warning!

Never buy a vacuum tube advertised as both a detector and an amplifier—no, not at any price. A vacuum tube can be either a detector or an amplifier, but no one tube can efficiently serve both purposes. That is an established fact. You know it. Only a combination of tubes provides all necessary operating characteristics without compromising essential features. And the A-P Vacuum Tube Combination is the one such proven combination on the market today.

The A-P Electron Relay is the most sensitive spark detector known to the radio art. It is a soft tube. It contains the right quantity of gas, and, equally important, the right kind of gas. The electrodes are correctly designed. You know this tube will give you results. On the market since May, 1920, it has made good in actual use.

A combination of two or more A-P VT tubes as amplifiers with an A-P Electron Relay as the initial detector or oscilator is the ideal receiving combination for long distance amateur or long wave reception. Only with such a combination can full efficiency and best results be obtained.

For sure results, for better results use A-P Tubes and only A-P Tubes—built up to quality, not down to price—the A-P Vacuum Tube Combination. Equipped with the SHAW standard four-prong base. Manufactured under the DeForest Audion and Fleming patents. Other patents applied for and pending. The A-P VT Amplifier-Oscillator—price $7. The A-P Electron Relay—price $6. Order from your dealer.

PACIFIC RADIO SUPPLIES CO. ATLANTIC RADIO SUPPLIES CO.
638 Mission St., San Francisco, Cal. 8 Kirk Place, Newark, New Jersey

Distributors for the Moorhead Laboratories, Inc.
It Merits Your Investigation

Demand Cunningham Tubes
The Name is etched on the glass

Type C-300
The Ideal Amateur Tube
$5.00

Cunningham Audiotron Tubes
WITH STANDARD FOUR PRONG BASE

These tubes embody all the knowledge and skill of many years research by the leading vacuum tube engineers. The New CUNNINGHAM TUBES are manufactured to rigid specifications in the world's largest vacuum tube factory. Quantity production by machinery makes possible the remarkable price.

Receiving tubes are of two general types. The high vacuum Navy type of rigid operating specifications for radio and tone frequency power amplification. Plate and filament adjustment are not critical. Detector properties are sacrificed to provide maximum amplification in multi-stage and complex circuits without distortion. An amplifying tube is necessarily an oscillator.

The gas content type designed for maximum signal audibility and sensitiveness in detector circuits. CUNNINGHAM TYPE C-300 is of the latter class and its combination properties exceeded the expectations of its designers. The plate requires only 22 1/2 volts—a single block cell. Maximum sensitiveness is always between 18-22 1/2 volts. In addition to its wonderful detector properties, low B battery, quietness in operation, it functions as a tone frequency amplifier and is a free and persistent oscillator for regenerative amplification and CW reception. The pleasure and satisfaction from operating this tube cannot be described. Price

Cunningham Type C-301 High Vacuum Amplifier

is the most efficient and stable amplifier ever produced and meets the demand for the Navy type amplifier and regenerative receiver. The exhaust is carried to a high stage permitting operation at plate voltages from 40 to 100 with increasing amplification. Amplification constant 6.5-8 at 40 volts plate and 8-10 at 100 volts. Filament operates on 6 volts with rheostat. Try C-301 in your multi-stage amplifier with loud speaker. There is a surprise waiting for you. Price

Service and Quality since 1915

Guaranteed by

TRADE AS
AUDIOTRON MFG. COMPANY
35 MONTGOMERY ST., DEPT. N SAN FRANCISCO

When writing to Advertisers please mention this Magazine.
SEND FOR OUR CATALOG
Ask Your Dealer To Show You Our Goods

Young & McCombs
L.P. BEST PRES.
ROCK ISLAND, ILL.

MANUFACTURERS—JOBBERS—RETAILERS

ROTARY GAP No. YM-1
A new development in the rotary line has been made expressly for Young & McCombs. Improvements on the well-known saw tooth rotary wheel make this gap the equal in size and efficiency to any selling for twice the money. It operates on the market which will run smoothly and reliably in either a horizontal or vertical position. Can be run in a vertical position while screwed to the wall. Rotor is made of cast aluminum with formula center. Has liberal sparking space and is drilled for either ¼ or ½ shafts. Variable motor speed switch in base.
PRICE—Completely Assembled—$16.00

SAW-TOOTH 16-POINT ROTOR
$4.50
ROTOR BASE AND STANDARD $7.00

“COOTIE” KEY No. YM-6
The “Cootie” key is the snappest sending device offered on the market for reliable spacing of characters. Large standards, formula knob, substantial silver contacts suitable for use up to 2 kW. The double action of the “Cootie” key lends an individuality to your sending. Price, Nickel-plated $5.00.

UNIT SECTIONAL CABINET RECEIVERS

YM-7b — YM-9 — YM-6a
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 160 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.

YM-7b — YM-9 — YM-6a
TUNERS
YM-7b—With plain mount $29.50
YM-7a—With geared mount $22.50
(less coils)

CRYSTAL DETECTOR
YM-9 Complete with test buzzer and battery $24.50

DETECTORS—AMPLIFIERS
YM-6a Detector $25.00
YM-6e Amplifier $31.00
(less bulb)

WESTERN REPRESENTATIVE—LEO. J. MEYBERG CO., SAN FRANCISCO, CALIF.
Amrad Radio Products enjoy distribution in every district of the United States and in Canada. They are recognized as the fastest growing line of quality radio apparatus on the market.

The dealers listed below are Amrad Dealers and have been carefully selected because of their experience in the radio field and their known reliability in business. They are prepared to fill immediately from stock all orders for any advertised Amrad Product and, in addition, give real Amrad Service to operators everywhere.

Visit your Amrad Dealer. See for yourself the latest in radio design and let him help you meet your needs.

In most cases your dealer can supply you with the latest Amrad Bulletins. If not, write us. If an Amrad Dealer does not happen to be in your immediate vicinity send us the name of your nearest dealer and we will be pleased to send you the up-to-date Amrad Catalog.
ARE YOU GOING TO BE Satisfied With Obsolete Apparatus or are you going to start the new year with something new Let Us Give You a Vacuum Tube Free of Charge!

Read this Remarkable Offer and see how easy it is for you to improve your equipment without any added expense

HERE IS THE OFFER:

Get four of your radio friends to subscribe to "Pacific Radio News" for one year. Send us eight dollars for these four subscriptions and 25 cents for mailing charges. We will promptly send you a vacuum tube absolutely free of charge. If you cannot get four individual subscriptions, get two of your friends to subscribe for two years each. These tubes will also be awarded to you if you subscribe as an individual for four years. If you are already a subscriber you can extend your subscription for four years. In short any combination for which you send us eight dollars will be accepted. All tubes are new and genuine and fully guaranteed by the manufacturer.

HERE ARE THE TUBES:

When ordering specify whether you want an A.P V.T. Detector, Oscillator or Amplifier tube or the new Cunningham Audiotron.

YOU SAVE FROM FIVE TO SEVEN DOLLARS ON THIS OFFER

HERE IS ANOTHER OFFER ON WHICH YOU SAVE FIFTY PER CENT

These instruments retail at one dollar each. Add 10 cents for postage.

THE PARKIN PANEL MOUNTING RHEOSTAT OR THE NEW PEN BRAND GRID CONDENSER GIVEN FREE WITH ONE SUBSCRIPTION TO "PACIFIC RADIO NEWS."

DOUBLE VALUE FOR YOUR MONEY—PLAIN AS DAYLIGHT.

NOW IS THE TIME TO SUBSCRIBE! MAIL THE COUPON TODAY.

SUBSCRIPTION RATE, $2 PER YEAR

PACIFIC RADIO PUB. CO.
50 MAIN ST.
San Francisco

Herewith is $........... and cents for mailing charges for which you will send "Pacific Radio News" for............. years to:__________________________

Name:__________________________

Address:__________________________

You will also promptly send the following apparatus as a premium for the above subscription:__________________________
Signals

The First Americans used to signal with smoke clouds as far as they could see.

Modern Americans now communicate around the world by invisible electric waves.

Whether dots and dashes, or spoken words convey the message, it is the AMPLIFIER which makes long distance radio service possible,—by the mere turning of a switch, you can bring those trans-ocean stations to your ears like magic,—or you can sit back and listen to local stations with your telephones lying on the table.

AND WHEN YOU GET YOUR AMPLIFIER, GET IT FROM THE AMPLIFIER SPECIALISTS.

The "SUPERADIO" Detector and Single Stage Amplifier, with the new Filament Temperature Indicator.

$45.00

The "SUPERADIO" Two-stage Amplifier, with the new Filament Temperature Indicator,

$55.00

The "SUPERADIO" Amplifiers are the BEST. GET THE BEST FIRST, AND NEVER REGRET.

Write for Bulletin 110.

SUPERADIO

CORPORATION
2674 BAILEY AVE.
NEW YORK
SUCCESSORS TO—
L.M.COCKADAY & CO.
The Backbone of a Radio Journal

Many people engaged in radio work are denouncing the radio publications that contain a large volume of advertising. "Nothing but ads," was the phrase we overheard at a local radio store recently when a prospective purchaser of a radio journal refused to buy either of the four publications on display. If this person would only stop to think that without the ads there would be no radio publications, he would not have made the aforementioned absurd remark.

Advertising, from a timid, fumbling idea, has become not only a science but a business. It has grown large, prosperous and necessary, and without its aid the wheels of modern industry would not spin and the needs of the public would not be so easily answered.

As the advertising of a publication increases the amount of reading matter also increases. Some publications can run a lifetime without an inch of advertising but the story is a different one when applied to radio journals. Not fifty years ago one of the large National monthlies refused $17,000 for an advertisement of a certain new household necessity. What would the average amateur radio station look like today if the owner had not patronized the advertisers of one radio journal or another?

Do you think for a moment that long distance amateur communication would be possible without the aid of the radio manufacturer in giving us what we need to accomplish the present day unusual feats? Therefore, in order to publish new ideas for the construction of modern radio equipment and bring these ideas into your station, you must read the latest radio publications and these publications would not reach your station were it not for the advertising that they contain.

Advertising, like all other useful bodies, has its troubles. Its strength lies in its healthy, constructive qualities, but many of us have learned that it can also be used for destruction.

The work of the honest advertiser is injured by the advertiser who exaggerates or deliberately swindles. And the first need of the honest advertiser is to see that the streams of publicity are kept clean—and that the public is not deceived. The various Representatives of "Pacific Radio News" have instructions to take particular care when accepting advertising and we do everything possible to see that nothing but truthful advertising enters our columns. If a publication sells its space freely to all sorts of doubtful solanres, it becomes a fellow-conspirator against the public and merely shares in the loot of robbery. It turns over its readers, bound and gagged, to be stripped by swindlers, and it hurts the entire community.

Many radio amateurs can relate a tale of woe as to how they were "jipped" of their hard-earned dollars. In order to crush this unlawful practice we will ask those who are experiencing difficulty in their dealings with radio manufacturers to write us and the proper steps will be taken to curb this state of affairs.

A new organization will soon be introduced to the radio public—the National Association of Radio Dealers, now being established in Omaha, Nebraska. This Association is being formed to give the amateur radio man a square deal in the purchase of his apparatus. It will soon be a great organization. Manufacturers of radio apparatus should not take its purpose lightly. The co-operation of "Pacific Radio News" is pledged in the good work of the Association—we have already been advised that our application for membership has been accepted. The Association will carefully examine the advertising printed in radio journals and protect the amateur in every possible manner—it will create a spirit and a movement that will make the radio business as clean and trustworthy as it must be if it is to continue its growth and usefulness.
Radio Convention is Great Success
Major J. F. Dillon is Made Permanent Chairman.
Pacific Coast Advisory Council is Formed.

