

B6

# PACIFIC RADIO NEWS

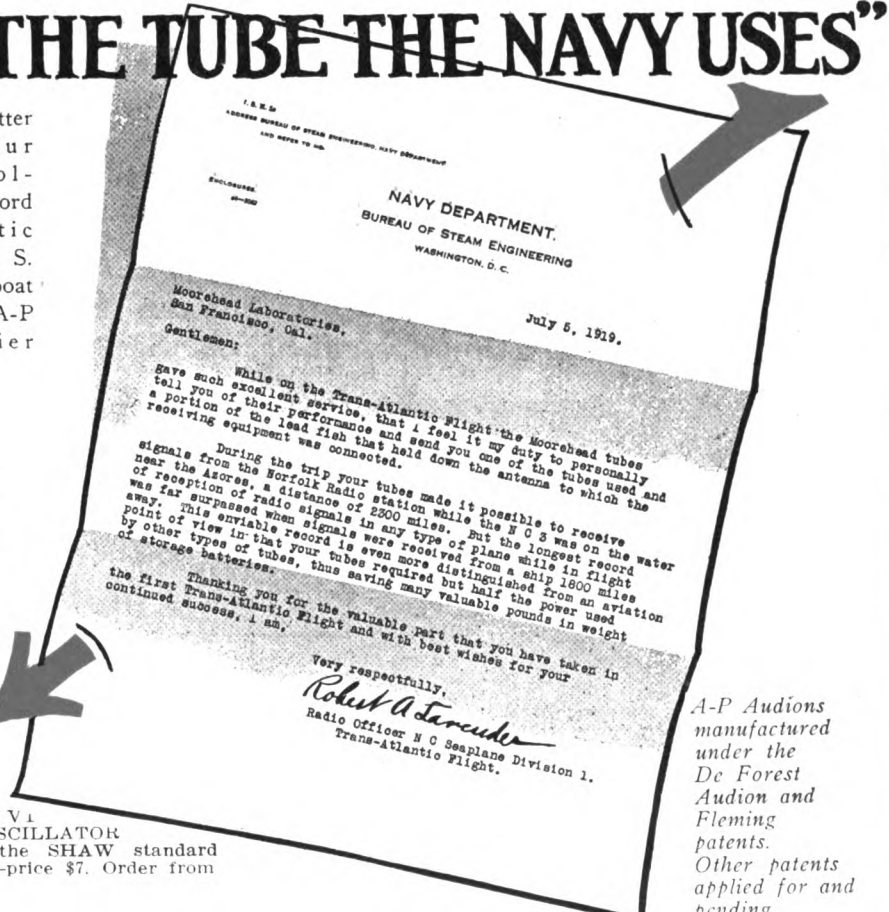
*Pioneer Journal of  
Western Radio News and Development.*

## "USE THE TUBE THE NAVY USES"

This is the letter received by our Laboratories following the record trans-Atlantic flight of the U. S. Navy flying boat NC-4, using A-P VT Amplifier Oscillators.



THE A-P VT AMPLIFIER-OSCILLATOR equipped with the SHAW standard four-prong base—price \$7. Order from your dealer.



Moorehead Laboratories,  
San Francisco, Cal.

July 5, 1919.

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While on the Trans-Atlantic flight the Moorehead tubes gave such excellent service, that I feel it my duty to personally tell you of their performance and send you one of the tubes used and a portion of the lead fish that held down the antenna to which the receiving equipment was connected.

During the trip your tubes made it possible to receive signals from the Norfolk Radio station while the NC 3 was on the water near the Azores, a distance of 2300 miles. But the longest record of reception of radio signals in any type of plane while in flight was far surpassed when signals were received from a ship 1800 miles away. This enviable record is even more distinguished from an aviation point of view in that your tubes required but half the power used by other types of tubes, thus saving many valuable pounds in weight of storage batteries.

Thanking you for the valuable part that you have taken in the first trans-Atlantic flight and with best wishes for your continued success, I am,

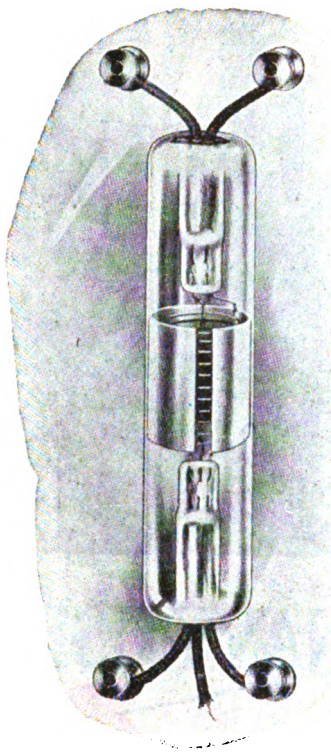
Very respectfully,  
*Robert A. Tarzander*  
Radio Officer NC Seaplane Division 1.  
Trans-Atlantic Flight.

A-P Audions manufactured under the De Forest Audion and Fleming patents. Other patents applied for and pending.

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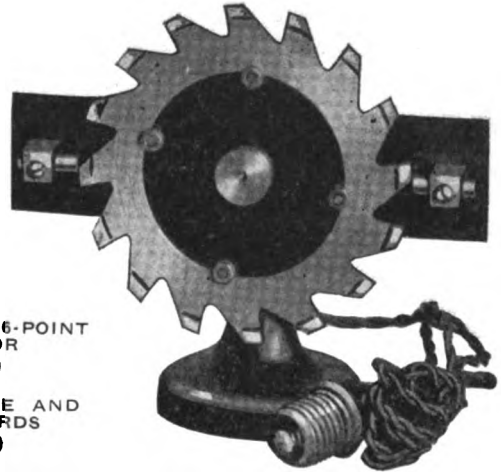
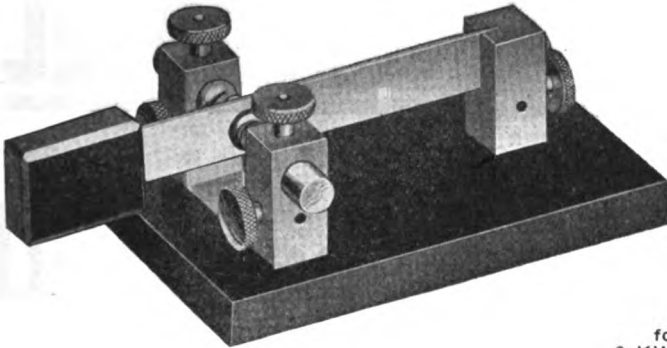


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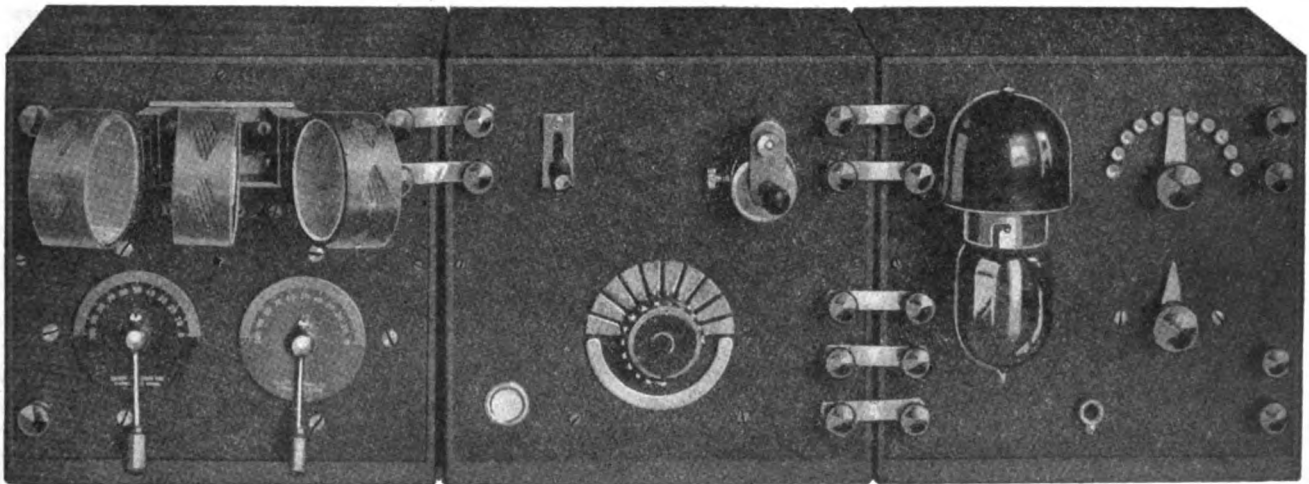
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## "COOTIE" KEY No. YM-6

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## UNIT SECTIONAL CABINET RECEIVERS



YM-7b

YM-9

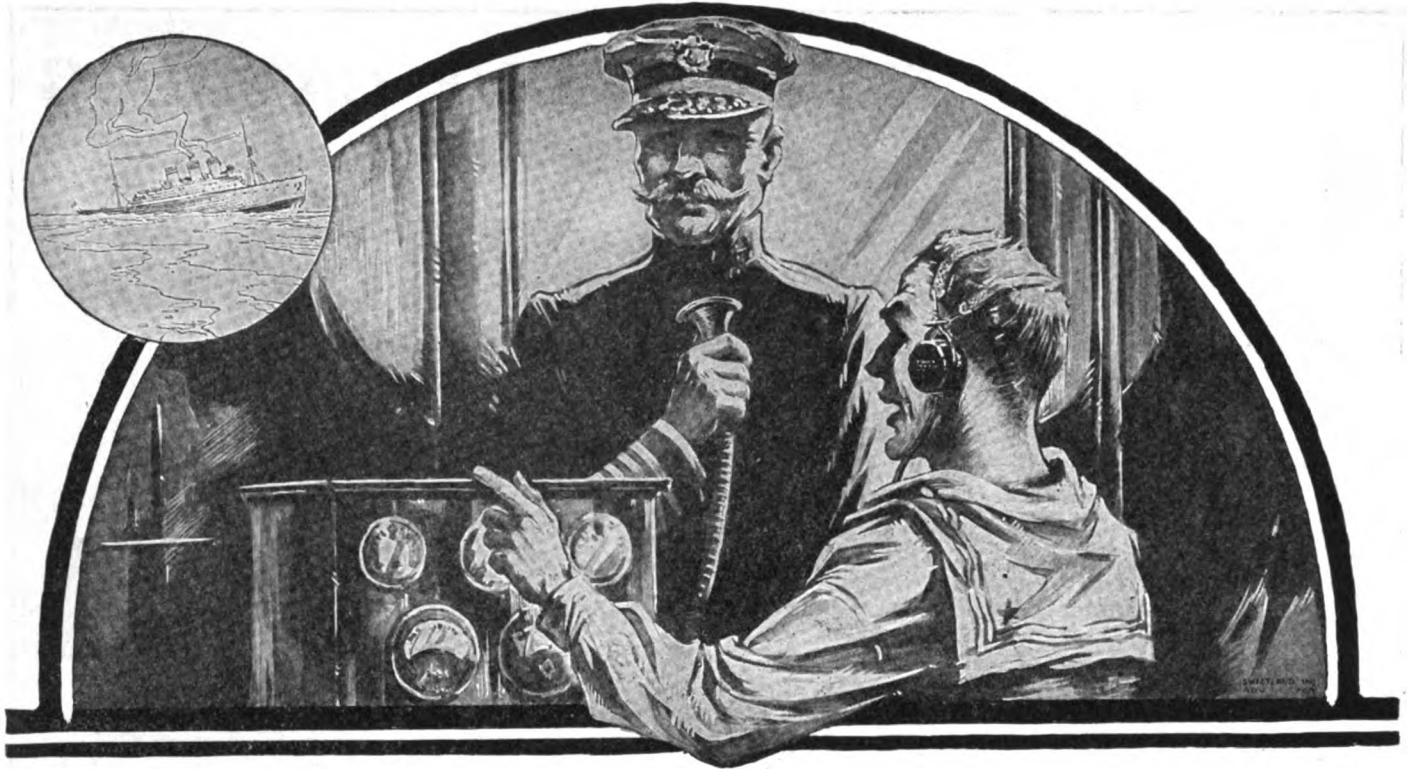
YM-4e

A typical unit sectional cabinet receiver is here shown. We are the sole originators and designers of this type of receiver. Cabinets are of quarter sawed oak with "Early English" finish. Bakelite panels. Audion cabinet contains 60 volt variable "B" battery. This set, with proper honeycomb coils, is operative from 150 to 20,000 meters. Amplifiers may be added to these sets in any number. The crystal detector cabinet includes an enclosed buzzer and battery. All instruments can be supplied separately or in complete sets.

<p><b>TUNERS</b> YM-7b—With plain mount.....\$29.50 YM-7a—With geared mount..... 32.50 (Less Coils)</p>	<p><b>CRYSTAL DETECTOR</b> YM-9 Complete with test buzzer and battery .....\$24.50</p>	<p><b>DETECTORS-AMPLIFIERS</b> YM-4e Detector .....\$25.00 YM-5e Amplifier ..... 31.00 (Less Bulbs)</p>
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WESTERN REPRESENTATIVE—LEO. J. MEYBERG CO., SAN FRANCISCO, CALIF.

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# S O S again Captain-Clear as a Bell

Faintly the call of a disabled passenger liner reached, the wireless room of the destroyer Falcon. A report to the bridge brought the captain rushing into the wireless room to get first hand news. Operator Nelson clamped his faithful Baldy phones tightly over his ears and waited breathlessly for a repeat.

"S. O. S. again Captain," he exclaimed, "Clear as a Bell." Position of the sinking ship was quickly obtained and the captain's hurried command started the destroyer plowing through the seas at thirty knots to lend timely aid to the disabled liner.

Baldwin Phones made good for operator Nelson. They have been making good for the U. S. Navy, the British, French and other foreign governments. The professionals all over the world chose Baldy Phones because their experience has proven them to be most sensitive.

From a standpoint of value received, Baldwin Phones are low priced. You obtain the equivalent of two mica diafram phonograph reproducers—two electro-magnetic amplifying mechanisms of the famous Baldwin design in addition to other accessories.

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# PACIFIC RADIO NEWS



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PAUL R. FENNER  
Editor

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## RADIOTORIAL

BY THE EDITOR

## OUR FIRST PACIFIC COAST CONVENTION

**D**URING the Thanksgiving holidays, Thursday, Friday and Saturday, November 25, 26 and 27, San Francisco will be the playground for all of the Pacific Coast radio men. The object of attraction will be the Pacific Coast Radio Convention, the first affair of its kind ever held on the Pacific Coast.

The convention will be thoroughly RADIO from beginning to end. Delegates from Pacific Coast radio clubs and associations, representatives from the Army, Navy, Department of Commerce, United States Shipping Board Radio Division, United Radio Telegraphers' Association, Institute of Radio Engineers and all radio apparatus manufacturers will be present.

The opening feature will be a speech given by radio and received with the aid of loud speakers, and Magnavoxes. Manufacturers will outline their past, present and future work, and will exchange useful ideas in production, marketing and administration work of their factories.

Amateurs will have an important part in the convention activities and will tell of conditions "in-the-air" in the vicinities of their homes, which cover a territory from Mexico to Canada and the Pacific Ocean to the Middle West. Clubs and associations are sending delegates who will contribute to the entertainment and who will be shown the interesting radio sights of the local country.

During the day time sight-seeing tours will be held and many radio stations, laboratories and factories will be visited. These tours will be highly interesting and educational. No man who is interested in the radio game should miss being in San Francisco during the convention.

*The Pacific Coast*  
**Radio Convention**

IF YOU CANNOT COME TO THE  
BIG CONVENTION WE WILL BRING  
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Another of the features of the convention will be the radio show. Manufacturers of radio apparatus will have booths to demonstrate their radio apparatus. Every known make and type of radio apparatus will be shown. Old apparatus of the "good old days" and some of the very latest types of equipment will be shown, and also some very extremely interesting relics from the world war. Laymen as well as radio men will visit the show, as it will be open to all.

The last night will be one of great note and will, no doubt, never be forgotten in the annals of radio history and development. A banquet and radio ball, surpassing anything of a similar nature ever given, will be held. It will be a great event. Novel centerpieces and surprises appropriate for the radio interested crowd will be seen at the banquet.

Among these will be speeches spoken by radio telephone.

Radio music will be used for the ball entirely. The opening selection will be played by the California Theatre symphony orchestra, which will be playing at the theater while the music will be transmitted by radio to the ballroom, and will be heard there just as if a real orchestra were right in the room.

The first exclusively radio speed contest in sending and receiving will be held at the show. All operators who have famous "mitts" are invited to participate, as are also those who can copy legibly by hand or typewriter at a speed of anywhere from thirty to forty-five words a minute, or even faster in Phillips' Code.

Every single person interested in radio transmission and reception should make it a point to be present, as it will be an event worth seeing or participating in.

**T**HE PACIFIC COAST RADIO CONVENTION is marking an epoch. This epoch, in making present-day history, is one of peace and prosperity. By the latter is not meant the lavish, extravagant so-called prosperity of war days, but a settled, sane prosperity, which reaches into the small corners where poverty was once existent.

Manufacturers are turning to the serious problem of development of radio apparatus, carefully and systematically working to produce equipment which will actually do service worthy of commendation. No more are we hampered by the tremendous press of wartime production, which gave us no time for proper reflection or even a "breathing spell." Now we are back to the time when the buying power of the dollar will mean more, and

(Continued on page 105)

New York Office.....147 Sixth Ave.  
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Portland Office.....420 Bd. of Trade Bldg.  
Chicago Office.....1306 Hartford Bldg.

Seattle Office.....419 Pioneer Bldg.  
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Entered as second class matter January 22, 1920, at the Post Office at San Francisco, Cal., under the Act of March 3, 1879.

DOWN TO THE  
MINUTE

## Current Radio News

UP TO THE  
STANDARDCOMPANIES PLAN TO EXCHANGE  
PATENTS IN WIRELESS FIELD

**P**ATENT and scientific discoveries in the fields of wireless telegraphy and wireless telephony are to be exchanged by the American Telephone and Telegraph Company and the General Electric Company under the terms of a contract which has been entered into between the two concerns.

Negotiations which led up to the contracts were begun after each company had received letters from the Bureau of Steam Engineering of the United States Navy, in which the bureau gave the opinion that the interests of all would be served best by some agreement between the holders of permanent patents.

"The world-wide wireless system of the Radio Corporation of America, in which the General Electric Company is interested, coupled with the universal service of the Bell Telephone System, are thus brought into harmonious relation," said H. B. Thayer, president of the American Telephone and Telegraph Company, in discussing the amalgamation.

"This will facilitate the use by the public of the present wireless telegraph facilities of the Radio Corporation, and, as the art advances, will enable the American Telegraph and Telephone Company to extend its telephone service to ships at sea and to foreign countries."—San Diego "Union."

**T**HE amateur radio license of R. P. Fleming (6KH), 606 San Benito street, Los Angeles, Cal. has been suspended by the Radio Inspector of the Sixth District for an indefinite period. Fleming was found guilty of interfering with distress signals from a seaplane working with the Inglewood Navy Station. Requests to stop transmitting were ignored by Fleming. His apparatus was ordered completely dismantled.

**A**NEW high-power radio station, capable of transmitting 12,000 miles, has recently been dedicated in Berlin, Germany. Members of the American Mission and the German government were present at the opening ceremonies and a message announcing the opening of the new plant was sent broadcast.

RADIO COMPASS ROBS FOG  
OF TERRORS

**S**KIPPERS will chuckle if fog envelops the sea lanes into San Francisco Bay, for Uncle Sam will be extending a guiding hand to steer all steamers safely past the dangers of shoals and rocks when navy radio compass stations will start their work of cutting terrors out of fogs.

Four radio compass stations are new guardians of the Golden Gate, having been established at Point Reyes, Bird Island, Point Montara and Farallon Islands. They will furnish bearings to steamers free of cost. No other means exists to obtain bearings when fog obscures the landmarks and vessels are not within sound of submarine bell warnings.

The principle involved in the operation of the radio-compass stations, is that the vessel sends signals by wireless, and the four radio compass stations, determine from which direction these wireless waves come, by means of a special radio-compass receiving apparatus. Each of the four stations then sends out a message showing the precise direction of the vessel from the station.

The master of the vessel, by charting these directions on the pilot charts which give location of the compass stations, can determine by the intersection of these direction lines the precise location of the vessel.

Canadian radio stations make charges for this direction finding service, while all United States Navy radio stations furnish this service to mariners without charge.

With the opening of radio-compass stations off San Francisco Bay, Lieutenant Commander McCaughey requests all mariners to make use of these stations in clear as well as foggy weather, for training of personnel and visible check on accuracy of bearing.

Lieutenant Commander McCaughey announced that the corrected precise location of the four radio-compass stations follow:

Point Reyes—Latitude 38 degrees 2 minutes 30 seconds north; longitude 122 degrees 59 minutes, 28 seconds west.

Bird Island—Latitude 37 degrees, 49 minutes 25 seconds north; longitude 122 degrees 32 minutes 11 seconds west.

Point Montara—Latitude 37 degrees 32 minutes 10 seconds north; longitude 122 degrees 31 minutes west.

Farallones—Latitude 37 degrees 42 minutes 6 seconds north; longitude 122 degrees 59 minutes 58 seconds west.—S. F. "Bulletin."

**D**R. D. W. REYNOLDS, a wireless telephone enthusiast of Colorado Springs, Colorado, has frequently heard the radio telephone at Catalina Island. "At first I thought that I had cut in on Denver telephone calls, because the voices were so clear," Dr. Reynolds is reported as having stated in discussing the matter, according to the San Francisco "Bulletin." "I could hear these voices, halfway across the continent, as if they were right here in Colorado Springs, talking over land telephones," Dr. Reynolds further states.

**T**HE Radio Corporation of America announces the opening of its new shore-to-ship radio station at Marshall, California. A two k.w. 500-cycle spark set has been installed and will be operated by remote control. The call letters of the new station are "KPH," formerly used by Hillcrest, San Francisco.

A 5 K.W. spark equipment and an undamped wave transmitter will be installed at the station in the near future.

**T**HE International Berne Bureau announces that, effective October 5, 1920, the following conventional signal will be placed in effect:

Abbreviation:

QTC

QUESTION,

HAVE YOU ANYTHING TO TRANSMIT?

ANSWER,

I HAVE SOMETHING TO TRANSMIT.

The same circular abolishes the present question for the signal QRU and makes it an answering abbreviation only, as follows:

QRU—I have nothing to transmit.

**T**HE Compagnie Generale Sans Fil, of France, by reason of a pre-war contract which gave them control of Dr. Goldschmitt's patents, are now demanding that the trans-oceanic station at Elvisse, Germany, be turned over to them for operation. The peace treaty makes their claim legitimate. The patents referred to are those covering the Goldschmitt high frequency alternator, the rights to which the Federal Telegraph Company acquired from the Hochfrequenz Maschin Co., Berlin, in 1914. By reason of this agreement the French company also became possessor of the Tuckerton, N. J., Station.

# Arc Radio Apparatus

By Jennings B. Dow

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## Part III

FIGS. 5 and 6 show typical current-time curves of arcs used for radio purposes. It will be noted that the arc is extinguished once during each cycle, and that in Fig. 6 the inertia of discharge evidenced itself by a complete reversal of the current, shown by the portion of the curve below the time axis.

