



HELP WANTED!

MANY communications have reached us from progressive amateurs who ask our help in enabling them to get their C.W. signals into the air. The old-reliable spark gap has not left us in spite of the ever-increasing number of tube sets coming into operation. The amateur who has used the spark for the past few years will not throw it in the discard in favor of a C.W. set until he can safely rest assured that other stations will hear undamped signals without necessitating the present system of long and continuous calling.

The spark is a valuable asset to C.W. work of the present day. It is usually necessary to call a station with the spark to inform the "party on the other end of the line" that C.W. signals are to be transmitted.

Amateurs will not take the trouble to do a little tuning for C.W. stations. The coupling of the tuner is set in a fixed position and it remains there until the cows come home. Sharp tuning is necessary to get those signals. We have heard C.W. stations call distance amateurs time and again without result. Closer co-operation is necessary among the amateurs of the West in order to realize the utmost of pleasure and benefit from their equipment.

Why not do a little tuning for C.W. stations and add a few more records to the credit of the Pacific Coast amateurs? If Sgt. Tavers (6XW) can work his phone set a thousand miles on two tubes—if Mr. A. F. Pendleton (6UV) gets over two amperes radiation on four tubes and is heard in Washington—if

Sgt. Lufkin (SC) can be heard off Mazatlan, Lower California—what in the world is going to prevent the C.W. amateurs of the Pacific Coast from being heard in the East?

A NEW DEPARTMENT

The U. S. Radio Inspectors of the Sixth Radio District will conduct the new department "With the Radio Inspector", starting in the next issue of "Pacific Radio News."

This department will be a monthly feature, explaining to our readers the manner in which their stations should be operated in order to comply with the Radio Laws.

Co-operate with the Radio Inspector by sending us your questions on doubtful matters. The Inspector will answer them for you through this new department. Your requests should be marked: **Radio Inspector's Department, "Pacific Radio News."**

Sgt. Tavers and Lufkin, of the Presidio of San Francisco, are using a wavelength of more than 300 meters. If a few of the six thousand Eastern amateurs who read "Pacific Radio News" will do a little tuning in the neighborhood of 345 meters they may experience a pleasant surprise in the form of hearing a Sunday night concert by radio telephone from San Francisco.

Due to the heavy interference on 200

meters, the C.W. set has a small chance of "getting through" on the amateur wavelength. For this reason the San Francisco Radio Club has framed a proposal to be submitted to the Pacific Coast Advisory Radio Council, requesting that body of authority on radio to do everything possible in promoting C. W. communication.

Steps will be taken to authorize the use of wavelength in excess of 200 meters for tube work. As we go to press the first meeting of the Council is called to order. Representatives of the commercial companies and amateur organizations will discuss the advisability of discontinuing the use of the 300 meter wavelength for commercial work, in order to give the amateur a wider range of wavelength for C.W. transmission.

The commercial companies are not in favor of using the emergency 300 meter wave. They want it abolished. A vast amount of money will be saved if the use of the 300 meter wave is discontinued for commercial work. Short wave apparatus will no longer be necessary.

But the Pacific Coast Advisory Radio Council has not the power to abolish the 300 meter wave for commercial work.

It can suggest to the higher radio authorities that action be taken to discontinue the use of the "costly wave". Give the amateur a broader field for experimentation and the entire science of radio will be revolutionized and more fully exploited.

It takes the modern 1921 amateur to "do the trick"—and he is here to do it.

New York Office.....147 Sixth Ave. Portland Office.....420 Bd. of Trade Bldg. Seattle Office.....419 Pioneer Bldg.
Boston Office.....18 Boylston St. Chicago Office.....1306 Hartford Bldg. London Office....62 and 8a, The Mall, Ealing

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SOMETHING DIFFERENT IN AMPLIFIERS

By B. F. McNamee, Chief Engineer, Moorhead Laboratories.

HOW can I get rid of that interference?"

This is the question asked by everyone who has tried to listen to the music sent out by the many radio telephones now working. Especially if you have tried to amplify the music in order to give your friends a "wireless concert," you have realized the need of some means of eliminating the "QRM." You have probably thought of using radio-frequency amplification. If you have not tried it, it was no doubt because you thought that the tube used for it would bring much louder signals if used for audio-frequency work.

The present circuit is designed to give the benefits of both kinds of amplification, without increasing the number of tubes. In fact, the same tube that is used for the radio-frequency amplification is used again as an audio-frequency amplifier. At the same time this circuit permits the use of a sensitive gaseous detector tube and a hand amplifier; in other words, each tube is functioning efficiently.

The step of radio-frequency amplification shown in this circuit will make the tuning much sharper, and thus eliminate many of the undesired signals, as well as the "mush" from local arcs.

Referring to the diagram, B, C and E are three honeycomb coils on the usual triple-coil mounting. F and G are two more honeycomb coils on a two-coil mounting. These two mountings should be placed some distance apart, to prevent interaction—a distance of two feet is sufficient. J is an audio-frequency transformer, whose primary and secondary are marked P and S, respectively. K is a fixed condenser of .001 m. f. capacity. I is a fixed grid condenser of about .0003 m. f. capacity. L is a hard tube designed for amplifying, while M is a soft tube designed as a detector.

The operation of this circuit is as follows:

The antenna circuit is tuned to the signal by means of the variable condenser A, and the secondary C is tuned by the variable condenser D. This is the usual loose coupler. The condenser K is used to permit the high-frequency induced in the secondary C to pass the transformer J, thus completing the high-frequency circuit from grid to filament. Since the tube L is a hard tube of the amplifier type, and since no blocking condenser is used in the grid lead, this tube will repeat the radio-frequency in its plate circuit, rather than act as a detector. The plate circuit of this tube is tuned to the radio-frequency by varying condenser H. There is sufficient capacity in the windings and cord of the telephones to allow the radio-frequency to pass through this plate circuit. F and G are the primary and secondary of a radio-frequency transformer, or as it is more commonly called, a loose coupler. Through the secondary G the high-frequency is finally impressed upon the grid of tube M. Since this tube is one designed for detector work, and since a blocking condenser I is used, an

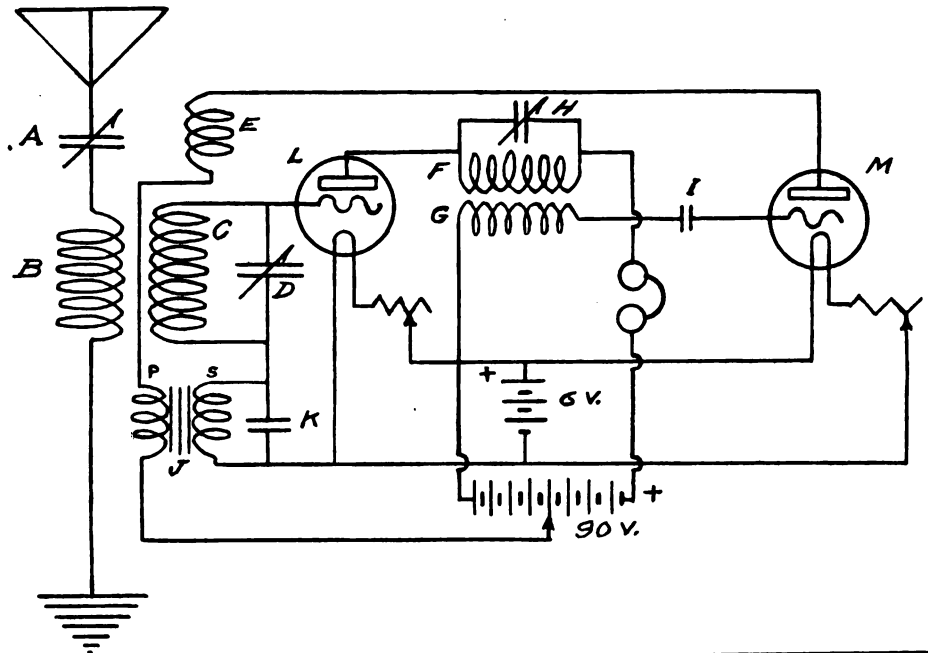
audio-frequency current will be obtained in the plate circuit of M. But even in this detector tube there will be some repetition of the high-frequency, and this is utilized by feeding it back into the grid of the first tube by means of the tickler E.

The audio-frequency current output of the detector, instead of flowing directly through the telephones, flows through the primary of the audio-frequency transformer J. The condenser K is too small to have any appreciable effect on the low-frequency output of the secondary of this transformer is really connected in the usual way, that is, between the filament and grid of the amplifier tube. The amplified audio-frequency then

ling between B and C quite loose. Begin tuning with the tickler as far from the secondary as possible, and after picking up the music, adjust the tickler for maximum strength. After adjusting the tickler, the signal may be still further improved by making a final adjustment of the secondary condenser.

This circuit may be used with good results on short waves. It will make the signals very sharp, and thus help working through the large amount of "QRM." For 200 meters, use the same condensers as above and the following honeycombs: B, 25; C, 35; E, 35; H, 25; G, 50.

Avoid the use of switches, as well as long wiring, in the radio-frequency portions of this circuit.



passes through the telephones.

Note that the plate battery applied to the detector tube is variable.

Thus with two tubes we obtain a step of radio-frequency amplification, radio-frequency regeneration, and a step of audio-frequency amplification. For further amplification remove the telephones and connect in their place the primary of an amplification transformer. The secondary of this transformer is connected to the next amplifier tube.

For receiving the music transmitted by the De Forest station at the California Theater, which sends on a wave length of 1400 meters, the following values should be used:

B, 200 turns (on the average amateur antenna); C, 250 turns; F, 150 turns; E, 200 turns (about); G, 300 turns; A, D and H, .001 m. f. each.

The setting of condenser A will vary with the antenna used. Condenser D is set at about 15 degrees, while H will be about half used. The coupling between F and G should be as close as the honeycombs will permit, and the coup-

FIRST "THREE OPERATOR SHIPS" ARRIVE IN PACIFIC

The first vessels of the commercial American merchant marine carrying three radio operators arrived in San Francisco harbor recently. The vessels are the "Golden State" and "Hawkeye State," built for the U. S. Shipping Board Emergency Fleet Corporation on the east coast. Both ships are equipped with a 5 k.w. Federal arc transmitter and a low power spark for short range work. The chief operator receives a salary of \$125 per month. Both assistant operators receive \$100 per month.

HAVANA, CUBA (PWA), IN OPERATION

Long distance radio service with Havana, Cuba, was recently established with the completion of the "PWA" station. The wave length used is 2,150 meters. No messages from ships will be accepted by "PWA" unless the ship is more than two days out of Havana.

THE DUPLEX RADIO TELEPHONE FOR THE AMATEUR

By H. Tenny

AFTER the first sense of novelty has somewhat abated from the consciousness of the elated new owner of one of those latest achievements of science, the Radio Telephone, he has borne upon him a rather depressing sense of operating unwieldiness caused by the bothersome necessity of throwing a switch, or a number of them, back and forth as he changes from talking to listening, and vice versa.

