

1924

RADIO WORLD

Title Reg. U. S. Pat. Off.

VOL. 5. No. 11.

ILLUSTRATED

EVERY WEEK



(Atlantic Foto)



(Kadel & Eerber.)



(Foto Topics)



(Foto Topics)

RADIO on the beach, the water, the diamond and in the woods brings added joy to vacation days.

CROSLEY

Announcing — The New Models — each a leader in its line



Crosley Trirdyn 3R3, \$65.00



Crosley Trirdyn 3R3 Special, \$75.00



Crosley 51, \$18.50



Crosley 51-P Portable, \$25.00



Crosley 52, \$30.00



Crosley 51-A, \$14.00



Crosley 50, \$14.50



Crosley 50-A, \$18.00

Guaranteed Satisfaction at a Reasonable Price

CROSLEY 50—A new one tube Armstrong Regenerative Receiver. We believe this to be the most efficient one tube receiver ever put on the market. Like our present Model V, which it supersedes, it will bring in, under average conditions, on headphones, broadcasting stations at a distance of one thousand miles or more. Uses any standard storage battery or dry cell vacuum tube. Price \$14.50

CROSLEY 50-A—A new two stage Audio Frequency Amplifier to match the new Model 50 receiver. This unit is equipped with a filament switch for shutting off the current from the "A" and "B" Batteries. When used in connection with the Crosley Model 50 Receiver, it gives the equivalent of a three tube regenerative receiver. Price \$18.00

CROSLEY 51—In twenty-four days this receiver became the biggest selling radio receiving set in the world, and it holds that position to-day. It uses two standard storage battery or dry cell tubes, regenerative detector and one stage of audio frequency amplification. Will bring in local stations on the loud speaker at all times, and under average conditions will also bring in distant stations on the loud speaker. Price \$18.50

CROSLEY 51-A—A new one stage Audio Frequency Amplifier to match the Model 51 receiver. When used in connection with the Crosley Model 51 Receiver it gives the equivalent of a three tube regenerative receiver. Price \$14.00

CROSLEY 52—A new three tube Armstrong Regenerative Receiver

has phone jack to plug in on two tubes and filament switch to turn off the "A" and "B" Batteries. It is unusually efficient, will provide loud speaker volume on distant stations under practically all conditions, and is in every way an ideal receiver for the home. Price \$30.00

CROSLEY 51-P—This is our new portable set. It is the Crosley Model 51 two tube receiver mounted in a leatherette covered carrying case, has a compartment for a pair of headphones and one to hold an ample power plant for the popular dry cell vacuum tubes. This receiver can be used as a stationary set in the home or as a portable. Price \$25.00

CROSLEY TRIRDYN 3R3—This three tube receiver gives the efficiency and volume of a five tube receiver. Incorporating Radio Frequency Amplification, Regenerative Detector with one stage of Reflex and one stage of straight Audio Frequency Amplification. Can be calibrated accurately—stations logged and returned to at will. Used on outdoor or short indoor antenna and is, we believe, the most efficient and sharpest tuning receiver on the market at any price for bringing in long distance stations. Price \$65.00

CROSLEY TRIRDYN 3R3 Special—This receiver is exactly the same as the Trirdyn 3R3 except the solid mahogany cabinet is larger, and more handsomely designed to harmonize with the most beautiful furniture settings. There is sufficient space inside for all the "A" and "B" Batteries required when standard dry cell tubes are used. Price \$75.00

Write for Descriptive Circular

THE CROSLEY RADIO CORPORATION

POWEL CROSLEY, JR., President

6401 ALFRED STREET

CINCINNATI, OHIO

Licensed under Armstrong
U. S. Patent No. 1,113,149

Crosley Owns and Operates
Broadcasting Station W L W

CROSLEY
Better - Cost Less
Radio Products

VOLUME FIVE OF
RADIO WORLD

[Entered as second-class matter, March 28, 1922, at the Post Office at New York, N. Y., under the Act of March 3, 1879]

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Announcing Vacation is at Hand



(Foto Topics)

"NEXT on the program is a joyous vacation." (Betty Vane announcing from Station SWIM). Her broad smile is anticipatory of happy days and nights on "mountain, lake, stream and shore," with a radio always at hand to add zest to each occasion. The portable set is the thing for vacation. By auto, train, boat or even airplane, you carry it along just like a suitcase. And as you alight the porter asks: "Carry your portable?"

A Novel Circuit: The Ultra Reflex



AT the Park Avenue fair, New York City, charming Marie Anferman directed the radio department. The panel view in the picture shows where dials and rheostat should be placed in the Ultra Reflex. Left to right, the dials are variometer, condenser and variocoupler. Two AF stages should be added for loud speaker operation.

By Herman Bernard

A CIRCUIT tempting to the experimenter because of its novelty and the triple use of one tube is the Ultra Reflex. As shown in the circuit diagram (Fig. 1) it consists of one stage of radio-frequency amplification and one stage of audio-frequency amplification, both obtained from the same tube by reflexing, and also a double system of detection—crystal rectification reinforced by detection in the tube. Thus RF, AF and detection occur in the only tube used in the circuit.

The set produces excellent quality of tone, with moderate strength, suitable, however, only for head phone use. It is not a DX set.

The parts needed are:

1 variometer.	1 cabinet, 7 x 21.
1 variocoupler.	1 panel, 7 x 21.
1 crystal detector.	1 baseboard, 7 x 18.
2 .001 fixed condensers.	1 tube.
1 .00025 fixed condenser.	1 socket.
1 .001 variable condenser	1 rheostat.
(43-plate).	Bus bar, binding posts, lugs,
1 audio-frequency trans-	and flexible wire for battery
former.	connections, etc.
1 honeycomb coil (100 turns).	

The variometer is the main tuning control, the variable condenser acting as auxiliary. The variocoupler is used principally as a regenerative radio-frequency transformer. It controls volume and resonance, but is not at all critical. The signal can be heard well, however the coupling may be varied, but there is only one setting in a given instance to achieve true resonance and best volume. This adjustment is easily made and will vary for different stations.

The duo-lateral coil (100-turn honeycomb) is used as a high-frequency choke, to prevent escape of the radio-frequency currents through the self-capacity of the AF transformer. A coil of No. 22 DCC wire, 70 turns, wound on a 3-inch tube, may be used instead, if the DL coil is not at hand. Many experimenters already

will have all the parts at home that are needed in this set.

The tube used was a C-299, with $3\frac{1}{2}$ volts of A battery and 45 volts of B battery. The rheostat for this tube should be 30 ohms. The AF transformer was a Federal, No. 65. It has a 6-to-1 ratio. The UV199 is the same as the C-299 tube. A UV201A may be used to advantage, but requires a 6-volt storage A battery. Do not use WD11 or WD12 tubes in this circuit, because they cannot stand the heavy load as well as the others, mentioned. The Myers tube, however, will stand the strain well.

As for the panel, use 7x21, because the circuit due to its novelty, lends itself to improvements that an experimenter will enjoy inventing. Hence, leave room for mounting some other variable tuning device and mount the first part, the variometer, with the center shaft 8 inches from the left-hand end of the panel. Next mount the .001 variable condenser, then the variocoupler. Mount the rheostat in front of where the tube will be, one terminal of the rheostat going to the A minus and the other to F minus of the socket. Do not fasten the AF transformer to the baseboard until the wiring is completed, because slight readjustments will be found convenient during the progressive stages of the wiring.

The construction is simple and the difficulty of getting proper reflexing, present in some circuits, need not be feared. In fact, any one who has built any kind of set can build this one. Follow these wiring directions:

1. Connect the aerial to one terminal of the variometer.
 2. Connect the other terminal of the variometer to four points as follows: (a) to the stationary plates of the .001 variable condenser; (b) to the beginning of the primary (stator) of the variocoupler; (c) to one end of the crystal detector; (d) to one end of the .00025 fixed condenser.
 3. Connect the ground to five points as follows: (a) to the rotary plates of the variable condenser; (b) to the end of the primary of the variocoupler; (c) to the end of the primary of the AF transformer (marked B or P2); (d) to the end of the secondary of the AF transformer (marked F or S2); (e) to the filament minus (A minus).
 4. Connect the beginning of the variocoupler secondary (rotor) to the plate of the tube socket. The end of the variocoupler rotor goes to one of the telephone terminals, the other terminal of the phones going to the B plus. Connect one end of one of the .001 fixed condensers to the plate and the other end to the B minus.
 5. Connect the A plus to the B minus, thus establishing a common lead.
 6. Shunt one of the other .001 fixed condensers across the primary of the AF transformer (marked P and B or P1 and P2), and connect the remaining terminal of the crystal detector to P.
 7. The beginning of the secondary of the AF transformer (marked G or S1) goes to one end of the honeycomb coil. The other end of the coil goes to the grid of the socket and to the still unconnected end of the .00025 fixed condenser.
 8. Connect the A plus of the battery to the F plus post of the socket.
- A fixed crystal may be used, but an adjustable detector (Concluded on next page)

Hook-up Tempts the Experimenter

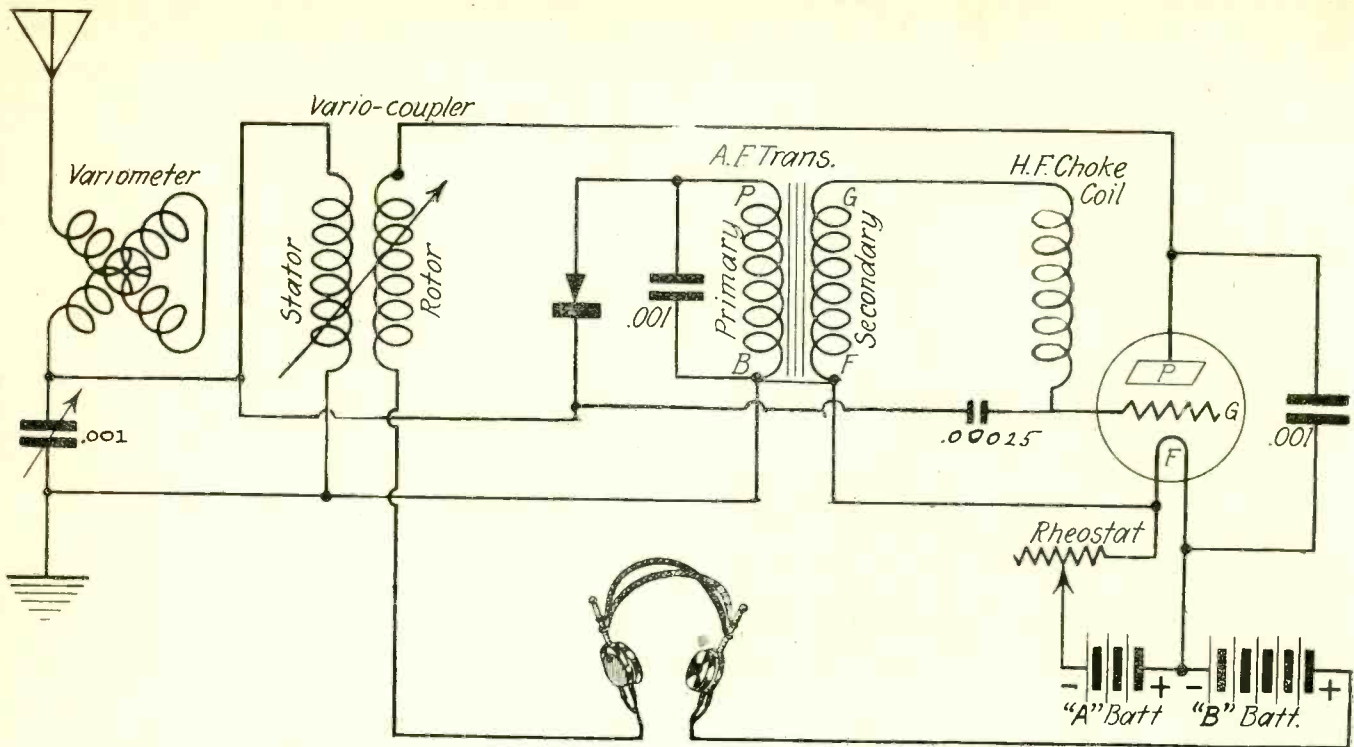


FIG. 1—Circuit diagram of the Ultra Reflex, which uses one tube for RF, AF and auxiliary detection, the main rectification being made by a crystal. The variometer is the principal tuner. A varico-coupler serves as a regenerating RF transformer. A .001 blocking condenser shunts plate and A plus, while a .00025 condenser bypasses the RF currents in the grid.

(Concluded from preceding page)

tor using galena or zincite-bornite or synthetic crystal, is preferable.

If proximity to two or more broadcasting stations requires that sharper tuning be obtained, use a variable .00025 condenser, instead of the fixed one in the grid

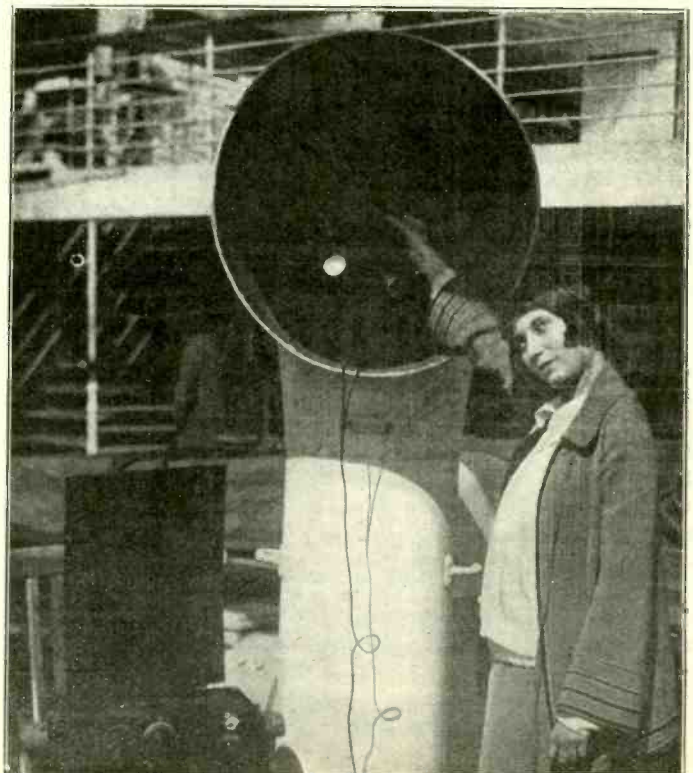
circuit. The connection of the primary to the secondary of the AF transformer, while unusual, is correct.

[Readers who construct this circuit or improve on it are requested to write full details of their experience. Address Technical Editor, Radio World, 1493 Broadway, New York City.]



(Foto Topics)

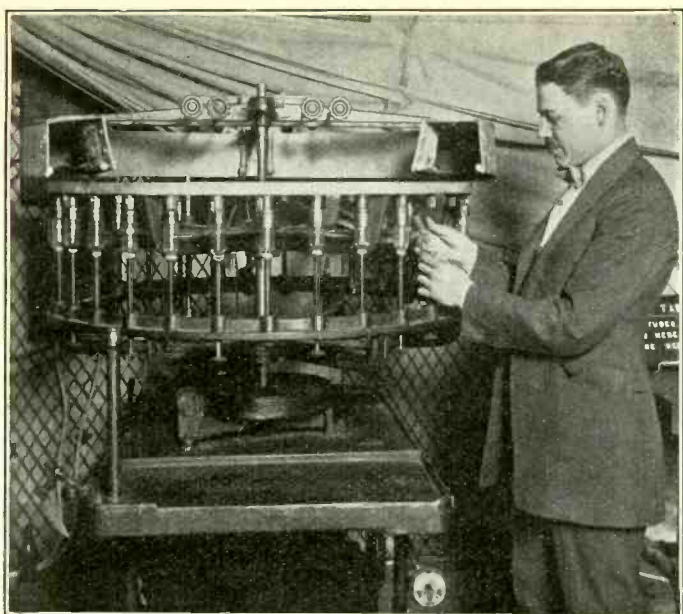
PART of one's vacation frequently being spent aboard ship, what could be better than a radio to add to the fun? The radio officer of the liner California is tuning in for the benefit of Miss Gretchen Bender. She sits comfortably on the steamer chair and smilingly enjoys the radio.



(Foto Topics)

AN IDEA!—Ethel Hirsch finds that if the throat of the ships ventilator is stuffed with newspapers, she can attach earphones to a set and use the vent as a loud speaker!

For Best Results, Know Your Tubes



(Fotograms)

THE TUBES are fastened to their metal base with cement, applied at an oven, during manufacture.

(Concluded from preceding page)

frequency or reflex circuits but usually will not perform as well as the UV201A tube, as regards volume. They are good for a low reflex stage. There is little need to use UV201A tubes for a low radio or low reflex stage, as power handling ability is not a question in such case. The larger capacity tubes can be favored for the last stage or stages of an amplifier where their capacity can be utilized, as they will stand up on larger plate potentials needed for power volume results.

Fallacy of Many "Any-Tube" Sets

Some so-called universal radio sets are put out with universal rheostats and claim that any tube can be used equally well. The filament question is only part of the story, as the transformer impedance ratios also need adjustment to fit different types of tubes. A UV199 tube requires higher impedance ratio than the UV201A tube does, so a set designed for the latter, while working with the little tubes, loses much in volume that cannot properly be credited against the tube. Aside from filament current requirements, different tubes vary in amplifying factor, mutual conductance and impedance values. Even tubes of the same make and type vary, sometimes widely, but on the whole average closely within a fairly limited group range. Sometimes changing tubes around in different sockets will improve operation.

Tubes Die Before Burning Out

Many tubes die or dry up before burning out. The filament is slowly evaporated and its resistance increases while the electron flow decreases. Thoriated filaments can often be restored by heating (without applying plate voltage) for twenty minutes time, but the oxide-coated types are near an end of useful life when they start to go. If everything else is in good condition and batteries replaced fresh, perhaps the lost volume from your set is due to employment of aged tubes. They may still be good for low stages, but cannot deliver volume for high stages.

Tube Sockets Faulty

Many tube troubles are caused by faulty connection between the tube base and the socket terminals. If

the tubes rattle around loose in the sockets, microphonic contacts may be made or even the grid or plate may fail to contact. If the plate fails it is easy to find, as no B battery current can pass the open circuit. An open grid contact can be told by applying a negative battery terminal to the grid, which should give a click sound in the phones if there is no open circuit.

Plate Current

The drain on B batteries is noticed mainly on sets using four or more tubes. The C battery or inserted plate impedance reduces plate current on radio stages or amplifying stages. Few loud speakers require more than 10 milliamperes current flow in the last stage for good volume. Three or four milliamperes plate current affords all the volume the usual headset receiver permits. As between small tubes like UV199 and larger tubes as 201A the plate current flow is less with the small tube, especially in low stages. To get audio volume it is necessary to boost the plate voltage, but the small tubes then require use of a C battery to limit plate current flow against overloading. If too much plate current is put on a tube, without grid potential control, the plate can be heated up to the melting point of supporting elements.

Other Special Tubes

There is a good English four-element tube, little used in this country, but permitting an efficient one-tube reflex set. It is the Schickerling tube, made in the United States. It resembles in performance average equivalent UV types, as do also the tubes called "magnatron," "DXtron," etc., but to avoid disappointment keep clear of the nameless bootleg or refill tubes unless the dealer selling them make a replacement offer. Some of the French and German tubes are now made to fit United States standard bases, but most of them do not. The fact that a tube lights up is not proof that it will perform as expected, and a test on a set in operation is a better guide, when the dealer is not equipped with a tester. Some tubes are made with porcelain base and brass shell cap, and others use bakelite molded bases, which seems to be an improvement. Tubes with fiber or poor insulating bases act as if there was a grid leak across the filament to grid terminals, and will not perform well in radio amplifying circuits, though tolerable in some audio and detecting sets for local station listening.

Regeneration and Super-Heterodyne Tubes

For regeneration tubes good as radio amplifiers are preferable. As oscillators for Super-Heterodyne sets, UV201A types usually work well, and sometimes UV199 tubes will be satisfactory. WD12 types are less desirable as oscillators. A tube which works in an ordinary radio-frequency set is able to work in the amplifying stages of a Super-Heterodyne set. The sets of the Neutrodyne type usually require UV201A tube and UV200 detector tube, though a UV201A tube can be substituted for the detector. In changing to 199 tubes, the neutralizing condensers would properly require to be reduced in value, though sometimes an improperly neutralized set using one kind of tube will just happen to be right for a different type of tube.

Spares

It is well to have one or two spare tubes on hand, in case a tube is broken or burned out, or to be able to try different tubes in each socket. Never put a 199 or equivalent low current filament tube in a socket connected to a six-volt battery supply without having a resistance of 60-ohm size in circuit.

Snodgrass, Holding Lead, Still Gains

RADIO WORLD'S TEST TO DETERMINE THE MOST POPULAR ENTERTAINER GETS STILL MORE EXCITING. VOTE FOR YOUR FAVORITE. USE COUPON ON PROGRAM PAGE

HARRY M. SNODGRASS, of WOS, Davenport, Ia., has increased his lead in Radio World's test to determine the most popular radio entertainer. The WOS announcer last month wrested the lead from Roxie (S. A. Rothafel), of WEA, New York City.

Mr. Snodgrass, up to the minute of going to press with this edition, had a lead of 67 over Roxie. The tally was, Mr. Snodgrass, 436; Roxie, 369.

However, Roxie is holding his own and the present standing of the contestants, say his followers, is in danger of an upset.