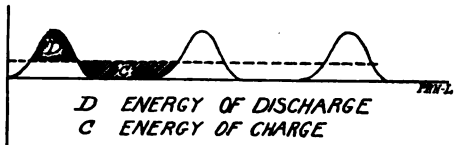


Figure 5

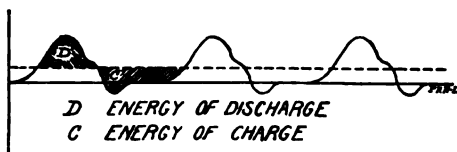


Figure 6

## Design

While no intent is made to cover thoroughly all details of design of arc apparatus, it is hoped that the following information may be applied in such a way as to permit the experimenter to design for himself good workable apparatus in powers up to five kilowatts.

The converter consists of electrodes, chamber, cooling system, electro magnet, and hydrocarbon feed system.

Since the electrodes are of a primary importance, and because upon their arrangement depends the design of so many other important parts of the apparatus, these will be taken up first. Fig. 7 shows three types of positive electrodes typical of small Poulsen arcs. In A, a copper tip is brazed to the end of a brass tube in which water is circulated for cooling purposes. A tip

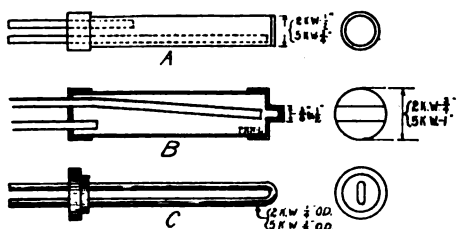
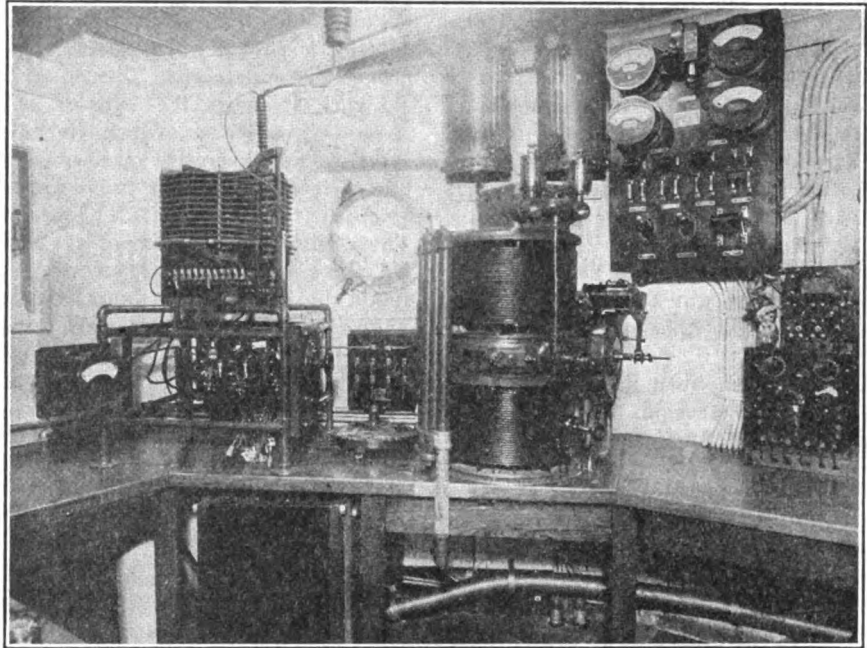
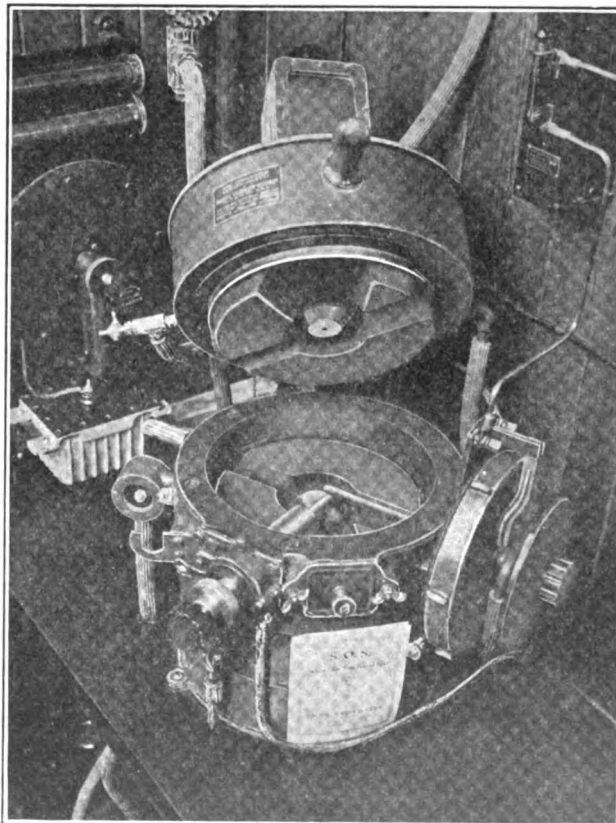


Figure 7



The 5 K. W. Federal Arc Installation on the U. S. Army Transport "Mount Vernon."



An interior view of the 2 K. W. Federal Arc Converter in use at The Pacific Radio School in San Francisco. The Carbon Electrode is slowly rotated by means of a  $\frac{1}{4}$  H. P., D. C. Motor. Note the handle on the end of this Electrode. It is used for striking the Arc. The copper Anode remains in a stationary position.



of this kind 3-32-inch in thickness, if properly cooled by water or oil, will last for several hundred hours of constant operation in arcs operated at in-puts up to ten kilowatts. B shows a

(Continued on page 98.)

# A SHORT WAVE REGENERATIVE RECEIVER OF HIGH EFFICIENCY AND UNIQUE CONTROL

(BY WILLIAM F. DIEHL\*)

THE radio amateur in the United States must confine his operations to a wave-length of 200 meters and he is limited by law to a power in-put of 1000 Watts. Compliance with this regulation necessitates the use of a small antenna, making possible the radiation of a comparatively limited amount of power—since the radiated power is proportional to the radiation resistance, this resistance being equal to the ratio of height to wave-length, i.e.  $R = \frac{40\pi^2 (AH)^2}{\lambda^3}$ , R being the radiation resistance, A the form factor (depending on physical dimensions of antenna), H the height of the antenna in meters,  $\lambda$

powered stations at great distances, and because of its high efficiency and unique control, it should be of interest to the progressive amateur.

Figure 1 shows the exterior of the Type CR-6 Receiver, which embodies a short-wave regenerative receiver, vacuum tube detector, two-stage audio frequency amplifier, and special telephone jacks which automatically control all circuits. All these elements are combined on a single Bakelite-Dilecto panel, shown in Figure 2, which can be readily removed from the cabinet for inspection of all parts, and due to the disposition of the various elements, the leads are extremely short, making for high efficiency. The

receiver by (a) absence of stray and shunt capacities, (b) low damping of the various circuits—effected by the use of continuously variable inductances and heavy bus wiring, (c) a primary circuit of finely variable inductance and antenna series condenser, (d) a unique coupling

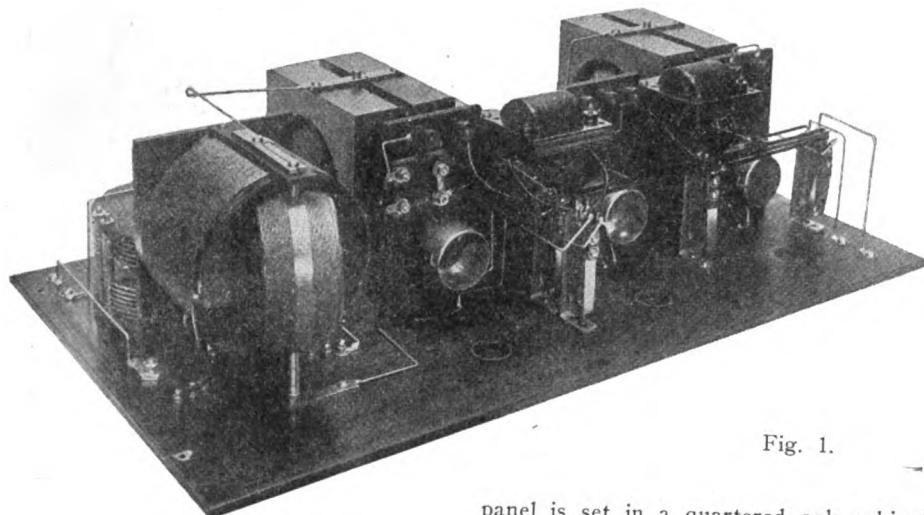


Fig. 1.

the wave length in meters. It is obvious that the two variables are the height and wave length, and since the height is limited by the wave length, and the latter fixed by law, it follows that the amount of power to be radiated by an amateur antenna is relatively low. Even with the finest equipment and most capable operation, it is rarely possible for the amateur to obtain a power output exceeding 600 watts. It would surprise the average amateur to know how little energy his transmitter actually radiates.

It is clearly evident that to communicate over great distances extremely sensitive receiving apparatus must be used, and because of the multiplicity of stations operating on the same wave length, receiving apparatus must also be selective to a high degree. To facilitate the reading of signals from great distances, amplifying apparatus is essential. The Grebe Type CR-6 Receiver was designed for the reception of signals from low

panel is set in a quartered oak cabinet having a hinged top, permitting the insertion of vacuum tubes in their respective sockets, the complete apparatus requiring a space of only 22x13x7 inches. The controls have been reduced to a minimum and are so located as to afford simple and rapid adjustment of the various circuits.

The wave-length range of this receiver, 170 to 680 meters, is best suited for the experimenter and relay operator. This range includes all amateur stations, short wave radiophone stations, commercial ship and shore stations (300, 450 and 600 meters), experimental stations, and various aircraft and small Naval craft stations.

This receiver is extremely sensitive, due to (a) the amplification obtained by regenerative action and (b) audio-frequency amplification. The signal strength to be obtained by this apparatus is approximately 15,000 times that obtainable by the use of a straight audion hook up.

Maximum selectivity is obtained in this

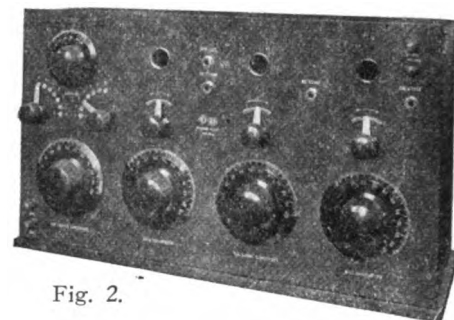


Fig. 2.

device, giving 0 to maximum coupling over the entire wavelength range.

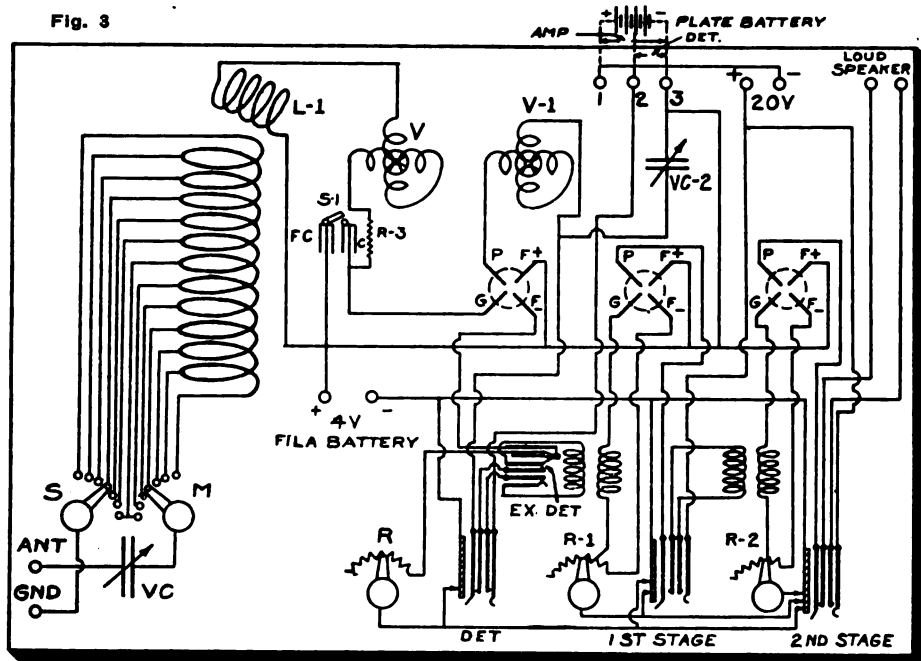
The use of variometers has reduced the number of controls to a minimum, thus simplifying the tuning-in of signals from various stations. This makes the Receiver admirable for use in connection with traffic handling—the work now being done by members of the A. R. R. L. All knobs, switch and rheostat handles, as well as binding posts have been designed with a view to easy adjustment, and a plug-and-jack control system enables the operator to shift from detector, to first or second stage of amplifier-unit merely by inserting the plug in the proper jack. This plug-and-jack system also contemplates the use of a loud-speaker, which may be put in circuit in the same simple way. The CR-6 Receiver is less difficult to operate than a telephone switch-board.

Referring to the wiring, Figure 3, primary circuit, consisting of an adjustable inductance, L, in series with the variable condenser VC. Referring to Figure 1, the two multi-point switches S and M give extremely fine adjustment of inductance. The dial marked "Ant. Series Condenser" controls a variable condenser. Coupling is effected by means of the coil L-1 (Fig. 3) which is controlled by the dial marked "Coupler." The variometer V, controlled by the dial marked "Grid Variometer," permits variation of wave-length, and the proper setting may be obtained by referring to a curve similar to Figure 4, which is furnished with each receiver. From this curve it may be seen that two ranges of wave length are possible, depending upon whether or not condenser FC is in

\*Chief Engineer A. H. Grebe Mfg. Co.



Fig. 3



circuit. Switch S-1, mounted on the sub-panel to the left of the detector-tube controls this condenser, and should always be open when receiving on wavelengths below 375 meters. The variometer V-1, controlled by the dial marked "Wing Variometer," is used to obtain regeneration. The condenser VC-2, controlled by the dial marked "Tel. Shunt Condenser," is connected across the telephones and high voltage battery, and serves to aid regenerative action and clarify the tone of incoming signals.

A signal 4-volt battery supplies the filament current for all three vacuum tubes, which are mounted on a sub-panel. The filament circuits are automatically controlled by means of special jacks, so constructed that when the telephone plug is inserted in the first jack, the filament circuit of the first or detector tube only is closed; when inserted in the jack marked "1st Stage" the filament circuit of both detector and first amplifier tube is closed; when inserted in the jack marked "2nd Stage" the filament circuit of all three tubes is closed. The plug furnished with this set is fitted with a special tip, which when partially inserted in the "2nd Stage" jack, transfers the output to the terminals marked "Loud Speaker". The filament current is varied by means of the rheostats mounted on the front of the panel. The windows directly above are for the purpose of determining filament brilliancy.

The arrangement for high voltage is especially unique. There are three terminals, 1, 2 and 3. The voltage applied between 1 and 3 is the amplifier voltage, that between 2 and 3 the detector voltage. The terminals marked "20 volts" are used when it is desired to add additional voltage to the second stage tube. With a minimum of batteries, any voltage may be impressed on the plate circuit of any tube. This is very useful

when employing tubes requiring various plate potentials and when using "gas" tubes as detectors. The plug-and-jack control mentioned above includes a special jack for controlling an external detector, making it possible to use the amplifying unit of the CR-6 Receiver for the amplification of signals from an external source. This plug-and-jack control also makes for the economical use of batteries.

Having connected up the Type CR-6 receiver as shown on wiring diagram, Figure 3, the process of tuning is as follows:

1. Set the coupling dial at 50.
2. Set the Wing Variometer dial at zero.
3. Set the Antenna Series Condenser at 100, and adjust switch M to some medium point, say 4 or 5.
4. Rotate the Grid Variometer to the

setting corresponding to the wavelength desired, or to a position giving maximum strength to an audible signal which you desire to read.

5. Reduce the coupling dial to about 10, and bring the primary circuit into resonance with the secondary.

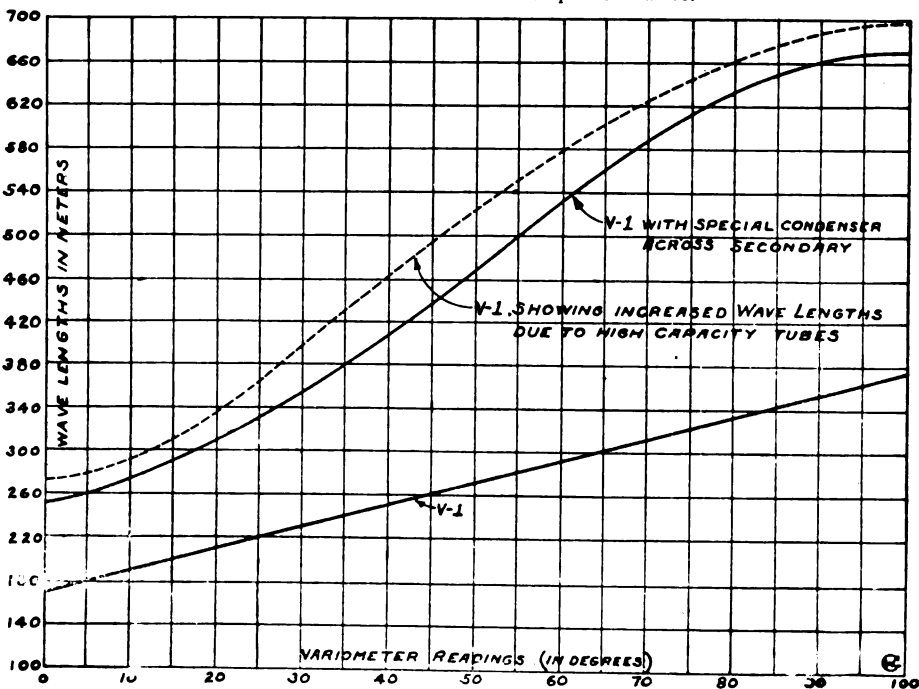
6. Rotate the Wing Variometer to a position where maximum regeneration occurs, without destroying the tone quality.

7. Adjust the coupling to a point where signal is maximum, yet readable through whatever QRM may be present.

In some cases the above order of tuning will be slightly modified, due to the fact that distant signals will not be audible until regeneration occurs. To tune to a distant station it will then be necessary to set the Grid Variometer to approximately the wavelength of the distant transmitter and rotate the Wing Variometer until the signal is heard. Then by increasing or decreasing both a point will be reached where with slight tuning of the primary the signal will become maximum. When increasing the variometers, always increase the Grid Variometer first but when decreasing them always decrease the Wing Variometer first.

It is sometimes noted that reduction of coupling causes distortion of signals. This is because at reduced coupling less energy is transferred to the primary circuit and more is applied to the grid. To restore the tone with reduced coupling, simply decrease the Wing Variometer slightly.

Much might be written of the achievements of this Receiver, but it may be noted that during the recent QSS tests, a station using one of these instruments copied all the stations sending test signals from 1AW to 9LC—truly an unparalleled performance.



# THE UPS AND DOWNS OF RADIO ON THE PACIFIC

BY THE STATIC HOUND

**T**HE EDITOR threatened to use bodily force in keeping me out of the magazine this month, but here I am again. You see, fellows, it's like this: I am out of work and have lots of time to call on my radio friends around town and pick up a little news for you.

**S**OMEbody was sending out a "QST" a few weeks ago, inviting everybody to the San Francisco Radio Club. Mr. B. Linden, our Assistant Radio Inspector, was going to give a lecture. The Power Administrator of the state ordered that no electric signs be operated between the hours of 7 and 10 p. m. Consequently I had an awful time finding the club rooms. The QRM from a half hundred "sixers," radiating from the S. F. Gymnastic Club Building, gave me my bearings.

I set a westward course for the signals and arrived without further mishap. The meeting had already been called to order. Somebody was just making a motion that the Chairman be fined ten cents for smoking while the meeting was in progress. Everybody else was smoking, so why pick on the Chairman?

The Convention Committee was asked to report. Sgt. Lufkin had lots of good news for the members. He advised them to hold the convention in the Civic Auditorium. No decision was reached as to where the big affair will be held. At any rate, it's going to be the talk of the town and you will be the loser if you do not attend. A substantial advertising and publicity fund was appropriated. After the convention was marked from the board we had a lecture by Mr. Linden. Say, fellows, that speech was hot stuff from start to finish. Mr. Linden outlined the future possibilities of radio as a career and received a most hearty applause. There's going to be a speaker at the club every Tuesday evening. Come to the meetings—you are always welcome, except at the usual business meeting, which takes place on the first Tuesday of the month.

**A**SENDING and receiving speed contest for radio operators will be one of the many features of the radio show at the convention. A separate test will be held for operators with commercial licenses and another for those with amateur licenses. A bit of keen-cut sending will hustle forth from the "mitt" of one of our crack Pacific Coast operators. It is predicted that the contestants will "put down" forty words a minute and roll cigarettes between paragraphs.

**M**R. PAUL OARD, of the Oard Radio Laboratories in Stockton, dropped into the "PRN" office the other day and showed us a number of samples of his new radio equipment. Mr. Oard just purchased a dandy automobile—works as good as it looks. The same applies to his new line of receiving apparatus.

Mr. Oard is an old-timer in the radio game. He was operator on the S. S. "Fifield" in 1913. The "Fifield" was one of those deep-water vessels which draws little water. She drew so little water that in rainy weather she could sail up the gutters in San Francisco's main street and discharge her cargo at the City Hall.

**T**HE Bay Counties Radio Club held its first social affair in Klinker's Hall, Oakland, on the evening of October 1st. Over 230 radio men were present. The house was filled to capacity and visitors were kept on the jump with a radio raffle, radio feed, jazz music and several speeches. Mr. E. W. Stone spoke on the old Bay Counties Wireless Association that was in its glory many years ago. Mr. Bessey unloaded on the "QRM" question. The sum of \$135.65 was realized from the raffle, for which the members received the following apparatus: 4 pairs of Murdock phones, one amplifying transformer, three honeycombs, one variometer, one Oard control panel, A-P tubes, one copy of Mr. Stone's book, "Elements of Radio Telegraphy," 2 V. T. sockets, three subscriptions to "PRN" and miscellaneous small parts. Messrs. Grubb, McNamee, Stone, Oard, Lambert, Berringer and Bessey were added to the list of honorary members.

**J**ACK BINNS, hero radio operator of the "Republic" disaster, is writing for the American Magazine. His first article, "How People Behave When in Danger," appears in the November number.

**T**HE following list of stations have all been worked by 7CU during the month of August, 1920. Who says radio is dead during the summer time?

5BR (Canadian), 6AS, 6AV, 6AR, 6BJ, 6BN, 6BQ, 6BR, 6GO, 6DK, 6DY, 6EA, 6EB, 6EJ, 6EP, 6EX, 6FS, 6GF, 6GR, 6IF, 6II, 6JD, 6JI, 6JM, 6JN, 6OC, 6OH, 6PQ, 6QR, 6SR, 6TC, 6ZE, 7AD, 7AN, 7BK, 7CE, 7CW, 7IN.