The experienced operator of the obsolete radio telegraph finds this switching a matter of relatively minor importance, as the transmission of language by Morse code is at best a sluggish and laborious procedure.

When we come to communicating the actual speech, however, the time and work element of this item is vastly increased, and early observance of this fact was made in government phones developed during the war, with the result that practically all new designs incorporate features which permit simultaneous talking and listening, called "Duplex" operation.

Such an arrangement was used in the semi-hi-power telephone used on the U. S. S. "George Washington" while carrying the President "Over There."

Among the earlier attempts at practical "Duplex" telephoning was that developed by Dr. Lee De Forest, who used a microphone transmitter having a small vane, which, operated by the tiny air currents caused in talking, controlled a system of electrically operated relays which effected the necessary switching.

This, however, did not entirely solve the problem, inasmuch as the receiving apparatus was entirely disconnected while talking, hence the talker could not hear while talking, nor could he talk while hearing.

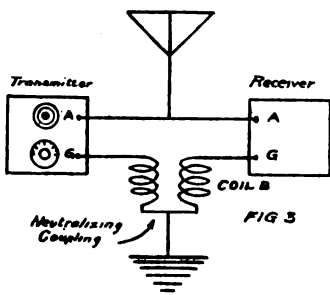
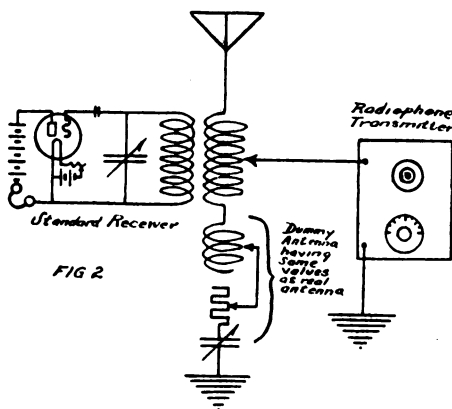
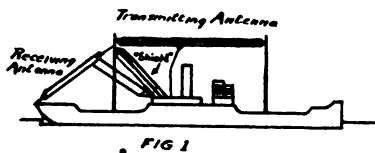
On the "George Washington" recourse was had to a separate receiving antenna, shielded from direct induction from the transmitting antenna. The success of this arrangement was due to the great difference in the wave lengths transmitted and received. With the transmitter radiating thirty-three amperes on wave lengths below two thousand meters, clear speech could be heard from the high power phone at New Brunswick, N. J., transmitting on four thousand meters, using very selective receiving circuits. (See Fig. 1.)

Such an arrangement, however, is, of course, impracticable for the amateur, who must therefore delve further into the possibilities of science for the filling of his needs. A circuit which accomplishes the object in a simple and effective manner is that shown in Fig. 2.

Use is made of a dummy aerial, which is placed in parallel with the actual aerial. The receiver secondary is coupled equally to both. The transmitting current divides equally between the real and the dummy aerial, and as they are both equally coupled to the receiver in opposite directions, they neutralize each other's effect on the receiver, and therefore the transmitted speech is not heard in the phones. In receiving, however,

the received waves effect only the real antenna and are carried over to the detector without interference from the dummy aerial.

The main drawback to this circuit is the fact that one-half of the transmitting energy is lost, being dissipated in the dummy aerial. For short-range work the advantages in convenience of opera-



tion far outbalance the loss of efficiency.

A new circuit which shows remarkable possibilities, but which is still in the experimental stage, is known as the "Speaker System," named after its inventor, and is illustrated in Fig. 3.

This system makes use of a "neutralizing coupling." As the antenna is alternately charged at high frequency, the receiver antenna lead is subject to surges of voltage. These are neutralized by counter-surges generated in the inductance B, which is connected to the ground terminal of the receiver. The surges being simultaneous and opposite in their effect on the receiver primary, no oscillations are generated in it and the transmitted speech therefore not heard in the phones.

The practical development of this circuit offers a wonderful and extensive field for the progressive experimenter. Standard duo-lateral inductances of various sizes can be used for the neutraliz-

ing coupling. As in the tickler couplings in regenerative audion circuits, care must be taken that the polarity of the B coil be such as to counteract the surges from the antenna connection, for if it is reversed it will have the effect of short-circuiting the transmitter. The correct polarity can be quickly determined by reversing the connections to the B coil and observing the effect. The coupling between the two coils should be varied until the transmitted speech heard in the phones is reduced to a minimum. In carefully designed apparatus it is quite possible that it may be eliminated entirely, even when radiating several amperes.

Experiments can be made to determine the correct amount of inductance for standard wave lengths to be used in each coil.

As a general rule, the best results will probably be had when both stations are using the same wave length. Careful tuning will be required to prevent heterodyne and beat notes from drowning out the speech.

PEKING EXPLAINS RADIO CONTRACT WITH FEDERAL CO.

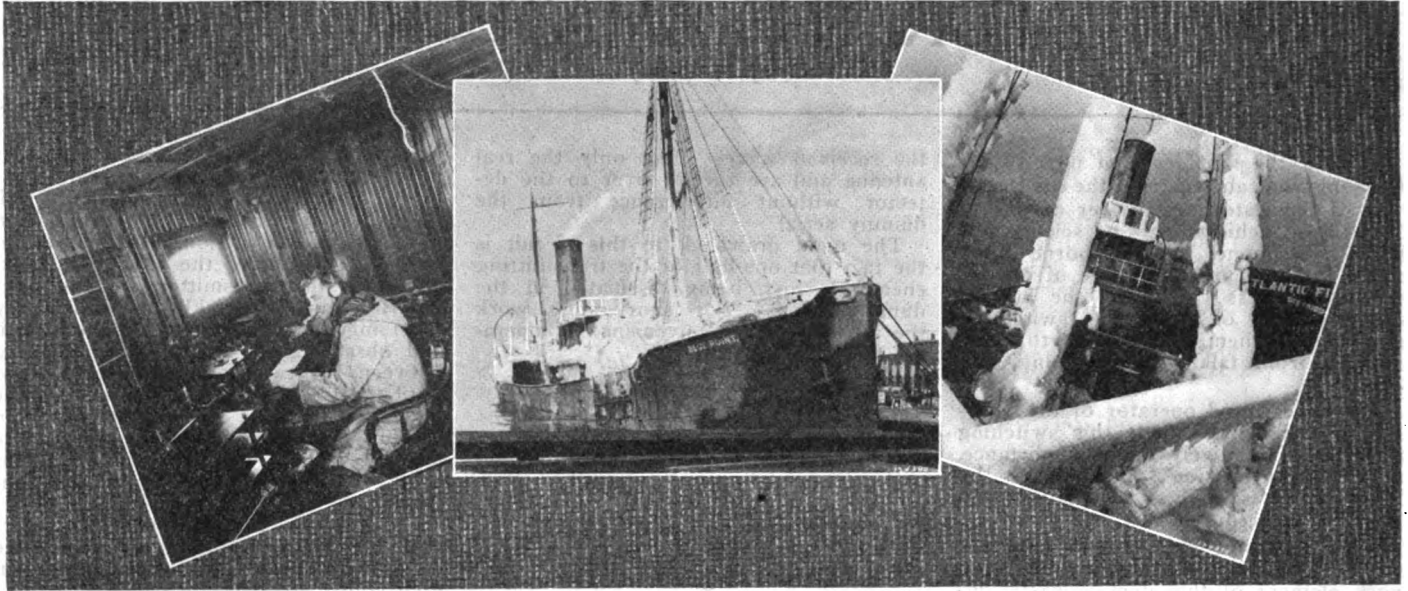
PEKING, February 11 (by the Associated Press).—In connection with the efforts of the British to effect a cancellation of the contract entered into between the Ministry of Communications and the American Federal Company for the construction of wireless apparatus, an official of the Prime Minister's office gave the following explanations of the situation:

"Plans were made by the aeronautic department of the government for forty add stations of 300 kilowatts each, but the Ministry of Communications disapproved the plan on the ground that their power would be too small for overseas use. For this reason the Department of Communications negotiated with the American firm for a station of more than 1,000 kilowatts and four stations of 600 kilowatts each, to be built in Peking, Harbin, Canton and Hankow.

"The purpose of the Aeronautics Department was to build many small stations inside the country, while the object of the Department of Communications was to erect a few stations powerful enough to reach foreign countries. The Aeronautic Department had an understanding with the Marconi Company and the contract of the Communications Department with the American firm does not entirely supersede it, because in future, when the Aeronautic Department wants to complete its plan it will still use the Marconi system.

"There also exists an agreement of the Ministry of the Navy with the Japanese for construction of a wireless apparatus, but the Japanese have not performed their part and since the Communications Department could not wait indefinitely while knowing the Japanese have not the material and therefore are not in a position to perform their part, the Communications Department concluded the American contract without hesitation."—San Francisco "Chronicle."

CURRENT RADIO



J. E. Bourke, Wireless Operator of the "Blue Point"

S. S. "Blue Point" at Dock After Her Battle with Seas, Wind and Ice

Ice on the "Blue Point's" Rigging

S. S. "BLUE POINT" WINS THROUGH

ON January 25th, the Siasconset wireless station of The International Radio Telegraph Company received the following message:

"New York Globe: At 3:36 P. M. our quadrant steering-gear went to smash, leaving us at the mercy of the worst gale of many years. Mate rushed to me to get SOS for help. Everybody in panic. Just as I was about to flash distress signal Captain Bishop banged into cabin shouting: 'Cut that damned thing off.' He was

already at work rigging up temporary gear with block and tackle, with which we hope to make Ambrose Light. From that point we can be towed to dock. This is the worst sea anybody has ever encountered. In 1912 I was in a big mess off Cape Hatteras, which up to that time was the worst within the memory of seamen. This has it beat. The poor devils now tending temporary steering gear are lashed to iron stanchions. Will keep you informed. Tell our wives not to worry."—J. E. Burke, Wireless Operator, S. S. Blue Point.

The "Blue Point" is a 324-ton steam

trawler operated in the interest of pure food by the New York "Globe," and is engaged in haddock fishing, off Nantucket. Though she was badly battered by the wind and seas, and laden with tons of ice, Captain Bishop succeeded in bringing her to New York under her own power. The accompanying photographs were taken after her arrival, and give some idea of her condition. The ice at one time covered her entire rigging and had to be chopped away from the antennae in order to enable her to use her wireless.

NEW RADIO STATION IN ORIENT

THE most powerful wireless station in the Orient is under construction by the Navy at Oshima, Sonoki-gun, Nagasaki prefecture, Kyushu, at an estimated cost of 6,000,000 yen, says the Japan Advertiser. Upon its completion the station will be able to communicate directly with all points of the world, say the Japanese papers.

The construction of the station was started following the decision of the authorities to build the eight-battleship and eight battle-cruiser squadron. What makes the station differ from others in the country is the manner in which it will be equipped. According to the Hochi, all equipment will be laid down in purely Japanese fashion. It is expected that when completed the station will be far superior to the Funabashi station in point of power.

It is believed that the station will be opened at the end of this year, subject to the sanction of the naval budget for the coming year. The abolition of the Yumihari naval wireless station will naturally follow the completion of the Oshima station, says the Hochi.