The photograph on this and the accompanying page shows approximately one-third of the delegates and radio men who attended the big convention.

THE Pacific Coast Radio Convention opened at 10:28 a.m. with the playing of the "Star Spangled Banner" transmitted by radio telephone from the California Theater. The audience consisted of 580 radio men. The opening address was read by the secretary to Mayor Rolph of San Francisco and outlined the importance and significance of the radio convention. The secretary then closed his address with the introduction of Mr. H. W. Dickow, president of the San Francisco Radio Club. The address and introduction was accomplished by radio telephone and loud speaker from the California Theater.

Mr. Dickow then addressed the convention, on behalf of the San Francisco Radio Club, and welcomed all the delegates and visitors, and closed by introducing Mr. Lufkin, chairman of the convention committee.

Mr. Lufkin outlined the entire plans for the convention, welcomed the attending radio men, and turned the convention over to Major J. F. Dillon, United States radio inspector, and who was the honorary chairman of the convention.

Mr. Dillon gave a brilliant talk on the possibilities of the convention, especially in the way of opposing bad legislation on controlling radio transmission, and gave a very comprehensive outline of the work done by the United States Department of Commerce for radio advancement. Mr. Dillon then concluded with words of praise for those who made the convention possible. His speech was met with the heartiest applause of the day.

The honorary chairman then called for a report from the credentials committee to find which organizations were entitled to seats in the convention. Chairman Tinsley, Mr. D. B. McGown and Mr. L. E. Grogan of this committee reported that all radio clubs should be seated that presented credentials. Seventeen radio clubs were officially seated. The committee refused seats for the Pacific Radio Supplies Company, "Pacific Radio News" and the Leo J. Meyberg Company for the reason that no sales or commercial organization should be entitled to a vote. A harsh protest was voiced to this statement. A vote was taken and popular sentiment showed that every willingness was evident to permit manufacturers of amateur apparatus, and especially the "Pacific Radio News," to have seats in the convention. The "Pacific Radio News" was lauded and declared to be the greatest medium of the West and entitled to a seat, even though manufacturers were barred. A great applause met this statement. An official amendment was then made to the report of the credentials committee by Mr. Tinsley, and "Pacific Radio News," Leo J. Meyberg Company, and the Pacific Radio Supply Company were given seats, with six votes to each.

The credentials committee then reported that all recognized organizations were to be given six votes each.

The honorary chairman, Mr. Dillon, then introduced the following men, who gave talks on the convention and other topics of interest: Mr. C. I. Hoppough, radio engineer for the Signal Corps, U. S. Army; Mr. B. Wolf, Pacific Coast radio supervisor for the United States Shipping Board; Mr. C. Langevin, Pacific Coast representative for the United Radio Telegraphers' Association; Mr. L. Malarin, of the Radio Corporation of America; Mr. Leo J. Meyberg, of the Leo J. Meyberg Company; Mr. Colin B. Kennedy, of the Colin B. Kennedy Company; Mr. A. E. Bessey, one of California's most prominent and enthusiastic amateurs; Mr. Pray, of the North Dakota Radio Association; Mr. Blake, of the Federal Telegraph Company; Mr. Kuhn of the Ship Owners' Radio Service; Lieutenant Twist, of the Naval Radio Service, and many other prominent radio men.

The next transaction of the convention was the nomination and election of a resolutions committee. Mr. H. W. Dickow was elected as chairman of this committee, and the chairman of each delegation was appointed as one of the resolutions committee. A recess of twenty minutes was called by the honorary chairman to allow the resolutions committee to transact its business.

Following the recess, Sergeant Lufkin read a telegram from the National Radio School of Washington, D. C., wishing the convention success.

Chairman Dillon then called for a report of the resolutions committee. Chairman Dickow of this committee read the resolutions. The first resolution was to make the radio convention an annual affair. Another resolution was introduced to appoint a chairman for the next year's convention, a man who is not affiliated with any commercial enterprise in the radio field. Nominations were: Major Dillon, Mr. Linden and Mr. McGown. Major Dillon was elected.
580 Radio Men in Attendance
Twenty-six Organizations Given Six Votes Each.
Sixteen Radio Clubs Represented.

The foremost radio man and the humblest amateur were given equal voting power at the convention

by a tremendous majority and amidst loud applause.

Mr. Dickow read a resolution, introduced by the Pacific Radio Publishing Company, to protest the passage of the new proposed radio act to regulate radio communication. The "Pacific Radio News" was the only publication which published the entire bill in its columns. A protest was drawn up and every attending radio man was asked to sign and the protest was to be sent to the Congressman from California. This resolution met with a roar of applause, and was unanimously accepted and members and friends signed the protest.

The third resolution was introduced by the Bay Counties Radio Club and read by the chairman of the resolutions committee, Mr. Dickow. This resolution called for a certain signal to be transmitted before beginning transmission in order to ascertain if other stations were listening for a message. This resolution met with a great deal of counter argument and the figure "4" was finally adopted by the delegates.

Another recess of twenty minutes was called. A photograph of all delegates to the convention was taken in front of the convention hall during this interim.

The next resolution was introduced by the San Francisco Radio Club, Inc., and was to form a committee of six to act as an advisory council to mediate, arbitrate and settle all questions relating to radio which would be brought to its attention. The council was to meet four times a year in San Francisco, Calif. The members of this council were named United States radio inspector for the Sixth Radio District, Pacific Coast radio supervisor for the United States Shipping Board, United States district communication superintendent for the Pacific Coast Naval District, United States chief signal officer for the United States Army, Western Department, United Radio Telegraphers' Association representative for the Pacific Coast Division, and the chairman of the board of directors of the San Francisco Radio Club.

The second part of the resolution called for the establishment of a Pacific Coast Radio League, with "Pacific Radio News" as official organ. There was a decided protest on the latter half of this part of the resolution and it was defeated two to one.

The resolution was then passed with the amendment that the American Radio Relay League representative of the Pacific Coast District be appointed on the advisory council instead of the chairman of the board of directors of the S. F. R. C.

Mr. Dickow then praised Mr. Dillon, honorary chairman of the convention, on the excellent manner in which he carried on the convention, and thanked Sergeant Lufkin for the untiring efforts he made on the convention work. He then concluded with a wish that all delegates and visitors to the convention have a capital good time at the radio show, banquet and ball which was to follow.

Mr. Lufkin thanked the committees that worked for the good of the convention in behalf of all present.

Major Dillon then closed the convention with the statement that any small difficulty that might have arisen, or any point not fully covered by this convention, was to be overlooked by those affected, and everyone left with a sense that the first Pacific Coast Radio Convention was a great success. Adjournment was at 2:30 p. m.

THE RADIO BALL

Art Hickman's jazz music from the St. Francis Hotel was carried to the radio ball at the Century Club on November 27th and amplified by means of a DeForest receiving equipment and a magnavox.

The dancers were given a treat in the form of a distinctive radio program. Herewith is a list of the radio dances:

1. Oscillating Fox Trot.
2. Amplified One Step.
3. Atmospheric Waltz.
4. Static Fox Trot.
5. Modulation Waltz.
6. Radiation One Step.
7. Frequency Fox Trot.
8. Synchronous Waltz.
9. S. O. S. Fox Trot.
11. Electron Fox Trot.
12. Quenched Gap Waltz.

EXTRAS

1. The Alternating Special.
2. The Ether Waltz.
3. Loose Coupled Waltz.

THE RADIO BANQUET

A SEVEN-COURSE chicken dinner greeted the anatologies of the visiting delegates to the convention. One hundred reservations were made and one hundred constitutions were replenished with sufficient food to hold them over for another year. Radio speeches and
jokes were delivered by more than twenty of the diners. Major J. F. Dillon, Sergeant Willard E. Lufkin and Mr. Dwight E. Lyon were the honored guests of the affair. Mr. Lyon spoke on truthful and honest radio advertising in the radio publications and congratulated the manufacturers on the manner in which they are carrying on their work.

First grade amateur licenses were issued at the Radio Show of the convention by the radio inspector of the Sixth Radio District to the following:

- Lew Torrey, 3820 High street, Oakland, Calif.
- Russell A. Hallon, 437 Walnut street, San Francisco.
- Ernest M. Carr, 316 Presidio avenue, San Francisco.
- John W. Barrett, 900 Jackson street, San Francisco.
- Carl J. Penther, 1076 Aileen street, Oakland, Calif.
- Paul J. Wing, 1040 Fifty-sixth street, Oakland, Calif.
- Sterling Winters, 659 Clayton street, San Francisco, Calif.
- Wm. W. Scamell, 1033 Excelsior avenue, Oakland, Calif.
- Arthur L. Bolton, Jr., 1700 La Loma avenue, Berkeley, Calif.
- Burton Cole, Los Gatos, Calif.
- Herbert C. Hand, Carmel, Cal.

Radio organizations who were awarded six votes each by the credentials committee of the convention:
- San Francisco Radio Club, Inc.
- Bay Counties Radio Club.
- Polytechnic Radio Club.
- Reno, Nevada, Radio Club.
- University of California Radio Club.
- Santa Cruz Radio Club.
- Lowell High Radio Club.
- American Radio Relay League.
- Technical Radio Club, Oakland.
- Stockton Radio Club.
- Pomona Radio Association.
- Sacramento Radio Club.
- Napa Radio Club.
- Federated Malay States Government.
- Evening High School Radio Club of San Francisco.
- "Pacific Radio News."
- Leo J. Meyberg Company.
- The United States Army.
- The United States Navy.
- The United States Shipping Board.
- Department of Commerce.
- United Radio 'Telegraphers' Association.
- Knights of Columbus Radio Club.
- Pacific Radio Supplies Company.

Delegates from all of these organizations were present.

The exhibit of the Colin B. Kennedy Company at the recent wireless show in San Francisco called forth much favorable comment from the visitors at the exposition, both on account of the attractiveness of the display and because of the high quality of the apparatus shown. Eastern visitors were heard to exclaim in surprise at the high standard exhibited by apparatus of Pacific Coast manufacture, and one remarked that nothing produced in the East could surpass the thorough-going, high quality, characterizing Kennedy receiving equipment. Westerners in general, and Californians in particular, may well be proud of possessing factories producing such apparatus.

The Colin B. Kennedy Company, whose exhibit is shown in the illustration above, was recently incorporated under the laws of the state of California after existing for some time as an individual enterprise. With its incorporation, the company acquired additional engineering personnel and manufacturing facilities. In the reorganization of the company, Colin B. Kennedy, founder of the original concern, was made president; Harry J. Rathbun, vice-president; Nathan A. Bowers, secretary, and Emil A. Portal, treasurer. These men, with Dr. Leonard F. Fuller, constitute the board of directors. Mr. Kennedy has
spent most of his life in various phases
of the art of communication, with the
British Pacific Cable Company, the Ca-
nadian government radio service and the
Federal Telegraph Company. Mr. Rath-
bun was also connected with the engi-
neering department of the Federal Tele-
graph Company in various executive ca-
pacities for several years during the
progress of the design and development
of the equipment for the chain of high
power transmitting stations for the U. S.
Navy. Mr. Bowers has been for the
past six years Pacific Coast editor of the
McGraw-Hill technical publications. Mr.
Portal joined the organization from the
research staff of the National Radio
Company after serving in the naval
radio service, following many years as
an associate with Professor Charles D.
Herrold in radio research. Dr. Fuller
was Chief Electrical Engineer of the
Federal Telegraph Company during the
period, covered by the development of
the modern Federal-Poulsen arc trans-
mitters of both high and low power,
ranging from two kilowatts to one
thousand kilowatts. He is too well
known the world over as a radio en-
gineer to require further mention here.