The correct address of the station operated by Maxwell P. Gilliland (6A CB) should be 1117 Foothill St., Pasadena, Calif.

**T**HE operators' waiting rooms in the office of the large radio companies are called "Static Rooms." You can hear more lies than truth about distance records and sea-sick remedies in those "Static Rooms." One of the operators was telling me about his experience on the S. S. "Greenwood," better known as the "Bay Coroner," due to her renown as a wrecking cruiser. The vessel put to sea with the purpose of salvaging a wreck off the Eureka coast. A 5 k.w. generating plant in the engine room supplied the ship with power. A 2 k.w. radio set was installed in the wheel house. The operator had a message to send to NPM and asked the chief engineer for power to start his generator. "Listen here," said the chief, "only one thing runs at a time on this ship—either the wireless stops or the ship stops." Whereupon the ship was stopped for a sufficient length of time to enable the operator to clear NPM.

**M**R. D. B. McGOWN, 6ZE, is building a complete ½ k.w. 500-cycle transmitting panel which is an exact duplicate of the Navy Standard type installed on many merchant vessels. He will use the new transmitter in his endeavor to reach Honolulu. He ought to be able to work Japan with that bunch of new efficiency hooked on the air.

**A**LITTLE pink-toed ether disturber with a half-inch spark coil sent us his application for the Honolulu test. If that fellow wins the contest I am going to present him with a handsome box of assorted wave lengths.

## CALLS HEARD BY 6EA

6AE, 6AK, 6AAT, 6AAW, 6BQ, 6BR, 6OC, 6DE, 6DT, 6EJ, 6FE, 6FX, 6FY, 6GX, 6IC, 6JI, 6JN, 6MZ, 6OH, 6QM, 6QR, 6SR, 6TC, 6XZ and "PM" (QRA?)

Stations worked: 6AN, 6AT, 6AV, 6BJ, 6BN, 6CO, 6EP, 6EX, 6FS, 6SK, 6ZE and 7CU. A single electron relay was used in the reception of the above mentioned stations.

Stations heard and worked by 6EB are: 6AK, 6AN, 6AT, 6BJ, 6BN, 6BQ, 6BR, 6CC, 6CI (6CO), 6DK, 6DO, 6DT, 6DY (6EJ), (6EP), 6EX, 6FE (6FS), (6IY-Daylight), (6JI-Daylight), 6JN, 6JQ, 6JR, 6MZ-Daylight, 6OH (6QM), 6QR, 6QU, 6SR, 6UM, 6ZE (7CU).

The next issue of "Pacific Radio News" will be our combined Christmas and Convention number. If you are interested in radio at all you will miss a treat if you do not send for a copy of the big number at once. Better send us your subscription before you forget it.

## THE EDITOR'S MAIL BAG

OUR READERS ARE INVITED TO SEND CONTRIBUTIONS FOR PUBLICATION IN THIS DEPARTMENT

East Orange, N. J., Sept. 9, 1920.

Mr. Paul R. Fenner,  
Pacific Radio Pub. Co.,  
San Francisco, Cal.

Dear Sir: That statement in your "Radiotorial" of the last issue of "Pacific Radio News," which says "be satisfied," makes me think. And it makes me think so hard that I shall attempt the expounding of a thesis on which I would appreciate your valued comments.

To introduce the theory we will take the supposed case of "John" and "James." John is the proud owner of a 1 k.w. transformer, while James has only a one-quarter inch spark coil. John, in view of his superior (?) equipment, will hardly speak to James now because he (John) claims he can transmit two thousand miles. He means to imply, I presume, that, with the average present-day equipment at the receiving end,—including with it a multious collection of vacuum tubes, their control panels, regenerative circuits, etc.,—his set will transmit signals that are audible two thousand miles distant.

But, let us see if John is justified in his claim to superiority. It is my intention, in the following, to show that the distance to which any transmitting station can actually transmit is infinite! And I mean this to imply regardless of the size or location of the transmitting station or the amplitude of the transmitted wave.

To make my meaning perfectly clear, let us take, for example, the analogy of a stone thrown into a pond of still water. When the stone strikes the surface of the water it causes circular ripples or waves to be sent out in all directions through the water; the point where the stone struck the surface of the water forming the center of these ripples or waves. Now, as the waves travel outward and away from this center of disturbance, they become less and less well defined until a point is reached where they are imperceptible to the human eye. We are led to believe, in consequence, that they are "absorbed." (So far, I believe. I am in perfect accord with the theories advanced by today's most noted radio engineers.) But are we, therefore, justified in assuming that because they are apparently absorbed that they in reality travel no further? Had we delicate and sensitive enough instruments at our disposal, it seems highly probable to me that we could detect the presence of these waves at the very extremities of this body of water, regardless of the size or magnitude of the transmitted wave and entirely irrespective of the

size of the body of water—be it a small pond, or a body of water the extent of Lake Michigan—provided only that our instruments of reception were sufficiently sensitive and that the waves, in their travel, met with no resistance.

This seems to be a perfect analogy of the transmission of those electro-magnetic waves termed "wireless," differing only in the medium through which transmission is effected. Due to the very nature of things, water, being matter, and possessing both weight and mass, must, of necessity, offer a considerable resistance to the progression of any waves that may be set in motion through it. But, in the transmission of electro-magnetic waves, we meet with no such obstacle. The ether—that intangible "something" which invades and fills all space—possessing neither weight nor mass, offers no resistance to electro-magnetic wave transmission and permits these waves to be conveyed through it with a speed sufficient to carry them a little over thirteen times around the earth in a single second! If we were given an infinitely sensitive receiver, there is nothing to prevent the reception in China (or Mars, for that matter) of waves emitted from a buzzer in Alaska!

All in all, O.M., it is the sensitiveness of the receiver rather than the power of the transmitter that is responsible for present-day long-distance communication. To me (in my ignorance), the development of a really efficient receptor of electro-magnetic waves possesses unbounded possibilities. It is a strange fact, but nevertheless true, that today, with all our modern radio equipment of "super-sensitive (?) receivers; with all our "efficiency (?) bank-wound and honey-comb inductances, in conjunction with our multi-stage radio- and audio-frequency amplifiers; and, with all due respect to the radio marvels that have been accomplished in the past, and to the geniuses who have brought them into being—there is not one single bit more energy abstracted from the aerial now than there was in the days of the coherer!

Because man takes that same amount of feeble current (or less) from his antennae that he could obtain, and did obtain some fifteen or twenty years ago, and by its well-known trigger action when passed through a bank of his modern vacuum tubes, causes energy to be released from his "B" batteries out of all proportion to the received current, he foolishly and vainly boasts of being almost able to transmit power by wireless! Better, by far, bend his energies toward

developing some method or device that will enable him to consign to the junk pile his multi-steps of amplification, by making use of a little more of the unused energy that is, assuredly, already in his aerial!

And this result will not be brought about by being satisfied with present conditions!

I assure you that your views on this interesting subject will be greatly appreciated and I shall look forward to your reply with considerable interest.

Cordially yours,

GEORGE N. GARRISON. 2AWM.

We will appreciate any further comment from our readers on this interesting subject.  
—Editor.

San Francisco, October 8, 1920.  
Editor, "Pacific Radio News,"  
San Francisco, Calif.

On October 4th at 8PM, 6BJ, located at Burlingame, Cal., worked 7AD in Seattle. A card received from 7AD reads as follows: "I don't know what I am going to do with you down there. You drown out the Portland and Tacoma fellows and most of the local stations. Have read you through NVL (Seattle) 5 K.W., five miles away." The card is signed by F. J. Brott, Seattle, Washington. A card from Mr. Dennis of San Fernando reads as follows: "Hearing you very QSA, louder than the fellows in Los Angeles, 20 miles away." Signed: B. H. Dennis.

Anyone hearing 6BJ will please write Hall Berringer, 714 Peninsula Avenue, Burlingame, Cal.

Yours very truly, 6BJ.  
(What's the secret, Berringer? Ed.)

San Francisco, Cal., Oct. 8, 1920.  
September 29, 1920.  
Editor, "Pacific Radio News":

I noticed an article in your October issue which states that Mr. Neilson, operator on the "Newport" has received long distances on his Kennedy receiver. Now, on the "D. G. Scofield," we did even better work with the Colin B. Kennedy Company's set. On the last voyage to England Mr. R. S. Rheem of Oakland made the trip as Junior with me and he had a Kennedy set which we used practically all of the time. We copied San Diego press 4,000 miles in daytime and through heavy static. Signals were strong. We received Balboa and Annapolis time signals at London and Liverpool. I made sure of this as I had a bet with Mr. Rheem, of a Manhattan Cocktail, that it could not be done. I lost the bet and paid for the cocktail. We used only one Audiotron bulb and I may say that up to the present time I have not seen a receiving set that can equal this one. It surely is wonderfully efficient for arc and other undamped waves.

Yours truly, Carl E. Soderstrom.

# THE AUDION OSCILLATOR\*

By R. A. HEISING

## 1. Introduction

**A**MONG the great inventions, developed in peace times but made use of in the late war, are the radio telegraph and telephone. They are recognized as most useful instruments of commerce, especially as instruments for safe sea travel. The wide use possible of radio apparatus necessarily makes for wide use of its most important apparatus element—the audion or vacuum tube,—and causes anything said or written about the latter to take on more than usual significance. The audion is also extensively used in telephone work. These varied uses together with the great potential possibilities in other engineering fields make it necessary for the present day electrical engineer to know something of its construction and operation.

The audion itself has been described in many articles up to the present, De Forest (Patent No. 879,532), Armstrong (Electrical World, Dec. 1914) (Proc. I. R. E., Mar. 1915), Van der Bijl (Phy. Rev., Sept. 1918), Vallauri (L'Elettrotecnica, Jan. 1917), Langmuir (Proc. I. R. E. 1915), and no attempt will be made to describe it here.

The audion, which is essentially an amplifier, is used for many other purposes. It is used to generate oscillations, detect oscillations, and modulate oscillations. The particular phase of its use to be discussed in this paper is that of generating oscillations. Audion oscillator circuits have to a certain extent been discussed by Armstrong, Hazeltine (I. R. E. April 1918) Vallauri, and in Bureau of Standard's Circular No. 74. Analytic studies of audion oscillator circuits were made by Hazeltine, Vallauri, the writer and others. In this article duplication of existing published work will be avoided where possible.

## 2. Scope

An analytic solution for an oscillator circuit, although giving much useful information regarding an oscillator's behavior, does not give the information necessary for the design of such circuits for power. It neglects many of the important factors which must be considered in securing best power conditions. The principal factors so neglected are: (1) the actual characteristic curve, (2) filament emission other than that of temperature saturation, and (3) the power absorbed by the grid input circuit. Such solutions give transient conditions, or requirements for oscillation. The neglected factors, though affecting these somewhat, produce their greatest effect after oscillations have begun by limiting the expanding current in the

transient state and bringing about the condition of stable, sustained, free oscillations. In conditions under which power is secured from an oscillator, all of these factors enter into the behavior of the oscillator and cannot be neglected. To treat analytically a circuit containing them leads to such complicated expressions that an experimental determination of the oscillator's behavior is much easier. The latter was therefore done and the principal results and deductions therefrom are given in the following pages.

In the study of oscillators, by experimental methods, the large number of variables entering into its behavior necessitates an extremely large number of experiments. It would be desirable, if space permitted, to give complete information regarding all these experiments. However most of them were of comparative unimportance or gave negative results and their discussion would be a waste of time. This paper will be confined to the more important matters, theory as well as practice, and where thought necessary experimental evidence will be given to support the statements made.

## 3. General Oscillator Circuits

An important trait, peculiar to all types of amplifiers, is that under proper conditions they may be made to produce free or sustained oscillations. Common examples are the electric bell, and the ordinary telephone set which can be made to "howl" by placing the receiver up to the transmitter. In both cases, variable current power is generated by a variable resistance, part or all is fed into an input operating device, phase relations in the input power are definitely set (this is especially observable in the bell), and a separate source of power (a battery) is used. The frequency is determined by the mechanical free periods,—the clapper and spring of the bell, and the diaphragms of the transmitter and receiver. A large number of purely mechanical oscillations might be named besides these two which are partly mechanical and partly electrical, but they all exhibit the same characteristics.

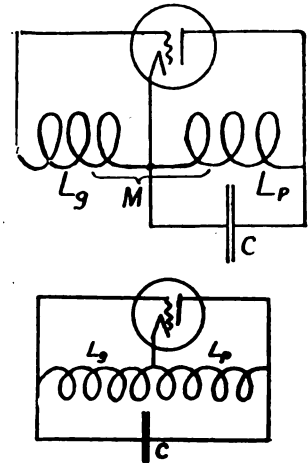
The audion, being essentially an amplifier, can also be made to generate oscillations. The same circuit conditions are necessary as for the example given. They are,

1. A circuit to fix the frequency.
2. A feed-back arrangement to impress some of the power from the output back into the input,
3. The proper phase relations for the impressed input,
4. A separate source of power.

The frequency is usually fixed by one or more tuned circuits. Oscillators can be made in which the frequency is determined by a condenser and a resistance, or an inductance and a resistance, but they are unsatisfactory for many kinds of work and are seldom used.

The feed-back arrangements for transferring power from the output circuit to the input circuit are innumerable. Fundamentally they all come under the heads of inductive, capacitive, or resistive coupling, but there is no particular manner in which the coupling must be accomplished.

The proper phase relation in the input power is of vital importance as regards the oscillator's operation. It is as important as the setting of the eccentric on a steam engine. The exact relations required are pointed out later.



The separate source of power used is generally direct current. It is not necessarily so as alternating current can be used if a single continuous frequency is not necessary. The power represented by the oscillation current all comes from the direct-current source. The oscillator acts only as a frequency changer, changing the power from zero frequency to that delivered into the oscillation circuit.

## 4. The Simple Oscillator Circuit

The two simplest types of oscillator circuits are shown in Figs. 1 and 2. They differ in a few points only. In Fig. 2 the oscillation circuit is  $(L_g + L_p) C$ , coupling to the plate circuit is the mutual inductance between  $L_p$  and  $L_g$ . In Fig. 1 the oscillation circuit is  $(L_g + L_p) C$ , and the coupling to the plate is the self inductance of  $L_p$ . Of the two circuits the former appears logically to be the simpler and more fundamental and the latter only a special case of it. Actually the latter is met with more often in practice. This is due to the inherent construction of the audion. If the audion were strictly a unilateral electrical device, a condition it approaches at low fre-

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quencies, the circuit in Fig. 1 would unquestionably be considered the fundamental circuit. Actually, however, the inherent capacity between the plate and grid prevents us from obtaining this desired condition, and in many cases causes oscillators to behave according to the circuit in Fig. 2 instead of according to the circuit in Fig. 1. For this reason, Fig. 2 is considered the simpler of the two and will be discussed first.

The number of oscillator circuits possible is innumerable. They can, however, all be resolved into one of the simple circuits of the types shown in Fig. 1 or 2, by considering the elements  $L_p$ ,  $L_k$  or C as being made up of complex circuits instead of simple inductances or capacities. The actual operation of the simple circuits can be shown in detail while for the more complex circuits, which do not lend themselves readily to mathematical analysis, the operation can be quite easily explained by resolving them into equivalent simple circuits and applying the theory of operation of the latter.

The simple Hartley oscillator in Fig. 2 will be explained first. The circuit as shown contains only the alternating current elements. The direct-current branches necessary to its operation may be brought in in a number of ways by inserting proper choke coils and condensers to keep the d-c. and a-c. paths separate. We are interested only in the a-c. operation at present and will therefore show only the necessary parts of the circuit.

The frequency in this oscillator is determined by the oscillation circuit ( $L_p + L_k + 2M$ ) C. The resistance, audion output impedance, and amplification constant affect the frequency slightly, but it is mainly the reactance of the oscillation circuit which determines the frequency. The inductances  $L_p$  and  $L_k$  may be of approximately equal value with or without mutual inductance. The condenser is connected directly between the grid and plate and includes the capacity between these elements.

A simple explanation of how and why the oscillations occur is as follows:

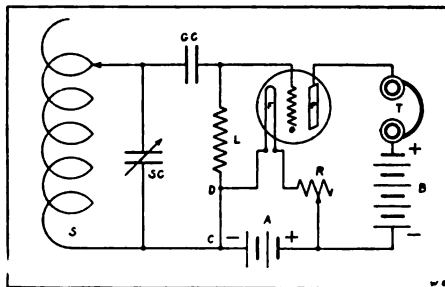
Assume to begin with, that in some manner an alternating voltage is impressed upon the grid. Such a voltage will cause an alternating current to flow in the plate circuit. This plate alternating current must flow through the inductance  $L_p$  or through  $L_k$  and C, or divide between these paths. The result is the same whatever path is taken, but for the purpose of a simple explanation it will be assumed that it all flows through  $L_p$ . In flowing through  $L_p$  this alternating space current produces an alternating e. m. f. This alternating voltage is the driving e. m. f. in the oscillation circuit and causes the oscillation current to flow. In flowing

through  $L_k$  the oscillation current produces an inductive voltage drop which because of the connection of the grid, is applied between the grid and the filament. This is the alternating voltage assumed to begin with as being applied to the grid.

(To be continued.)

## GRID LEAKS

A GOOD deal of speculation has been caused, and some blind experimentation carried on by many operators who try, with more or less success, to use a grid leak in a vacuum tube circuit. The chief difficulty lies in the failure to understand the purpose of the leak, which is a very simple thing after all. The grid in any tube, whether it be a detector, amplifier, or oscillator, is really the control member on the tube, i.e., it controls the output and current flowing between the plate and filament. Now, for best results, the grid should have a negative potential impressed on it,



the value of which depends entirely on the characteristics of the tube, and the conditions of the circuit in which it is used. This can be obtained in several ways. The grid leak is one way which is very simple, and gives good results. It should be connected between the grid and negative pole of the filament, as it allows any positive charge, which may tend to accumulate on the grid to be neutralized by the flow of current, minute though it may be, from the negative terminal, which flows through the grid leak. The accompanying figure shows the method of connecting the grid leak in a simple detector circuit, and no change is necessary for using the leak in any detector, amplifier or oscillator circuit, as long as care is taken to connect the leak between the grid and negative pole of the A battery. A negative potential may also be impressed on the grid by the use of a grid, or "C" battery, or by the use of a "bias" resistance, which both impress a negative potential on the grid. A "C" battery of about 2 volts is connected in place of the grid condenser. To use a bias resistance, short circuit or disconnect the grid condenser, and connect a resistance of about 2.0 ohms between points C and D in the figure. The "C" battery possesses few advantages over the grid condenser,

and the bias resistance is especially recommended for amplifier circuits, especially.

## A PECULIAR PHENOMENA

By C. I. Hoppough, Radio Engineer,  
U. S. Signal Corps, Fort Mason,  
San Francisco, Calif.

AN interesting and somewhat unusual fact was recently noted while a radio telephone equipment was in operation on one of the U. S. Army Transports running between San Francisco and Manila. The radio telephone set was tuned to a certain wave length and all parts of the equipment were given a thorough examination. Another check of the wave length was made during the latter part of the day for purposes of verification. It was noted that the wave length of the set had increased, although by only a few meters, and it was further noted that the "mush" from the South San Francisco NPG arc station was heard loudly on the same wave length. The arc "mush" stopped, apparently due to the fact that the arc had been shut down, and it was then noted that the wave length of the radio telephone set returned to its original point. It is thought that the energy from the arc "mush" caused a change in the ionization of the atmospheric layer between the antenna and earth of the telephone antenna, which in turn changed the capacity of the antenna, resulting in the noticeable change in wave length. Authorities on the subject state that no such action takes place. It would be of interest to hear from persons who have had a similar experience.—The Editor of this publication will be pleased to publish further comment on this timely subject.

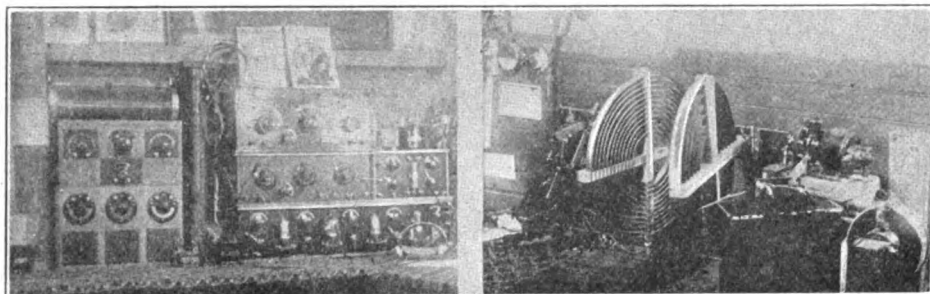
MR. R. M. KLEIN, manager Lee DeForest, Inc., San Francisco, has been called to New York to take a position with the home office, DeForest Radio Tel. & Tel. Company. While Mr. Klein's new position has not been announced, it is understood he will be General Manager of the Eastern Company.

Mr. Klein's successor in San Francisco is Ellery W. Stone, General Manager Pacific Radio Supplies Co., which company is taking over the manufacturing and sales work of the Western DeForest Company.

While no announcement has been made of any merger of the DeForest interests with those of the Pacific Radio Supplies Co., Mr. Stone will look after the affairs of both companies.

The extraordinary subscription offer advertised in our last issue expires on December 1st.

# RADIO STATION 6AT, SAN JOSE, CAL.



**M**R. E. GARRATT ARNOLD (6AT) has sent us a photograph of his station which we publish herewith. The transmitting equipment comprises a 1 K.W. Thordarson transformer, Thordarson condenser, special type Thordarson rotary gap and an oscillation transformer constructed of one inch ribbon for the primary and three quarter inch ribbon for the secondary. Meters for indicating power and radiation are also used.

Several receiving sets are employed. The short wave units consist of a Grebe and Paragon regenerative receiver, audion detector and four-stage amplifier with Brandes phones. The long wave set is of the Western Radio, type LW make, with proper condensers and loading inductances.

An aerial consisting of four wires sus-

ended between two masts, 62 feet high separated by a distance of 48 feet, is used for short wave work. The long wave aerial is 200 feet long, 110 feet high at one end and 62 feet at the other. The ground consists of a number of cables and plates, buried in the form of a fan, directly under the antenna.

During the winter and spring season, the station established reliable communication with Seattle, Phoenix, Portland, Boise, Los Angeles, Salt Lake and San Diego. Signals from 6AT were reported heard in Des Moines, Iowa, by 9UA. A total of 117 messages passed through 6AT during the months of January and February, 1920. Signals from France, Japan, South America, Mexico, Canada, Alaska, Hawaii and the Philippines were copied on the long wave receiver with good audibility on two steps of amplification.