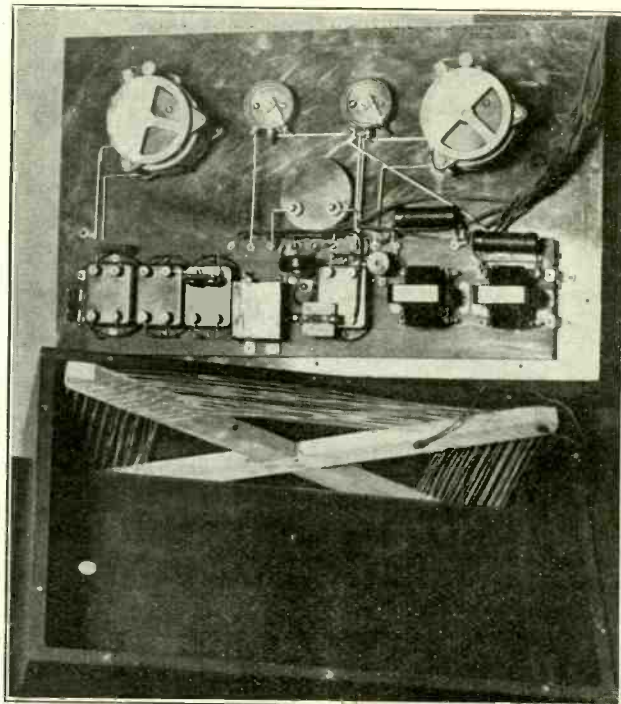
The McDowell Sisters, of WFAA, otherwise known as the Hawaiians, have 215 votes and are now in fourth place. The Old Time Fiddlers, who hail from WOS, have been whooping it up, and are now running in third position, with 224.

The Cafe Boulevard Orchestra, of WJZ, New York City, increased their votes, but still are in the ninth position. Dody Reimer, who made a remarkable run last month, is holding her own in eighth position. Harry Richman, WHN, New York City, who was off to a late start, is getting into the running in good shape.

The Tally

H. M. Snodgrass	WOS	Jefferson City, Mo.	436
Roxie	WEAF	New York	369
Old Time Fiddlers	WOS	Jefferson City, Mo.	224
McDowell Sisters	WFAA	Dallas, Texas	215
Thornton Fischer	WEAF	New York	214
Little Symphony Orchestra	KDKA	Pittsburgh, Pa.	209
Wendell Hall	WEAF	New York	202
Dody Reimer	WLAG	Minneapolis, Minn.	199
Vincent Lopez	WEAF	New York	181
Cafe Boulevard Orchestra	WJZ	New York	174
Jerry Sullivan	WDAP	Chicago	164
The Harmony Girl	WDAP	Chicago	154
Night Hawk Frolic	WDAP	Kansas City, Mo.	151
Jack Nelson	WDAP	Chicago	148
Henry Field	WOAW	Omaha, Neb.	142
E. H. Smith	WGY	Schenectady, N. Y.	139
Jack Chapman	WDAP	Chicago	121
Howard Lannin	WDAR	Philadelphia	115
Alabama Club Orchestra	WHN	New York	112
The Hired Hand	WBAP	Fort Worth, Texas	102
Little Orchestra	WGY	Schenectady, N. Y.	102
Ernie Rogers	WSB	Atlanta, Ga.	85
Bob Miller	WMC	Memphis, Tenn.	83
Desert Orchestra	KZN	Salt Lake City, Utah	77
Coon Sander's Orchestra	WDAF	Kansas City, Mo.	75
Mary Vogt	WOO	Philadelphia	54
Prison Band	WOS	Jefferson City, Mo.	53
Happiness Boys	WEAF	New York	46
The Hotel Astor Band	WJZ	New York	39
Dr. Cadman	WEAF	New York	28
A. E. Sonn	WOR	Newark, N. J.	25
Eveready Battery Orchestra	WEAF	New York	25
Uncle John	KHJ	Los Angeles, Calif.	24
KGO Players	KGO	Oakland, Calif.	21
Harry Richman	WHN	New York	20
Sweeney Radio Orchestra	WHB	Kansas City, Mo.	14
Dance Orchestra	WCAM	Villanova, Pa.	10

Portable Sets Help to Make Vacation Joys



(Kadel & Herbert)

MAJOR E. H. ARMSTRONG'S portable Super-Heterodyne uses only six tubes and a small built-in loop antenna. Both A and B battery circuits are supplied by small dry cells. Only two tuning controls are used besides the two rheostats, as shown in the photo. This outfit does good work no matter where located. The set is shown built into a portable cabinet, but it may be just as conveniently built into a small suitcase, and provision made for ground lead and antenna equipment. Major Armstrong at the Super-Heterodyne.

Cure for Regeneration Loss in R-C Set

OWNERS of R-C receivers have doubtless noticed that on certain stations and under certain conditions, especially on damp or rainy nights, that the set does not regenerate well. Here's what to do about it.

Remove the grid leak and condenser that is located in the upper rear left hand side, and in its place construct a small variable grid leak and grid condenser to take its place.

It will be better if a variable 3 plate condenser is used either alone in parallel with a small fixed condenser, and the grid leak should be of the order of from 0 to 5 megohms, preferably of the type that moisture does not affect.



(Kadel & Herbert)

AIRPLANES are being equipped with transmitting sets that broadcast talks from the air. This device will give increased joy to an aero vacation and be of invaluable benefit in the forested regions of the country in case of fire. Directions for fighting fires and floods can now be broadcast from off on the trial flight.

Best Reception on Vacation Made Easy

REQUESTS have led the Radio Section of the Associated Manufacturers of Electrical Supplies, 30 East Forty-second street, New York City, to issue a series of suggestions to the radio public for summer reception, especially on vacation. No difficulty should be experienced in securing good reception in the summer, it is pointed out, as during the past year the power of sending stations has been materially increased. The suggestions follow:

1—Put your set in the pink of condition. Whether your radio receiver is to be used at home, at the seashore or in the mountains, see that the connections are gone over and tightened up, that old batteries are replaced and that a good set of tubes are installed.

2—In camping with a radio, if your receiver is one of the antenna type, erect your aerial wire from the camp to a branch of one of the tallest trees in the immediate vicinity. If thunderstorms are prevalent, it will be found advisable to erect an additional antenna not over ten to twenty feet off the ground. That type of aerial is not so readily influenced by atmospheric disturbances. An aerial of this character can be of any length, from 100 to 200 feet.

3—Whether you use a receiver which operates from a loop or an antenna, the sensitiveness of the receiver should be reduced in times of atmospheric disturbances either by reducing the filament temperature or by "loosening the coupling," so that the best results might be obtained from your local stations. If atmospheric conditions are good, the filament temperature should be readjusted to normal, so that the sensitiveness of the receiver might be increased and reception obtained from broadcasting stations located at greater distances. The long low aerial or the loop type of receiver will give marked results during the summer from atmospheric disturbances.

4—See that you have a good ground connection when the aerial is used. If such cannot be obtained at the camp or at the seashore, the equivalent of a good ground connection can be had in the use of a piece of wire 100 to 200 feet in length laid over the surface of the ground and directly underneath the aerial.

5—Receiving apparatus in the camp should be duly protected from moisture and dampness. A moderate amount of moisture and dampness may not interfere with the operation of the average type of receiving set, but at least the set should not be allowed to get wet by exposure to rain or inclement weather.

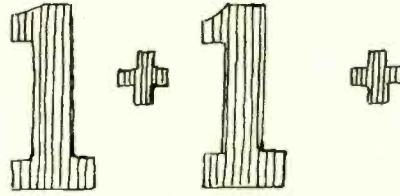
6—Broadcast listeners should bear in mind that the electrical constant of aerials erected at the seashore or in a camp may be quite different from the electrical constant of the aerial used with the same set at home. This means that stations formerly heard at home will not come in at the same point on the dials in the camp. It should not be difficult to locate new positions for such sets after the first evening's operation.

7—With regard to head telephones, be sure that the headset cord is not worn, that the connections are tight at the back of the head-telephone and that the caps are also screwed down tight.

The officers of the Associated Manufacturers of Electrical Supplies are: E. B. Mallory, chairman (Westinghouse Electric and Manufacturing Co.); Powell Crosley, Jr., chairman, membership committee, (Crosley Radio Corporation, Cincinnati); E. F. McDonald, Jr., chairman, legislation committee, (Zenith Radio Corporation, 332 S. Michigan Ave., Chicago); E. P. Edwards, chairman, rules committee, (General Electric Co., Schenectady, N. Y.); A. J. Carter, chairman, parts committee, (Carter Radio Company, 209 S. State St., Chicago); L. S. Brach, chairman, antenna circuit devices committee, (L. S. Brach Supply Co., 129 Sussex St., Newark, N. J.); R. H. Manson, chairman, aural devices committee, (Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.); M. C. Rypinski, chairman, broadcasting committee, (C. Brandes, Inc., 237 Lafayette Street, N. Y. C.); G. C. Furness, chairman, battery committee, (National Carbon Co., Thompson Ave., Long Island City, N. Y.); E. E. Bucher, chairman, merchandising committee, (Radio Corporation of America, 233 Broadway, N. Y. C.); G. K. Heyer, chairman, statistical committee, (Western Electric Co., N. Y. C.); Pierre Boucheron, chairman, publicity committee, (R. C. A.).

RADIO WORLD for next week, issue of June 14, will contain an article by Charles H. M. White on how best to add one RF stage to a regenerative set.

The Weekly Rebus



No. 4

CAN you decipher this rebus? Send your answer to Rebus Editor, RADIO WORLD, 1493 Broadway, New York City. Mention Rebus No. 4. The names and addresses of those sending in the correct answer will be published.

REBUS NO. 1

Among those who sent in the correct answer for Rebus No. 1 were:

Wm. Fisner, Jr., 21 Chestnut Road, Verona, N. J.

J. M. Wallace, Newcastle, Pa.

C. F. Kunkle, Box 194, Flemington, Pa.

Albert Deprato, 207 W. Circular St., Lima, O.

LaVerne Auchue, 37 N. Sibley St., Fond du Lac, Wis.

Carl Fanswe, Wauson, O.

Harry Spears, Mitchell, S. D.

G. C. Duncan, 1001 Praetorian Bldg., Dallas, Tex.

Ray Love, 328 E. 12th St., New Albany, Ind.

Roy Baker, RFD No. 1, Box 78, Hudson, Wis.

F. H. Herring, Ft. Pierce, Fla.

F. E. Emerson, 2500 Rawson St., Oakland, Cal.

H. R. Sibley, 30 Clark St., Torrington, Conn.

L. E. Wall, Pomona, Cal.

Mrs. Luke Brady, Boomer, Mo.

W. B. Bolton, 154 Westmoreland Court, Riverside, Cal.

J. E. Hagstrom, 3011 Euclid Ave., Berwyn, Ill.

R. W. Golden, 2954 N. Leavitt St., Chicago.

Alfred Morgan, Las Cruces, N. M.

J. L. Parent, 263 Riverdale Ave., Yonkers, N. Y.

Miss Mary Brown, 301 Fifth St., Fairmont, W. Va.

E. W. Simmons, 141 Central Ave., San Francisco.

H. A. Cassini, 2292b St. Hubert St., Montreal, Quebec.

A. B. Clemons, Southern Surety Co., Des Moines, Ia.

Max H. Hopf, Harper, Tex.

Herbert Eisenhart, 392 Wheatfield St., York, Pa.

Mrs. L. A. Lash, 171 W. River Ave., Hot Springs, S. D.

Wm. G. Wheat, 2607 Benton Blvd. Kansas City, Mo.

REBUS NO. 2

Among those who solved Rebus No. 2 were:

Wm. Filler, 1741 Washington Ave., N. Y. C.

Jos. Landry, 37 Spencer Ave., Chelsea, Mass.

Warren MacDonald, 426 Willow Ave., Jamaica, N. Y.

Fred Gomo, Jr., 278 Flushing Ave., Brooklyn, N. Y.

David Krantz, 1650 Amsterdam Ave., N. Y. C.

Coming Events

JUNE 10—Opening of Republican National convention, Cleveland. Speeches nominating candidates for President and Vice-President will be broadcast.

JUNE 24—Opening of Democratic National convention, Madison Square Garden, N. Y. C. Speakers nominating candidates for President and Vice-President will be broadcast.

AUG. 16-21—Radio Exposition, San Francisco, conducted by Pacific Radio Trade Assn.

SEPT. 22-28—First Annual International Radio Show, Madison Square Garden, New York City.

OCT. 2-11—Exposition, Grand Central Palace, New York City, under auspices of American Radio Exposition Co.

Zenith Exhibits Set Carried in Hotel

THE Zenith Radio Corporation, of Chicago, exhibited their new super-portable receiver at the Hotel McAlpin, New York City, during the week of the Music Trades' Convention. An unusual feature of the demonstration was that the set was carried about the lobbies and up and down the elevators while broadcast programs were being received.

Join the A. B. C.

THE American Broadcast Club, formed under the auspices of RADIO WORLD, has for its object the promotion of the welfare of the broadcast listeners of the United States, Canada and Mexico.

Membership is open to all interested in radio in any way, either as broadcast listener, dealer, manufacturer, wholesaler or jobber.

A novel feature of the A. B. C. is that membership entails no duties or obligations whatever. There are no dues. All you have to do is enroll. That will signify your interest in radio and make you one of the thousands unselfishly united in a common interest.

All you have to do to join is to send in your name and address on a postcard or in a letter.

Address, A. B. C. Editor, RADIO WORLD, 1493 Broadway, New York City.

OTHER NEW MEMBERS

W. R. Lansdale, 760 Gladstone Ave., Toronto, Ont.

B. J. Killeen, 34 Indiana St., Wheeling, W. Va.

J. P. Vanderkoy, 2200 Forestdale Ave., Cleveland, Ind.

A. P. Walker, Box 462, Hazard, Ky.

C. A. Kientz, 21 Kingsland Ave., Harrison, N. J.

Paul Bair, 516 East Eighth Ave., Tarentum, Pa.

Arthur Bair, 516 East Eighth Ave., Tarentum, Pa.

W. R. Emerson, Lexington, Nebr.

Paul Saffron, 780 Hazelwood Ave., Pittsburgh.

R. W. Lopstedt, 58 Clay St., San Francisco.

L. E. Wall, 496 E. Tenth St., Pomona, Cal.

Robt. W. Mott, 915 W. Fourth St., Pomona, Cal.

Allan Cannon, 631 N. Park Ave., Pomona, Cal.

H. R. Howard, 942 West Holt St., Pomona, Cal.

Harry Kufus, 255 East Pasadena St., Pomona, Cal.

W. L. Williams, 497 West Second St., Pomona, Cal.

A. B. Clemons, Southern Surety Co., Des Moines, Ia.

Mrs. L. R. Harris, 73 Waverly St., Roxbury, Mass.

W. H. Morris, 57 Glen St., Glen Cove, N. Y.

M. H. Hop, Harper, Tex.

Emmett Poons, 267 W. 89th St., N. Y. C.

R. F. Smith, Jr., 171 Bryant St., Palo Alto, Cal.

Sylvester W. Wendell, 521 Taylor St., Topeka, Kas.

Miss Viola K. Wendell, 531 Taylor St., Topeka, Kas.

F. B. Cordova (dealer), Apartado 1140, Tampico, Mexico.

R. H. Jones, 21 Atlantic Ave., Fitchburg, Mass.

Dr. W. A. Ransier, Box 436, Hardin, Mont.

THE NEW TIVOLI THEATRE, Washington, D. C., is being wired for broadcasting. The wires will run into a Washington radio station and the vocal and instrumental portions of the Tivoli's performance will be sent through the air once or twice weekly.

Summer Reflex Sold by Harrington Co.

THE Harrington Radio Co., 145 Greenwich St., New York City, are Erla specialists. They are turning out a portable Erla Duo Reflex for summer use. It is an efficient and compact set and they claim it to be the ideal summer circuit. This concern gives free advice and Erla bulletins.



The RADIO PRIMER

Information and Instruction for the Beginner

WHAT A REFLEX IS

By N. N. Bernstein

(Technical Editor)

THE expression "reflex" in radio means forcing one tube to do the work of two, by connecting the proper transformers in such a manner as to send back the current once passed through the tube to be again passed through it in another manner.

In the reflex circuit the signal passes through the antenna tuning coil to the grid of the tube, no grid condenser being used. Since there is no blocking of signals, due to the absence of a grid condenser, no rectification takes place, thereby allowing the original signal which is of radio frequency to pass through the tube, there to be amplified by the high voltage current on the plate, and passed to a crystal detector, or rectifier. The crystal changes the nature of the signal by reducing it to audible or audio-frequency, when it is then passed through the primary of an audio-frequency transformer and inductively stepped by the secondary of that transformer.

The current, now of audio-frequency, is again impressed upon the grid of the tube, and relay action again takes place to the plate, where the high voltage battery does the actual boosting of the signal.

The two currents, radio and audio-frequency, do not conflict because of their different nature, and because the tube is able to handle both kinds of current. Therefore, both radio and audio-frequency currents are constantly passing through the tube at the same time, the tube performing both functions without hindrance to either.

GRID RETURN EXPLAINED

The expression "grid return" is very often used by technical writers on radio subjects, but is little understood by a great number of novices in the game. As the expression indicates, it is a wire connected from the grid of a tube to its proper position elsewhere in the circuit. The grid return goes either to the positive or negative post on the tube socket, depending on whether the tube is used as a detector or amplifier. When used as a detector, the grid return usually goes to the positive post, and when an amplifier, to the negative post. These positive and negative posts are determined by their connections to the A or filament lighting battery. Usually the tube socket is marked F minus and F plus, so that the positive and negative of the A battery may be correctly wired. The rheostat that controls the tube is connected in the negative battery lead.

The grid return in the case of a detector tube goes first through the grid leak and condenser, through the secondary of the variocoupler or other tuning device and thence to the plus post on the socket. (Fig. 1.) For convenience in wiring, the connection is sometimes made onto the plus lead of the A battery when that lead is in a favorable position, to avoid the addition of more wire in the circuit. The positive grid return is necessary for the detector because the detector tube grid

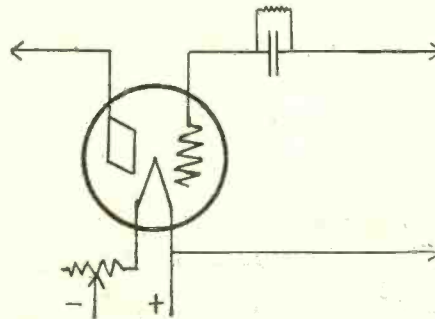


FIG. 1—Positive grid return for detector.

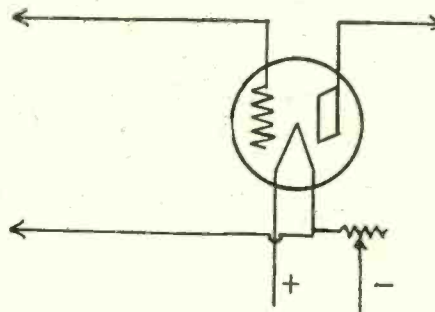


FIG. 2—Negative grid return for amplifier.

always carries a positive charge. Should the return lead be connected to the minus pole, the negative current would detract from the signal value by counteracting the inflow of signal current going to the grid.

In the case of amplifier tubes, the grid return goes through the secondary of the radio or audio-frequency transformers as the case may be, and thence to the negative A battery lead. (Fig. 2.) This is necessary in amplifying circuits, to prevent overloading the amplifier grids, and causing a blocking effect on the signals.

Beginners' Dictionary

VERNIER—A mechanical means of obtaining a fine adjustment. In a rheostat, an extra piece of wire is used to obtain intermediate resistance. In a condenser one separated plate is used, or a friction knob is attached to the dial on the panel.

CIRCUIT—The path of electricity over conductors. In a winding diagram the various lines show the wires connected to the different instruments. The current is traced from its source to the end of the circuit by these wires.

His Talk Brings Results

AS a result of his three radio talks broadcast from WEAf on February 26, March 11 and March 25 on railroad problems, Robert S. Binkerd, vice-chairman of the committee on Public Relations, Eastern Railroads, received more than 200 requests for copies of his talks. He had pamphlets printed and supplied the demand.

WHAT'S WRONG HERE?

THIS time it might well be asked "What's Wrong There?" instead of "Here." The wiring in Fig. 1 in the column to the left of this one is correct. But there is a decided informality in the drawing. If you can discover it, send your answer to Wrong Diagram Editor, RADIO WORLD, 1493 Broadway, New York City, and refer to Wrong Diagram No. 5. The names and addresses of those sending in the correct answer will be published. Among those who sent in correct answers to previous Wrong Diagrams were:

WRONG DIAGRAM NO. 1

- D. P. Hartley, Jasper, Alta., Can.
- Mrs. A. W. Wallace, 310 No. 2nd St., Monroe, La.
- Wm. H. McGann, RFD No. 2, Box 136, Pittsfield, Mass.
- Wm. G. Wheat, 2607 Benton Blvd., Kansas City, Mo.
- J. E. Trout, 32 Putnam Ave., Brooklyn, N. Y.
- Wm. Wiking, 153 W. 16th St., N. Y. City.
- Rosewell F. Clarke, Schuyler Lake, N. Y.
- Bayard G. Livingston, 3d, 10 Perry St., Morristown, N. J.

WRONG DIAGRAM NO. 2

Among those who found the mistakes in Wrong Diagram No. 2 were:

- Arthur Rand, Oakland, Me.
- M. L. Lujan, Hotel Belmont, San Diego, Cal.
- Ray Love, 328 E. 12 St., New Albany, Ind.
- Robert Burkham, Kent school, Kent, Conn.
- R. W. Golden, 2954 North Leavitt St., Chicago.
- Wm. G. Wheat, 208 Bright Bldg., Kansas City, Mo.
- Isidore Schneider, 457 Powell St., Brooklyn, New York.
- Herbert Eisenhart, 392 Wheatfield St., York, Pa.
- E. W. Simmons, 141 Central Ave., San Francisco.
- Alfred Morgan, Las Cruces, N. M.
- La Verne Auchue, 37 N. Silbey St., Fond du Lac, Wisc.
- Raymond Lane, Midland, Mich.
- Mrs. A. W. Wallace, 310 No. Second St., Monroe, La.

