by inning; local Pacific Coast League game, or game in which Oaks participate, given play by play.
7 TO 7:30 P M—News items, weather bulletin, market and financial news.

KGO—General Electric Co., Oakland (312 Meters)

1:30 P M—Stock exchange and weather reports.
4 TO 5:30 P M—Concert orchestra of the Hotel St. Francis, San Francisco; Fermin Cardona, conducting.
6:45 P M—Stock exchange and weather reports and news items.
8 P M—Concert by Columbia Theatre All-Artist Orchestra, Harry Linden, director.
8 TO 10 P M—"Peg o' My Heart," a drama in three acts, played by the KGO Players under the direction of Wilda Wilson Church.

CAST

Mrs. Chichester .....Florence Palmer
Alerie .....David Barnwell
Ethel .....Evelyn Avery
Montgomery Hawkes....Conrad Kahn
Christian Brent .....David Barnwell
Jarvis .....Conrad Kahn
Bennett .....Kate Brown
Jerry .....Howard Irwin
Peg .....Mary Harper

Scene—Library in Mrs. Chichester's home in England. Time—The present.
Instrumental selection — Sweetheart March; Aubade, Neapolitaine Trio.

Act I
Instrumental selection — Souvenir, Neapolitaine Trio.
Act II
Instrumental selection—Glow-worm, Neapolitaine Trio.
Act III
Instrumental selections—Hungarian Dance, Rendezvous, Neapolitaine Trio.

DISTANT STATIONS

KGW—Portland Oregonian, (492 Meters)

7:30 P M—Baseball scores, weather forecast and market reports.
8:15 P M—Studio program of dance music by George Olsen's Metropolitan Orchestra of Hotel Portland, Herman Kenin, director.
10 P M—Dance music by George Olsen's Metropolitan Orchestra of the Hotel Portland.

WBAP—Fort Worth Star-Telegram (476 Meters)

7:30 TO 8:30 P M—Concert by John Dyers' old time fiddlers of Cleburne.
9:30 TO 10:45 P M—Monthly organ recital by Will Foster, organist of the First Methodist Church.
6:45 TO 7:30 P M—Y. M. C. A. concert and lecture.
8 TO 9 P M—Ambassador Hotel concert.
9 TO 10 P M—Examiner concert.
10 TO 11 P M—Harry Girard and pupils.

KHJ—Los Angeles Times (395 Meters)

6 TO 6:30 P M—Art Hickman's Concert Orchestra from the Biltmore Hotel.
6:45 TO 7:30 P M—Children's program presenting Prof. Sylvester Hertzog. Weekly visit of Dickie Bran-

(Concluded on Page 3, Column 1)

The Radio Column

BY CARLTON E. BUTLER
Radio Engineer

The most common form of trouble in the reflex type of receiver is squealing. This may be caused by a number of things — principally wrong or faulty connections. Go over each connection with a hot soldering-iron. Hold the iron on each joint until the solder flows again, and hold the wire until cool.

Check over every detail to make sure that you have made no mistakes or have overlooked to make any connection that should be made. Be sure that all plate and grid leads are short and that they do not run parallel with each other or with other wires for a very great distanc.

If your set has a persistent hum, it usually indicates that you may have an open circuit due to a connection being left off, to an open or burned-out transformer, or to a poor contact or no contact of the cat-whisker on your crystal.

If your set works, but signals are faint, there are a number of possible causes. Examine your antenna and ground connections to be sure that there are no high-resistance joints, defective insulation, short-circuited lightning arrester, etc., in your installation.

Try changing the tubes around in the sockets. Try a new crystal detector. Check the voltage of both A and B batteries, to be sure that they are up to the rated voltage required for the circuit and the tubes you are using.

Reversing the connection on the audio frequency transformers sometimes makes a differ-

(Concluded on Page 4, Column 3)