## CALLS HEARD BY 7BH (Clive Scott, Salem, Ore.)

6EO, 6FE, 6EJ, 6KK, 6YM, 6BO, 6OH, 6BQ, 6AD, 6AE, 6BR, 6BW, 6PQ, 6TC, 6AV, 6AK, 6TS, 6DJ, 6JN, 6RA, 6CV, 6BK, 6AT, 6AAT, 6DQ, 6CR, 6AAW, 6JI, 6ABP, 6EN, 6JM, 6QR, 7BQ, 6BJ, 7CC, 6AAK, 6EK, 6VM, 7AD, 7CR, 7DP, 7CU, 7BP and 7BK.

Signals could be heard a foot from the phones from 6QR, 7BQ, 6BJ and 7CC. The radio telephone on the Avalon-San Pedro circuit as well as the DeForest phone in San Francisco have been heard several times.

## NAPA RADIO CLUB ELECTS NEW OFFICERS

**A**T a recent meeting of the Napa Radio Club the following officers were elected:

- E. M. Swift, President.
- G. Gerlach, Vice-president.
- F. C. Simpkins, Secretary.
- Mrs. M. L. Webb, Treasurer.
- B. R. Norton, Sergeant-at-Arms.

Mr. M. L. Webb was retained as chief operator and instructor. After the closing of the ballots a social was held and speeches delivered by the newly elected officers. Code messages are sent to members three nights a week, between 8:30 and 9:30 P. M. by B. R. Norton from his station 6JQ. The messages are transmitted on low power in order to avoid any possible interference.

### BOOK REVIEW

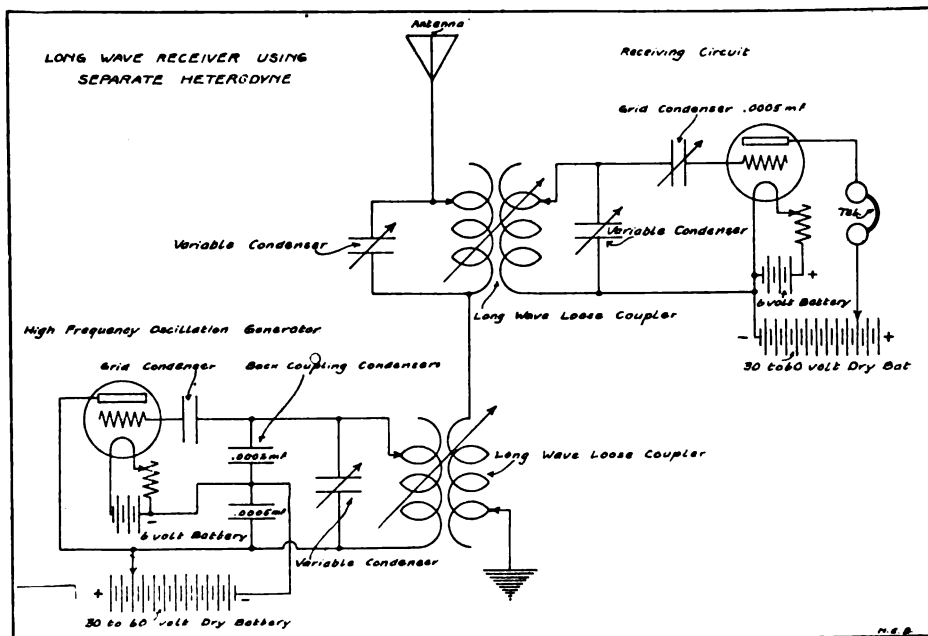
The second edition of the Consolidated Radio Call Book, dated July 1920, contains data on Shore Radio Station Calls; Ship Radio Calls; Telegraph, Cable and Radio Rates; Radio Compass Stations; Press Schedules; Weather Reports; Time Schedules; Amateur Calls and a Radio Map of the World. It has taken 160 pages to cover the aforementioned subjects in a thorough and reliable manner.

"Trans-Pacific Radio Operator's Log" is the title of a new pamphlet that will be ready for distribution on November first. The purpose of the log is to give the commercial operator full details of radio conditions on the Pacific Coast. Call letters, press schedules, wave-length data, weather reports, time signals and other valuable information will be contained therein. The authors of the book are W. Breniman and G. E. Knudsen.

In the last issue of "PRN" on page 54, we published a list of stations heard and worked by station 6UV. Credit for these call letters belongs to 6AR. 6UV, however, has succeeded in covering 850 miles with his radio telephone. His list of calls heard and worked was unavoidable omitted.

# A GOOD HOOK-UP FOR LONG WAVE RECEIVER USING SEPARATE HETERODYNE

Courtesy of the Pacific Radio Supplies Co.



Cut out this Diagram and paste it in your note book. We will have another good one for you in the next issue of "Pacific Radio News."

## HONOLULU TEST AROUSES INTEREST IN AMATEUR CIRCLES

**S**EVERAL of the most efficient amateur stations on the Pacific Coast will partake of the test to establish communication with Hawaii. Never in the history of amateur radio on the Pacific has such interest been aroused. Competition is keen; sets are being tuned and adjusted in order to radiate the maximum energy.

Final word is being awaited from Mr. M. A. Mulrony, Expert Radio Aide at the U. S. Naval Station, Pearl Harbor, Hawaii, as to the time and date on which the test is to take place. Every contestant has expressed faith in the accomplishment of the project. "Why can't we be heard in Honolulu when they copy us in Alaska?" is the question asked by one of the contestants. "The distance to Honolulu is something like 2,100 miles—clear sailing, with no obstacles to encounter, such as mountainous regions, etc. It should be far easier to be heard in Honolulu than in Colorado," says another contestant.

Mr. Malcolm H. Finley has the following to say in regard to the test:

"The Hawaiian transmitting contest sure sounds like great dope, and, although I do not claim to have anything like the best station on the Coast, I have been doing some fairly good work and would certainly like to take a whack at the test. The closed circuit of my transmitter is about as efficient as any set in the state, but the weakness lies in the open circuit. My aerial is only fifty-five feet high at one end and twenty-five feet at the other. It is well insulated, especially at the outer end. Regardless of these handicaps, stations as far north as Vancouver, Washington, report hearing my signals with good audibility. Put me down on the list for the test and when the time comes, this bird will be on hand."

The most interesting factor of the test is the lack of interference that will be experienced by the listening-in station at Pearl Harbor. Mr. Mulrony will silence the arcs on the balmy isle in order to give us a fair chance to be heard. Among the entries received to date are the following:

D. B. McGown (6ZE), San Francisco.  
Hall Berringer (6BJ), Burlingame, Cal.  
A. E. Bessey (6BR), Sunnyvale, Cal.  
H. R. Shaw (6BN), San Francisco.  
Seefred Bros. (6EA), Los Angeles.  
Malcolm H. Finley (6PQ), Santa Ana.  
Garratt Arnold (6AT) San Jose, Cal.  
Royal Mumford (7CU) Vancouver, Washington.

The Seefred Brothers have this to say:

"We note on page 51 of the current issue of "PRN" an article on the doubtfulness of Mr. T. C. Hall copying our station (6EA) in Honolulu. We would like to say that we believe that Mr. Hall is correct in his statement, as we have been heard in Juneau, Alaska, on a crystal detector and a Marconi type 101 tuner with Bladwin phones. We have also been heard by 9ME, Fort Wayne, Indiana, with the use of a Paragon RA6 tuner, single Audiotron and Brandes 2,000 ohm phones. Both stations mentioned are in the neighborhood of 2,000 miles from Los Angeles and our signals were copied with good audibility. With Mr. Hall's eight-stage amplifier he should not experience any difficulty in copying us. My brother (6EB) and myself are ready to participate in the test."

The contestants will be asked to comply with certain fixed rules in order to make the test one of fair play. The power input shall not exceed 500 watts and a wave length of 200 meters shall be used. Further details will be forwarded to the contestants by mail and the result of the contest will be announced in an early issue.

device depends on a well-known scientific principle, and it seems strange that it has not been used before.

In order to secure the greatest signal strength, no matter what type of receiving apparatus we employ, the circuits must be in resonance with the wave length of the transmitting station from which we desire to receive. This is brought about by varying the values of capacity, inductance, or both, in the receiving circuits until the point of resonance is found. The waves sent out from the station from which we are receiving are of constant length when the values of the transmitting circuits remain constant, and once the proper setting of the receiver is found no further manipulation is necessary. Waves of a given length will oscillate in the receiving circuits while waves of other lengths will be excluded. When two or three stations are working together in the same neighborhood, even though they are of different wave lengths, if their power is great enough they will force their way through the receiving apparatus either by forced oscillations, harmonics, or in some instances by re-radiation.

However, a well-designed receiving set coupled to a loop receiver will generally cut out this sort of interference. But let us consider several stations of approximately the same power, working on the same wave length and in comparatively short distances of one another. The result may quite well be compared to the parliamentary proceedings at the famous Tower of Babel.

This is just about where the thing has rested for a number of years. No thought seems to have been given to the fact that but few stations produce identical notes in the telephone receivers. The application of acoustics to radio has not, until recently, been given much attention.

Scientists tell us, and it is everywhere evident, from the pipe organ to the phonograph, that any sound has a natural period of vibration. Using a certain sized acoustic chamber as a unit in a pipe organ, it will produce a certain note. By simply reversing this principle we find that any given note will pass with the greatest intensity through an acoustic chamber of a size corresponding to its wave length.

Even though we find a great many stations which are supposed to be equipped with apparatus which will produce the same tone at the receiving end of the line, practice indicates that there is a great variation of tones. This may be the result of any of a number of causes which are brought about by local conditions. But the point is this: given a means for tuning to the acoustic wave

(Continued on page 103)

## ACOUSTIC TUNING

The Latest Scientific Aid to Radio  
Communication

**A**VAST improvement in static signal ratio can be noted when a loop antenna of the proper design is used. Instead of conducting the static from all directions to the tuning apparatus, only such strays as those which have their origin in a plane parallel to the loop are received. There is therefore a great reduction of static, with but little reduction of signal strength, and the proportion is much improved.

Loop antennae and multi-stage amplifiers, both radio and audio, are here to stay, but even these devices do not entirely fill the need where the static is extremely heavy and the signals very weak.

A static eliminator, introduced by an Eastern company, is a very unique departure from the customary methods employed for killing the bane of radio operating. The operation of this new

S4038

A BILL

66TH CONGRESS  
Introduced by MR. POINDEXTERTO REGULATE THE OPERATION OF AND FOSTER THE DEVELOPMENT  
OF RADIO COMMUNICATION IN THE UNITED STATES.

READ TWICE AND REFERRED TO THE COMMITTEE ON NAVAL AFFAIRS.

**B**E it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the purpose of this Act is to regulate the operation of and to foster the development of radio communication in the United States so that the maritime and other commercial interests of the United States may receive the maximum benefits therefrom; and to provide additional facilities to be utilized by the United States in maintaining and improving the national security and defense.

That wherever used in this Act the term "radio communication" shall be construed to mean communication by an electrical system or method without the aid of conducting connections, or with the aid of wires or other conducting connections from which radio frequencies can be intercepted at a distance of one-half of one mile; the word "apparatus" to mean machines, devices, and all other equipment used in radio communication; the words "transmitter" and "receiver" to mean the sending and receiving apparatus, respectively, used in radio communication; the word "radiogram" to mean message, communication, or signal transmitted or received in radio communication; the term "radio station" to mean a place where apparatus is used for transmitting, receiving or for transmitting and receiving the signals used in radio communication; and the term "territory of the United States" or the word "territory" to mean any territory, district, zone, insular possession, water, or other place subject to the jurisdiction of the United States, and not within any State.

The word "person" as used in this Act shall be construed to import both the plural and the singular and to include corporation, co-partnership company, or association; and when construing and enforcing the provisions of this Act, the act, omission or failure of any director, officer, agent, or employee of such corporation, co-partnership company or association acting within the scope of his employment or office shall in every case be deemed the act, omission, or failure of such corporation, co-partnership, company, or association as well as that of the person so acting for or on behalf thereof.

Sec. 2. That radio stations are divided for the purposes of this Act into the following classes:

First. Coastal station, a radio station on land or on a permanently moored vessel used for the exchange of correspondence with ships at sea or aircraft. Coastal stations include (a) those open to general public correspondence and (b) those open to limited public correspondence. Coastal stations of class (b) transmit and receive private radiograms to and from certain stations only which are designated in the license.

Second. Ship station, a radio station on board any vessel or aircraft not permanently moored. Ship stations and aircraft include (a) those open to general public correspondence and (b) those open to limited correspondence. Ship and aircraft stations of class (b) transmit and receive private radiograms to and from certain stations only which are designated in the license.

Third. Land stations, namely, radio stations on land or on a permanently moored vessel used in the transmission or reception of private radiograms (1) between a point within the continental limits of the United States and any other point within such limits, (2) between a point within the limits of any Territory of the United States and any point within the limits of the same Territory, (3) between a point in the United States of a Territory of the United States and a point in another Territory of the United States distant one thousand miles or less. Land stations include (a) those open to general public correspondence, (b) those open to limited correspondence.

Fourth. Transoceanic stations, namely, radio stations on land used in the transmission or reception of public correspondence (1) between a point in the United States and a point in any foreign country; (2) between a point in the United States and a point in any territory of the United States distant more than one thousand miles from the first; (3) between a point in any Territory of the United States and a point in any other Territory of the United States

## A NEW BILL PROPOSED BY SENATOR POINDEXTER THREATENS DANGER TO ALL BRANCHES OF THE RADIO ART

**A**T the last session of Congress Senator Poindexter introduced the Bill known as S4038 which appears herewith. This Bill, which, it is understood, is really proposed by the Navy Department, is one of the most dangerous of all Bills which have even been presented to Congress.

This Bill provides for a National Radio Commission appointed as described in detail in Section 4. The control of radio communication will be left to this Commission and here the first Joker appears:

THE SECRETARY OF THE NAVY SHALL APPOINT A NAVAL OFFICER WHO WILL ACT AS SECRETARY OF THE COMMISSION AND WILL, OF COURSE, BE ITS ADVISORY HEAD, BEING AN APPOINTEE OF THE SECRETARY OF THE NAVY THIS OFFICER, WHOSE VERY POSITION WILL DEPEND UPON THE PLEASURE OF THE SECRETARY, WILL HOLD THE NAVY AND THE NAVAL RADIO SERVICE AS SUPREME.

## THE SECOND JOKER:

Section 7. No station shall be licensed if, by its operation, it might interfere with the operation of previously existing Government or licensed stations. The statement, "That it is not necessary for the general good of the public service," as provided in this section is vague and indefinite. This means that if one commercial company established a shore station to handle the ship-to-shore business at any port no other station can be established to handle this business.

## THE THIRD JOKER:

Section 12. This section provides that a license shall be issued to any person who submits proper evidence under oath that said applicant possesses sufficient experience and skill to operate a station. No examination or other method of determining the qualifications of the candidate is provided for, and nothing is said in regard to the various grades of operators to be licensed. No restriction is placed on aliens as ship operators but none other than American citizens may operate other classes of stations.

## THE FOURTH JOKER—AND A BAD ONE!

Section 18. No land station, amateur, experimental or training school, shall be located in such a manner as to interfere with coastal, trans-oceanic, or Government stations. This means that all amateurs in the vicinity of any of these classes of stations will be forced to discontinue transmitting because they MIGHT interfere with the above mentioned stations.

**WRITE TO YOUR CONGRESSMAN AND PROTEST THE PASSAGE OF THIS BILL. IF THIS BILL BECOMES A LAW IT WILL MEAN THE DEATH OF AMATEUR RADIO**

distant more than one thousand miles from the first.

Fifth. Experiment station, a private radio station on land, ship, or aircraft actually engaged in conducting experiments for the development of the science of radio communication of the apparatus pertaining thereto.

Sixth. Technical and training school station, a private radio station on land, ship, or aircraft used for purposes of instruction in radio communication and training operators.

Seventh. Amateur station, a private radio station on land not covered by third, fourth, fifth, sixth, or eighth paragraphs of this section and not operated for financial profit. Amateur stations include (1) general amateur stations; (b) restricted amateur stations which are within five nautical miles of a Government station; (c) special amateur stations, the operation of which seems likely to result in some substantial benefit to radio communication.

Eighth. Government station any radio station controlled and operated by any department of the Government. They are not open for general public correspondence except as specified in the provisions of this Act. They do not require licenses, but shall be subject to the jurisdiction of the National Radio Commission hereafter mentioned, so far as concerns wave lengths and other matters affecting interference.

Sec. 3. That nothing in this Act shall be construed to apply to the transmission, reception, or exchange of radiograms or signals between points in the same State if said transmission, reception, or exchange shall not interfere with the reception of radiograms or signals from beyond the jurisdiction of the said State, or if the effect thereof shall not extend beyond said jurisdiction.

Sec. 4. That, for the purpose of regulating radio communication in the United States and its Territories there is hereby created a permanent National Radio Commission composed of four members properly qualified, one to be appointed by the Secretary of the Navy, one by the Secretary of War, one by the Secretary of Commerce, and one by the Postmaster General. There shall be a secretary of the commission, who shall be an officer of the active list of the line in the United States Navy, to be designated for this service by the Secretary of the Navy. The members of the commission shall receive a salary of \$4,000 per annum each, and officials of the departments named in this section may be detailed for service on the commission by the heads of the departments, respectively, and each member shall be subject to removal or transfer by the head of the department from which he was appointed.

This commission shall be designated as the National Radio Commission, and as such shall have full power to regulate radio communication in the United States and its Territories in accordance with the provisions of this Act and in accordance with such international radio communication conventions as may be ratified or adhered to by the United States.

The National Radio Commission shall publish regulations concerning methods of operating, procedure, wave lengths, radio interference, and power used by the various classes of licensed radio stations. These regulations shall be based, in so far as is practicable, upon the regulations of international radiotelegraph conventions, shall be of such a nature as to afford protection to the various services involved and shall conform invariably to the technical developments of radio communication.

The National Radio Commission shall assign bands of wave lengths for the use of each of the classes of licensed stations described in section 2 of this Act; such bands shall correspond in so far as is practical, to those prescribed by present or future international radio conventions ratified by the United States.

The National Radio Commission shall grant licenses for radio stations and operators in accordance with the provisions of this Act, assigning to each separate station, so far as is possible, a wave length or wave lengths such as to enable it to accomplish the purpose for which the license is issued, with due regard to the rights of duly licensed stations.

The National Radio Commission shall enforce its regulations and the provisions of this Act, through the Department of Commerce and through collectors of customs and such other officers as the Secretary of Commerce may designate; and the National Radio Commission shall in the same manner enforce the provisions of such international radio conventions as have been or may hereafter be ratified or adhered to by the United States, except that provisions there-



of relating to Government radio installations shall be enforced by the departments controlling such installation.

The National Radio Commission shall advise and assist citizens, firms, or corporations of the United States in the establishment of radio communication facilities with foreign countries and shall represent the Government and citizens, firms, or corporations of the United States in matters pertaining to international regulations of radio communication. The National Radio Commission is authorized to appoint representatives at international conferences in which subjects pertaining to radio or other methods of communication as to be discussed.

The National Radio Commission is authorized to correspond with any international radio commission or bureau which has been or which will be constituted, and to correspond with any foreign national radio commission or department charged with the administration or regulation of radio communication in a foreign country; Provided, That such correspondence shall be conducted through and by and with the advice and approval of the State Department or in accordance with the provisions of present or future international radio or communication conventions.

The National Radio Commission is authorized to advise and assist citizens of the United States or corporations, co-partnerships, companies, or associations licensed in the United States to operate transoceanic radio stations between the United States and a foreign country or countries in matters pertaining to transoceanic radio communications: Provided, That no such advice or assistance on the part of the National Radio Commission shall constitute an obligation on the part of the Government of the United States to support financially or politically any action taken by such person or licensee, and that no such advice or assistance on the part of the National Radio Commission shall operate to modify or change the action taken by the Interstate Commerce Commission, or other authorized Government agency, in the exercise of its legal powers.

Whenever application is made for the grant of a license for a radio station, the operation of which may interfere with the operation of then existing Government or licensed stations, notice of such application shall be given forthwith by the National Radio Commission to the department of the Government or licensee operating such existing station, and an opportunity shall be afforded such interested party to be heard and to submit evidence before the National Radio Commission in opposition to the granting of such license.

The National Radio Commission is hereby authorized to mitigate or remit any fine, penalty, or forfeiture (other than penalty of imprisonment) incurred under the provisions of section 5, section 8, section 11, section 12, section 13, section 15, and section 28 hereof, in the manner prescribed by law for the mitigation or remission of penalties for violation of the navigation laws.

Sec. 5. That no radio station other than those belonging to or operated by the United States shall be used by any person within the jurisdiction of the United States to transmit or receive any radiogram by the apparatus and methods of radio communication except under and in accordance with a station license or licenses, issued by the National Radio Commission. In case of stations not actually under construction or already constructed at the date of the passage of this Act, the license or licenses must be secured before the commencement of the construction of such stations. Any person who shall operate any radio station in violation of this section shall be punished by a fine not exceeding \$500 for the first offense, and by a fine not exceeding \$1,000 or imprisonment for not more than one year or both, for each offense thereafter; and any radio apparatus operated in violation of this section shall be subject to forfeiture: Provided, That licenses for amateur radio stations shall be issued without cost to the licensees.

Sec. 6. That the station license required by section 5 hereof shall not be granted to, nor shall the station so licensed be managed, operated, owned, or controlled by or transferred to or to the management, operation or control of, any alien or aliens or representatives thereof, nor any foreign Government or representatives thereof, nor any company, corporation, or association organized under the laws of any foreign Government; nor any company, corporation, or association of which any officer or any director is an alien, or of which more than one-fifth of the voting capital stock is owned or controlled by aliens or their represen-

tatives, or by a foreign Government or representative thereof, or by any company, corporation or association organized under the laws of a foreign country; nor to any company, corporation or association which is dominated or controlled by alien interests; and a license may be declared void by the National Radio Commission, on violation thereof: Provided, That reasonable opportunity shall be accorded to a licensee to make arrangements satisfactory to the National Radio Commission, if such violation arise through no fault of such licensee. And the National Radio Commission is given discretionary power in such cases to declare void or to continue a license absolutely or on terms, after a full examination of the circumstances attending any investments in or a transfer of stock in violation of this section: Provided further, That if the charter or by-laws of the corporation in question shall provide that all officers and directors thereof shall be American citizens and that a representative of the Secretary of the Navy, who shall be an officer of the line of the Navy of or above the rank of captain, may attend and be heard at meetings of its stockholders and of its directors, and if such charter shall further provide that certificates for not more than one-fifth of the total shares of the corporation at any time outstanding may be issued in special form, which may be owned or held and voted by foreigners without restrictions, to be called foreign shares, and that no other share of such corporation may be voted, which such share is owned or the voting right therein is controlled, directly or indirectly by an alien, and that at any annual or other meeting of the corporation the representative of the Secretary of the Navy may, by notice in writing filed at the meeting, challenge any vote on the grounds aforesaid, and if the challenged votes affect the result, the directors shall investigate the challenge, adjourn the meeting, separately record the votes and investigate the charge, and if they find such challenge well founded shall, in counting the votes, disregard the votes so challenged.

Sec. 7. That except in the case of experiments in the development of the art, a license shall not be granted to any station not in actual process of construction or already constructed at the date of the passage of this Act, if the operation of the proposed station will seriously interfere with the operation of existing Government or licensed stations or is not necessary for the good of the general public service.