WRONG DIAGRAM NO. 3

Among those who sent in the correct answer to Wrong Diagram No. 3 were:

- Jack Gerson, 5514 Ellsworth Ave., Pittsburgh.
- Rollin Jenney, 414 Jackson Ave., Endicott, N. Y.
- L. M. Church, Ordinance Office, War Dept., Washington, D. C.
- C. A. Ferguson, 714 Broadway, Utica, N. Y.
- J. L. Parent, 263 Riverdale Ave., Yonkers, N. Y.
- T. H. Lucking, 23 Birch St., Derry, N. Y.
- Mrs. A. W. Wallace, 310 No. 2nd St., Monroe, La.
- Alader Nagy, 772 Ninth Ave., N. Y. C.

Band in Washington, D. C. Heard in Vienna

WASHINGTON EVIDENCE that American jazz is about to girdle the Seven Seas via radio is found in two letters which Meyer Davis, orchestra magnate, has received from radio fans in Vienna, Austria, who report that they picked up a concert given by the Davis Le Paradis band in Washington a few weeks ago. Vienna is four thousand miles from Washington.

LITERATURE WANTED

THE names and addresses published below are those of readers of RADIO WORLD who desire manufacturers of and dealers in radio sets, parts and supplies, to send literature on their products.

- H. B. Williams, 808 W. Barraque St., Pine Bluff, Ark.
- Howard Tire Shop, Box 85, Cameron, W. Va., interested in manufacturers and jobbers.
- Henry J. Nace, Electric Dept., Gilboa Dam, Gilboa, N. Y.
- H. W. Pangburn, 6 Grand St., Glens Falls, N. Y., interested in manufacturers and dealers.
- Ed. J. Frick, 121 West 96th St., N. Y. C.
- Frank Daniels, RFD No. 1, Wayland, Mich.
- R. J. White, Radio School, Signal Battalion, Quantico, Va., especially on transmitters.
- H. A. Smith, Box 93, Depbyster, N. Y.
- E. G. Bick, Box 12, Latrobe, Pa.

RADIO CHEERS MURDER JURY

PROVIDENCE, R. I. AT the suggestion of Judge Hahn, presiding in the Superior Court here, over the trial of Antonio Venditte, charged with murder, a radio receiving set was installed in the rooms of the hotel where the jury is locked up each night. This is the first time the State has provided radio in such cases.

BROADCAST PROGRAMS

KEY

Abbreviations: G. M. T., Greenwich Meridian Time; E. S. T., Eastern Standard Time; C. S. T., Central Standard Time; M. T., Mountain Time; P. T., Pacific Time; m, meters; k, kilocycles.

D. S. T.—Daylight Saving Time.
How to tune in a desired distant station at just the right time—Choose your station from the big list published herewith. See what time division the station is under (E. S. T., C. S. T., etc.); then consult the table below. Add to or subtract, as directed, from the time as given on the PROGRAM. The result will be the same BY YOUR CLOCK that you should tune in. The tables:

If you are in	And want a station in	Subtract	Add
E. S. T.	C. S. T.		1 hr.
E. S. T.	M. T.		2 hrs.
E. S. T.	P. T.		3 hrs.
C. S. T.	E. S. T.	1 hr.	
C. S. T.	M. T.		1 hr.
C. S. T.	P. T.		2 hrs.
M. T.	E. S. T.	2 hrs.	
M. T.	C. S. T.	1 hr.	
M. T.	P. T.		1 hr.
P. T.	E. S. T.	3 hrs.	
P. T.	C. S. T.	2 hrs.	
P. T.	M. T.	1 hr.	

If you are under Daylight Saving Time, and the station you want is under that time, too, or if both are under Standard Time, the above table will hold.

If you are under Daylight Saving Time, and the station operates under Standard Time, add one hour to the table result.

If the station uses Daylight Saving Time, and you are under Standard Time, subtract one hour from the table result.

E. S. D. S. T.—Eastern Standard Daylight Saving Time.

Wednesday, June 4

WDAR, Philadelphia, 395m (760k), E. S. D. S. T.
—11:45 A. M., daily almanac, 12 noon, organ recital from Stanley Theatre; features from studio; Arcadia concert orchestra. 2 P. M., Emiliy L. Buckley, contralto; Elsie I. Tucker, soprano and pianist. 4:30 P. M., Martha G. Korndaffer, contralto. 5:15 P. M., program of dance music. 5:45 P. M., baseball and other sports results. 7:30 P. M., Dream Daddy with the boys and girls. 8 P. M., Sylvania quartette (male).

WIP, Philadelphia, 509m (590k), E. S. D. S. T.
1:30 P. M., weather forecast. 3 P. M., Dorothy Bringhurst, pianist; Emma Thompson Mills, soprano; Helen Scull Mankey, contralto; Emilie Loeben, accompanist. 6 P. M., weather forecast; final baseball scores. 6:05 P. M., dinner music. St. James Hotel orchestra, from St. James Hotel. 6:45 P. M., agriculture, livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children.

WOC, Davenport, Ia., 484m (620k), C. S. T.
12 noon, chimes concert. 12:15 P. M., weather forecast. 1 P. M., closing stocks and markets. 3:30 P. M., educational program. 6:30 P. M., Sandman's visit. 6:50 P. M., sport news and weather forecast. 8 P. M., organ recital.

WJZ, New York, 455m (660k), E. S. D. S. T.
7:20 P. M., financial developments of the day. 7:30 P. M., Irving Selzer's Cafe Boulevard orchestra. 7:45 P. M., "Epsom Derby," by G. L. Chesterton. 8:30 P. M., city official series. 8:45 P. M., popular songs by Ross Fowler and William J. McKenna. 9 P. M., Innis Brown, "Golf." 9:30 P. M., Mrs. Emil Coleman, soprano. 10 P. M., Anna Pinto, harpist. 10:30 P. M., Emil Coleman's Trocadero orchestra.

KFAE, Pullman, Wash., 330m (910k), P. T.
8:30 P. M., Guitars Trio, program of Hawaiian music; Yakima; "Crude Oil and Its Products," Prof. L. J. Smith; vocal selections.

KHJ, Los Angeles, 395m (760k), P. T.—6 P. M., Art Hickman's concert orchestra. 6:45 P. M., children's program, bedtime story by Uncle John. 8 P. M., Roberts' Golden State band; Lester Hugo Castle, baritone; Dr. Mars Baumgardt, lecturer. 10 P. M., Art Hickman's dance orchestra.

WGI, Medford, Mass., 360m (830k), E. S. D. S. T.
—6:30 P. M., closing stock market reports; Boston police reports. 7 P. M., meeting, Amrad Big Brother Club. 7:30 P. M., evening program: "Health-o-gram," by Rev. B. M. Heald; drama, direction of Miss Gladys R. Brigham; readings by Martha Elsie Fitzgerald; popular song hits. Don Ramsey at the piano; weather report and time.

WLAG, Minneapolis, Minn., 417m (720k), C. S. T.
—2:40 P. M., daylight concert. 4 P. M., magazine reading. 5:30 P. M., children's hour. 2:10 P. M., "The Woman Beautiful," Maude Hart. 7:30 P. M., farm lectures. 9:15 P. M., business message. 9:30 P. M., Nankin Cafe orchestra.

WOR, Newark, N. J., 405m (790k), E. S. D. S. T.
—6:15 P. M., "Music While You Dine"—Baudistel's Olympic Park orchestra. 6:55 P. M., resume of the day's sports. 8:45 P. M., "Alaska," travel talk by J. A. Wales. 9 P. M., Dr. Carl Ackley, talking on "My African Experiences." 9:15 P. M., Frank Munn, tenor, and Dr. Robert H. McConnell, baritone. 9:45 P. M., popular program—Pennington Record orchestra and Leo Friedman's All-Star Songsmiths.

WEAF, New York, 492m (610k), E. S. D. S. T.



THE ARION TRIO, popular feature of KGO, the Pacific Coast broadcasting station. Left to right they are: Margaret Avery, Josephine Holob and Mrs. J. H. Barthelson.

6 P. M., dinner music from Rose Room, Hotel Waldorf-Astoria. 7 P. M., synagogue services; daily sport talk; George O'Brien, tenor; talk, auspices American Agriculturist; lecture on Psychology, by Gardner Murphy; Gold Dust Twins; the Chiclet orchestra; Radio Wedding of Wendell Hall, the Eveready Red Head, and Marian M. Martin.

WLW, Cincinnati, O., 309m (970k), E. S. T.
1:30 P. M., business reports. 3 P. M., market reports. 4 P. M., "Shut In" program by Wurlitzer Concert Co. 4:25 P. M., lesson in French from Crosley University. 5:15 P. M., baseball results. 8 P. M., recital of sacred songs.

WGY, Schenectady, N. Y., 380m (790k), E. S. T.
—11:30 A. M., stock market report. 11:40 A. M., produce market report. 11:45 A. M., weather report. 11:55 A. M., time signals. 5 P. M., produce and stock market quotations; news bulletins; baseball results. 5:30 P. M., Adventure Story.

PWX, Havana, 400m (750k), E. S. T.—8 P. M., concert at Malecon band stand, Municipal band of Havana with operas and national music.

KGO, Oakland, Cal., 312m (960k), P. T.—1:30 P. M., stock exchange and weather bureau reports. 3 P. M., short musical program; address, "A Vision of What Education Might Be," by Mrs. George H. Hoyt. 4 P. M., concert orchestra, Hotel St. Francis. 6:45 P. M., stock exchange and weather reports, and news items.

WHAS, Louisville, Ky., 400m (750k), C. S. T.
4:50 P. M., local livestock produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., Central Standard time. 7:30 to 9 P. M., agricultural tabloid talk; concert, auspices of Mrs. Jane Webster Murrell Studio; readings, Mrs. Cordia Greer Petrie; piano solos, Miss Tekla Miner.

KSD, St. Louis, Mo., 546m (550k), C. S. T.
—6:45 P. M., program by Abergh's concert ensemble. 9 P. M., violin recital, direction Arno Weachtler. 11 P. M., dance music by Rodemich's orchestra.

Thursday, June 5

WDAR, Philadelphia, 395m (760k), E. S. D. S. T.
2 P. M., Arcadia concert orchestra. 4:30 P. M., recital from studio. 5:30 P. M., educational talk by member of faculty, Peirce School. 5:45 P. M., baseball and other sports results. 7:30 P. M., Dream Daddy with the boys and girls; Stetson Kiddie Players.

WIP, Philadelphia, 509m (590k), E. S. D. S. T.
6 P. M., weather forecast and final baseball scores. 6:05 P. M., dinner music by Harold Leonard's Red Jackets. 6:45 P. M., agriculture, livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children. 8 P. M., "Timely Talks for Motorists" by Gene Hogle. 8:15 P. M., concert by artist-students from Morley Studio, Philadelphia. 11:15 P. M., Ted Weems and his Victor Recording orch.

WOC, Davenport, Ia., 484m (620k), C. S. T.
—12:15 P. M., weather forecast. 1 P. M., closing stocks and markets. 3:30 P. M., educational program. 5:45 P. M., chimes concert. 6:30 P. M., Sandman's visit. 6:50 P. M., sport news and weather forecast. 9 P. M., orchestra program.

WJZ, New York, 455m (660k), E. S. D. S. T.
7 P. M., David Cory's Jack Rabbit stories. 7:20 P. M., financial developments of the day. 7:30 P. M., Club Lido Venice string ensemble. 8:30 P. M., Wanamaker organ recital. 9:30 P. M., Irene Kehsler, contralto, accompanied by Keith McLeod. 10 P. M., "National Rifle Day," by J. H. Phillips, Jr. 10:15 P. M., Fay Milbar, pianist. 10:30 P. M., Hotel Majestic orchestra.

WJY, New York, 405m (740k), E. S. D. S. T.
—7:30 P. M., Roy G. Parker, tenor; William Guggolz, baritone, accompanied by Keith McLeod.

8 P. M., New Jersey String Quartet. 9 P. M., Ruth A. Warburton, soprano. 9:15 P. M., "The Way to Prevent Motor Vehicle Accidents" by T. D. Pratt. 9:30 P. M., operatic and Spanish program.

KFAE, Pullman, Wash., 330m (910k), P. T.
—8:30 P. M., orchestra numbers, Murphy's Five; piano solos, Florence Carpenter; soprano songs, Glade Burnett; guitar selections, Ray Kromer; talk on new books, Alice L. Webb.

KHJ, Los Angeles, 395m (760k), P. T.—6 P. M., Art Hickman's concert orchestra. 6:45 P. M., children's program; bedtime story by Uncle John. 8 P. M., program, courtesy Fitzgerald Music Co.; Ruth Quisenberry, reader. 10 P. M., Art Hickman's dance orchestra.

WGI, Medford, Mass., 360m (830k), E. S. D. S. T.
—6:45 P. M., code practice. 7 P. M., meeting, Amrad Big Brother Club. 7:30 P. M., talk by Geoffry L. Whalen, "The Radio Movie Man"; film digest. 8 P. M., WGI radio revel; weather report and time.

WOAW, Omaha, Neb., 526m (570k), C. S. T.
—6 P. M., speaker's half hour. 6:30 P. M., dinner program by Russ Townsend and his orchestra. 9 P. M., program, featuring the K. of C. Glee Club.

WLAG, Minneapolis, Minn., 417m (720k), C. S. T.
—2:40 P. M., Paul Wilke's university orchestra. 4 P. M., magazine reading. 5:30 P. M., children's hour. 6 P. M., "Black Bass in Minnesota Lakes," Howard Selover. 6:15 P. M., Geo. Osborn's Golden Pheasant orchestra. 7:30 P. M., farm lectures, "Hog Cholera, Its Prevention," F. P. Hall.

KHJ, Los Angeles, 395m (760k), P. T.—6 P. M., Art Hickman's concert orchestra. 6:45 P. M., children's program; bedtime story by Uncle John. 8 P. M., Studebaker radio orchestra of Long Beach. 10 P. M., Art Hickman's dance orchestra.

WGI, Medford, Mass., 360m (830k), E. S. D. S. T.
—6:30 P. M., closing stock market reports; code practice; Boston police reports. 7 P. M., meeting Amrad Big Brother Club. 7:30 P. M., selected verses by Mr. C. L. H. Wagner. 7:40 P. M., late Ampico releases. 7:50 P. M., Red Cross health talk. 8 P. M., Boston University night—musical clubs program; weather report, and time.

WOAW, Omaha, Neb., 526m (570k), C. S. T.
—6 P. M., community program by talent from Elgin, Neb. 9 P. M., Woodmen of the World National Memorial Day service, auspices World Radio Camp.

WLAG, Minneapolis, Minn., 417m (720k), C. S. T.
—6 P. M., "Motor Boating," Dr. J. F. Schefcik; "Playing Tennis at U. of M." Clarence Sandors; "Radio," Ray R. Sweet. 7:30 P. M., farm lectures—"How to Decorate Your Table," Myrtle H. Letchel; "Function of Vegetables in the Diet," Dr. J. J. Willaman. 9:15 P. M., business message. 9:30 P. M., Esther Cutcheon Moss, pianist; Capitol Quartet.

WOR, Newark, N. J., 405m (740k), E. S. D. S. T.
—6:15 P. M., Albert E. Sonn, technical editor, weekly lesson on "Radio for the Layman." 6:25 P. M., "Music While You Dine," Tom Cooper's Country Club orchestra. 7 P. M., "Olympic Games," by C. Fielding. 7:25 P. M., resume of the day's sports.

WEAF, New York, 492m (610k), E. S. D. S. T.
—11 A. M., Helen Clark, soprano, accompanied by Grace Hoffheimer; market and weather reports. 4 P. M., William Scotti, saxophonist, accompanied by Paul Fiedelman; Lydia Orlova, soprano; Clyde C. Clark, jazz pianist; children's program. 6 P. M., dinner music direct from Rose Room, Hotel Waldorf-Astoria. 7:12 P. M., Interdenominational services; daily sport talk; Emily Alice Berry, dramatic reader; Serenaders Banjo Trio; Melanie Dowd, contralto; Pasquale Ferrara, tenor; Sara Alter, Pianist; Alois Havrilla, baritone; Vincent Lopez and orchestra.

WLW, Cincinnati, O., 309m (970k), E. S. T.
5:15 P. M., baseball results. 10 P. M., Times-Star Radio Club of the World. 10:10 P. M., program from representatives Junior Chamber of Commerce. 10:45 P. M., songs by Mrs. Julia Hammerler Wendell, accompanied by Mrs. Nettie W. Shaffer; popular dance program by the Doherty Melody Boys.

WGY, Schenectady, N. Y., 380m (790k), E. S. T.
—5 P. M., produce and stock market quotations; news bulletins; baseball results. 5:15 P. M., report on New York State highways. 5:30 P. M., organ recital by Stephen E. Boisclair. 7:45 P. M., a few minutes with new books. 7:50 P. M., musical program.

KGO, Oakland, Cal., 312m (960k), P. T.—1:30 P. M., stock exchange and U. S. Weather Bureau reports. 4 P. M., concert orchestra of Hotel St. Francis. 6:45 P. M., stock exchange and weather reports, and news items.

WHAS, Louisville, Ky., 400m (750k), C. S. T.
4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., Central Standard time. 7:30 to 9 P. M., concert by Miss Gardner and her Novelty orchestra; International Sunday school lesson; Boy Scout talk.

KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.
—6 P. M., baseball scores; dinner concert. 6:30 P. M., children's period. 6:45 P. M., news bulletins. 7 P. M., baseball scores; "Your Garden This Summer," Radio Garden Editor. 7:15 P. M., farm program. 7:40 P. M., National Stockman market reports. 8 P. M., Lyman A. Perkin's artists' concert with KDKA Little Symphony orchestra. 9:55 P. M., time signals; weather forecast; ball scores. 11 P. M., concert by Edgar Thompson male quartet.

KYW, Chicago, 536m (560k), C. S. T.—6 P. M., dinner concert from Congress Hotel. 6:35 P. M., talk on "Sports," by Leo Fisher. 6:45 P. M., talk on "Finance and Markets," by Mr. Tbos. Hoyne. 7 P. M., twenty minutes of good reading. 7:20 P. M., musical program.

WBZ, Springfield, Mass., 337m (890k), E. S. T.
—7:30 P. M., bedtime story for kiddies. 7:40 P. M., musical program from the St. James Theatre,

Boston. 8:15 P. M., concert by Vespers Quartet; Joshua Jones, Jr., reader. 9 P. M., Mildred Cobb, soprano; Paul Russell, tenor; Jessie Fleming Vose, accompanist. 10:55 P. M., time signals and weather reports.

Friday, June 6

WDAR, Philadelphia, 395m (760k), E. S. D. S. T.— 2 P. M., Arcadia concert orchestra; recital from studio. 4:30 P. M., program of dance music. 5:45 P. M., baseball and other sports results. 7:30 P. M., Dream Daddy with the boys and girls. 7:50 P. M., book review. 8:30 P. M., Blanche Brooke Haley, soprano; Hans Schlegel, flute; Oscar K. Meyer, piano; Jeanne Modave, cello. 9:30 P. M., Mrs. Julieva and Radcliff. 10 P. M., Jimmy Lapsley, Scotch comedian.

WIP, Philadelphia, 509m (590k), E. S. D. S. T.— 1:30 P. M., weather forecast. 3 P. M., Mildred Kay, soprano; Mrs. Alsie May Pollard, soprano; Einna Aberle, soprano; Arnold V. Pent, tenor. 4:15 P. M., lesson in Mah Jongg, by Mr. and Mrs. Wei Lum Wong of Shanghai. 6 P. M., weather forecast; final baseball scores. 6:05 P. M., Jordan-Lewis dance orchestra. 6:45 P. M., agriculture market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for the children.

WOC, Davenport, Ia., 484m (620k), C. S. T.— 1 P. M., closing stocks and markets. 3:30 P. M., educational program. 5:45 P. M., chimes concert. 6:30 P. M., Sandman's visit. 6:50 P. M., sport news and weather forecast. 8 P. M., musical program. 9 P. M., weekly tourists' road bulletin.

WJZ, New York, 455m (660k), E. S. D. S. T.— 5:30 P. M., agricultural, farm and home reports; closing quotations, N. Y. Stock Exchange; foreign exchange quotations. 7 P. M., Thornton Burgess, "Jack Rabbit Stories." 7:20 P. M., financial developments of the day. 7:30 P. M., weekly French lesson. 8 P. M., C. E. Bricken, pianist. 8:15 P. M., surprise program. 10 P. M., Dr. R. B. Tensler, "Japan." 10:15 P. M., Alex Maltseff, tenor. 10:45 P. M., Specht's Alamac Hotel orchestra.

WJY, New York, 405m (740k), E. S. D. S. T.— 7:45 P. M., George A. Leach, baritone. 8 P. M., Loosleaf Current Topics. 8:15 P. M., George A. Leach, baritone. 8:45 P. M., "Bull Head," by F. A. Staiger. 9 P. M., People's Chorus. 9:45 P. M., "Bermuda Ways and By-Ways" by Dr. W. D. Moffat.

WOR, Newark, N. J., 405m (740k), E. S. D. S. T.— 6:15 P. M., "Music While You Dine," Ernie Crickett's Cinderella orchestra. 7:20 P. M., resume of the day's sports. 8 P. M., Brandorff string quintette. 8:30 P. M., baritone solos by Nicolai Oulukanoff, Agnes Bevington, piano. 8:45 P. M., "Half Hours With Men of Achievement," William Dublier, radio expert, "The Past, Present and Future of Radio." 9:45 P. M., concert by WOR-IORS, direction J. M. Barnett.