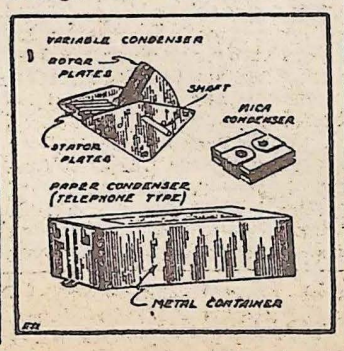
RADIO FROM THE GROUND UP

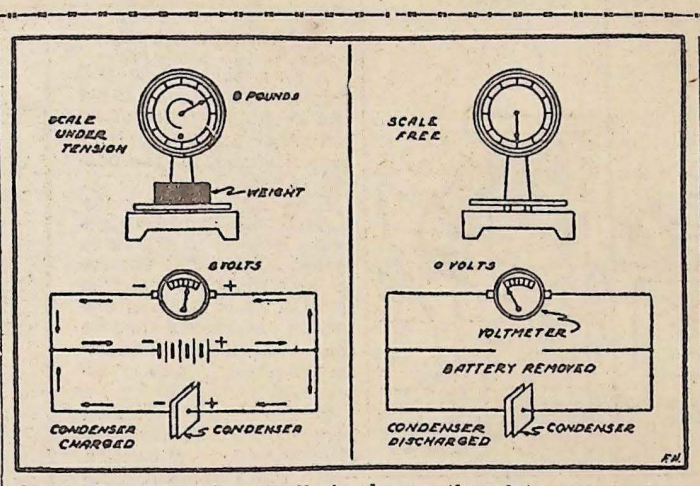
Besides inductance, there is another factor which is used everywhere in radio sending and receiving. This is called "capacity" and its name is a very good definition in a general way. "Capacity" is the property possessed by certain electrical instruments to store up a given amount of electrical energy for a fraction of a second or even a good many seconds, and the device which stores the energy is very appropriately named a "condenser."

Inductance is the inertia factor—that which tries to keep current flowing as it is or opposes any change in the strength of the current. Capacity is very much like elasticity in that you can preserve some electricity in the condenser and use it a little later just as you can compress a piece of rubber or a steel spring and use that energy when you release the spring or the rubber. A good mechanical analogy may be found in the ordinary spring scale. Suppose we place a certain weight on its platform. The weight exerts a pressure of perhaps eight pounds and the spring is stretched until the pointer reads "8."

Condenser Circuit

In just the same manner we arrange the condenser — two





sheets of metal with a small air space between them, a battery and a voltmeter. The condenser is the spring of the platform scale; the battery represents the weight or pressure, and the voltmeter is the needle showing what the pressure is. A certain pressure on the spring causes a definite strain in the spring, as shown by the pointer. Now, if the weight be taken off the scale the pointer will fall to zero. Likewise, if the battery be disconnected the voltmeter will gradually recede to the zero setting. But it will not fall abruptly, for the energy stored in the condenser takes a little time to discharge through the high resistance of the coil in the voltmeter. Similarly, the pointer of the scale does not drop to zero instantly. It cannot, due to the slow action of the spring.

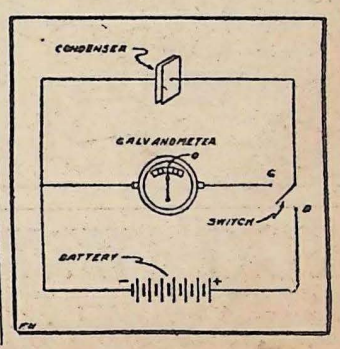
The capacity of the condenser, that is, the amount of electrical energy that it can store within itself, is dependent upon two things—the area of its "plates" and the distance between them, assuming the separating material to be air. When the battery is connected to the condenser the plates are under a strain according to the voltage of the battery. The strain remains after the battery is removed unless there is some electrical connection between the plates through which current can flow. The condenser is then said to be "charged." A condenser in which there is no great possibility of leakage will often retain a charge for several minutes.

Retention of Charge

Just as there is energy stored magnetically in the inductance coil, it is stored capacitively in the condenser. A circuit demonstrating the holding of a charge by a condenser is illustrated. There is a plate condenser, battery and galvanometer for indicating the flow of a small amount of current. A switch with two contacts is arranged to first connect the condenser to the battery and then to connect it to the galvanometer. After the condenser has collected its charge the switch is opened and then connected to the galvanometer. This immediately shows a momentary deflection and signifies the discharge of the condenser through the galvanometer.

Capacity is expressed in a unit called the "farad." A condenser having a capacity of one farad will, under a pressure of one volt, store up one ampere of current per second. This would be an immense condenser, and as this unit is much too large for easy use the "microfarad" is employed instead. This is one-millionth of the farad and is a term which should be fairly well understood as it is widely used in our radio set making.

Condensers are made in many different forms. A "variable condenser" consists of two sets of metal plates insulated from electrical contact with each other. The distance between the plates remains the same in this sort of condenser, but the overlapping area is different. "Fixed condensers" consist of two sets of metal or tinfoil sheets, separated from each other by paper or mica sheets and pressed firmly together within a stiff covering. A very large condenser of the order of 1 to 10 microfarads (mfds.) is made from two long strips of tinfoil rolled up with strips of very thin paper between them. These are usually placed in metal casings.



