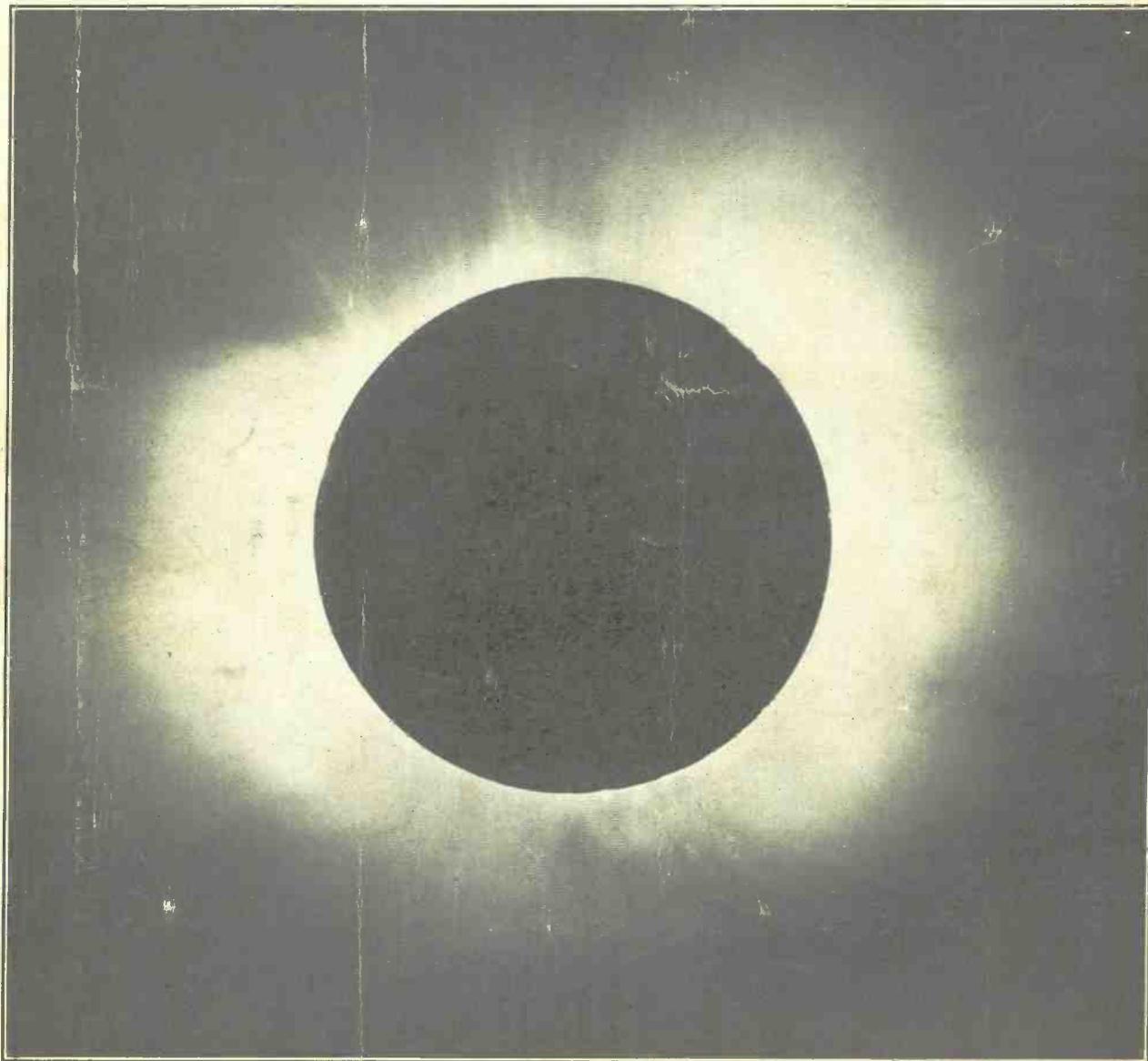


February
1925

25c

Radio Journal

Established 1922

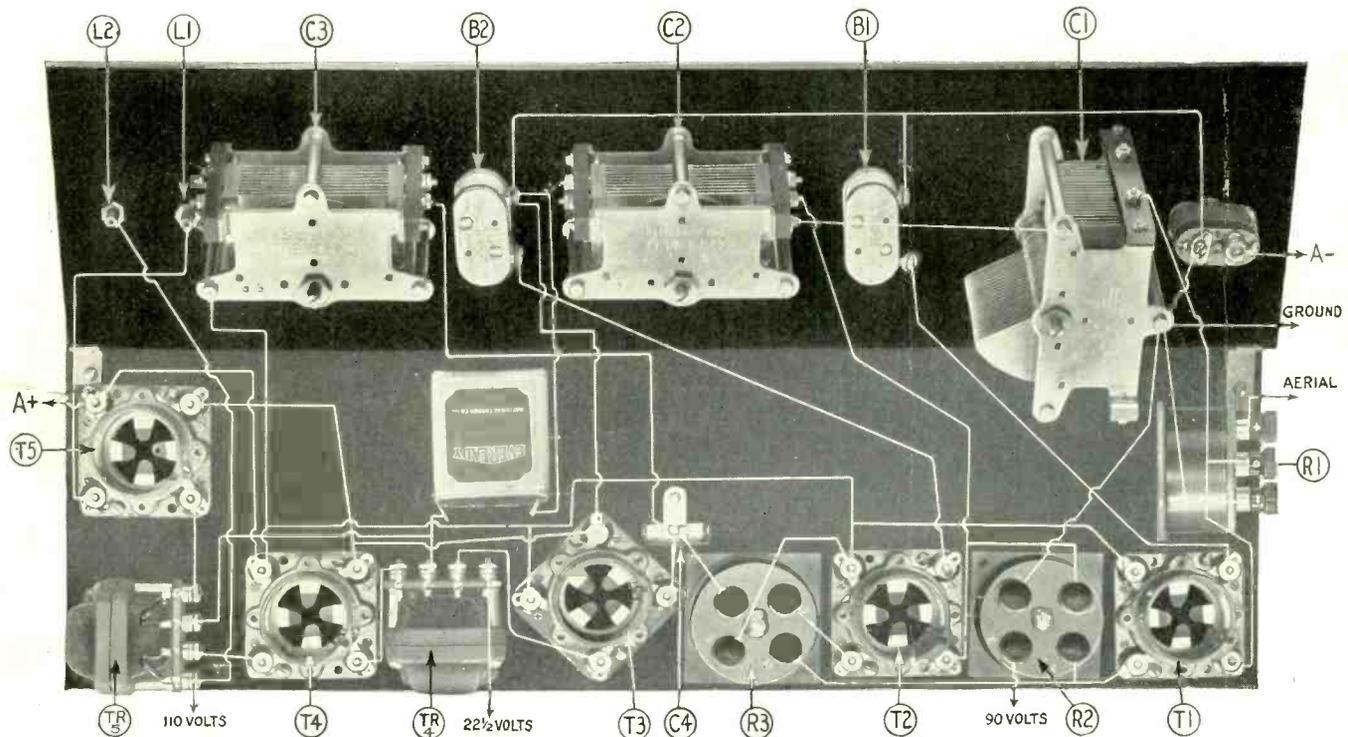


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Wavelengths ~ Reviving The Bat. ~ Electronic Development

Better Coils in a Better Hook-up

Try Roffy Radio Frequency Transformers In Your Set



WIRING INSTRUCTIONS EASY TO FOLLOW—This illustration, specially prepared to show you every connection and every binding post in a typical set using Roffy Transformers in the Roffy Hook-up, is reproduced from the complete wiring instructions sent free with every set of Roffy Transformers.

ASK any authority on radio in what part of the set lies the secret of greatest progress in securing greater distance—greater selectivity—undistorted reproduction. He will tell you—

In the radio frequency circuit---in the way the coils are wound and the way they are hooked together.

Hence, the most important thing about your set for you to determine, is whether or not you

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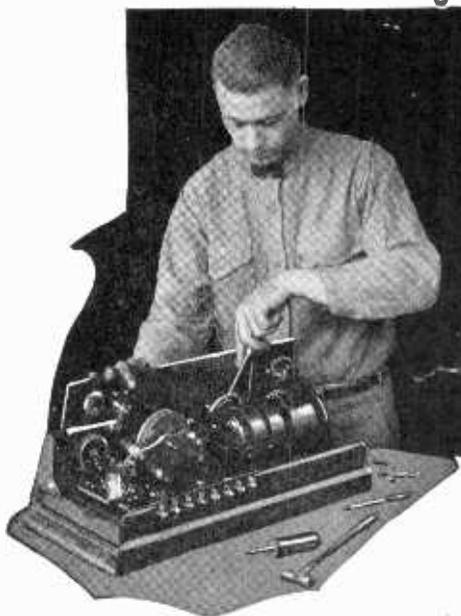
Take advantage of our practical training and the unusual condition in Radio to step into a big paying position in this wonderful new field. Radio offers you more money than you probably ever dreamed possible—fascinating easy work—a chance to travel and see the world if you care to or to take any one of the many radio positions all around you at home. And Radio offers you a glorious future!

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(Signed) A. N. Long,
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From \$15.00 to \$80.00 a Week
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Route 1, Box 10,
Tamaqua, Pa.



VOLUME FIVE

FEBRUARY, 1925

NUMBER FIVE

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Because of the fact that intense interest in radio is sweeping the entire country causing a flood of inventive and research work, much of which will be duplicated, it is necessary to state that in the event of expressions of opinion and various statements from contributors and correspondents appearing in Radio Journal from month to month becoming the subject of litigation in courts, or of controversy in scientific circles, and which may involve

CONTENTS

THE TELEMOMIC III.....	LESTER L. JONES	7
THAT ULTIMATE SET.....	H. G. AYLESWORTH	9
FAMOUS AUSTRALIAN STATION.....		10
NEW WAVE LENGTHS.....		10
COMPACT PORTABLE SUPERS.....		11
ELECTRONIC DEVELOPMENTS.....	DANIEL N. CLARK, L.L.B.	12
COUPLING AND SELECTIVITY.....		13
USING POLARIZER ON THE REFLEX.....		13
FIVE TUBE NEUTRODYNE LESS NEUTRODONS.....	E. PATTERSON	14
SHARP TUNING WITH PHONOGRAPH RECORDS.....	L. B. MCNELLY	14
PIONEER RADIO FIRM AND IT'S GROWTH.....		18
LOUD SPEAKER CONSTRUCTION.....	FRANK REICHMANN, B.S., E.M.	20
RADIO AND THE PUBLIC.....	HERBERT HOOVER	22
QUESTIONS AND ANSWERS.....		23
WITH THE WESTERN AMATEURS.....		26
TRADE TALKS.....		30

questions of priority of invention and a comparison of merit of apparatus, the owners and publishers of Radio Journal positively and unequivocally, disclaim any responsibility for any such expressions of opinion or partisan statements.

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Pacific Trades Functions

THE Pacific Radio Trade Association, recently organized in San Francisco, Calif., with Heckert L. Parker as manager, is making great strides toward a general betterment of the industry and radio affairs in general, according to its members. The association is organized on entirely new lines, with a board of directors made up, much as a Chamber of Commerce, one director from each group, class or interest in radio. One director represents each of the following: radio manufacturers, manufacturers' agents, radio jobbers, electric supply jobbers, miscellaneous jobbers, electrical dealers, radio dealers, music dealers, individuals and miscellaneous groups. Herbert E. Metcalf is president and A. S. Lindstrom is vice-president.

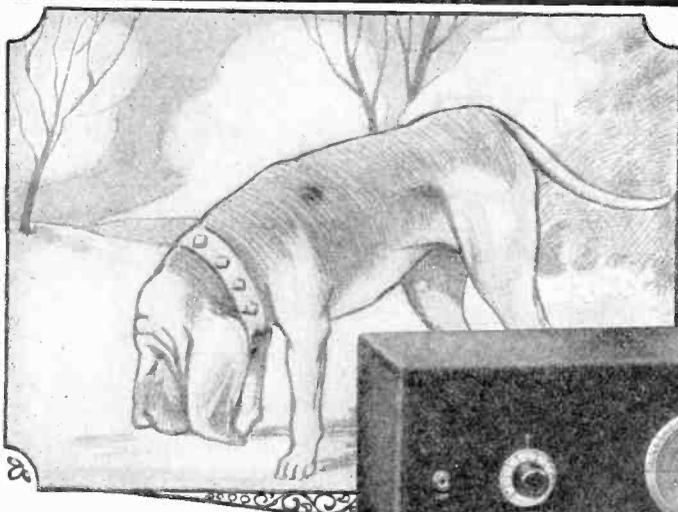
The association controls its own registered trade-mark, licensing members to use it in advertising, etc., but recovering the same when such use is completed. "The privilege to display this hangar or use the cut" said Mr. Parker recently, "will become desirable because of the publicity which the association obtains through the running of suitable advertisements outlining the aims and objects of the organization.

The directors meet weekly, general bulletins are issued once each month giving a digest of everything of interest regarding the organization's activities, and the association is decidedly active in promoting radio affairs in general in and about the Bay city.

The Association's chief revenue is

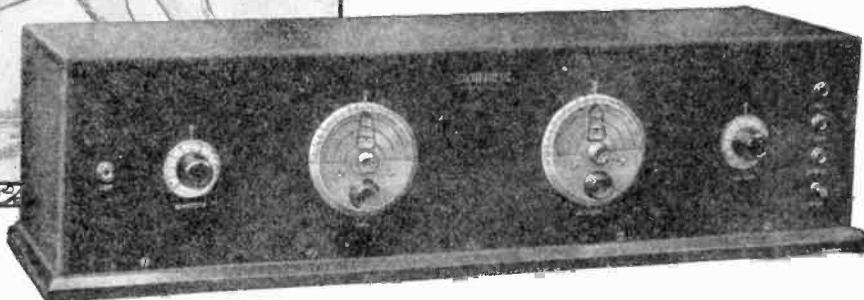
derived from the annual radio exposition, conducted each year on a cooperative basis with exhibitors. It also furnishes active merchandising helps, supplies lecturers on radio for any and every occasion, maintains a reference library, cooperates with the federal inspector's office, and with broadcasters, and monthly meetings of all members are held at night, usually following a dinner.

The really unique feature of the organization, however, is the makeup of its directorate with one representative from each of the various groups engaged in the manufacture, distribution, and sale of radio, thus assuring the fact that no one group or class of radio merchandisers will be in control of the board.



Sensitivity

The bloodhound, remarkable for the acuteness of its smell, can pick up a scent and follow a trail when all else fails.



-never before thought possible!

With the extreme acuteness of the bloodhound's scent, the Model L-2 Ultradyne detects the faintest broadcast signals—signals that are "dead" to other receivers—regenerates and makes them audible on the loud speaker.

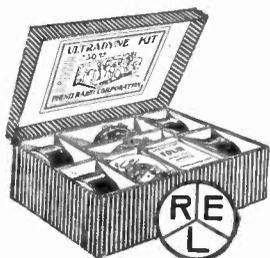
It's here, where the development of other super-radio receivers has halted; the Ultradyne forges ahead.

The unusual sensitivity of the Model L-2 Ultradyne is due to the successful application of regeneration, to the famous Modulation System of radio reception, recently perfected by R. E. Lacault, E.E., A.M.I.R.E., Chief Engineer of this Company and formerly Radio Research Engineer with the French Signal Corps Research Laboratories.

It's this development, an exclusive feature of the Model L-2 Ultradyne, that makes it possible to receive greater distance on the loud speaker.

In addition the Ultradyne is the most selective receiver known. Regardless of close similarity in wavelength, it selects any station within range—brings in broadcasting clearly, distinctly, faithfully.

Everything that the Model L-2 Ultradyne means in actual results and genuine satisfaction, you will appreciate the first evening you operate it.



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Consists of 1 Low Loss Tuning Coil, 1 Special Low Loss Coupler, 1 Type "A" Ultraformer, 3 Type "B" Ultraformers, 4 Matched Fixed Condensers.

To protect the public, Mr. Lacault's personal monogram seal (R. E. L.) is placed on all genuine Ultraformers. All Ultraformers are guaranteed so long as this seal remains unbroken. **\$30.00**



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32 page illustrated book giving the latest authentic information on drilling, wiring, assembling and tuning the Model L-2 Ultradyne Receiver..... **50c**

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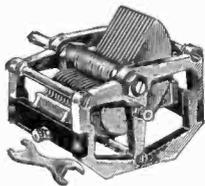
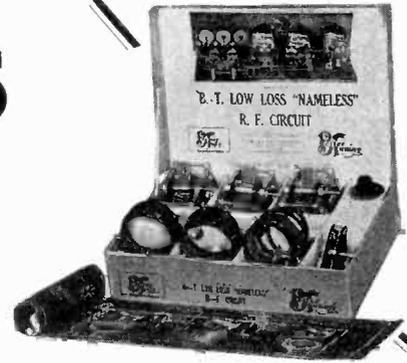
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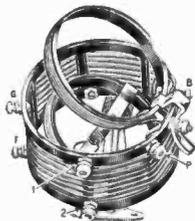
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**B-T LIFETIME
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Type	Capacity	Price
L-7	125 M.M.F.	\$4.25
L-11	250 M.M.F.	4.50
L-23	500 M.M.F.	5.00
L-35	750 M.M.F.	6.50



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Made in two types for Broadcast and Short Wave work. Ranges covered with an L-11, Lifetime Condenser.

Type B	200 to 565	\$5.00
Type SW	50 to 150	5.00

B-T's reputation for never having put out a part that was not a continued success means a great deal to you. It means that you can build any tried and proved circuit, using the proper B-T parts, and be assured of good results. Buy proved parts—not experiments. Use B-T apparatus.

READ WHAT OTHER PEOPLE HAVE DONE

Tito Schipa, the world's greatest tenor, praises the "Nameless" set installed in his apartment at the Congress Hotel, Chicago, a few blocks from several powerful broadcasting stations. Part of his statement follows:

"After using several other well-known radio receiving sets and discarding same, to say that I am well pleased with your set is speaking very mildly. The volume, selectivity, quality of tone and ease with which distant stations were tuned in whilst other Chicago stations were radiocasting, was simply marvelous and almost beyond understanding. I suppose that you will hardly believe me when I tell you I tuned in 42 stations my first night, Monday, December 8th, 1924, including one Pacific Coast station, KHJ." Roanoke, Va., December 26, 1924

I have completed your No. 1 using your tuner and condenser. It is the clearest and most powerful regenerative set that I have ever heard.

C. F. K.

Denver, Pa., Dec. 23, 1924

Have just received my certificate showing that I have received European stations. I used your tuner and condenser.

E. F. B.

Kirkwood, Ga., Dec. 24, 1924

I enclose a list of 54 stations received on the B-T No. 2. I find it better than any set I have ever listened to.

V. H. S. Jr.

B-T KIT NO. 3

Contains three 3-Circuit Transformers, three type L-11 Lifetime Condensers, one Control Condenser with Dial and complete Blue prints and Instructions for building the Nameless\$26.50

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Type AC-3 (200 to 565—adjustable primary\$3.50
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Get Your Copy of Better Tuning

A 40-page book containing hookups, (B-T No. 1 and No. 2 are included) construction, tuning and general information on crystal to multi-tube sets. Has helped thousands of set builders and operators. See your dealer or send 10c for a postpaid copy.

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The Telemonic III—A New R.F. Receiver

by LESTER L. JONES

Chief Engineer, Danziger-Jones, Inc.

Lester L. Jones, one of the best known tuned radio frequency experts in the country, here writes the first of two articles for Radio Journal describing in detail his latest development on which he has been working for two years past. Complete plans, wiring diagrams, and full data will make everything plain. It is worth reading whether you build it or not.