Sec. 8. That the station license prescribed by section 5 hereof shall be issued or amended only in response to a written application therefor, addressed to the National Radio Commission, which shall set forth the following facts:

First. (a) If the applicant be a natural person, his name and address, the date and place of his birth, and, if naturalized, the date and place of his naturalization.

(b) If the applicant be a partnership or association of natural persons, the foregoing data regarding each member thereof.

(c) If the applicant be a corporation, the date of incorporation and under what laws incorporated, the principal place of business of the corporation, the names and addresses of the officers and directors, a statement as to each officer, specifying his place of birth and the country of which he is a citizen, and, if a naturalized citizen of the United States, the date and place of naturalization, and a statement showing what proportion of the capital stock is owned or controlled by aliens or their representatives thereof, and by companies, corporations, or associations organized under the laws of any foreign country.

Second. The ownership of the station and apparatus.

Third. The exact location of the station.

Fourth. The station with which it is proposed to communicate.

Fifth. The purpose or purposes for which the station is to be used.

Sixth. The wave length or wave lengths which it is desired to use at the station and the period or periods of the day during which it is proposed to operate the station.

Seventh. Such further information as the National Radio Commission may by regulation prescribe.

Eighth. The application shall state the earliest and latest date of completion of construction and the earliest and latest date operation shall begin. Evidence satisfactory to the National Radio Commission of financial, technical, and other ability of the applicant to construct station as proposed shall be stated in the application.

Every application shall be signed by the applicant upon oath or affirmation. If the applicant is a corporation, the application shall be signed upon oath or affirmation of a duly authorized officer thereof.

Whoever shall knowingly make any untrue statement in the application for a license prescribed by this section shall be guilty of perjury, and shall be punished by a fine not exceeding \$2,000, or by imprisonment for not more than five years, or both.

Sec. 9. That station licenses shall be in such form as the National Radio Commission shall prescribe, and shall contain a statement of the following conditions, to which such licenses shall be subject:

First. The station shall be at all times subject to inspection by officials of the Department of Commerce and the National Radio Commission.

Second. The ownership or management of the station or apparatus shall not be transferred in violation of section 6 of this Act.

Third. Such books and records of the licensee as contain entries showing whether or not the provisions of this Act are being observed shall be open at all times to inspection by officials of the Department of Commerce or the National Radio Commission to enable them to determine whether such violation or failure to observe has occurred.

Fourth. Apparatus other than that specified in the license shall not be used for radio communication, except in case of emergency or for experimental work authorized by the National Radio Commission.

Fifth. Such license shall show specifically the ownership and location of the station in which the apparatus is to be used and such other particulars as the National Radio Commission may deem necessary for the identification of the apparatus and to enable its range to be estimated, shall show the purpose of the station, the wave length or wave lengths and the decrement or decrements authorized for use by the stations, and the hours for which the station is licensed to work.

Sixth. Such licenses shall also show specifically the earliest and latest date operation shall begin and shall indicate that the license will be automatically forfeited if the station is not operated by time set, unless the license is renewed by the National Radio Commission.

Sec. 10. That any station license shall be revocable by the National Radio Commission for continued failure to operate service contemplated, or for violation of or failure to observe any of the restrictions and conditions mentioned in the preceding section or other provisions of this Act or regulation of the National Radio Commission, and such books and records of the licensee as contain entries showing whether or not the provisions of this Act are being observed shall be open at all times to inspection by officials of the Department of Commerce or the National Radio Commission to enable them to determine whether such violation or failure to observe has occurred: Provided, That before a license is revoked, the licensee shall be afforded opportunity to present evidence in his behalf to the National Radio Commission; and that upon revocation of a license the National Radio Commission shall issue a statement giving the reasons for such revocation.

Sec. 11. That the actual operation of every radio station for which a station is required by this Act shall be carried on by a person to whom an operator's license shall have been issued hereunder. No person shall operate any such station except under and in accordance with an operator's license issued him by the National Radio Commission. The National Radio Commission, in its discretion, may grant special temporary licenses to operators of radio apparatus when an emergency arises requiring prompt employment of such an operator. Whoever shall employ any unlicensed person in the operation of any licensed radio station, or whoever without an operator's license shall operate such a station, shall be punished by a fine not exceeding \$100 for the first offense and by a fine not exceeding \$200 or imprisonment for not more than two years, or both, for each offense thereafter: Provided, That this section shall not apply to the use of radiotelephone stations regularly licensed for public service.

Sec. 12. That an operator's license shall be issued only in response to a written application therefor addressed to the National Radio Commission, which shall set forth the name, age, and address of the applicant,

date, and place of birth, the country of which he is a citizen; and if a naturalized citizen of the United States, the date and place of naturalization. The application shall also state the previous experience of applicant in operating radio apparatus and such further facts or information as may be required by the National Radio Commission. Every application shall be signed by the applicant upon oath or affirmation. An operator's license shall be issued only to a person who, in the judgment of the National Radio Commission, is shown to be proficient in the use and operation of radio apparatus and in the transmission and receipt of radiograms. Except for the operation of a station on shipboard, an operator's license shall not be granted to any alien, nor shall such a license be granted to a representative of a foreign Government for the operation of any radio station. Whoever shall knowingly make any untrue statement in an application for an operator's license shall be guilty of perjury and shall be punished by a fine not exceeding \$2,000 or by imprisonment for not more than five years, or both.

Sec. 13. That an operator's license shall be in such form as the National Radio Commission shall prescribe, and may be suspended by the National Radio Commission for a period not exceeding two years, upon proof sufficient to satisfy the commission that the licensee has violated any provision of this Act or regulation of the National Radio Commission, or that he has failed to compel compliance therewith by an unlicensed person under his supervision, or that he has been willfully negligent, or has failed in carrying out the lawful orders of the master of the vessel on which he is employed, or that he has willfully damaged or permitted apparatus to be damaged. The license may be revoked by the National Radio Commission upon proof sufficient to satisfy the commission that the licensee was or is ineligible for a license.

Sec. 14. That during any war in which the United States shall be a neutral nation, the President may establish such control over the operation of radio stations within the jurisdiction of the United States, as may be necessary to prevent violation of the international obligations of the United States, and in time of threatened or actual war in which the United States may be a party, and in time of public peril or disaster, the President may cause the temporary closing of any radio station within the jurisdiction of the United States and the temporary removal therefrom of any radio apparatus for the period of the emergency, or may authorize the temporary removal therefrom of any radio apparatus for the period of the emergency, or may authorize the temporary use of the station or the apparatus by any department of the Government for a like period or periods. In case of any action under this section, just compensation shall be paid to the owners.

Sec. 15. (a) That whoever shall maliciously or willfully interfere with or cause any interference with radio communication carried on or sought to be carried on by any duly licensed or Government radio station or apparatus shall be punished by a fine not exceeding \$500 for the first offense, and by a fine not exceeding \$1,000 for each offense thereafter.

(b) That whoever shall receive or assist in receiving with intent to divulge or publish the contents, substance, purport, effect, or meaning of any radiogram or any part thereof to any person other than the addressee thereof, his agent or attorney, except to a telegraph or radio station employed to forward such radiogram to its destination or to proper accounting or distributing officers of the various communicating centers over which the radiogram may be passed, or to the master of a ship under which he is serving or in response to a subpoena issued by a court of competent jurisdiction, or on demand of other competent authority, and whoever shall receive or assist in receiving any radiogram with the intent to use the same or any information therein contained for his own benefit or for the benefit of another without authority and whoever, having received such radiogram or become acquainted with the contents, substance, purport, effect, or meaning of the same or any part thereof shall so willfully and without authority divulge or publish the contents, substance, purport, effect, or meaning of the same or any part thereof, or use the same or any information therein contained for his own benefit or for the benefit of another without authority, shall be punished by a fine not exceeding \$500 for the first offense,

and by a fine not exceeding \$1,000 or one year's imprisonment, or both, for each offense thereafter: Provided, That this section shall not apply to the divulging or utilizing of the contents of any radiogram by the sender or his agent or his attorney, or to the receiving, divulging, publishing, or utilizing of the contents of any radiogram intended for the use of the general public.

Sec. 16. That no person owning, controlling, or operating licensed radio station or stations shall form a partnership, combination, or association with any person owning, controlling, or operating submarine cables or land telegraph or telephone systems in or touching the United States or its Territories in such a way as to limit competition in the transmission of intelligence from and to the United States.

Nothing herein contained shall prevent co-operative agreements made with the consent of the National Radio Commission which without undue restraint of competition, tend to further and improve the radio service.

Sec. 17. That all ship and coastal stations shall give priority over all other radiograms to radiograms relating to ships in distress, and except when answering or aiding a ship in distress, shall refrain from sending until all radiograms relating to the ship or ships in distress shall have been completed.

Sec. 18. That no land stations, amateur stations, experiment stations, or technical and training-school stations shall be located in such a manner as to interfere with coastal, transoceanic, or Government stations.

Sec. 19. That the National Radio Commission may in its discretion, grant special temporary licenses to stations to permit the carrying on of tests with any amount of power or any wave lengths at such hours and under such conditions as will insure the least interference with the work of other stations.

Sec. 20. That land, amateur, experiment, and technical and training-school stations, shall not use transmitting wave lengths except as prescribed by the National Radio Commission.

Sec. 21. That every coastal station and ship station shall at all times be ready to send and receive messages and signals on such wave lengths and of such wave character as are required by the existing or future international conventions.

Sec. 22. That coastal, transoceanic, and ship radio stations shall adhere to the rules regarding wave lengths and power prescribed by the National Radio Commission.

The National Radio Commission may regulate the use of or prohibit the use of transmitters of stations on shipboard in harbors within the jurisdiction of the United States, as it may deem necessary.

Sec. 23. That whoever, including any person in the service of the Government shall knowingly transmit or publish, or knowingly cause to be transmitted or published, any false or fraudulent distress radiogram, or who, when engaged in radio communication, shall transmit or publish, or cause to be transmitted or published, any other radiogram for the purpose of defrauding or deceiving the Government, shall be punished by a fine not exceeding \$2,000, or imprisonment for not more than five years, or both.

Sec. 24. That no person shall use or operate any radio apparatus on a foreign ship when within the jurisdiction of the United States otherwise than in accordance with the provision of sections 14, 15, 17, 21, and 22 of this Act, and all provisions of said sections and penalties thereto attaching are hereby made applicable to such apparatus: Provided, however, That in no other respect shall anything in this Act apply to public vessels of foreign governments otherwise than by a general proclamation of the President.

Sec. 25. That the office of Director Naval Communications, established under the jurisdiction of the Navy Department, shall be charged with the accounting and payment of charges in connection with the settlement of international radio accounts of ship-to-shore traffic, as provided by the London Radiotelegraphic Convention of 1912, or as may be provided by future international conventions. The expenses involved in the settling of international radio accounts, not exceeding \$7,000 per annum, shall be borne by the United States.

Sec. 26. That in all cases of violation of any provision of this Act or of any regulation of the National Radio Commission for which no penalty is otherwise prescribed, a

penalty of \$100 upon the owner of the apparatus by means of which such violation was effected, or a penalty of \$25 upon the offending operator, or both, to be imposed by the commission, is hereby prescribed, but such penalties may be reduced or remitted by the National Radio Commission, in its discretion; and, in addition, the National Radio Commission, in its discretion, may revoke the station license of such owner and revoke or suspend the license of such operator, as provided in sections 10 and 13 of this Act.

Sec. 27. That, except as otherwise specifically provided in this Act, the provisions of this Act shall extend to all places subject to the jurisdiction of the United States. The several courts of first instance in the Philippine Islands and the district court of the Panama Canal Zone shall have jurisdiction of offenses as defined by this Act committed within their respective districts, and of conspiracies to commit such offenses, as defined by section 37 of the Act to codify, revise, and amend the penal laws of the United States, approved March 4, 1919, and the provisions of said section, for the purposes of this Act, are hereby extended to the Philippine Islands and to the Panama Canal Zone.

Sec. 28. That orders of the National Radio Commission granting or denying applications for licenses for radio stations or radio operators, or revoking, suspending, modifying, or declaring void any licenses for such stations or operators previously granted, or imposing penalties for alleged violations of the provisions of this Act, may be reviewed on petition by any of the parties affected thereby to the Court of Appeals of the District of Columbia. Such petition shall be filed within thirty days from the date of the order of the National Radio Commission sought to be reviewed and a copy thereof shall forthwith be served upon the National Radio Commission. The National Radio Commission shall forthwith answer said petition setting forth the grounds upon which its order was based and shall file in the said court a transcript of the proceedings had before it; and thereupon the said court shall proceed expeditiously to hear and determine said petition and to affirm, set aside, or modify the order of the National Radio Commission, and the order of said court shall be final. The said court shall have power by appropriate orders to regulate all matters of practice in connection with the review of such cases.

Sec. 29. That the Act approved August 13, 1912, entitled "An Act to regulate radio communication," is hereby repealed. Such repeal, however, shall not affect any act done or any right accruing or accrued, or any suit or proceeding had or commenced in any civil cause prior to said repeal, but all penalties, forfeitures, or liabilities incurred prior to taking effect hereof under any law shall continue and may be prosecuted and punished in the same manner and with the same effect as if this Act had not been passed.

## DOINGS OF THE S. F. RADIO CLUB

WE are thinking of nothing but the Convention and your co-operation to make it a booming success. Have you seen the advertisement of the San Francisco Radio Club regarding the Convention? It tells the story from beginning to end. The reception committee must know in advance how many radio men will attend and for this reason it is asked that the blank be mailed promptly. Up to the time that we go to press about 200 names are on the list. Let's try to swell that list to busting proportions. SIGN THAT BLANK and let those unscrupulous and inconsiderate few in Washington know that we are alive.

The fair sex are by no means barred from the Convention. We hope that they will be there in all their glory and charm. If they will let us hear from them we can arrange to have a chaperon for each 'n every one. How's that? SIGN THE BLANK!

# A NEW DECREMETER

**T**HE measurement of the Logarithmic Decrement has always been the greatest obstacle in the way of proper tuning of the Amateur Radio Transmitter. The delicacy of the hot-wire, current-squared meter used in the construction of decimeters, with its high cost, have placed the instrument entirely beyond the reach of the Amateur Station Owner.

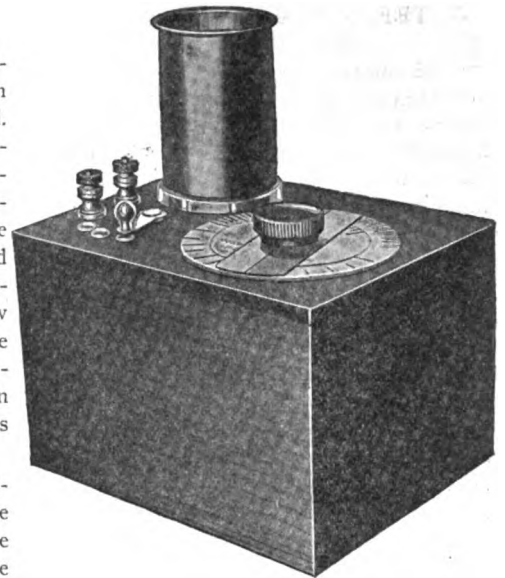
A Decimeter has been developed which does not require a hot-wire meter, is accurate and rugged, and is perfectly adapted to Amateur needs. This instrument will measure both the logarithmic decrement and wave length. It is provided with two small incandescent electric light bulbs which are mounted at the bottom of a cylindrical tube, the upper end of which is closed by a frosted screen. One of these bulbs is lighted by the current induced in the oscillatory circuit of the Decimeter and the other is lighted by two dry cells. A tubular shield is provided through which the screen can be viewed.

The operation of the instrument is as follows: The Decimeter is first adjusted to perfect resonance with the antenna circuit as indicated by maximum illumination of the oscillatory circuit bulb. The coupling between the Decimeter

and the Transmitter is then varied until the illumination produced on the screen by the two bulbs is equal. A resistance is now into the battery circuit by throwing a switch, which reduces the current by a suitable pre-determined fraction, and thereby reduces the illumination on the screen associated with the battery circuit bulb. The variable condenser of the Decimeter is now rotated, first on one side of resonance and then on the other, until the illumination on the two halves of the screen is again equal, and the scale reading is taken in each position.

The difference between the two readings is the sum of the decrement of the circuit under measurement and that of the Decimeter itself. The decrement of the Decimeter is subtracted to obtain the final result. No complicated calculations of any kind are necessary. The measurement of the logarithmic decrement has thus been reduced to its simplest possible terms, the total time required for making a measurement not exceeding one minute.

The United States laws governing Radio Communication state that the logarithmic decrement shall not exceed two-tenths. Under these conditions it is actually possible to radiate more energy



which is effective in transmitting, than with a broad wave of high decrement. A hot-wire ammeter in the antenna does not give a good indication of the effectiveness of a radio transmitter, because it does not distinguish between the condition where the energy is spread over a broad band of wave lengths and the condition where it is concentrated in a narrow band.

\*Photograph courtesy of F. M. Doolittle Co.

## INTERNATIONAL RADIO TO BUILD STATION HERE

**A**NOTHER wireless transmission concern, the International Radio and Telegraph Company of New York, is preparing to erect a station and do business in San Francisco, according to advices received by Major J. F. Dillon, radio inspector for the bureau of navigation, Department of Commerce. There are now four radio companies doing business in San Francisco, the Federal Wireless, the Marconi, the Ship Owners' and the Independent. The three former have divided the 1,200 vessels of the Shipping Board equally among them.

"I have had remarkable success with one of the B. S. Tuners," says Chief Electrician E. S. Pyle, U. S. N. Radio Station, Ketchikan, Alaska. He refers to the instrument manufactured by the Tresco Company and states that he hears the East Coast arcs on an aerial 70 feet long and 30 feet high. NPN has been heard on the same aerial—a distance of almost 6,000 miles. A Western Electric VT1 tube was used.

Turn your spare time into dollars by securing subscriptions to "Pacific Radio News." Any ambitious amateur can handle our new proposition. It will interest you. Write for details.

## SIXTH DISTRICT AMATEUR STATIONS—Continued.

6ACT	C. A. Thunen...	5766 Broadway.....	Oakland, Cal.
6ACU	"Y" Radio Club...	110 Cabrillo St.....	Santa Barbara, Cal.
6ACV	R. Walker.....	1127 El Centro Ave.....	Alameda, Cal.
6ACW	C. Potter.....	117 Hillside St.....	Piedmont, Cal.
6ACX	R. H. Owen.....	6811 Hollywood Blvd.....	Los Angeles, Cal.
6ACY	A. E. Ekdale...	115 N. Chester Ave.....	Los Angeles, Cal.
6ACZ	D. deNeuf.....	811 B St.....	Petaluma, Cal.
6ADA	M. Madero.....	436 10th St.....	San Diego, Cal.
6ADB	A. Cook.....	3016 Brook St.....	Oakland, Cal.
6ADC	A. B. Curtis.....	2060 Marengo Ave.....	Los Angeles, Cal.
6ADD	A. Merrill.....	214 Highland Ave.....	Piedmont, Cal.
6ADE	E. B. Weise.....	1355 Regent St.....	Alameda, Cal.
6ADF	R. D. McCurdy...	1602 Pine Ave.....	Long Beach, Cal.
6ADG	F. Noel.....	301 W. Avenue 43.....	Los Angeles, Cal.
6ADH	P. Freidenthal...	2249 Broderick St.....	San Francisco, Cal.
6ADI	J. W. Summers...	1061 62d St.....	Oakland, Cal.
6ADJ	H. T. McRae.....	643 N. Kenwood St.....	Glendale, Cal.
6ADK	M. D. Jergins...	1037 Elden Ave.....	Los Angeles, Cal.
6ADL	J. S. Campbell...	873 N. Chester Ave.....	Pasadena, Cal.
6ADM	H. J. Bolton.....	124 N. Dillon St.....	Los Angeles, Cal.
6ADN	W. Van Ziles...	1113 Evelyn Place.....	Pasadena, Cal.
6ADO	J. H. Neilsen...	4003 1st St.....	San Diego, Cal.
6ADP	R. P. Coulter...	69 S. 10th St.....	San Jose, Cal.
6ADQ	W. R. Pressel...	136 Mill St.....	Reno, Nevada.
6ADR	R. N. Bell.....	1835 Edgemont Ave.....	San Diego, Cal.
6ADS	C. De Vinna.....	1004 2d St.....	Santa Monica, Cal.
6ADT	L. P. Smith.....	729 W. 5th St.....	Reno, Nevada.
6ADU	L. B. Benjamin...	140 S. Oxford St.....	Los Angeles, Cal.
6ADV	R. W. Hichman...	440 N. Washington St...	Whittier, Cal.

## SPECIAL AMATEUR CALLS FOR THE SIXTH DISTRICT ISSUED TO DATE

6ZA	Ira J. Kaar.....	243 E. 7th St.....	Salt Lake City, Utah
6ZB	Dr. A. E. Banks...	1648 Neale St.....	San Diego, Cal.
6ZC	Dr. J. B. Ellis...	.....	Cochise, Arizona
6ZE	D. B. McGown...	1247 47th Ave.....	San Francisco
6ZG	F. W. VanWhy...	2012 N. Broadway.....	Los Angeles
6ZH	W. C. Thompson,	.....	Richfield, Utah
6ZJ	A. L. Munzig.....	1017 Tribune St.....	Redlands, Cal.
6ZK	A. E. Bessey.....	.....	Sunnyvale, Cal.
6ZL	A. N. Marquie...	649 1st Ave.....	Yuma, Arizona

**MONTEREY RADIO ASSOCIATION ENTERTAINS**

THE members of the Monterey Radio Association were hosts at a seven course banquet given at the Sherman Rose Tea Garden, Wednesday evening, September 29th, to fellow radio enthusiasts within a radius of twenty-five miles from Monterey.

The visitors were met at the club rooms of the Monterey Radio Association and were given a demonstration of the operation of the remote control system that is used to operate 6DI.

The opening address was one of welcome, delivered by Mr. H. A. Greene, President of the club. Mr. Herbert Hand acted as toastmaster and several clever speeches were delivered. Mr. Earl Harris, President of the Santa Cruz Radio Association, spoke on radio conditions

between Santa Cruz and Los Angeles; Professor ellog of the Monterey High School, spoke of the services of the amateur radio man during the war; Mr. Hand spoke on water power conservation and Mr. Greene boosted the improvement of the amateur radio game with an interesting address.

The visitors were then taken to the various amateur stations in Monterey and several interesting equipments were examined.

"Honolulu comes in fine on my new V. T. socket," said Mr. E. S. Petersen at the radio club the other night.

Gee whizzzzz, young fellow, if you take another look at that socket you will discover that you have a vacuum tube peeking out through the top of it.

**RADIO PHONES TO BE USED FOR TARGET PRACTICE**

DIRECTED by wireless telephones from a squadron of airplanes and captive balloons, the coast defense artillery will begin target practice, the magnitude of which never before has been attempted on this coast. Another spectacular feature of the target practice will be a machine gun target shoot at an altitude of two miles and several miles at sea by members of the Ninety-first Aerial Squadron.