WEEK'S AIR PROGRAMS, CONTINUED

(Concluded From Page 2)

don, screen juvenile. Victoria Louise Kerner, screen juvenile. Doris Snowdon, pianist, 14 years old, pupil of Lillian Norman Duncan. Bedtime story by Uncle John.

8 TO 9 P M—Program presented through the courtesy of the Fitzgerald Music Co.

9 TO 10 P M—Program presenting Ruth Ryan Pederson, mezzo-soprano.

10 TO 11 P M—Art Hickman's Dance Orchestra from the Biltmore Hotel.

KJS—Bible Institute, L. A. (360 Meters)

8 TO 9 P M—Organ selections; Mildred Colville, contralto; Lucile McArthur, violinist; Dr. J. L. Leavel, tenor; accompanied by Mrs. J. L. Leavel.

Friday, May 30

KPO—Hale Bros., San Francisco (423 Meters)

12 NOON—Time signals; Scripture.

12:45 P M—Talk broadcast from the Commonwealth Club luncheon at the Palace Hotel.

1 TO 2 P M—Rudy Seiger's Fairmont Hotel Orchestra.

KLX—Oakland Tribune (509 Meters)

3 TO 5 P M—Baseball scores, all leagues, given inning by inning; local Pacific Coast League game, or game in which Oaks participate, given play by play.

7 TO 7:30 P M—News items, weather bulletin, market and financial news.

8 TO 10 P M—Studio program: "Shenandoah," by Bronson Howard, famous four-act play of Civil War time, presented by the newly formed KLX Players, under the direction of Etta Wilson Coleman.

CAST

Kerchival West.....L. Spencer Riley
Jenny Buckthorn.Etta Wilson Coleman
Gertrude Ellingham .....
.....Mary Louise Meyers
Robert Ellingham.....John Barrier
Madeline West .....Ethel Johns
General Buckthorn.....John Fahey
General Haverill.....Roger Burnham
Constance Haverill.....
.....Mrs. Roger Burnham
Captain Heartsease....Caryl Coleman
Edward Thornton.....John Collier
Frank Bodine.....Irving Hazeltine
Edith Bedloe.....Eugenie Houck
Sergeant Barket..E. Ferguson Speiker
Major Hartwick and
Captain Lockwood..Robert Southgate
Corporal Dunn.....Charles Spaan
Margery.....Mary Prescott

Music by Senor Marras' orchestra.

This play, upon the occasion of its first presentation by radio, is dedicated to the men of the Blue and Gray, who yesterday faced each other in deadly conflict, but who today meet on common ground and as comrades and veterans to share the love of a united country.

Act I—Scene laid in the old Ellingham homestead in Charlestown harbor, just overlooking the Charleston fort. Time, about 1861, just before the shot was fired on Fort Sumter.

Act II—Scene, still the Ellingham homestead. Action takes place in the Ellingham garden, with Three Top mountain rising in the distance. Time, at twilight, about three years later than the first act. Troops are in camp.

Act III—Scene, same as second act, next day. Battle in progress. Gen. Sheridan's ride terminates.

Act IV—In home of Gen. Buckthorn in Washington, D. C., after the war is over and the troops are returning home.

KGO—General Electric Co., Oakland (312 Meters)

1:30 P M—Stock exchange and weather reports.

3 P M—Short musical program; poems by Lillian Craner Coen, read by Wilda Wilson Church.

4 TO 5:30 P M—Concert orchestra of the Hotel St. Francis, San Francisco; Fermin Cardona, conducting.

6:45 P M—Stock exchange, weather and news items.

DISTANT STATIONS

KGW—Portland Oregonian, (492 Meters)

7:30 P M—Baseball scores, weather forecast and market reports.

8 P M—Special Memorial Day program.

10:30 P M—Hoot Owls.

WBAP—Fort Worth Star-Telegram (476 Meters)

7:30 TO 8:30 P M—Concert by Westminster College of Texarcana, Tex.; directed by M. L. Martin.

9:30 TO 10:45 P M—Concert by talent from Henrietta, Tex.

KFI—Earle C. Anthony, Los Angeles (469 Meters)

6:45 TO 7:30 P M—Vocal concert.