THE history of radio art within the past two years has shown conclusively that the tuned radio frequency receiver will be the receiver for the future. Radio frequency amplification, as a matter of fact is accepted even now as the only proper way to greatly strengthen very weak radio currents.

In effect tuned radio frequency brings the sending station nearer to the listener. That is, it strengthens or amplifies the radio frequency current in your receiver in the proportion that would be apparent were the sending station moved closer to you. Audio frequency amplification, on the other hand, does not increase the sensitivity of a receiver, but has the effect of moving the telephone receivers or loudspeaker closer to your ear. That, in a few words, is why the radio frequency receiver is the logical radio receiver of today.

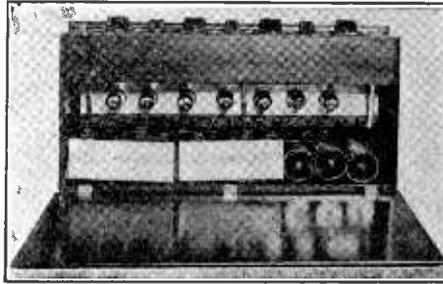
Not so very long ago radio frequency amplification was thought to imply the use of numerous tubes with their batteries and circuits. It was deemed expensive, difficult of operation and too advanced for the novice. Then broadcasting conditions changed. Receivers that would give a high degree of selectivity with volume on a small antenna became in demand. Quality, besides volume, was required. The radio engineer got busy and produced the modern tuned radio frequency amplifier.

To secure good long distance reception with a small antenna under general receiving conditions a high degree of radio frequency amplification is needed. This is because the mere additions of more audio stages will never increase nor make up for the lack of sensitivity of the detector and its inefficient performance on weak signals. Tuned radio frequency gives volume with quietness, while audio frequency is admittedly noisy. The well balanced set uses as much radio frequency amplification as possible and reduces the audio amplification to a minimum. A radio receiver equipped, for instance, with two stages of inductively tuned radio frequency amplification, a detector and two radio stages will amplify signals about half a million times. If one of the audio stages be cut out and an additional radio

stage used the ratio of amplification may be decreased, but the noises are so much less that more perfect reproduction and distance are secured.

Prevailing conditions make necessary a radio receiver that covers the broadcasting wave bands from at least 220 to 550 meters. It should be uniformly sensitive over this entire wave length range, not sensitive in spots.

With certain radio frequency re-



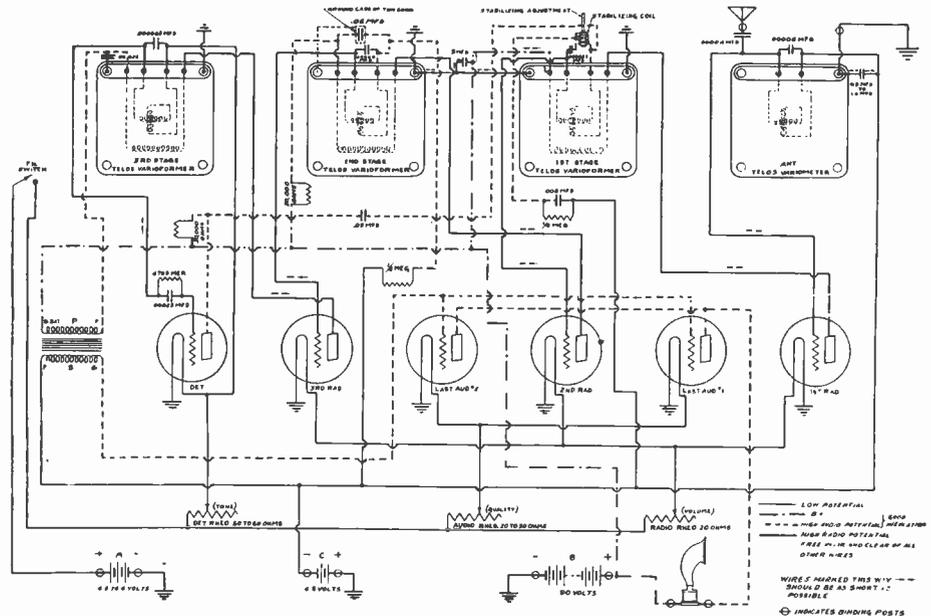
As the Telemonic appears with the lid lifted and looking down from the top

ceivers the sensitivity is not evenly distributed, so that at either the highest or the lowest or even intermediate ranges the set is not working at top-notch efficiency. This is, in fact, an inherent defect of the capacitive tuned circuits, and is the reason for the development of the tuning with vario-transformers, in which inductance predominates.

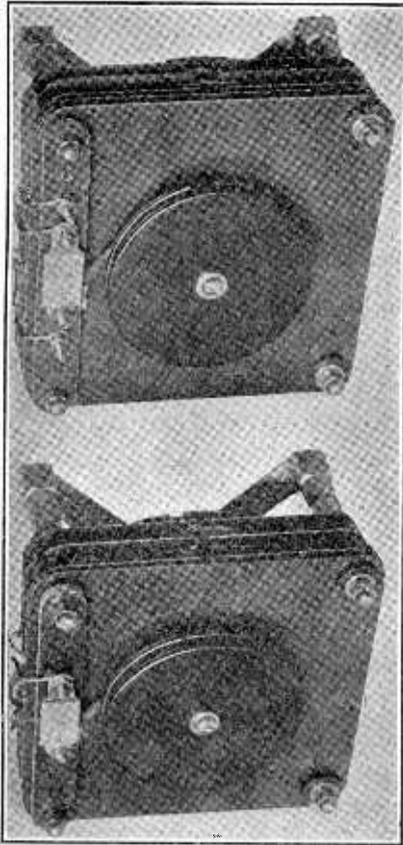
With vario-transformer coupling it is possible to maintain the capacity fairly constant. Constant capacity means constant voltage supplied to the grids, which results in uniform quality of reception over the entire range of the instrument.

It is a peculiar phenomenon, not always grasped by the layman, that the tuning of a radio instrument must broaden with the decrease in frequency. In recent experiments it was found that where a carrier current frequency band range was 1 per cent of the total frequency at 200 meters, it became 2 per cent at 450 meters and 3 per cent at 600 meters. This is, indeed, the whole selectivity question. The logical solution is to provide a coupling that is variable with the wave length, a principle that is being appreciated more and more in radio design. It is, in fact, the principle developed and worked into the vario-transformer Telos unit which makes this radio frequency tuner the ideal receiver from all the angles discussed above.

Interstage radio frequency tuning in this receiver is provided for by special vario-transformers that consist of interleaved rotors and stators. Each section is of the double "D" type of winding. This method of winding does away with stray fields that might lead to feed back troubles. The vario-



Wiring diagram of Telemonic, using UV199 or DF3 tubes, tube detector, 2 stage resistance coupled audio, 1 stage transformer coupled audio.



The improved vario-transformers which are the reasons for the success of this three stage R. F. receiver.

transformer, is in fact, an ingenious combination of a tuning instrument and a transformer, and its presence in this circuit accounts for the good tonal quality, the unusual selectivity and the volume. The interleaving has the advantage of strong mechanical construction.

A very important thing about the vario-transformer is that it is self-compensating, like the condenser. Each instrument has a primary and secondary winding, just like any other kind of a transformer. Its rotor is affixed to a shaft that connects to the dial. It is as simple as any radio device in connection and operation.

strength if dry cells were substituted for standard tubes in the two stages of a radio frequency receiver. This loss is more than made up by the addition of the third stage in this case, for it increases the selectivity of the receiver enormously. In fact, since the cry still seems to be for "more selectivity," the radio lover can hover here without additional troubles so far as either tuning or operation is concerned.

Efficient radio frequency amplification with the vario-transformer method would be useless unless a good audio frequency amplifier were provided also. Everyday observation shows that since this receiver is uniformly sensitive over the entire wave range, near saturation of the detector is possible with the use of one stage transformer coupled amplification for loud speaker results.

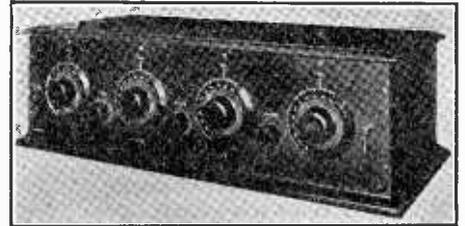
However, the problem was to produce a receiver that would give quality with volume and distance under general operating conditions. So the audio frequency amplification was tackled. One stage of transformer audio amplification gives, say, small room for volume, but this is loud with a local station. Now, for long distance reception the addition of more audio stages of the transformer type lead to noisy signals. Most transformers for this purpose lose the low tones below 400 cycles, so that cascading them multiplies the effect which tells on quality. The radio frequency will carry the tones through to the detector, but they will be lost if some means of amplifying them uniformly is not provided.

So a novel system was developed, that of reflexed resistance coupling. Resistance coupled amplifiers for audio work are admittedly superior for quality work. In conjunction with the highly efficient vario-transformers the results are beyond comparison.

It is difficult enough to design reflex circuits in which transformers are used

the radio frequency system the stabilizer coil. This stabilizer, which is extremely simple in design, permits the reflexing of the detector output back into the radio frequency system without upsetting or disturbing it in the least.

Special constant resistance units are used for the radio resistance reflexing. A stage of transformer audio frequency is provided for very loud speaker volume. The receiver is remarkably free from feed back action and exceptionally "quiet" in operation.



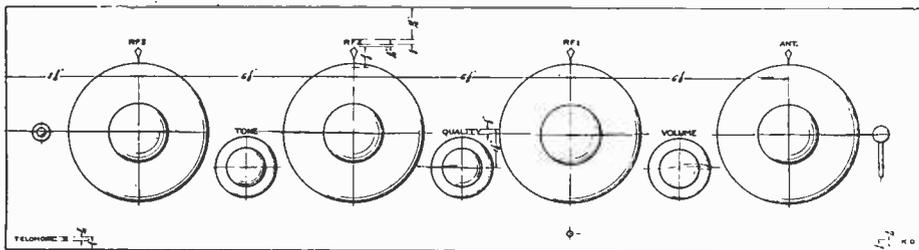
This set is not what it appears to be. All four dials are operated simultaneously by any one of them, and each dial may be changed for any final slight adjustment, if it should be found necessary

The studied method of disposing of the various units, the method of wiring them and the general wiring provides for the perfect neutralization of the interstage feedback.

Because of the three stages of radio frequency amplification of inductive type this receiver is admirably adapted to long distance reception. Fairly consistent reception from Mexico City, Calgary, Canada, and the Pacific Coast has been checked with the receiver operated at Fifty-fifth street, between Eighth and Ninth avenues, New York City. The writer has been able, since early winter, to hear everything east of the Rockies when on the air, using an indoor aerial.

The upkeep of this six tube radio receiver is remarkable. Under actual measurements, and using six of the UV-199 tubes, a "B" battery current of but 6 to 8 milliamperes was consumed. This is a remarkable decrease as compared to modern five and six tube radio frequency receivers that take from 20 to 30 milliamperes of current. "B" batteries used in conjunction with this radio frequency receiver will outlast several times batteries used in a similar way with standard tubes (six volt). The economy is a big factor of this receiver. Since the batteries need less attention, they can readily be enclosed in the cabinet. A practical self-contained unit is the result.

Simplicity of tuning is received in spite of the three stages of tuned radio frequency through the use of a clever unicontrol device that permits simultaneous variation of all vario-transformers or individual tuning of each stage for finer adjustment.



Front view of panel for Telomonic receiver.

Three stages of tuned radio frequency are provided for in this receiver. This was done because this is essentially a dry cell tube outfit—built for economical radio reception. Now, even though small dry cell tubes may not be so good amplifiers as storage battery types, causing a loss of approximately 50 per cent in signal

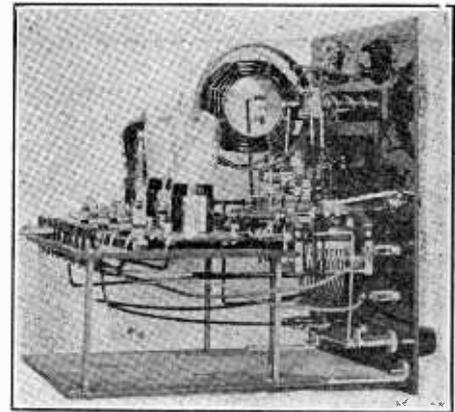
that will perform satisfactorily, and the problem of making a workable resistance reflex was not an easy task. The stumbling block is that the audio frequencies are brought back into the tuned radio circuits, which results in violent oscillations and general instability of the whole receiver. This emergency was met by introducing into

That Ultimate Set

by H. G. AYLESWORTH

THE Ultimate Set—"there ain't no such animal to the real fan, especially when he has an urge to get down to the lower wave lengths to hear what the little "birdies" are chirping about. We tried to solve the problem at our house by having two sets, one for the O. W., who is strong for the broadcast stuff, and another, mostly Reinartz, for this ex-ham. The scheme worked fine, unless we forgot to hook the broadcast set on the next morning—then by night the "war department" was functioning and the battle was on. Finally the edict went forth that there would be two sets, and necessarily two aerials. Positively impractical, sez I, to say nothing of the expense of a duplicate plant. It is unnecessary to say that the set stayed "as is"—all you married men know that. After consult-

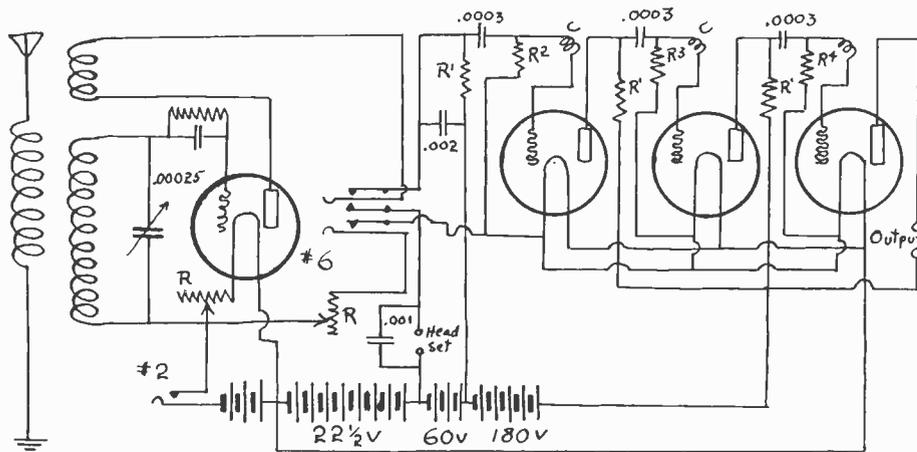
It is also unnecessary to say much about the quality of resistance coupled amplification. The three stages give all the volume required on DX and too much for comfort on local. Originally I intended to use a regular Daven three stage unit, but they were so slow in coming that the amplifier was built up from standard parts. The capacity of the plate-grid condenser is not critical. Anything from .0025 to .006 seems to give grand results. All the plate registers are 100,000 ohms (1 megohm). The grid leak for the first stage is one megohm, for the second stage one-fourth megohm, for the third stage 50,000 ohm (.005 megohms) L1 is a radio frequency choke on each grid. About 30 turns of No. 28 or 30 wire, 3/4 inch in diameter. These coils improve any amplifier. You transformer hounds might try them and lose some of the sausage grinder ef-



An idea of what it looks like "behind the scenes."

fects due to inter-action and radio frequency between stages.

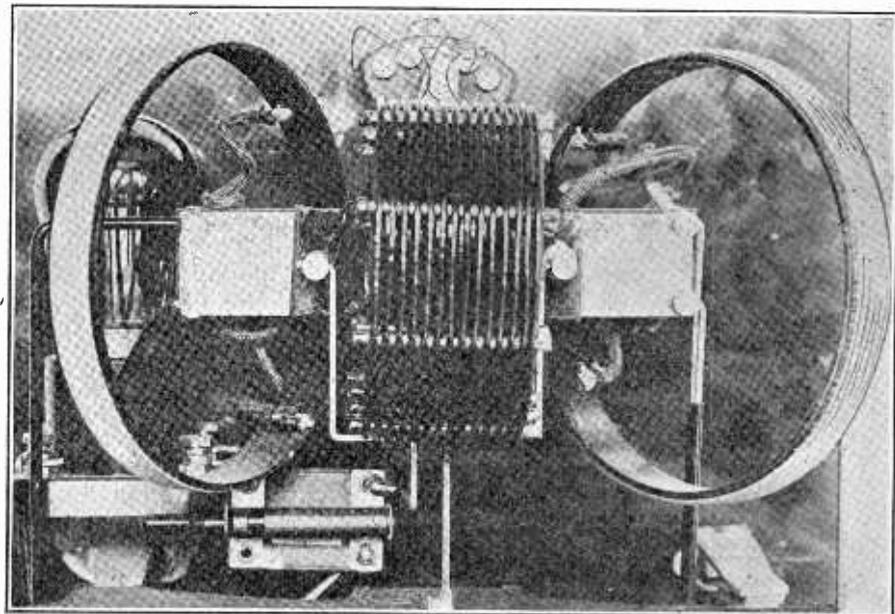
The sensitiveness of the detector might be improved by omitting the bypass condensers shown around the headset jacks and the first stage resistor, and putting either a .001 or .002 to the upper long spring on No. 6 switch and the negative B battery. This is not an advertisement but I hope some of our jobber friends are stocking Marshallstats. There are two on this set. Everything has been tried for detector tubes from a 199 to a 5 watter. And on my 6 volt storage the control has been perfect. No use telling what this set will do. I hear wonderful stories, DX, every day all day, but it is nice to turn the switch and get down among the 50 meter fellows or go up to 600 at will. Yet the ultimate set is going to get them from 5 meters to 25,000 meters, barring a few little details, such as rubber aerials and collapsible masts. Maybe sometime later. The bug is working anyhow.



ing various manufacturers' agents and others we met up with one Sheldon who claims a factory somewhere in the environs of La Verne. Mr. Sheldon produced his low loss tuner—universal and everything—and the problem was solved. You do not have to prove that this outfit is not a low loss. We admit it. But we do claim that it is fully as efficient at all wave-lengths within its range as the best of the factory sets. And an improvement over some.