A wireless apparatus is also to be attached to the recently established Ocean Meteorological Observatory at Kobe, which has been largely handicapped by the lack of a radio station. The expense of the station is to be borne by public contribution, shipping companies and marine transport firms having already given 400,000 yen for this purpose.

PHONE TALKERS WARNED

Capt. Thomas W. Holmes, master of the five-masted schooner John W. Wells, now loading lumber in Port Blakeley for Australia, said recently that while he was 1,000 miles off the California coast he heard the chatter of the city of Los Angeles over its telephone wires by listening in with the ship's wireless.

"My attention was called to the wierd phenomenon by the wireless operator, who had tuned his apparatus down to 300 meters and had been doing some experimenting," said Captain Holmes. "I thought he was out of his head or had been drinking, but consented to put on the headgear and listen in. I could hear voices, evidently people talking over the telephone, and could make out distinctly what they were saying.

"I listened to a fellow in Los Angeles order a sack of potatoes from his grocer, heard the laughter of women who were gossiping with their neighbors and heard the election returns. I picked up the voice of a man who said that Harding was winning the election. He was talking to a business acquaintance and seemed to be very much elated over the way the contest was going. Wireless experts told me that hearing of voices by wireless apparatus aboard a ship is possible, but only under unusual conditions.

"All I have to say is that you had better be careful while talking over the telephone from a sound-proof booth and imparting a deep secret to a friend. Ships at sea may hear every word you say."—Seattle "Times."

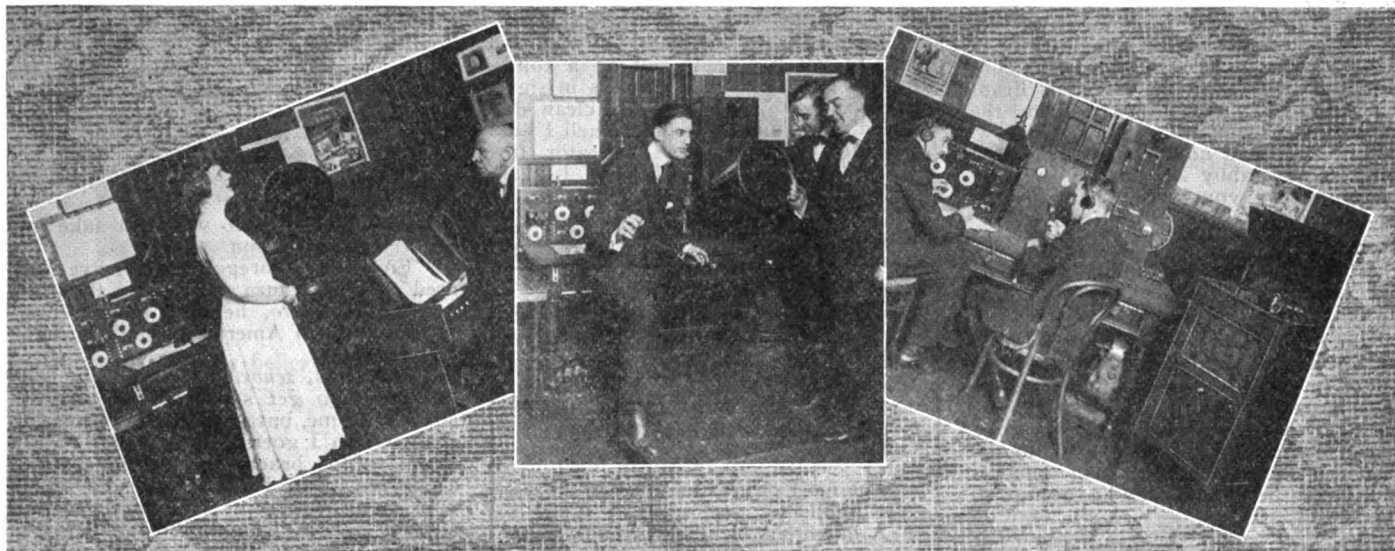
RADIO MUSIC FROM THE PRESIDIO OF SAN FRANCISCO WAKES UP RESIDENTS OF LOS ALTOS.

GREAT excitement prevailed on a recent Sunday evening among residents living within several miles of Emile Portal's receiving station at Los Altos, about thirty-five miles south of San Francisco. Portal was enjoying the radio telephone music sent out by the Presidio of San Francisco (6XW), when he conceived the generous idea of letting his neighbors enjoy it, too. Suiting the action to the inspiration he hooked up six-stages of amplification between his short-wave receiver and his Magnavox and opened the windows. His home is in a country district where the neighbors are well scattered, but it was only a few minutes before they began telephoning to ask Portal if that music they were hearing was coming from his house. Whenever any unusual sounds occur around Los Altos, the natives always know where to look to find their source. As the concert progressed more distant neighbors telephoned that they were enjoying the music from their porches and hoped that it would continue.

Astonished by the distances from which some of the reports were coming, Portal drove a mile down the road to hear the results for himself and found that every word of Sergeant Tavers' announcements were easily understood.

Residents of Los Altos haven't entirely recovered their equilibrium yet, but are now asking for regular Sunday evening concerts to be enjoyed from their front porches.

NEWS ILLUSTRATED



Left: Wireless telephone carries music fifty miles. Practic ability of new Westinghouse instrument for conveying music to large number of places demonstrated in test.

Miss Frida Stjorna, Swedish soprano, singing into the new Westinghouse wireless telephone in the tower of the 71st Regiment Armory in New York City, with Frank L. Scaly, organist of the New York Symphony Orchestra playing the accompaniment on a portable organ.

Miss Stjorna's voice and the organian music of Mr. Scaly were heard fifty miles from New York by passengers on the Fall River Line steamer "Plymouth."

Instrumental music was played in the tower for a dance in the McAlpin Hotel, and in addition to the successful transmission to the steamer and the hotel, amateur operators in the region around New York.

The instrument can be used for distributing music over a wide area, for the benefit of any number of audiences. It has been suggested that the Westinghouse wireless phone could be used in a big hotel or a vast amusement place to enable one orchestra to furnish music for a large number of ballrooms.

The transmitter is a very small apparatus, and can be carried around very easily.

This occurrence was photographed by Galloway, New York, only. Copyrighted by photographer.

Center: Vaudeville comedians singing and cracking jokes into the new Westinghouse wireless telephone, in the tower of the 71st Regiment Armory, New York City. They were heard fifty miles away by passengers on a Fall River Line steamer on Long Island Sound.

Center: Wireless telephone operators transmitting talking machine music with the new Westinghouse wireless telephone in the tower of the 71st Regiment Armory in New York City to the steamer "Plymouth" of the Fall River Line, fifty miles from New York City, and to dancers in the McAlpin Hotel, New York City. The music was transmitted with wonderful clarity.

Portal distinguished himself during the recent automobile show in San Francisco by a similar performance when music from the Presidio was projected for a distance of several blocks from an automobile while it was being driven about the streets of the city. The automobile started from Twin Peaks where a small antenna was stretched about ten feet above the ground between bamboo poles at the front and back of the car, and the Presidio radio phone was tuned in. The machine was then driven down town and down Market street followed by the wide-mouthed gaze of the astonished pedestrians. Driving up to the front of the Civic Auditorium where the automobile show was in progress, Portal in the car with Sergeant Tavers at the Presidio rendered a choice concert for the benefit of the large crowd that gathered.

The apparatus in both cases consisted of a standard Colin B. Kennedy short-wave receiver and audion control panel, two Kennedy two-stage audio-frequency amplifiers and a Radio Magnavox with two stages of amplification, making a total of six stages. This unusual amplification was effected with an entire absence of squeals, howls or other foreign noises. The automobile was a La Fayette furnished for the tests and driven by E. W. Milburn, general manager of the Greer-Robbins Company.

RADIO PHONES FOR BAR PILOTS

What next?

The pilots station on the bar outside the Golden Gate are to have their sloops equipped with wireless telephones.

Announcement to this effect was made by pilot port admiral, John Wallace.

No longer will steamships dally in the fog in search of the pilot before entering the harbor. A simple call on their wireless apparatus will bring Mr. Pilot to the phone and they will be told where to lower away their skiff.

Thus the last vestige of adventure which has marked the operations of the bar pilots will be swept away and the finishing touch of luxury and comfort added to the men who navigate liners in and out of San Francisco harbor.

"What ho, my hearties, is there a drink on the bar?" is one of the phone conversations suggested by shoreside skipper upon hearing the news.

Communication with the pilot boats will be maintained with a similar wireless phone set established at the local pilot office.—San Francisco "Examiner."

FEDERAL TELEGRAPH'S YEAR

Stockholders of the Federal Telegraph Company recently held their annual meetings in the Mills Building. In the absence of President R. P. Schwerin, who is in New York on business regarding the contracts for the construction of six 1,000-foot wireless towers in China,

his brief report covering activities of the company during the year was ordered read by Vice-President Leon Bocqueraz.

It referred to the dissolution of the Poulsen Wireless Corporation, told of the necessity of installing wireless stations for coast service as the result of action by the Pacific Telephone and Telegraph Company, of the success of the Lafayette station in France, and reported progress toward the first steps in the construction of superstructures in China.

An interesting part of the report was the preliminary financial statement which will be mailed to stockholders when audited. It shows that on December 31, 1920, the company's total assets were \$3,571,894. Of this amount \$359,120 was recorded as plant property, \$122,703 as construction assets, while \$2,532,673 was set down as rights and contracts. Current assets are reported at \$463,248, while cash on hand totals \$85,200. Accounts receivable are listed at \$125,366, materials and supplies at \$108,557, work in process \$144,123, and miscellaneous investments at \$1,941. Government claims are reported at \$61,772, while defined debit claims are set down as \$30,435. On the liabilities side of the sheets, capital and surplus are reported at \$3,198,001, current liabilities \$167,237, and reserves at \$206,655.

The outgoing directors were re-elected.—San Francisco "Examiner."

TOUGHER THAN A GOAT

By Volney G. Mathison

Another Samuel Jones story by the Author of "The Fall of Samuel Jones"

OU'RE looking pretty glum today," remarked Cunningham to Samuel Jones, who sat morosely contemplating the broad view of San Francisco Bay that was afforded from the audion-tube man's office window. "What's happened now? Have you been giving some crabby skipper a black eye again; or have you merely had another row with one of your affinities?"

Removing his gaze from a big freighter that was steaming out past Goat Island, the old shellback operator frowned sourly upon Cunningham.

"Humph, that's old stuff. Why don't you spring somethin' new once in a while?" he retorted, sourly. "An' what's furthermore, I reckon if you'd get an idea all of a sudden that you was goin' to be a millionaire, an' then lost out an' come near kickin' the bucket in the bargain, you'd be lookin' kind'a glummish yourself."

"Let's hear about it," prompted Cunningham. "Get the yarn off your chest, and maybe you'll feel better."

"Well, I s'pose you will, if I don't. You always like to get hold of my doin's an' peddle 'em around to every darn fool in town, don't you?"