WEAF, New York, 492m (610k), E. S. D. S. T.— 11 A. M., talk by Mrs. Clarence R. Hyde; market and weather reports. 4 P. M., club program for women; talks and music by Arthur Michaud, tenor; Marjorie Caddell, soprano, and Jennie Robinor, pianist; children's program. 6 P. M., dinner music from Rose Room, Hotel Waldorf-Astoria. 7:10 P. M., Mildred Scott, soprano; Milkarpie stories for children; the Happiness Boys; Billy Jones and Ernest Hare; James McKinley Rose, tenor; B. Fischer's "Astor Coffee" orchestra.

WLW, Cincinnati, O., 309m (970k), E. S. T.— 10:30 A. M., weather forecast and business reports. 1:30 P. M., market reports. 3 P. M., stock quotations. 4 P. M., special program.

WGY, Schenectady, N. Y., 380m (790k), E. S. T.— 1 P. M., music and stock market quotations; news bulletins; baseball results. 5:30 P. M., children's program. 6 P. M., International Sunday school lesson. 7:35 P. M., health talk, N. Y. State Dept. of Health. 7:40 P. M., baseball results. 7:45 P. M., WGY prize drama, "A Million Casks of Pronto," by Agnes Miller.

KGO, Oakland, Cal., 312m (960k), P. T.— 1:30 P. M., stock exchange and U. S. Weather Bureau reports. 3 P. M., afternoon of California composers and authors. 4 P. M., concert orchestra of Hotel St. Francis. 6:45 P. M., stock exchange and weather reports, and news items.

WHAS, Louisville, Ky., 400m (750k), C. S. T.— 4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., Central Standard time. 7:30 to 9 P. M., concert, auspices of William K. Fries; baritone solos, Arthur Finding.

KSD, St. Louis, Mo., 546m (550k), C. S. T.— 8:15 P. M., broadcasting the opera "The Firefly" direct from Municipal Opera.

WOS, Jefferson City, Mo., 441m (680k), C. S. T.— 8 P. M., Samuel M. Jordan, Missouri State Board of Agriculture, address on "Emergency Crops." 8:20 P. M., varied musical program by talent from Versailles.

KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.— 5:30 P. M., organ recital by Paul Fleeger. 6 P. M., baseball scores; dinner concert. 6:30 P. M., children's period. 6:45 P. M., address by Mrs. Grayce Drutt Larus, travel editor. 7 P. M., baseball scores; feature. 7:40 P. M., National Stockman and Farmer market reports. 8 P. M., concert by Holden Trio.

KYW, Chicago, 536m (560k), C. S. T.— 6 P. M., dinner concert from Congress Hotel. 7:20 P. M., talk, auspices American Farm Bureau Federation; "Among Our Neighbors," regular weekly feature. 8 to 11:30 P. M., midnight revue.

WBZ, Springfield, Mass., 337m (890k), E. S. T.— 6 P. M., dinner concert by the WBZ Trio. 7 P. M., results of Eastern, American and National league games; market reports. 7:10 P. M., "The Weak Spot," dramatized story. 7:30 P. M., bedtime story. 10 P. M., Alice Hatch, soprano; Agnes Ruggles Allen, accompanist. 10:55 P. M., time signals and weather reports. 11 P. M., con-



DR. FRANK W. ELLIOTT, one of the announcers at Station WOC, Davenport, Iowa. Dr. Elliott gives educational lectures.

cert by the WBZ Trio, and Miss Minnie Bagg, soprano.

Saturday, June 7

WDAR, Philadelphia, 395m (760k), E. S. D. S. T.— 11:45 A. M., daily almanac. 12 Noon, organ recital from Stanley Theatre; features from studio; Arcadia concert orchestra. 2 P. M., Arcadia concert orchestra. 4:30 P. M., Bobbie Lee and his Cotton Pickers. 5:45 P. M., baseball and other sports results. 7:30 P. M., Dream Daddy with the boys and girls.

WIP, Philadelphia, 509m (590k), E. S. D. S. T.— 6 P. M., weather forecast and final baseball scores. 6:05 P. M., Harold Leonard's Red Jackets orchestra. 6:45 P. M., Agriculture livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call. 8 P. M., "Household Insect Pests and How to Rout Them," by Prof. Louis Gershenfeld. 8:15 P. M., special concert by Russian Choir from Church of the Holy Virgin. 9 P. M., concert by K. of C. Choral Society of Philadelphia. 10:15 P. M., concert by Ursinus College Glee Club. 11:00 P. M., Harold Leonard's Red Jackets orchestra.

WOC, Davenport, Ia., 484m (620k), C. S. T.— 12 Noon, chimes concert. 12:15 P. M., weather forecast. 3:30 P. M., educational program. 5:45 P. M., chimes concert. 6:30 P. M., Sandman's Visit. 6:50 P. M., sport news and weather forecast. 9 P. M., orchestra program.

WJZ, New York, 455m (660k), E. S. D. S. T.— 7 P. M., Howard Garis' Uncle Wiggley stories. 7:20 P. M., Waldorf-Astoria grill orchestra. 8:20 P. M., Lila Hamilton, soprano. 8:45 P. M., "The Many Varieties of Broadcasting," by Dr. Alfred N. Goldsmith. 9 P. M., Helen Davis, banjo; Sidney Koppel, pianist. 10 P. M., Louis Vermont, contralto; Alice Siever, pianist. 10:30 P. M., Club Lido Venice orchestra.

KHJ, Los Angeles, 395m (760k), P. T.— 6 P. M., Art Hickman's concert orchestra. 6:45 P. M., children's program; bedtime story by Uncle John. 8 P. M., the Long Beach Californians. 10 P. M., Art Hickman's dance orchestra.

WGI, Medford, Mass., 360m (830k), E. S. D. S. T.— 6:30 P. M., code practice; weather forecast; crop notes. 7 P. M., meeting Amrad Big Brother Club. 7:30 P. M., talk on current events by David M. Cheney. 7:45 P. M., popular song hits by C. P. Keene. 8 P. M., talk New England business industry; musicale; weather report, and time.

WOAW, Omaha, Neb., 526m (570k), C. S. T.— 6 P. M., speaker's half hour. 6:30 P. M., banjo recital by Frank Buckingham. 9 P. M., recital program by artist puppets of Louise S. Zabriskie.

WLAG, Minneapolis, Minn., 417m (720k), C. S. T.— 8:30 A. M., announcements. 10:45 A. M., household hints. 11:35 A. M., weekly meeting Postcard Club. 7:30 P. M., business message. 9:30 P. M., Geo. Osborn's Golden Pheasant orchestra.

WOR, Newark, N. J., 405m (740k), E. S. D. S. T.— 6:15 P. M., Agnes Leonard in songs for children. 6:30 P. M., "Man in the Moon" stories for children. 7 P. M., joint recital by Vini Warwick, contralto, and Vincent St. John, tenor. 7:20 P. M., resume of the day's sports.

WEAF, New York, 492m (610k), E. S. D. S. T.— 4 P. M., Billy Wynne and his Greenwich Village Inn Orchestra; Emmeritz R. Zetervial, dramatic soprano; Musical Clubs of New Rochelle High School—in Mexican operetta. 6 P. M., dinner music from Rose Room, Hotel Waldorf-Astoria. 7:30-12 P. M., Vera de Rosa, soprano; bedtime story; Irving Feinson, reader; Walter Leary, baritone; James Brakey, pianist; Issay Lukasheszky, violinist; Original Plectra Club; Vincent Lopez and his orchestra.

WLW, Cincinnati, O., 309m (970k), E. S. T.—

10:30 A. M., weather forecast and business reports. 1:30 P. M., market reports.

WGY, Schenectady, N. Y., 380m (790k), E. S. T.— 11:30 A. M., stock market report. 11:40 A. M., produce market report. 11:55 A. M., time signals. 8:30 P. M., dance music, orchestra of Hotel Ten Eyck, Albany.

PWX, Havana, 400m (750k), E. S. T.— 8 P. M., concert at the studio of Station PWX; tenor, Mr. Fausto Alvarez; baritone, Mr. Antonio Plana; baritone, Mr. Nestor del Prado; contralto, Miss Nena Plana; Professor Juan Gonzalez, piano accompaniment by Mr. Roger de Brand; first soprano, Miss Emilia Suarez, program of Cuban music.

KGO, Oakland, Cal., 312m (960k), P. T.— 12:30 noon, Stock Exchange and Weather Bureau reports. 4 P. M., concert orchestra of Hotel St. Francis. 8 P. M., musical program, Joseph B. Corey, composer; Corey Male Quartette; Ernest Paul Alwyn, euphonium soloist; Ethel Isaacs, violinist. 10 P. M. to 1 P. M., Hotel St. Francis Dance Orchestra.

WHAS, Louisville, Ky., 400m (750k), C. S. T.— 4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., central standard time. 7:30 to 9 P. M., concert by the Sylvian Trio; fifteen-minute musical specialty; Clem E. A. Eliert.

KSD, St. Louis, Mo., 546m (550k), C. S. T.— 8 P. M., Missouri Theatre Orchestra and music specialties broadcast from theatre. 9:30 P. M., piano recital by Edna Feldman.

KGW, Portland, Ore., 492m (610k), P. T.— 11:30 A. M., weather forecast; 3 P. M., children's program; story by Aunt Nell. 10 P. M., baseball scores, weather forecast and dance music by George Olsen's Metropolitan orchestra.

KDKA, Pittsburgh, 326m (920k), E. S. D. S. T.— 6 P. M., baseball scores; dinner concert. 6:30 P. M., children's period. 6:45 P. M., Last Minute Helps to Teachers. 7 P. M., baseball scores; sport's review by James J. Long. 7:15 P. M., feature. 8 P. M., concert by the Westinghouse Band and assisting artists.

KYW, Chicago, 536m (560k), C. S. T.— 6 P. M., dinner concert from Congress Hotel. 7 P. M., musical program. 8 P. M., talk by Vivette Gorman on home economics. 8:15 P. M., short stories, articles and humorous sketches. 8:15 to 12:30 A. M., late show.

WBZ, Springfield, Mass., 337m (890k), E. S. T.— 7:10 P. M., dinner dance music by Leo Reisman and his orchestra. 7:30 P. M., bedtime story for kiddies. 7:40 P. M., concert by Hotel Kimball trio. 8:30 P. M., concert by Vreeland mandolin-banjo-guitar-ukelele concert trio. 9:30 P. M., concert by mixed quartette, Alice Hopkins, soprano; Elizabeth Bates, contralto; Edwin Griffith, tenor; William Weigle, baritone; Katherine C. McMichaels, accompanist. 10:55 P. M., time signals and weather reports.

Sunday, June 8

WIP, Philadelphia, 509m (590k), E. S. D. S. T.— 4:30 P. M., services by Dr. W. B. Wilkinson from the Germantown Theatre. 7:30 P. M., evening service from Holy Trinity Church. 9:30 P. M., Sunday night symphonic concert by Ben Stad and WIP Little Symphony orchestra, Karl Bonawitz at the organ.

WGI, Medford, Mass., 360m (830k), E. S. D. S. T.— 4 P. M., "Adventure Hour"; musicale by Norman Church Concert Company. 8:30 P. M., talk, auspices Greater Boston Federation of Churches; musicale.

WOAW, Omaha, Neb., 526m (570k), C. S. T.— 9 A. M., Radio Chapel service, Sunday Morning Radio Congregation. 9 P. M., Musical Chapel Service, courtesy Omaha Bible Institute.

WGY, Schenectady, N. Y., 380m (790k), E. S. T.— 10 A. M., service at First Presbyterian Church, Rev. Dr. E. W. Rice, Sr. 7 P. M., baccalaureate service of Union College, at First Presbyterian Church.

KGO, Oakland, Cal., 312m (960k), P. T.— 3:30 P. M., concert by KGO Little Symphony Orchestra and soloists.

WHAS, Louisville, Ky., 400m (750k), C. S. T.— 9:57 A. M., organ music. 10 A. M., church service, auspices Broadway Baptist Church; Mrs. Roy N. Downs, soprano; Miss Carolin Gauld, contralto; Charles H. Barnes, Jr., tenor; William C. Burger, baritone. 4 P. M., concert, direction Mrs. Emory Nold.

WBAP, Fort Worth, Texas, 476m (620k), C. S. T.— 11 A. M., services of First Christian Church. 4 P. M., organ concert from Rialto Theatre. 5 P. M., concert by the Osceola quartette. 7 P. M., sport review. 11 P. M., popular program by Crockett's Texans.

WOS, Jefferson City, Mo., 441m (680k), C. S. T.— 8 P. M., union open air religious services broadcast from Capitol lawn; music by Missouri State Prison Band.

WCAE, Pittsburgh, 462m (650k), E. S. D. S. T.— 3 P. M., People's Radio church services. 6:30 P. M., dinner concert from William Penn Hotel.

KGW, Portland, Ore., 492m (610k), P. T.— 6 P. M., church services by Bishop Walter T. Sumner. 7 P. M., Olsen's concert orchestra in dinner program; baseball scores.

KPO, San Francisco, 423m (710k), P. T.— 11 A. M., undenominational and non-sectarian church services; soloist, H. E. Bultmann, bass. 8:30 to 10 P. M., Rudy Seiger's Fairmont orchestra.

KYW, Chicago, 536m (560k), C. S. T.— 10 A. M., Central Church service from Orchestra Hall; musical program, direction Daniel Protheroe. 1:30 P. M., Studio Chapel service, direction Chicago Church Federation.

Monday, June 9

8:30 P. M., baritone solos, Paul Christian; piano numbers, Jean Fulmer; songs, Agnes Dilts, so-
(Concluded on page 20)

Radio Brightens Camp Life, Even Makes its Bow on Ferris Wheel



(Kadel & Herbert)

RADIO brings additional camping joys to J. E. Hewener and his son while they are on a camping trip in the Adirondacks. They listen in every morning to get the cooking instructions broadcast by station EAT, as their cook has left them.



(Gilliams)

RADIO is all the rage these days with the youths who play at Indian and backwoodsman. The scene shows a group of lads of the Culver School of Woodcraft, Culver, Indiana, studying radio signals and codes. They find this study more fun than play, in fact, they rate it as play and call "code work" vacation from their other studies.



(Wide World)

THIS GROUP of ball players of the Washington (American League) team stayed in the clubhouse one rainy day when they got an unexpected vacation from the diamond. On their vacation, the boys entertained themselves indoors, because their work keeps them outdoors all they want. Left to right, the seven listening in are Shirley, Goslin, McGrew, Hargrave, Zanheiser, Martina and Winfield.



(Foto Topics)

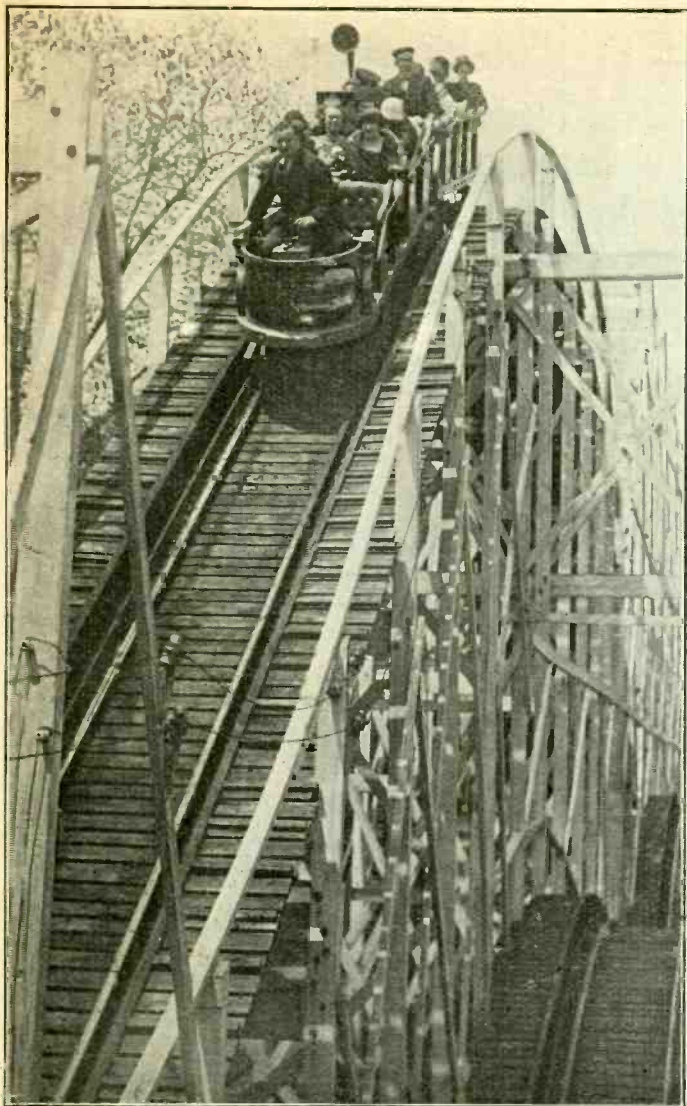
MARGIE FORD and Marjorie Norman listen in while picnicking at an amusement park. They are in a ferris wheel car. The ground was connected to the framework of the structure, while the wire cage was used as an aerial. The soothing motion of the car, combined with the romantic music coming over the radio caused both girls to look wistfully over the enchanting panorama. "Gee, this is great," said one of the enraptured girls, and the other readily and heartily agreed with her. Both vowed they'd "ferris wheel" some more.



(Atlantic Foto)

HOI FOR THE LIFE OF A SAILOR, particularly is turned on when the

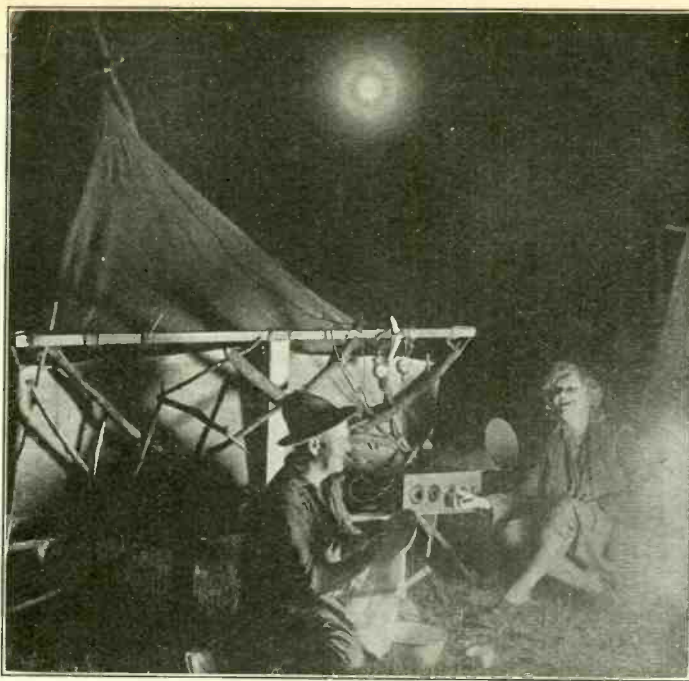
Wheel and Roller Coaster, On Joyous Vacation Days and Nights



(Foto Topics)

NO MATTER how fast the roller coaster shoots, the radio waves can keep up with the portable outfit. Of course, when the coaster reaches the top of a grade, the signals come in much louder, due to the effective height of the antenna.

The worst "interference" is encountered on the down grade, for then the car speeds fastest and the noisy rollers give the broadcast music stiff competition. Some means of silencing the rollers should be invented, the girls agreed. They told the manager about it.



(Foto Topics)

ALTHOUGH tucked deep in the woods, these campers enjoy broadcast entertainment and while away otherwise lonely hours after a day's hike. The moon shines brightly, casting a romantic spell over the scene. And the girl laughs with boundless glee.



(Foto Topics)

WHEN out camping, mother necessity provides even loud speakers. This merry group of vacationists utilizes part of a portable stove pipe with which to reproduce with volume the music brought in over the camp radio. The pipe is right over the tuning engineer's left arm.



aboard this houseboat at Atlantic City. The radio girls return from a dip.



(Fotograms)

ONE MORE R is added to the well known three, Reading, 'Riting and 'Rithmetic. The addition is Radio, and from all reports, it is the easiest subject to hold the pupils' attention. The broadcast music gives the rhythm for the physical training, for which (yes, yes) the pupils forego vacation hours.

New Broadcasters

Tune in for Them
CLASS A STATIONS

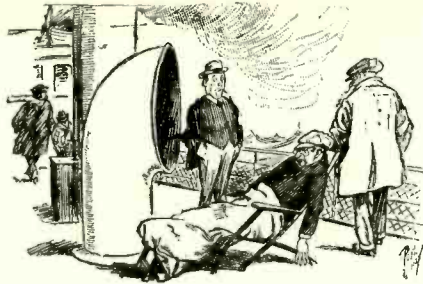
Station	Owner	Kcy.	M.	Pow.
KFQB	Searchlight Publishing Co., Fort Worth, Tex.	1180	254	100
KFQC	Kidd Brothers' Radio Shop, Taft, Cal.	1320	227	100
KFQD	Chovin Supply Co., Anchorage, Alaska	1070	280	100
KFQE	Dickenson-Henry Radio Laboratories, Colorado Springs, Col.	1340	224	5
WDBK	M. F. Broz Radio Co.	1210	248	100
WDBO	Rollins College, Inc., Winter Park, Fla.	1250	240	50
WMAZ	Mercer University, Macon, Ga.	1150	261	100
WSAU	Camp Marienfeld, Chesham, N. H.	1310	229	10

CLASS B STATIONS

WFBW	Ainsworth-Gates Radio Co., Cincinnati, Ohio	970	309	750
WQJ	Calumet Rainbo Broadcasting Co., Chicago, Ill.	670	448	50
WTAC	Penn Traffic Co., Johnstown, Pa.	1090	275	150

EIGHT NEW CANADIAN BROADCASTERS
Eight new broadcasting stations along the Canadian border have been opened recently in Alberta, Ontario, Quebec and British Columbia. These new stations operate on waves from 400 to 440 meters, and should be heard by all fans in the northern half of the United States. These stations are: **CFXC**—The Westminster Trust Co., New Westminster; **CHCG**—Marconi Company, Toronto; **CHCM**—Riley & McCormack, Calgary; **CHCS**—The Hamilton Spectator, Ontario; **CJCM**—J. L. Philippe Landry, Mont Joli, Quebec; **CKCH**—Canadian National Railways, Ottawa; **CKCO**—Ottawa Radio Association, Ottawa, and **CKCX**—P. Burns and Company, Calgary, Alberta.