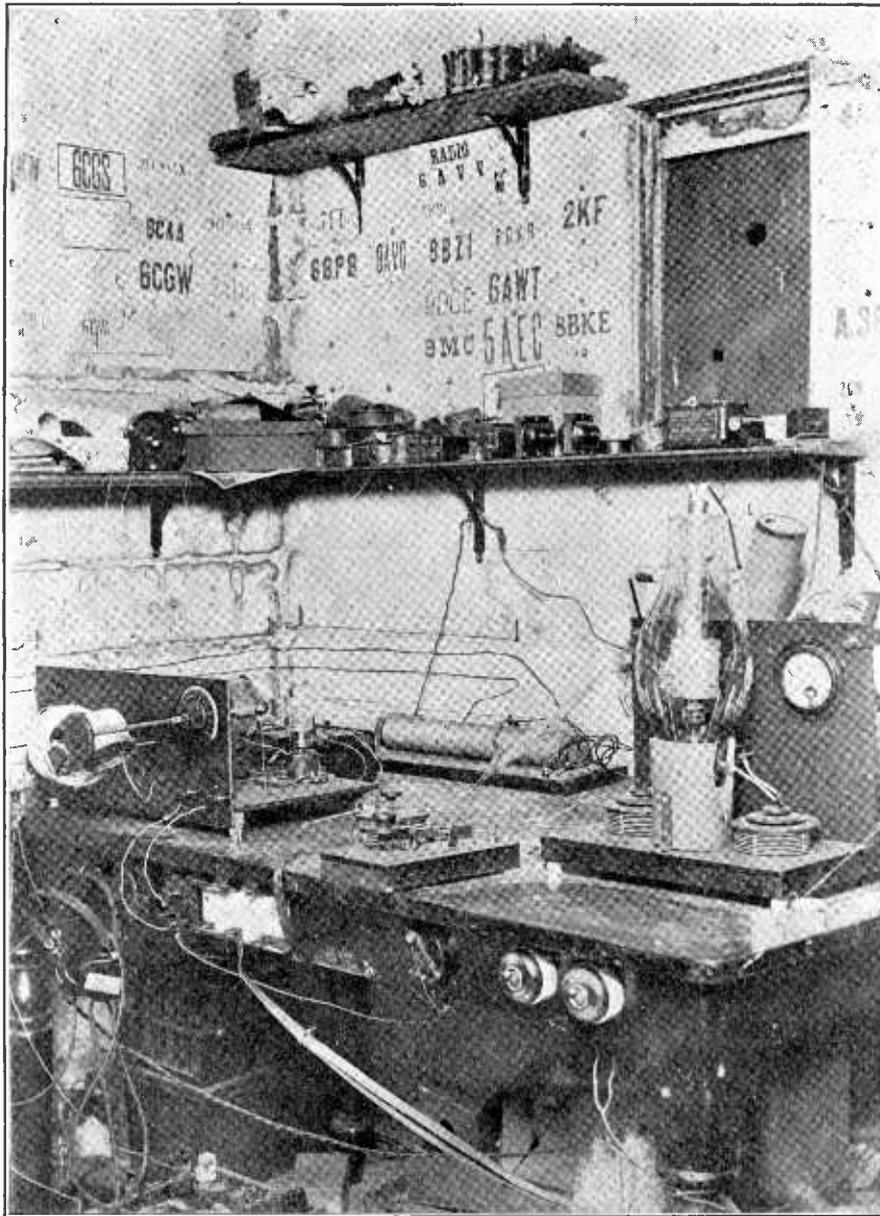
There is little to say about the assembly of parts or circuits—that is all old stuff. The No. 6 Carter switch, in the off position, cuts the headset into the detector circuit with 22 1/2 volts on the plate. In the "on" position the amplifier filaments are lit and the 60 volt battery cut onto the detector plate circuit.

The diagram shows 180 volts on the plates of the amplifier tubes, but very good volume can be gotten with ninety.



This tuner is the heart of the circuit.

Famous Australian Station World Beater



THIS is the famous wireless station 3BQ, owned and operated by Maxwell Howden, Box Hill, Victoria, Australia, which first established two way communication with England. In the December issue Radio Journal ran Mr. Goyder's story of this work, Mr. Goyder being the British amateur G20D. Mr. Howden has worked many United States stations. His transmitter is a three-coil series fed Meissner, fed by a home-made transformer giving about 1500 volts through an electrolytic rectifier consisting of 104 jars, into a Phillips 24 tube which passes about 1000 milliams at that potential. The aerial is a 50 foot 5 wire cage suspended between 280-foot masts. The five-wire tapering cage lead in comes from the center of the horizontal cage and is connected to the set by a copper strap 1 inch by 1/16 inch. The counterpoise is made up of six 100-foot wires on 15-foot spreaders. The

wires are bunched at the center where the lead is soldered on giving a double fan. There are no low loss condensers in the set. The receiver consists of a detector with one stage of audio. The coils are wound with No. 16 DCC on cardboard tubing with five turns for the primary, 14 for the secondary and 11 turn tickler. The secondary is shunted by .0005 condenser with moulded mud ends.

New Wave Lengths

New wave-lengths for Pacific Coast stations, both Class A and Class B, have been announced. Last month Radio Journal was able to publish the Class A for the Seventh district. This month we are publishing the remainder of the Class A and Class B. Here are the Class B:

Wave lengths both new and old:
 KJS, Bible Institute, old, 360; new 293.
 KGO, General Electric, old, 312; new 299.8.

KDYL, Salt Lake City, old, 360; new 305.

KNX, Los Angeles Express, old, 337; new 336.9.

KHJ, Los Angeles Times, old, 395; new, 404.1.

KPO, San Francisco, old, 423; new, 429.5.

KFI, Anthony, Los Angeles, old 469; new, 467.

KLX, Oakland Tribune, old, 509; new, 509.9.

Practically all assignments in Class A are new. It will be noted that an effort is being made to emphasize the frequency, instead of the wave-length. This is a much more accurate method of denoting a station in the scale and also more convenient in handling allocations, as it is really on the frequency that the difference in allocations is based. Here are the Class A stations, beginning with 206.8 meters and running to 360 meters:

206.8 meters, 1450kc., 50w., KFRP, Trinity Church, Redlands, Calif.

208.2 meters, 1440kc., 10w., KFCP, Ralph W. Flygare, Ogden, Utah.

209.7 meters, 1430kc., 10w., KDZB, F. E. Siefert, Bakersfield, Calif.

212.6 meters, 1410kc., 10w., KFNL, Paso Robles Broadcasting Ass'n., Paso Robles, Calif.

220. meters, 1360kc., 50w., KFQH, Radio Service Co. (Sherman), Burlingame, Calif.

222.1 meters, 1350kc., 100w., KFQU, W. Riker, Holy City (P. O. Alma), Calif.

223.7 meters, 1340kc., 20w., KFBC, W. K. Azbill, 5038 Cliff Place, San Diego, Calif.

223.7 meters, 1340kc., 50w., KEUR, Perry & Reffield, Ogden, Utah.

227.1 meters, 1320kc., 100w., KFNZ, Royal Radio Co., Burlingame, Calif.

228.9 meters, 1310kc., 100w., KFQG, Southern Calif. Radio Ass'n., Los Angeles.

228.9 meters, 1310kc., (new) 50w., KPPC, First Presbyterian Church, Pasadena, Calif.

228.9 meters, 1310kc., 5w., KFNV, L. A. Drake, Santa Rosa, Calif.

230.6 meters, 1300kc., 100w., KFQC, Kidd Bros., Taft, Calif.

230.6 meters, 1300kc., 100w., KFOC, First Christian Church, Whittier, Calif.

232.4 meters, 1290kc., 100w., KFON, Echaphone Radio Shop, Long Beach, Calif.

234.2 meters, 1280kc., 100w., KMJ, San Joaquin Light & Power Co., Fresno, Calif.

234.2 meters, 1280kc. (new), 50w., KFUS, L. L. Sherman's Church, Oakland, Calif.

236.1 meters, 1270kc., 960w., KFPR, L. A. Forestry Dept., Los Angeles, Calif.

236.1 meters, 1270kc., 10w., KFPV, Heintz & Kohlmoos, San Francisco, Calif.

236.1 meters, 1270kc., 10w., KFUQ, Julius Brunton & Sons, San Francisco, Calif.

238. meters, 1260kc., 10w., KFCB, Neilson Radio Supply Co., Phoenix, Ariz.

238. meters, 1260kc., 50w., KFPG, Oliver S. Garretson, Los Angeles, Calif.

239.9 meters, 1250kc., 50w., KQW, C. D. Herrold Laboratories, San Jose, Calif.

239.9 meters, 1250kc., 250w., KFQZ, Taft Radio Co., Hollywood, Calif.

241.8 meters, 1240kc., 250w., KLS, Warner Bros., Oakland, Calif.

241.8 meters, 1240kc., 100w., KZM, Hotel Oakland (P. D. Allen), Oakland, Calif.

242.8 meters, 1230kc., 100w., KFOO, Latter Day Saints University, Salt Lake, Utah.

245.8 meters, 1220kc., 50w., KUO, S. F. Examiner, San Francisco, Calif.

245.8 meters, 1220kc., 50w., KDPT, Southern Electrical Co., San Diego, Calif.

247.8 meters, 1210kc., 50w., KWG, Portable Wireless Telephone Co., Stockton, Cal.

252. meters, 1190kc., Reserved for Hollywood station.

258.5 meters, 1160kc., 100w., KRE, Claremont Hotel-Berkeley Gazette, Berkeley, Cal.

258.5 meters, 1160kc., 150w., KFDH, University of Arizona, Tucson, Ariz.
 260.7 meters, 1150kc., 500w., KFPT, Radio Serv. Corp. of Utah-Cope, Salt Lake, Utah.
 260.7 meters, 1150kc., 100w., KFUT, University of Utah, Salt Lake City, Utah.
 270.1 meters, 1110kc., 100w., KFGH, Stanford University, Palo Alto (Std. P. O.)
 270.1 meters, 1110kc., 50w., KFRC, Whit-

comb Hotel-Radioart Corp., San Francisco.
 272.6 meters, 1100kc., 100w., KFAD, McArthur Bros. Merc. Co., Phoenix, Ariz.
 277.6 meters, 1080kc., 500w., KFSG, Angelus Temple-Echo Park Evang. Temple, Los Angeles, Calif.
 360. meters, 1080kc., KGU, M. A. Mulrony, Honolulu.

found that the midget condenser had too much capacity. He took a Marco condenser and spread the plates a trifle, double-decking it on one side. This gave him a rotator of two plates and a stator of two plates, and setting them about one-half in is sufficient to control the set. Not much current is needed. Don't go above 22 volts on the detector, radio and oscillator and 90 C. He found that going up to 40 volts put him out of luck.

A few changes were made for the WD11 set. Seven tubes were found sufficient, one audio, three intermediate, two detector and one oscillator. It was more critical on the filament, quieter and better quality, if possible,

Compact Portable Supers

AN EIGHT tube super heterodyne all inclosed in a cabinet 10½ inches high, 13½ inches deep, with the batteries contained in the back lid, 2¾ inches deep, and a lid on to make it portable 1¼ inches deep—and all this performing like a super should perform—folks, believe us or not but it is a real set. C. Llewellyn snagged this set out of his intelligence complex, as the psychologists would say, using 99 tubes—and then he repeated the performance using WD 11 tubes, getting better quality but not quite the distance, of course.

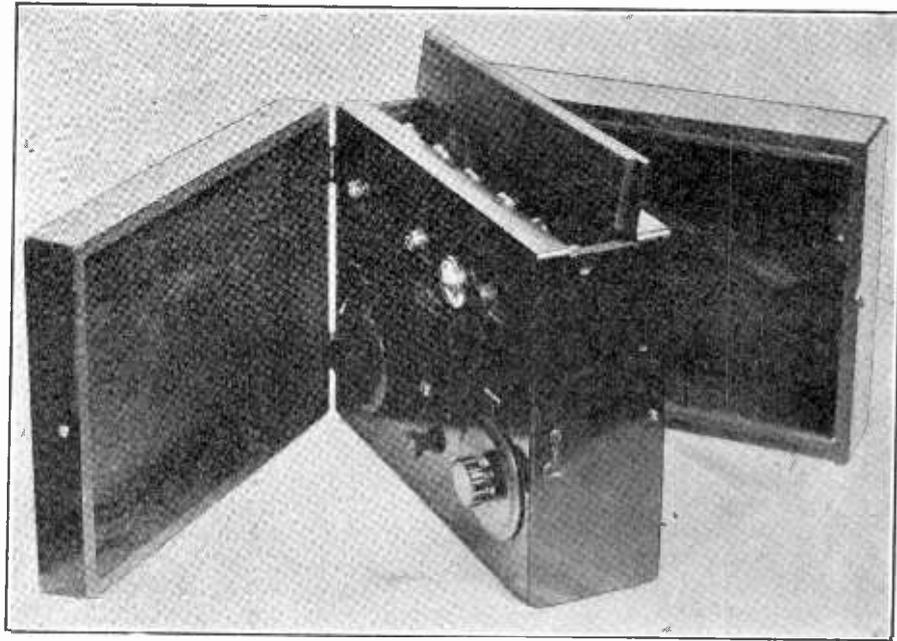
The set consists of two stages of intermediate frequency, one oscillator, two detectors, and two stages of audio. Everything in the set is commercial. He used a good low ratio transformer on the audio end for quality. He had to experiment on the by-pass condenser end of it, and anyone else would have to do the same. He found that with some half of the tubes paralyzed, local tone quality was improved.

As will be noted in the photographs, he built the thing on the double deck plan, and everything is close together, thereby changing a few pre-conceived ideas.

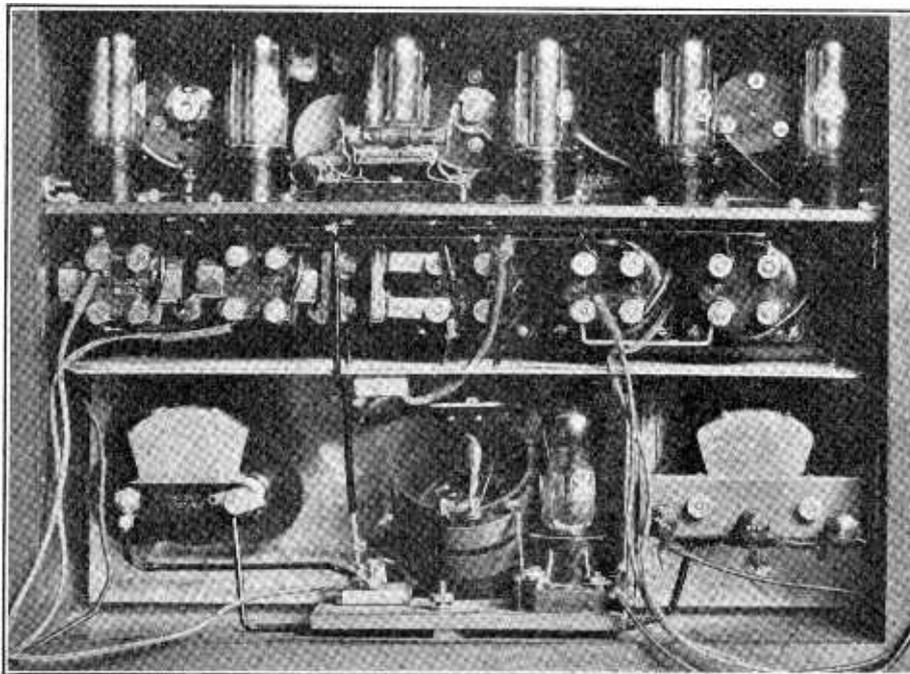
The oscillator tube and condenser

are all shielded from the radio and audio stages. The loop condenser is also shielded from the oscillator and the rest of the set. No shielding is used behind the radio frequency on the panel.

In this connection Mr. Llewellyn



Just a little larger than a vanity case. This super-heterodyne has the eyebrows plucked off all the gnats when it comes to size, compactness, portability and performance.



The innards of this delightfully compact heterodyne. Remember, the whole set is contained in a case 10½ by 13½ by 3½. This is the 199 tube set.

but not the volume of the 99 set.

The main difficulty to overcome on both sets was the handling of the filament. It was found that selectivity depended on the filament control. Mr. Llewellyn will be glad to answer questions relative to this super, addressed care of Radio Journal.

Crystal D X

California Radio Minerals, Harry Grant, Jr., recently received two letters of interest to radio fans. Both were written on December 25, 1924, but one was from Sioux City, Iowa,—the other from Oakland, California.

Mr. Anderson from Sioux City, reported hearing WOC, WHO, WCX, WOS, WOAW, and WFAA. Regarding this latter station Mr. Anderson said—"To get Dallas, Texas, from Sioux City, Iowa, nearly equals Mr. Beck's record." Mr. Beck using A-1 Crystals has repeatedly heard KGO from San Antonio, Texas, a distance of 1,525 miles.

Electronic Developments

by DANIEL NELSON CLARK, L.L.B.

Scientific Editor of Radio Journal

This is the second of a series of articles written by Mr. Clark upon this subject. The general trend of this series is to instructively lead our readers into a better understanding of the nature, structure, and composition of matter and its relation to motions, from that of the electron, the smallest gravitational division of substance, to those of the atomic elements evolved by the integrations of this electronic substance, the transmutation thereof, the commutation of the motion and the redistribution of its energy, both radiated and contained, up to those marvelous and magnificent, awe inspiring organic arrangements found in the Solar and Sidereal Systems of the Universe.

IN the last analysis there is always a quantitative exchange, or commutation of motion and energy. As the electronic motions (the motions of the electron) become less and less, as the process of integration, or density of matter, increases, the variations of the motions are always expressed in the transmutation of elemental matter accompanied by a corresponding increase in the stability of this matter.

As we have noticed, as the contained motions decrease and the atomic weight, or density of matter, increases, all in fixed direct mathematical relation of units, squares and cubes, manifested in the commutation of matter and energy, the radiations from those of gravitation, the electromagnetic, to those of heat and light are always varied by the squares of the distances (as of the areas) from the common center, while the velocities of integrating matter are varied as the cubes of the periodic times.

Of course, it must be understood that energy is proportioned as the units of elemental matter, and expressed in the inverse of squares of the radiations, from those of gravitation, electromagnetic, heat and light, on the one side, to the motions, varied as units, by the cubes of the periodic times, on the other.

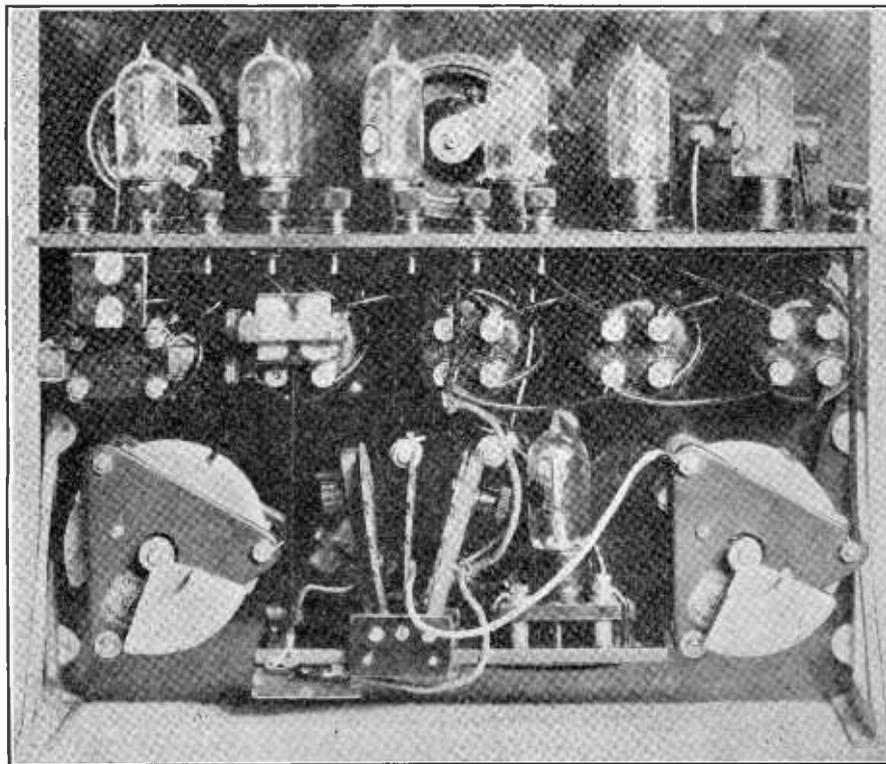
In other words, a principle of commutation or conversion must prevail in all elemental generations whereby the quantity of matter in motion must be exactly counterpoised by the equal commutation of energy and the transmutation of matter and its contained motions.

Thus the atomic weight of elemental matter increases as the contained motions decrease. And so they stand in inverse proportions, in mechanical relation. This can only be truly conceived, expressed or understood, by the appreciation that there must be an inverse relation of organic motion and radiated energy, for as the elemental

motions, or atomic motions, decrease these motions must be transposed into various forms of energy. For instance the orbital velocity of Neptune is about 3.37, while that of the Earth is 18.5 and Mercury 29.73 miles per second. In each case the velocity multiplied by the square-root of the planetary distance from the sun will result in exactly the same number which, in miles per second of velocity and miles of distances from the sun, is 178.275. .06542387620+.