"Oh, come on, now, you know that isn't so," protested Cunningham. "Why, if I told everything I knew about you, you wouldn't be here, Samuel—you'd be in jail."

"Yes, an' that's where I'll finally get anyways, if prohibition hangs out much longer," gloomed Samuel Jones. "But look here, if I tell you about this, you got to keep it mum. I sure don't want the supervisor to hear about it."

"You can be sure he'll never hear about it from me," Cunningham assured him; "so spiel away."

"Well, it was sure one rip-snortin' adventure, an' I ain't forgettin' it right away either, lemme tell you." The old shellback tipped his chair back and hoisted one long, lanky leg up over the other.

"You know, about four weeks ago, the supervisor sticks me on the big oil-tanker 'Selville,' for a trip to Panama. The 'Selville's' got an arc set, an' she was workin' fine, but just when we was half way back home what happens but the only can of alcohol I got goes an' upsets, leavin' me nothin' to run my arc with. There was some kerosene around the ship, but you know you might's well chuck an arc overboard as to put that soot-makin' stuff into it. I didn't run the set for a couple of days, but at last the steward digs up a quart bottle of grain alcohol out of the ship's medicine chest, an' gives it to me; so that night I fires up the ol' juice-squirter an' tries to raise San Pedro.

"We was way down the Mexican coast, an' it was a pretty long stretch to work through all the static. The old man was in a big sweat about a message or I wouldn't have tried it; because it was sure painful to see that darn arc guzzlin' all that good drinkable alcohol. Seemed like it took about five times as much to keep the arc burnin' steady as when usin' the denatured dope, but I couldn't see no help for that, an' I keeps hammerin' away. 'Long about two in the mornin' I was still settin'

there poundin' brass, tryin' to raise a chirp out'a NPX, though it was like tryin' to get a warble out of a tombstone. The end of the alco was in sight, an' I was wet with sweat an' clean disgusted, an' wonderin' what in hell I ever learned to be a wireless operator for, anyway, when all of a sudden, I hears some damped spark scratchin' out my call. Cuttin' out my tickler an' tunin' in the signals, I hears XAE, the Mexican

other word, he gets into the Mexican's boat an' goes ashore.

"We was all up in the air about the mystery, an' we was all standin' around arguin' whether the Japs had declared war, or if the old man had gone batty, when a native comes out from the beach in a little dugout, an' asks if anybody wants to go ashore.

"How much you want to take me ashore?" I asked him.

"Five pesos Obregon dinero, five hundred pesos Carranza dinero, five thousand pesos Villa dinero," he says, in bum English.

"How much American dough is that?" I demands.

"Two bits, *senor*," he says, politely.

"I tries to get some of the gang to come with me, but they wouldn't take no chances; so I goes ashore alone. When I got to the beach, I remembers all of a sudden that I left the radio shack open, with what was left on that grain alcohol standin' on the table, an' I thinks to myself that I can kiss the alco goodbye if that bunch of booze-hounds on the ship ever sees it there.

"Where's this Del Cabo, or whatever you call it?" I asks the Mexican; for there ain't nothin' on the beach but palm trees an' cactus. The *hombre* points out a road that runs back from the beach, an' I starts off. The road straggles along through the palm trees an' a lot of other tropical truck for a couple of miles, an' then I comes to a old tumblin'-down shed, with a big high fence around it. When I gets up pretty close, what does I see lyin' inside the fence but an ugly monstrous snake. Say, I've seen them pythons in the zoos, but they'd all look like a bunch of little garter snakes alongside of this giant boa-constrictor, an' that's no joke. As sure as I'm sittin' here, the thing was over fifty feet long, if it was an inch, an' it was about three feet through in its thickest places. It was kind of a dull gray and black color, an' it had a wide, flat head an' a pair of jaws big enough to swaller a cow, easy. It was movin' an' squirmin' around kind of slow an' heavy, like a snake does, an' it sure give me the shivers to watch it. Pretty soon it crawls into an old shed in the middle of the yard; an' then I goes on.

"Just a little way farther, the road widens out into a kind of a street an' wanders around like a cow-trail between a couple of rows of flimsy huts, built out of mesquite trunks an' palm leaves. Finally, I reaches the middle of the town, where there is about a dozen one-story houses, all built low an' square an' lookin' like a string of shoe-boxes. All the doors an' windows had gates an' shutters made out of heavy iron rods, an' there wasn't no sign of life no place.

"I hears the poppin' of a gasoline engine, though; an' I notices that the sound is comin' from a big shack standin' pretty well off to one side, which has a wooden lattice mast on each side of it. I makes this out for a wireless station right away; an' I starts toward it. The lattice masts was about a hundred feet high, an' they was carryin' a fan aerial, made with one big cable stretched between the two masts, an' about thirty vertical wires strung off the cable, with their lower ends all runnin' into the station.

(Continued on page 302)

In the May Issue

"ARCHIBALD AUGUSTAS GETS A SCARE."

By V. G. MATHISON

The most clever radio fiction story yet published.

A humorous blending of truth and nonsense.

It will take you back to the "Good old days" of Radio.

DON'T MISS IT!

station at Mazatlan, callin' me like he was clean frantic. When he quits, I jumps in an' tells him to go ahead; an' right away he comes back an' rattles off a three hundred and twelve word message—all in Spanish. I don't savvy that spig lingo, but I manages to copy the message pretty straight, an' I OK's for it."

"Deliver to the captain of the 'Selville' immediately," he comes back, in English this time, an' that's the last I hears of him.

"Wonderin' and puzzlin' what it was all about, I wakes up the old man an' gives him the message. Well, say, when he reads it, he just jumps outa bed in his pajamas an' raves like a wild man.

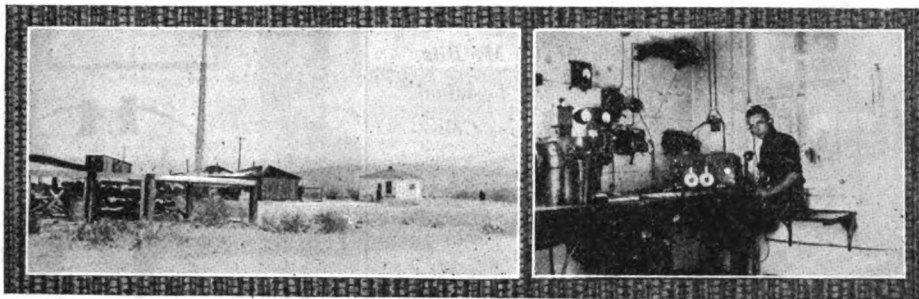
"Why didn't you give me this before?" he howls; then he rushes out an' rouses out the mate. 'Have the officer on watch blow the whistle every thirty seconds,' he bawls. 'Get a couple of sailors' an' put 'em to ringin' the ship's bell for all they're worth; an' then go an' get out the chief an' tell him to open up the engines an' shake out some speed even if he busts every boiler in the damn ship!'

"Believe me, there's no more sleep for nobody after that. What, with the whistle blowin' an' the ship's bell a bangin' an' the old coffee mill wide open, links down an' passovers on, makin' the old boat shake an' shimmy worse'n a jane at a jazz dance, there was racket enough to give a wooden Indian a ear-ache. Everybody piles out, wonderin' what in blazes is the matter, but the old man wouldn't say nothin', only to keep yellin' for more speed. Early in the mornin' we makes Cape San Lucas, which is the very south end of Lower California; an' then the old man runs the ship up to San Jose Del Cabo, which is a Mexican burg about twenty miles farther north. We comes dashin' into the bay like a house afire, drops anchor, an' 'right away a little boat, rowed by some Mexicans in uniforms, comes out to us from the beach.

"Be ready to sail at six tonight," barks the old man; an' then, without an-

NEW STATIONS OF THE AERIAL MAIL SERVICE

By H. L. Rodman



East Tower and Station Building at Elko, Nevada

Operating Station at Elko, Nevada

*An Overland
System of Radio
Using the Standard
Federal 2 K.W. Arc
Transmitter and the
Navy Type S. E. 1420
Vacuum Tube Receiver*



HAT is believed to be one of the most efficient radio circuits in the world, in terms of power-input and distance covered, is in daily operation between two of the United States Aerial Mail Service radio stations, one at North Platte, Nebraska, the other at Elko, Nevada.

The distance between these two stations is approximately one thousand miles, over one of the most broken portions of the United States.

Four schedules a day are worked constantly, two in the forenoon and two in the afternoon, and the traffic handled is copied direct on typewriters.

Although there are three other stations between these points at intervals averaging 250 miles, North Platte and Elko work direct for the purpose of clearing through traffic and saving the time that would otherwise be required to relay from point to point.

The most remarkable part of this circuit is that the stations are equipped with arcs of only 2 K. W. nominal power.

The receiving apparatus consists essentially of navy standard 1420 receivers and two-step amplifiers, utilizing both Moorhead and Western Electric tubes.

The amplifiers were added simply to facilitate the use of the typewriting in copying, as there is quite a good basic signal.

These two stations are links in a chain of six arc stations stretching across the western part of the United States which were recently built by the Air Mail Service, coming under the jurisdiction of the Second Assistant Postmaster General at Washington, D. C.

North Platte is the easternmost arc station and communicates with an Air Mail spark station at Omaha, Nebraska, constantly, and with the U. S. Naval Radio Station at Chicago at frequent intervals.

North Platte is the easternmost arc station and communicates with an Air Mail spark station at Omaha, Nebraska, constantly, and with the U. S. Naval Radio Station at Chicago at frequent intervals.

Proceeding westward we find a 2 K. W. arc radio station at or near each landing field, as follows: Cheyenne, Wyoming; Rock Springs, Wyoming; Salt Lake City, Utah; Elko, Nevada; Reno, Nevada.

Reno is the westernmost station and has regular schedules with the San Francisco Navy Radio.

It was stated that the stations are "at or near" the landing fields. At Cheyenne which was the first of the arc stations

to be installed, the towers were placed on the field. This was found to be an error, as radio towers on airplane landing fields have proved to be more of an obstruction to aerial navigation than a guide. Several instances are on record where pilots have crashed into radio towers on landing fields.

For this reason the radio towers are now placed at from one to five miles from the landing fields, communication with the field being made by telephone.

The station at Elko, Nevada, cuts of which are shown herewith, is typical of the Air Mail construction, although the other stations do vary somewhat as to details.

The two towers are 110 feet in height, built up to 100 feet on a modified Howe Truss plan, with 10 foot topmasts above the trusswork, the base centers being separated by 300 feet.

At the base the towers are four feet square; at the top about two and one half feet, giving the towers a slight taper which is very pleasing in appearance.

To guard against high winds, four sets of guys are employed.

The antenna at Elko is of the "T" type. Five wires, each 280 feet in length, spaced 3 feet 6 inches apart on 15 foot spreaders comprises the flat-top portion, and five wires, cabled together about ten feet from the top, are used for the down-lead.

The down-lead is anchored by a string of eight goose-egg insulators, to relieve the entrance insulator of any excessive wind strain.