Losing His Patience



(London Opinion)

BEFUDDLER RADIO ENTHUSIAST: Been waiting for more than an hour. When does the concert commence?

Maxim Opposes Tax; Speaks for 15,000

A NATION-WIDE appeal to amateurs interested in radio to join the fight on the proposed 10 per cent. radio tax has been sent out by the American Radio Relay League. Hiram Percy Maxim, president of the organization, said: "The American Radio Relay League has a membership of between 15,000 and 16,000 amateurs throughout the country. These amateurs own low-power transmission and receiving sets which they employ to pick up and relay messages of a non-commercial character.

Convicts Dig Tunnel to Freedom As Radio Drowns Their Clatter

PHILADELPHIA.

AN attempted jail delivery, in which two convicts had tunneled their way to within a few feet of the outside wall of the Eastern State Penitentiary, was frustrated here recently by Deputy Warden Charles Santee. The discovery was made shortly after the conclusion of a musical program by the convicts which was broadcast by WIP.

A tunnel extending from their cell to within nine feet of the Fairmount Avenue wall of the institution had been dug by the two convicts, Harry Watson of Hartford, Conn., and Louis Olstein of this city, both serving long sentences. Prison officials said the two convicts had made arrangements with friends on the outside to meet them on Fairmount Avenue with civilian clothing and a motor car in which to make their escape.

Programs

Monday, June 9

(Concluded from page 17)

prano; Pasture for Swine, Prof. R. T. Smith; educational lecture.
WOAW, Omaha, Neb., 526m (570k), C. S. T.—6 P. M., speaker's half hour. 6:30 P. M., dinner program by Randall's Royal orchestra. 9 P. M., program by Catholic Daughters.
WHAZ, Troy, N. Y., 380m (790k), E. S. T.—9 P. M., entertainment by Grisman's Young People's orchestra; elocution pupils of Miss Edna B. Towne. 10 P. M., a one-man minstrel show by Will H. Wade. 10:30 P. M., concert by Troy Chapter, Order of De Molay, boys' orchestra.
WGY, Schenectady, N. Y., 380m (790k), E. S. T.—1 P. M., music and household talk, U. S. Dept. of Agriculture. 5 P. M., produce and stock market quotations; news bulletins; baseball results. 5:15 P. M., review of week's sports, "Joe" Haubner. 7:15 P. M., address, "Home Economics in a State College," Professor Martha Van Rensselear. 7:40 P. M., baseball scores. 7:45 P. M., musical program, compositions of Robert Huntington Terry.
KGO, Oakland, Cal., 312m (960k), P. T.—4 P. M., Hotel St. Francis dance orchestra. 6:45 P. M., stock exchange and weather reports, and news items. 8 P. M., educational program, with musical numbers; courses in agriculture, Spanish, music, economics and literature.

WHAS, Louisville, Ky., 400m (750k), C. S. T.—4 P. M., selections by Alamo Theatre orchestra; police bulletins; weather forecast; selections by Walnut Theatre orchestra; news bulletins. 4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores.
WBAP, Fort Worth, Texas, 476m (620k), C. S. T.—9:30 P. M., concert by talent from Alford, Texas.
WOS, Jefferson City, Mo., 441m (680k), C. S. T.—8 P. M., address, "Tragedies of the Missouri Penitentiary"; band concert by Missouri State Prison band and Harry M. Snodgrass, pianist.
WCAE, Pittsburgh, 462m (650k), E. S. D. S. T.—4:30 P. M., stock market reports; the Sunshine Girl. 6:30 P. M., dinner concert from William Penn Hotel. 7:30 P. M., Uncle Kaybee. 7:45 P. M., baseball scores. 8:30 P. M., musical program by the Sequilla Club. 11 P. M., late concert.
WFAA, Dallas, Texas, 476m (630k), C. S. T.—12:30 P. M., address, C. E. Osborne, physical director. 8:30-9:30 P. M., Lone Star Five orchestra, dance music.
WWJ, Detroit, 517m (580k), E. S. T.—10:25 A. M., weather forecast. 11:55 A. M., Arlington time. 3 P. M., Detroit News orchestra. 3:30 P. M., weather forecast. 3:35 P. M., market reports and baseball scores. 7 P. M., Detroit News orchestra; John McLean, baritone.
KGW, Portland, Ore., 492m (610k), P. T.—11:30 A. M., weather forecast. 3:30 P. M., literary program. 7:30 P. M., baseball scores; weather forecast, and market reports. 8-10 P. M., program by Civic Music Club.
KPO, San Francisco, 423m (710k), P. T.—2:30 P. M., organ recital by Theodore J. Irwin. 4:30 P. M., Seiger's Fairmont Hotel orchestra. 5:30 P. M., children's hour stories. 7 P. M., Seiger's

Fairmont Hotel orchestra. 8 P. M., program, management Wurlitzer Co. 9 P. M., program by Los Gatos Chamber of Commerce. 10 P. M., Bradford's Versatile Band.

Tuesday, June 10

WOAW, Omaha, Neb., 526m (570k), C. S. T.—6 P. M., piano recital by artist pupils of Martin W. Bush. 9 P. M., program, courtesy Fontenelle Park Celebration Association.
WGY, Schenectady, N. Y., 380m (790k), E. S. T.—1 P. M., music and one act play, "The Boor," by Anton Tchekoff. 5 P. M., produce and stock market quotations; news bulletins; baseball results. 5:30 P. M., dinner music, Instrumental Trio of Hotel Ten Eyck, Albany. 7:40 P. M., baseball scores. 7:45 P. M., excerpts from the grand opera "Carmen," WGY Opera Company, assisted by WGY orchestra.
KGO, Oakland, Cal., 312m (960k), P. T.—6:45 P. M., stock exchange and weather reports, and news items. 8 P. M., travel talk, "A Trip Around the World," by J. E. Barnes; Arion Trio; 159th Infantry, National Guard Band; Claire Upshur, soprano; Erwin Holton, tenor; Ada Jeanice Madison, pianist; Mrs. J. E. Toussaint, violinist; Jean A. Center, mezzo-soprano; vaudeville act, "You're Dumb!" Boruck and Tarleton. 10 P. M. to 1 A. M., Hotel St. Francis dance orchestra.
WHAS, Louisville, Ky., 400m (750k), C. S. T.—4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., Central Standard time. 7:30 to 9 P. M., agricultural tabloid talk; concert by Carl Zoeller's Melodists; baritone solos, A. A. Brooks. Central Time announced at 9 P. M.
WBAP, Fort Worth, Texas, 476m (620k), C. S. T.—9:30 P. M., concert by the Fort Worth Camp Fire Girls.
WCAE, Pittsburgh, 462m (650k), E. S. D. S. T.—6:30 P. M., dinner concert from the William Penn Hotel. 7:30 P. M., Uncle Kaybee. 7:45 P. M., baseball scores; vocal selections by Charles Mundy, tenor; Miss Olga Mundy, accompanist. 8:30 P. M., musical program by Beck's Pennsylvania Four orchestra. 11 P. M., late concert, artists from Loew's Aldine Theatre.
WFAA, Dallas, Texas, 476m (630k), C. S. T.—12:30 P. M., address, DeWitt McMurray, medley of humor, pathos and wisdom. 8:30 P. M., Victor H. Schoffelmayer, "The Cotton Production Contest"; musical program, Count Rubinoofsky, Russian Count and musician. 11 P. M., Netto Male Quartet, vocal recital.
WWJ, Detroit, 517m (580k), E. S. T.—9:45 A. M., Fred Shaw, pianist and popular songster. 10:25 A. M., weather forecast. 11:55 A. M., Arlington time. 3 P. M., Detroit News orchestra. 3:30 P. M., weather forecast; 3:35 P. M., market reports and baseball scores. 5 P. M., baseball scores. 7 P. M., Detroit News orchestra; the Chapel Four.
KGW, Portland, Ore., 492m (610k), P. T.—11:30 A. M., weather forecast. 3:30 P. M., children's program. 7:30 P. M., baseball scores; weather forecast, and market reports.
KPO, San Francisco, 423m (710k), P. T.—2:30 P. M., organ recital by Theodore J. Irwin. 4:30 P. M., Seiger's Fairmont Hotel orchestra. 5:30 P. M., children's hour stories. 6:30 P. M., "Cleveland Six" orchestra. 7 P. M., Seiger's Fairmont Hotel orchestra. 8 P. M., Paul Weber, baritone, accompanied by Hazel Budd; Imperial Marimba Band. 10 P. M., Max Bradford's Versatile Band.

Who Is America's Most Popular Radio Entertainer?

Everybody is interested in this query: Who is America's most popular radio entertainer? You have your favorite. Who is she or he? Let us know your choice, whether a comedian, an opera singer, a jazz band, or a story-teller.

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The Radio University

A Question and Answer Department conducted by RADIO WORLD for its Subscribers by its Staff of Experts.

Address Letters to Radio University Department
RADIO WORLD, 1493 Broadway, New York City

YOUR article in RADIO WORLD for May 17, interests me very much. The Knockabout set for summer appeals to me. What ratio transformers are used, and what make of coupler and crystal can I use? Would like to build a set before going away for the summer.—*Jos. H. Johnson, Ph.D., 421 North Front Street, Milton, Pa.*

The audio-frequency transformer should be about 5 to 1 ratio for this circuit. Any good make of variocoupler may be used, and can be obtained at your local radio shop or through the advertising columns in this publication. A fixed crystal detector is advised, as this portable set will probably be knocked about some.

I have constructed the Golden Rule receiver as described in RADIO WORLD for March 22 and have obtained excellent results. Would like to replace present coils with duo-laterals as described in connection with the Neutrad Unit. What is the number of turns of wire required when used with .0005 mfd. condensers?—*L. M. Salisbury, 124 Central Ave., Caldwell, N. J.*

You can use two sets of coils, one set of 50 turns and another of 75 turns, and make them interchangeable on the mountains. This will insure your reaching both the very low waves and also the higher waves over the whole broadcasting range.

I have your issue of RADIO WORLD for December, in which you describe the Superdyne set. Being a novice, I am somewhat puzzled as to the parts I must buy. Will you please publish a complete list of parts?—*E. J. Fitzpatrick, 5021 Wabash Ave., Chicago, Ill.*

Suggest that you see RADIO WORLD for May 17 and 24, in which appear two instalments of an article on the Superdyne, together with a full list of parts necessary. The final instalment is published in the present issue.

Can a Star Coil be used in a three-circuit regenerative hook-up?—*Harold Frichmann, Chicago, Ill.*

Yes, the coil mentioned can be used in place of the variocoupler usually used for tuning the first or antenna circuit.

Will the Neutrad unit as per RADIO WORLD for May 3 work in conjunction with the Haynes circuit, and what would be the gain in using it? Will it interfere with tuning? The set is now very selective.—*E. M. Feeney, 173 Beach 105th Street, Rockaway Beach, N. Y.*

Not only will the unit work well, but it will still add to your present good selectivity, and in addition will bring in stations which were too weak to be heard before. The tuning will not be interfered with.

On page 7 of RADIO WORLD, issue of May 10, I saw how to make a grid condenser, and did so. I placed it in my set, and now results are better than ever before. The set I am using is a three-circuit, three-tube outfit. It was also through RADIO WORLD that I learned really how to use a potentiometer to get the best out of my set. Now the DX comes in like a local station, clear as a bell. I have obtained much valuable information and instruction from RADIO WORLD.—*A. H. Stearns, 883 River Street, Troy, N. Y.*

We are very pleased, indeed, to find that you have been helped by our publication. As all our readers know they need only ask for any information on radio, and they will receive it through these columns.

The article by Brainard Foote, in RADIO WORLD for May 17, on the variable grid condenser, was very interesting. Will this condenser prove of any benefit in a five-tube Neutrodyne? The grid circuits of the Neutrodyne are the ones so hard to get properly neutralized, and in my set cause all the trouble. Perhaps some of my trouble comes from the detector, which is UV201A, a hard tube. I also notice Mr. Foote speaks of connecting the grid leak from the grid of the tube to the plus of the filament. I use a standard .00025 mfd. condenser and leak mounting, and this condenser and leak unit is in line from the secondary to the grid of the detector. Would any benefit come from the insertion of a leak from the grid of the tube to the positive filament post, and if so what size do you recommend?—*L. H. Amidon, R 6, Magill Block, Fargo, N. D.*

This condenser should be of benefit in the grid detector circuit of the Neutrodyne, as it is very efficient, and the losses are fairly low. The condenser described by Mr. Foote was not intended for use as a neutralizing condenser, as its capacity is too high. The small neutrodon condensers should be used for neutralizing the two radio frequency tubes. The noises you mention probably do not come from the detector tube, as the harder the tube is, the less noises are apparent in the tube.

when properly used. The grid leak may be connected from the grid to the positive filament post, but the grid condenser still remains in the same place. Sometimes better results are obtained when the leak is connected to the A+ plus, after the correct value has been found.

I have a single-circuit regenerative receiver from which I get good results. However, neighboring sets pick up interference from my set when it is in operation. Is there any method by which I could still use regeneration, but at the same time eliminate this annoying interference?—*B. J. Kennelly, Bellows Falls, Vt.*

By the addition of one stage of radio-frequency amplification you can stop radiation and at the

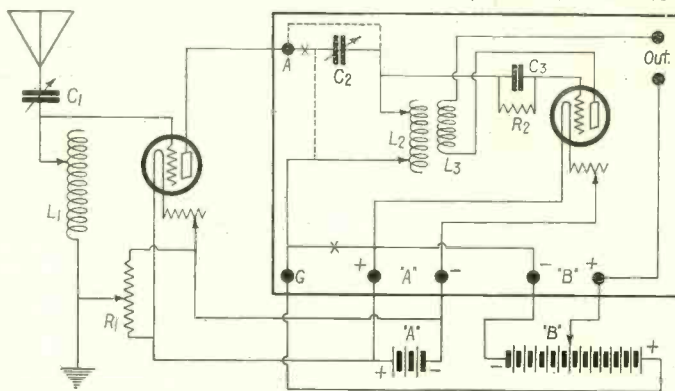


FIG 16—Circuit for addition of one stage of radio-frequency amplification asked for by B. J. Kennelly. C-1 should be a 43-plate low loss variable for best results.

same time improve the receiving range of your set. The accompanying diagram (Fig. 16) shows how to connect the extra tube in relation to the set you already have. Coil L-1 may be a 50 or 75 turn honeycomb coil, or 60 turns of No. 22 DCC wire with a tap taken from every tenth turn. R-1 is a standard potentiometer having a resistance of 200 to 400 ohms. It will be necessary before connecting up the extra tube to remove the two leads marked X on the diagram and make the two connections shown by the dotted lines. C-1 is a 43-plate condenser having a capacity of .001 mfd. In tuning, R-1 is varied until the grid bias on the amplifying tube is of the correct value.

1—I am planning to make the campers' set described in RADIO WORLD, issue of April 26. Are both sides of condenser C-3 connected to the same wire? 2—At present I have two WD12 tubes. Will they give same results as UV190s? 3—In this set, is the core of the audio-frequency transformer connected to the ground terminal?—*P. J. Anderson, care Farmers Lumber Co., Council Bluffs, Ia.*

1—See diagram published in this department, issue of May 17, which diagram explicitly shows connections. The right hand wire goes to bottom of L-1. 2—WD12 tubes will give results which compare very favorably with UV199, except that as amplifiers they have not the capacity to deliver as much volume. Otherwise, with the proper constants they are very efficient. 3—Yes, the iron core of the AF transformer is grounded.

I have a Westinghouse Aeriola Sr. receiving set and the second stage transformer suddenly went bad. I would like to know what ratio transformer this is and where I could get one.—*Clifford Vogel, 504 West 14th St., Davenport, Iowa.*

The second stage transformer is approximately 4-to-1 ratio, and can be purchased at any radio supply shop, or you can write to advertisers in this publication who will supply you with the correct transformer.

RADIO WORLD'S BROADCAST UNIVERSITY

Questions and Answers Broadcast Every Wednesday Evening from WLS, the Sears-Roebuck Station, Chicago.

1—I recently constructed a one-tube reflex set as described in RADIO WORLD for March 8, using the necessary parts. My antenna is 40 feet high and 100 feet long. The ground is a buried copper plate with a 45-foot lead. The signals are very clear, but with hardly more volume than a good crystal set. The second dial, supposed to control volume, has no effect. The set works the same whether the cat-whisker is on the crystal or not. All connections are soldered. I have tested the coils and transformers and the tube is OK. What could be my trouble? 2—Which is best for distance and volume, the Erla three-tube reflex or the four-tube Superdyne? Where could I get the coils for the Superdyne set? 3—Which of the RF transformers is the first one (tuning) in the one-tube reflex—the one with 30 primary turns or the one with 20?—*R. P. Adams, 130 Farrand Park, Detroit.*

1—Something is wrong with the wiring. Examine and check with the diagram all connections, making sure that you have the proper polarity on the A and B batteries. The wiring itself should be carefully gone over to see that there are no close or parallel grid and plate wires. Try spacing the parts a bit more. A little careful work in this

respect should bring about a change for the better. 2—it is impossible for us to guarantee one set to be better than another, as all depends upon the way the set is constructed and how it is operated. Both outfits you mention are capable of doing excellent work. 3—The first RF transformer is the one having 20 turns of the primary, and should be placed in back of the left-hand side of the panel.

I have a five-tube Neutrodyne, using UV201 and 200 tubes, also three 24-volt wet B batteries. Is that enough voltage to use? Will wet and dry B batteries work together? The dials on my machine are all on different numbers when getting one station. Is there any way to make them all come on the same number when getting a station?—*Ed. Santelman, Cornell, Ill.*

You have a total of 72 volts which is plenty to use with the neutrodyne. Wet and dry B batteries will work well when connected in series. The difference in dial settings on your set may be due to the way the dials were originally fastened to the condenser shafts. Look in back of the panel and see if the condenser is entirely out when the dial reads zero. If not, loosen the dial with a screw driver, and put them on the proper setting.

I have a 4-tube symphony circuit, 3 tubes. I have had it about eight months and it has been working good up to about 3 days ago. Suddenly all signals stopped on the second stage, although the tube is OK and all the parts seem to be in good condition and all connections soldered. Where can my trouble be?—*John Vivalda, 3404 W. Pershing Road, Chicago.*

Your trouble may be due to a number of things. Test the second transformer windings so see whether either primary or secondary has an open circuit. Do this with a battery and earphones, placed in series with the winding to be tested. If a click is heard, the windings are OK. Before testing, disconnect all other leads to the transformer. Replace the last jack with a new one if the transformer is right, as the jack may have become short circuited. See if the B battery plus is connected to the third tube in the proper manner. A general overhauling and examination of the set will probably locate the trouble.

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Changing Your Set Into a Superdyne

By Lewis A. Morrison

(Engineer, Globe Radio Equipment Co.)

FOR the price of the parts necessary to build a single tube set, you can change any three-tube set into a Superdyne. Of course there are exceptions, such as the reflex, but any set comprising a detector and two steps of audio can be very easily changed over. At least 70 per cent of the work and material in a Superdyne set is comprised in the last three tubes and in that respect it does not vary from any other three-tube set. All that is necessary is to add one step of tuned RF with negative feed-back.

Take the old RC set, for example. They were made in two sections, the tuning unit and the 3-tube unit, with binding posts on the back for connecting these two sections together. That three-tube unit is just as good to-day. If you will look at some of the new circuits which have appeared from time to time you will see that 95 per cent of the improvement has been made before the detector tube. If you will just consider the tuning element of a diagram as the really new element, a great many of the apparently complicated hook-ups will become quite simple to understand.