In other words, 178,275.+ is the product of the matter and the energy

Radio Journal's cover this month, contains a reproduction of one of the best photographs of a total eclipse of the sun ever taken. It was taken by observers from the Mt. Wilson Observatory, at Green River, Wyo., June 8, 1918, and, among other things is remarkable for the splendid corona. With the total eclipse in the east the last of January intensive Radio study of the eclipse was made, the results of which are yet to be determined. Solar phenomena studied in the light of radio phenomena may still solve many problems of scientific importance and lead us nearer the goal of ultimate knowledge and ultimate truth.



Here is almost the same heterodyne built for WD 11 tubes—and it is a little wizard. Not the volume of the 99 set but better quality.

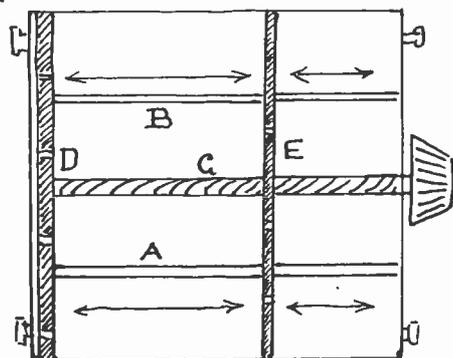
of the solar system, a product of time and motion, as it were. And to further illustrate this, let us suppose that the earth, organized as it is with its moon and its totality of mass, should come out of infinity into the gravitational field of the sun and supposing also that its line of motion tended directly towards the sun, or parallel with the line of gravitation, the accelerated motion in the time would involve a velocity, at the moment of its collision with the sun, of 178,275.+ miles per second, a velocity substantially equalled, if it is not exactly equalled, the velocity of light or radiations of energy of the solar system.

And so the energy, gravitational, electromagnetic, heat and light, gener-

(Continued on Page 33)

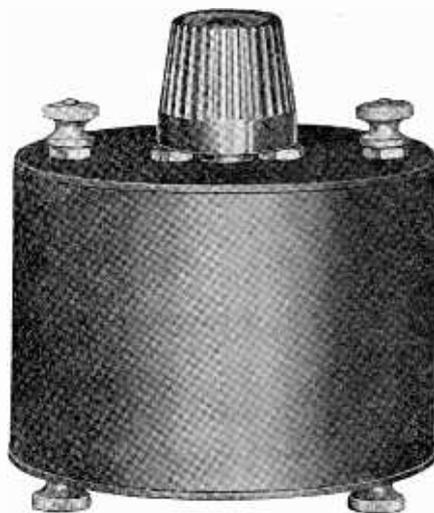
Coupling and Selectivity

A LOT of folks have a lot of trouble with radio. And not the least of these troubles is lack of selectivity. Now there are a thousand and one remedies for this trouble, just as there are a thousand and one things which cause the trouble, but by the time Mr. Average Fan gets through with six or seven and finds his set little better, if not worse, than it was before he begins to figure that radio is as imperfect a science or art or what-not as one could find from here to Balzac.



D, C, Phipps coils, E being movable. B and G, riding bars. C, threaded rod, with movable coil mounted on it on threaded bushing. This is the neutrodonless neutrodyne—it has no lead pencil attachments—but for all that is highly selective

D. C. Phipps comes along with a solution for most of the troubles in neutrodynes, reflexes and the like—nothing so very startling but the application of a well known principle in a new way. It is simply this: A couple of Phipps coils are mounted on sliders—i.e., one coil remains stationary while the other can slide to or from the other, as per accompanying diagram. A threaded rod passes through the center of this movable coil, passing through a threaded bushing in the center of the coil. When this rod is turned, the coil is moved backward or forward along the sliders—varying the



induction between the two coils with regular hair vernier adjustment.

According to Mr. Phipps, this has one big advantage over any other method of varying this particular adjustment—the induction between the two coils is at all times parallel and at the same angle. In other words, one coil is not tipped toward or from the other, and the turning of the threaded rod enables the operator to get hair tuning. The whole thing is housed in a bakelite case, with a knob for varying the induction. The coils are recommended for neutrodynes, reflexes, regenerative sets, in fact most any kind of a set. It solves, he claims, the problem of balancing the neutrodyne.

The coils are being put in two and three unit containers, to accommodate various types of sets, Mr. Phipps being in charge of the manufacture. They are called Clarkworth Variformers and a patent has been applied for. Mr. Phipps, who also invented the Phipps super coil, expects to announce a new and rather revolutionary detector within the next thirty days.

the slight re-arrangement necessary in changing a reflex from the orthodox Harkness hookup to accommodate the Black Polarizer. A C battery should be inserted, as shown here, but incidentally a C battery will improve any Harkness.

The polarizer can be mounted on either tube socket. Run the ground and B connection to the center of the polarizer, instead of attaching them to the filament lead. Be sure to remove any leads that are connected to either side of the filament circuit.

An ordinary six to ten volt door bell transformer, which has been connected to electric lighting circuit, is attached to the binding posts. If desired the same transformer in use for the residence doorbell may serve a secondary purpose in the set. If at any time a storage battery is desired, for any reason, on a set so equipped with a polarizer, no changes are necessary, the polarizer will not interfere in any way with the functioning of the battery. In such cases the storage battery is merely connected to the six volt polarizer binding posts.

M. J. Black does not claim that a Harkness, so equipped, will do the distance work of a DX set, but he has picked up stations as far away as Hastings, Neb. "The polarizer is, I believe, the real solution of the A battery problem," he said. "It disposes of storage battery troubles and expenses. It operates at an even, constant, uniform strength at all times and there is nothing to wear out or get out of order about it. Once the rheostat is correctly adjusted with a polarizer, one may forget about it, for no further regulation will be necessary. If carefully adjusted to give the best results with the least possible current it can be fixed in that position. Another factor is the inconspicuousness of the polarizer. There is nothing mussy about it, it is small, fits out of sight in the set itself, and of course, involves no acid, etc."

The Black Polarizer is a western product, being manufactured by Black Bros., Inc., of Los Angeles. This firm, since its organization, has been interested in financing and manufacturing

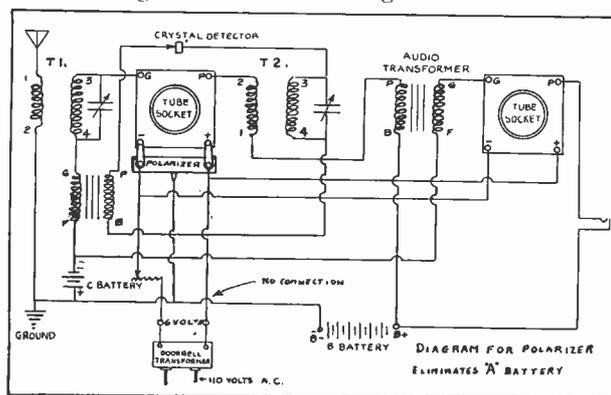
Using the Polarizer on Reflex

THE "Black Polarizer" for the elimination of storage battery on reflex sets is meeting with marked success since it was placed on the market a short time ago. Manufacturers have been experimenting with something, anything, to eliminate the inconvenience and expense of the A battery through the utilization of regular electric light current. Several Black Polarizers, tested by Radio Journal, worked with marked success, dissipating the alternating current hum to such an extent that during a program the set could be switched from storage battery to the polarizer without the observer dis-

tinguishing the difference.

A difference is here given, showing

This hookup shows changes necessary in reflex set when polarizer is used.



various products, as well as being engaged in the oil business. Since the beginning of radio M. J. Black of this firm has been building sets, and ex-

perimenting with radio as a hobby. He made a special study of electricity and mechanics at the University of California.

2 12" or 14" disc graphophone records.
2 flathead machine screws with nuts.
1 stove bolt $\frac{1}{4}$ "x2" with 2 washers and 2 nuts.

Five Tube Neutrodyne Less Neutrodons

By EMMET PATTERSON

BELAY the lead pencil as a tuner as a neutralizing device. That is mortal of the neutroing device. Drag out the last In other words, take a hitch in your cerebellum to accommodate a new idea in Neutrodynes.

The set I am mentioning is a five-tube tuned radio frequency affair, self-neutralized, and known to the radio trade as Supreme RT-5. It is exactly the counterpart of the standard neutrodyne, save that the neutrodons are not there—the whole secret lying in raising the induction and lowering the capacity.

In the first place, everything in the set is soldered and, bus bar being used, it can be picked up and carried by any connection. Capacities are figured down to the well-known but over-worked gnat's eyebrow. If on one stage it is necessary to use a connecting line $1\frac{1}{2}$ inches long, the same length connection is used in the corresponding connection on all other stages. It is not neutralized by the process of throttling condensers. Condensers are merely used to improve the tone quality—and everyone from Timbuktu (wherever that is) to Oshkosh knows that there is occasional opportunity for such improvement.

To get down to thumb tacks, a .006 condenser is used from the plate of the first audio ground, giving tone quality. An .006 is inserted between the 90-volt lead and the ground to stop any tendency toward oscillation.

The success of the set is due primarily to the concentration of the induction, a two inch bakelite tube being used, with enamelled wire of small size. This concentrates the energy and gives greater selectivity. And it does nothing else but.

By raising the inductive capacity and lowering the capacity of the condensers to .00025 I get approximately 40 per cent more selectivity than on any neutrodyne model I have tried to date, and I have played with most of them.

Here is a factor to be noted: In milliamps, this set pulls down, at full resonance with the rheostat full on, 18 milliamps, as compared with around 26 milliamps on the average neutrodyne. We also shut our eyes and use 3-1 ratio audio transformers, and found they not only did the business at hand better, but delivered better tone quality. I used Jefferson transformers, USL rheostats, Rathbun condensers, Cutler-Hammer switches, etc. The

whole works mounts on an 8 by 18 panel. Likewise in a cabinet of solid mahogany, containing all B batteries, etc., and with the connections coming out at the bottom, it makes a pretty piece of work.



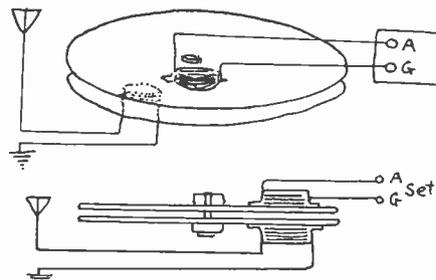
The Supreme R T-5

SHARP TUNING WITH OLD PHONOGRAPH RECORDS

By LESTER B. MCNELLY

WE read a lot these days about "sharp-tuning" and "selectivity," of the newer sets. We hear the "DX" hounds talking casually about getting stations that seem impossible. Sometimes those "DX" hounds get over enthusiastic but many times they are talking facts. The reason that we doubt many of their stories is because we cannot duplicate their feats, and the reason that many of us cannot duplicate their feats is because our sets tune too broadly.

If an expert diagnosed our troubles



he would probably tell us that our aerial was too long or that our inductances were too close, and by the time he got through we would feel that our faithful old box of junk was in the single circuit crystal class. The expert is probably right, but here's a little stunt that will rejuvenate the old set and give it selectivity to the Nth degree.

Material needed: 50 feet of insulated wire not smaller than No. 24.

of the tape up over the coil and use each tape to jiggle to coil loose from the bottle. Slide the coil off the bottle and use the tapes to bind the coil as tightly as possible. Clip the coil from the original bulk of wire leaving a 3 foot lead. The next coil is a duplicate of the first.

Drilling the Records—Three inches from the center of the graphophone records drill a hole to accommodate the flathead machine screws and countersink the holes deeply enough to avoid any possible projection of the heads of the screws above the surface.

Mounting the Coils—Take 2 pieces of very stiff card-board, or preferably fibre 1" wide and $2\frac{1}{2}$ " long. Drill a hole in the center of each of the same size that was used on the records. Insert the screws in the records and mount the coils rigidly by means of the card-boards as "bridges." Bind tightly on the nuts. The leads of both coils should point toward the circumference of the records.

Final Assembly—Drill a $\frac{1}{4}$ " hole in a block of wood 1" thick, and 4" square, countersink to accommodate head of bolt. Insert bolt through block, slip on a washer, then place on the bolt one record with the coil down and one record with the coil up, with a washer between, then comes the third washer. Bind the whole together with a nut until all slack is taken up but not so tight that the records drag. After final adjustment of tension is made the whole assembly can be locked with the extra nut.

Hook Up—The leads from the top coil should be connected to the aerial

and ground posts of your tuner. The leads from the bottom coil should be attached to your aerial lead-in and ground wire.

Tuning—Place the coils directly over each other, and tune in to the station that has given you the most trouble in broad tuning, tune it to its maximum volume, then with your left hand rotate the records in opposite directions (which can be accomplished by a pinching motion between the thumb and forefinger) until the station fades. Now return to your old tuner and note the difference on the main tuning dial, you will hear many different sounds that you didn't realize were on the air before. Pick out one with a healthy whistle and get right after it in earnest. It's a station maybe a thousand or may be two thousand miles away that you can hear as plainly as you can your neighbor on the telephone. Take a smooth round stick with a couple of tight turns of tire tape wound on one end with the tape projecting slightly over the tip. Sit two feet away from your set and use the

stick to turn the main tuning dial by resting it against the panel and delicate rotation on the rim of the dial, at the same time with the left hand, by means of the "pinching" process secure a very delicate calibration.

Decreases Volume—We all know that the law of averages has determined that where something is gained, something must be lost to compensate. Therefore the greater the selectivity, the smaller the volume, but luckily the ratio is not equally balanced in radio, and in this case the loss of volume is inconsiderable.

Radio Chart Exchange

The Up-to-the-Minute Radio Chart Exchange Bureau of Fresno, Calif., has hit upon a novel plan to put more punch in the logging of distant stations, and to that end has launched its Find-Me-Quick Radio Chart. The chart itself contains space for logging 100 stations, with all data regarding each, when logged, conditions, etc.

Here is where the big kick comes in. (Continued on Page 17)

Weak Chains in Radio

A CHAIN is no stronger than its weakest link, and a radio receiving set is no better than the poorest part that is used in its construction, writes Major Herbert H. Frost, member Institute of Radio Engineers and American Institute of Electrical Engineers. One of the greatest drawbacks to radio in its early stages was the large amount of inferior material dumped on the market.

Material that was good enough for general electrical work was not good enough for radio. The amount of energy that is received in the average aerial is so minute that it is one of the wonders of the present age that such a small force can be converted into words and music that are clear and pleasant to the human ear. The amount of current impressed on the grid of the tube is so small that to lose even the least bit through poor apparatus results in greatly decreased efficiency.

Insulation leaks and poor connections that would pass unnoticed in ordinary electrical work must be guarded against in radio. Most of the losses are not in the connections which are made by the set builder; they are in the apparatus which he uses and are losses which he can only guard against by buying good, standard, nationally advertised products.

One of the commonest forms of poor apparatus is the "moulded mud" product, used frequently in the manufacture of sockets, etc. When you buy

a socket and are in doubt, rub it against a piece of paper. If it makes a black mark throw it away. This "mud" composition which is substituted for bakelite and hard rubber in cheap apparatus contains lampblack, a high resistance conductor, and should never be in any radio set.

The mechanical features of all apparatus should be carefully noted. Sockets should have good, strong phosphor bronze contact springs. It is a good idea to buy a socket that can be mounted either on the baseboard or panel and one that has a ring of soft rubber set into the bakelite to prevent vibration of the tube. This will tend to eliminate tube noises.

Jacks should be selected for their quality and it is especially advisable to see that they are insulated with something better than paper or cheap fiber. Rheostats, potentiometers, plugs, battery switches and, in fact, every small part that goes into your set, is important.

For those beginners who do not understand the mechanical construction of radio apparatus, the greatest safety lies in going to an established, reputable dealer who has his reputation to maintain in his community. He will have apparatus manufactured by reliable concerns which stand behind their products.

The best is cheapest in the end and the satisfaction of a radio receiver that performs is worth a great deal more than the possession of a mediocre re-

"The Crystal With the Power of a Tube"

—L. B.

"Made your No. 1 Hook-up with No. 18 bare wire, spaced and wound on bakelite tubes. With this set, which is very particularly made, and your A-1 crystal, it comes in as loud as the three tubes on the phone jack of my five-tube Neutrodyne."

—G. W. M., San Francisco, Calif.
Our No. 1 Hook-up Free With Order if You Mention Radio Journal

A-1 THE WONDER CRYSTAL

FOR REFLEX or CRYSTAL SET
Guaranteed Tested

Sent Postpaid by Insured Mail 50c each.

60c C. O. D.

"I sent for one of your A-1 CRYSTALS for two-tube Harkness Reflex and have now used it for several evenings."

"I can only use it with loud speaker as it has too much power to be used with headphones."

—R. E. S., Bard, California.

Discounts to Jobbers and Dealers

California Radio Minerals

HARRY GRANT JR.

904 Oak Grove Ave.

Burlingame, Calif.

Tested and Approved Radio Journal

The Connection Everybody Wants

A Positive Instantaneous Connection for Aerial, Ground and Battery Leads



Patented June 20, 1924

RAJAH SOLDERLESS SNAP TERMINALS

Instantaneous in Operation—Positive Contact—Just push on or pull off to make or break connection—No screws to bother with; no springs to bruise the fingers.



Patented September 23, 1924

A positive electrical connection between terminal and cable in ten seconds, without solder or tools, that cannot be pulled off or shake loose.

FULLY APPROVED BY LEADING LABORATORIES
Base studs sold separately for use on B batteries or any place where changes of connection is desired.

Retail price, Terminal and Base Stud, as illustrated, 20 cents. Base studs only, each 8 cents.

SPECIAL INTRODUCTORY OFFER: 1 dozen terminals and studs, by mail prepaid\$2.00
Dealers: Get in line at once for the best selling radio device you ever saw.

RAJAH AUTO SUPPLY CO.
Bloomfield New Jersey, U. S. A.

ceiver, which is noisy, non-selective and generally unsatisfactory for the reason that a slight saving has been made in buying the small parts for its construction. Good apparatus is really just about as low in price as poor apparatus, for the reason that the reliable manufacturer takes a small profit on each item and has a much larger volume of sales.

The New Mexico College of Agriculture and Mechanic Arts, Station KOB, started a radio broadcast course in telegraphy, January 7. The regular Wednesday night period of KOB's schedule (7:30 to 8:30 p. m., Mountain Time) is devoted to this.

ITS THE NEWEST! THIS MASTER TYPE

Gaining in volume and eliminating metallic vibration



CALIFORNIA NIGHTINGALE LOUD SPEAKER UNIT

This new idea has hit the bull's eye of discriminating demand!

Our famous Stentorfone Unit has been built into an exceedingly attractive and convenient sized deep brown BAKELITE SHELL which instantly *eliminates all metallic vibration*—a real step forward in Radio perfection.

The new MASTER TYPE increases the volume also because the Stentorfone Unit parts are built larger and it holds for you a superior clarity, a naturalness of tone and an entirely new quality heretofore unknown in the loud speaker field.

HEAR THE NEWEST—THE STENTORFONE BAKELITE SHELL MASTER TYPE

Stentorfone Standard Price

California Nightingale Unit—Master Type - - - - - \$18.80

Correspondence from Responsible Eastern Distributors Solicited
Liberal Discount to the Trade on Application

The STENTORFONE Company

784 CERES AVENUE

Phone VAndike 7040

LOS ANGELES, CALIF.

Tested and approved in the Radio Journal Laboratory

(Continued from Page 15)

The purchaser of the chart, on logging 100 stations, sends his completed chart in to the exchange, where a photostat copy of it is made, and his original together with a copy of another completed chart, is returned to him with fifty cents in cash with which to purchase a new chart. Upon his logging the second chart full, he repeats the process, when his chart and two other copies are returned to him together with 50 cents to buy a new chart and a free subscription is furnished him to any radio magazine of his choice. With his third chart back he gets another fifty cents for another chart, and any two radio magazines for a year. With his fourth chart he gets his usual fifty cents, and his choice of any three radio magazines for a year.