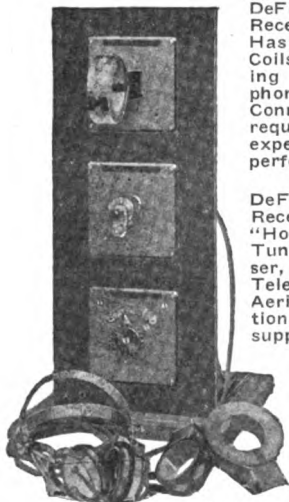
Army officers from the Coast Defense and the Army Air Service today are perfecting plans for maneuvers which give promise of being one of the most spectacular events ever seen in this vicinity. Crews of aviation mechanics are getting ships in the Ninety-first Squadron in readiness for the practice, which will continue throughout the greater part of October. At the same time, enlisted personnel in the Coast Defense and Coast Artillery are getting the guns ready for the big shoot.

**Phone to Direct Fire**

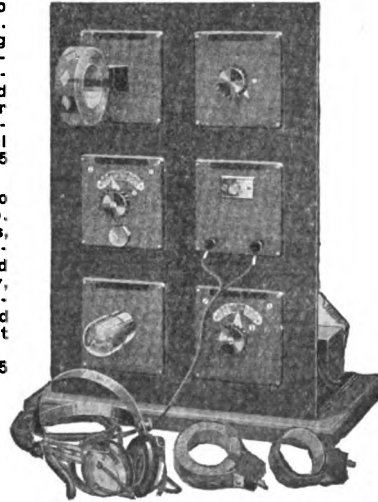
One of the unique features of the unusual form of target practice is the firing directed from planes in the squadron, which are being rigged up with wireless telephone, and in addition each ship will have two sets of radios.

Flying at an altitude of more than two miles, members of the squadron, talking through the wireless telephones, which will be in communication with tugs towing the moving targets and the forts in action, will direct the line of fire.—S. F. "Call."

The Somerville Radio Laboratory, 102 Heath Street, Somerville, Mass., has recently perfected the "Nucleus", which is a bakelite panel and a number of parts for radio telephone sets. These various instruments can be connected together and used for speech transmission purposes.



DeForest Simplified Radio Receiving Station (3 Panel). Has "Honey-Comb" Tuning Coils, Crystal Detector, Tuning Condenser, Head Telephones, Aerial and Ground Connections and all other required supplies. An inexpensive set of wonderful performance. Complete \$47.35



DeForest Audion-Unit Radio Receiving Station (6 Panel). "Honey-Comb" Tuning Coils, Tuning and Grid Condenser, Audion Detector, Head Telephones, "B" Battery, Aerial and Ground Connections, and all other needed supplies. A very efficient set of wide range. Complete .....\$76.15

DeForest Simplified Radio Receiving Station

DeForest Audio-Unit Radio Receiving Station

**Complete Unit-System Receiving Sets for Amateurs**

THESE complete Radio Receiving Stations offer the most satisfactory method of securing reliable efficient, and scientific apparatus for absolutely dependable quality. They include everything required to set up and operate a Receiving Station that will operate satisfactorily and allow for expansion as the owner desires; including Aerial and Ground connections, Panels, Base and Back Boards, Unit Panels, all screws, wiring, insulators, etc.

Both Sets are part of the famous DeForest Unit-System and additional panels to increase the range and selectivity of the sets may be added at any time. For the beginner, or even the experienced amateur these sets are the most logical system. They do away with costly cabinets and more costly factory assemble, thus saving money for the purchaser. They are also more instructive as by wiring the panels the Amateur secures practical information.

**SEND FOR CATALOGUE**

DeForest Radio Apparatus should be on every Amateur's Christmas list. Send for our latest catalogue giving full, detailed descriptions of DeForest Receiving Apparatus. Sent postpaid for 10 cents.

**DeForest Radio Telephone and Telegraph Co.**

INVENTORS AND MANUFACTURERS OF AMATEUR AND COMMERCIAL APPARATUS

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Sole Western Distributors

**Lee DeForest, Inc.**

451 THIRD STREET

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**Portland Radio Exchange**

**RADIO APPARATUS BUILT TO YOUR SPECIFICATIONS**

We also have a stock of reliable Radio equipment on hand including the apparatus manufactured by the Radio Development Co., and Pacific Radio Exchange.

**LET US KNOW YOUR WANTS**

422 Board of Trade Bldg.  
PORTLAND, ORE.

# FINANCIAL NEWS

**T**O HANDLE its growing business, the Federal Telegraph Company has decided to issue \$500,000 general mortgage, serial, short term, 8 per cent gold notes, according to a circular letter to the stockholders, sent out by R. P. Schwerin, president. This note issue will mature in annual sums of \$100,000 in every year from 1923 to 1927, both inclusive.

The object sought to be obtained by this new financing, as explained in the circular letter, is the construction of two fully equipped wireless stations, one near Mountain View, California, and the other at Portland, Oregon.

This new financing will also assure the company obtaining the control and operation of a wireless station for the purpose of providing a ship-to-shore radio business, and it is also intended out of the proceeds of the notes to buy the patent rights of certain radio equipment.

It will be recalled that the company's wireless stations were sold to the United States government in 1918 and ever since the company has been compelled to transmit its telegraph messages upon leased lines, secured from the Pacific Telephone and Telegraph Company, at a yearly rent of \$81,303.

In January this year, President Schwerin says, the telephone company endeavored to cancel its lease on a part of the service, and had it been successful the Federal Telegraph Company would have had to shut down and discontinue a very lucrative branch of its business.

The Federal Company secured an injunction restraining the telephone company from discontinuing these leased lines for the present, but it was specified that a wireless station must be constructed by the Federal Telegraph Company to provide the necessary facilities for carrying on its business and the Federal Company stipulated that it would have this wireless station in operation by January 1, 1921; hence the necessity for these notes.

The company's business has grown materially since it came under the management of R. P. Schwerin and his associates, and that the company now has in its treasury, in cash, \$150,000.—S. F. "Call."

## WOULD SELL WIRELESS

**A**N action in libel was filed by U. S. Attorney O'Connor yesterday in the United States District Court, praying for the sale of a wireless apparatus captured by the Federal officers at Mexicali, and intended, it is supposed, to be carried into Mexico.

The outfit consists of one DeForest two-step audion amplifier, one DeForest large coupler coil, one horn and two Marconi audion vacuum tubes. It is charged that the parts of the wireless

outfit were to be taken into Mexico in defiance of the proclamation of President Wilson.—Los Angeles "Times."

## NEW RADIO COMPANY FORMED

**M**R. John B. McGinnis announces the formation of the Radio, Research and Supply Company, 88 Johnson St., Lynn, Mass. The new company will cater solely to the wants and needs of the amateur. John B. McGinnis, Ds., Sc., A. M. is President. Ray Corliss, M. S., is Consulting Engineer and Mr. Clyde Gould, M. S., is Secretary.



### "Insulate" Handles, Knobs and

OTHER INSULATION ACCESSORIES  
for WIRELESS and other Instruments

made either of the Best Substitute for Hard Rubber or "Hi-Heet" Resisting Synthetic Materials manufactured by the

**GENERAL INSULATE COMPANY**  
1008-1026 ATLANTIC AVE. BROOKLYN, N. Y., U. S. A.

**Y**OU men who live in the West are as near to the G-A House as your nearest mail box. Mail your orders.

## G. A. Standardized Supplies

If you could see the enormous quantity of wire, and the thousands of bakelite panels in the stock room of the G-A Company, you would feel insured against delays in the shipment of your orders.

### G. A. STANDARDIZED HIGH FREQUENCY CABLE

All receiving inductances for wave lengths up to 3,000 meters and vacuum tube transmitters should be wound with high frequency cable if maximum signal intensity and sharpest tuning is desired.

10—No. 38	<b>\$ .60</b>	20—No. 38	<b>\$ .95</b>	3x16 No. 38	<b>\$ 2</b>
50 turns per inch		38 turns per inch		20 turns per inch	


Prices are per 100 feet. The finest enamel wire is used, covered with two wrappings of unbleached Italian silk threads.

### G. A. STANDARDIZED BAKELITE PANELS

Sizes for everything from detector bases to complete sets. Every panel smoothly and squarely cut to an accuracy of 1/32 inch.

Thick	2½x5 ins.	5x5 ins.	5x10 ins.	10x10 ins.	10x15 ins.
¼ in.	\$0.30	\$0.60	\$1.18	\$2.35	\$3.50
2 oz.		4 oz.	8 oz.	1 lb.	2 lbs.
3/16	\$0.44	\$0.88	\$1.76	\$3.50	\$5.25
3 oz.		6 oz.	12 oz.	1½ lbs.	3 lbs.
¼ in.	\$0.58	\$1.16	\$2.30	\$4.60	\$6.85
4 oz.		8 oz.	1 lb.	2 lbs.	4 lbs.

When you are in New York, visit the G. A. Retail Store. You will find the best products of other companies as well as the G. A. Standardized Supplies.



**THE GENERAL APPARATUS CO., Inc.**

570-P West 184th St., at St. Nicholas Avenue      NEW YORK CITY.

## UNLISTED SECURITIES

San Francisco, October 8, 1920

Stocks	Bid	Ask
National Radio .....	21c	....
Moorhead .....	17c	18c
Poulsen .....	2¾	....

★

## ASHEVILLE N.C.

Radisco Agency for this District

★

10c stamp for Catalog and deduct from first order

SPECIAL—Complete VT & Tron receiving set on Formica panel 6½ x 10x3-16, with 43 plate variable and universal coil, \$19.50.

Manufacturers and Distributors  
**HI-GRADE WIRELESS INSTRUMENT CO.**



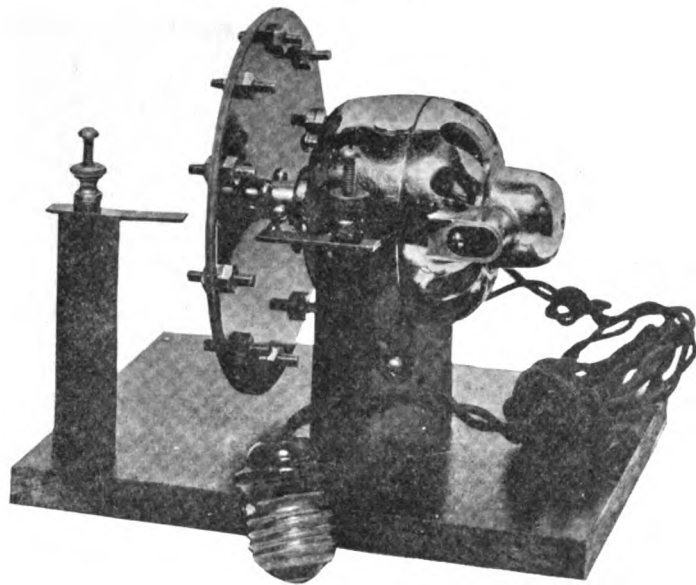
**\$12**

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Is obtained by using a Rotary Gap of  
the Proper Design, Construction  
and Insulation

### *The Price You Pay*

*for a Gap  
Does not Determine Its  
EFFICIENCY!*



*The Illustration shows our new Commercial Type  
Rotary Spark Gap.*

**YOUR RADIATING CIRCUIT WILL  
NOT DELIVER THE GOODS IF THE  
OSCILLATING CIRCUIT DOES NOT  
FUNCTION PROPERLY**

**PUT SOME LIFE INTO YOUR HOT-WIRE  
AMMETER—DON'T LET THE POINTER AS-  
SOCATE WITH THE ZERO MARK ON THE  
SCALE. THE SECRET LIES IN THE GAP**

### **RADIO DEVELOPMENT COMPANY**

*Manufacturers of High-Grade Radio Apparatus*

P. O. BOX 2114

SAN FRANCISCO

(Visit the Radio Show at the Pacific Coast Convention)

**THE ROTOR:**  
Genuine Bakelite  
5-inch diameter

**THE MOTOR:**  
110-Volts A. C. or D. C.  
Highly Finished

**THE ELECTRODES:**  
Heavy Copper Strips  
½-inch in width.

**THE STUDS:**  
Heavy Brass  
Easily Renewed.

**THE STANDARDS**  
½-inch Round  
Rubber Rods

**THE CAPACITY:**  
Up to and includ-  
ing one kilowatt

**THE BASE:**  
½-inch Hardwood,  
Mahogany Finish

**THE CONNECTIONS:**  
Flexible Cord  
With Plug

**THE SIZE:**  
Seven Inches  
Overall

**THE PRICE:** \$12.00  
Shipping Weight  
Eleven Pounds  
Include Postage



## The Recognized Symbol of Superior Performance

**L**AST season hundreds of radio operators and scores of radio dealers who placed orders for Amrad Products were disappointed on deliveries. Although manufacturing conditions are still serious we are determined that the unfortunate delays of last year shall not occur again. By placing orders well in advance of demand and maintaining adequate

stocks, the Amrad Dealer listed below renders a distinct service to the radio interests of the country.

Get acquainted with the Amrad Dealers in your locality; patronize them; they are dependable. Those whose names are prefixed by a star (\*) are prepared to fill mail, telegraph or telephone orders for any advertised Amrad Product immediately from stock.

### FIRST DISTRICT

\*Atlantic Radio Co., 88 Broad Street, Boston, Mass.  
 W. D. Kendall Co., 208 Main Street, Worcester, Mass.  
 \*F. D. Pitts Co., 12 Park Square, Boston, Mass.  
 Radio Equipment Co., 630 Washington Street, Boston, Mass.  
 Waitt and Sackett, 191 Oxford Street, Lynn, Mass.  
 \*G. B. Chase, 94 Railroad St., St. Johnsbury, Vt.  
 Rhode Island Electrical Equipment Co., 45 Washington Street, Providence, R. I.

### SECOND DISTRICT

Radio Service & Mfg. Co., 454 Merrick Road, Lynbrook, L. I.  
 American Electro Technical Appliance Co., 235 Fulton St., N. Y.  
 Brooklyn Electric Lamp & Novelty Co., 278 Fulton Street, Brooklyn, N. Y.  
 J. H. Bunnell & Co., 32 Park Place, New York.  
 \*Continental Radio & Electric Co., 6 Warren St., New York.  
 Manhattan Electrical Supply Co., 17 Park Place, New York.  
 L. Bamberger & Co., Dept. 85, Newark, N. J.  
 \*Robins & Williams, 253 South Broadway, Yonkers, N. Y.

### THIRD DISTRICT

\*Central Electric & Lock Co., 12 North 13th St., Philadelphia, Pa.  
 J. Edw. Broadbelt, Jr., 553 E. 38th St., Baltimore, Md.  
 \*Meeks-Collins Electric Co., 411 Granby St., Norfolk, Va.

\*Philadelphia School of Wireless Telegraphy, Philadelphia, Pa.  
 \*Shotton Radio Manufacturing Co., Box 3, Scranton, Pa.

### FOURTH DISTRICT

\*Carter Electric Co., 63 Peachtree St., Atlanta, Ga.  
 Holt Electric Utilities Co., 134 West Bay St., Jacksonville, Fla.

### FIFTH DISTRICT

\*Hurlburt-Still Electrical Co., Capitol Ave. and Fannin St., Houston, Texas.  
 \*Nola Radio Company, 134 Chartres St., New Orleans, La.

### SIXTH DISTRICT

\*California Electric Supply Co., 643 Mission St., San Francisco, Cal.  
 \*Southern Electrical Co., 3rd and E Sts., San Diego, Cal.  
 \*Arno A. Kluge, 639 S. Figueroa St., Los Angeles, Cal.  
 \*Western Radio Electric Co., 512 E. 9th St., Los Angeles, Cal.  
 Pacific Radio Distributing Co., Pomona, Cal.  
 Leo J. Meyberg Co., 428 Market St., San Francisco, Cal.  
 Newcombe's Electrical Service, Yerington, Nevada.

### SEVENTH DISTRICT

\*Northwest Radio Service Co., 609 Fourth Ave., Seattle, Wash.  
 H. E. Williamson Electric Co., 316 Union St., Seattle, Wash.  
 Building, Glasgow, Montana.  
 \*Glasgow Electric Shop, Orpheum

Intermountain Electric Co., 43 East 4th St., South, Salt Lake City, Utah.

### EIGHTH DISTRICT

\*McCarthy Brothers & Ford, 75 W. Mohawk St., Buffalo, N. Y.  
 \*Northern Radio Laboratory, Clyde, Ohio.  
 \*Barker-Fowler Electric Co., 117 E. Michigan Ave., Lansing Mich.  
 \*Radioelectric Shop, 919 Huron Road, Cleveland, Ohio.

### NINTH DISTRICT

\*Chicago Radio Apparatus Co., 3400 S. Michigan Ave., Chicago, Ill.  
 \*Klaus Radio Co., Eureka, Illinois.  
 \*J. Donald Vandercook & Co., 1st Nat'l Bank Building, Elmhurst, Ill.  
 \*Young & McCombs, Rock Island, Illinois.  
 \*Tafel Electric Co., 236 W. Jefferson St., Louisville, Ky.  
 \*Linze Electrical Supply Co., 1129 Olive St., St. Louis, Mo.  
 \*Central Radio Co., Independence, Missouri.  
 \*Cosradio Company, 1725 Fairmount Ave., Wichita, Kansas.  
 \*U. of I. Supply Store, Champaign, Ill.  
 \*Springfield Radio Supply Co., 1217 N. 14th St., Springfield, Ill.  
 \*C. E. Goddard, Radio 9SY, Shawnee, Kas.

### CANADIAN

\*Scientific Experimenter, Ltd., 11 St. Sacramento St., Montreal, Canada.  
 \*Salton-Foster Radio Engineering Co., 356 Main St., Winnipeg, Canada.

If your local dealer cannot supply you with the latest Amrad Bulletins, send us his name and ask for our catalog.

# AMERICAN RADIO AND RESEARCH CORPORATION

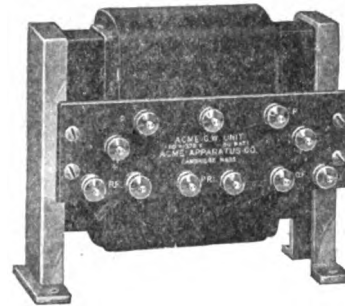
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POWER TRANSFORMERS  
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1½ HENRY CHOKE COILS

The ACME C. W. POWER TRANSFORMERS are designed for use with rectifying tubes for supplying D. C. Voltage and current and for heating filaments.

The ACME A-3 MODULATION TRANSFORMER is correctly designed for Radio Telephony without distortion of speech and for maximum modulation.

The ACME FILAMENT TRANSFORMER is designed for 110 volts, 60 cycles and delivers current at two voltages of 8 and 10 volts each.

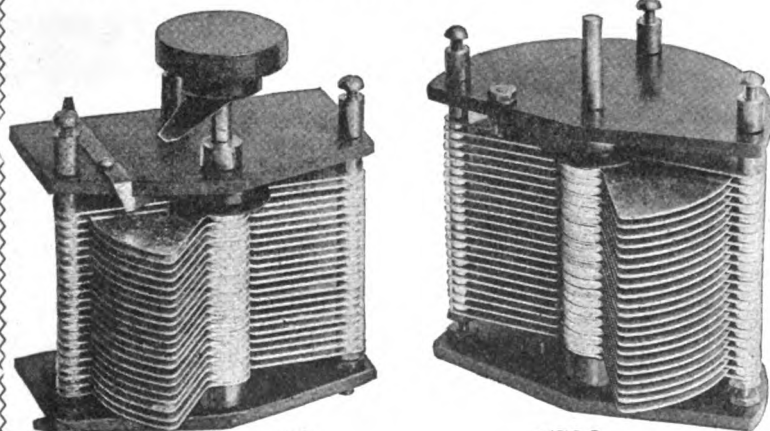
ACME 1½ HENRY CHOKE COILS are designed for use in D. C. circuit when modulating and also serve to iron out current fluctuations.

Write for Bulletins

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**ACME APPARATUS COMPANY** 21 WINDSOR STREET,  
CAMBRIDGE 39, MASS.

Up-To-Date Transformer and Radio Engineers and Manufacturers



## Announcing a New Variable Condenser

Built along the same general lines as our SERIES "S" condenser, but heavier construction throughout. The plates are die-stamped from 1/32" hard rolled aluminum, and are separated by heavier spacers. Extreme rigidity, best of materials, accurate machine work and careful assembly are the outstanding features of construction. At the present time we are unable to fill orders for the SERIES "S" condenser, as we are unable to obtain materials for its construction, but we can ship the NEW SERIES "T" and the SERIES "L" VARIABLE CONDENSER from stock.

REMEMBER—WE ABSOLUTELY GUARANTEE SATISFACTION OR YOUR MONEY BACK.

SERIES "T"		— PRICES —	SERIES "L"
No. 20	2 plate VERNIER	\$2.00	No. 2300 23 plate, .00075
No. 70	7 " .0001 m.f.	2.35	No. 4300 43 plate, .0013
No. 130	13 " .0002 m.f.	2.75	No. 6300 63 plate, .002
No. 170	17 " .0003 m.f.	3.15	
No. 230	23 " .0005 m.f.	3.60	
No. 310	31 " .0007 m.f.	4.30	
No. 430	43 " .001 m.f.	5.25	
No. 630	63 " .0015 m.f.	7.50	

Include postage for one pound

Include postage for two pounds

Either style of condenser fitted with indicating dial at additional cost of 75c.

## The Wireless Shop

511 W. WASHINGTON STREET

A. J. Edgcomb

LOS ANGELES, CAL.

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# A Combination that Can't be Beaten

For Results—real long-distance signals on short wave lengths you can't beat the



Relay Receiver (Type CR-3)  
and

Detector and 2-Stage Amplifier  
(Type RORD)

This is the Outfit which made a reputation for itself in the recent QSS tests.

You can get into the Big Relay Game and become one of the dependable long-distance men with this outfit.

Inspect this Outfit at your Dealer's. If he doesn't carry our line as yet, drop us a postal for catalogue, mentioning his name.

GREBE RADIO apparatus is licensed under the original Armstrong and Marconi patents.

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**A. H. GREBE & CO., Inc., 73 Van Wyck Blvd., Richmond Hill, N. Y.**

"In the Good Old Summer-Time"

**ACE**

You did not get that C-W set fixed up. Get busy NOW so you will be in for the coming season. We have parts or finished instruments. Only the best get our list before buying.

DEALERS, if you are going to be ready for the Holiday rush, let's have your orders. We are going to publish our dealers list, get your name in. Our apparatus is licensed under Armstrong Patent No. 1,113,149.

Remember—"You may pay more but you can't buy better."

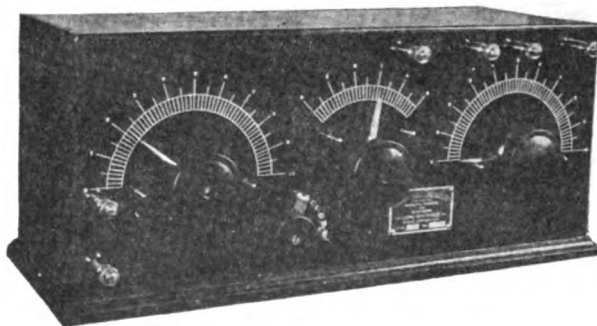
**THE PRECISION EQUIPMENT CO.**  
2437 GILBERT AVE., Dept. F  
CINCINNATI, OHIO

## Fellow Amateurs!

THE RADIO AMATEUR enters its third year of existence with the November issue. As a "different" radio journal it is gaining new friends each day. The class of advertising received speaks well for it.