Superdyne is no exception to the above rule as all the change comes before the detector tube. With the possible exception of the inductance coils, the necessary parts are all standard. To get real Superdyne volume and sensitiveness we must proceed as follows:

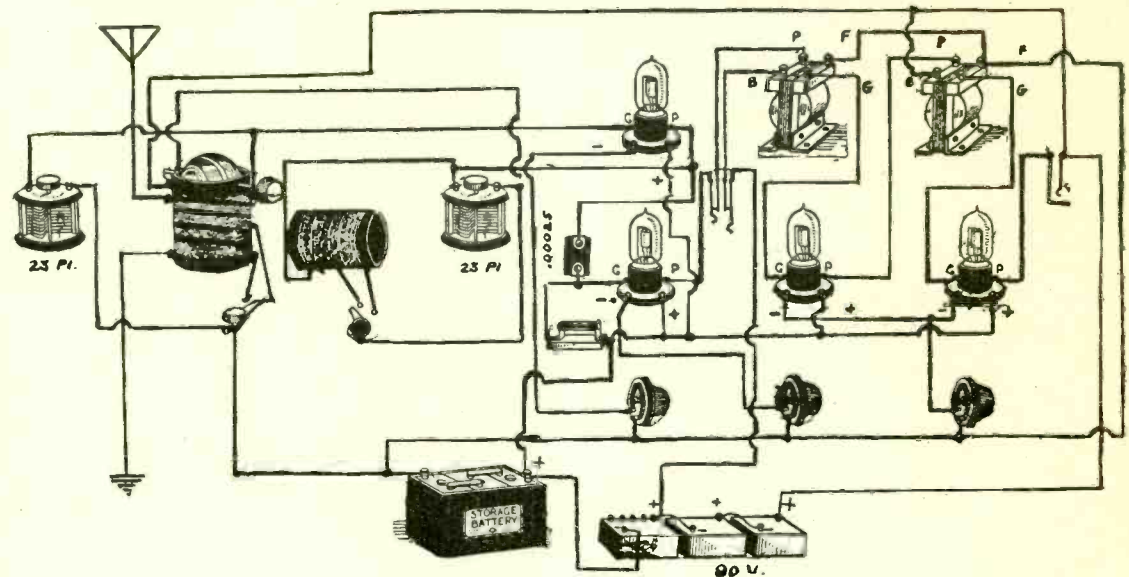
On a piece of 4-inch diameter tubing about 3 inches long, wind 42 turns of No. 22 DSC wire with a tap at the 20th turn. On top of this winding, wrap 4 turns of any well-insulated flexible wire in the same direction. These 4 turns act as an aperiodic primary and are important. This complete coil is the stator of a vario-coupler, so provision must be made to mount a rotor at top. This rotor can be of any suitable material such as a hard wood ball or tubing, so long as it is as large in diameter as will rotate freely in the stator. On this rotor wind 36 turns of No. 22 DSC wire, 18 turns on a side, but be sure to have both sides wound in the same direction and joined at the middle. If you have an old vario-coupler which you can re-wind so much the better, providing it does not vary more than 1/2 inch in diameter from the above specifications.

With the coupler finished we go to the plate coil which should be the same diameter tubing as the coupler stator and about 2 inches long. On this tube wind 46 turns of No. 22 DSC wire with a tap at the 21st turn. This plate coil must be mounted at right angles to the coupler stator or grid coil, as it will hereafter be called, so with a couple of small angles make provision to mount it either on the plate condenser or to the grid coil itself. Its exact location does not matter, so long as it is at right angles to the grid coil. These Superdyne coils are the only special parts necessary for the set.

The only other item of importance is the condensers. These are of 23-plate type, .0005 mfd., but they must be of good quality. That does not necessarily mean expensive, but it does mean that they have low bearing resistance and if

possible pig-tailed. Do not use vernier condensers of the single movable type unless they are pig-tailed. Vernier condensers are not necessary but if desired, use a type employing a reduced ratio movement of the air shaft or vernier dials.

face in a horizontal position. At one point in the revolution a distinct snap or thud will be heard. This point is where the feedback changes from positive to negative or vice-versa. This is the critical spot on the dial and it will never



HOOK-UP of Superdyne as converted from an RCA set.

This goes for any type of circuit. Now, having already accomplished that, we can proceed to the assembly of the set. It is quite likely that there will not be sufficient room in your present cabinet and such will be the case if an RC set is used. This Superdyne section will require at least 14 inches of panel space, so if necessary put it in a separate cabinet. This will not interfere with its operation in any way. Arrange the coupler a little to the left of center with a condenser at each side and at the extreme right place the rheostat and tube. Binding posts always look better when placed in the rear of a set such as the RC, but in this case arrange them to conform closely with the detector and two-step section used. Short leads are more important than appearance. The aerial and ground posts, however, should be at the left of the cabinet.

Now a word about the handling of this circuit to get best results. The Superdyne is not an easy circuit to tune. There is a certain knack about it. However, when once acquired it becomes a simple matter. In order to overcome this difficulty several variations of this circuit have appeared leaving out the four-turn aperiodic primary and connecting the aerial directly to the grid of the RF tube, the ground return going to the filament or A battery. This method will produce good results with a short indoor aerial, but it greatly reduces the selectivity of the set. However, the four turns are no hindrance to the builder experimenting with this method if he so desires. Using fewer number of turns on the plate and grid coils has also been suggested, but it greatly reduces the wave-length range of the set, it being difficult to get much above 500 meters, using the smaller coils. It might be said that greater selectivity on the short wave-length stations is gained, but when the tapped coils are used the best conditions of both are met.

When our Superdyne unit is complete and hooked up to the detector and two step, proceed to test it out as follows:

With all the tubes burning and both tap switches on full coil position, set both condensers at about one half inch. Now slowly rotate the coupler rotor through an arc of 180 degrees, starting with one

be necessary to move the dial far from this position. Set the dial within a few degrees of this point. Now gradually rotate both condensers at the same time and in the same direction until something is heard. It may be a squeal or it may be music. In either case gradually rotate the coupler or stabilizer as it is called, a few degrees on both sides of the critical point. It should be found that one side produces music and the other side squeals. The music comes from the side giving negative feed-back and its volume will only be limited by your tuning skill in approaching this critical point without going into positive feed-back position or the spill-over point. This last position will become less difficult with slight adjustments of the condensers and a little practice will produce wonders.

LIST OF PARTS

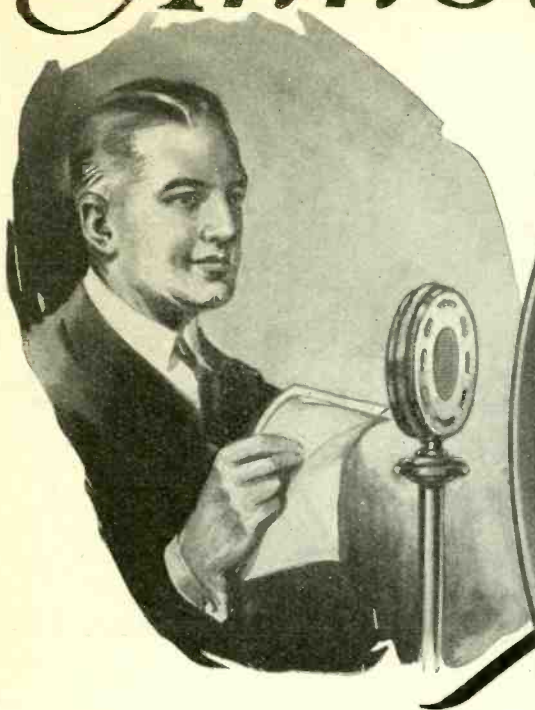
- 1 Set of Superdyne coils.
- 2 .0005 mfd. variable condensers. (23 plate.)
- 1 Bakelite socket.
- 1 30-ohm rheostat.
- 2 Tap switches.
- 4 Switch points.
- 4 Stops.
- 6 Binding posts.
- 1 UV201A or C301A tubes.
- 1 Detector and two step AF unit.

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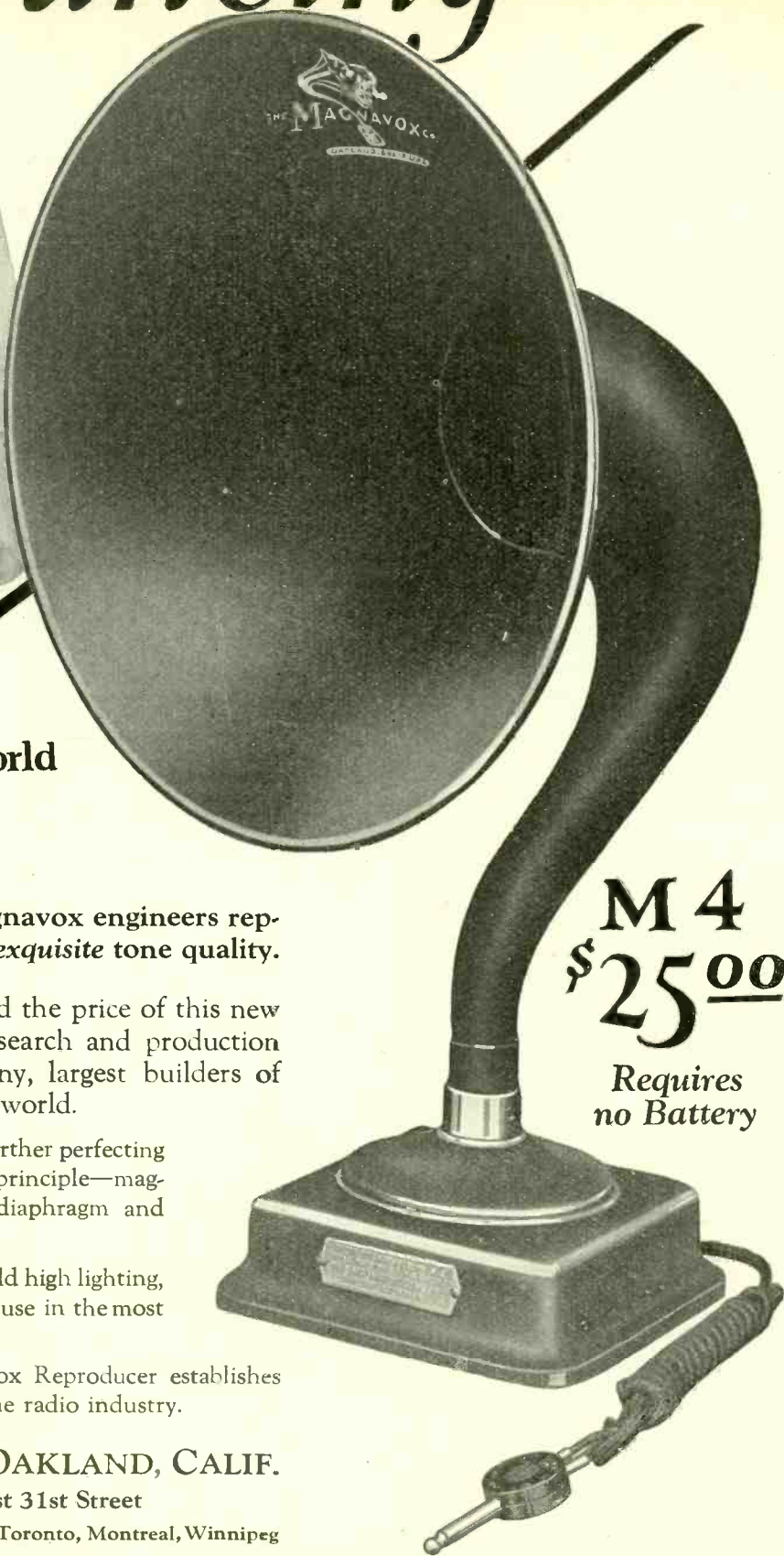
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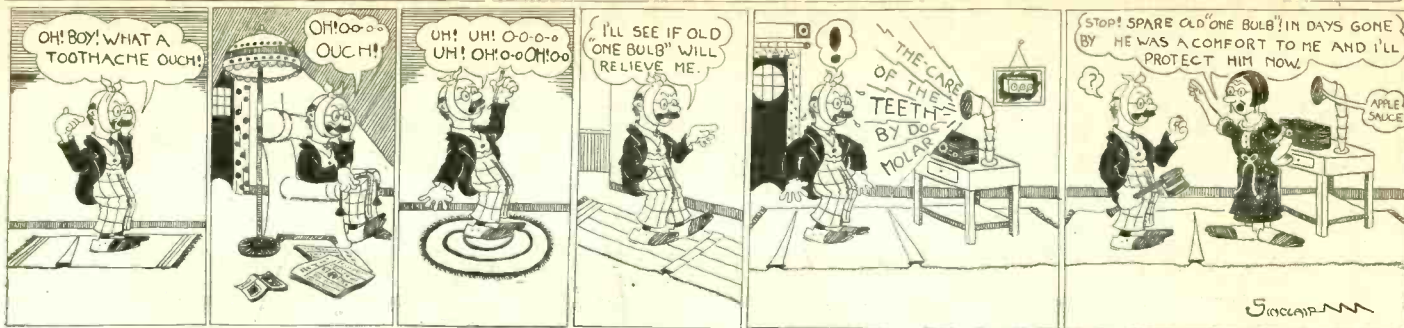
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Armstrong Retaliates With Tube Suit

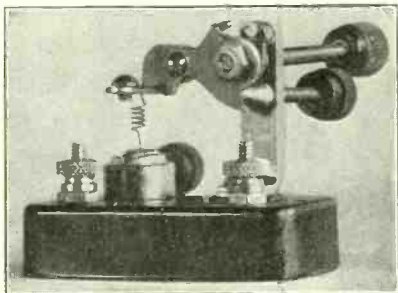
A SUIT filed in the Federal court in New York City by Edwin H. Armstrong and the Westinghouse Electric and Manufacturing Company seeks control of a patent for an "improvement in method and apparatus for producing sustained electrical oscillation." The defendants are the American Telephone and Telegraph Company, the DeForest Radio Telephone and Telegraph Company, the General Electric Company and several individuals, including the Secretary of the Navy. A suit was filed by the Hazeltine Company against the Electrical Service Engineering Corporation for alleged infringement of the Neutrodyne patent.

\$100 Prize for a Name
THE Brooklyn Radio Service Company, 577 Myrtle Avenue, Brooklyn, N. Y., is holding a contest, open to all radio fans, to get a popular trade name for their products. The judges are John Karch, Clark Griffin, Harry Nicholl, Leon Schoenberg and Frederick Blake. The contest closes July 5 and all mail must be dated no later than noon of that day. The prize is \$100. As many suggestions as desired may be sent in by one contributor. The firm does a big mail order business, besides the counter sales in its chain of stores. Those sending in suggestions for names should write their full name and address, the company advises.

How Some Fans Meet Radiation Problem

"HOW can I prevent other radio sets from interfering with my reception?" ask many readers and radio fans continually. A special organization has recently been formed among radio engineers to formulate some method by which reradiation or "canary bird" interference can be eliminated. Users of Antenella aerial plugs report that this light socket aerial has solved this problem for them and many have taken down their aeriels because they can get just as good results with the Antenella. The construction of the Antenella is such that it makes the house wiring system act as an antenna, and because these lines are self-shielding due to conduit wiring, they do not pick up outside aerial radiation and are accordingly ideal to eliminate such interference, as well as static.

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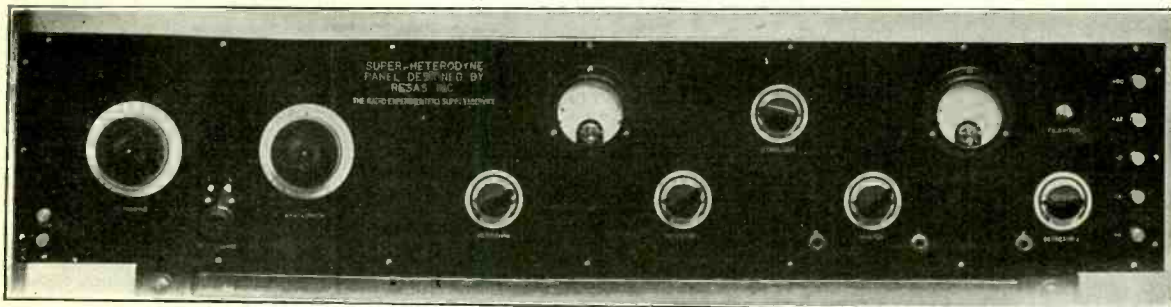
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|---|--|--|

All necessary hardware for above.

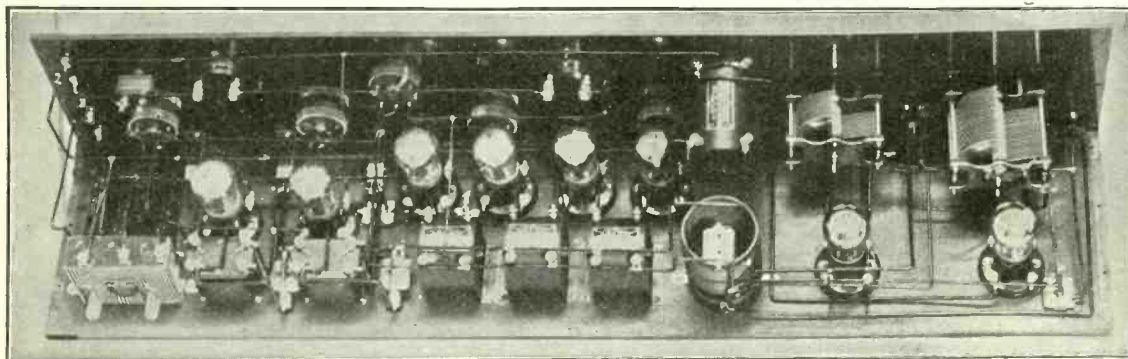
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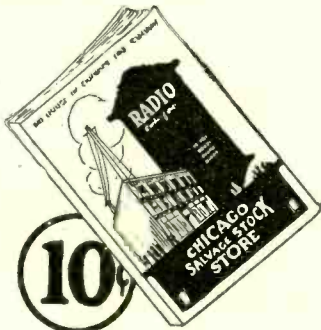
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The Radio Clubs

What They Are Doing to Help Solve Pressing Problems

Address Club Editor, **RADIO WORLD**, 1493 Broadway, New York City.

HOW EL PASO SOLVED PROBLEMS

ORGANIZED only three months, El Paso Radio Club, Box 1214, El Paso, Tex., has 300 members. The officers are J. T. Burke, president; A. D. Clark, vice-president; C. J. Henry, secretary; D. J. McCanne, treasurer. Mr. Henry reports:

"One source of vicious interference we encountered was from a high-tension precipitation system used by the local smelter. This has been eliminated through screening and grounding. We have obtained the cooperation of the local electric light and railway company to the extent of having them place at our disposal a trouble-shooting auto with competent crew and tests set with loop. This has been of invaluable assistance in running down interference!"

"Recently the proposition of a new lighting system came up. Our committee promptly appeared before the city administration and succeeded in having the matter held up until our technical committee could make tests to determine as to whether the proposed system would cause radio interference. Our tests showed that it would not with underground wiring and it was endorsed on this basis."

"We are also putting out an applause or acknowledgement card which we believe is good. This is printed on a government stamped post card and we place these on sale at one cent each, actual cost of card, the club standing the cost of printing."

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PARTNERSHIP with public utilities or business dislocation and irretrievable harm to everyone—these alternatives are set before the people of the country by Philip L. Thomson, president of the Association of National Advertisers.



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the Improved Super-Heterodyne. Send 50c for book giving complete details of drilling, assembling, wiring and tuning 6 and 8 tube ULTRADYNE Receivers.

50c
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If it isn't just right and you used GOOD parts, you can use same panel, same layout and, in a few hours' easy work, turn it into a Kladag Coast-to-Coast On Loud Speaker Receiver that takes its hat off to nothing. Stores have done this.

We'll send you complete, simple instructions, hook-up, extra part and enuf real gold sheathed bus wire, prepaid, for \$5.00. Descriptive sheet only—10c. Radio list for stamp. We accept U. S. stamps same as cash.

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From Your Lamp Socket

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AT LAST

THE MOST PERFECT ONE - TUBE REFLEX

CLARITY — VOLUME — DISTANCE
Inductance or Capacity Tuning or Both

NO Howling, Hissing, Scussing, Distortion, Raucous, Storage Battery (optional), Taps, Switches or dead-end losses!

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Full set of Neuroformers, Variable Condensers with dials, and Neurodons **\$13.25**

Above parts are Genuine Workrite Neuroformers, made under Hazeltine patents.

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HELENA, MONTANA

HOW TO KILL RADIATION—See **RADIO WORLD**, February 23, March 1, 8, 22, April 12, 1924. 15c a copy. **RADIO WORLD**, 1493 Broadway, New York City.

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Indicate if renewal
This Offer Good
Until
June 14, 1924

Name
Street Address
City and State

Amateurs Handle Air Traffic as Storm Cripples Ships

WITH the old coast station that used to operate at this city out of commission, due to a storm which completely demolished one mast of the antenna, radio amateurs came to the rescue of a number of lake steamers.

Amateur radio stations 9ADF, 9DOE and 9DFN worked these ship stations, handled traffic for them, and sent weather reports in order to facilitate more immediate release from the ice fields. A. Bergtold, operating Station 9DOE, took three messages from three different ships and immediately forwarded them to Cleveland by wire telegraph. Station 9ADF took a number of press reports and turned them over to local newspapers in addition to giving several of the ice-locked boats weather reports.

The receivers used by the amateurs were only short wave sets, primarily built for work from 80 to 300 meters, while the transmitters on the ship stations were tuned to 600 meters. The ships' receiving sets were crystals for spark and phone reception only and, therefore, the amateurs were compelled to switch from CW to phone in order to be heard by the ship operators.

Captain Jackson Gets Training Station Post

CAPTAIN RIDLEY McLEAN, U. S. N., formerly in command of the battleship Arkansas, has been designated to succeed Captain O. P. Jackson, as Director of Naval Communications. Captain Jackson goes to command the training station at Newport, R. I.

Captain McLean is a graduate of both the Naval and Army War Colleges, has served as Judge Advocate General of the Navy, and is a gunnery expert. He reported to the Navy Department at Washington recently and is understudying Captain Jackson whom he relieves on June 1.

Peru Hears Troy Radio

TROY, N. Y.

THE special program broadcast March 24 by Latin-American students of Rensselaer Polytechnic Institute, from Station WHAZ was received in South America, according to a letter which reached here from L. Anciaux of Arequipa, Peru.

The letter says the entire program was received clearly with a loud speaker plugged in on the detector circuit. A transmission of 4,000 miles in a direction at right angles to the aerial to the Troy station is regarded as remarkable, though

WHAZ has been heard approximately 10,000 miles away in New Zealand and in the other direction, in Norway.