There are other recording privileges, honor list to be published once every two months at least etc., but the feature outlined here is enough to give every chart owner a big time of it. In a word they have hit upon a way to make a national game out of logging the DX.

Many governmental officials stationed in South America keep in touch with home affairs by listening-in on their radio sets, according to A. E. Cook, aide to Secretary "Jim" Davis of the Department of Labor.



RADIO EXPERTS EARN BIG MONEY

Thousands of big pay opportunities open to the radio trained man. Success easily won in the fastest growing industry of all time. From land and sea comes the urgent call for men who can construct, install, operate, repair, maintain and sell radio equipment.

CASH for Your Spare Time!

Take orders from your neighbors for radio sets. Get big fees for your services and advice. Home study qualifies you—short course, low cost, easy terms, money back guarantee.

FREE Wonderful tube receiving set of latest design. Range over 1000 miles. Write today for FREE copy of "Radio Facts."

A. G. MOHAUPT, Radio Engineer
RADIO ASSOCIATION OF AMERICA
 4513 Ravenswood Ave., Dept. H-2 Chicago

HERCULES Aerial Mast

All Steel Construction



Today, anyone may have an aerial mast of sufficient height to get coast to coast reception. A mast that is ideal for both receiving or transmitting. This mast is painted black and is furnished complete with galvanized steel guy wires and galvanized masthead pulley. You have no extras to buy. We pay the freight. 20' mast \$10. 40' mast \$25. 60' mast \$45. Write for literature and

FREE BLUEPRINT

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KENNEDY **RADIOLA**
The Royalty of Radio *The Super-Heterodyne*

ROLA RECREATOR

PREST & DEAN RADIO CO.
 ESTABLISHED 1918

The Best in Radio

AMERICAN AT FOURTH PHONES 617-97 & 617-78
 LONG BEACH, CALIFORNIA

Tower's Scientific

\$2.95



MILLIONS are enjoying music and entertainment reproduced in clear, mellow tones, characteristic of TOWER'S Scientifics.

Two Towers

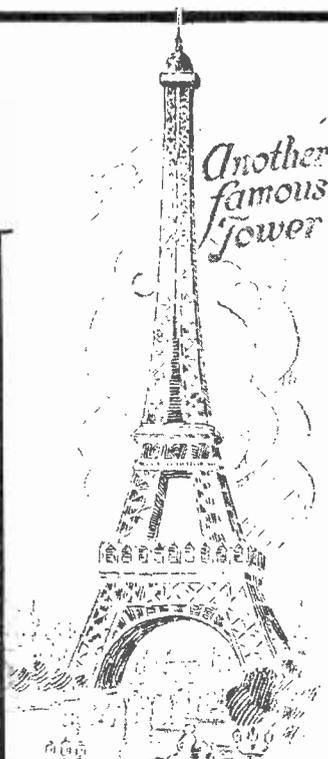
As the Eiffel Tower stands as a monument to skilled engineering construction so TOWER'S Scientific phones stand as a monument to supreme radio achievement.

¶ Each phone is carefully tested and approved before it leaves the factory by a Government Licensed Radio Operator thus guaranteeing perfection in tone quality with a positive uniformity of volume.

¶ Lightest of all in weight (only 84 oz.) they do not catch in the hair and are unusually easy to adjust conforming gracefully to the head.

If your dealer cannot supply you, order direct, we will ship immediately Parcel Post C. O. D.

THE TOWER MFG. CORPORATION
 98 BROOKLINE AVE. Dept. M BOSTON, MASS.



One of the seven wonders of the world.—The Eiffel Tower built in 1887-89 on the Champ-de-Mars contains 3 stories. Reached by a series of elevators, the platform at the top being 985 feet above the ground. In the top story is located the powerful Broadcasting Station F.L.

The World's Greatest Headset Value

Pioneer Radio Firm and How It Grew

and designed as a part of it, they have recently procured the southeast

INTELLIGENT, individual service has been the aim of the Prest and Dean Radio Co., since its beginning in Long Beach, Calif., more than six years ago, when radio was carried as a side line in the electrical repair shop of Prest and Bottorff at 18 Elm avenue, and their phenomenal growth to one of the finest equipped radio shops on the Coast has proven to the present firm the indisputable value of consistent service.

Six years ago, 18 Elm avenue was the only place in Long Beach where radio equipment could be obtained and every day there were new devotees of DX drifting in with claims for this part and demands for that. The discarded cigar box evolved into a magic thing by the addition of a coil or two of wire, "a hunk of galena" and a pair of phones. But, as broadcasting stations sprang up over the country, DX



Present Staff of the Prest and Dean establishment: F. J. Dean, Stock Clerk; Roy Willis, Set Salesman; Deane Bottorff, Parts Salesman; Ernest Ashcraft, Service Department; Fred S. Dean, Manager of Store and Prop.; L. E. Wendel, Service Department; R. S. Prest, Manager of Credit Dept. and Prop.; Coletta Gwartney, Secretary; George Sturgeon, Set Salesman; L. J. Hammond, Service Department; Ray Angel, Set Salesman; B. E. Round, Parts Salesman; H. R. Noble, Set Salesman; Ralph Holbrook, Set Salesman.



Demonstration room where the atmosphere of the home is reproduced

corner of Fourth and American and have extensively remodeled it to care for the demand of this new type of set. The personnel of the present firm consists of R. S. Prest and Fred S. Dean, owners, with their twelve able assistants.

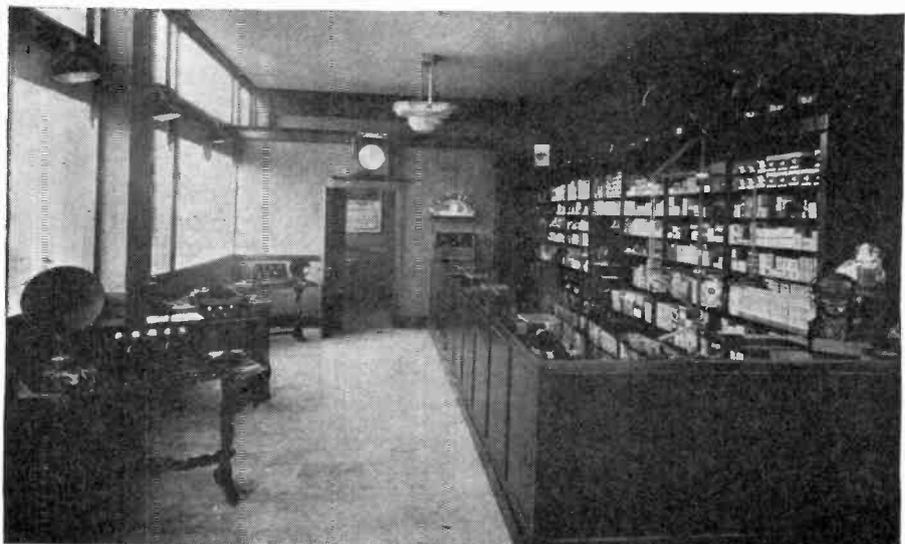
R. S. Prest has been a resident of Long Beach for about sixteen years. All of this time, previous to the forming of this company of which he is the original owner, having been spent with the Long Beach Telephone Co. as trouble man. This constant association with electrical equipment and his broad acquaintance has well fitted him to take over complete charge of the service and installation work.

Fred S. Dean attended grammar and high school, later going to Berkeley. Upon his return he was connected with the Green Crown Drug Co. and the American Avenue Hardware Co. This business training plus marked person-

fans commenced to work for quality of reception and selectivity.

Fred S. Dean joined the firm about this time and ever on the alert to be of service to the radio public, they opened the first Long Beach broadcasting station, KSS. Programs were broadcast afternoon and evening until it was deemed inadvisable for small stations to compete with those of larger communities.

The shop at 18 Elm avenue soon became too small to take care of the rapid growth of business, so larger and more convenient quarters were obtained at 742 East Fourth street, where an attractive display and demonstration room was added to the store. Anticipating the demands of the public, who no longer wishes just a radio set but rather a beautiful piece of furniture for the home with a radio built

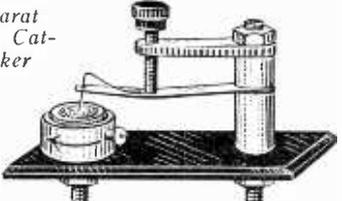


Interior of main sales room

ARGENTITE DETECTOR

At Your Dealers

14 Karat Gold Cat-whisker



Permanent Adjustments Made Easy

Make that SET Perfect—
It is doing it for others—
It will do it for YOU.

LIGHT ADJUSTMENT
MAXIMUM EFFICIENCY
NO VIBRATION
ADJUSTABLE CUP
NO LOSSES

The Last Word in Detectors

\$1.25

ARGENTITE RADIO CORP.
303 E. Fourth Street,
Los Angeles, Cal.

ality has been a deciding factor in carrying on this fast expanding business to its present success. He is an optimist and a booster for business through the Radio Trades Association of Long Beach, of which he is president. He is also a charter member and ex-vice president of Southern California Radio Trades Association.

Personal service has developed this business from an experiment in an electrical repair shop to a flourishing business house with beautifully appointed display rooms and a supply of sets and parts second to none.

Crystal Distance

Editor, Radio Journal:—Doubtless many of your readers will be interested to learn that this evening at 7 o'clock, when I tuned in expecting to hear "All's Well" by the "Town Cryer" at KNX, that instead I found all local stations off the air. To my surprise I heard a voice that while clear was not strong, reading stock and market reports.

To hear with a crystal set, these reports being read from K.G.O. at Oakland, from Los Angeles is not a very usual feat. In my excitement I listened in for about ten minutes hearing clearly the readings, when I suddenly thought of a neighbor and phoned for him to call to listen in as well, as they have a set I made for them as well. Unfortunately they arrived just as KGO shut off at 7:15 only hearing the very close.

Because of the unusualness of the distance and type of set, a crystal set that I made, it has more than common interest for those interested in crystal distance reception. I shall be pleased to show by appointment only, any enthusiasts on crystal sets who may first make an appointment with me over the phone. Hempstead 5385. Cordially yours, Presson W. Banning, 148 North Wilton Place, Los Angeles.

Station WHA, University of Wisconsin, broadcasts three evening programs a week during the college year.

Best for Reflex

and Crystal Sets

FRESHMAN
Double Adjustable
Crystal Detector



No more searching for the sensitive spot—
Merely turn the knob as you would a dial
For base or panel mounting, complete with Freshman super-Crystal
At your dealer's, otherwise send purchase price and you will be supplied postpaid.

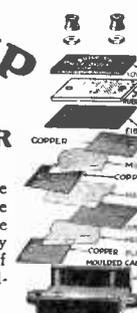
\$1.50

CHAS. FRESHMAN CO., Inc.
240 W. 40th St., New York

BUILD-UP

MICA CONDENSER

Patent Pending



insure high efficiency and the Build-Up feature enables the operator to obtain any definite capacity from .00025 to .006 by simply adding extra plates of copper and mica to the Build-Up base.

Each alternate copper and mica plate has a capacity of approximately .0002 Mfd.

Build-Up Mica Condensers of the following capacities, each assembled complete in carton, at the following prices:

.00025 Mfd.	.....	List price	50c
.0005	.....	"	50c
.001	.....	"	55c
.002	.....	"	60c
.0025	.....	"	65c
.005	.....	"	70c
.006	.....	"	75c

Extra envelope containing 20 copper and mica plates, or sufficient to build up a condenser from .00025 to .006, list price 25c

Table showing required number of plates needed for any capacity is furnished with each condenser.

Ask your dealer—or order direct

CHAS. SCHINDLER
1403 W. Delaware Ave., Toledo, Ohio

Build Your Own—At 1/2 the Price!

Guaranteed Nation Wide Reception



\$27.95
3 Tube Assembled

Volume!
Clarity!
Distance!

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THE NEW DE LUXE AMBASSADOR
With Special Features—Can Be Wired Easily—Quickly
This kit enables you to build a set that will compare with any factory built set. Will bring in all the distance you want—loud, clear, distinctive. Wiring and assembling chart that comes with kit, makes building simple, easy. Plug in ear phones or loud speaker and get Frisco or New York. By building it yourself you save 60%
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1 Drilled 7 x 10 Radio Mahogany Panel, Engraved in Gold.
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2 Brunswick Jacks with Gold-Plated Fronts; 1 for phones; 1 for loud speaker.
1 Freshman Mica Grid Condenser.
Send no money—just mail postal or letter today. Written money back guarantee with every order. RADIO SHACK, America's Largest Radio Dealers, 65 Vesey St., Dept. B-35 New York.

TYPE 199



Large Base Fits Standard Sockets

Thorium Tungsten Filament
Bakelite Base

Try a Dynotron

Thousands of radio set owners all over the country are getting better results from their receivers by using DYNOTRONS. They are getting louder, clearer reception and greater distance. And they are replacing tubes less often, because DYNOTRONS last longer.

One of the chief reasons for DYNOTRON success is their filament of special amalgamated thorium and tungsten wire. DYNOTRON filaments are not merely thorium coated as are those of most tubes, they are made of tungsten impregnated through and through with a comparatively large proportion of thorium. That's why the effective life of DYNOTRONS is so much longer than that of the average tube, for in ordinary tubes, when the coating of thorium is gone the tube ceases to function. And, as DYNOTRONS are impregnated, not coated, they operate until the filament is entirely consumed. You get at least 1500 hours of actual service.

For complete satisfaction and real economy, use DYNOTRONS.

\$3.00

They are guaranteed to give satisfaction, if not abused. Order NOW, using the coupon furnished below.

Any Type

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DEALERS! JOBBERS!
Write or wire for proposition

Mark Number of Tubes you want in these Boxes

201-A	199 Small Base	199 Large Base
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Send me _____ tubes at \$3.00 each.

Enclosed find \$ _____

Name _____

Address _____

Town and State _____

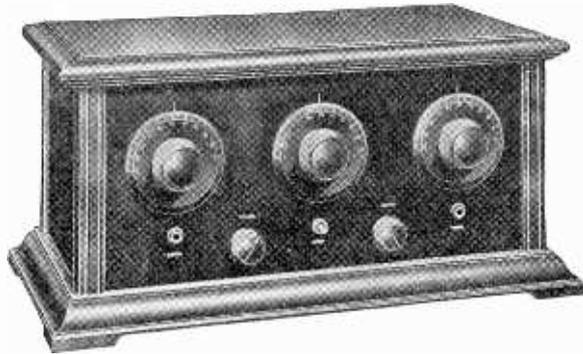
Charles Freshman Co., Inc.,
240 W. 40th St., N. Y.

Loud Speaker Construction

by FRANK REICHMANN, B.S., E.M.

A radio loud speaker consists essentially of two parts, the "unit" and the "horn". The unit consists of an electro-magnet, with a vibrator arrangement, and a diaphragm. The electro-magnet, acting either through a vibrator or directly on the diaphragm, causes the diaphragm to vibrate. This motion causes the air to vibrate, and these impulses, when they strike the ear, create sound. The horn serves to amplify these air vibrations to create

This is the first of a series of articles by Frank Reichmann, the oldest designer and manufacturer of loud speaking devices in the United States. He is a recognized acoustical engineer—which by the way, is another way of saying that he knows a lot about sound and how to handle it. Mr. Reichmann is also vice-president of the Radio Manufacturers Association.



Announcing
THE SUPREME R-F-5
\$95.⁰⁰ List

A Five-Tube Tuned Self-Neutralizing Radio Frequency Receiver in genuine Mahogany cabinet to take B battery size 8x18 panel 10 inches deep. Brings in the distant stations clearly on the loud speaker, extreme selectivity for those who live close to local broadcasting stations.

This set has been developed in our own factory and has proven efficient and simple in operation.

A set that you can sell and guarantee at a price in keeping with the pocket of the average buyer.

Dealers Write for Attractive Proposition

PATTERSON RADIO CORPORATION

229 So. Los Angeles St.

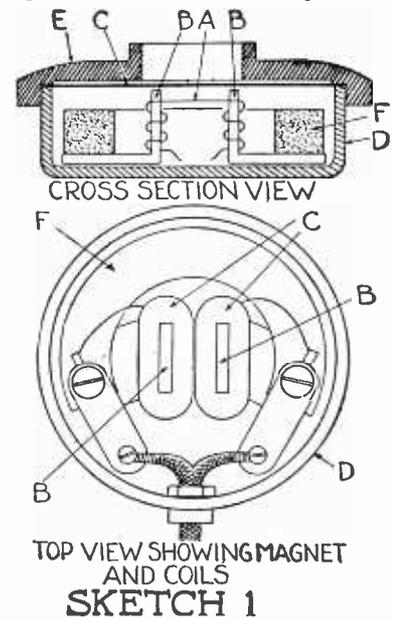
Phone Main 5884

Los Angeles, Calif.

louder sounds.

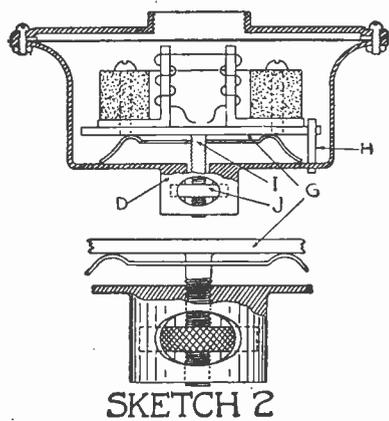
In considering the construction of loud speakers, it is well to deal first with the unit, as it is here that the sound originates. The loud speaker unit and the single headphone are fundamentally the same. The headphone is designed to give a very slight impulse to the diaphragm and the loud speaker unit is constructed to give as strong an impulse as possible and to handle very violent vibrations faithfully and accurately.

Sketch number one shows the arrangement of parts in an earphone or telephone type of loud speaker unit. "A" is the coil of wire connected by the phone cords to the output of the



receiving set. "B" is the soft iron core around which the coils are wound. "C" is the soft iron diaphragm. "D" is the shell holding the various parts. "E" is the ear piece or cap of the unit. "F" is the permanent magnet.

Pulsating current from the receiving set in passing through the coil "A" sets up magnetism in core "B". Core "B" attracts the diaphragm "C" with more or less force, substantially in proportion to the current flowing through the coil. As this current varies in strength it causes the diaphragm to vibrate back



and forth. These vibrations produce sound waves.

This type of unit works efficiently on moderate signals. On strong signals the diaphragm is apt to vibrate violently and strike the tip of the pole pieces, causing it to either "freeze," or to make an unpleasant rattling sound.

In the case of weak signals the greatest volume is derived when the space between the diaphragm and the pole piece tips is small. The reason for this is that the magnetism induced in the cores causes the diaphragm to vibrate and the closer the distance between the poles of the magnets and the diaphragm, the stronger this action becomes. A good many units using this general principle have some means of adjusting this air space, making it greater or less as the occasion demands. On weak signals this air gap can be made very small and the volume of the loud speaker increased. On powerful signals this gap can be increased to prevent the diaphragm from striking the magnets.

The adjustable type of unit is shown in figure 2. The magnets and coils are mounted on a false plate "G" which has a threaded extension "I." Turning nut "J" lowers or raises the entire magnet and coil assembly.

While both of these types are in common use as loud speaker units, considerable improvement can be made in tone quality by the use of other substances than iron for the diaphragm, and in improved methods of design of the armature of the unit and its leverage to the diaphragm.

Here is what Harry Grant, Jr., manufacturer of the well-known A-1 Crystal, writes: "The effective circulation of Radio Journal has proven a pleasant surprise to us. Ordinarily we do not expect extensive returns from technical or trade magazine advertising, but our first advertisement in Radio Journal has brought inquiries and orders from New York to San Francisco and from British Columbia to San Diego."