The price is only \$1.00 per year. \$1.25 outside the United States.  
THE RADIO AMATEUR, MARION, ILL.

## Radiophone Music from Alaska With the C. R. L. Paragon!



C. R. L. Paragon Short-Wave Regenerative Receiver

During the week of July 26th, L. J. Simms of station KBC, Billings, Montana, copied radio telephone conversation from Alaska, using our famous C. R. L. Paragon and Amplifigon combination. And this in summer!

Think of what the C. R. L. Paragon can do for your relay work this winter!

The C. R. L. Paragon can now be used to receive long wave time signals. Watch for our announcement of the Paragon Time Adapter next month.

C. R. L. Paragon Short Wave Regenerative Receiver, F.O.B. Chicago, \$55.00.

Licensed under original Armstrong U. S. Patent No. 1,113,149 and U. S. Application Serial No. 807,388.

## CHICAGO RADIO LABORATORY

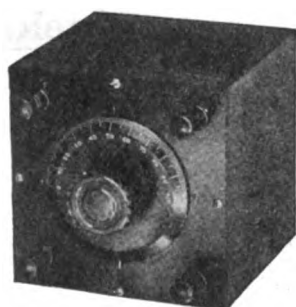
1316 CARMEN AVENUE  
5525 Sheridan Road (Testing Station 9ZN) CHICAGO, ILL., U. S. A.



**This Label**

on a "B" Battery  
 is a definite assurance to you  
 of the quality, the hard-and-fast reliability  
 that has characterized, always,  
 products backed by the name

**EVEREADY**



Type 12

**HERE IT IS**

**Lattice Wound Variometers  
 Especially Designed**



Type 7

**TO IMPROVE THE SHORT WAVE REGENERATIVE CIRCUIT**

Realizing the need of a neat, compact and highly efficient variometer for the modern receiving set, we have produced one which we feel will meet the requirements.

Type 7 is assembled ready for panel mounting and can be easily mounted by simply drilling a 1/4-inch hole in the panel.

Type 12 is a complete unit and consists of Type 7 mounted on a 4 1/2 x 4 1/2 bakelite panel incased in a mahogany finished cabinet. Four binding posts are provided so that leads can be connected to any side.

Both types are furnished with a standard 3-inch dial and knob and make a very attractive instrument.

**PRICES (Charges Prepaid)**

Type 7G (for grid circuits)	.....\$ 7.50
Type 7P (for plate circuits)	..... 7.50
Type 12G (for grid circuits)	..... 12.50
Type 12P (for plate circuits)	..... 12.50

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 DISTRIBUTOR

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# RADIO CLUB PINS

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Be sure to see these new numbers, which will put new life in your club

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Amateurs to Secure Subscriptions  
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Our Motto—"Play Fair with the Amateur"—Our Motto

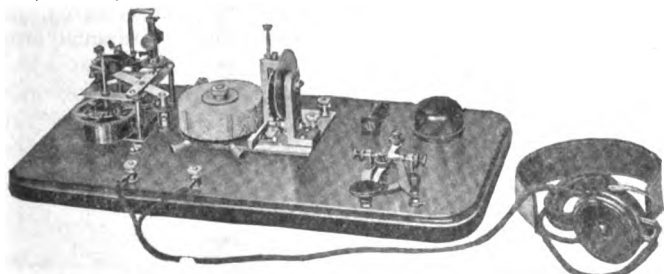
# LEARN WIRELESS AT HOME

The Demand for  
**Good Wireless Operators**  
 Far Exceeds the Supply

The New York Wireless Institute will make you an operator—AT HOME—in your spare time—quickly, easily and thoroughly. No previous training or experience required. Our Home Study Course has been prepared by Mr. L. R. Krumm, formerly Chief Radio Inspector, Bureau of Navigation, N. Y. Radio experts able to impart their practical and technical knowledge to YOU in an easy to understand way, will direct your entire Course. The graded lessons mailed you will prove so fascinating that you will be eager for the next one. The instruments furnished free, will make it as easy to learn the Code as it was to learn to talk. All you will have to do, is to listen.

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Wireless operators receive excellent salaries ranging from \$125 to \$200 a month and it is only a stepping stone to better positions. There is practically no limit to your earning power. Men who but yesterday were Wireless Operators are now holding positions as Radio Engineers, Radio Inspectors, Radio Salesmen at salaries up to \$5000 a year.



This wonderful Set for learning the Code furnished free with our Course

The transmitter shown is the celebrated Omnigraph used by several Departments of the U. S. Government and by the leading Universities, Colleges, Technical and Telegraph Schools throughout the U. S. and Canada. Start the Omnigraph, place the phone to your ear and this remarkable invention will send you Wireless Messages, the same as though you were receiving them, through

the air, from a Wireless Station hundreds of miles away. When you apply for your license, the U. S. Government will test you with the Omnigraph—the same model Omnigraph as we furnish to our students. Ask any U. S. Radio Inspector to verify this.

**FREE POST-GRADUATE COURSE**

A one month's Post-Graduate Course, if you so desire, at one of the largest Wireless Schools in N. Y. City. New York—the Wonder City—the largest port in the World and the Headquarters of every leading Wireless and Steamship Company.

**TRAVEL THE WORLD OVER**

A Wireless Operator can visit all parts of the world and receive fine pay and maintenance at the same time. Do you prefer a steady position without travel? There are many opportunities at the numerous land stations or with the Commercial Wireless or with the Steamship Companies.

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We furnish free to all students, during the course, the wonderful receiving set exactly as produced in the illustration. THIS SET IS NOT LOANED, BUT GIVEN TO ALL STUDENTS COMPLETING THE COURSE.

**EASY PAYMENTS**

A small payment down will enroll you. We will make the payments so easy that anyone ambitious to enter the fastest growing profession—Wireless—may do so.

**SEND FOR FREE BOOKLET**

Without obligating you in any way, send for our booklet "How to Become an Expert Wireless Operator"—it is free. Mail the coupon below, or postal or letter—BUT DO IT TODAY.

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Send me free of charge, your booklet "How to Become an Expert Wireless Operator," containing full particulars of your Course, including your Free Instrument Offer.

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# Wesrad Mail Order Service

Did you take advantage of last month's offerings? Are you one of the many satisfied Wesrad customers who get what they want when they want it? Opportunity raps but once—read on.

Immediate deliveries on the following items, delivered post-paid west of the Rockies.

GREBE		SOCKETS	
RORH Vacuum Tube Unit.....	\$17.00	Remler, back or table mounting....	\$ 1.50
RORE Single Stage Amplifier.....	25.00	DeForest .....	1.60
RORJ Two Stage Amplifier.....	50.00	General Radio .....	1.80
RORD Detector and Two Stage Amplifier .....	75.00		
RLVD Variable Inductance Unit..	16.50	VACUUM TUBES	
RKAB Variable Coupler Unit.....	25.00	AudioTron, Two Filament .....	\$ 6.00
RCVF Self Balanced Air Condenser Unit .....	17.50	Moorhead (AP) Electron Relay ....	6.00
		Moorhead Amplifier-Oscillator ....	7.00
		Moorhead Transmitter .....	7.50
AMPLIFYING TRANSFORMERS		MISCELLANEOUS	
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Acme A2 Unmounted .....	4.60	Acme Modulation Trans. ....	5.10
Federal, Mounted .....	7.60	Roller Smith H. W. Ammeters, Flush Mounting, 0-2½ .....	7.50
Federal, Un-mounted .....	6.10	Federal Anti-Capacity Switch....	2.80
CRYSTAL DETECTORS		Murdock Phones, No. 55, 2000 OHMS	4.75
Murdock, No. 324.....	\$ .75	Murdock Phones, No. 55, 3000 OHMS	5.75
Adams Morgan .....	1.75		
Bunnell, Jove .....	2.00		
Grebe, Dust proof, panel mounting	2.80		
DeForest, Dust proof .....	3.00		

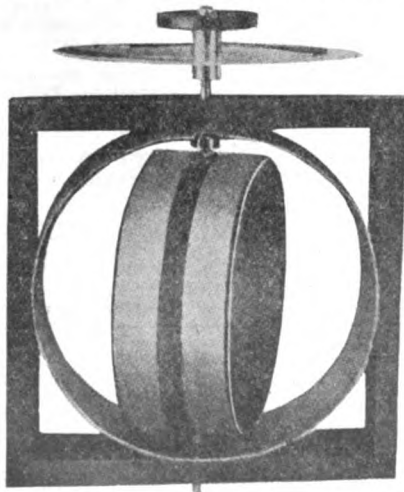
A complete stock of Acme Radio Transformers just received by freight—you know our price policy—'nuf sed. Get the Wesrad habit and you will say what we do, "Why Send East?"

## Western Radio Electric Company

550 SOUTH FLOWER ST.

LOS ANGELES, CALIF.

### Here is an Unexcelled Value in a Variometer for Regenerative Work on Short Wavelengths



It is designed for use in plate and grid circuits and may be used either for cabinet mounting or otherwise. It is provided with a non-capacity aluminum dail and scale 5 inches in diameter, with a bakelite knob. Guaranteed to be the equal in working quality of any variometer on the market, or your money cheerfully refunded.

Send 15 cents in stamps for our catalogue, illustrating many other values equal to the above. All apparatus either in knock-down or finished form. Dealers write for trade discounts.

**OARD RADIO LABORATORIES**  
"Your Ears Tell"  
STOCKTON CALIFORNIA

### ARC RADIO APPARATUS

(Continued from page 77)

cast copper tip having a rectangular end. This type is only found in the higher powered converters. C shows a recent electrode design which has found great favor because of its simplicity and ruggedness. It consists of a piece of copper tubing bent into the shape shown and sweated into a screw plug for holding it in place. It will be noted that water circulation is relied upon in all cases for preventing rapid destruction of the tip by the heat of the arc.

The negative or carbon electrode should be made of the hard uncoated, uncoated variety of round rod and should be rotated at a speed of about ¼ R.P.M. during the operation of the arc, to facilitate its even consumption. The size will range from ¼ inch for arcs up to the two kilowatt size to ½ inch for the five kilowatt size, and inasmuch as carbon is not a good conductor of heat, the length projecting out of the carbon holder should be a minimum. If alcohol is used in the chamber, the carbon will be found to be consumed at approximately the same rate as it is in the ordinary arc lamp used for illuminating purposes, and if coal gas or kerosene is used, the rate of consumption will be only one tenth to one quarter as great. The most common arrangement of the electrodes has been with the axes coincident, but most recent designs show the electrodes mounted at right angles to one another. In this connection, either a horizontal or vertical arrangement of electrodes may be used. Fig. 8 shows various arrangements.

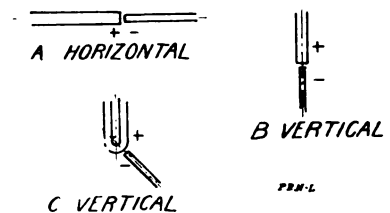


Figure 8

Much of the successful operation of arcs is dependent upon good chamber design. Good insulation and the minimizing of chamber volume are of paramount importance. Fig. 9 shows various shapes of chambers used with small arcs.

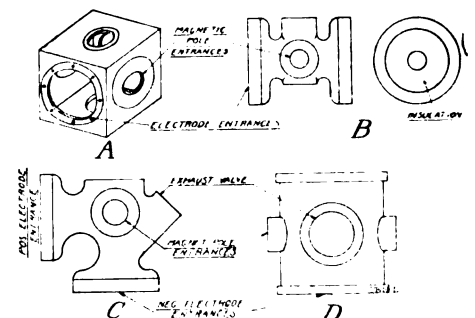


Figure 9

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Much of the successful operation of arcs is dependent upon good chamber design. Good insulation and the minimizing of chamber volume are of paramount importance. Fig. 9 shows various shapes of chambers used with small arcs. A is the common box chamber found generally in the larger sizes. It has six openings, two large ones for the electrode insulation, two for the magnetic pole tips, one for the exhaust valve, and the top one for cleaning and inspecting the interior of the chamber, B is another type of chamber wherein every effort has been made to reduce chamber volume. This facilitates instant operation upon striking the arc and makes possible the use of a minimum of gas. C is a very recent type wherein a 90 degree displacement of the electrodes is used. D is a type popular among experimenters because of its simplicity of construction. It is cylindrical in shape and has two Bakelite discs for supporting the electrodes and sealing the ends. None of the chambers illustrated are water cooled. When converters are designed for inputs in excess of three kilowatts, the chambers should be water cooled also, as very high temperatures result from the use of arcs of this size. Owing to the large amount of metal in the magnetic circuit, heat from the arc is quite easily conducted to parts of the apparatus which might be damaged thereby.

In connection with chamber design for arcs within the scope of this article, there is one more or less rigid rule that should be adhered to as closely as possible. This is, briefly, that any possible current path over insulation from one live part to another of opposite polarity, or to a part intended to be of zero potential, as the chamber, for example, should be at least two inches in length inside the chamber, and an inch long outside; and any gap through space inside the chamber from a live part to a dead one, should be at least 3/4 inch in length. This rule gives minimum distances and it is to be implied that greater distances between the various parts would be most desirable, provided this does not require excessive bulk and large chamber volume. This variation inside and outside requirements results from the fact that the insulation inside the chamber is subject to various deposits, such as soot, which greatly impairs its insulating qualities.

(To be continued)

Your Classified Advertisement in "Pacific Radio News" will reach the class of amateurs who need apparatus. Don't throw your old apparatus away—there may be a dozen of our readers who are looking for the very instruments that you no longer need.

# Materials and Parts

FOR THAT NEW SET YOU ARE BUILDING, WE HAVE IT

Brass sheet, round and square rods, sheet aluminum, fibre, bakelite and hard rubber cut to size, machine and wood screws, binding posts, switch points, knobs, insulators, switches of all types, variable and fixed condensers, and cardboard tubing.

Murdock, Acme, Tresco, Bunnell, Moorhead, Parkin and Burgess products in stock and we can give you the service you want. Our new catalogue sent for 5 cents, which will be refunded on first order for one dollar or over. Try us on your next order.

## KEYSTONE RADIO CO.

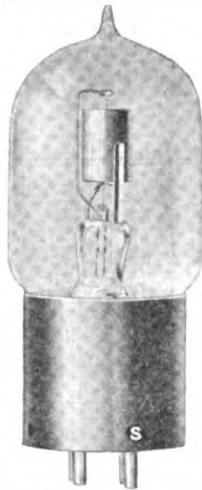
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GREENVILLE, PA.

# VACUUM TUBES

GIVEN FREE TO OUR READERS

AN UNUSUAL AND EXTRAORDINARY OFFER



Combination No. 1

## The A-P Tube AMPLIFIER OSCILLATOR DETECTOR

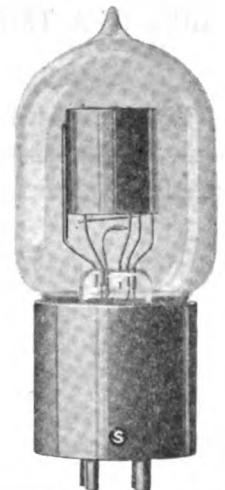
GIVEN FREE WITH A FOUR-YEAR  
SUBSCRIPTION TO

"PACIFIC RADIO NEWS"

Specify what type tube is desired.

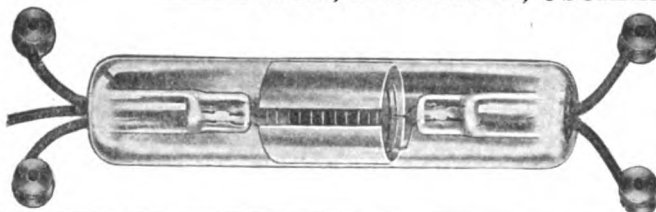
Add 25 Cents for mailing charges.

All tubes are genuine and guaranteed



Combination No. 2

## The Tubular Audiotron DETECTOR, AMPLIFIER, OSCILLATOR



Given free with a four year subscription to "Pacific Radio News". All tubes are genuine and fully guaranteed by the manufacturer. Add 25 cents for mailing charges.

These instruments will be Awarded on Extensions, Renewals or New Subscriptions. Subscription Rate \$2.00 per year.

### COUPON

PACIFIC RADIO PUB. CO.

50 Main St., San Francisco, Calif.

Herewith is \$..... and..... cents for Mailing Charges.

Please send "Pacific Radio News" for..... years to:

Name..... Street & No.....

City..... State .....

You will also promptly mail me the apparatus described in Combination No.....

When writing to Advertisers please mention this Magazine

# RADIO TELEPHONE

## and C. W. Supplies of Every Description

### METERS

Type RTS 0-500 Volt DC 3-in. Flush type	\$15.00
Milliammeter, Scale 0-100 3-in. Flush type D'Arsnoval	9.00
Model 301 Weston DC Ammeter 0-2 for filament reading	13.00
General Radio 0-1 Hot Wire Ammeter, 3-in. Flush Type	5.00
Same type 0-2.5	5.00

### CONDENSERS

1 MFD Fixed Condensers, 1,000 volt test	\$ 2.25
1/2 MFD Fixed Condensers, 1,000 volt test	2.25

We carry a full line of all standard makes of both fixed and variable condensers.

### INDUCTANCES

RT-1. 5-in. diameter. Tube 6-in. long with No. 14 hard drawn copper wire	\$ 4.50
RT-2. CW Inductance, 6-in. long, with bakelite panel, two switches, taps taken off every other turn	7.00
RT-3. CW Inductance, Electromagnetic circuit type complete, less panel and switches	7.00
RT-4. Same as above with panel	9.00
R-T5. Electromagnetic type with variable grid coil	11.00

### MODULATION TRANSFORMERS

Acme. Semi-Mounted	\$ 5.25
Acme. Fully Mounted	7.00

### AMPLIFYING TRANSFORMERS

Federal	\$ 7.10
Acme, Mounted	7.50
Acme, Unmounted	4.50

### SOCKETS

Remler, all Bakelite	\$ 1.50
General Radio	1.75
DeForest	1.60

### CHOKE COILS

1 1/2 Henry 500 M. A.	\$ 6.50
1 1/2 Henry 150 M. A.	4.25
Two coil type	8.50
Radio Frequency choke coil	2.00

### VARIOMETERS

We have just received a supply of the NEW Clapp-Eastham Variometers.  
 Price, without dial and knob.....\$ 6.00  
 With dial and knob..... 6.75

A COMPLETE LINE OF RECEIVING AND TRANSMITTING SETS AND PARTS

### RHEOSTATS

General Radio 1 1/2 Ampere carrying capacity. 7 OHM Panel Type	\$ 2.50
Remler, large size panel type	1.75
Small Size	1.00
White Porcelain base, 10 OHMS	1.25

### KEYS

Small Telegraph key for CW buzzers	\$1.50
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### BUZZERS

Back mounting adjustable knob, through panel	\$ 2.75
Century	3.00

### VACUUM TUBES

A-P Transmitter tubes	\$ 7.50
A-P Amplifier tubes	7.00
A-P Detector tubes	6.00
Audiotrons	6.00

We are the manufacturers of the Pen Brand Grid Condensers. Price.....\$ 1.00

Visit our booth at the Pacific Coast Radio Convention exhibit.

We do not issue a catalog. Keep this page for reference.

GIVE US A TRIAL. WE APPRECIATE YOUR BUSINESS AND YOU WILL APPRECIATE OUR SERVICE

## THE RADIO TELEPHONE SHOP

175 STEUART STREET

SAN FRANCISCO, CAL.

## Buy Your Radio Apparatus on the Pacific Coast

De Forest, Amrad, Radisco, Bunnell, Murdock, Moorhead and other apparatus carried in stock at list prices F.O.B. Seattle.

### MAGNAVOX AGENCY

Arco Amplifying Transformers	\$5.00
Federal Transformers	7.50
Mica Grid Condensers	.50
Genuine Navy Rheostats	2.75
45-volt "B" Batteries	5.00
Audion Panels	11.00
Audion Panels (professional)	15.00
1-stage Amplifier	22.50
2-stage Amplifier	40.00

We reached Portland (150 miles) with our type "O" Radiophone using AC. Why not install one?

## Northwest Radio Service Co.

609 Fourth Avenue

Seattle, Wash.

# FORMICA

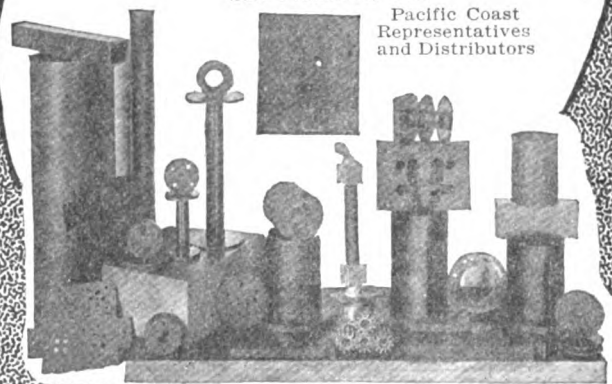
Many manufacturers of radio apparatus use Formica exclusively because of its exceptional tensile and dielectric strength. Formica on account of these qualities is ideal for many mechanical uses also.

Write for data and prices.

**THE FORMICA INSULATION CO.**  
 Cincinnati, Ohio.

"The Hermans-Griffith Co., Sheldon Bldg.  
 San Francisco, Cal.

Pacific Coast  
 Representatives  
 and Distributors

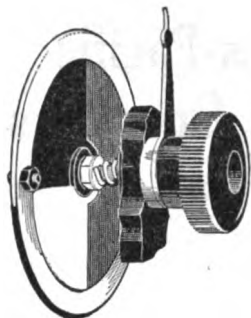


SHEETS TUBES RODS

**WIRELESS AND COMMERCE**

**T**HE French postal authorities are making a great effort to apply wireless telegraphy to the needs of commercial men. Since June the Eiffel Tower and Lyons stations have been authorized to transmit messages on certain lines. From the Eiffel Tower messages have gone to Belgrade and Budapest, and from the Lyons station to Annapolis, near New York, and negotiations are at present taking place for a new line between Paris and Bucharest. Although the services are working well, it is admitted that French business men are loth to entrust their telegrams to the Hertzian waves, preferring the ordinary cables. With a view to encouraging them to make use of wireless telegraphy it is pointed out that France is not well off in the matter of cables, and has in fact to make use of the British lines. There are complaints of long delays through the messages of British merchants being accepted first, and there is a suggestion that as a result French business men lose the race for orders, their British competitors getting in first.