The large grounding switches for protecting the installation against lightning is located on the outside of the building, near the entrance insulator, and a heavy lead is taken to ground from this switch so as to provide the best possible protection to the set during a severe electrical storm.

The arc was modified slightly at Elko, as was done at the other air mail arc stations, so as to obtain certain desired results.

These two kilowatt arcs are designed to operate on 600 meters as well as on 2,400 meters. A very strong magnetic field is necessary for the arc to function on 600 meters due to the high corresponding frequency of 500,000 cycles. On a wave-length of 3000 meters, with its corresponding frequency of 100,000 cycles, the same strength of magnetic field is neither necessary nor desirable. The action of the arc is naturally slower at this lower frequency and the same strength of field employed at 500,000 cycles (600 meters) for maximum radiation is much too strong for obtaining

maximum radiation at 100,000 cycles (3000 meters) due mainly to the fact that the arc is blown out too soon during each cycle, not allowing the full amount of current to flow during the discharge portion of the cycle.

As the wave-lengths selected for these stations range from 2800 meters to 3600 meters, and no work was contemplated on shorter wave-lengths, it was at once apparent that a weaker field than that created by the four field coils in series was desirable.

Leads from each field coil were therefore brought out and the series-multiple scheme of connections utilized. This served to weaken the field strength, to allow a greater current to be used through the arc, and at the same time reduce the heating of the field coils when using this greater current.

With the series-multiple scheme of connections, a current of 15 amperes is used in the arc at 200 volts, making the actual power input 3 kilowatts.

It will be noted that although a heavy current is being used for so small an arc, the power consumed in kilowatts is not proportionately great, due to the low voltage used, this latter being made possible by the low antenna and ground resistance at the wave lengths employed.

The method of signalling used at Elko and other air mail arc stations is the coupled compensating method, using two turns of radio-frequency cable loosely coupled to the antenna loading inductor. The signalling or lower wave is separated from the upper or compensating wave by approximately 50 meters.

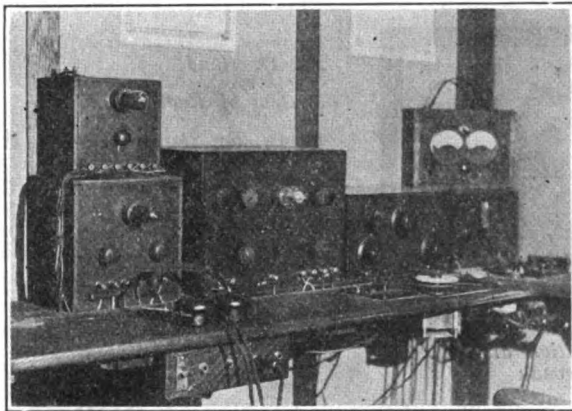
Although these particular arc sets are equipped with the ignition key signalling apparatus, the coupled compensating method was found best adapted to these stations, and in addition to being best adapted, it is preferred by the operators.

A surprisingly large amount of traffic is being handled by the air mail stations, their principal use being the reporting of arrivals and departures of mail planes and handling the telegraph business of the air mail service between Washington, D. C., and the officials in the field.

The circuit is complete between San Francisco and Washington, connection being made east of Chicago through other air mail radio stations employing spark systems.

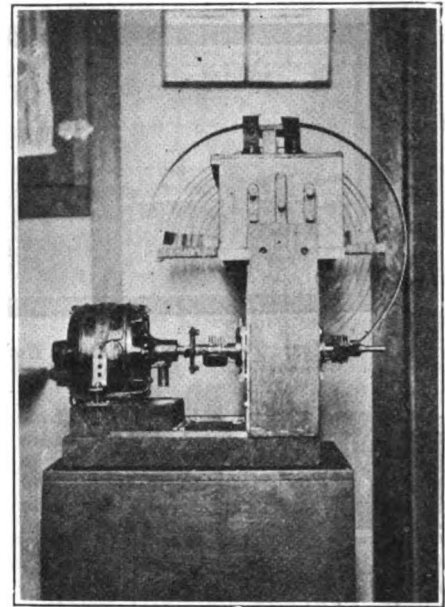
There is, however, no communication with the mail planes, as the planes are not as yet equipped with radio. This will doubtlessly come with the growth of the air mail service in the near future, as will the direction finding apparatus and other radio aids to aerial navigation.

6 JD - LOS ANGELES, CALIFORNIA



This is another of the best Pacific Coast Amateur Stations. You can always tell a record-making station by the absence of needless apparatus. 6JD has a receiving set of the regenerative type and a two-step amplifier. Let's have a few more photos of this type, Fellows.

*Record making and
Record breaking
Station of V. M. Bitz,
Pacific Coast Terminal
Station of Trans-Con-
tinental
Relay.
Message
to Hartford,
Connecticut and
Return in
6½ Minutes.
Signals from
this Station .
Have Been
Heard at a
Distance of more
than 2,500
Miles.*



*One turn in the closed circuits is used by
6JD. Note the compactness.*

BAY COUNTIES CLUB HOLDS SOCIAL

ON Friday evening, February 25th, the members and friends of the Bay Counties Radio Club were given many thrills in the form of a grand social meeting. The affair was held in Klinker Hall, 59th and San Pablo Ave., Oakland, with an attendance of over 185 radio men from the Bay Cities and San Francisco.

Among the many unusual surprises of the evening was the "Liar's Contest." The person telling the "biggest lie" was to be awarded a grand prize. Mr. Harold Irthum, one of the club members, was the winner of the contest. He dealt with length on his cruise with Christopher Columbus at the time that America was discovered. Mr. Irthum, radio operator of the exploring vessel, took the entire credit of discovering the continent as a result of the information he received via radio. Mr. R. W. Carroll, Secretary of the club, delivered an address entitled "Why you should be a member of the Bay Counties Radio Club." Mrs. R. W. Carroll, dramatic reader, furnished one half hour of amusement with her humorous selections.

Light refreshments and lunch were served. (The response was hearty.) Cake, beans, sandwiches and coffee were plentiful. The California Theatre in San Francisco furnished the radio musical program of the evening. A raffle was also held. Apparatus was donated by the Leo J. Meyberg Company, Colin B. Kennedy Company, California Electric Supply Company, Pacific Radio Supplies Company and The Radio Telephone Shop.

TECH HIGH RADIO CLUB

AT the 34th meeting of the Tech Radio Club, on February 3, 1921, Mr. Metcalf of the Magnavox Company, gave a very interesting talk about the Magnavox loud speaker. He also gave the history of the Magnavox, as well as explaining the principle involved in this electro-dynamic receiver. As the Tech Science Club attended this meeting, much interest was stimulated along the lines of radio.

The next day an assembly of the student body was held. At this assembly a radiophone concert was given. This was only made possible through the courtesy of the Magnavox Company and Sergeant Travers of the Signal Corps, located at the Presidio, San Francisco, with whom plans for a lecture and music reception were made.

A small two-wire aerial not over 75 feet long and 40 feet high was used, and another stretch of bell wire wrapped around a water pipe serving for a ground. Together with this a three step power amplifier using 400 volt B-battery was employed after stepping up with a two-step amplifier. Most signals could be heard all through the halls and in front of the school very distinctly.

After president Wallace Brainard of the club had made a short talk on the subject of telephony, the bulbs were turned on. The radiophone speech of Sgt. Travers was about fifty times as strong as an average man's voice, being in fact too loud, because of the echoing. After Sergeant Travers had completed his lecture, he played a few records on the phonograph, after which the concert was terminated. Another interesting

SAN FRANCISCO RADIO CLUB NOMINATES OFFICERS

AN election of officers of the San Francisco Radio Club, Inc., will be held in the club rooms, 2460 Sutter street, Thursday evening, April 7th, at 9 P. M.

The following have been nominated: For President, Sgt. W. E. Lufkin, Prof. C. R. Tinsley, V. C. Litton; For Vice-President, I. H. Baum, S. N. Petersen; For Secretary, Geo. F. Barry; For Treasurer, Sgt. R. Tavers. H. Shomaker.

Elections will hereafter be held semi-annually, as the result of a resolution passed at the regular monthly business meeting in March.

Ten new members were admitted to the club during the past month. A committee of six was appointed to interview the U. S. Radio Inspector in an endeavor to permanently close the stations of several local amateurs who have been the cause of much unnecessary interference.

feature of the assembly was an experiment with an Ingersoll watch which was held up to a microphone. The ticking of the watch could be heard very distinctly all through the auditorium, much to the amusement of the student body.

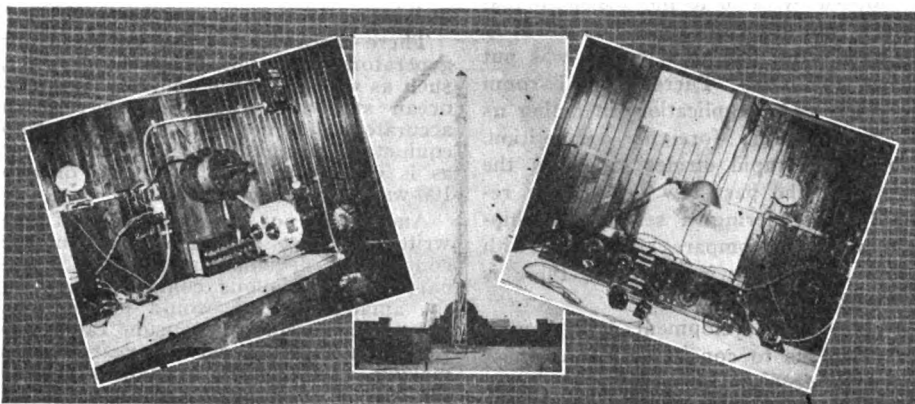
During the week eight members were enrolled in the Radio Club, probably on account of the stimulated interest. We now have our meetings every Thursday afternoon at 3:15 P. M.

SAN JOAQUIN LIGHT & POWER COMPANY INSTALLS MODERN STATION AT FRESNO, CALIF.

MR. R. C. DENNY, Operating Engineer of the San Joaquin Light and Power Company of Fresno, Cal., supervised the installation of the efficient station shown in the accompanying photographs for the use of transacting business of the Power Company.

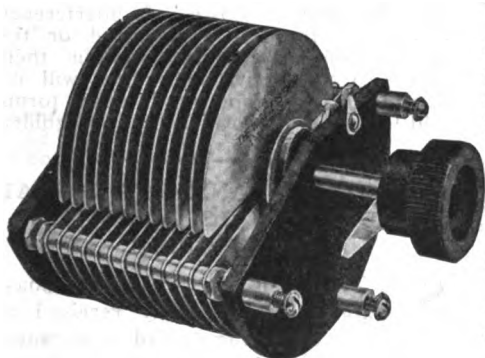
The station is one of several erected by the Company to maintain reliable communication between its various power plants. The Fresno station employs a regenerative receiver and two-step amplifier of sufficient power to establish uninterrupted communication with the other stations of the circuit.

Two towers, forty feet high, support the aerial of the Fresno station.