FEDERAL TUBES— —THEY SATISFY



Just the Tube to Give the Radio Set
Owner the Joy of Perfect
Reception

Every Federal Tube a Talker
Every User a Booster

Clear tone and better reception assured—excellent for bringing in distant stations.

Federal Tubes are made by men who are expert in tube construction—try them and end your tube troubles.

MADE IN THE FOLLOWING TYPES:

F201A.....5 Volt .25 ampere Amplifier
F199A.....3 Volt Dry Cell

PRICE \$4.00 EACH

SPECIAL Introductory OFFER

This coupon, when presented to your dealer, will entitle you to a 50c Reduction on every Federal Tube purchased within the next 30 days.

If your dealer cannot supply you with Federal Tubes send your order direct to us.

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112-114 Trinity Place
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Better Reception

Our Aerial Antenna, with Counterpoise, movable up or down four to ten feet, regulated by a suitable hand wench which aids the grounding area of the unit, thus making the Counterpoise a practical clothes line.

If you are not getting Radio Results we guarantee
SELECTIVITY—VOLUME WITH LESS RESISTANCE—DISTANCE

Write for full details and prices

Manufactured solely by

SOUTHERN CALIFORNIA FENCE COMPANY, INC.

Phone ANgelus 7480

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Los Angeles, California

Tested and approved in the Radio Journal Laboratory

1500 Volt
General Electric
D. C. GENERATOR
233 Ampere Capacity

\$50.00

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317 Central Avenue

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Radio and the
 Public

By HERBERT HOOVER

IN radio development during the past year two factors are outstanding—the use of the short waves and wire interconnection of stations. Both are of great importance. The short wave has found its place in commercial and amateur transoceanic communication and in transmission for rebroadcasting both at home and to places across the seas. In domestic use it is a rival of wire interconnection, both being a means to the same end, the furnishing of simultaneous pro-

The Standard of the World



The base-type **FRESHMAN VARIABLE GRID LEAK** is the standard for those who build their own sets. It is the most compact and being entirely sealed it always remains unaffected by any climatic conditions. Complete with either .00025 or .0005 Freshman Condenser..... \$1.00 without condenser..... 75

At your dealer's, otherwise send purchase price and you will be supplied postpaid.

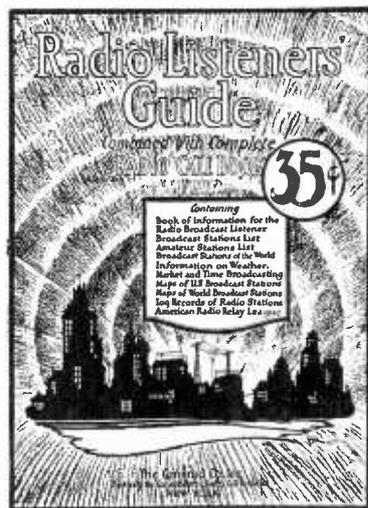
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 160 No. La Salle St. Chicago
 Specializing in Radio and Mechanical Inventions



Self Balanced T. R. F. Transformers
 Zig Zag Pat. Aug. 21, '23.
 Spider woven, interlaced, no compounds or pins. Set of 3 with mountings and instructions postpaid—\$4.50.
NOLTE MFG. CO., DEPT E,
 61 Gautier Ave.,
 Jersey City, N. J.



100 Pages
 Size 9 by 12 inches
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“Just Off the Press”

“RADIO LISTENERS GUIDE AND COMPLETE CALL BOOK”

Containing more practical radio information than ever before contained in any single radio book

CONTENTS

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100 LARGE PAGES OF REAL, PRACTICAL INFORMATION—NO ADVERTISING

Published and Distributed by THE CONSRAD CO., 233 Fulton St., N. Y. City

Consrad

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grams to several stations. I consider interconnection, in whichever mode effected, almost essential to the future of broadcasting, if we are to look at radio as a means of service to all our people all the time. It ultimately means national programs, nation-wide utterances, more valuable subject matter and that great happenings in which our people have so vital an interest will be made available to everybody. To give them an immediate touch with national and world happenings must result in better citizenship. We have already seen examples of nation-wide communication in the simultaneous broadcasting on several occasions by stations from the Atlantic to the Pacific, and it is now a nightly practice within extensive areas. All this has happened in the past year. It is transforming broadcasting from a local to a national service, and this not by way of detriment to the local stations, which are the backbone of the system, but as an advantage to them. Interconnection, with its corollary of national service, is only just beginning. It will go much further. Its development, together with some general rise in the power level of stations for the overcoming of static and interference, giving us really useful reception, will I believe be the principal improvements in the immediate future.

I look for remarkable development along these lines for the good of broadcasting, which means for the benefit of the listener, during the coming year.

Questions and Answers

Q.—A few questions on the Neutroflex described in your magazine: What can I add to get distance on a table talker? Would a two stage amplifier do it? How can I make it more selective? I cannot separate local from distance. Would a wave trap help? Would adding RF and AF help any? My aerial is 120 feet long, ground ten feet, three UV201 A tubes, A1 crystal, 90 volt B battery 4½ C and Y volt A.—A. Borman, 965 63rd street, Oakland, Calif.

A.—Your Neutroflex should bring in L. A. stations unless you are so unfortunate as to be located in a very bad spot. If you are using but two tubes, viz: two radio, crystal detector and one stage audio reflexed then you cannot expect more than just headphone reception from L. A. stations. In that case an additional stage of audio will bring the volume that you want. To make your set more selective cut down the length of your long antenna to about a total length of 80 feet. A wave trap can be made by winding 50 turns of No. 24 on a 3" tube and inserting this in series with your antenna and shunting a 23-plate variable condenser across it. Tune the variable condenser to the station to be cut out. A little practice will obtain further selectivity. Another stage of RF will help you. Look your connections over again. Look for defective parts.

Q.—What size aerial is recommended for use in Los Angeles near the center of the

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 Use your natural talents. Find your place in life. Make big money. Write at once for our special offer.
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 451 Railway Exchange Building, Chicago, Ill.

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 114 Trinity Place New York City

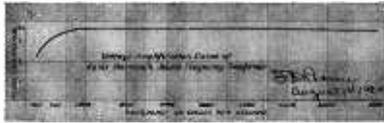


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Delivers the most beautiful and delightfully pleasing radio reception you have ever heard—Amplifies with great volume and with a clearness and faithfulness and purity of tone heretofore unknown to radio.

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COMPARE THIS LABORATORY CURVE WITH THAT OF ANY OTHER TRANSFORMER—IT WILL SHOW WHY KARAS ARE SO INFINITELY SUPERIOR TO ANY OTHER ON THE MARKET, REGARDLESS OF PRICE.



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Radiogrand
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"The World's Finest Crystal Receiver"

Look for the name "Radiogrand"



Finished in fine quality black or dawn gray Leatherette

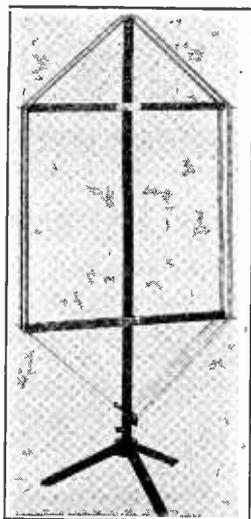
MODEL K—PRICE \$12.00

- 1—Tunes through EVERYTHING and selects the station you want to hear.
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The Dunham Collapsible Loop Aerial



Maximum efficiency with any set designed for loop aerial.

Wound with special stranded non-kinkable bare copper wire.

Center-tapped for regenerative Super-Heterodynes.

Wound on bakelite supports which completely insulates loop from frame.

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Comes packed in box 4x6½x18 inches. At your dealers or shipped direct.

D. F. DUNHAM

3941 Cumberland Avenue
Los Angeles, California

Tunes from 200 to 630 meters using .0005 condenser.

business section that will bring in local fairly sharp and what size for distance. I was surprised recently on hearing a Munzig low-loss reflex at the distance secured through local but not so much impressed with the local reception. It seemed rather broad. I am making this set as described in your magazine.—M. Franklin, Los Angeles, Calif.

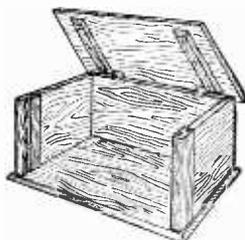
A.—Referring to the Low Loss Regenerative Reflex circuit it has been noted that when located within close proximity to a high powered broadcasting station the audio-frequency amplifying transformers act as untuned R-F transformers—in the reflex stage only—thus causing considerable disturbance. However, this can be overcome by decreasing the length of antenna to suit local conditions. Distant stations cannot then be expected to be received. Suggest you reduce your antenna to 40 feet and also make sure you have a perfect ground connection. A high resistance ground connection will also help materially to broaden the tuning of the circuit. A counterpoise made of a length of wire approximately the same as the antenna may also remedy things.

Q.—Sometime ago I assembled an Erla one-tube set and got excellent results. Then I tried to construct the three-tube set as described in the April issue of your most excellent publication, but I have not had much success. I get a little on it but it is only about one-quarter as loud as the one-tube set was. It is very clear, selective and free from noises, however. I am using the Erla parts as given and C299 tubes. I have checked and rechecked the wiring and can find no mistakes and the connections are good and tight. Any suggestions you might be able to give me would certainly be greatly appreciated. I am crippled up so that radio is the only entertainment I get and, believe me, I enjoy it.—John A. Sharp, Vernon, Utah.

A.—Your trouble is very hard to locate as the information does not give us any real value to assist, but suggest you try as follows: Check B batteries for voltage. All winding should be checked to see if circuit in them are correct. Hook phones and single dry cell and winding all in series and see if click is noticed in phones when circuit is opened and closed. Look at crystal detector to see if it is still in good condition. Test crystal set if possible. Tubes should be tested in a working set to make sure they are ok. If trouble is not located write us with more data. Condensers may be tested same as the primary and secondary of transformers but they should not pass any noticeable amount of current so no sound noted in headphones.

Q.—I am not a regular subscriber of your Journal but buy it at the news stand when ever I can. I've been experimenting in radio for about four months and don't seem to have any luck. I used to get KHJ, KFI, KPO, KGW and KGO on one tube when I first started. Now I've added one stage of audio and all I can get is KGO and KFKX when they are on. I would like to know if you could help me out. I would like a circuit that uses my material or as much as possible, and arranged so I can add one more stage of audio and one more stage of radio later on so I can use a loud speaker. I also wish to use dry cells in my hookup. The material I have on hand is as follows: One all wave coupler with 10 coarse and 10 fine taps; one 22 Vernier variable condenser; one 43 plate variable condenser; one .00025, one .001, one .005 fixed condensers; two 1 meg grid leaks; one Dublier variable grid leak, 2 to 10 meg.; 3-6 ohm rheostats; one 30 ohm hreostat, 3 W D 12 tubes, and one 10 to 1 Atwater Kent audio transformer. The coupler is so large it takes up too much room, and I would get a smaller one if I can get the right circuit. If it isn't too much trouble and you can

"A-1" Radio Cabinets



Prices on unfinished cabinets. Finish them yourself to match your furniture.

Hand Rubbed Finish \$2.00 Extra

Panel Size	Deep	Price	Panel Size	Deep	Price
7x12	8	\$3.00	7x21	10	\$4.25
7x12	10	3.25	7x24	8	4.25
7x14	8	3.25	7x24	10	4.50
7x14	10	3.50	7x26	8	4.75
7x18	8	3.75	7x26	10	5.00
7x18	10	4.00	7x28	10	5.00
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Terms: Cash with Order
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"A-1" Radio Cabinets are made of selected, kiln dried Philippine mahogany thruout. The lid is hinged and cleated to prevent warping. The ends are grooved to slide panel in. Tops and bases nicely moulded all around. These cabinets are first class in design and workmanship and will make a creditable appearance in any room.

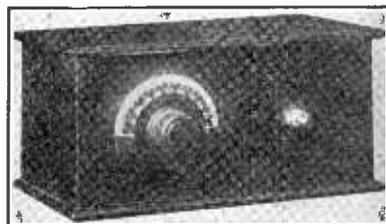
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A-1 WOODWORKING CO.

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DISTANCE!



Results doubled from any set using a loop aerial.

The SUPER-AMPLIFIER is the greatest advance in Radio in recent years. Used with a super-heterodyne or any set using a loop aerial it will amaze you with results.

The SUPER-AMPLIFIER increases the efficiency of your set 100 per cent. Increases your range 1000 to 2000 miles. Doubles the life of your batteries and tubes. Size 4½x4x8 inches. Complete, nothing extra to buy.

\$12.00

Sent direct, C. O. D. if Your Dealer Cannot Supply

SUPER-AMPLIFIER CO.

806 VALENCIA STREET

LOS ANGELES, CALIF.

do that for me I'll be very much obliged.—
J. C. Schneller, Tooele, Utah.

A.—In answer to your questions will advise you to obtain a .006 MP Mica fixed condenser and place across the primary of the amplifying transformer. Give us your diagram and we may be able to advise you the easiest way out of your trouble.

Q.—Saw in your July number how to construct an A and B battery charger, and would you please give us the following information: 1. Where can, or from what company, can we obtain these transformer laminations cut to these specifications? 2. Supposing we wanted to charge 1-24 volt B battery could we charge at .1 amp? I think these to be the rate most manufacturers call for. If so, how could you connect for two 242 battery? If not, would it be advisable to wind more turns on the 175 turn side where the connection runs to the B battery?—Roy Ide, Outlook, Wash.

A.—Try Westinghouse Elec. & Mfg. Co., 3451 East Marginal Way, Seattle, Wash. A tap at 85 turns in the 175 turn coil will probably work ok for single 24 volt battery. Hook 30 ohms rheostat in series with battery to get variations. 2 Battery, 24 volts each, can be hooked in series to charge.

Q.—I am interested in a three-circuit hookup for W. Anderson shown in past issue. I had most of the parts laying around, so that is why I am using that circuit. I would like to combine Mr. Portis' audio-frequency with the three-circuit tuner without dropping any of the condensers. In other words, I want to add AF transformers and crystal to the six control set. I also hope to build a Munzig receiver soon.—H. J. Boutsche, Los Angeles.

A.—We do not believe that you will be able to combine a detector tube circuit and a reflex circuit with any satisfaction. Phones in Mr. Portis' set should have been placed between the place of the tube and the point where the crystal detector is connected to 150 turn coil.

Q.—Please give me the complete data on that 1500 coil in H. E. Jamieson's version of the auto-plex in November Radio Journal. Will this hookup get good distance with the addition of amplification? How about adding radio frequency?—D. D. Stoner, McNeal, Ariz., R. F. D. 1.

A.—The coil is an L750 Honeycomb. Do not add R. F. The set works best on local with one step of audio, or two tubes in all. It is intended for this work.

Questions by L. M. Noyes, 3526 West Pico St., L. A., on the Wagner Roberts circuit as published in Radio Journal:

1. What kind of tubes are used? Either UV199, C299 or "A" tubes can be used; 199's were recommended due to their low battery consumption and plenty of volume can be obtained from these tubes.

2. Can 3-199 tubes be used? Yes.

3. Can I use .0005 Remler VC of the new style? Yes, this condenser is being used in one of our test sets and is an exceptionally fine condenser.

4. How would a 3-199 tube set compare with a Radiola Super Het.? Very favorably.

5. Same as above only 2 or 4 "A" tubes? Should give more volume, distance about same, depending on the operator.

6. Name some DX stations received. Our list is quite lengthy, but includes several Chicago stations, KDKA, WOC, CFCN, WSAI, WWJ, CYL, XICE, WOAW, etc., all on loudspeaker with volume.

7. How does your circuit compare with Munzig as described in Nov. Radio Journal; better, as good or otherwise? This is like comparing two racing cars, undoubtedly, depending largely on the skill of the driver. Personally, I have never heard one of the

sets mentioned in operation.

8. What size antenna should be used? As large as can be used without broadening

out tuning, this rule holds good in any receiver in fact. Approximately 100 to 150 feet.

"GOOD BYE" -- STORAGE BATTERY BLACK'S A. C. POLARIZER

ELIMINATES "A" BATTERY COSTS AND WORRIES
On Harkness and other Reflex sets
PLUG IN ON YOUR ELECTRIC LIGHT CIRCUIT

Accurately tested—Perfectly balanced—Lasts a life time.
First Cost—Last Cost

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See your Dealer or send direct
Ask for "Black's"

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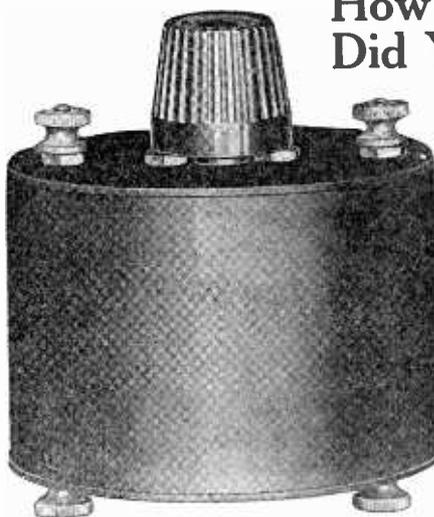
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Los Angeles

Dealers and Agents Wanted

Tested and approved in Radio Journal's Laboratory

How Many Radio Miles Did You Go Last Night?



That's the up-to-the-minute question from Los Angeles to Chicago. Did you hear Denver 20 seconds later? If you didn't, why didn't you?

CLARKWORTH VARIFORMER

Patent Applied For

Engineering skill and correct designing have proven in our laboratory that a Variable Tuned Radio Frequency Transformer tuned by a micrometer action is the answer.

The length of your aerial changes the tuned R. F., which demands you retune, and the Variable Coil must move straight away from the fixed coil to give 100 per cent loose coupling, which is the answer to selective tuning, distance and volume.

Clarkworth Variformer for each of the following circuits:

Regenerative, each.....	\$ 6.00
Reflex, each.....	5.00
Neutralizing set of three.....	15.00

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With the Western Amateurs

A Department Conducted by the Southern California Radio Association

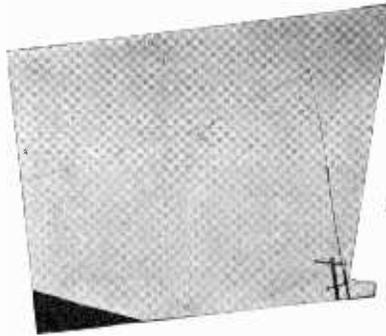
Edited by JAY PETERS, 6BEV

Look in on 6AFG

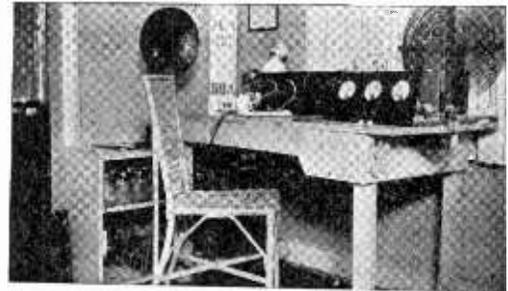
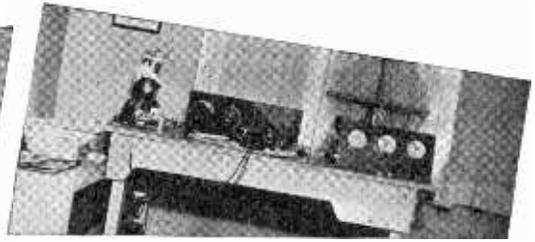
We are herewith presenting an inside look at station 6AFG, owned and operated by J. H. Deeney, Jr. Its present QRA is 828 North Formosa avenue, Hollywood, Calif., where all the wild movies are made. Regarding the word "present" the owner writes: "I may say 'present' as in the last year it has been necessary to change the location of the layout four different times, thus keeping yours truly and several ham friends busy hoisting the well-known timber, also keeping the R. I. on the job. That's that. Now for the junk.