8 TO 9 P M—Evening Herald concert.

9 TO 10 P M—Examiner concert.

10 TO 11 P M—Oscar Seiling and Louise Gunning.

11 P M TO 12 M—Ambassador-Max Fisher's Cocoanut Grove Orchestra.

KHJ—Los Angeles Times (395 Meters)

6 TO 6:30 P M—Art Hickman's Concert Orchestra from the Biltmore Hotel.

6:45 TO 7:30 P M—Children's program presenting Prof. Walter Sylvester Hertzog. Weekly visit of Richard Headrick, screen juvenile. Bedtime story by Uncle John.

8 TO 9 P M—Special program for Decoration Day.

9 TO 10 P M—All-American program arranged through the courtesy of Tilda Rohr, contralto.

10 TO 11 P M—Art Hickman's Dance Orchestra from the Biltmore Hotel.

KFAE—Washington State College, Pullman, Wash. (330 Meters)

8:30 TO 9:30 P M—The Science of

KUO

San Francisco Examiner—360 Meters

Daily Except Saturday and Sunday

9:05 A M—Weather forecast.
11:00 to 11:30 A M—Market reports.
8:30 P M—Financial bulletin.
6:00 to 6:20 P M—Financial and garden hint broadcast.
6:40 P M—Weather forecast.

Saturday Only

9:05 A M—Weather forecast.
6:00 to 6:20 P M—Financial and garden hint broadcast.
6:40 P M—Weather forecast.

Sunday Only

9:05 A M—Weather forecast.
6:45 P M—Weather forecast.

Additional Friday

5:45 to 6:00 P M—Health bulletin.

Geology, Arthur Kraloweo, Auburn; soprano solos, Ruth Wilkins, Greenacres; Seed Potatoes, George L. Zundel; instrumental solos; Books You Should Read, Alice L. Webb.

Saturday, May 31

KPO—Hale Bros., San Francisco (423 Meters)

12 NOON—Time signals; Scripture.

1 TO 2 P M—Rudy Seiger's Fairmont Hotel Orchestra.

2:30 TO 3:30 P M—The Tau Tau Dance Orchestra, under the direction of T. Raymond Rafael: There's Yes, Yes in Your Eyes; Oh, Baby (featuring Raymond Rafael, drums); Linger Awhile (featuring Cowell Dein, banjo); Cinderella Blues; The One I Love (featuring Harold Harriss, saxophone); Mandalay; Why Did I Kiss That Girl? (featuring Hubert Gagos, trumpet); You; Sobbin' Blues (featuring Bob Cove, clarinet); Oriental Love Dream; Somebody Stole My Girl (featuring Gerald Shapro, piano).

3:30 TO 5:30 P M—Tea Dansant—E. Max Bradfield's Versatile Band, playing in the Palace Hotel Rose Room Bowl.

8 P M TO 12 M—Dance music by Art Weidner and his popular orchestra. During the intermission the KPO Trio, Bennie Berman, Jimmie Raymond and Harry Hume, will sing popular songs.

KLX—Oakland Tribune (509 Meters)

3 TO 5 P M—Baseball scores, all leagues, given inning by inning; local Pacific Coast League game, or game in which Oaks participate, given play by play.

7 TO 7:30 P M—News items, weather bulletin, market and financial news.

DISTANT STATIONS

KGW—Portland Oregonian, (492 Meters)

10 P M—Baseball scores, weather forecast and dance music by George Olsen's Metropolitan Orchestra of Hotel Portland (two hours).

WBAP—Fort Worth Star-Telegram (476 Meters)

7 TO 7:40 P M—Review of the international Sunday school lesson and radio Bible class by Mrs. W. F. Barnum.

KFI—Earle C. Anthony, Los Angeles (469 Meters)

6:45 TO 7:30 P M—Vocal concert.

8 TO 9 P M—Altheda Oliver in all-American concert.

9 TO 10 P M—Examiner concert.

10 TO 11 P M—Popular song concert.

11 P M TO 12 M—Ambassador-Max Fisher's Cocoanut Grove Orchestra.

KHJ—Los Angeles Times (395 Meters)

6 TO 6:30 P M—Hickman's Concert Orchestra from the Biltmore Hotel.

6:45 TO 7:30 P M—Children's program presenting Prof. Walter Sylvester Hertzog. Marjorie Thornton, pianist, 14 years old, pupil of Ethel Sanborn. Moreau Clark, reader, pupil of Inez Norris Moore. Onolee Jones, 11 years old, cellist and reader. Bedtime story by Uncle John.