"WIRELESS SHOP" VARIABLE CONDENSERS

THE Wireless Shop of Los Angeles, has just placed on the market a new variable condenser, which will be known as their Series "CW". This condenser has been designed to meet the increasing demand for a high-grade condenser, especially designed for CW telephone and telegraph sets, and should help out many an amateur who has been experiencing trouble from his condensers. The plates are of heavy gauge, hard rolled sheet aluminum, which are punched in the best sub-press dies obtainable.



These plates are widely spaced in the condenser in order to withstand the high potentials used on the plate of the modern CW set. The insulation throughout the condenser is genuine Formica, being machined from the sheet instead of moulded, making a much better job, mechanically and electrically. Dielectric losses in "Wireless Shop" condensers are very low, due to the use of solid Formica end plates.

A very essential feature of all "Wireless Shop" variable condensers is the copper ribbon connection to the moving system of plates, which entirely eliminates the possibility of dirty contacts in the condenser. A stop pin, bearing on the edge of all movable plates in the smaller types, and on the end collars on the larger types, limits the rotation of the moving system to 180 degrees, there-

by reducing the liability of breaking the copper ribbon.

Mr. Edgcomb, manager of "The Wireless Shop" writes that although the company's manufacturing facilities have been worked to the limit in order to supply the trade with variable condensers, they are constantly adding to their equipment, and will announce several new instruments to the amateur field in the very near future. At the present time the company is manufacturing, besides variable condensers, a very large and complete line of high grade parts, for the amateur who would rather build his own apparatus.

A new bulletin has just come from the press, illustrating and describing the entire line of "Wireless Shop" variable condensers, which Mr. Edgcomb states will be mailed upon request to any one interested.

MONTEREY RADIO ASSOCIATION HOLDS IMPORTANT MEETING

THE regular meeting of the Monterey Radio Association was held in the club rooms of the Presbyterian church on February 7, 1921.

Lieutenant Calvin H. Burkhead, radio officer of the local Presidio, spoke to the members on the uses of wireless in directing the air forces in the world war. He told in detail just the system used for directing air squadrons over the front line trenches.

His talk was enjoyed by all those present and he was given a vote of thanks for his trouble.

The association has purchased a complete receiving set, which will be installed in the club rooms. This set has been built by members of the club and the parts paid for entirely by the members.

The club, up to the present time, has been entirely self-supporting and in the past year the membership has grown to a total of twenty-three.

This is a live organization and deserves the support of the people of the Peninsula.—Monterey "Cypress."

STOCKTON RADIO STATIONS GOING STRONG

Stockton's radio relay night, held February 28, by radio operators of the city to demonstrate the efficiency of experimental and amateur wireless stations in coast-to-coast radio transmission, demonstrated several things very conclusively. For one it was shown that people when offered the chance of securing something for nothing are glad to avail themselves of the opportunity, as evidenced by the fact that up to six o'clock a total of forty-seven wireless messages, directed to points over the United States, were filed with the local stations. It demonstrated another fact with equal clearness—that amateur radio stations form an important means of emergency communication and established the possibility that the Pacific Coast record for the greatest number of messages transmitted in continuous order to a station over a distance of 1,000 miles without relay had been broken.

Of the forty-seven messages filed up to closing time of the radio men's offer, forty went through toward their destination without hitch. That the other seven did not go on their way was due to the fact that the fortieth message was sent just as day broke, at which time Paul Oard sent the final check with station 7IZ after a continuous transmission with only a half hour break, starting at 10 o'clock the evening before. As day broke, signals "faded," necessitating the holding over of the remainder.

GONZAGA IS LINK IN INTER-SCHOOL WIRELESS LEAGUE

Gonzaga will be linked by radio with the other schools of the Pacific Coast in a regular wireless communication system, according to Mr. Francis Prange, S. J., professor of science, who has announced that the Gonzaga radio plant, one of the biggest amateur outfits on the Pacific Coast, will be in operation within two months.

The establishing of a regular commercial-like system between Gonzaga and

(Continued on page 300)

SHIPPING, SCIENCE AND COMMON SENSE

By Arthur H. Lynch

REALIZATION of the many aids afforded by radio to our marine industry has not been accomplished even by the wonderful uses to which it was put during the war. There is still room for much wider application, in aiding us to cope with foreign competition. Though the rapid strides taken by the art within the past few years have resulted in rendering a service to ship-owners which compares favorably with the present land wire systems, there is still room for improvement.

And in this development, it is incumbent upon us to consider the usefulness of the amateur and experimenter. Many of the most valuable discoveries in the radio enterprise are the direct result of amateur research.

The audion, a seemingly insignificant device, which has revolutionized the systems for transmitting and receiving, was discovered by Dr. Lee De Forest, and, though he is an accomplished experimenter, he makes no pretense of being a professional, in the sense which some seek to give the word.

A device which was designed for use in the trenches and enabled men in a dug-out, many feet below the surface of the earth, to communicate with stations several miles distant, was the development of an "amateur."

And the remarkable performance of a New Jersey experimenter of sending broadcast radiophone music and speech which was heard by another amateur in Scotland, would cause us to believe that some of the professionals are in no position to look down upon him. But there is agitation among some of the legislators concerning the amateur, and they desire not merely to curtail his efforts, but to abolish him entirely. Before considering this legislative policy, let us see more clearly what this amateur has actually done.

Under the existing laws, in this country, the activities of the men and youths who desire to experiment with radio must be kept within certain well-defined electrical limits. Working within the lawful scope puts the experimenter at a distinct disadvantage when the use of power suitable for covering great distances would be desirable. But he has taken the action good naturedly, realizing that commercial and government communication must not be interfered with. In addition to this, he has developed apparatus of such extreme technical co-ordination and efficiency that his correspondence is carried on with considerably less power and much greater skill than that necessary for the management of the usual types of commercial equipment.

There are certain electrical characteristics which render the use of great power ineffective, if the law is followed. Under ordinary conditions, all the law allows him to use is one kilowatt or about one and one-third horsepower. That is just one-half the amount of the rated power of many marine installations. With even this power, we find but few instances of vessels communicating directly across the Atlantic. When we consider the accomplishment of this wireless telephone feat, only one-fifth the lawful power was used, or one-tenth

that of the general commercial ship transmitter, its significance is more striking.

There were no 600-foot towers, nor generators of hundreds of horsepower, such as we find in the commercial transocean stations. There was merely an accurately designed and controlled radio equipment, using about as much power as is necessary for the lighting of two 100-watt incandescent bulbs.

And it is not the intention of the writer to cast any aspersion on the commercial development, nor to insinuate that continuous communication by the amateur station would be possible. Commercial radio has made rapid advances during the past few years and is making itself felt as a dynamic force for the promotion of international as well as domestic communication. Rather would he depict the deplorable ingratitude we would show by casting from our midst a body of earnest workers, who burn the midnight oil in an effort to perfect one of the arts which already is recognized as a potent factor in our commerce.

When the war broke over our heads we were unquestionably in a state of unpreparedness. One branch of our military and naval organizations which did not need the same amount of drilling as some of the others was the signal system. Many amateurs were immediately capable of filling important posts, while others were far enough advanced to make it possible for them to be put on productive work in a much shorter time than would otherwise have been possible. Many of them were capable of undertaking the teaching of others. And the signal system of our military machine was a section which we have every reason to be proud of. Many of those who were not either directly in the army or navy were designing apparatus, or making it, for one of the companies which were called upon to furnish it.

Much Disregard for Laws

The fault is not entirely with the law-makers, but is the result of unlawful activities on the part of some members of the amateur ranks. In some cases there has been, and undoubtedly continues to be, an utter disregard for the radio laws. Government and commercial communication has suffered interference at the hands of the amateur many times, but little attention is given to the fact that many instances are on record where messages have been forwarded through the assistance of an amateur station, when the efforts of the larger stations were fruitless. And amateurs throughout the country are organizing clubs having for one of their main objects a set policy for "operation within the law." It must not be forgotten that the amateur development of today finds its commercial application tomorrow, and the amateur becomes the manufacturer, designer or operator.

To suppose that eliminating the amateur would be of value to our communicating system seems rather shortsighted. It would reduce the amount of interference, to be sure, but it would also reduce the pace at which radio development is moving. It would eliminate a field of pleasant and instructive occupation for the youth, who would confine young enthusiasm to other pursuits,

some of which might be afterward regretted. It would do away with the preliminary education, self-accomplished, which has aided us in the war and is now aiding us in commercial development. Many of the radio engineers of the country would not be in the positions they now hold, were it not for the fact that their interest in radio was nurtured when they were youths.

It must be thoroughly understood that there has been a more direct application of improvements by the experimenters than we meet in the commercial installation, due to the radio patent situation and the failure of some of the interested companies to get together for their mutual good. The amateur has perfected his apparatus to a degree which enables him to carry on his correspondence with other amateurs without interference from the commercial or government stations, except in some extreme cases, even though there are many instances of commercial stations not living within the law, and causing interference in the amateur's already contracted field.

What Is Needed

Instead of trying to abolish the amateur and pass radio blue laws, it would be far better for the interests concerned and for the country in general to encourage amateur endeavor, make use of some of the inventions of these earnest workers and instead of complaining about the damage they are doing, provide enough supervision of the ether for making those among them, who need compulsion, to live within the law. It will be found, by the earnest and just observer, that the majority of those engaged in the amateur practice are men and youths of accomplishment, who desire to work according to the regulations and are doing all possible for the cutting down of interference caused by the less experienced or the selfish and inconsiderate within their ranks. Constructive legislation will do a great deal of good, while other forms will kill the goose which lays the golden egg.

DAYLIGHT TRANSCONTINENTAL RADIO SIGNALS IN MOVING AUTOMOBILE

SIGNALS sent out by Atlantic Coast stations were recently received at midday by apparatus carried in an automobile moving along the streets of San Francisco. The demonstration was made in connection with the automobile show then being held in this city and is believed to be the first time that such long range daylight signals have been received by light portable equipment of this sort.

The antenna consisted of a stranded copper wire aerial hung about ten feet above the ground by means of bamboo poles at the front and rear of the automobile. The frame of the machine served as a "ground." The signals were clear and of excellent audibility without the use of amplification, only one bulb being used. A standard Colin B. Kennedy long-wave receiver was employed. Except for the six-volt storage battery for lighting the filament of the bulb, the

(Continued on page 300)

6ZK HEARD IN NEW YORK. HONOLULO HEARS 6ZR

MR. A. E. BESSEY has just received verification of the reports that he was heard by 2TT in New York City on the morning of January 15th at 5:05 A. M. Eastern time. Mr. Bessey was calling 9ZN by appointment but was not heard by 9ZN. An amateur station in Defiance, Ohio, heard the signals very QSA at the time that they were intercepted by 2TT. This is a remarkable record and worthy of congratulations from the entire amateur fraternity of the West. In line with Mr. Bessey's cross-continent record is the good news from Honolulu, informing us that 6BJ was heard during the last Hawaiian Transmitting Contest. The reports are herewith published in full:

Honolulu, T. H.,
February 7, 1921.