The Colin B. Kennedy Company main-
tains its offices and display rooms in the
Rialto Building, San Francisco.

Booth of the Radio Corporation of America

Herein was displayed not only the modern commercial
installation, but also the apparatus used in the pioneer
days of radio. An aeroplane equipment, manufactured by
the Corporation, was another display of unusual interest.

AN OSCILLATING ODDITY

The Answer to the Contest Held by the
Pacific Radio Supplies Company
at the Wireless Show

By B. F. McNamee, Research Engineer,
Pacific Radio Supplies Company.

A curious oscillating valve circuit was
shown in operation in the booth of the
Pacific Radio Supplies Company at the
San Francisco Wireless Show, and prizes
were offered for the two best written ex-
planations. Following are the winners:
Homer G. Tasker, 205 Hearst avenue,
Berkeley, Calif.
Earl R. Meissner, 2329 Carlton street,
Berkeley, Calif.

An Electron Relay was awarded as a
prize to both of the winners.

For the benefit of those who did not have the good fortune to attend the show, the following account of the circuit and its action is given. The circuit used is shown in Fig. 1. C is a condenser of .1 mfd. ca-
pacity. P and S are the primary and
secondary respectively of an audio-fre-
quency amplifying transformer. Although

Fig. 1

the transformer used was of the air-core
type, one with an iron core would do.
The telephone receiver used was of the
usual high-resistance type (about 1,000
ohms). The meter was a Paul Unipivot
micrometer having a full scale reading of
two-tenths of a milliamper. The circuit
would, of course, operate without the
meter and the telephone, both of which
were used to indicate the action of the
circuit. The valve was an AP amplifier,
which has a very high vacuum. The "B"
battery was about 60 volts, but might have
been anything from 15 to 500 volts. The
needle of the meter showed a gradual in-
crease of plate current from nearly zero
to about 60 microamperes, taking four or
five seconds to do so. Then a very quick
swing of the needle showed a sudden in-
crease of plate current from about 60 to
about 140 microamperes. This sudden in-
crease was accompanied by a high-pitched
note of short duration in the telephone.
The needle swung back to zero just as

(Continued on page 180)
WORLD'S RECORD FOR FAST RADIO RECEPTION IS BROKEN AT THE CONVENTION

A. E. Gerhardt copies over forty-nine words per minute for a period of more than four minutes

M. L. HART, U. S. N., TAKES SECOND PLACE

The world's record for fast reception of radio signals was broken by A. E. Gerhardt at the wireless show of the Pacific Coast Radio Convention on November 28, 1920. Gerhardt copied forty-nine and a quarter words per minute for four consecutive minutes, with but five errors. A Wheatstone transmitter was used for the contest and messages of ten words in length were sent.

Gerhardt is employed by the Radio Corporation of America at the high power station, Marshall, Calif.

He succeeded in winning second prize at the speed contest of the recent exposition in San Francisco, but he is now the uncrowned king of the radio code.

Major J. F. Dillon, local United States radio inspector, was the judge of the contest. The prize awarded to Mr. Gerhardt was a silvered electric shaving mirror.

M. L. Hart, chief electrician, radio, U. S. N., won favorable mention by maintaining the same speed, but not with the same accuracy.

Gerhardt also won first place in copying ten letter code messages at a speed of 33 words per minute.

An amateur speed contest was held on the same evening.

Perfect copy at a speed of 25 words per minute was handed to the judge of the contest by M. S. Ayres of San Francisco. He was awarded a pair of 2,200 ohm receiver as a prize. The receivers were donated by the local DeForest Company. Mr. P. Friedental took second prize. He copied 25 words a minute with but three errors. He was awarded a Radio Shop variometer, donated by the Radio Shop of San Jose, Calif.

LATEST IN RADIO AUTOMOBILES

Fred W. Swain and Wilbur Cramer are credited with this unique auto equipment. The center photo shows the elaborate receiving set being operated by Wilbur Cramer.

When Wilbur R. Cramer and Fred W. Swain, 2916 North Sixteenth street, Omaha, Neb., take their evening ride in their automobile they can chat with their friends by wireless telephone. The equipment shown in the accompanying photographs is the apparatus with which they have been experimenting for the last several years. It is attached to their automobile, as shown, and can be operated while traveling.

Their experiments with amateur wireless telegraphy began four years ago while they were attending the Omaha High School. Following the completion of their courses, both men continued their intensive study and have several inventions already in operation.

Another channel for their wireless efforts will be the conveying of orchestra music from one Omaha motion picture theater to another, and the transmission of a speech from a nationally known suffrage worker while in Chicago to one of these theaters in Omaha.

The Pathe News Service, Kinograms, and Selznick News have taken about two hundred feet of motion pictures of their apparatus while in operation.

HOW WOULD YOU LIKE AN OLD-TIME RELAY BY 9XE?

Mr. W. Kirwan, sales manager of Tresco, is arranging for an "old-time relay" by 9XE. He expects to get a message from President-elect Harding and deliver it to every state in the Union. It is his desire to have it delivered by amateur radio to Hawaii and Alaska. CW and phone sets will be a feature of the relay. Further details will be published in our next issue.

While traveling by train from New York to Boston, one of the staff of the American Radio and Research Corporation enjoyed a novel experience with the use of an Amrad crystal detector. Using the baggage rack of the train as an aerial and the steam pipe for a ground, he was able to hear signals from stations many miles distant. An extensive line of new receiving apparatus is in the process of manufacture by the Amrad Corporation, of which the crystal detector referred to above is one unit.

Actions speak louder than words! Write a firm protest against the passage of S4038 to your Congressman before you lay this issue aside.

Hit the iron while it's hot. Fight for your rights as an amateur radio operator. Tell your Congressman to 'help defeat Bill S4038.'
PART V.
CONTROL OF ARC OUTPUT

For telegraph work, the problem of controlling the output of the arc presents little difficulty and several methods are available. Figure 11 shows one method in which a key is bridged across a few turns of inductance in the antenna circuit.

Figure 11

This is, without doubt, the most common method. If the antenna current is in excess of four amperes and this should be the case if the arc input is over 1 K.W., the key contacts will be subjected to considerable arcing. This difficulty may be eliminated by decreasing the amount of inductance bridged by the key contacts and, if necessary, by using a multiple key arrangement whereby one set of contacts is called upon to bridge only one or two turns of inductance. It will be seen that by using this method of control, two waves will be radiated. One of these waves cannot be read as the groups of oscillation will conform in duration of time to the spaces in letters of the code. Figure 12 shows the absorption method of control. A circuit, consisting of a resistance, inductance and capacity having practically the same constants as that portion of the antenna circuit not bridged by this circuit, is placed across the active coupled inductance of the antenna circuit. This circuit is intermittently opened and closed by a key which is preferably placed near the grounded side. When the key is closed, a large portion of the energy which is transferred from the arc is made to flow through the resistance in the dummy circuit where it is absorbed, and this results in a material decrease in the antenna energy.

In certain cases of smaller arcs under 1 K.W. input it will be found possible to control the antenna circuit by opening and closing the antenna circuit. It may be necessary when using this method to loosen the coupling between the open and closed oscillating circuits in order to prevent the effects of excessive reaction between the two circuits and possible extinction of the arc. The application of the arc to radio telephone work has always been a problem, and up to the present time no really successful method of control has been devised. This lack of a successful modulator for the arc output is largely responsible for the undeveloped low power arc of today.

Microphones whose design vary from the ordinary telephone transmitter as used in wire telephony, to huge water cooled types have been used, and various departures from the ordinary carbon grain type have been made. Majorana used an electrolytic jet which was made to impinge upon two electrodes, and the variation in the physical condition of the jet caused by voice vibration altered the resistance across the path between the two electrodes, and consequently the amount of energy that would be passed. Fessenden varied a capacity shunt across a certain part of the oscillating circuit with some success. (To be continued)
HELP!

By C. Hennings

I was tired. So tired that the last signals I had heard had come through the receivers with a dull and muffled sound, very different from the sharp and clear code I had copied earlier in the evening. I was glad that I could turn in, for now that the nightly press had been received, I had nothing else to do. The mate must have sensed something of my weariness when I whistled through the speaking tube that all was well.

"Pleasant dream, Sparks," he called to me.

I gathered up the sheets upon which I had been copying news, for even a radio station must have some order of neatness, and started to pull off my coat. One arm was out, and I was working with the other when I distinctly heard a call. I stood stock still.

"S. O. S. S. O. S."

I dropped my coat, papers went flying to all parts of the room, and with one jump I was in my chair before the tuner. There was no need, however, of putting the receivers over my ears, for the sounds had come in loud enough the first time to be heard without phones. I quickly adjusted them to my head in a sort of second-nature movement, and reached for a pencil with which to copy what I felt certain would follow. I heard nothing in the phones except a far distant vessel reporting her position. My two detector tubes were droning and hissing away in a regular duet, and I could hear the faint hum of the generator down below in the dynamo room. That was all. I had evidently made a mistake.

Once more I started for my bunk. The receivers were on the table while I began to gather up the press reports which had flown all over the floor. Then as I stooped under the table to get the last sheet, the call came again, clear, distinct, in a peculiar whistling noise.

"S. O. S. S. O. S."

Once more the papers went to the floor. "Some foreign ship," I thought, for the signals were of a strange fluttering quality. The receivers were again dead. Nothing but the detector hiss came to my ears. Excitedly I tore off the receivers and blew through the speaking tube.

"Just heard an S. O. S. What'll I do?"

"That so," was the mate's rather disinterested reply. "Don't get excited. The ocean is a big place."

"Yes, but this is close. Hadn't we better call the Old Man?"

"Nope, can't bother him with such stuff. Find out where the old tub is that wants help."

And with that he hung up his end of the tube.

I was quite angry at the Mate. He was a young fellow, a former naval radio operator, and should have known the seriousness of the distress signal. I jumped to the end of the cabin and peered out of the porthole into the blackness of a murky St. Lawrence night. Before my eyes could become accustomed to the darkness outside, the signal came again.

"S. O. S. S. O. S."

"I just heard it again," I shouted to the Third Officer. "It's a ship in trouble. Pretty close, too. See anything?"

"Nope," was his only reply. I heard the AB at the wheel laugh as I dropped my end of the speaking tube. It jarred on my nerves to have the Mate and the wheelsman joking when a ship was in trouble so near.

Only silence greeted me when I placed the phones over my ears again. Touching the button at my elbow, I waited until the rising whine of the motor-generator told me that the "juice" was ready, and then my own clear spark sung out into the night.

"Who sent out S. O. S.? Where are you? What's the trouble?"

No one answered. At least no ship answered, but in a few seconds Grindstone Island came back in his sharp staccato notes.

"Who heard S. O. S.? Who are you? Where are you?"

As well as I could I told him our position. He then called North Sydney and Point Riche, but neither of them had heard the call. I could not understand it, for the signals had been quite loud. I pinned myself to make certain that I had not been dreaming.

"Your mistake," said Grindstone Island rather caustically, and I was about to reply when a long whistle on the speaking tube stopped me.

"Anything done, Sparks?" queried the Mate.

"Nothing new," I said.

"Well, listen real hard now," and once more I heard the Quartermaster and the Mate laugh. Then quite distinctly came the call:

"S. O. S. S. O. S."

I drew back to the opposite wall, my heart threatening to upset in surprise. Then from my wall chest I grabbed a can of face powder and again called the pilot house.

"It's very plain now, Mate," I said. "Do you want to hear it?" and when his affirmative reply came down that long winding copper tube, I filled my end with powder and gave a long dusty blow. Expectantly I waited. I distinctly heard the A. B. wheelsman laugh again, this time with more life than before, and in a second the Mate roared down:

"You win, Sparks, she's sunk!"