8 TO 10 P M—Program arranged through the courtesy of J. Howard Johnson.

10 TO 11 P M—Art Hickman's Dance Orchestra from the Biltmore Hotel.

KGO—General Electric Co., Oakland (312 Meters)

12:30 P M—Stock exchange and weather reports.

4 TO 5:30 P M—Concert orchestra of the Hotel St. Francis, San Francisco; Fermin Cardona, conducting.

8 TO 10 P M—Program furnished by the A. Capella Choir of the College of the Pacific, San Jose; C. M. Dennis, director.

Instrumental selection—Kamennoi-Ostrow, Arion Trio.

Vocal selections — Blessing and Glory; Glory to the Trinity, The A. Capella Choir.

Soprano solos—By the Fountain, Snow Fairies, I've Been Roaming, Esther Hornaday.

Vocal selections—Au Friskay Love Lilt, The De'll's Awa, the A. Capella Choir.

Instrumental selection — Largo, Arion Trio.

Tenor soles—Rest at Eventide, At Eve I Heard a Flute, Kenneth MacKenzie.

Vocal selections—The Death Croon, Merry Yuletide, the A. Capella Choir.

Vocal duet—Come, Mallika (from "Lakme"), Olive Bryson and Dorothy Dennis.

Instrumental selection—Meditation (from "Thais), Arion Trio.

Baritone solos—Hear Me, Ye Winds and Waves, Duna, Song of the Clock, Walline Knoles.

Soprano solos—Waltz song (from "Romeo and Juliet"), Little Lad o' Dreams, Villanelle, Olive Bryson.

Violin solo — Obertass, Josephine Holub.

Vocal selections—Night Whispers, A Spring Ditty, the A. Capella Choir.

Piano solo—Fantaisie, Elfin Dance, Bernice Rose.

Soprano solos—We Go This Way But Once, June Is in My Heart, I Am the Night Wind, Dorothy Dennis.

Vocal selections—O Lord Most Holy, Choral Blessing, the A. Capella Choir.

Instrumental selection — Liebestraume, Arion Trio.

10 P M TO 1 A M—Hotel St. Francis dance orchestra, San Francisco; Henry Halstead, leader.

Sunday, June 1

KPO—Hale Bros., S. F. (423 Meters)

11 A M TO 12 M—Prelude, organ recital, Theo J. Irwin; sermon and prayers, Rev. Gordon Kent, Unitarian church, Alameda; soloist, Mme. Brige Astar, mezzo-contralto.

8:30 TO 10:30 P M—Concert, Rudy Seiger's Fairmont hotel orchestra.

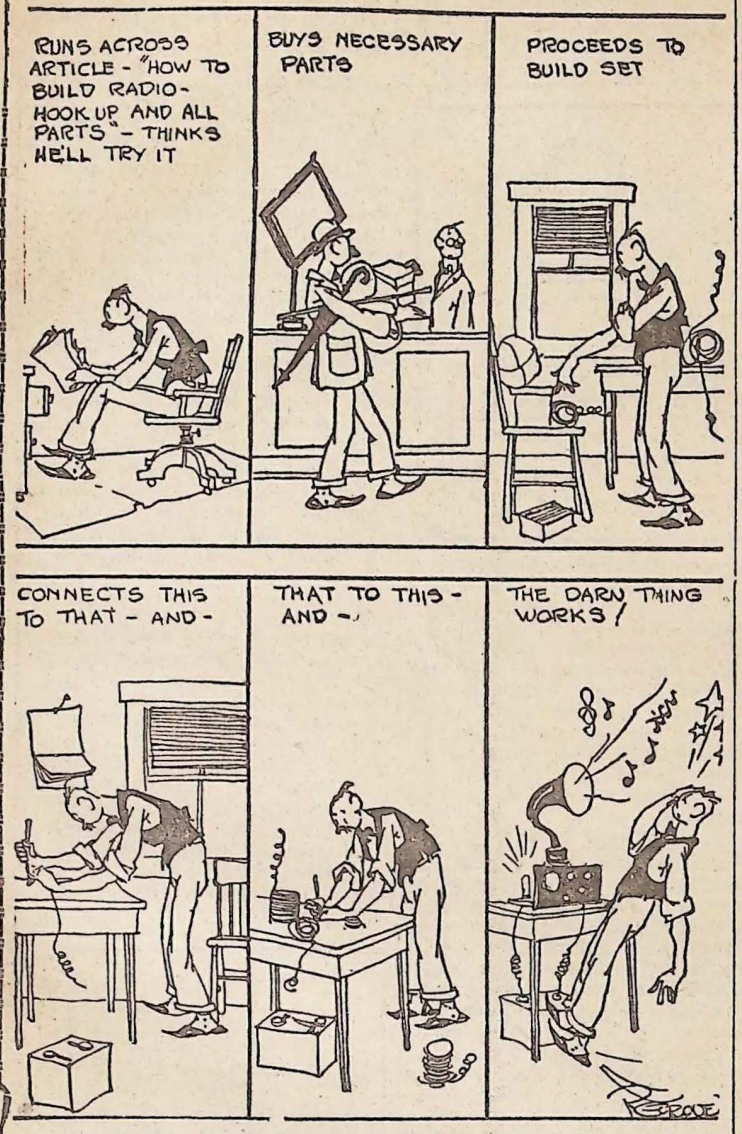
KLX—Oakland Tribune (509 Meters)