"The transmitter consists of a 50 watt fire bottle hooked into the conventional coupled Hartley circuit, all of which seems to fill the bill quite satisfactorily. The set is arranged in a manner which seems to have met with considerable favor among the hams in this vicinity, mounting the radiation, volt and milliammeters respectively on a small panel placed in the front of the baseboard. The tube is placed in the center directly back of the panel, followed by grid and condenser. Filament rheostat is placed on the side, to be within easy reach of the operator. To the rear of this the pancakes are mounted standing in a vertical position. They are wound with three-eighths brass ribbon on paraffined wood strips, the antenna coupling standing at about three and a half inches which, according to reports, gives a very sharp wave.

The Cardwell .0005 mf series condenser is mounted on one support on the panel and seems to oscillate the works on 8p meters O. K. No other tuning condensers are used. The set is wired with three-sixteenths inch copper tubing, that is all but the filament leads. The said paraphernalia hoists an antenna current of five amps into the sky wire on 98 meters, and at present on seventy-



ANTENNA SYSTEM AND LAYOUT AT 6AFG



eight meters, a shade over one amp, all of which works rings around the high wave (antenna current doesn't mean much but is given as a matter of convention, 'hi'). The plate current is 100 milliamperes at 900 volts, approximately 90 watts input, high voltage being delivered by a 650 watt Acme transformer. What our output is we won't attempt to figure. The present tuner used is the famous BGF, two circuit, covering a wave band of from 40 to 125 meters, built in real low loss fashion, and it seems to work quite fb.

A BCL set and loud speaker, Reinhartz circuit, is used for the folks' entertainment, and mine also when a good jazz orchestra pops up, all of which is far from unusual. A tubes are used throughout, both for amplifier and detector. For signal strength and sensitivity we find the UV 201-A a much better detector than any of the soft tubes. 100 volt Burgess B, an Exide 150 ampere

hour A and Baldwin phones complete the intake system. A Handy vibrator charger is used to keep the batteries full of pep. The thing happens to be on now and offers considerable QRM, but what's the use, we have to work DX tonight.

Nearly forgot to mention the chemical rectifier, which consists of 44 of the well-known pint Mason jars, containing a saturated solution of borax and distilled water. The aluminum plates were acquired by cutting up some of the Edison Company's discarded arresstor cones, and said aluminum seems to be about as near 100 per cent as it is possible to get. A high grade of paraffine base motor oil is used on top of the solution to prevent creeping, evaporation and the ever-invading dust. Also to prevent the kitty from hooking a drink of our solution now and then.

A cabinet is provided for the rectifier and also takes care of the batteries, charger, filter system and high voltage transformer.

The antenna consists of 40 and 60 foot poles with a single wire, broken up with insulator, slung between the sticks. The top of the antenna proper is about 20 feet from the top of the sixty-footer and drops directly down, at an angle of about 60 degrees, to the transmitter. It is a cage affair, starting out at the base with a three-inch cage, which remains about the same size until within about 15 feet of the top, whence it spreads out to a five-foot loop, thus giving the discharge at the highest point.

Two Ohio brass insulators are used at the top to take care of this explosion. The length over all runs around 70 feet, giving a very low fundamental. The counterpoise is made of four No. 22 enameled wires arranged in fan shape directly under the antenna, and about eight feet from the real estate. DX here has been fair but nothing startling has been done. All districts but the first have been worked several times, but for some reason I don't seem to be able to QSO the first. However, we are optimistic birds around here and believe the trick will be turned soon. Hawaii, Mexico and Canada are worked consistently. The set has been logged in Australia, Alaska and by ships off the coast of Central America while working on the high wave. It might interest the gang to know that 6AFG is on O. R. S., a member of the S. C. R. A. and R. O. W. H. and is also 14— for all traffic.



New Regulations

New regulations, folks! Here they are, as promulgated by the department of commerce. And nothing so radical in them for western amateurs at that.

Intercommunication: Amateur stations are not permitted to communicate with commercial or government stations unless authorized by the Secretary of Commerce, except in an emergency or for testing purposes. This restriction does not apply to communication with small pleasure craft, such as yachts and motor boats, which have difficulty in establishing communication with commercial or government stations.

Wave lengths: One hundred and fifty to 200 meters, 75 to 85.7 meters, 37.5 to 42.8 meters, 18.7 to 21.4 meters and 4.69 to 5.35 meters are allocated to amateur stations.

Spark transmitters: Amateur spark transmitters produce considerable interference and consequently are responsible for many complaints. Amateur owners of such transmitters should abandon their use as early as possible and adopt a system producing less interference. Until such change is made they will be permitted in the wavelength and band between 170 and 180 meters and should have a decrement not exceeding .1.

Phone and ICW transmitters: Phone and ICW (interrupted continuous wave) transmitters will be permitted in the band from 170 to 180 meters. ICW shall be defined as the type of wave produced by mechanically interrupting one or more of the radio frequency circuits of the type of wave produced by any transmitting set which produces an equivalent effect.

CW transmitters: CW (continuous wave) transmitters shall be permitted in all of the bands allocated for amateur use.

Coupled circuits: Amateur stations must use circuits loosely coupled to the radiating system, or devices that will produce equivalent effects to minimize key impacts, harmonics and plate supply modulations, except in cases where loops are used as radiators. Conductive coupling, even though loose, will not be permitted.

Power supply: No restrictions will be imposed relative to the character of power supply, provided the emitted wave is sharply defined.

Quiet hours: Amateur stations, when using wave lengths between 150 and 200

378 DX STATIONS

DX fans. If you have not logged 300 stations in past six months you need a Kennedy Three Circuit Tuner. The Kennedy Tuner logged 378 stations from September 15th to March 15th, including 2LO, London; 5WA, Cardiff, Wales; CFCN, Calgary, Alberta, Canada; KGW, Portland, Oregon; KFI and KHJ, Los Angeles, California; KPO, San Francisco, California; KGO and KLX, Oakland, California.

Kennedy Tuner Takes the Place of
 3 Honeycomb Coils at \$1.40.....\$ 4.20
 1 Honeycomb Coil Mounting..... 5.00
 1 23-Plate Vernier Condenser..... 5.00
\$14.20

**INCLUDING GLOBE
 TROTTER DIAGRAM\$5.00**
 Send for Free Diagram

T. J. KENNEDY

Radio Globe Trotter
 1360 University Ave. New York, N. Y.
GUARANTEE: If not satisfied after 30 days will cheerfully return your money.

Fits any Grid Leak mounting

FRESHMAN PLUNGER
 TYPE VARIABLE GRID LEAK was designed especially for the non-technical set owner who can replace in an instant the fixed grid leak with this new efficient cartridge type Variable Grid Leak; without requiring the change of a single wire.
 At your dealer or by mail postpaid. Write for free catalogue

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240 W. 40th St. New York

C. LLEWELLYN RADIO

After looking over all makes of sets, walk a short distance to see something in a RADIO SET built to fit your location.

Note its work and the merchandise used in its construction.

Our prices are less and the material used is the best you can buy.

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ROBERTS COILS

Just what you have been looking for, a real low loss Roberts Coil. No enamel wire used, no colodium or shellac used to bind coil, no metal to create eddy losses and above all a coil designed by the man that holds the World's Record using this coil.

Price Broadcast band 200 to 600 meters \$7.00

FLEX COILS

At last a LOW LOSS Harkness coil that brings enormous volume and wonderful results using the same construction as the famous Roberts Coils.

Set 2 Coils and Mounts \$1.75

WORLD RECORD COILS CO.

464 W. Sixth Street, San Pedro, Cal.
 W. B. Magner, 6 BCP President Phone 1525-W
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- PARTS REQUIRED**
- 1 Set W. R. Coils
 - 2 Low Loss Condensers
 - 1 7x18 Panel
 - 3 Sockets
 - 2 30-Ohm Rheostats
 - 1 Double Jack
 - 1 Single Jack
 - 2 1 to 1 Transformers
 - 1 Chelton Condenser
 - 3 201 A or 299 Tubes

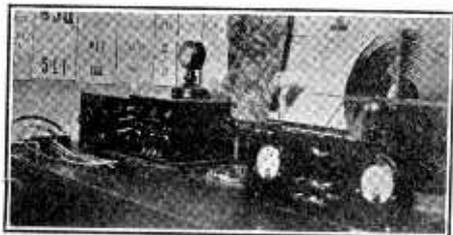
Complete Kit
\$40

- PARTS REQUIRED**
- 1 Set Flex Coils
 - 2 23 Plate Condensers
 - 2 Sockets
 - 1 30-Ohm Rheostat
 - 1 Double Jack
 - 1 Single Jack
 - 1 7x12 Panel
 - 2 201 A or 299 Tubes

meters, are required to observe a silent period from 8 to 10:30 p. m. daily, standard time, and on Sundays while church services are being broadcast. Such stations, when using wave lengths below 85 meters and having a pure continuous wave, or where a full wave rectification is employed, are not required to observe a silent period provided no interference is caused by other services.

6OF-6AIG

6OF-6AIQ is woned and operated by E. L. Lamoureux, 3419 South Hope street, Los Angeles, Calif. The aerial consists of four wire flat, 40 feet long and 50 feet high. The counterpoise consists of seven wires, ten feet high and 60 feet long. The first transmitter was a five watter, soon replaced by ten watts. The DX on this was nil so it was replaced with a fifty, which endured until last Christmas, when it went west. The fifty set uses the Meissner circuit with series feed. The two meters are antenna current and filament volt. A 43-plate condenser is used in



This is the layout at 6OF-6AIQ

the antenna for short waves. The plate voltage, 2200 volts, is supplied by a G. E. pole transformer which is rectified by a 48-jar chemical rectifier. The filament transformer is home-made and gives about 30 amps. The filament voltage is controlled by a Bradleystat which works fb. The antenna current on low waves is from 1.2 to 1.5 amps.

The first real ham receiver was a Reinhartz, which worked fb on 100 to 200 meters but would not go down to 75 meters. Now use three circuit low loss with two-step, but detector only is employed most of the time because of bad power leaks. Only two NZ stations have been copied here and then they were drz. WJS in Brazil was heard here qsa.

In fact, the dx is pretty nil here. The best worked on 150 meters was Alaskan 7NM. On 80 meters all districts but the second were worked the first night on. My best dx was working all districts and Canada in five hours. Z4AA has been called and he answered but was lost on account of power leak. This station will be back on the air by the time this magazine is read, I hope, with a W. E. fifty. We also answer all cards.

McCreery, 6LJ, to Paris?

The S. C. R. A. has unanimously endorsed M. E. McCreery, 6LJ, as its choice to attend the International Conference in Paris. Donations and votes are being mailed by the hundred from all parts of the west to A. L. Babcock at San Francisco or to the Southern California Radio Association headquarters in Los Angeles. Mr. McCreery is one of the oldest operating amateurs now actively engaged in amateur work in this section, as well as having charge of the A. R. R. L. affairs in the Sixth. He is one of the best known hams, from the viewpoint of activity in amateur affairs and his consistent endeavor to promote the interests of the amateur fraternity. He is credited, back at A. R. R. L. headquarters, with having put the Sixth district, and particularly the Southern California end of it, up to the League headquarters in such a way as to gain real recognition for the con-

scientious amateur workers for this section. It is confidently hoped by LJ's many friends in the southwest and west that he will be able to make the trip to Paris, not only for what he will derive from the trip, but for the benefits which will accrue to the whole amateur fraternity and western amateurs in particular, if he attends.

A ways and means committee was appointed at the last meeting, as follows: Mr. Rayfield, chairman, Peters, Wright, Cannon and Lemke.

6CFY and 6WV sure spend a lot of time in at that radio store on Third street. Is that your new Q. R. A. O. M?

6BVG is building B. C. L. sets now. I hope they are coupled circuits, O. M.

6CJX will have his 250 watter going before long.

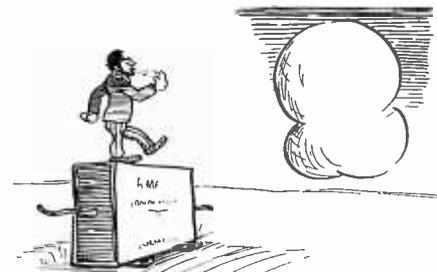
It is not very often that a radio club can boast of nobility in its ranks. We feel justly proud to have the Duke of Magnolia St. in our midst. He signs 6JX. He is also our chief traffic officer.

6CNL is still stepping out (with the young ladies). The trans is being badly neglected. That makes him a member of the She W. Club.

6BSG has made application for the She W. Club. He will join next week.

6JX has some voice, any one hearing it would think he made a living selling fish.

6ACB quit radio for a wife sometime ago. Now he has taught her the code. They both will be on the air soon.



Here lies the body of A.B. Denser,
He forgot to discharge his filter condenser.

CORNELL BELL

6CFS has quite a reputation, at least that is the dope passed out. It has been reported that he is the sheik of Venice. (Lots of hams envy you, O. M., Ed.)

Gerfin and Dan Harbough will be hams yet. It all takes time.

6BRF is the sheik of Third St., Los Angeles, not San Diego, as first reported. Must be some swell lady. He must have a new car. I don't blame her. I wouldn't take a chance in that green roadster either. Hi! Hi!

6CZ is a regular ham. We need lots of fellows just like him.

F. W. Christian will be back on the air before long. That proves that once a ham always a ham. That's sure ib, we all welcome her.

The Club Orchestra is as follows: 6CHZ, piano; 6CTL, horn; 6CQY, saxophone; 6OR, violin; 6CBN, drums.

Well, that sure is tuff. No train and no program from the Ritz to-night.



CORNELL BELL

The new officers elected are as follows: President, Mr. Blodgett, "6ALG;" 1st vice-president, Mr. Deeny, "6AFG;" 2nd vice-president and chief traffic officer, Mr. Deming, "6JX;" secretary, Mr. Smith, "6BUR;" treasurer, Mr. Wiggins, "6CHZ;" sergeant-at-arms, Mr. Wright; chairman of technical committee, Mr. Lughton, "6CFT;" chairman of membership committee, Mr. Deming, "6JX;" chairman of meetings committee, Mr. Session; editor and publicity manager, Mr. Peters, "6BEV."

From 6BUW

From 6BUW, Whittier, calls heard four nights in December, 6BUR tuner, O-V-O: Beverage antenna: 1abf, 1aII, 1aom, 1are, 1bv, 1ci, 1cla, 1hn, 1pl, 1sf, 1zt, 2az, 2be, 2cbg, 2cee, 2cpa, 2cva, 2dn, 2kx, 2rk, 2vr, 2adb, 3bwj, 3bva, 3ca, 3hs, 3yp, 4co, 4kl, 4ku, 4nb, 4oa, 4oi, Z2ac, Z4ak. I want to give real credit to 6Bur's tuner. It is a wonder.

Mott in East

Lawrence Mott, Avalon, Catalina, 6XAD and 6ZW, sent Christmas greetings and the following news: Herewith advise I am leaving for New York, Washington and thence to Palm Beach, Fla., for some sailfish and tarpon. Expect to be back by the last of February. You might make note so the fellows will know why no QSL to any communications. Worked G2NM two nights ago, using WE250 on 82 meters. He is very QRK, at times almost QSA.

South Americans

Dear OM: The other day I received the following dope on South American stations from Major Raven-Hart, ch9TC, and tho't that you might like it for Radio Journal:

CHILE—FAL, 50 watts, QRH 80-100 meters, DX. NZ9TC, (burned down now but will probably be on agin this month) 200 watts, QRH 90 meters, DX. US, NZ.

ARGENTINA—CB8-DA8 (generally uses cb), usually 50 watts, QRH, variable, DX, US, NZ. ENG. DB2, 200 watts, QRH abt 100 meters, DX, NZ. A8, 200 watts, QRH abt 80-100 meters, DX, NZ.

This is as I got it and if you can use it pass it on to somebody that don't know about it. TNX. 73's and best of luck with Radio Journal.—Robert Amsbury, 6CIX, 317 North Friends avenue, Whittier, Calif.

After a considerable period of operation on the short wave lengths amateurs of the coast have come to some very definite conclusions as to its advantages, among which the amateurs of San Diego are not the least of the benefited. San Diegans find that the arc mush is absent on the lower waves.

6ZH, who was presented with a 250-watt set at the Modesto convention, has erected a vertical antenna, or practically vertical, seventy-five feet high with a twelve-inch ball at the tip.

6BUR has been exchanging signs with G6RY—not so worse, what?

6CGW has installed 1000 watts water-cooled—zowie.

Here is a record to hang a comfortable hat on: 6BEB, of the Riverside district, has been working New Zealand on an input of 12 watts on a 5 watt bottle.

6AKZ and 6LJ are among those reported from Korea.

Radio 6CLR dishes up a few cartoons for this issue of Radio Journal, with the promise of more to come. Non-technically he is known as James H. Cornell.

Station Exploded

Sitting up at his radio station until 5 a. m., an hour when most radio fans have gone to sleep after the usual period of DX hunting, R. B. Bourne of West Hartford, Conn., was rewarded by hearing the call of an amateur in faraway New Zealand. In great excitement, he reached for the key of his transmitter and pounded an answer in the International Morse code. In a moment, he was listening again and heard the New Zealand Ham acknowledge his call.

Half an hour later, he stood looking at the remains of what had been a first-class station; enthusiastic over making the contact, Bourne had used all the power available with the result that an explosion occurred, which temporarily dismantled his equipment. The accident happened as Bourne was in the act of sending a message addressed to his brother, Rolf Bourne, in Singapore. He expected the message would be relayed by amateur radio to Australia from which point it would be forwarded by mail to its destination.

Operated Railroad

Amateur radio scored again recently when G. W. Bergman, owner and operator of station 9CA at Dwight, Ill., handled important messages for the Chicago and Alton Railroad. Due to the heavy snow, the railroad telegraph lines were inoperative, so Bergman was asked to establish communication between Dwight and Chicago. Station 9CA got "on the air" immediately, but was unable to "raise" any Chicago stations. He managed finally to relay some messages through 9AZN, the station of A. D. Sanial in La Crosse, Wis.

By this means, Bergman got into communication with R. H. G. Mathews, Central Division Manager the American Radio Relay League, who warned local amateurs to listen for Bergman's signals. He also asked the Chicago broadcast stations WEBH, WGN and KYW to have their listeners notify amateurs to get in touch with 9CA.

In a short time, 9CA "raised" 9AAW and 9BE, the stations of W. E. Schweitzer and M. H. Romberg, both of Chicago, and the traffic for the Chicago and Alton was then handled direct from Dwight to Chicago by means of amateur radio telegraphy.

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**AUDIO FREQUENCY
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Los Angeles, Calif.

Trade Talks

Freshman Co. Moves

The tremendous demand for the Freshman Masterpiece 5-tube tuned radio frequency receiver has compelled the Chas. Freshman Co., Inc., to move into the brand new twelve-story fire-proof building at 240-8 West 40 street, New York—known as the Freshman Building. The vastly increased space and every known manufacturing convenience will enable the Freshman Company to more than double the productions of the Masterpiece and their line of small radio parts.

It may interest those persons who are interested in the growth of radio to know that this company started in business with a single item—the "Antenella"—a light socket plug that eliminates the use of an aerial and other outside wiring, only two and one-half years ago. Growing to a point where the monthly business is over the million dollar mark within this period is remarkable and speaks highly for the public interest in radio.

Some Portable

Six Los Angeles people, on a tour through the California mountains recently, had a mighty pleasant time of it, because of their portable radio. They drove, in two cars, from Los Angeles through the Colorado desert to San Diego and back by the coast route, one of the party taking a port-

able set, an Operadio, along. They took an interesting side trip up Painted Canyon, one of the most interesting spots in California. Here Nature has torn the mountains, known as the San Bernardinos, into high peaks, valleys and gullies and, at the same time, has added many beautiful streaks of red, dark blue, purple and dull yellow, giv-



Los Angeles touring party finds the portable receiver highly efficient in heart of mountains.

ing the place its name.