RADIO ENGINEER WILL PRESIDE OVER BAY COUNTRIES RADIO CLUB

Mr. B. F. McNamee, research engineer of the Pacific Radio Supplies Company, was elected to the presidential chair of the Bay Counties Radio Club at the regular election of officers held in the club rooms on December 3rd.

Mr. G. V. Tudhope, former president, is now first vice-president; C. H. Grubbs, in charge of the local DeForest factory, is second vice-president, and Stanley Hudd is third vice-president.

R. W. Carroll will remain in office as recording secretary and W. D. Wood will act as financial secretary.

C. T. Peterson was elected treasurer; S. Sollie is the new sergeant-at-arms, and R. H. Cornell, Jr., is the new chief operator.

The board of trustees has for its new members Mr. B. F. McNamee, Mr. G. V. Tudhope and Mr. R. C. Adams.

The speaker of the evening was Mr. M. E. Borch of the Reliance Radio Laboratories. His lecture dealt chiefly with the decrement question of 200-meter transmitters.

Meetings are held on Friday of every week in the new club rooms of the Alden Branch Library, Fifty-second street and Telegraph avenue, Oakland. A radio telephone and spark station will soon be ready for installation. The club has a membership of 140.
THE HAWAIIAN TRANSMITTING TEST

MUCH to the regret of fifteen Pacific Coast amateurs, the Hawaiian transmitting test did not accomplish its object. However, the contestants can feel much encouraged to hear that practically all stations were heard by the operator on the Matson liner "Maul," 1,800 miles from San Francisco, 300 miles from Honolulu. Further encouragement is had in the form of a letter received from a Honolulu amateur who states that he heard a CW station working on a low wavelength at the time that the test was scheduled to take place. The station heard by the Honolulu amateur was probably 6ZE, Mr. D. E. McGowan, 1247 Forty-seventh avenue, San Francisco, who was using a CW transmitter on a wavelength somewhat above 200 meters. No stations were heard either by Mr. Mulrony at Pearl Harbor or by Mr. Hall at Honolulu. The following letters will explain more fully the results of the tests. Mr. Mulrony suggests that another test be held in June, 1921, as the present receiving season in Honolulu is an exceptionally poor one. In view of the fact that Mr. McGowan's CW set may have been heard by the Honolulu amateur station, we will arrange an individual test for CW equipments and will be pleased to accept applications for another test from amateurs who desire to participate. In the meantime we will arrange further details for our next issue. We publish herewith a letter received from Mr. Kenneth A. Cantin of Honolulu and three letters received from Mr. Mulrony:

Honolulu, T. H.,
November 30, 1920.

Paul R. Fenner,
Editor, Pacific Radio News,
San Francisco, Calif.

Dear Sir:

Kindly send me the transmitting schedule of the amateur stations that entered the trans-Pacific radio test of November 20th and 21st.

On the first night of the test, Saturday, November 20th, I was "listening in" for the coast amateurs, and between 12:10 o'clock and 12:15 I heard a CW undamped wave station working. Not knowing that CW undamped stations were to be used in the test until I received my "Pacific Radio News" a week after the test, giving the list and telling that two CW stations had entered, I tuned out this undamped wave station, as I thought that it would "Q-R-M" the coast amateurs that were transmitting.

I do not wish to claim that I received a coast undamped wave amateur station, but I would like to check over the transmitting schedule of the stations that entered the test so as to see if a CW station was transmitting at the time I received these undamped wave signals.

Thanking you for a reply, I remain,
Yours very truly,
Kenneth A. Cantin.

6-T-Q.

Kenneth A. Cantin,
1593 Piiko Street,
Honolulu, T. H.

U. S. Naval Station, Hawaii.
Pearl Harbor, T. H.
Office of Radio Officer.
November 10, 1920.

Dear Dickow:

Enclosed please find clipping from yesterday's paper. I have a lot of interest worked up here and all stations have agreed to close transmitters. Ten amateurs have already entered today, and the thing bids fair to go well. Give this test some publicity in San Francisco. I would suggest you follow up a committee to take the 10 word official message in a sealed envelope to each of the six stations, the envelopes only to be opened a few minutes before the test—you see this will eliminate any faking, and I am only taking an interest in this because I expect the test to go on the square. Two of the amateurs here have first-class short wave receivers and excellent two-step amplifiers. I understand Mr. Hall has an eight-step amplifier, consequently there is good reason to believe signals will be heard. I will use a three-step amplifier and will only report what I hear in case no one else hears the messages and I do. I am appointing two observers here so that anything we report hearing will be absolutely square.

If we hear anything I will give the papers a good line of dope on you here.

Yours sincerely,

M. A. MULRONY.

U. S. Naval Station, Hawaii.

Pearl Harbor, T. H.
Office of Radio Officer.

November 7, 1920.

Mr. W. H. Dickow,
Pacific Radio News,
No. 50 Main Street,
San Francisco, Calif.

Dear Dickow:

Regarding the trans-Pacific amateur test, I have taken up the matter of closing down all transmitters on this island with the Navy through official channels and the request has been granted. The test to take place on November 20th, and 21st, 1920, beginning at 12:01 a.m., Honolulu time and to last twenty minutes each night.

The Radio Corporation and Mutual Telephone Company have also been requested to close down their stations and I expect they will reply favorably this week.

Eleven local amateurs have already entered their request to try to receive the California amateurs' signals on this test, and I believe there will be at least twenty ready for the start, as we will give this matter considerable newspaper publicity in a few days. There are several very good amateur receiving stations on this island and I have good reasons to believe the test will be successful if all local interference can be made quiet during the test schedules.

I would suggest that you form a committee to select your six best radio transmitters on 200 meters and have these stations send in turn. The first night have No. 1 station start and send a ten-word message, beginning with his call about ten times, then send his message, repeating each word (double) and then finish his schedule with his call letter several times. Each sender to have a seven-minute period, at about ten words per minute, and be sure you have the time of the test correct. With this scheme it will give the local boys here a good chance to copy all that is sent and have the real proof of the test.

I am very much pleased with the interest which is manifested here and trust that everything will go well with the test.

Any messages which are copied as proof of the test will be repeated by Navy Radio Long Waves to San Francisco if the District Communication Superintendent will grant us permission to use this means to inform you.

Yours truly,

M. A. MULRONY.

Pearl Harbor,
November 22, 1920.

Dear Dickow:

Re the test on November 20th-21st, all amateurs were on the job and tried hard, but it appears no one heard anything on 200 meters. I saw Mr. Hall this morning, and he says he did not hear anything, so it must be so. I listened with a three-step amplifier and heard nothing except very bad static on 200 meters. Tell the amateurs not to be discouraged, but to try again about next June—the present is about our poorest receiving time from the coast. With kind regards,

M. A. MULRONY.

343 So. Fremont Ave.,
Los Angeles, Calif.,
November 23, 1920.

Editor, Pacific Radio News,
San Francisco, Calif.

Dear Sir:

Thinking it may be of interest to the readers of your magazine, we are giving a few accounts on audibility of stations near San Francisco, as received at our station on the morning of the 21st and 22nd of November, using two stages of amplification (audiotron detector and Western Electric VT-15) short wave regenerative set of the heterometer type and two pairs of "Baldy's."

(Continued on page 185)
DOWN TO THE MINUTE

Current Radio News

UP TO THE STANDARD

WORLD RULE, PLAN FOR CABLES AND RADIO

Washington, Dec. 8.—(By Universal Service.)—The establishment of a universal electrical communications union, which it is hoped to model ultimately after the International Postal Union, having as its object the international reciprocal exchange of telegraphic, cable and radio communications, will be recommended by the International Communications Congress.

A preliminary report giving an outline of the arrangement it expected to perfect was made public by a special committee including delegates from the United States, Great Britain, France and Japan.

For guidance and control of the proposed union the congress makes provision for an electrical communications council, consisting of representatives of the United States, Great Britain, Japan and France and four representatives to be selected by the other powers.

In countries like the United States, where communication facilities are provided wholly or in part by private corporations, such enterprises when complying with international regulations in the treatment of international traffic, are authorized to exchange such traffic with all government-owned services. — San Francisco "Examiner."

NEW RADIO SITE SELECTED AT BULL HARBOR, B. C.

VICTORIA, B. C., Friday, Nov. 26.—A site for a new wireless station to replace that on Triangle Island, which is to be dismantled early next year, has been chosen at Bull Harbor, Hope Island, near Shusartie, off the north end of Vancouver Island. The new station will be of similar power to that now at Triangle, and will handle traffic from ships and northern stations. The Ikeda station, which was closed some time ago, has been dismantled.—Seattle "Times."

RADIO ENGINEERS VIEW PHONE EXCHANGE

The San Francisco section of the Institute Radio Engineers met recently in the telephone exchange at 445 Bush street, where the telephone system, together with the vacuum tube apparatus, was explained by A. G. Champereus, transmission engineer of the Pacific Telephone and Telegraph Company.—San Francisco "Examiner."

LONG DISTANCE DAYLIGHT COMMUNICATION RECORD BROKEN

H. A. Cookson, radio operator of the S. S. "West Camargo," establishes communication with navy stations at a distance of 1,200 miles from San Francisco.

What is believed to be a record for long distance work during the daylight hours has just been brought to light with the arrival here of the Shipping Board steamer "West Camargo." The operator of the vessel reports that he established communication with the NPW (Eureka, Calif.) navy station at a distance of 1,200 miles west of San Francisco, November 24, 1920.

Worked NPW on 600 meter 2 k. w. quenched spark set at 1:30 p.m., a distance of 1,200 miles west of San Francisco.

Worked NPM (Honolulu) 900 miles in day time.

Copied NPK (Point Arguello) 600 meter spark in Wellington, New Zealand, at night.

Copied NPM 600 meter spark and KHK 600 meter spark in Melbourne, Australia, at night.

WIRELESS ON TRUCKS

SHANGHAI, Oct. 15.—(By Mail.)—Trucks of the Shanghai Fire Department are soon to be equipped with wireless telephones, conforming to the latest practices of the largest cities. The improvement is expected to enable the department at all times to keep in touch with its men while fighting fires.—Tai- coma "Tribune."

FEDERAL TELEGRAPH NOTES

The Federal Telegraph Company's application for authority to issue $500,000 first mortgage 8 per cent serial gold notes was approved by the Railroad Commission on November 24th. The proceeds are to defray the cost of constructing four wireless stations on this coast, one at Palo Alto, one near Portland, Ore., one near San Diego and one near Los Angeles.

Construction of these stations has been made necessary by the termination of an agreement with the Pacific Telephone and Telegraph Company under which the latter company transmitted messages received by the Federal at the wireless plants, but which it could not forward because of lack of facilities.

Completion of the wireless plants at the various points named will enable the Federal company to give full service.—San Francisco "Chronicle."

PRESIDENT-ELECT HARDING SENDS CONGRATULATIONS BY RADIO

WHEN President-elect Harding sent his congratulations by radio to the American Society of Mechanical Engineers on their Fortieth Anniversary at Boston the increasing importance of wireless as a means of practical communication was forcibly brought home to all the mechanical engineers of the country.

Senator Harding's message, requesting the co-operation of the membership was broadcasted three times during the evening of November 5th by the station of the American Radio and Research Corporation who received the greetings from Marion, Ohio transmitting them to the Convention at Boston. Amateurs hungrily.

Governor Coolidge, vice-president-elect also sent greetings by radio. Other messages received and sent by the Amrad Station were those of Mayor Peters of Boston, Dean Anthony of Tuft's College and H. J. Power, General Manager of the American Radio and Research Corporation.