This is one of the reasons why it is sought to develop wireless telegraphy and to urge French commercial men to use it. By the end of next month it is expected that the Lafayette station, near Bordeaux, will be ready to receive commercial and other messages for America and for other parts of the world. This powerful station was made by the Americans in order to insure rapid communication between the General Staff of General Pershing and America. The installation was begun in May, 1918, and the work was finished last month, when trials were begun, and will last until the end of September. The station will then be handed over to the French postal authorities. It is claimed that it is the most powerful station in existence, and that it can not only send messages 12,500 miles, as was predicted two years ago, but to the ends of the earth. As the waves travel as quickly as light—that is to say 187,500 miles a second—it is claimed that they can make the tour of the earth in one-seventh of a second. It is hoped that Bordeaux will become a wireless telegraphy office for communicating with America. A day and night service is contemplated, and it is calculated that it will be possible to send 72,000 words every twenty-four hours. It is the intention to use this station to connect France with her colonies, and there is a talk of installing at Saigon, in Indo-China, a station as powerful as that at Bordeaux, and other posts in Algeria, French West Africa, the Congo, and Madagascar.—London "Daily Telegraph."



**A New Invention**

The Parkin .001 mf Variable Condenser (pat. applied for) fills the long felt want for a rugged, low priced, balanced variable condenser for panel mounting. No plates to bend and short circuit. Cannot get out of order. Has very low minimum capacity. Easily mounted, only one small hole being necessary in the panel.

Guarantee: All Parkin Condensers are sold subject to return within five days if not fully satisfactory.

- No. 50 .001 mf Unit alone, may be mounted on any shaft... \$1.50 postpaid
- No. 51 .001 mf Unit with knob, pointer, etc., as shown..... \$2.00 postpaid
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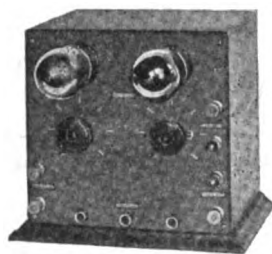
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Individual Filament Control, Plug and Jacks for Changing From Detector, One or two Steps of Amplification, Federal Transformers, Bakelite Panel, Hand Rubbed Finish and Mounted in a Quartered Oak Cabinet. Will Operate From Same "A" and "B" Battery Used for the Detector Circuit With Same Amplification. Constant.

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Wireless Receiver Specialties

# PAGE 99

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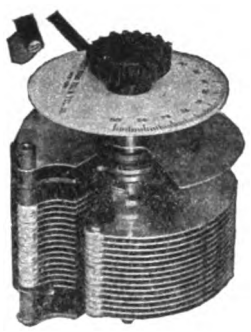
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- Audion Control Panel.....\$7.80
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### New!-The "Nucleus" \$36

consists of a carefully grained and finished Bakelite panel, fastened to a Mission oak base, at the top is mounted a \$10 General Radio Flush Type Hot Wire Radiation Meter; a \$5 Western Electric Microphone and Type J Flush, Plate Current Milliammeter. Below is mounted a .0006 Type C.S.U. Variable Condenser with Silver Plated Navy Dial Indicator. Additional instruments may be mounted and connected, thereby making a first class wireless 'phone, at minimum expense and bother. Investigate, or—  
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We are in need of subscription solicitors in every city of the U. S. Write today for our proposition.

### ACOUSTIC TUNING

(Continued from page 85)

length of the sound emitted by the telephone, after the electrical tuning has been properly cared for, we have a means at our disposal for tuning out interference which is bound to fill a long-felt need.

Just as the spark frequencies, which have nothing to do with the electrical wave length, cause the telephone diaphragms to vibrate and produce a note at the receivers corresponding to the note produced at the transmitting station by the spark discharge and just as acoustics enable us to differentiate between these notes, so it is with static.

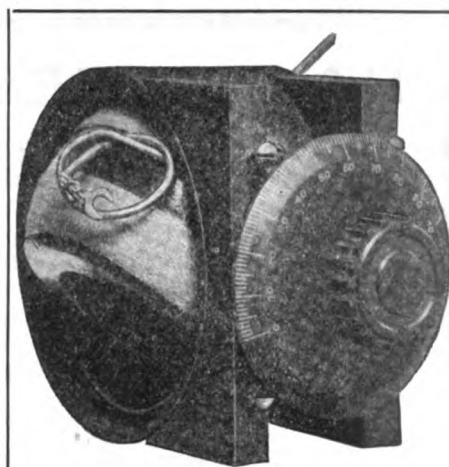
The interference caused by static is not confined to any wave length and regardless of the tuning qualities of any receiving system, static will force its way through. But it is a fact that the frequency of static discharges in comparison to the spark discharge of a modern radio transmitter is low. The note produced in the telephones is therefore of a low pitch. From this it will readily be seen that a method of tuning to the resonance point of the sound produced by the telephone receiver will permit us to cut out the static and hear the signal or cut out the signal and hear nothing but static.

When receiving undamped signals the method of tuning is somewhat different and the note produced in the telephones, instead of depending upon spark frequency, depends upon the difference between the wave sent out by the transmitting station and the wave sent out by a local oscillator. This local oscillator may be either of the heterodyne or autodyne type. Variation of this difference of wave length permits us to cause the telephone receivers to produce any desired pitch. The field of acoustic tuning is thereby very much broadened.

The value of acoustic tuning will undoubtedly be felt very strongly and it is bound to revolutionize our present system.

Pacific Radio News has been informed by the Nostat Company that tests are now under way, in the Gulf of Mexico, where King Static formerly reigned, and very marked results have been noted. Acoustic tuners are now being used on trans-Atlantic vessels, as well as those running between Gulf and Atlantic ports, and arrangements are now being made for their installation on Pacific steamers, as well as shore stations throughout the country.

These machines are on exhibit at the office of C. C. Langevin, 24 California street, San Francisco, and those interested may see the device in operation.

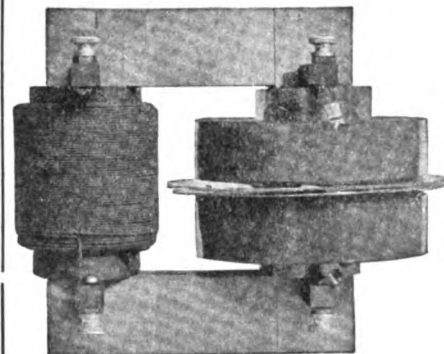


TYPE Z. R. V.

Variometer has unit construction with bakelite shell and hardwood ball. Has low dielectric losses and a range of inductance of 1.25 mil henry maximum to .1 mil henry minimum. Is readily used on table or mounted on panels.

Complete with 3-inch dial and knob ..... \$6.50

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THEO. AUDEL & CO., 72 Fifth Ave., N. Y. Please submit for examination Hawkins Electrical Guides (Price \$1 each). Ship at once, prepaid, the 10 numbers, if satisfactory, I agree to send you \$1 within seven days and to further mail you \$1 each month until paid.

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ANYTHING IN—

# RADIO APPARATUS

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Frank P. Herrguth      Al Rosenberg  
 Formerly of Paul Seiler Electric Works

520 Market Street

San Francisco, Cal.

When writing to Advertisers please mention this Magazine

# RADIOTORIAL

(Continued from page 75)

when every man will have to earn, fairly and squarely, every cent of his salary.

And the operators, that great mass of men in our radio industry who keep the name of "SERVICE" ever upon the door of the radio stations at shore and at sea—they too are settled down to a lesser group of men. The war made thousands upon thousands of radio operators, but of these, we all know too well, many were not adapted for the game that requires not only ability but talent. Now the profession has simmered down to those men who can "pound the brass" and do it well, ready to give service for a fair salary.

Last, but not least, are the amateur radio men who are the engineers, operators and manufacturers of the future. Most of these men are just beginning to get their sets into good order and into shape for the coming winter. Many of the amateurs are contemplating the installation of tube transmitters. This is certainly good to observe, because if there is anything that will solve the eternal QRM problem amongst amateurs it is the tube transmitter. A thousand amateurs with properly built vacuum tube sets could work together or with other amateurs in outlying districts, and all be within a city without interference of any kind. So we see ahead of us, in the amateur game, a period of upbuilding and construction and progress. More enjoyment, better sets and more general satisfaction amongst amateurs is the coming thing.

The convention will bring all the radio men of the Pacific Coast together; commercial operator, amateur, manufacturer, government radio men, all will meet in San Francisco in one big open-hearted handshake, and after the three big days, will return to their homes for a successful and prosperous year, enlightened and contented.

**E**QUIPMENT of all lighthouses with wireless will reduce the dangers from fog to a minimum, according to Frederick Kolster, radio expert of the Bureau of Standards, who was here from Washington inspecting the new radio compass stations which were established last week to aid vessels in finding their positions offshore.

Kolster has designed a system by which short wave signals can be sent from lighthouses and lightships that can be picked up by captains on approaching shore and thereby obviate the use of the compass stations and the operators. By this system a captain could adjust his compass to the signals and proceed to port without danger of running ashore.—S. F. "Call."

*The*  
**San Francisco Radio Club**  
INCORPORATED

Invites the Radio World

TO THE FIRST

## Pacific Coast Radio Convention

TO BE HELD IN SAN FRANCISCO DURING THE LATTER PART OF NOVEMBER

**T**HIS INVITATION is extended to you, as a brother Radioman, Amateur, Commercial, Governmental, or otherwise, for the sole purpose of being favored by your presence at this, the most important undertaking on the Pacific Coast in our entire radio history.

**T**HE PURPOSE of the convention is to bring together the Radiomen from every nook and corner of the continent, in order to discuss the development of the radio art since the signing of the Armistice.

**S**PEAKERS of prominence will address the visitors, and many vital factors will be discussed. Plans for the betterment of amateur radio will be formulated. It is proposed to make the convention an annual affair. We have many surprises in store for you, and it is to your own advantage that you favor us with your presence. If you have the interest of radio at heart, seriously; if you want protection from radio laws and bills that are introduced from time to time; if you want to know how good the radio game really is—then, by all means, come to the convention.

**R**ADIO Clubs are requested to send delegates to the convention. A general invitation is extended to members other than delegates. The committee on arrangements will provide hotel accommodations for out-of-town guests. Your inquiry will be given personal attention.

**T**HE MAIN CONVENTION will open on Thanksgiving Night, Thursday, November 25th. An elaborate radio show will be staged. Leading manufacturers will have their products on display.

**A**BANQUET, "the kind that's different," a radio ball and other social features will be a part of the affair. We ask you to mail us the blank at the foot of this advertisement. A bid to attend the convention will reach you by return mail. We will also advise you of the time and place where the convention will be staged. The general public will be admitted to the exhibition and ball, but only those who possess a bid will be admitted to the convention proper. A nominal charge will be made to visit the exhibits and the ball, but there will be no charge for your seat at the convention.

*The Committee on Publicity*

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YOUR  
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Give it the widest publicity possible. Tell every one of your friends about it. Announce it "via radio" from your station.

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2460 SUTTER ST., SAN FRANCISCO, CALIF.

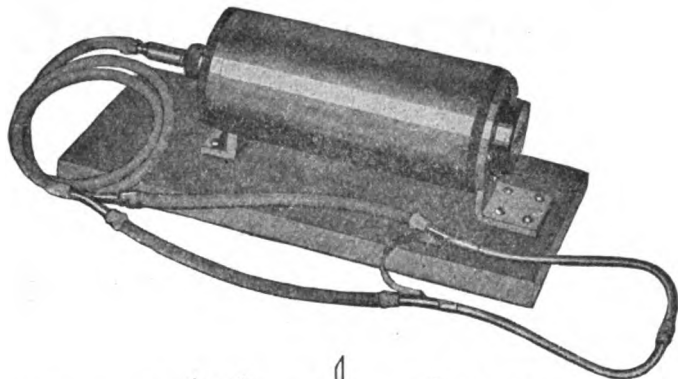
You will please reserve..... seats for myself and..... radio friends, who will attend the convention. It is understood that there will be no charge for this service.

Name..... Address.....

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For working through  
(QRN) or (QRM)



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equipment you can not  
afford to be without

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"Storage batteries, for audion filaments, etc. Guaranteed two years, 6 V 40-60 amperes \$16.00. 6V 60-80 amperes \$19.00. Immediate delivery, dealers wanted." WILLIAM SCHICK, 2723 Cooper Ave., Brooklyn, N. Y.

THREE STEP AMPLIFIER. Modeled after the French type. Has three amplifying transformers, three tube sockets, filament control rheostat, switch for changing from Detector and Two Step Amplifier or Straight Three Step Amplifier. In good condition. Price \$98.00. H. E. MATT, 1701 Franklin Street, San Francisco, Calif.

A GOOD CHRISTMAS RADIO STORY WANTED.—1600 words in length. Send manuscripts to the Editor of "Pacific Radio News", 50 Main Street, San Francisco, Calif.



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bulb owners have been looking for

Price \$1.50

Pat. App. for

**Radisco Agency**  
We make special instruments  
to order



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Dealers write for propositions.

**Amateur Wireless Equipment Co.**  
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## Our Paragon Rheostat

has become the standard filament resistance. For back of panel or table mounting. 2¼-in diameter. 6 ohms., 1½ amps.

\$1.75 Postpaid

Immediate shipment.

Standard VT Socket \$1.00. Why pay More?

44 Volt Variable "B" Battery, \$3.60

Include Postage on 4 Lbs.

Complete in handy wooden case and adjustable phosphor-bronze "Jiffy" connectors. Better than block batteries! If one 4.4 V. unit weakens prematurely, it can be removed and replaced, thereby not impairing the total voltage—making this the best battery value on the market.

Audiotron Adaptor

Consists of standard 4-prong base with brass supporting connectors. Permits mounting tube in vertical position, so filament will not sag and touch grid.

\$1.75 Postpaid

Aerial Wire 1c Per Foot  
7 strands No. 22 solid copper—tin plated to prevent oxidation. Include postage on 15 lbs. per 100 feet.

Ground Wire 8c Per Foot  
\$7.00 Per 100 Feet

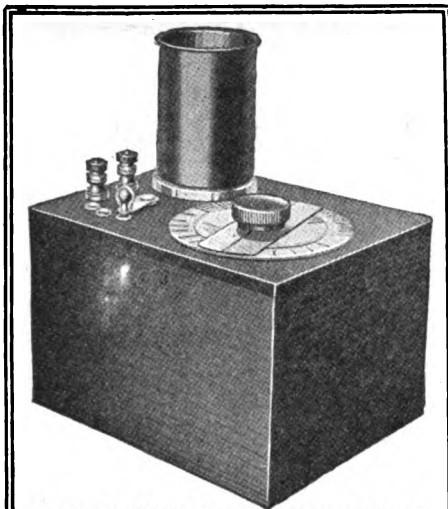
No. 4 solid copper—triple braid—rubber covered. Include postage on 20 lbs. per 100 feet.

Lightning Switch, \$4.00  
600 volts, 100 amps., S.P.D.T.

**Radio Equipment Co.**

630 Washington St.  
Boston-11, Mass.





**DOOLITTLE DECREMETER**

A superior Wavemeter and a Decremeter in one instrument. Will enable you to adjust your station to the legal requirements and at same time improve the efficiency of your transmitter. **PRICE \$25.00**

Shipping weight 4 lbs.

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157 Valley St. New Haven, Conn.

**Radio Engineering Principles**

By Henri Lauer and H. L. Brown

This is one of the first books to cover progress in radio engineering during and since the war. It contains much valuable information on vacuum tube theory and practice. A worthy addition to any wireless man's library.

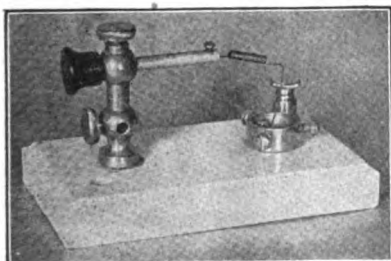
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This Mineral Detector is a most valuable device to eliminate the Amateur's troubles in Wireless Operating

**PRICE \$2.25 EACH**

Including Parcel Post Charges

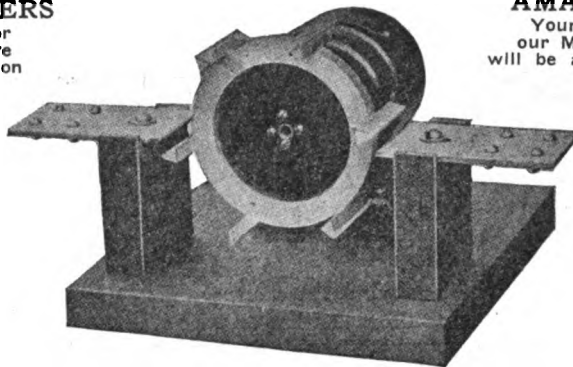
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Write for Attractive Proposition

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Vacuum tube control panels and amplifiers, unit panel type. Oscillation Vacuum tube control panels and amplifiers, unit panel type. Oscillation transformer, highly efficient. Antenna switch, mighty good and reasonably

**Wireless Manufacturing Co. Canton, Ohio**



**HOOK 'ER TO YER BULB**

THE MOST WONDERFUL TUNER IN THE WORLD \$10.

Add Parcel Post  
COILS ONLY \$6.00

A WONDERFUL TEST. CAN YOU BEAT IT?

During the out-door meet of the convention of the A RR L at Chicago, September 3, one of our 20000 Meter tuners was set on the sand in front of 9 Z N Radio Station and the aerial was nothing but a bell wire 50 feet long lying on the sand. The ground was tied to the ground lead of 9ZN. Two pairs of phones permitted everyone willing to read all the Arc stations going at that time. Good readable signals and the time was from 3 to 6 P. M. A further test was made in room 760 Edgewater Beach Hotel by hanging the 50 foot wire out of the window and the ground was tied to a radiator. European stations were copied all night. All the leading amateurs of the middle west were at the meeting.

**KNOCKED DOWN OR ASSEMBLED CONDENSERS**

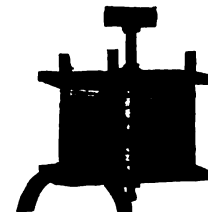
Which kind do you want? Made for panel mounting and are complete with scale, pointer and knob. Used all over the world. No C. O. D. orders, add Parcel Post. Buy from your local dealer or send us his name if he can't supply you. Formica tops and bases. Movable plates are now held by nuts and not clamped with washer as formerly

11 Plate K.D.	.....	\$1.80
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41 Plate K.D.	.....	3.20
11 Plate assembled	.....	2.75
21 Plate assembled	.....	3.25
41 Plate assembled	.....	4.25

Tuners Licensed under Armstrong Patent

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**DESIGN - WORKMANSHIP - PERFORMANCE**



**K**ENNEDY RECEIVING EQUIPMENT IS SETTING A NEW HIGH STANDARD OF QUALITY IN APPARATUS FOR THE RADIO AMATEUR AND EXPERIMENTER.

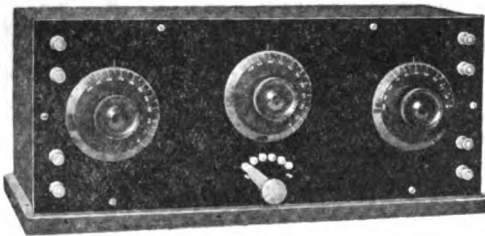
**I**T IS BUILT FOR THOSE WHO ARE SATISFIED WITH NOTHING SHORT OF THE *BEST*—FOR THOSE WHO TAKE PRIDE IN MAKING RECORDS THAT ARE BETTER THAN THEIR NEIGHBORS'—FOR THOSE WHO WANT THEIR STATIONS TO HAVE THE APPEARANCE OF CAREFUL, EXPERT DESIGN BY THOSE WHO KNOW HOW. *ARE YOU IN THAT CLASS?*

**I**F YOUR DEALER CAN'T SUPPLY YOU WITH KENNEDY EQUIPMENT, WRITE US YOUR REQUIREMENTS, AND MENTION HIS NAME.

**THE COLIN B. KENNEDY COMPANY**

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**ANNOUNCEMENT**

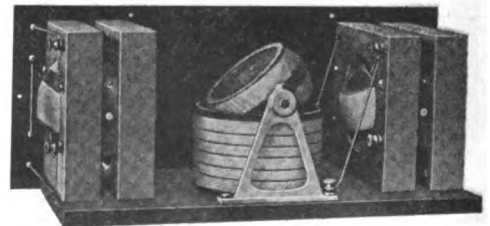
Negotiations have recently been completed with THE RADIO SHOP of San Jose, California, whereby The California Electric Supply Company will distribute their entire output of Short Wave Regenerative Receivers, Variometers, and Vario-couplers

A slight increase in price is necessary to meet added costs of material and to facilitate prompt delivery to our patrons. We will, however, fill all orders received before November 15th at the old prices. This will give all an opportunity to obtain these already well-known units before new prices are effective.

**NEW PRICES**

(Effective November 15th.)

- RADIO SHOP Short Wave Regenerative Receiver.  
Licensed under Armstrong U. S. patent No. 1,113,149. \$50.00
- RADIO SHOP Variometers, each..... 10.00
- RADIO SHOP Vario-couplers, each..... 8.00



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643 MISSION STREET

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# Amplification 100 Times

Do you want to receive signals of marvelous strength; to hold those that gradually fade out and to bring in stations that you have never heard before? You do not need a big aerial to get them—use the new



## Paragon RA-Ten

**Amplifying  
Short Wave  
Receiver**

Licensed under Armstrong and Marconi Patent, 1,113,149.

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Do you remember the super-service of the old original Paragon RA-6 amplifying short-wave receiver? This new set surpasses it in every respect.

*And the original RA-6 was the only one of its kind.*

**150 per cent improvement over the old original Paragon, away ahead of all other receivers and excels the most serviceable set on the market today.**

### Here are the 150 per cent Pointers

A wave length range of 160 to 1000 meters.

24 per cent more sensitive and selective than the RA-6.

All amplification obtained without change of spark tone.

Changeable effect of change in note entirely eliminated.

Coupling has scale of 180° instead of 90° giving wider range of coupling.

Knobs on all adjustments fitted with vernier attachments permitting of very fine tuning control.

And end losses.

Set of quartered oak; overall size 20 $\frac{1}{4}$ x8x7 $\frac{1}{2}$  inches; white filled engraving, bakelite knobs and dials.

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Our word of honor to you is our guarantee. Let us prove it.

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Did you ever stop to consider the "Radio-Co-operation" of the instruments you buy? How do they co-operate and conform with each other, when they are hooked up in your station? Do you get the strength of signal that only comes from apparatus "that works in harmony."

RADISCO apparatus does just that; every single instrument turned out by Radisco Engineers is a piece of master craftsmanship which must be subjected to the most rigid scrutiny of laboratory censorship known; and not a single article is marketed until it is proven by actual tests to work in harmony with the other Radisco instruments of quality in "Radio-Co-operation."

The latest triumph to be released from the Radisco Laboratories is the

## Radisco Coupler

Specially designed for use with the No. 1 Variometer

The stationary winding consists of 37 turns in groups of six turns and single turns. Strength and high insulation insured by use of Bakelite tubing. Brass bearings support thoroughly seasoned wooden ball; Brass shaft of standard size to fit the No. 67 Corwin dial projects far enough for Coupler to be readily mounted. The whole instrument is finished off on a neatly varnished wooden base.

No. 2 Coupler (as illustrated) \$8.50

No. 2D Coupler with "dial" \$9.75

Shipping weight 3 pounds



The agents listed below carry all Radisco products and they will be glad to consult with you on the new Radisco Coupler

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