Despite Ban, Shanghai Fans Get Sets

THERE are several hundred radio receiving sets in use in Shanghai, though radio sets are on the contraband list and their importation is prohibited by the Customs, Consul-General E. S. Cunningham reports. Some of the sets here have probably been assembled locally from imported materials. The fact that many firms are able to offer these radio receiving sets for sale is evidence that some firms are able to manufacture or assemble them locally.



For best reception you need
The Goodman
The niftiest short wave tuner on the market. Great for present broadcasts, local and DX. Used in all parts of the world. Certificates of merit from testing laboratories. Pamphlet on request.
L. W. GOODMAN, Mfr., Drexel Hill, Pa.

The Ultimate Radio Receiver
THE FLEX-O-DYNE CO.
1674 Broadway (At 52nd St.)
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Circle 4589

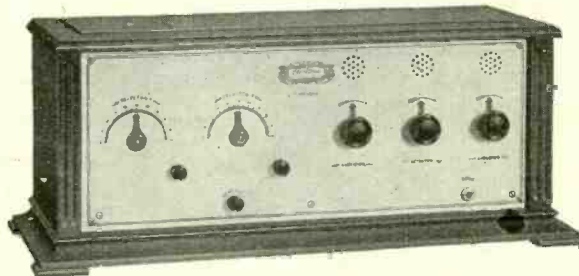
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MORE THAN A LOUD SPEAKER
Bristol Audiophone, Sr., 15-in. Horn..\$30.00
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SOMETHING NEW
Green Radio Applause Cards
Bound in Book Form
with stubs on which records of Radio Artist are kept after card is detached and sent, a Log Book and Card combined, all for 1c. 25 CARDS 25c.
Sent by mail postpaid. No stamps. Address
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PLATTSBURGH, N. Y.
DEALERS: Write for sample and terms.

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Model 70

\$75.00

Cleartone engineers have perfected a new circuit, embodying the desirable features of SELECTIVITY, LOG-ABILITY, EXTREMELY SIMPLE TUNING AND PERFECT CONTROL in the new GOLDCREST CLEAR-O-DYNE FOUR TUBE MODELS.

The beautifully etched, gold-finished panels and the distinctive, solid mahogany cabinets combine to give you a receiving set which is a valuable addition to any home, and a source of amusement, education and great pleasure for the entire family.

Long distance records are being established with these new models on which testimonials are being received daily. We want you to see and be convinced. Write today for free illustrated circulars, showing all of our beautiful cabinet models.

DEALERS and JOBBERS: Look at the prices below—then at the distinctive design and characteristics above. Write for our interesting proposition—a business builder.

Model 60.....\$60.00	Clear-O-Dyne Model 70.....\$75.00
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Model 62.....120.00	Clear-O-Dyne Model 72.....135.00

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A Radio Frequency Amplifier of TREMENDOUS POWER
Gets distance, volume, less static.
Attachable to any receiving set.
Price complete with tube, \$25.00.
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Amateurs Must Remain Silent 7 to 10:30 P. M., Standard Time

BROADCAST listeners throughout the country will be glad to know that the time for evening amateur transmission has been changed so that during daylight saving no confusion will result. This was done by order of the Department of Commerce. All general, restricted and spe-

cial amateurs are required to observe a silent period from 7:00 P. M. to 10:30 P. M., local standard time, or from 8:00 P. M. to 11:30 P. M., daylight saving time, and on Sundays during church services, from May 1 until October 1, 1924.

The American Radio Relay League indorsed the plan, adopted to prevent a repetition of the confusion and increased complaints which followed the adoption of daylight saving time last year.

The department has issued the order affecting about 17,000 amateurs with reluctance.



\$1.50

Anchor Radio Lightning Protector

for removing static charges & discharges from outdoor Radio Receiving Antenna.

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are not two days old when they're sent to you. And they are built right. Made of finest materials to give extra service. After you've used them if you don't feel they're the best buy, send them back and your money will be refunded.

	Large	Medium	Small
22½ V. Variable..	\$1.80	\$1.60	\$1.00
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Send M. O. or order for C. O. D. Postage Free.

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Supremacy Proven by Every Test!

The filament kontrol of infinite adjustment

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The SCIENTIFICALLY CORRECT RADIO RHEOSTAT for All Tubes!!

Can You "TUNE IN" With Your Rheostat?

DX stations you never heard before and silent tube operation are yours with a Filkostat in any hook-up, with any tube. It makes your tube an important tuning unit—for the FIL-KO-STAT is more than a rheostat. Its critical control, spread over four turns of the knob, enables you to "tune in" DX stations that no other control on your set will get. Tube reradiation is eliminated through micrometer vernier adjustment of filament heat (electronic flow).

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Some Good Service Articles in 1924 Back Numbers of Radio World

- Neutrodyne Article By R. L. Dougherty, March 15, 22, 29
- Construction of a Battery Charger By Walt S. Thompson, March 29, April 5
- Spider Web Neutrodyne By Byrt C. Caldwell, April 12
- Amplidyne By Thomas W. Benson, April 19
- Camper's Portable Set By J. E. Anderson, April 26
- Power-Amplification By Chas. H. M. White, April 26
- Neutrad Radio Frequency Unit By Walt S. Thompson, May 3
- Explanation of Super-Heterodyne By Walt S. Thompson, May 3
- Short Wave Adapters By J. E. Anderson, May 10
- Simplified Super-Heterodyne By Chas. H. M. White, May 17
- Superdyne By N. N. Bernstein, May 17, 24, 31

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Original Globe Coils
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All transformers are matched and mounted as a single unit. Complete wiring diagram with each kit sent parcel post.

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Type 201-A
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Dollar Radio Specials

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- 8 Genuine Foote Triple or Double Crystals, value, \$1.80.....1.00
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- 1 Monodyne Set, regular \$10.00, EXTRA SPECIAL.....8.95

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CEDAR RAPIDS, IA.

RAJAH SOLDERLESS SNAP TERMINALS

For Aerial, Ground and Battery Connections



Patent Pending

Instantaneous in Operation—Positive Contact



SOLDERLESS ATTACHMENT TO WIRE

Patent Pending

Just Push removable part, attached to wire, on the base stud and it snaps into place making a positive electrical connection.

To remove, just pull it off; no screws to bother with; no springs to bruise the fingers.

A positive electrical connection in ten seconds, without solder or tools, that cannot pull out or shake loose and is as easy to remove as it is to assemble to the cable.

Base studs secured by No. 8-32 screws and will fit all "B" batteries with screw posts.

Rajah Snap Terminals allow instantaneous change in place voltage with a secure connection, better than any switch.

No owner of a radio set who has seen or used a Rajah Snap Terminal will ever use any other style of binding post. Free, Snap Terminal and Base Stud, complete as illustrated, each 20c.

Base studs are sold separately as they can be used wherever a change of connection is desired, thus permitting a quick change of lead in and battery wires from one set to another.

Base studs with screw and washer, each 5c. Special Introductory Offer: 1 Dozen Snap Terminals and Base Studs complete by mail prepaid, \$2.00.

Dealers get in line at once for the best-selling radio device you ever saw.

A. J. VOLK

Dept. RW No. 143

North 16th Street Bloomfield, N. J.

Radio Gets a Head Start in South Africa

A STAFF sergeant capering in Cape-town Castle to "Mr. Gallagher and Mr. Shean," played in Johannesburg, 900 miles away—this signified the coming of broadcasting to South Africa.

Africa's first programs consisted of five concerts broadcast from a temporary station at Johannesburg, employing a Western Electric 500 watt transmitter. General Smuts, Premier of British South Africa, broadcast a Christmas speech, which along with a varied program was clearly heard and enjoyed by many people in Transvaal and Rhodesia.

The people of South Africa had been interested in radio broadcasting for some months due to reports of its benefits and entertainment on the other continents.

J. D. Carpenter, South African manager of the Western Electric Company, suggested a plan for temporary operation of broadcasting apparatus whereby concerts given by the South African Railways could be sent out. The Railway people were at once enthusiastic.

State Monopoly of Air Discussed in Ireland

A NEW issue has been raised in Ireland—the possibility of a state monopoly of radio broadcasting, which the Irish plan to take up now.

A committee organized to study the best methods of organizing this industry in Ireland has reported favorably toward such a system; and an offer has already been

received for the erection of a powerful station. True to tradition, the government has ordered that if it be accepted, the antenna be rigged in the shape of a harp.

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Plugs included.

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Rasia RT6	3.00
Rasia CR	3.25
Owl 1714	3.60
RR 1716	6.75

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Reetigon, 5 Amp.	22.40
Tungar, 2 Amp.	14.40
Tungar, 5 Amp.	22.40
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A "B" Battery with an unconditional guarantee. Tested and approved by the Tribune Institute. NOTE OUR PRICES, 4 SIZES:

22 1/2 Small	\$1.00	45 Volt Medium	\$2.80
22 1/2 Large	2.00	45 Volt Large	3.75

Allow us to quote on any parts or standard sets.

Caruso's Voice Broadcast Fifteen Years Ago

THE agitation that is going on today in favor of having the famous operatic and other stars broadcast brings to the minds of a few the fact that almost fifteen years ago, when not one person in 10,000 had heard of radio, Caruso's voice was broadcast.

Dr. Lee DeForest, whose invention of the Audion makes broadcasting possible, recalled this early experiment the other

day in conversation with Andreas Dippel, the operatic impresario. It was in 1909, and at that time DeForest was working out the details of the invention that has since brought him world-wide fame. Dippel was then director of the Metropolitan Opera House in New York, in which organization he had, for many years previous, been the principal tenor.

Dr. DeForest was eager to have some great singer broadcast for an experiment and solicited the greatest of them all. Caruso did everything in his power to make the experiment a success. To get the microphone anywhere near the singer it was necessary to lower it from the flies and then camouflage it back of a "prop" tree. But finally everything was ready. It had been decided that Caruso should sing "The Sicilian" number into the microphone from the Metropolitan's stage. Several of DeForest's associates were in the little laboratory of the inventor in Jersey City awaiting the result. Almost before the last golden note had died away the telephone at the Metropolitan rang and an excited voice on the other end of the wire in Jersey City joyfully announced that the song in all its beauty had been plainly heard across the Hudson.

But the greatest thrill came to Dr. DeForest the following day. Two American warships were lying in the harbor down the bay. They, too, had picked up the priceless voice and realized that it belonged to the greatest tenor of all time. But aside from the operators on the warships and the little group in the laboratory in Jersey City none others heard the golden notes, which, if they were broadcast today, would enthrall millions.

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Separator Insulator
Suspend near ceiling

NO DANGER from LIGHTNING
Or \$5, if four set owner's addresses are sent to us.
Details about **KILLING NOISE** in Radio Sets FREE!
INTER-STATE SIGNAL CO., DEPT. 2, COLUMBUS, O.

COAST TO COAST

Every Turn **STAR** No
A Tap **COIL** Soldering

SEND FOR LITERATURE
STAR RADIO PRODUCTS CO.
711 S. DEARBORN ST. CHICAGO, ILL.

USE

EVEREADY

Radio Batteries

-they last longer

COSMOPOLITAN PHUSIFORMER

The Missing Link in Radio

15-17 WEST 18th ST. NEW YORK

The Ultimate Radio Receiver

THE FLEX-O-DYNE CO.

1674 Broadway (At 52nd St.)
New York, N. Y.
Circle 4569

The "Goode" Two - o - One

A

Le Ton d'argent

Guaranteed



BY
MAIL
ONLY

\$2.39

Postpaid

QUARTER AMPERE AMPLIFIER-DETECTOR RADIO TUBE

GUARANTEED SATISFACTORY

All "GOODE" Tubes Sold Direct to the Consumer—No Dealer Profits

ONE—"Goode" Detector-Amplifier..... **\$2.39**

THREE—"Goode" Detector-Amplifiers..... **\$6.42**
(All postage prepaid)

The "Goode" Two-o-One A Tube amplifies or detects. It is a quarter ampere, six volts, standard base silvered tube.

Send express or postal money order or New York draft to—

The Goode Tube Corporation
Incorporated
EVANSVILLE INDIANA

Deadspot Troubles Brussels Station

BELGIUM is having trouble with a zone of silence from her new Brussels broadcasting station. It is noted that this zone extends directly out from the station to south-southeast, and seems either to be a "shadow" cast by some type of mountain or ground, or is the fault of a poorly situated antenna or lead-in. No solution has yet been found.

WE REPAIR
RADIO TUBES

WD-11 ... \$2.50	DV-2 \$2.50
WD-12 ... 2.50	DV-6A ... 2.50
UV-200 ... 2.50	UV-199 ... 2.50
UV-291 ... 2.50	C-295 ... 2.50
C-300 ... 2.50	UV-201A ... 2.50
C-301 ... 2.50	C-301A ... 2.50
DV-6 ... 2.50	Marconi ... 2.50
DV-1 ... 2.50	Moorhead ... 2.50
6 v. Plain Detector..... 2.50	
6 v. Plain Amplifier..... 2.50	

Mail orders solicited and promptly attended to.
Dealers and agents write for special discounts.

H. & H. RADIO CO.
P. O. Box 22-B
Clinton-Hill Station Newark, N. J.

HOOK-UPS FOR EVERYBODY—
Henley's 222 Radio Circuit Designs.
Mailed for \$1.00, postpaid. The Columbia
Print, 1493 Broadway, N. Y. C.

30 STATIONS! in one hour!

—heard with one Myers Tube (name and address furnished on request). The remarkable results being obtained with Myers Tubes are due, largely, to the elimination of socket with its bunched leads.

Myers Tubes

(practically unbreakable) give you distance with clarity. They add 50% to the efficiency of any set by reducing interference. See that you get the New Improved Myers Tubes. Others are not guaranteed. Insist on Myers at your dealer's—otherwise send purchase price and be supplied postpaid.

Two types: Dry Battery and Universal (for storage battery)
Write for free circuit diagrams.

\$5

EACH. Complete with clips ready to mount on your set; no sockets or extra equipment required.

F. B. Myers Co. Ltd.
Radio Vacuum Tubes

240 CRAIG ST. W.
MONTREAL CANADA

Actual Size

For Maximum Amplification Without Distortion and Tube Noises

use the well known
Como Duplex Transformers
Push-Pull
Send for literature.
COMO APPARATUS COMPANY
446 Tremont St. Boston, Mass.



349 FULTON STREET
BROOKLYN, N. Y.

Send for our new CATALOGUE No. "B" (just off the press).

The greatest radio bargain list in the country.

Don't buy anywhere before getting our prices.

AMPERITE
The "SELF-ADJUSTING" Rheostat

PERFECT for every CIRCUIT

Simplifies wiring
Eliminates
hand rheostats
RADIALL COMPANY
320 W. 42nd St., N. Y.



\$1.10

Write for Free Hook-ups

From Your Dealer

Record Your Radio Stations
On RADEX Log Cards to Match Your Set

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Telephone
FRANKLIN 2159

100 Cards, Mahogany Finish or Oak Cabinet, and Index Dividers, Complete, \$3.00. A Useful Accessory to Any Set. Give Name of Your Set or Sketch of Dial Arrangement. Sent Postpaid on Receipt of Cash or Money Order.

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DUTCH RADIO VALVE
D-201-A

Honest!

.25 Amp. 8-6 Volts

Detector-Amplifier
Guaranteed

Rigidity tested by expert engineers.

Sole Distributors for U. S.
D. E. V. Importing Co.
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Missouri-St. Louis Radio Tube Laboratory
3872 Olive Street, St. Louis, Mo.

Austria Tunes In But Taxes Fans Twice

WASHINGTON.

THE demonstrations of broadcasting by the Technological Trade Museum have made radio very popular in Austria, Assistant Trade Commissioner F. M. Zwickel reports to the Department of Commerce. In view of the great economic and social importance of broadcasting, which has created a new industry in Austria, a permanent service has now been undertaken by the Oesterreichische Radio-Verkehrs-Aktiengesellschaft. As present this company co-operates with the Austrian Postal authorities in the matter of transmission.

The tax for a radio set will be 10 gold crowns collected by the federal post office. To cover the expenses of the broadcasting station, every owner of a radio set will have to pay a yearly fee of possibly 50 gold crowns. This fee will be reduced considerably in cases of hospitals, associations, and schools. Motion picture houses and other public places, where radio is used for advertising purposes, will pay a higher rate.

THE ROBERTS "B" BATTERY

Everlasting, rechargeable "B" BATTERY made of Edison elements.

Best for Neutrodynes, Superdynes, Superheterodynes and all high powered circuits. Superior in quality, durability, workmanship and finish. Satisfaction absolutely guaranteed. Insist on your dealer showing you ROBERTS "B" BATTERY before buying any other.

Dealers write for terms.

ROBERTS "B" BATTERY COMPANY
1120 Myrtle Avenue Brooklyn, N. Y.

CAUGHT

with worn-out dry cell "B" batteries? Purchase the economy way. Build a rechargeable "Hawley" knockdown "B" storage battery consisting of large-size Edison elements, special molded extra heavy flat bottom glass vials (not ordinary thin test tubes), special nickel wire, 200-hole hard rubber perforated separators, rubber stoppers, chemical electrolyte; in fact, everything for the actual making of battery, including, free, an 8-page illustrated folder, showing the simple putting together, making of a charger, and charging. 4-volt, \$6.25; 90-volt, \$9.90; 100-volt, \$10.50; 150-volt, \$14.25; 200-volt, \$17.00. Unconditional guarantee or money refunded. 30-day trial. Pioneer dealer. B. W. Smith, 31 Washington Ave., Danbury, Conn.

\$15 Set Gets 2,000 Miles

The Essex Radio Special, the receiving set with a condenser, gets you more distant stations clearer and sweeter than sets costing ten times its price.

\$15 SET COMPLETE WITH CABINET, WITHOUT TUBE OR BATTERIES

\$20 SET COMPLETE WITH CABINET, TUBE AND BATTERIES

Essex SX Service

617 West 125th St. New York
Detailed information on request.

MAGNAVOX R1—Latest nationally advertised reproducer; electrical modulator. List, \$35.00. Introductory, \$25.00. The factory sealed carton is your guarantee. Radio Central, Dept. W, Abilene, Kansas.



The Crystal That Made the Deaf Hear

Wonderful for Reflex or any Crystal Set. Requires no changing. Stands high voltage. Large magnetic surface. Sensitive all over. Standard base.

SYN-TEC is Guaranteed.

Dealers, Jobbers write for attractive proposition.

APPLIANCE RADIO CO.

1441 Broadway, Dept. R.W., New York City

THERE IS A BRAND-NEW CRAM'S RADIO MAP

(New Edition)

Just issued with all the very latest broadcasting stations and information.

ALL THE STATIONS OF THE UNITED STATES AND CANADA

Scale 100 miles to the inch in two colors—Size 34x28"

PRINTED ON HIGH-GRADE MAP PAPER UP-TO-THE-MINUTE INFORMATION INDICATING ALL AMATEUR AND STANDARD BROADCASTING STATIONS WITH COMPLETE INDEX OF STATIONS 35c (POSTPAID)

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1493 BROADWAY NEW YORK CITY

SUPERDYNE

THE WONDER CIRCUIT
Tremendous Volume!

D. X. Without an Aerial

Original Globe Coils

With Complete Wiring Instructions and Diagram.

\$6.25 Postpaid **\$6.25**

Globe Radio Equipment Co.

217 WEST 125th STREET NEW YORK

Ackerman

LOUD SPEAKER, \$9.50

Complete—Ready for Immediate Use Delivered anywhere in the U. S. A. A marvelous Speaker for the price of a headset.

Dealers and Jobbers Write for Discounts
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How to obtain a patent and other valuable information is supplied in our FREE Booklet. Write for a copy today.

MANUFACTURERS PATENT CO., Inc.

70 WALL STREET, NEW YORK



SUNBEAM'S VACATION SPECIALS

DIRECT FROM WHOLESALER TO YOU

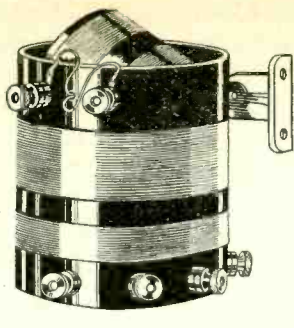
A Full Line of Fresh Supplies for your Summer Needs—Crystals, Tubes, Batteries, Parts, Spring Aerials, Phones, etc. All tested and guaranteed.

14 Years in the Same Spot **IDEAL VACATION PORTABLE SETS**
THE AIR-KING, 3 Circuit Tuner...\$16.50 **THE FAMOUS JOURNAL 1 Knob Set...**\$12.50
THE WONDERFUL AMBASSADOR, 1 Tube\$16.50

All three assembled and wired in handsome Cabinets. Each of these sets has brought in WOC from New York City.

"ANYTHING IN RADIO" Satisfaction and Quality Absolutely Guaranteed **EVERYTHING ELECTRICAL**
SUNBEAM ELECTRIC CO., 71 Third Avenue, New York City

"Write to Third Avenue and Save a Third"



TUNING COIL

COAST TO COAST RECEPTION

You can get 50 per cent. better results with this wonderful tuning coil. It covers all broadcasting ranges—gives maximum selectivity—increases volume and tonal qualities.

PRICE, DIRECT TO YOU \$5.50

SEND NO MONEY. Pay postman \$5.50 plus a few pennies postage upon delivery.

Absolute Satisfaction Guaranteed

J. L. Lewis, Inc., 132 W. 32nd St. New York City

GOING TO BUILD A NEUTRODYNE?



Here is the outfit for you!

You can purchase a Neutrodyne outfit for less, you can pay twice as much as we ask, but you cannot obtain a receiver which will even equal in distance, volume, tone, and selectivity the results obtained on this receiver.