One of the novel manner in which the president-elect sent his message to the Convention, its content is of deep significance to the engineering fraternity. Said he, "My greetings and good wishes to the American Society of Mechanical Engineers, on the occasion of the celebration of the forty-anniversary of the organization. The Administration which comes into power next March fourth very much wishes the advice and co-operation of the membership. Signed: Warren G. Harding."

WESTPORT RADIO TO OPERATE SOON

Construction work on the new naval radio station at Westport is progressing nicely, and the station is expected to be in full operation in another month according to Chief Petty Officer James E. Parrott, in command of the new station.

The new radio station will be one of the largest on the Pacific Coast, and is planned to have a sending radius of 1,000 miles, and a receiving capacity of a greater distance. Radio equipment of the latest type is being installed. When in full operation the new station will have a crew of about twelve men.—"Washingtonian."

Your Congressman will stand behind you in your endeavor to crush Bill S4038. If you don't write and tell him to protest its passage he may be in doubt as to how to vote on the bill.
WITH THE MANUFACTURERS

NEW KENNEDY VARIOCOUPLER

THE Colin B. Kennedy Company of San Francisco has brought out a new variocoupler designed primarily for short wave work. This unit is unique in that it affords a wider range of coupling between primary and secondary than is common in apparatus of this type.

THE SORALA TYPE CSU VARIABLE CONDENSER

One of the new variable condensers is the type CSU, made by the Somerville Radio Laboratory. While it is a condenser of comparatively low price, it combines the best features of the best make, and several new ones as well.

Practically everyone is familiar with Chelsea die-cast plate assembly. The CSU is of this type, and moulded Bakelite end-plates of the same manufacture are used to insure extreme ruggedness, best insulation and minimum leakage.

The shaft is of steel, five-sixteenths inch in diameter, running in bronze bearings. At one end a counter-balance is attached which assures permanence of scale position. As a further guarantee against shifting of scale position, a tension adjusting screw is placed on the back end-plate, which, with the broad rear bearing, makes the rotary plate action as stiff as the user desires.

A feature which appeals to many radio men is the ease with which the condenser unit may be mounted on a panel. The black oxidized brass mounting screws and nuts which are supplied also appeal to the more particular radio men, blending harmoniously with the usual grained Bakelite instrument panel.

However, the main feature of this condenser is the dial indicator. Formerly, dials were made of turned Bakelite or moulded composition, with the exception of a few others of white celluloid. While the Bakelite dials present a good appearance and do not warp, they are non-metallic and cannot be used to shield the circuit from capacity effects from the body, and are not adapted to direct calibration, as is possible with the CSU dial. The CSU dial has a COUNTER clock-wise scale which permits a capacity increase by rotation to the RIGHT. The fact that the navy uses this same dial design proves its worth. The dial is SILVER plated and then lacquered to preserve its finish.

Another feature is the generous two-inch knob, also used on some navy apparatus and on Grebe receivers. Anyone who has tried to tune in CW with a small one-inch knob on the condenser will readily appreciate this “man’s size” style.

As we go to press we learn that Mr. Hall Berringer (GBJ) is now connected with the Radio Shop of San Jose, Calif., in the capacity of sales manager. Mr. Berringer made many new friends at the radio show of the convention, where he was demonstrating the new Radio Shop products.

WE welcome into the field the National Association of Radio Dealers.

This new association is yet in its infancy, but is deserving of the support of every radio dealer. The temporary national headquarters are in Omaha, Neb., with Mr. F. Wilson Swain as acting secretary. The purpose of the association is to promote the greatest possible cooperation between the radio dealers, to exchange information and render service beneficial to its members, and aid in the maximum development of the radio industry.

Any person, firm or corporation engaged in the development, manufacture or sale of radio apparatus is eligible to membership.

An official bulletin known as the “N. A. R. D. News” is to be published monthly for distribution among the members of the association.

THE Somerville Radio Laboratories will market a new motor generator for radio purposes. It will be of the single housing, common shaft type with ball bearings. The new Somerville condenser and dial is shown in the accompanying cut. The dial is silver-plated and is six inches in diameter. The condenser unit is of the Chelsea Radio manufacture with a shaft of the correct size to accommodate the new dial and knob.

The Trans-Pacific Radio Operator’s Log. A 32-page 5x7 pamphlet, issued on November 1, 1920, for the use of commercial operators employed aboard ships on the Pacific Coast. Contains much valuable information on Japanese radio stations, Oriental radio schedules, data on all naval stations, Japanese weather code signals, Golden Gate compass stations, wave-length abbreviations, and other general information on radio conditions in the Occident and Orient.

The authors of the pamphlet are W. Breniman and G. E. Knudsen, pioneer commercial operators of the Pacific Coast.
FRESNO AMATEUR WORKS 150 MILES ON INDOOR AERIAL

Fresno, Calif., November 28, 1929.
Mr. Paul R. Fenner,
Editor, Pacific Radio News,
50 Main Street,
San Francisco, Calif.

Dear Friend Fenner:

I am enclosing herewith photos and wiring diagram of my new radio installation, with description of same. I consider this installation as a whole something unique, and heretofore untried in its entirety.

You will probably remember that last winter I had my apparatus installed in the Fresno High School, where, operating on a 95-foot fan aerial, my signals were copied 1,600 miles over land, and practically the same distance out to sea. I carried on some relay work, actually exchanging messages with amateur stations up to 1,000 miles distant. This was done on 3½ k w. input, and the transmitting range, I believe, was largely due to the high aerial.

After February my call was no longer heard, as sickness in my family prevented my being away from home late at night. Not wishing to give up the game entirely, I decided to move the apparatus to my home, for the next season's work, so during the summer the set at the school was dismantled.

I then designed and built a modern regenerative receiving set with two steps of amplification, to fit into a built-in bookcase in the living room of our bungalow. It is comprised of the standard fittings and instruments found in most modern sets, the cabinet being 10x20x6 inches, made of mahogany, and nicely finished. The whole set complete with phones, tubes and B-batteries costing just about $85.

Having no room in the house for the transmitting set, I decided on a remote controlled installation, so put the more or less dangerous and noisy thing in a small cellar under the rear of the house. This set consists of some standard apparatus, and some built by myself. The transformer is a Westinghouse type SK 1 k. w. 220 to 6,600 volts; the spark gap is the larger 12 stud Murdock rotary, which runs about 6,000 R. P. M. It is my intention to inclose the rotor in a cast metal case, similar to the Benwood, as soon as I can get time to make the patterns. The condenser and oscillation transformer were made by myself, being used in the former installation. The condenser is about 0.1 MF capacity, being built in two sections which are operated in series. Ordinary double strength window glass was used, and covered with tin foil, the whole being immersed in transformer oil. A variable reactance is used in the primary circuit, which circuit is carried to the receiving set, and broken with a large Boston key. The set was tuned by means of a wavemeter, and only one turn is used in the primary coil of the oscillation transformer, while seven turns were necessary in the secondary. The input as measured with a wattmeter is 620 watts with a power factor of 0.85, resulting in a radiation of 3 amperes.

All operating and control wires run from the cellar to the receiving set through a galvanized iron conduit, including the aerial receiving lead, and this conduit is used as a receiving ground, being connected to the water pipes. The aerial switch, a solenoid operated affair, was also built by myself and is proving entirely satisfactory. The A-battery, an Exide 6 volt, is kept in the cellar also, for lack of other space, and is charged by a standard type of vibrating rectifier which "floats" the battery at a ½ ampere charge continuously.

Having little or no room in the back yard for an aerial mast, due to a maze of electric light and telephone services, and not wishing to decorate the roof of the bungalow with an unsightly aerial, I decided to put it out of sight in the attic. Realizing that I would not get nearly the required natural wave length in the 40-foot stretch, I wound up inductance coils of a large diameter, each containing 40 feet of wire. The wire used was No. 18 soft drawn bare copper, and six of them were stretched the length of the attic, 3 feet apart, with one of the inductance coils added at the free end of each wire. The aerial was supported from porcelain cleats, and had an average height of 15 feet from the ground. Besides adding to the natural wave length, these coils increased the electrostatic capacity of the aerial system. The lead-in is a length of Packard high tension automobile cable connected to all the wires at one end and passes down between the walls to the aerial switch in the cellar below, the whole installation being entirely concealed and exceedingly well insulated.

My transmitting has been limited to just a few nights, having only recently renewed my station license, corrected to cover the present installation. I have, however, been heard up to 150 miles, and that distance QSA, so no doubt have a range of several hundred miles. For receiving, the aerial is quite as good as a higher one outdoors. The following stations have been heard in a single week:

6AB, 6AD, 6AF, 6AT, 6AAW, 6ABP, 6RC, 6BJ, 6CY, 6EJ, 6EN, 6ER, 6EZ, 6GF, 6HV, 6IL, 6I1, 6J, 6JM, 6JN, 6KP, 6KL, 6OH, 6OX, 6RJ, 6SK, 6XZ, 6ZA, 6ZH.

I should like to request that from now on all stations hearing 6CS will QSL either by radio or mail, or both, so that the maximum transmitting range of this type of station may be determined.

Mr. Fenner, if you care to work up the information in this letter into an article for publication in your "Pacific Radio News" you are certainly welcome to it. I think it would open up opportunities to many members who have heretofore considered operation under such conditions impossible. Some may ask about inductive interference to the parallel lighting circuits in the attic. I shot out several sockets on the start, but after insulating them at their inherent weak points with mica, had no further trouble. Neither am I bothered by induction from these circuits when receiving. Fact is, I get more QRN from my five months' old son than anything else, providing that my two-year-old daughter is in bed.

Signed: R. C. Denny.
"6EN"

Here is another of our Pacific Coast relay stations. 6EN is its call, and it is operated by Messrs. H. A. Duvall and C. G. Esler. One of the operators is on the job every night. Duvall signs HD and Esler signs RX. The station is located in Los Angeles, Calif., and is well known among the Western amateurs. The transmitter is arranged in a large box and is located in the yard of the station's job every night. A home-made 1 k. w. transformer with the secondary wound over the primary on both cores is used for transmitting. The condenser is of the glass plate, oil immersed, type A Benwood gap and a home-made oscillation transformer complete the equipment. The primary of the oscillation transformer consists of one-half turn of 1/4 x 1/4 inch ribbon, and trouble from heating this of this ribbon is experienced after the set has been worked for some time. For the ground connection a number of galvanized pipes driven into the earth are used, as well as two large sheets of galvanized iron and a mass of wires running to many water pipes in the vicinity. The receiving set is homemade throughout. A honeycomb coil set is used for long wave reception. With the use of one bulb and this set, signals from NSS have been copied with ease. The French station (YN) has also been heard several times. A short wave regenerative receiver and two-step amplifier are used for amateur wavelengths. The receiver is of the tickler coil type and is extremely sensitive. Signals of high amplification are received without distortion of signal note. The familiar "Baldy" phones are used and have been fitted with plugs so that changes to any stage of amplification may be made in the shortest possible time.

ONE DOUBLE YOU TEE

The photo of station 1WT, located at Manchester, N. H., needs little explanation. The owner is Mr. Louis M. Higgins, 119 Myrtle street.

The receiving equipment consists of a Clapp Eastham tuner, Clapp Eastham Radion tuner for navy working, and a Tesco long-wave receiver. The A. P. tubes are used for audition reception. Three condensers of variable capacity and two pair of phones complete the receiver.

The EDITOR'S MAIL BAG

Our Readers Are Invited to Send Contributions for Publication in this Department.

THE EDITOR'S MAIL BAG

San Jose, Calif., December 3, 1920.
Pacific Radio Publishing Co.,
50 Main St, San Francisco.

Gentlemen:

6BJ would like to state that he is now using 980 watts for his transformer primary input. The gentleman who calls himself Ten-nin-o in the December issue of "Pacific Radio News" is invited to take a trip to Burlingame any night or Sunday and bring his good watt meter with him to measure the primary input.