Mr. P. R. Fenner,
Editor, P. R. N.,
San Francisco, California.

Dear Sir:

In regard to the second trans-Pacific radio test of February 5th and 6th, I wish to state that on the first night of the test, February 5th, I was able to pick up a medium tone spark station working on wave length slightly above 200 meters.

Owing to very heavy QRN and the weakness of the spark signal, I was unable to pick up any of the message except the call which was 6BJ. The time that this station was received was between 7 P. M. and 7:03 P. M. Honolulu time.

I am making no claim that I received a coast amateur station, and the above statement may be proved to be incorrect, but to satisfy my personal curiosity I would like to know if the amateur station 6BJ was working at the time named by me.

Thanking you for a reply, I remain,
Yours very truly,

Kenneth A. Cantin.

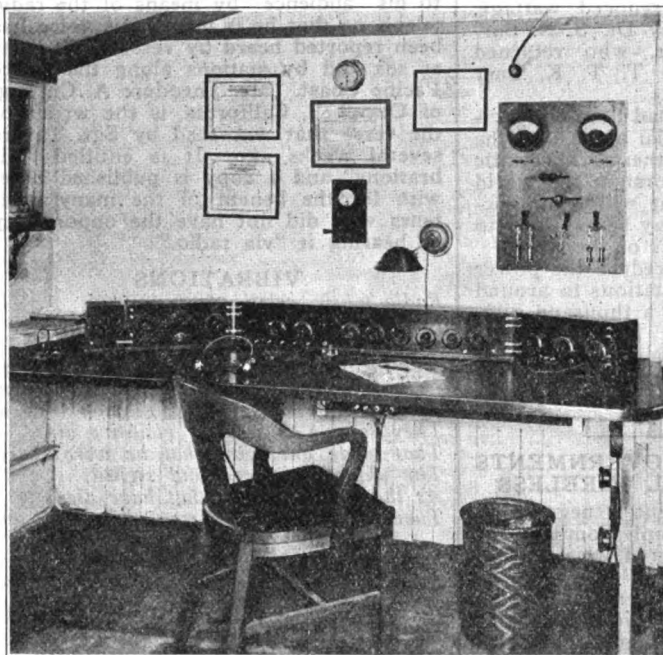
Kenneth A. Cantin,
1593 Piikoi Street,
Honolulu, T. H.

Honolulu, Hawaii,
February 11, 1921.

Dear Dickow:

I now hasten to give you the dope on the amateur test held on February 5th and 6th as far as I am concerned, in an unofficial capacity.

On the two nights allotted to the test I had all my apparatus at the Wahiawa station of the Mutual Tel. Co.



The Equipment Shown in this Photo is of
"The Radio Shop" Manufacture

The Radio Station of Mr. A. E. Bessey, Sunnyvale, Calif., Mr. Bessey Uses a six-step Amplifier. This is one of The most complete Stations in the United States. Note the uniformity of the Apparatus.

I had as assistants Mr. Westlake, the chief operator, and his assistant, Mr. Seymour, and we used a Grebe Type C. R. 3 short wave set and a De Forest Audio Panel in conjunction with a Magnavox, three stage amplifier, with three pairs of phones hooked in.

On Saturday night, through static the worst I ever heard, we could hear several rotary gap sets working and all we could get was a station calling N. P. M. on about 210 meters but could not get his signature although the other boys made statements, not for publication, which, coming from two totally disinterested parties, convinces me beyond all shadow of a doubt that the amateur station on the coast can and will be read here when the Q. R. N. lets up.

Because of the fact that Mr. Mulrone and I agreed that we would make no claims unless we copied at least one message in its entirety I have notified the Press that the tests were not successful on account of static.

On Sunday night the static was so bad that we could not wear the phones and gave up at seven p. m. for that reason. I suggest for the next test that the transmitting be done from this end as I believe that static conditions are not quite as bad on the coast as here.

Please note that this letter is not in any way making claims as it whether we heard the coast or not but you can read between the lines.

I will state for your information that any night when the big arc is out and static conditions normal I can hear station after station "chewing the fat" and they certainly are not in Hawaii.

With certain improvements that I am working on in connection with short-wave barrage receivers, I gamble that I will send you a copy of certain coast amateur stations which will then convince the skeptics, both here and on the coast, that "it can be done."

Yours fraternally,
Thos. C. Hall.

Honolulu, February 11, 1921.

LONG DISTANCE STATIONS ENTERED FOR ELIMINATION CONTEST

APPPLICATIONS for participation in the coming elimination contest with ships at sea have been received from practically every important amateur station on the Pacific Coast. 6EA, 6EB, 6ZE, 6ZR, 6ZK, 6GP, 7ZJ, 7BJ, 6ED, and many others are among the first to apply for participation.

It is proposed to have ten amateur stations call during the first half of one hour and ten others during the first half of the next hour, regularly every night for seven or eight successive nights. Arrangements to conduct the

test are at present under consideration by the various radio companies controlling the vessels that will listen for the amateurs.

NAVY TO INSTALL COMPASS STATION

Four more radio compass stations on the Southern California coast have been authorized by the Navy Department and work of construction will start March 15, according to announcement made by Rear Admiral Roger Welles, commandant of the Eleventh Naval District.

These stations will be located at Imperial Beach, Point Arguello, Point Firmin and Point Hueneme.

The stations at Imperial Beach, with the new radio compass plant on Point Loma, will handle all ships asking for correct navigational courses in the vicinity of San Diego during foggy or thick weather.

The stations at Point Arguello and Point Hueneme will handle ships passing through the Santa Barbara channel, and the station at Point Firmin, with a second plant at Newport, will take care of the harbor of San Pedro.

A total of nineteen radio compass stations are to be established on the Pacific Coast. Several of these are already in commission.—San Diego "Union."

LOW POWERED RADIO ANNOUNCED BY EXPERT

Successful experiments with a new type of radio receiver that will carry message with greatly reduced wattage, was reported recently by Dr. S. N. Baruch, electrical engineer, who returned from Honolulu on the T. T. K. liner "Shinyo Maru."

Barush explained he had been conducting experiments in Hawaii because of the atmospheric conditions there. The static there is reported the worst in the world and radio apparatus that will work successfully at Honolulu may be expected to operate in all other parts of the world.

"The receiver should reduce the power needed for the largest stations to around ten kilowatts instead of a thousand kilowatts," he said.

Baruch was chief engineer for the Federal Radio Company at Palo Alto for several years.—San Francisco "Examiner."

THREE FOREIGN GOVERNMENTS SEEKING FEDERAL WIRELESS

The Danish government is negotiating with the Federal Telegraph Company for erection of a high powered wireless station at Copenhagen, and the Belgian government has made overtures to the company regarding a plan for stations at Brussels and in the Congo. This was made known at the Federal's annual meeting by President R. P. Schwerin, who added that preliminary work on the huge Chinese contract that is being protested by Great Britain, Denmark and Japan, is being proceeded with in anticipation of the protests being "cleared up."—San Francisco "Bulletin."

KITSAP COUNTY RADIO ASSOCIATION FORMED

A preliminary meeting of all interested, on the evening of February 24, the Kitsap County Radio Association was formed, with an initial membership of twenty-four boys and men, all of whom were enthusiastic over the proposed activity.

A president and secretary-treasurer was elected, the former being George Dewey of Bremerton, and the latter office filled by Travers Campbell, also of Bremerton.

Two committees were appointed, a Rules and Regulations Committee, to draw up a suitable constitution, and a Housing Committee, to investigate the possibilities of obtaining a suitable meeting place.

It was agreed that the meetings would be held at 8 p. m. Thursday evenings, and the monthly dues would be 50 cents per member. No entrance fee was to be charged.

Two licensed commercial operators of long experience, H. S. Pyle and H. R. Andrews, will serve as an advisory board and present papers dealing with the practical operation and construction of various pieces of apparatus from time to time. They are also at the service of the club in the capacity of consulting engineers.

A cordial invitation is extended to all Kitsap County men and boys who are interested to attend the meeting and become members. The secretary will be glad to answer inquiries as to where the next meeting will be held. The club also will be glad to welcome visitors from other radio clubs, and solicit their correspondence.

Address inquiries and correspondence to the secretary, Travers Campbell, 1534 Elizabeth Avenue, Bremerton, Wash. Telephone 386J.

SGT. TAVERS, who has been operating station 6XW at the Presidio of San Francisco, has read several verses to his "audience" by means of the radio telephone that he is using. His voice has been reported heard by vessels 750 miles at sea and by stations along the entire Pacific Coast. Mr. Theodore A. Cutting, of Campbell, California, is the writer of the verse that was read by Sgt. Tavers several weeks ago. It is entitled "Vibrations" and a copy is published herewith for the benefit of the many amateurs who did not have the opportunity of hearing it "via radio."

VIBRATIONS

*Radio music, estatic, high,
Falling clearly from the sky;
Nothing since God's first creations
Has thrilled mankind like these vibrations!
Last Wednesday night soon after seven,
I heard the Hawaiians sing from heaven,
They sang a sweet and plaintive air
That made one wish that he were there.
The ukulele twanged and sighed,
As though for lovers that have died.
Then spake a voice from the great unknown,
Deliberate in its monotone.
From space it came, to space it sped,
It addressed the living and the dead.
"Just a minute," spake the voice,
The world waited; it had no choice.
It listened in doubt and troubled gloom,
It dared not hope, yet feared its doom.
But the voice returned with a tone of cheer,
Full resonant, and strong, and clear—
And more than that—it seemed quite near;
Instead of listing the poor world's faults,
"We'll have first a two-step and then a waltz!"*

*'Twas Taver's voice, as all hams know,
Vibrating from the Presidio,
Long may its oscillations flow!!*

—Theodore A. Cutting.

Station 6XW operates on a wavelength of 345 meters. Radio concerts are transmitted on Sunday nights from 7 P. M. to 8 P. M. and on Wednesday nights from 8 P. M. to 9 P. M. The radio telephone station at 175 Steuart St., San Francisco, operated by Mr. A. F. Pendleton of the Radio Telephone Shop, transmits press by voice and CW on Tuesday and Friday evenings from 8 P. M. to 9 P. M. Several musical numbers are also provided on both nights. Signals from Mr. Pendleton's station (6UV) have recently been heard with good audibility in Portland, Oregon.

CW STATIONS HEARD AT AVALON

The following communication has been received from Mr. J. Stevens, Avalon, Cal.:

Editor "Pacific Radio News,"

San Francisco, Cal.

Dear Sir:

It may interest you to learn that I am still in the wireless game and am the same enthusiastic radio bird. I have installed a station at Avalon, using a Grebe short wave receiver and one step amplifier. The aerial consists of one wire, 90 feet long and 40 feet high. Have heard most all the amateurs in California and am able to read the following: 9LR, 7YA, 7CC, 5ZA, 5IF, and am also surprised to hear the following CW stations: 7ZI, 9XM, 9XI, 9XG, 6IT, and all the Los Angeles men.

March 11, 1921.