9:30 TO 10:30 A M—Talk, church services, Rev. John Snape, First Baptist church, Oakland.

KGO—General Electric Co., Oakland (312 Meters)

3:30 TO 4:30 P M—Little Symphony orchestra.

BUGS — — — By Roy Grove



2 TUBES DO WORK OF 4

BY ISRAEL KLEIN
NEA Service Radio Editor

A two-tube push-pull amplifier that equals three and even four tubes of an ordinary amplifier has been designed for the benefit of radio fans.

It is one of the many ways by which radio engineers have been trying to obtain clarity and volume in amplification, to free radio of its bugaboo of distortion whenever more than two stages of audio-amplification are attempted.

In the circuit described here—one of the varieties of push-pull amplification—two tubes and two middle-tapped push-pull transformers give amplification equal practically to three stages of a transformer-coupled amplifier.

The idea of the push-pull amplifier is this:

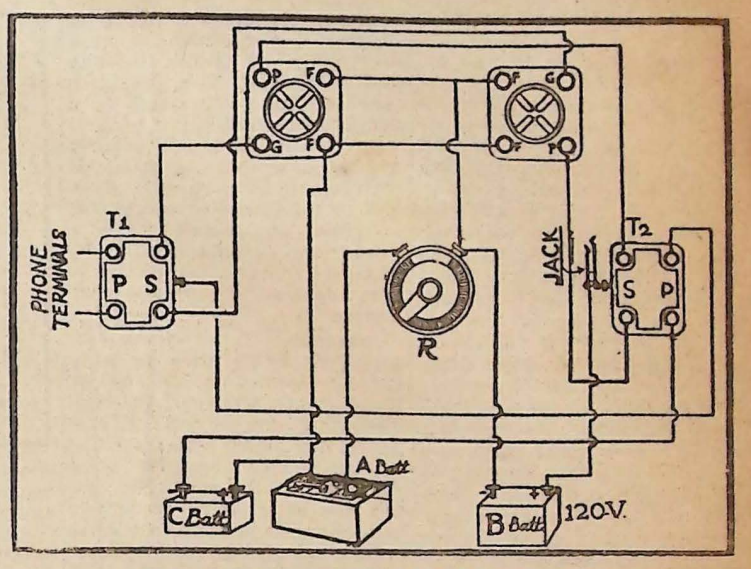
Two audio-frequency transformers, with a tap in the exact middle of each of their secondary windings, are connected so that the two outside ends of one secondary connects to the grid of each tube, while the outside ends of the other secondary are joined to the plate of each tube.

More Efficient

Thus, a positive and negative feedback system is established between the tubes, resulting in greater efficiency from both. While one tube has positive feed-back and tends to howl, the other has negative feed-back and absorbs and prevents howling.

The parts to this amplifier are:

Two push-pull amplifiers, T1 and T2.



Hookup Diagram of the Push-Pull Amplifier

Two tubes and sockets, UV-201-A.

One rheostat, 6 ohms.

Wire for connections.

The B battery of the receiving set should be stepped up to 120 volts and a C battery of about 6 volts should be connected between the primary of the second transformer and the negative of the A battery and filaments.

Since connections are easy, in this amplifier, and there are few parts, there has been no attempt to describe any arrangement of the parts.

The Transformers

A mechanically inclined fan may try building his own transformers, although middle-tapped audio-frequency transformers for push-pull amplification are on sale. The transformers should be of the low ratio variety, 4 to 1 being about the best.