The station known as 6BJ has been remodeled during the past month. A rotary gap consisting of a 12-inch disc with 16 studs is driven by a ½ H. P. motor at a speed of 3,400 R. P. M.

Your friend, Hall Berringer.

San Francisco, Calif., December 6, 1920.
Pacific Radio News,
San Francisco, Calif.

Dear Sirs:

Suppose you saw the little item in the "Examiner" about working the S. S. Columbia. I received a letter of commendation from the Navy Department for the good work, working her 4,000 miles out at 11:55 p. m., November 27th. They claim this is a record for the Beach Arc. I am not sure if Inglewood has worked any ship out that far before midnight. On December 1st I worked her out 5,100 miles. Her TR msg said 4,920 m., but I did not work h. t. until about 5 a. m., so she must have been about 5,100 by that time. This has been surpassed by the Inglewood station a few years ago. Think a number of records will be made this winter. Worked the S. S. "Meton" on the East Coast last night. Her TR msg. read: "S. S. Meton, New York for Taxpum, Mexico, 90 miles east north east of Taxpum." Not so bad for across the continent. We control the S. F. end of the (Continued on page 193)

By using the Tesco tuner and a V. T. detector signals can be copied at a distance of more than 7 feet from the phones. A ½ k. w. Thordarson transformer, Amrad quenched gap, Murdock condenser, oscillation transformer and a Roller-Smith hot wire meter are used for transmitting. The set radiates 3.8 amperes on low power. For local work an input of 10 volts is used. A wave-meter containing a Murdock 43 plate variable condenser and DeForest honeycomb coil was constructed by the owner of the station and calibrated by the Bureau of Standards. A radio telephone set is at present under construction, and a Paragon type short wave regenerative receiver is also in the course of home manufacture.
LIST OF STATIONS HEARD BY 6CH
6BQ, 6CV, 6EJ, 6ER, 6FH, 6GQ, 6JY, 6LX, 6JY, 6JZ, 6KA, 6KP, 6KI, 6LZ, 6OH, 6OP, 6OL, 6SK, 6UM, 6VN, 6ZC, 6ZD, 7BC, 7CU, 7CD, 7DE, 7DI, 7Q and 7ZJ.

These stations were heard on an aerial fifteen feet high, suspended in a grove of trees.

Newest Ideas in DeForest
Unit-System Receiving Apparatus

ADVANTAGES of the Unit-System include extreme economy due to the simplicity and interchangeability of the Units; convenience in arranging circuits of the individual need; and greater operating efficiency due to the engineering design and quality of the instruments. The Unit Sets shown here are examples.

SIX PANEL UNIT SET

comprising a combined Tuner and Detector to receive all local stations and practically any large station in the world. Everything necessary for the operation of the set, including detector tube, "B" battery, head phones and a set of 11 coils, can be had for $75.00 complete.

(Purchaser to furnish panel board and "A" battery). This set will give greater satisfaction than any outfit anywhere near this price. Expansion possibilities unlimited.

NINE PANEL UNIT SET

comprising the same six panels shown above, and either three additional panels to give one step of amplification, or three panels to increase the efficiency of the original six. The former will add about $23.75 to the cost of the original six, the latter about $12.10.

DeForest Radio Telephone & Telegraph Co.

Manufacturers and Inventors of High Grade Radio Apparatus
1415 Sedgwick Avenue
NEW YORK, N.Y.
Lee DeForest, Inc., Western Distributors
461 Third Street, SAN FRANCISCO

RADIO CLUB DIRECTORY

Published every month. It keeps you posted on important meetings.

United Radio Telegraphers' Association, Pacific Coast Division—Rooms 418-420, 24 California St., San Francisco Cal. Phone Douglas 706. All commercial operators eligible for membership. Address communications to above address.

San Francisco Radio Club, Inc., S. F. Gymnastic Club, Sutter and Divisadero Sts., San Francisco, Calif. Meetings every Tuesday evening at 8:30 P.M. Visitors welcome at any meeting except first meeting of the month. Initiation fee $2.50. Monthly dues 50c. For experimental and commercial radio operators, address communications to the secretary.

CALLS HEARD BY 6BA

(Additional)

Heard: 6ADE, 6AJ, 6GF, 6GN, 6OC, 6PR, 6UO, 6ZL, 7BP and 7DA.

Worked: 6AH, 6AR, 6CP, 6CV, 6DH, 6JL, 6JZ, 6KE, 6LF, 6LQ, 6MH, 6NF and 7CC.

SAVE THE AMATEUR. Tell your Congressman to vote NO on Bill S4038.
Absolute Dependable Accuracy—Low Priced

The Wireless amateur has always asked for a set of good looking, neat and compact electrical measuring instruments that were unfailingly accurate and reasonably priced.

ELDREDGE Instruments fill all of these requirements. They are designed and manufactured by a firm world renowned for creating the most accurate type of miniature electrical measuring instruments.

Notes on all types: Scales calibrated individually to ensure absolute accuracy—polished nickle finish—flush mounting.

JOHN FIRTH & CO., Inc., 18 Broadway, New York

EVEREADY

Wireless “B” Batteries

SEVEN SEVENTY-FOUR

Made up of twenty-seven cells connected in series. The wooden case containing this battery is cooked in melted paraffine with a half-inch of sealing wax added after the cells are in place, making of the whole a unit impervious to moisture.

One negative and six positive terminals. All terminals have heavy brass screws and nuts. This battery allows a range of 18 to 43 volts in steps of 4½ volts.

Dimensions over all 9 in. x 3½ in. x 3½ in. deep.

Suitable to a wide range of requirements, this type of wireless battery, will meet the needs of those who demand the best.

Number 774

The National Carbon Co., Inc.
San Francisco  599 Eighth St., San Francisco
Los Angeles

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A New Invention

The Parkin .001 mf Variable Condenser (pat. appl. 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
No. 52 .001 mf Unit with knob, etc., and 3-inch black dial...$2.50 postpaid

Write for full description of this new invention

Ask for Circular No. 16

Dealers: Write for discounts

PARKIN MFG. CO., San Rafael, Calif.

AN OSCILLATING ODDITY

(Continued from page 169)

rapidly as it had made the sudden jump, and the cycle began again.

It will be seen that if the condenser C is short-circuited, the circuit of Fig. 1 is a simple audio-frequency oscillator in which the grid and plate circuits are coupled inductively by the transformer. It will produce a continuous note, the frequency of which will depend chiefly on the inductance and distributed capacity of the transformer windings.

The curve in Fig. 2 is known as the characteristic curve of the valve, and is typical of the type of valve used. It is obtained by connecting batteries of various voltages between the grid and the negative end of the filament, and reading the corresponding currents in the plate circuit. When the valve is oscillating, the plate current rises and falls between the values B and D, or, in other words, from nearly zero to saturation. This, of course, means that the grid potential oscillates between the values b and d, due to the inductive coupling between the plate and grid circuits. The grid, being a cold electrode, attracts electrons from the filament when it is positive with respect to any part of the filament. When the grid is negative, it cannot, in a “hard” valve, give back electrons to the filament or space charge, except they return through the secondary of the transformer. While the valve is oscillating, the grid attracts electrons each time its potential is positive, as at d, and these electrons usually return to the filament through the secondary of the transformer, constituting what is called the grid current.

When condenser C is used the valve will start oscillating, but now no electrons can flow from the grid, and therefore the grid soon accumulates a negative charge. As soon as this negative charge reaches some value a on the lower flat portion of the characteristic curve the oscillations stop and the plate current is reduced to zero or very near it by the negative grid charge. If the insulation of the grid lead and the condenser was perfect the negative charge

(Continued on page 184)
YOU'RE LUCKY—
you amateurs who live on the Pacific Coast
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radio amateurs.

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Leo J. Meyberg & Co.
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The Latest Gaseous Vacuum Tubes

make necessary the use of a variable voltage. And what method
of variation is more convenient, efficient and economical than that
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The "VARIABLE STANDARD VT BATTERY" combines all
the desirable advantages of cast en bloc batteries with the additional
feature of close variation without current loss. Each cell is tapped,
thus allowing variation by steps of 1½ volts—from 1½ volts to 22½
volts.

Should your tube require more than 22½ volts, add either our
Type No. 7623 STANDARD VT BATTERY, or Type No. 7625,
for the initial 22½ volts. With tubes requiring less than 22½ volts,
use Type No. 7650 "VARIABLE STANDARD VT BATTERY."

For long service we recommend Type No. 7623, $1.50. For
longer service Type No. 7625 at $2.65, or Type No. 7650 (Variable)
at $3.50 are recommended. $5.00 will buy 45-volts, with the last
22½ volts variable—use No. 7623 and No. 7650 units.

LET YOUR DEALER KNOW YOU WANT WHAT YOU WANT BY ASKING
FOR A "STANDARD VT BATTERY" AND NOT FOR A "B" BATTERY

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Pacent Electric Co., Sole Eastern Agents, 150 Nassau St., New York City
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<thead>
<tr>
<th>Call</th>
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<tr>
<td>6AFR</td>
<td>Kimball Elect. Co.</td>
<td>526 Thirteenth Street</td>
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<td>6AFS</td>
<td>E. D. Freeman</td>
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<td>6AFT</td>
<td>M. Heeder</td>
<td>4165 Twenty-fifth Street</td>
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<tr>
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<tr>
<td>6AFU</td>
<td>J. S. Gerard</td>
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<td>6AFV</td>
<td>N. Borch</td>
<td>1919 Grant Street</td>
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<td>6AFW</td>
<td>R. Thompson</td>
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<td>6AFX</td>
<td>R. Mortimer</td>
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<tr>
<td>6AFY</td>
<td>J. P. McDonough</td>
<td>800 West Grant Street</td>
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<td>6AFZ</td>
<td>P. Stecher</td>
<td>2322 E. Jefferson Avenue</td>
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<td>6AGE</td>
<td>W. E. Bowen</td>
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<td>6AGS</td>
<td>A. L. Semrau</td>
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<td>Trp 10, Boy Sc's, 1835 Bancroft Street</td>
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<td>Trp 20, Boy Sc's, University Avenue</td>
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<td>6AHJ</td>
<td>Trp 30, Boy Sc's,4176 Jackdaw Street</td>
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<td>6AHK</td>
<td>R. Straight</td>
<td>2072 Broadway</td>
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<td>2159 Mission Street</td>
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<tr>
<td>6AHM</td>
<td>I. H. DeYoung</td>
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<td>F. C. Miramontes</td>
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<td></td>
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<td>Redwood City, Calif.</td>
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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

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Radio Apparatus

Distributors of Reliable Radio Apparatus to Schools, Colleges, and Experimenters all over the world.

AMPLIFIERS

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AUDION CONTROL PANELS

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CHOKE COILS

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COILS—(De Forest Duo-Laterals)

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C. W. TRANSFORMERS

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<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acme 1050 Watts</td>
<td>$75.00</td>
</tr>
<tr>
<td>Acme 200 Watts</td>
<td>$15.00</td>
</tr>
<tr>
<td>Acme 500 Watts</td>
<td>$25.00</td>
</tr>
</tbody>
</table>

IMPORTANT! Every article sent to any part of the United States postage or express prepaid. We want your patronage.

P. D. PITTS CO., Inc. Dept. E 12 Park Square, BOSTON, MASS., U. S. A.

"PITSCO" The Sign of Service! All We Ask is a Trial!

"REMEMBER" When you say "PITSCO" you think of Everything in Radio.

Note: These are the latest tubes put out by the Radio Corporation.