Camp was made six miles up the canyon where the tourists were entirely surrounded by mountains from 1,000 to 2,500 feet high. And here they heard some concerts on the loud speaker: KGO, Oakland; KPO, San Francisco; KFON, Long Beach; KGW, Portland, Ore.; KFPT, Salt Lake City; KOA, Denver; KFKX, Hastings; KOB, New Mexico State College; KNX, Los Angeles; KFI,

Los Angeles, and KHJ, Los Angeles. The top of the set was used for a loop, and the fans of the party considered this a splendid record.

Trouble-Solving Tip

Every once in a while a little tip can do a lot of people a lot of good. That may be the case with a suggestion made by Mr. Falck of the Advance Electric Company, Los Angeles, makers of the Advance Model 4, which has been in great demand for the past two or three months. Some BCLs using this or other similar sets in the vicinity of one of the low wave-length stations having been having a bit of trouble cutting low enough to eliminate the nearby station and pick something still lower, or similar problems. Mr. Falck suggested trying a .0025 fixed condenser in series with the ground, and in every case where this was tried the trouble has been solved with little, if any, apparent loss in volume. In fact some of the real short wave stations come in with increased volume.

Tanner Company Formed

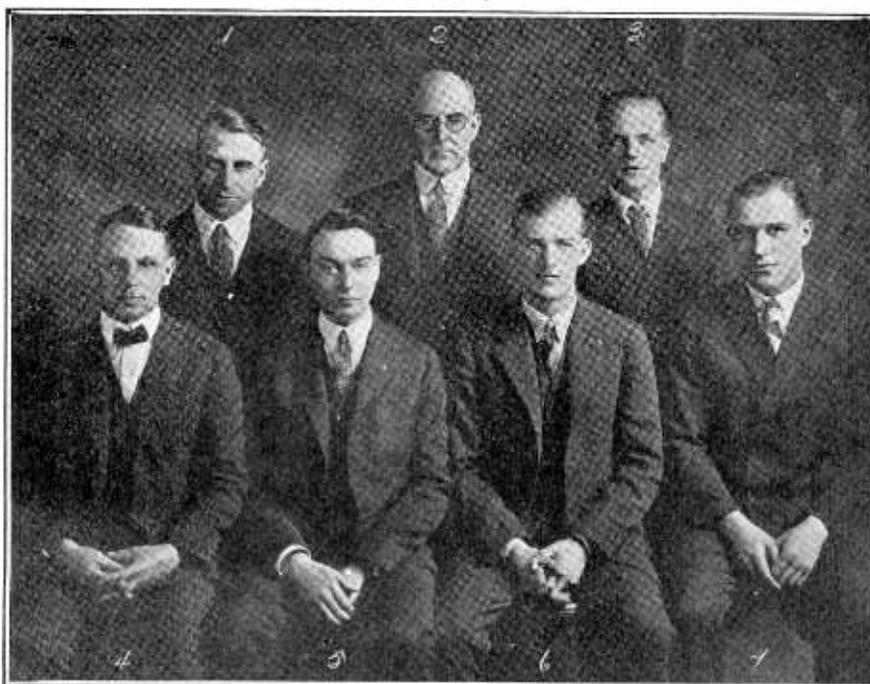
C. D. Tanner, of Los Angeles, has just announced the formation of a new company for the general wholesaling of radio and allied equipment and for the manufacture of the recently announced three-tube low loss Neutroflex. The Neutroflex, which is already a well known commercial set, has been rebuilt in accordance with advanced design, giving greatly improved performance and simplified operation, according to Mr. Tanner. An extensive manufacturing program, he said, will permit of a low list on this receiver, considerably below the accepted market on most built-to-a-piece receivers.

Markets CeCo Tubes

B. Kruger & Co., of Los Angeles, in the radio jobbing end of the industry for the past few years, are placing a new tube, the CeCo, on the market with marked success. This tube is made in both the 99 and A styles. A pair given a preliminary test by Radio Journal stood up under ordinary receiving conditions with splendid results. Exhaustive tests as to endurance and the many other factors involved have not been completed. The tubes carry the usual guarantee. The A type takes 5 volts filament, .25 amperes filament current, and 20 to 120 volts plate. The 99 type take 3 volts filament, .06 amperes filament current, and 20 to 80 volts plate voltage.

Firm Change

R. T. Herold, for many years a well known radio experimenter, has purchased the interest of A. L. Munzig in the Ray-Dee-Artcraft Instrument Co., of Redlands, Calif., Mr. Munzig remaining with the firm as technical



Putting the punch in radio sales. This is the executive and selling force of the Walter S. Gray Company, 1054 Mission Street, San Francisco, with offices at 926 Midway Place, Los Angeles, and 2602 Fourth Avenue, Seattle. The picture was taken shortly after Christmas, when they got together to discuss ideas, policies, plans, etc., for radio during 1925. They are radio jobbers on a big scale. 1, Cass Aetschuler, secretary; 2, Walter S. Gray, president; 3, James J. Southard, manager radio dept.; 4, Joseph J. Grimsey, Los Angeles manager; 5, Geo. W. O'Neil, Seattle manager; 6, G. Gray, vice-president; 7, Wm. A. Hiecke, manager record

advisor. The company has taken over the distribution of Magnavox and Thermiodyne products and is about to launch several new products of its own.

Karas Transformer

The Karas Harmonik audio frequency amplifying transformer, just placed on the market by the Karas Electric Company of Chicago, and distributed in the west by the Pacific States Commercial Company of Los Angeles, was given a test in Radio Journal's laboratory which resulted in some highly favorable comment. The curve of this transformer is almost



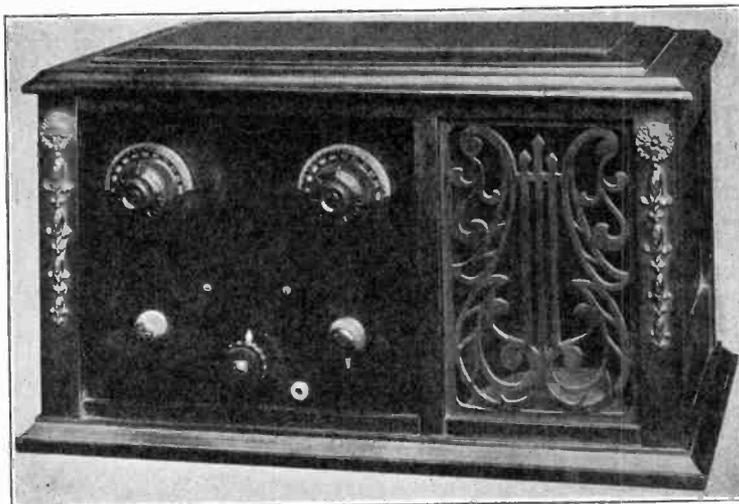
straight, from beginning to end, starts in high at the lowest frequency, quickly reaches its very highest point, and maintains this height right across the chart. The result, of course, is the deliverance of uniformly amplified notes. The radio is 4 to 1, with an amplification ratio of 3.7 to 1. One stage ratio, using A tube, is 28.5 to 1. The primary has 5,000 turns, with 20,000 on the secondary, using No. 40 enamelled wire, insulated between layers of turns. The coils are vacuum impregnated with wax composition and the impedance of the primary is high. The core is $\frac{5}{8}$ of an inch. It can be placed in any old position, anywhere in a set. One of the manufacturers chief claims for this transformer is that it gives equal amplification to all harmonics, the importance of which can be gathered from the fact that it is these various tone harmonics which give quality to any given note and pitch—it is what makes the difference between a flute note and a piano note.

New Resistance Coupler

Haddaway Resistance Coupling units, recently placed on the market, are attracting considerable attention owing to the ease with which they solve the amplification problem. The diagram shows the use of Haddaway units for a three stage audio frequency amplifier to be used on any type of tuner. Greater amplification of weaker signals is claimed for it, making it valuable as a distance getter. Its economy is cited, three stages of such coupling consuming less current than two stages of ordinary iron core.

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Complete **\$190** Complete

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100 VOLT Edison Type "B" battery, knocked down. Parts and plans complete, \$12.50 **LANE MFG.**, 2939 W. Lake, Chicago.

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DEALERS—Write for our illustrated catalog of reliable radio merchandise. Rosister-Manning Corporation, Dept. E, 1830 Wilson Ave., Chicago, Ill.

WIRE TERMINALS—150 assorted \$1.00, 20 two foot lengths No. 14 square tinned busbar \$1.00, 10 two foot lengths No. 10 special round busbar \$1.00. Send for samples. Immediate shipment postpaid on receipt of remittance. Radio Engineering Co., 55 Halsey St., Newark, N. J.

MISCELLANEOUS

ONE MILLION GERMAN MARKS either hundred thousand or fifty thousand denomination. Genuine guaranteed currency. Fifty cents. Agents wanted. Write or wire wholesale price.—Di Foti, 561 Washington St., Akron, Ohio.

THE WORLD'S LARGEST DOG KENNELS offer for sale Oorang Airedale watch dogs, automobile dogs, children's companions, farm dogs, stock drivers, hunters and retrievers. Also Big Game Hounds, Coon Hounds, Fox Hounds, Rabbit Hounds and thoroughbred Hound and Airedale puppies. Satisfaction and safe delivery guaranteed to any point in the United States. Large illustrated descriptive catalog mailed free. Oorang Kennels, Box 206, La Rue, Ohio.

FOR SALE—\$160. Workrite Neutrodyne (without accessories) in perfect condition, \$80; or complete with tubes, batteries, loud speaker, etc. (cost \$300) for \$160. C. R. Whistler, 1520 East Orange Grove, Glendale, Calif.

LONELY HEARTS—Exchange letters; make interesting new friends in our jolly club. Eva Moore, Box 908, Jacksonville, Florida. Enclose stamp.

Haddaway Incorporated, 1806 South Hoover street, Los Angeles, are responsible for the new product.

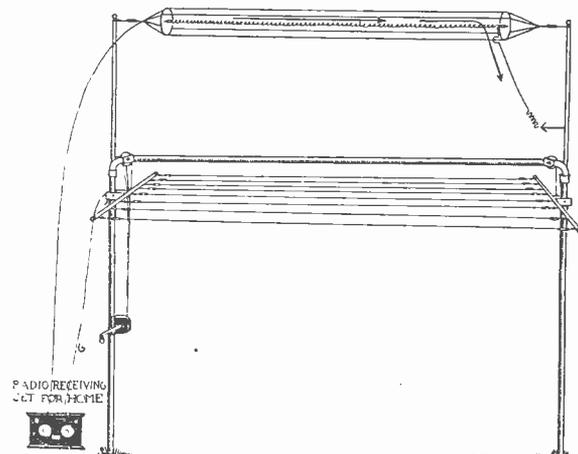
Jobbing House Moves

The Yale Electric Co., jobbers and distributors of radio and electrical specialties and one of the oldest radio firms in Los Angeles, has moved to larger and finer quarters at 1111 Wall street, Los Angeles. The company has more floor space, is in the heart of the wholesale district, in its new location.

Battery Hours

In deciding the problem of the right battery, the recommendations of the set maker are invaluable as to correct voltages. As to ampere hour capacity, that is entirely up to the set owner and his pocketbook, according to S. E. Leonard, radio engineer of Willard Storage Battery Co.. Ampere hour capacity is the electrical measure of the life of the battery on a single charge. It means that the battery will deliver one ampere an hour for as many hours as its rated capacity.

This antenna, known as the clothes-line antenna, is manufactured by the Southern California Fence Company of Los Angeles. By using a counterpoise, with a certain wire insert in center of a four wire cage grounded at the free end, with an adjustable counterpoise which moves up or down from four to ten feet from the ground, makes an efficient clothes line as well as antenna system. The antenna, calibrated, covers a wave length of from 180 to 600 meters. The masts are of two inch pipe which graduates, at the top, to 3/4 inch. A hoist handles the counterpoise. The cage is of four lengths of stranded wire on circular spreaders.



"As you are aware, there is no monopoly in the radio world at the present time, there being over 500 broadcasting stations of which not more than four are the property of any one institution.

To meet the continually increasing business of the Pacific Coast, the Diamond State Fibre Company, the biggest and oldest manufacturing concern in the world, has been compelled to double the size of its San Francisco branch and increase its stock in proportion. The new address is 274 Brannon Street.

The Fox Company, 247 So. Broadway, Los Angeles, has issued a self-tabulating radio log book of novel and useful design, pocket size, for dealer premiums, etc.

The most advanced class in radio ever offered by the University of California Extension Division of Los Angeles, started January 28. This class is open to those who have had the preliminary radio courses or those who understand the beginning work. This class meets in room 5, Woodbury Building, Los Angeles, from 7 to 9 in the evening. Registration is taken at 815 South Hill Street.

New Daven Amplifier

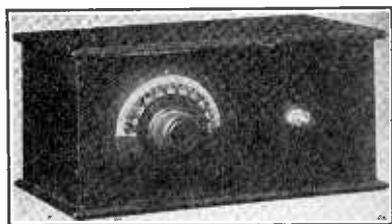
The new Daven Super-Amplifier recently made its appearance on the western market, a resistance coupled amplification unit of three tubes. Binding posts are provided for input and output on all batteries, etc., and is easy to connect to any set. All plate resistors, gridleaks and fixed condensers are provided in the proper values so



that all that is necessary is to hook it to the set and batteries. The manufacturers, in outlining some of the advantages of resistance coupling, point to low cost, relationship between input and output being practically linear, elimination of distortion, etc. Low plate consumption and absence of C battery reduce maintenance. Purity of tone is claimed as its great advantage. The Saven people have just put out a handbook on resistance coupled amplification, written by Zeh Bouck, which goes into great detail on this angle of the amplification problem.

Super-Amplifier Launched

The Super-Amplifier is the name of a new device, recently placed on the market by the Super-Amplifier Company, 806 Valencia street, Los Angeles. The device is specifically in-



tended for inserting in the aerial circuit, between the aerial and set, on a super-heterodyne or any other set using a loop antenna. Its manufacturers claim that it increases the set's efficiency 100 per cent, range, volume and battery economy included. It is put up in a mahogany cabinet to match the set. There is no upkeep on the unit. The market is already taking a number of the new devices with apparent satisfaction.

Election Developments

(Continued from Page 12)

ated by this motion of the earth and its collision with the sun must be radiated, commutated or transformed, quantitatively accompanied by a corresponding redistribution of this motion and a transmutation of the elemental matter at the common center into increasing stability and heterogeneity of the organic substance.

Hence we see the intimate and inexorable association of matter and its motions and the invariable relation of

resultant energy expressed in the proportions of radiations and the contained and remaining motions of this matter.

Wavelengths of Energy

The integration of matter electronically or elementally, always involves heat in fixed relation as the amount of contained motion is proportioned in the volume of the actuated masses.

The true thermostatic scale should be graduated accordingly, rather than upon the centigrade or fahrenheit

scale, and thus the absolute electronic rule of heat graduations may be ex-

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pressed. To illustrate, suppose we take a cubic foot of hydrogen gas (atomic weight of one) at a given pressure of 8 atmospheres (an atmosphere being 14.7 pounds per square inch), or of a density of 8, and at a given temperature of 8. Now let this cubic foot of gas expand until its dimensions are doubled in all directions, the areas involved will be increased in proportion by the squares, while the volumes will be increased proportionately by the cubes of the dimensions.

Hence the pressure will be decreased by the cube-root, the temperature decreased by the square-root and velocity

of the contained motion reduced by the units of the dimensions. Thus we see the same fixed relation of motion to matter, expressed volumetrically as it is manifested in the relations of the units of the velocities of the planets of the solar system to the inverse square-roots of their distances from the sun and the inverse cube-roots of the periodic times.

The resistances offered to moving bodies, through a resisting medium, is directly proportioned to the areas and, therefore, varied inversely to the density of the masses and inversely to the units of velocity. Therefore the prod-

uct of the squares and the units of velocity fixes the periodic time in the cubes, while the wavelength must vary directly to this periodic time. Now as the heat increases as the distance to the common center of motion and gravitation decreases, the wavelength of radiated energy must vary from those indefinitely long—such as gravitation, the first and foremost of radiant energy—to those of the electromagnetic or wireless, and finally to those of heat and light down to those of the Xrays. These wavelengths bear *inverse* relation to squares of the heat and pressure of elemental matter. Thus as the heat or the pressure increases by the squares of atomic weight, the wavelength decreases by the units—a rule of universal application.

Hence we see the invariable association of wavelengths of energy to the elemental motions of matter.

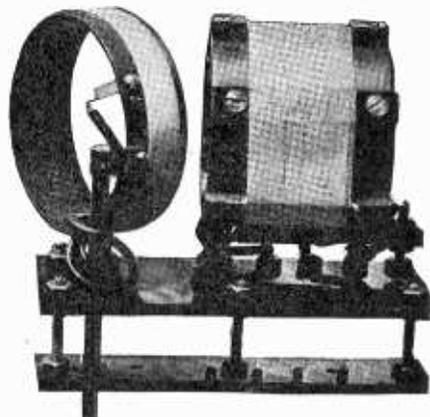
Now as we pass, in the course of this series, through atomic elements, we must always carry in mind the conception that the wavelengths are varied not only by each element, according to its electronic scale of development but also that these wavelengths are varied by the heat and the pressure of these elements from those infinitely long, at low pressure and heat, as great diffusion implies, to those of infinitely short as great pressure and heat and integration entails. This is true from the longest of gravitation to electromagnetic, heat and light to the shortest of the Xrays.

In the next article we will consider gravitation and its wavelengths, since it is the first of radiant forces in the order of organic developments.

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Low Loss Regenerative Reflex Units

(As Described in November Radio Journal)



Low Loss Regenerative Reflex Unit.....\$4.00



Antenna Coupler.....\$1.50

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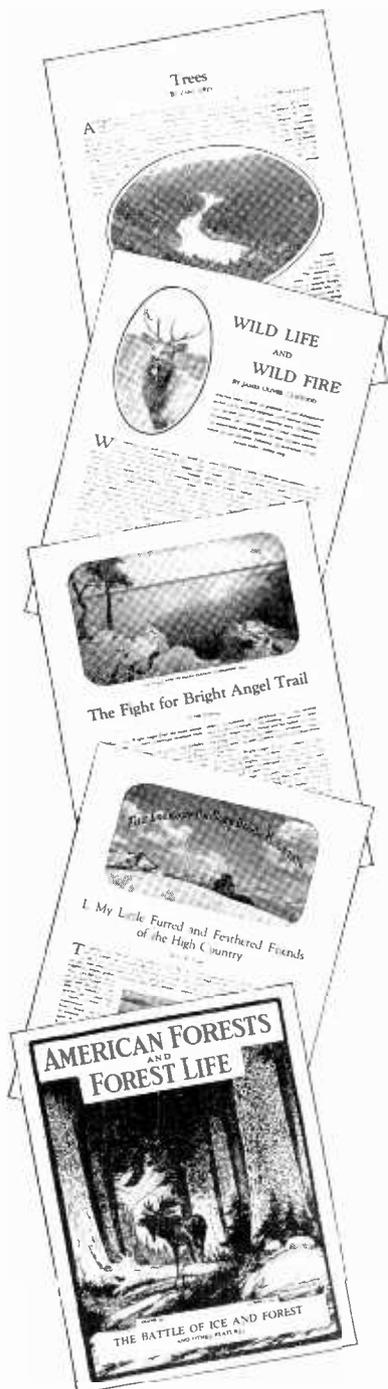
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THE AMERICAN FORESTRY ASSOCIATION
Room 210 Lenox Building,
1523 L Street N. W., Washington, D. C.:

I hereby apply for membership in The American Forestry

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