A good one may be made by assembling two transformer windings on one core. The core consists of two U-shaped pieces of soft iron, butted together, to form a rectangle. The windings are put over the joints. They are the primaries and secondaries of two low-ratio audio transformers. The primaries are then connected together in series, with the two outside connections of the primaries and secondaries brought out, and a tap brought out where the two inside connections of the secondaries are connected.

By reversing the secondary leads, the amplifier may be tested for best results.

KGO Will Open St. Francis Studio

The San Francisco studio of KGO in the Hotel St. Francis will be formally opened Wednesday at 8 p m.

Ralph McLaren, acting mayor of San Francisco, will speak. The KGO Grand Opera company, under the direction of Carl Anderson, with Florence Ringo, Blanche Hamilton Fox, Gregorio Artieda, Marion Vecki and Elsie Hilton Cross in the cast, will produce "Cavalleria Rusticana." Augusto Serantoni will conduct.

Ground wires under San Francisco bay connect the San Francisco studio with the control room and power house of KGO, located about 10 miles away on East 14th-st and 56th-av, Oakland. With this arrangement, it is possible to produce a number on a program in San Francisco, and so quickly switch to the Oakland studio that listeners will not be aware of the change. Complete programs will be given by San Francisco talent from time to time, and prominent people stopping in San Francisco will be asked to speak to the KGO audience.

Under the supervision of J. A. Cranston, Pacific coast manager of the General Electric Co., and operated as a part of the studio equipment in Oakland, radio program facilities of KGO will be greatly enhanced by the use of the San Francisco studio.

N. J. One Tube Set Gets L. A.

Getting Los Angeles with a single tube dry cell receiving set powered by two National Carbon Co. dry batteries is the record set by Allen T. Haas of Magnolia, N. J.

Haas, who has been a DX radio fan for only two months, has a single tube (WD-11) Westinghouse Aeriola Sr., and uses a Columbia dry cell for his A battery and an Eveready for his B battery. His outside aerial is 100 feet long, seven-strand copper wire, running from the house (30 feet) to a tree 20 feet high. Aerial runs east and west—pointing due west.

Warm B Batteries

Warming up the B batteries, when they are beginning to run down, will put new life into them. But this is recommended only for an emergency, because is isn't a pleasant job.

Direction Finders

Great Britain is installing a series of direction finding stations around the islands to help mariners along the coasts. This system is expected to reduce to a minimum collisions in fogs.

Marconi in Portugal

Guglielmo Marconi has obtained a concession from the Portuguese government to operate broadcasting statiions there. His company is also active in Spain.

WAVELETS

A new radio relay station is soon to be opened at Liverpool, England.

Station WSB, State College, Pa., recently broadcast the rattle of a rattlesnake.

Radio boosted attendance at two Chicago plays recently, managers claim.

License fees collectable by the government under the new radio bill range from 50 cents to $300.

STATUE TO BE AERIAL

NEW YORK, May 12.—At last the famed "Diana" atop the Madison Square Garden tower may become modernized. There's talk of converting her into the "world's most exquisite antenna."

James F. Kerr, manager of the first radio world's fair to be shown next autumn, is originator of the idea. He believes Diana can make herself useful in broadcasting and receiving.

Now three wireless engineers are conducting experiments with the view of converting the Saint-Gaudens masterpiece into a radio aerial.

LET'S SWAP

These "Swap" advertisements will be published free of cost until further notice in the Monday Radio Magazine of The Daily News. The article to be traded must be radio equipment. Keep the wording concise.

TO SWAP: Eastman Rigmarotier one tube set for 6 volt tubes.—Joe Kabb, 154 East-st.

TO SWAP—6-volt, 45-ampere storage battery for something equal to $5 value. Wm. Pabst, 1163 Kansas-st.

TO SWAP—Good crystal set; want a folding card table, a good cross-cut saw or a stereoscope. L. Powell, 2729 Filbert-st. Phone Fillmore 4421.

TO SWAP—Two dandy crystal sets, in exchange for phonograph attachment or other parts. H. J. Pratt, 441 4th-av. Phone Bayview 7663.

TO SWAP—Columbia variometer, new, for phonograph loud speaker attachment or something of equal value. C. H. Gereke, 1000 Ashbury-st, Apt. 3.

TO SWAP—Willard rechargeable "A" Battery for something of equal value. M. Finnegan, 120 Eugenia-av, San Francisco.

TO SWAP—Flewelling receiving set, mahogany cabinet. Fine for distance. For one r. c. loop or something of equal value. J. B. Vassallo, 676 Pennsylvania-av, San Francisco.