VACUUM TUBES

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiotron UV-206 Detector tube</td>
<td>$5.00</td>
</tr>
<tr>
<td>Radiotron UV-205 Amplifier tube</td>
<td>$6.00</td>
</tr>
</tbody>
</table>

TRANS. CONDENSERS—(Doubler)

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 100</td>
<td>$12.50</td>
</tr>
<tr>
<td>Type 200</td>
<td>$17.50</td>
</tr>
<tr>
<td>Type 300</td>
<td>$25.00</td>
</tr>
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</table>

TRANS. TRANSFORMERS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 11</td>
<td>$7.00</td>
</tr>
<tr>
<td>No. 12</td>
<td>$8.00</td>
</tr>
</tbody>
</table>

TELEPHONES

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 11</td>
<td>$6.00</td>
</tr>
<tr>
<td>No. 12</td>
<td>$7.00</td>
</tr>
</tbody>
</table>

When writing to Advertisers please mention this Magazine.
RUB YOUR EYES AGAIN!
TALK ABOUT SALE—HERE'S A GOOD ONE
—And the reason? Well it's this. The C and S Catalog is ready. We need your address to send you a catalog. So we figured that by offering these prices you will grasp the opportunity and order some apparatus. We will secure your address and send you a catalog. So in this ad we are offering superlative apparatus selling at EXTREMELY LOW PRICES.

THIS EXTRAORDINARY LIBERAL OFFER POSITIVELY EXPIRES IN 30 DAYS

The Old Reliable Short Wave Amplifying Receiver

SPECIAL PRICE
ONLY $35
Express Two dollars extra.
Only one receiver sold to a customer.

The super-sensitive, super-selective, and super-efficient short wave amplifying receiver of wide renown. We guarantee this receiver to be the best of its kind sold today. Get it today and receive these signals at marvelous intensity. Amplification 100 times. Complete receiver ready to connect up as a amplifying receiver only $35.

GENUINE RADIOTRONS
Those ultra super-sensitive detector and amplifier bulbs. Absolutely the best bulbs sold. Detector operates on 221/2 plate voltage; amplifier 45 volts. For maximum results and efficiency you should use "radiotrons." Order today—while the price is low!

Detector UV 200 Special price only $4.50
Amplifier UV 201 Special price only $6.00
Postage 1 lb. Postage 1 lb.

NOT MORE THAN SIX OF EITHER TUBES SOLD TO ONE CUSTOMER

C and S NAVY TYPE DIALS
BAKELITE PANELS

Regular $16.00 4-in. white cellotoid dial 78c. Regular 78c 3-in. white cellotoid dial 90c. 8 in. x 6 in. x 1/4 in. only 90c. Postage 1 lb. 12 in. x 8 in. x 1/4 in. only 127c. Postage 1/2 lb.

SAVE MONEY—BUY TODAY—AT ONCE
OUR STOCK LIMITED. ORDERS FILLED IN ROTATION
THE C and S RADIO-ELECTRIC CO., Dept 21-21, OMAHA, NEBRASKA

AN OSCILLATING ODDBIT
(Continued from page 180)
would remain constant and no further action could occur. But when we commonly term a good insulator is really a conductor of some millions of ohms resistance. Consequently the negative electrons will flow very slowly from the grid through the glass, the base, etc., or, in other words, the grid slowly loses its negative charge. As the grid potential is changed by this "leaking" process from a to b, the plate current rises very slowly. This part of the cycle occupies the greatest length of time. As soon as the negative electrons on the grid have sufficiently "leaked off" to bring the potential to b, the valve will again oscillate, since the steep portion of the curve has been reached. The sudden rise in plate current takes place just as soon as the oscillations start, since direct current component of the plate current while the valve is oscillating is much larger than its valve at B. The grid again accumulates a negative charge as before, and the cycle is repeated.

The length of time required for a complete cycle is usually several seconds. It depends chiefly on the following:
Insulation of the grid and grid lead;
Insulation of the condenser;
Capacity of the condenser;
Filament current;
Plate battery voltage.

The degree of insulation of the grid and condenser partly determines the rate at which the negative charge can leak off. The larger the condenser the greater will be the number of electrons accumulated by the grid before its potential is sufficiently lowered to stop the oscillations, and consequently the longer it takes the grid to lose its charge. A one mf condenser, substituted for the one-tenth mf. used at the Wireless Show, would lengthen the cycle to about 30 seconds.

The filament current and plate battery voltage partly determines the position and shape of the characteristic curve. Because of this, and other reasons, both of these quantities have something to do with the frequency of this circuit.

Anyone interested in vacuum valves will derive much knowledge of their operation, and a good deal of amusement, by connecting up this circuit and experimenting with it. Most experimenters are not equipped with a very sensitive meter, but this may be omitted, and the action studied with the telephone receiver. If the circuit does not operate at first, reverse the leads on either the secondary or primary of the transformer. The writer welcomes communications from those who try this experiment.
HAWAIIAN TRANSMITTER TEST  
(Continued from page 173)

When we received letters from “DX” radio men stating that they copied our signals as far as 50 and 60 feet from the phones, it was hardly believable until we proved it the other night by reading the following amateurs as far as 60 feet from phones. In fact, they could be heard much further. To be sure about it, one of us stayed in the station while the other walked out in the back yard and would tell by voice in code whether the station was saying NPM or signing his own call. They are:

6AK .............. 60 feet
6BJ .............. 60 feet
6BJ .............. 60 feet
6ZK .............. 60 feet
6ZE .............. 50 feet
6BN .............. 50 feet
6KL .............. 50 feet
6OC .............. 10 feet

Now, in regard to the weather here on the morning of the 21st, before 2 a.m., there was a low and heavy fog and slightly “buzzy.” After 2 a.m. the sky was clear, stars and moon observable, the best weather one could expect for a long distance test. About 3 a.m. the steady buzz and heavy fog came back to pay us another visit. But, thank heaven, it stayed out while the test was being carried on. It certainly came off in fine shape the 21st, but not so good the 22nd. It was pretty cloudy, and that steady buzz which we all lost was in again. That is the next thing we will all have to fight, since we have “Old Man Static” pretty well wiped out. It seems to be in a different locality every night and is pretty hard to tell whether the power companies are to blame or “Old Man Static’s” assistant. We would like to hear through “P. R. N.” whether or not the amateurs from other distant points get this steady buzz business. Amateurs in Pasadena, ten miles north of us, claim they can hear it 100 feet from the phones at times.

We hope that the Honolulu test will show some remarkable records for the Pacific Coast amateurs.

We are very sorry that we will be unable to attend the convention, but will certainly experience pleasure reading all about it in the “Pacific Radio News.”

Very truly yours,
Seefred Bros.,
6EA and 6 EB.

THE radio inspector at San Francisco has received a number of letters recently complaining of the working of other amateur stations. A large number of these letters have been unsigned, and it is the desire of the radio inspector to inform the writers that such letters cannot be considered unless the name and address of the writer is given.
Acme Amplifier $13.00

Acme Detector $10.00

THE ACME AMPLIFIER shown in the cut sells for a price only slightly greater than the retail price of the individual parts, which include an ACME type A-2 Amplifying Transformer, Tube Socket, Filament Rheostat, Dial, Oak Box, Engraved Bakelite Panel and Binding Posts.

The ACME DETECTOR is mounted in the same way and includes a Condenser and Grid Leak in place of the Amplifying Transformer.

Compact Attractive Short Connections

By connecting adjacent binding posts of two Amplifier units side by side a two-stage amplifier is obtained with separate filament control and same A and B batteries. A detector may be added to either one or two-stages with the same ease of connection.

Acme Apparatus Company 21 WINDSOR STREET, CAMBRIDGE 39, MASS.

RADIO CLUB PINS

Special folder of designs and prices in addition to regular catalogue free on request.

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

METAL ARTS CO. Dept. 9 Rochester, N.Y.

ANYTHING IN— Telephone Garfield 71

RADIO APPARATUS

Electric Supply and Repair Co.

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
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.

SERIES "T"

<table>
<thead>
<tr>
<th>No.</th>
<th>Value</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>2 plate</td>
<td>$2.00</td>
</tr>
<tr>
<td>70</td>
<td>.0001 m.f.</td>
<td>2.35</td>
</tr>
<tr>
<td>130</td>
<td>.0002 m.f.</td>
<td>2.25</td>
</tr>
<tr>
<td>170</td>
<td>.0003 m.f.</td>
<td>3.15</td>
</tr>
<tr>
<td>230</td>
<td>.0005 m.f.</td>
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</tr>
<tr>
<td>310</td>
<td>.0007 m.f.</td>
<td>4.30</td>
</tr>
<tr>
<td>430</td>
<td>.001 m.f.</td>
<td>5.25</td>
</tr>
<tr>
<td>630</td>
<td>.0015 m.f.</td>
<td>7.50</td>
</tr>
</tbody>
</table>

Include postage for one pound

SERIES "L"

<table>
<thead>
<tr>
<th>No.</th>
<th>Value</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2300</td>
<td>23 plate</td>
<td>$6.00</td>
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<tr>
<td>4300</td>
<td>.00075</td>
<td>8.00</td>
</tr>
<tr>
<td>6300</td>
<td>.0013</td>
<td>10.00</td>
</tr>
</tbody>
</table>

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

Include postage for two pounds

The Wireless Shop

511 W. Washington Street
A. J. Edgcomb
Los Angeles, 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.
It won’t perch on the tree, but--- IT MAKES A "BIRD" OF AN XMAS GIFT

C. R. L. Paragon Reg. Receiver

The C. R. L. Paragon, with its tremendous amplification factor and extreme electrical efficiency combined with mechanical perfection and convenience, makes the ideal Christmas present—and you can be sure that it will be appreciated—but be sure that you get the genuine C. R. L. product. Look for our name on the instrument. The genuine C. R. L. Paragon is used in almost all long distance stations throughout the country. Price, F. O. B. Chicago, $60.00.

C. R. L. Amplifier, Type AON-2

IF A "BIRD" OF A GIFT ISN'T ENOUGH FOR HIM, ADD AN AMPLIFIGON AND MAKE IT A "WHALE"!

The C. R. L. Amplifigon detector and step attenuator is now equipped with phone plug and jacks for detector and each step, our special 5-way battery switch with transmitting position, extra phone post, NON-SQUEEALING transformers and many other special features. Combined with the C. R. L. Paragon, it makes up the BEST complete short wave receiver on the market today, bar NONE. Price, F. O. B. Chicago, $105.00.

Both sets fully guaranteed for TWO YEARS. Licensed under Armstrong and De Forest patents.

Special preparations made for Xmas deliveries. Write for our descriptive bulletin.

Chicago Radio Laboratory
1316 Carmen Ave.
5525 Sheridan Road (Testing Station 92N)
CHICAGO, ILL., U. S. A.

BAKELITE-DILECTO

The standard insulating material for all radio work. Water-proof, permanent, strong, used by all important manufacturers of wireless apparatus and others requiring the utmost in insulation.

Furnished in sheets, rods and tubes.

We also manufacture VULCANIZED FIBRE in sheets, rods and tubes and CONITE, a special insulation, in sheets or rolls from .005" to .020" thick.

Let us show you how our standard products can be made to solve your insulation problems.

THE CONTINENTAL FIBRE CO.
NEWARK, DELAWARE

333 Broadway, New York City
332 S. Michigan Ave., Chicago, Ill.
325 Market St., San Francisco, Cal.
411 S. Main St., Los Angeles, Cal.
1710 Royal Bank Bldg.,
Cor. King and Yonge Sts., Toronto, Ontario, Canada

OBTAINING A NEGATIVE GRID CHARGE

THE hook-up shown here will enable the user to obtain a negative grid charge. The rheostat R-1 should be of the low ohmage type in order to permit of very close potential adjustment.