And why can we make such a broad statement? Let us tell you.

First—The finest receiver must be constructed of the best of parts. We use the very best for this receiver—Radion Panel, bakelite dials, and bakelite sockets with a "swiping" contact. Federal jacks, Pada rheostats, the very best licensed Neutroformers and Neutralizing condensers, Acme audio frequency transformers, and, the most important of all, National "Low Loss" variable condensers, the most rugged, the most handsome, and the most efficient variable condensers made. Other condensers seriously cut down distance possibilities. Due to these condensers alone, our receiver is far more sensitive, and more selective than any other.

Second—To give the best results, a receiver must be made properly, it must be wired carefully, and it must be operated correctly.

With our instructions, even the novice is an expert at the construction of radio receivers.

The receiver is sent you completely assembled, ready for wiring, as shown in the illustration. As a consequence, all of the instruments are placed properly for the very best results, and the trouble involved in drilling and assembling is avoided.

A large, clear hook-up of the connections is given, and drawings, showing how each connection is made, how each wire is bent and placed, and how the wiring will look when completed are furnished. Complete wiring instructions are given to supplement these diagrams.

You simply cannot fail. The wiring of your receiver will not be surpassed by that of the finest factory made set.

Complete instructions for the tuning and operation of the receiver are also furnished, which will make you expert in a very short time.

Our illustration gives you an idea of the beautiful appearance of this receiver, and our story above tells you why this is the best Neutrodyne purchase on the market today. Now—send us your order and let us prove what we say.

Build this KING OF RECEIVERS, the five tube Neutrodyne.

Price. Complete parts, assembled, ready for wiring, including bus wire, lugs, etc., and all instructions and diagrams. (Tubes, phones and batteries are not included.) **\$45.00**

BILTMORE RADIO COMPANY

Dept. W-3 BOSTON 30, MASS.

NIGHTINGALES

"The British Broadcasting Company is planning an attempt to radio the song of the nightingale in its native haunts."—Cable Dispatch.

By EDWARD VAN ZILE

O SHADE of Shelley, have you heard that Spring Smiles on the earth and that the souls which sing, Poet or bird, a bard or nightingale, Are tuned to song that minstrelsy prevail? And do you know that now, from sea to sea, Across the continents, and where'er there be An ear that listens, shall be heard at times, The bird you hymned and your immortal rhymes? Such wonders come, as years sink into years! A song is sung, and lo, a whole world hears! You live again who feared your light would fail— Your song is ours and our your nightingale.

—Contemporary Verse.

Roxy Goes to Towns That Adore Him

WHILE Lillian Gish's production, "The White Sister," was attracting capacity crowds to the Capitol Theatre, New York City, S. L. Rothafel (Roxy) and his company of artists left New York for a second tour of towns in New England.

TEST YOUR BATTERIES

DON'T BLAME YOUR SET

SAVE MONEY { ON VACATION— ALL YEAR— ALL THE TIME— EVERYWHERE.

Assure Yourself of Good Reception With Your Radio Set At Home or at Camp.


0 to 50 Volts



VOLTS

For Testing "B" Batteries \$1.25 Each, Postpaid

0 to 35 Amps.



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For Testing "A" Batteries \$1.00 Each, Postpaid

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Dealers and Jobbers Write for Special Discounts

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198 Broadway New York City

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5 CENTS A WORD. 10 WORDS MINIMUM

RADIO BARGAINS—25% discount on any type Crosley, Radiola, Fada, Federal, Zenith & Grebe receiving sets, and Magnavox speakers. Prompt shipment. H. J. Engel, New Braunfels, Texas.

FOR SALE OR TRADE—Brand new Western Electric 10-D loudspeaker, list price \$55.00 for Radiola 111-A or \$37.50 cash. L. Frazer, Oakwood School, Poughkeepsie, N. Y.

FOR SALE—Two Weston DC Voltmeters Type 301, two 400-ohm Bradleyometers, four 1/10 H. chokes. All new, cheap. Kenneth Jones, London Mills, Ill.

MAGNOVOX R3—Latest nationally advertised reproducers; electrical modulator. List, \$35.00. Introductory, \$25.00. The factory sealed carton is your guarantee. Radio Central, Dept. W, Abilene, Kansas.

FOR SALE—Improved 4-circuit tuner. Five tubes, 2,500-mile Loud Speaker range, \$125. Three-tube Loud Speaker set, \$60. Three-tube Westinghouse R C set, \$90. One-tube Auto-Plex, \$25. UV-201A, UV-201, UV-200 (repaired) tubes, \$3.00. C. N. FISHER, Williamstown, Mass.

158 GENUINE FOREIGN STAMPS—Mexico War issues. Venezuela, Salvador and India Service, Guatemala, China, etc., only 5c. Finest approval sheets 50 to 60 per cent. Agents wanted. Big 72-page Lists Free. We buy stamps. Established 20 years. HUSSMAN STAMP CO., Dept. 155, St. Louis, Mo.

PATENTS PROCURED—Send sketch or model today for examination, prompt report and advice. No charge for preliminary advice. Write for free Booklet and blank form on which to disclose your idea. Highest references. Promptness assured. Clarence A. O'Brien, Registered Patent Lawyer, 2011, Security Bank Building. Directly across street from Patent Office, Washington, D. C.

FREE APPARATUS for securing subscriptions for "RADIO." Write today for complete lists of premiums and our special subscription offer. "RADIO" Pacific Bldg., San Francisco, Calif.

GET THOSE SUPERDYNE COPIES
THE Superdyne Circuit, brought up to date in diagrams and text, in RADIO WORLD for May 17, 24, 31. Per copy, 15c; the three copies, 45c, or start your subscription with the first number. RADIO WORLD, 1493 Broadway, New York City.

PATENTS—Write for free Guide Books and Record of Invention Blank before disclosing inventions. Send model or sketch of your invention for our prompt Examination and Instructions. No charge for the above information. Radio, Electrical, Chemical, Mechanical and Trademark experts. Victor J. Evans & Co., 924 Ninth, Washington, D. C.

THE BABY PORTABLE, \$10.50—1,000 miles! Small and compact. Guaranteed. Cash with order. Be our demonstrator. Big money. B Radio Products, 123 B. Street, S. E., Washington, D. C.

PATENTS—SEND DRAWING OR MODEL FOR EXAMINATION AND OPINION. Booklet free. WATSON E. COLEMAN, Patent Lawyer, 644 G Street, Washington, D. C.

CRAM'S RADIO MAP IN TWO COLORS—Best map on the market, 35c. The Columbia Print, 1493 Broadway, N. Y. C.

FULL LIST OF BROADCASTING STATIONS in Radio World dated May 17th, 1924, mailed on receipt of 15c or start your subscription with that number. RADIO WORLD, 1493 BROADWAY, NEW YORK CITY.

Very Good for Two Tubes

From V. V. Nowark, 122 S. Fitzhugh Street, Rochester, N. Y.

I take pleasure in submitting the following stations I have heard on my two dry cell tube set which I constructed three weeks ago. Most of the stations came in with loud speaker intensity.

I receive KHJ, a distance of 2,350 miles, almost every night loud and clear. The antenna consists of single strand 50 ft. long with a 25 ft. lead in, run alongside of a two-story brick building.

The following is the list of stations picked up from Feb. 9th, 1924, to March 1st, 1924:

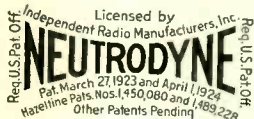
- KDKA, WEAJ, WRC, KYW, WIP, WDAF, WJZ, WMAQ, WTAM, WGY, WOR, WEAN, WNAC, WOAW, WDAP, WSB, WSAI, WHAA, WJZ, WGR, KHJ, KGO, KFI, KFKX, KFJF, KFAF, CFCA, WBAP, WCAP, CFGR, WBAH, WTAY, WBCD, WLAG, WHN, WHAZ, WOC, WWJ, WCAE, WAAD, WCB, WLW, WDAM, WDA, WBAV, WBZ, WCAI, WHAS, WCAP, WOS, KSD, WHA, WTAS, WLAG, WHAM, WJAX, WOO, WOO, WKAR, WCAU, WDAF, WIAD, WFAA. A total of 63 stations aggregating about 37,000 miles.



Write Today For Descriptive Folder of the

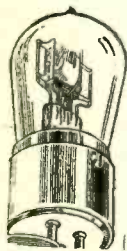
NEW HOWARD 5-TUBE NEUTRODYNE

This Remarkable Set has Created a Sensation Among Radio Enthusiasts. Beautiful Walnut Cabinet with Special Howard Neuroformers, Tube Sockets and Rheostats.



HOWARD MFG. COMPANY
4248 No. Western Ave. Chicago, Ill.

Burnt-Out Tubes Replaced for \$2.50



A Wonderful Tube for Your Superdyne.

The Only Tube with a written Replacement Guarantee Against Breakage or Blowout.

Burnt-out, Defective or Broken Tubes of any brand or make whatsoever will be replaced by a brand new (not refilled) Royaltron Tube, at a cost of only \$2.50.

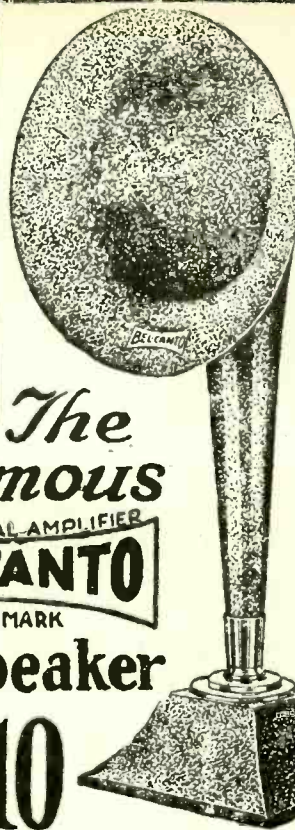
It is with the Object of Advertising the MERITS of ROYALTRON Tubes, that we make the above unusual offer.

Every ROYALTRON Tube is accompanied by a money-back guarantee.

Approved by the Radio News and World Laboratories
ROYAL MANUFACTURING CO.
Department W. O.
206 BROADWAY NEW YORK
Dealers, distributors and agents, write or wire immediately for unusual proposition.

BEL-CANTO will bring convention to you

\$25 for \$10



Buy Direct and Save \$15

The Famous **BEL-CANTO** Loud Speaker

PRICE DELIVERED FREE TO YOUR DOOR **\$10**

GUARANTEE
Money back any time within ten days if dissatisfied. We further guarantee to the publisher on carrying this advertisement that each and every speaker will be sold on the above terms and the instrument will be exactly as offered in this issue.

SENT FREE
Radio Locking Chart—Get One.

You can only buy the BEL-CANTO Direct from Us—the Manufacturers—We save you these three profits—Distributor—Jobber—and Dealer.

Call at our factory, send us your check, money order, or pay the Postman \$10.00. Prepaid to any part of U. S. and Poss. BEL-CANTO Adjustable Phonograph Attachment, Delivered Free, \$3.50.

Bel-Canto Manufacturing Co.

BENSEL-BONIS CO., INC.
General Office & Factory, Dept. A.
417-419-421 E. 34th St., N. Y. C Telephone Vanderbilt 8959

ROLLS ROYCE RADIO TUBES



Like their name, significant of quality. Durable and powerful. Bring in distance with a maximum of volume and clearness.
Type 200—5 volts, 1 ampere Detector Tube
Type 201A—5 volts, .25 ampere Amplifier and Detector
Type 199—3-4 volts, .06 ampere Amplifier and Detector
Type 199—3-4 volts, .06 ampere With Standard Base—Amplifier and Detector
Type 12—1 1/2 volts, .25 ampere Platinum Filament—Amplifier and Detector
"The Rolls Royce of Radio Tubes" **\$2.50**

ALL TYPES EVERY TUBE GUARANTEED

to work in Radio Frequency. Especially adapted for Neutrodyne, Reflex and Super Heterodyne Sets. Shipped Parcel Post C. O. D. When ordering mention type.

Rolls Royce Tube Co.
21 Norwood St. Dept. W Newark, N. J.

FOR SALE!
Three-tube radio set, solid mahogany cabinet; tunes easily, excellent workmanship; reception loud and clear. 800 miles on horn. Wonderful opportunity to obtain a good set at very low price. Phone 1363 New Rochelle for particulars, or address E. Pratt, 21 Grant St., New Rochelle, N. Y.

INFORMATION WANTED
Address of the Teco Radio Co., Boston, Mass. Please address J. L., care Radio World.

ERLA DUO REFLEX 1-2-3 TUBE

Tube for tube most efficient circuit. Tone quality and selectivity unequalled. Loud Speaker reception on distant stations. Ideal all year round circuit. We are Erla Specialists
Complete parts for one tube set including mahogany cabinet and panel, without tubes or batteries \$29.85
Same as above for three tube set 44.50
Set wired, finest workmanship, extra 10.00
Send for latest Erla Bulletins

Harrington Radio Company
145 GREENWICH STREET
NEW YORK CITY

ANY TYPE SET BUILT TO ORDER

Specialists in Superdyne and Superheterodyne Sets
Correspondence Invited.

Quality Workmanship
HERMAN E. ERICKSON
(Associate, Institute of Radio Engineers)
ONE UNION SQUARE NEW YORK

How a Tube Is Made

THERE are thirteen steps or processes of assembly before a vacuum tube, starting as raw material, takes its completed shape. There is also a test made after each assembly and still further tests after the tube is completed. These tests are so severe that once a tube has passed through them, it is rarely returned because of failure in operation.

The raw material from which the tube

is assembled consists of the following: A glass blank, a thin glass stem, a short tube of glass; the filament; the plate and grid. The plates are shaped from rectangular bits of metal and the grid wires are wound into the spiral form they take in the completed tube. The illustrations show these various parts clearly.

The first step in the assembly process is spinning a flare on the end of the short glass tube. This tube is then called the flare.

Next is the inserting of the five wires in the flare. Looking at the WD-11 one can see five wires on the inner unit though there are but four leads at the base. The fifth wire is a blind insert to act as a support for the plate. The five wires are inserted in the end of the glass tube opposite the flare and the glass melted to the shape seen in the completed tube, thus holding firmly in place the wires. The glass tube with its wires inserted is now called the press.

The five wires are next cut to their proper lengths so that the plate, grid and filament can be mounted. These units are spot-welded in place by girl operators, each of whom is a highly skilled worker. The filament used in the WD-11 is a metal wire coated with oxides.

Now the glass blank is tubulated or in other words the thin glass tube is placed on its end after a small hole has been melted in the glass blank with a gas flame.

Next the press is sealed to the bottom of the blank. In this process the flare is held tightly to the bottom of the blank and a flame melts the glass sufficiently so that they weld together.

As the long glass stem is placed on the blank for the purpose of exhausting the tube, this process is the next in order. The long glass stem is inserted into a piece of rubber tubing which leads directly to the pumps which are two in number. An oil pump and a mercury vapor pump are used to exhaust the tube down to the required vacuum. Before the pumps are turned on, a covering which serves as an oven is pulled down over them and they are subjected to a high temperature to drive gases from the glass walls and metal parts.

Then the pumps are turned on and the tubes exhausted to a very low pressure which is at a much higher point of exhaustion than that given the electric lamp.

A coil of wire surrounds the tube when placed in the exhausting machine and by means of a high tension spark the vacuum is tested. Next the plate of the tube is heated red hot by a high frequency oscillating current generated from transmitting tubes to remove the gas from the plates and metal supports.

RADIO RECORD

Keep a permanently bound record of all stations you have received and how you received them. Radio Record 5 1/2" x 14"—600 lines. All broadcasting stations listed, and indexed with space for new stations—\$1.00 Postpaid.

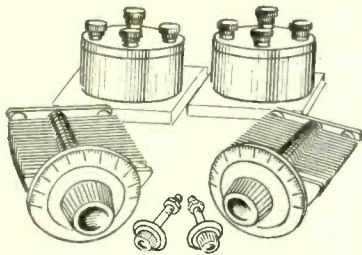
THE BEADLE PRINTING CO.
MITCHELL SOUTH DAKOTA
Applause Cards 60 for \$1.00 Postpaid.

Long Distance Receiver

**Results Same as Super-Het.
7 to 9 Tube. With the New
ROFFY No. 3.**

Circuit, using 4 Type 199 dry cell tubes, WITH LOUD SPEAKER.

Only 2 controls; simple and inexpensive to operate. Eliminates great deal of static.



**SPECIAL PARTS
OUTFIT \$32.50**
Complete in box for.....

None but finest materials and parts possible to procure used in our sets.

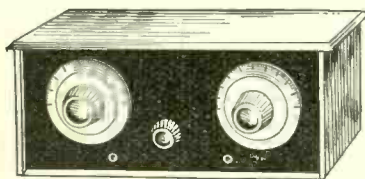
- 2 Roffy Hetro-Trans. No. 3.
- 2 Special Balanced Condensers.
- 2 Verniers. Wiring diagram and complete instructions.

SEND NO MONEY. Pay postman on arrival or send \$32.50 with order if preferred.

NO COMPLICATED WIRING EXTREMELY SELECTIVE

For example, we easily tune out KHJ on 295 meters, only 2 miles distant, and bring in WOR, Newark, N. J., on 405 meters—a difference of only 10 meters; also PWX, Havana, on 400 meters (only 5 meters off!)—and this with 4 powerful broadcasting stations in the city on the air.

Greatest all-around efficiency over ANY circuit yet devised. No previous experience needed to wire up this set owing to its extreme simplicity.



ROFFY NO. 3 — COMPLETELY WIRED and assembled, but without \$125.00 tubes or batteries.....

GUARANTEED SATISFACTORY or Money Refunded

PACIFIC RADIO CO.
651 So. Hobart Blvd.
LOS ANGELES CALIF.

Does Your Neutrodyne Howl?

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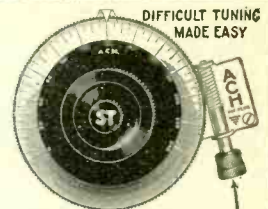
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Argument Over Origin of SOS Is Officially Settled

By Carl H. Butman

Washington.

THE origin of the distress call of ships at sea, familiar to all operators and many fans, has caused considerable curiosity, and in order that a complete report could be made, the Bureau of Navigation of the Department of Commerce asked the International Bureau of The Telegraph Union at Berne for a resumé of the origin and history of SOS.

According to advices just received from M. Etienne, Director, the first suggestion of a distress call for ships was made by the Italian Delegates to the preliminary conference on wireless telegraphy, at Berlin in 1923. They urged the adoption of a universal signal SSSDDD, to be sent by ships in distress, explaining that all stations and ships should be obliged to receive the following messages, suspending their other communications and passing immediately to reception. The other delegates agreed to the need for such a signal but left the final decision to a special conference.

Need in Distress

Soon after this suggestion, the Marconi Company recognized the need for a distress call, and on February 1, 1904, the famous call CQD was instituted on all their ships by a general order. This signal was a combination of the general call CQ coupled with the letter D to signify distress.

It was used only at the order of the captain of a ship in distress, or a station re-transmitting the signal. All stations were to recognize the urgency of the call and make every effort to establish satisfactory

communication without delay. The dismissal of operators was to follow the misuse of the call. Several countries, including the United States, adopted CQD and used it until the Berlin regulations were ratified.

At the Radio Telegraphic Conference in Berlin in 1906, the German Government submitted the following suggestion relative to a standard distress call:

"Ships in distress will make use of the following special danger signal: (SOS)."

Previously, German ships desiring to communicate with all vessels in their proximity without knowing their names of call would send an inquiry signal SOE. Germany planned to suggest this signal as the international signal, but as the last letter, E, represented a single dot, was not believed sufficiently characteristic, being easily susceptible to loss, especially during atmospheric disturbances or in heavy traffic, or when carelessly transmitted, the delegates in 1906 suggested the final letter as S, thereby having the honor to define what became the universal signal (SOS).

Interpretations such as "save our souls," "save our ships," given the call, the Berne Bureau points out, should be accepted with reserve. The Italian proverb: "If it is not true, it is well invented," they suggest, is applicable to the literal translations offered. In a similar manner, Berne reports—the Marconi signal CQD has been interpreted to mean "come quick danger."

The signal to-day is SOS without spaces, the Berne Bureau explains, and should not be sent but

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A DEMONSTRATION of the Phonofilm, Dr. Lee De Forrest's talking pictures obtained by uniting movies and the radio, was given at the annual convention dinner of Famous Players-Paramount to their sales organization at the Pennsylvania Hotel, New York City.

When it came time for the speech-making to start, the lights suddenly went out. Then, through the silence, came the voice of Sidney R. Kent, general manager of the film organization. For half a dozen sentences he continued to talk, without being visible. Then, slowly, his features "faded in" on the screen and the guests realized that the words they had been listening to were photographed sound waves.

Later Adolph Zukor, president of Famous Players, talked to his employees through the phonofilm.

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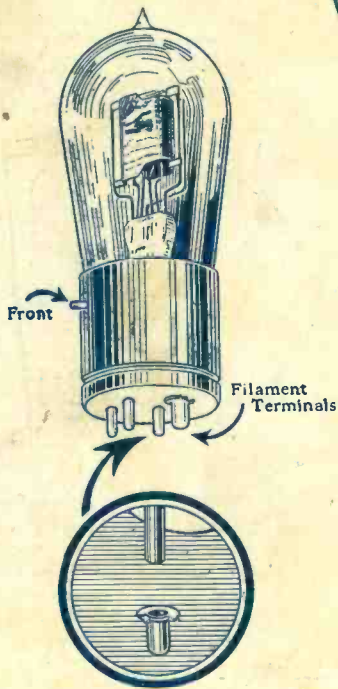
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