TO SWAP—Loose coupler crystal set, complete except for headphones; will exchange for other radio equipment. P. S. Jones, 1410 Milvia-st, Berkeley.

TO SWAP—A dandy crystal set, complete with head-phones; almost new, in fine condition; gets all local stations. What have you? Phone Market 1412.

Radio Column Continued

(Concluded From Page 3)

ence. Although you may have them connected up as the diagram indicates, it is often possible to make the circuit function much better by reversing either the primary or secondary connections. That is, change the wire from the P post to the B, and vice-versa, not changing the connections on the primary to the secondary binding posts.

The amount of current that can be picked up on a loop aerial is limited. Tomorrow I will show how to arrange for the use of an outside aerial with the reflex or super-heterodyne receiver.

Audio-frequency amplifiers will not increase the range of a set. They build up the signal strength passed through the detector.

6 RY Sending On Batteries

(Concluded From Page 1)

tends the entire length of the masts, and this is reinforced by spruce boards in such a way that the masts are 6½ inches square up to 25 feet from the base, 4½ inches square from 25 to 36 feet above, and 2½ inches square for the final 12 feet.

Six guy wires, each with three insulators, are used on each mast, three at 36 feet and three at the top. These are standard three-sixteenths seven-strand wire.

No Ground

A counterpoise is employed instead of a ground. This consists of eight wires two feet apart, of seven-strand silicon bronze, having a length of 70 feet, with a four-wire lead-in to a change-over switch. The length of the lead-in is 35 feet.

The lead-in from the antennae consists of four wires, these being seven-strand No. 18 silicon bronze.

These are led directly to a change-over switch. The length of the lead-in is 70 feet.

The amperage regularly obtained in the antennae is 1.9 amperes.

The installation of this new station is largely the work of W. M. Riley, who installed broadcasting station KFHJ at Santa Barbara and also several amateur stations. Riley, who will be the operator of station 6RY, is a former navy and commercial ship operator. He began as an amateur in 1908. From 1914 to 1919 he was with the marines as sergeant in charge of the 29th radio detachment. From 1920 to 1923 he was a first-class operator in the navy, being stationed at various times at Goat island, Eureka and the Farallones. Subsequently he was operator in charge on the Standard Oil ship Lubrico.

They worked 7JU at Eugene, Ore.; 6ATN at Fallon, Nev., and 6AHP at Pomona, Cal., by phone Saturday, May 10, on test.

Radio for Swiss

Four broadcasting stations are being planned for Switzerland. They will be located at Lausanne, Geneva, Zurich and Basel. The Swiss government will place at the disposal of the stations, for better programs, the larger part of the revenue it collects from licenses issued to amateurs.

ANSWERS

Questions addressed to this department will be answered by L. E. Day of the Day Radio laboratory, 693 Mission-st. No hookups will be printed.

L. Alden, 1627 Hayes-st, San Francisco, asks:

Can a crystal set be attached to a phonograph?

If by holding the headphones several inches from the ear you are still able to hear distinctly, you should be able to use a phonograph attachment. This may be purchased from any local dealer.

V. A. Leaman, 135 Brighton-av, San Francisco, asks:

(1) I have a crystal set, but the only station I can hear is KGO. (2) I am constructing a single tube set and would like to know the range.

(1) Would suggest that you increase the size of the tuning coil. Also increase the aerial to about 100 feet if it is not already that long. (2) It is impossible to give the range of a set without seeing the hookup.

C. Sailor, 1530 Leavenworth-st, asks:

I would like to know where I can obtain more information about the "simple tube receiver," published in The Daily News radio section of Apr. 28.

The circuit you refer to is only a detector and two-step amplifier, without any tuning device ahead of the detector. Would suggest that you use what is known as the single regenerative circuit for your set.

Earle Lewis, 1816 Bush-st, asks:

Is the enclosed circuit correct?

Yes.

Stanley Lewis, 2833 Golden Gate-av, asks:

My aerial is 75 feet in length and rectangular in design, being hung around the walls of my back porch. Am having trouble with my crystal receiver.

(1) An aerial of the type described above is not very satisfactory for a crystal set. (2) Would suggest going over all connections and testing all condensers. Be sure that your crystal is a good one.

Long Distance Claim

Sixty-one stations in one night is the latest claim for DX honors, made by Clifford Riseborough of Blenheim, Ont. He heard the stations on a detector and one stage of amplification.

Station WDAR, Philadelphia, has substituted storage batteries for the motor generator, to eliminate the commutator hum.