Courtesy of the Amido Apparatus Company

BOOK REVIEW


OPERATORS' GENERAL INSTRUCTIONS AND LAND LINE TARIFF BOOK

For use of commercial ship and shore operators. Published by the Ship Owners' Radio Service, Inc. Contains full account of rates, abstracting of messages of any character, message forms, time signal and weather information, watch hours for operators, instructions on counting of words, general traffic regulations for Shipping Board vessels, and other data of value to the commercial operator. Can be secured from any Ship Owners' Radio Service Station at $1.50 per copy.

SAN FRANCISCO RADIO CLUB WILL START MEMBERSHIP DRIVE

WITH the view of having every radio man in San Francisco on the Membership list of the San Francisco Radio Club, a new membership campaign will soon be in progress. It is planned to reduce the initiation fee to $1 for a period of thirty days. The dues will remain at 50 cents per month.
Storage Batteries

We are but one of several hundred radio accessories supplied by us. Order anything of standard make advertised elsewhere and get immediate delivery in a single package which is an ideal one. Send stamp for details of saving you can make.

C-2 4 volt 20-40 amp hour 8.75
C-2 4 volt 40-60 amp hour 10.75
C-3 6 volt 20-40 amp hour 10.75
Type "C" designed especially for lighting vacuum tube filaments. Supply limited.
T-1 4 volt 20-40 amp hour 10.00
T-2 4 volt 40-60 amp hour 12.50
T-3 6 volt 20-40 amp hour 10.00
T-4 6 volt 40-60 amp hour 12.50
Type "T" designed for automobile trade are excellent for tube lighting.
F-1 6 volt 60 ampere hour 12.00
F-2 6 volt 80 ampere hour 24.00
Type "F" designed for the new Ford car are also excellent for tube lighting or spark coil work.

Add 5 per cent extra tax to these prices which are F.O.B. Marks factory Brooklyn, N.Y.

Mutual Purchasers Association
Dept. P-1-24 Stone St., New York

ENGLAND

HOOK S 'ER TO HER BULB

THE MOST WONDERFUL TUNER IN THE WORLD FOR $10.00—ADD PARCEL POST

"On the evening of July 19th I was listening in with a companion to a Marconi Operator using your 20,000 meter tuner when we heard NSS with great clarity and copied the whole of the message. We also heard NFU. In communication with a U. S. War ship. We also heard KFU which we have been unable to hear. Stations we heard quite distinctly and had no trouble in taking the messages. The aerial used was a 70 feet twin wire on a house in the city. The circuit the one given by you—all together we were listening was never silent for a moment and we received messages from considered these results excellent."

(Signed) W. R. Wade, 5 West Mall, Clifton, Bristol, England.

PERFECTION BINDING POSTS—6 FOR 75c

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.D.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.O. $1.90
21 Plate K.O. 2.25
41 Plate K.O. 3.20

OUR NEW CATALOG

JUST OUT, BLIM'S FULL OF WIRELESS DOPE.
Send 10c Stamps

GLASS PLATE CONDENSERS

7 Plates, 15,000 mf. .0015 MF. 2.00 add P. P.

VARICOMETER

VERY EFFICIENT
$5.00 Each, add Parcel Post

Send in Cabinet with Scale and Pointer $7.50

Midwest Agency for New Radiotrons

TRESCO, Davenport, la.

HERE IT IS

Lattice Wound Variometers
Especially Designed

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 3/4-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

ATTRACTIVE PROPOSITION TO DEALERS

A. W. HALLBAUER
Sole Agent and Distributor
1001 N. LOCKWOOD AVENUE
CHICAGO, ILL.

When writing to Advertisers please mention this Magazine
RAY-DI-CO.
SPECIAL SPARK GAP MOTORS

Type C-2-110 Volts  Specify A. C. or D. C.
These motors equipped with ball bearing. Eliminating vibration.
Price, Postpaid in U. S. $13.85

Flight spark point rotor for this motor made of
1/4-in. grade XX Bakelite Diletco $5.75 postpaid.

RAY-DI-CO.
Radio Supplies
2653 C. N. CLARK ST. CHICAGO, ILL.
Specializing in the designing and construction of
radio-phones to your specifications

KLAUS RADIO CO.
Eureka, Illinois
Mfrs. of Electrical Specialties
Distributors for
DREES MUMMERY
DE FOREST BALDWIN
MURDOCK BURBIDGE
AMRAD ACME
THORDARSON ACMG, ETC.

NOW READY
Another Bulletin on Late Developments in
RADIONET and D. A. ACCORDANCE.
The nucleus is fully described, as are the
components parts which may be
purchased separately:
Type J 0-100, 0-300, and 0-500 Mili-
Ameters, 2-inch flush type........ 7.00
Type J, 0-3 and 0-5 D.C. Amometers........ 7.00
Type J, 0-20 and 0-500 Voltmeters (External
Resistance), 2-inch flush type. 18.00
$10 General Radio No. 127A. M. W.
Amometers, 0-1, 0-2, 0-5 ranges. 7.75
Special Radio Microphone with Adj.
Bracket, 4.50
Type CSU .0006 mfd. Balanced Var.
Condenser. 6.00
Type CSU .0011 mfd. Balanced Var.
Condenser. 6.00

Beginning the New Year Right, We An-
ounce PREPAID POSTAGE ON BORULA SPECIALTIES!
It pays to send East for "Borula Service"

Sommerville Radio Laboratory
102 Heath St. Somerville, 65, Mass.

Dependable Efficient Serviceable

ACE EQUIPMENT

ACE Regenerative Receiver............... 80.00
ACE Regenerative Tuner............... 85.00
ACE Audion Control Cabinet............. 22.50
ACE One-Step Amplifier (Cabinet type)........ 49.00
ACE Two-Step Amplifier (Cabinet type)........ 60.00
ACE V.T.V. Sock with Glass Lens........... 1.50
ACE 3¼" Etched Metal Dial................ 1.50
ACE 2-1/4" Hard Rubber Dial............. 1.50
ACE Stopping Condenser................ 1.00
ACE Grid Condenser.................. 1.25
ACE We also carry a complete line of
radio equipment such as rotary
amps, transmitting transformers and
condensers, oscillation transformers, keys,
back presses, formica panels and tubes (any size), switches, binding posts, contact, etc., etc.

When writing to Advertisers please mention this Magazine
Audion Control Panels

Panel size 4x6¼ in. of Polished Forcina, use V. T. or Audition Tube, Rheostat, Grid condensor, B battery control, 6 binding post, mounted on brackets, all metal parts highly nickel plated and polished, 30 day special price $6.25 prepaid.

One Step Amplifier
Panel size 4x6¼ in. 30 day special price $12.25 prepaid.

Two Step Amplifier
Panel size 6½x28 in. 30 day special price $22.50 prepaid

Ask for Illustrated Literature Free

Keystone Radio Company
Manufacturers and Dealers
Drawer 307
GREENVILLE, PENN.

LET THIS BE YOUR NEW YEAR'S RESOLUTION—
Resolved—That I will Use a Good Rotary Gap Throughout the Year of 1921 and Will Cease to Join the Air With that Inefficient, Mushy Spark.

A GOOD ROTARY GAP IS A RADIATION BOOSTER


$12.00 THIS GAP WILL HANDLE ONE KILOWATT SAFELY. ROTARY AND STATIONARY ELECTRODES ARE EASILY RENEWED.

Include Postage on eleven pounds

Our New Bakelite Audion Control Panel with V.T. Socket, Rheostat, "B" Battery Switch, Nickeled Binding Posts and Brackets for Table Mounting, $5.00.

RADIO DEVELOPMENT COMPANY
Manufacturers of High-Grade Radio Apparatus
P. O. BOX 2114 SAN FRANCISCO

When writing to Advertisers please mention this Magazine
RADIO INSTITUTE
OF AMERICA
Conducted by the greatest and most experienced radio telegraph organization in the world.
Thorough training given in radio operating, traffic, and in damped and undamped systems.
Tuition ten dollars a month for either the day or evening sessions or both combined.
RADIO CORPORATION OF AMERICA
Phone Douglas 3030
335 New Call Bld., San Francisco

WE RECOMMEND “Saco Radio Apparatus”
The Audion Control Panel illustrated is the very best of its kind. It has a variable grid condenser
to control the grid potential, a filament ammeter, telephone condenser, plug type grid leak, etc.
The Two Stage Amplifier illustrated at the right is guaranteed against squealing and howling as found with other makes of amplifying units.
They can be used with equal success in amplifying radio telegraph and telephone signals without distorting the incoming signal.
Price $50.00

Order anything in RADIO PARTS or made up—
We have it.
Price $50.00

American Electro Technical Appliance Company
Dept. PR. 235 Fulton Street New York

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 maxim to .1 mil henry minimum. Is readily used on table or mounted on panels.
Complete with 3-inch dial and knob $6.50
Without dial or knob $5.75

TYPE Z. R. L.
Transformer for use with rotary spark gap has two section secondary, bakelite terminal supports and high grade construction, 400 watts power rating highly efficient at 200 meters.
Price $14.00
Apparatus which excels in those qualities which for 13 years of continuous manufacture have maintained its enviable reputation for reliability will be found pre-eminent in the display rooms of discriminating dealers and is manufactured by
CLAPP-EASTHAM COMPANY
140 Main St., Cambridge, Mass.
Catalogs mailed for 6c stamps.
THE EDITOR'S MAIL BAG
(Continued from page 177)

air mail service radio stations. It is getting to be quite a circuit. They are using 2 k. w. arcs on the western division and some 5 k. w. sparks in the East. They average time for a message to get back East on this circuit is about 45 minutes. They are installing radio telephones on the airplanes now. Radio seems to be taking quite a forward march. Your "Pacific Radio News" is very interesting.

Yours truly,
DANTE H. CORDANO,
U. S. Naval Radio Station,
Goat Island, Calif.

Remember, if S4038 is made a law it will seriously harm the amateur. Protest the passage of this dangerous bill today — don't wait until tomorrow.

Station 6ZV,
1247 Forty-seventh Avenue,
San Francisco, Calif.,
December 8, 1920.

Pacific Radio News,
50 Main Street,
San Francisco, Calif.

Gentlemen:

In connection with the Honolulu transmitting test on November 21st last, concerning which your representative requested me to state the exact time I transmitted, I started and then started the test together with the matter sent, I will state at 2:32 a. m., San Francisco time (12:02 p. m., Honolulu time), I started, and called NPM for one and a half minutes on my 60 cycle non-synchronous spark on 200 meters and then shut down. I called NPM again on both buzzer modulated, and pure continuous wave for the remainder of the three-minute period and then broke off and told 6B1 to go ahead. The undamped wave was radiating exactly one and a half amperes on 230 meters, using 4 vacuum tubes, with about 400 volts on the plate. Being able to receive at the same time the transmitter was operating. I left the CW set run for a few minutes longer in order to have it ready for communication again in case I should need to start the next station, knowing that it would not interfere with the test owing to its extreme sharpness, and because of its being considerably over the normal amateur wave of 200 meters. I shut the transmitter down at about 2:39 or 2:40 a. m.

Trusting this information will be satisfactory, I remain,

Yours very truly,
D. B. McGOWN.

P. H. Boucheron, formerly associate editor of the "Radio News," is now connected with the Radio Corporation of America as assistant to Mr. Elmer E. Bucher in their sales department.

Makes Audions function properly

Ever have trouble making your audion set behave? Perhaps the vacuum tube oscillates too freely. Perhaps the regeneration is faulty. But, whatever it is, the Pen Brand Grid Condenser will cure that trouble. The grid condenser is the most important part of an audion set. The grid of an audion is its control element. And the Pen Brand Grid Condenser makes the audion grid function properly.

THE PEN BRAND GRID CONDENSER—

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