AMRAD TRANSCONTINENTAL LINE—BULLETIN 5— FEBRUARY 18, 1921

Results of February 15th Test: This time success. A bit of radio history was made when three messages were relayed from coast to coast solely by Amrad Gap stations under usual conditions of QRM and quite heavy QRN in the East. We appreciate deeply the services of those who have contributed to making fame for the Amrad Quenched.

At 1XE: QRN heaviest of the season. No dx heard, except 2PL.

At 1TS: QRN terrific. Heard 1XT, 3VV, and 8ML. 1TS doing great work since getting tuned up. Worked 8OJ, 8MH, 8AB, 8ID, 8ES, 3GO, 3VV, 8WY, 8ZD, 8AIO, 8XE, and 3PB, 2CF Canadian.

At 1XT: The star of test on QST to 8ML. Cleared No. 11, No. 13 and No. 15 to him. Worked 2PL, 1VAA, 3VV, 8ID, 9PV. Heard 2RK, 3IP, 8TT, 8KK, 8ZL, 8BO, 8FK.

At 2PL: QRN heavy until daylight. Worked 3VV, 1XT, 8ML, 8KK, 8RQ, 8AMZ. Took eastbound No. 6 direct from 9PV. Took No. 8 from 8ML the most QSA dx station ever recorded by 2PL. Could be copied all night clear across room; no QSS.

At 3VV: Heavy QRN and QRM. Worked 1XT, 2PL, 8ML, 8ZL. 1XT faded out for good at 2:45. Heard 9PV QRS No. 6 and No. 8 east. Says the Quenched seems to get through dead air better than rotaries.

At 8ML: Heavy local QRM. Worked 1XE, 2PL, 3VV, 9PV, 2AER. "Why do you choose nights with so much QRN?" he asked 2PL. "My eyes opened to Amrad possibilities," says 8ML.

At 9PV: Heard 1XE, 3VV, 8FK. Took eastbound No. 6 and No. 8 from 9AFX 3:09 and 3:20 C. S. T. Took westbound No. 11, No. 13 and No. 17 from 8ML. Took No. 15 direct from 2PL.

At 9AFX: Took No. 13 westbound direct from 8ML. Copied part of No. 15 direct from 2PL. Copied all of No. 11 and No. 13 direct from 8ML. 9AFX turned in before No. 17 westbound arrived.

At 5ZA: 5ZA copied No. 6 eastbound direct from FD. Heard 8ML working 1XT. No. 6 east and No. 15 west crossed at 5ZA, 12:45 a. m. Pacific Time.

Thursday Morning, February 24th: With improved organization and a fair night we hope to increase our speed. The best one way time made so far was with No. 15 westbound, 2PL to FD in approximately 25 minutes. Both eastbound and westbound messages will require immediate answers from the Atlantic and Pacific stations which receive them. Westbound MSGS will be No. 19, No. 21, No. 23. The same time schedule will be followed but note the substitution of Thursday for Tuesday morning in this next test. We propose to have additional relays on March 15th, April 12th, May 17th, and June 14th. We would appreciate receipt of call letters of any new DX Amrad stations you may have heard. Eventually we hope to organize a chain of Amrad Gap stations encircling the United States. 73's. 2PL.

Calls Heard By Western Amateurs

List of Heard and Worked Calls by 6EJ During the Three Winter Months

5XD, (5ZA), (6AAB), (6AAK), (6ABA), (6ABP), (6ACY), (6ADU), 6ADX, (6AHU), 6AIL, (6AIO), (6AJH), (6BQ), (6DA), (6DK), (6DH), (6DP), (6EA), (6EB), (6EC), (6ED), (6EK), (6EL), (6EN), (6ER), 6EV, (6FE), (6FT), 6GE, (6GP), (6HH), (6HY), (6IF), (6IG), (6IL), (6IU), 6IV, (6JD), (6JI), (6JJ), (6JT), (6MH), (6MN), (6MZ), (6NY), (6OH), (6OL), 6OT, (6PE), (6PO), (6PR), (6QY), 6RE, (6RS), (6SK), (6TF), (6TL), 6VL, (6XZ), (6ZA), (6ZB), (6ZH), (6ZL), (6ZM), (6ZN), 6ZO, (7AD), (7BJ), (7BP), 7BR, (7CW), (7DA), 7DH, (7IM), (7IN), (7IU), 7IR, 7YA, (7YS), (7ZB), (7ZJ), 7ZK, 8ZA, 8ZR, 9AEG, 9EL, 9HI, 9LR, 9YW.

Above listed only includes stations that exceed 100 miles. 6EJ reported heard in Columbus, Ohio.

Additional Calls Heard by 6JJ Between January 25 and March 1

(5ZA), (6AE), 6AR, 6AT, 6AH(cw), 6ABG, (6ABM), 6ACR, 6ADG, (6ADL), (6ADX), (6AGF), 6AGP, 6AHU, (6AIO), 6AID, 6AJH, 6BAA(cw), 6BAB(cw), 6BAC(cw), 6CH, (6DA), (6DP), (6DS), 6DD, (6EA), (6ED), 6EP, (6GP), 6HR, (6IC), (6IF), (6IS), (6JD), (6JI), 6JQ, 6JR, 6KC, (6KP), 6KM, 6KL, 6LQ, 6MK(cw), (6OC), (6OW), (6RN), (6SK), 6TS, 6TV, 6VL, (6WN), (6XZ), 6ZO, (7BC), (7BQ), (7BP), 7BK, 7CW, 7DH, 7DM, 7ED, 7EX, 7FL, (7IN), 7JR, (7KT), 7MA, 7YI, (7ZI), (7ZJ), (7BJ), 7KX, 9HT and 9AVS.

Calls Heard by Radio 6ACM

5ZA, 6AJ, (6AK), 6AY, 6BQ, 6CV, 6DH, (6DK), 6DP, (6EA), 6EB, 6EC, 6ED, (6EJ), (6EN), (6ER), 6FE, 6FH, 6FS, 6GI, 6GP, 6HH, 6HY, (6IC), 6ID, 6IF, 6IL, 6IR, 6IV, (6IY), 6JD, 6JI, 6JJ, (6JQ), 6KA, (6KP), 6OH, 6PQ, 6QR, 6RE, 6RN, 6SK, 6TB, 6TC, 6TL, 6UM, 6WC, 6WR, 6XZ, 6ZA, 6ZM, (6ZN), 6ZO, 6AAB, 6AAK, (6AAT), (6ABP), (6ACA), 6ACR, (6ACY), 6AGF, 6AGP, 6AHA, 6AIK, 6AIL, (6ALA), 6MQ, 7AD, 7BC, 7BJ, 7BK, 7BP, 7CC, 7CN, 7CW, 7DA, 7DS, 7ED, 7EW, (7GQ), 7GY, (7IN), 7PK, 7YA, 7YS, 7ZI, 7ZJ, 7ZK.

Anyone hearing 6ACM please QSL.

CALLS HEARD AT 6TL, JANUARY 22 TO FEBRUARY 22.

5ZA, 6AE, 6AH, 6AI, 6AK, 6AR, 6AT, 6CP, 6DK, 6DP, (6EJ), 6EX, 6HH, (6IC), 6IG, 6IY, 6JI, 6JJ, (6JN), 6JR, 6KL, (6OC), 6PR, (6QR), 6TC, 6TF, 6TV, (6XZ), 6ZA, 6ZB, 6ZH, 6ZM, 6ZO, 6ZR, 6ACA, 6ACM, 6AG, 7BQ, 7DA, 7IN, 7YA, 7ZI, 7ZJ.

Using only one tube and heard before 9:30 P. M. or after 1:30 A. M.

ERRATA

The station of Mr. C. Maass (6AKH) is located at 250 21st avenue, San Francisco, instead of 520 21st avenue, as listed in the call directory of our last issue.

SIXTH AND SEVENTH DISTRICT AMATEUR STATIONS

Amateur Calls Issued to March 8, 1921, Radio Inspector, San Francisco, Cal.

Call	Name	Residence	Location
6AKO	C. Bauman		Auburn, Cal.
6AKB	E. Jones	Box 14	Auburn, Cal.
6AKQ	H. H. Hunt	629 San Francisco St.	San Mateo, Cal.
6AKR	H. E. Williams	1319 Napa St.	Vallejo, Cal.
6AKS	J. Hauschild	1035 Sierra St.	Reno, Nev.
6AKT	J. Insaund	40 Goethe St.	Daly City, Cal.
6AKU	F. Comyns	813 Third St.	Modesto, Cal.
6AKV	H. L. Winer	638 Ryland St.	Reno, Nev.
6AKW	L. R. Potter	120 Maple Ave.	Fullerton, Cal.
6AKX	A. L. Young	516 N. Gertrude St.	Rendondo Beach, Cal.
6AKY	N. J. Becar	185 E. San Fernando St.	San Jose, Cal.
6AKZ	E. Catendo		Sebastopol, Cal.
6ALA	A. H. Saare	938 Sonoma Ave.	Santa Rosa, Cal.
6ALB	J. L. Davis	320 N. Pickering Ave.	Whittier, Cal.
6ALC	F. Vettel	1088 Sixty-third St.	Oakland, Cal.
6ALD	R. Taggart	1500 N. Los Robles Ave.	Pasadena, Cal.
6ALE	W. W. Lindsay	5107 Eleventh Ave.	Los Angeles, Cal.
6ALF	G. S. Corpe	100 W. Main St.	El Monte, Cal.
6ALG	A. L. Blodgett	803 Forty-fifth St.	Los Angeles, Cal.
6ALH	B. Wright	2223 Jefferson St.	Ogden Utah.
6ALI	P. Murphy		Salida, Cal.
6ALJ	W. E. Seivers		La Habra, Cal.
6ALK	R. A. Hancock	408 Palm Ave.	Anaheim, Cal.
6ALL	F. Weyerhausen III	315 S. Orange Grove St.	Pasadena, Cal.
6ALM	F. Lee	1304 E. Worth St.	Stockton, Cal.
6ALN	M. F. Ferren	719 Rampart St.	Los Angeles, Cal.
6ALO	C. J. Reikeberg	290 E. Tenth St.	Pomona, Cal.
6ALP	H. Brown	1605 E. First St.	Los Angeles, Cal.
6ALQ	R. Merrill	235 Orange St.	Oakland, Cal.
6ALS	Roy Donovan	469 Twenty-fifth Ave.	San Francisco, Cal.
6ALT	R. I. Ludwig	4105 Twentieth St.	San Francisco, Cal.
6ALU	H. G. Peery	25 Northwood Drive	San Francisco, Cal.
6ALV	R. P. McKenzie	1016 Fourth Ave.	Los Angeles, Cal.
6ALW	O. Zimmerman	1926 Park St.	Alameda, Cal.
6ALX	C. Champney	422 Vernon St.	Oakland, Cal.
6ALY	W. A. Hammond	3020 Champion St.	Oakland, Cal.
6ALZ	E. Koerper	9401 E. Fourteenth St.	Oakland, Cal.
6AMA	M. W. Sutliff	8925 E. Fourteenth St.	Oakland, Cal.
6AMB	G. H. Freyermuth	154 Fifteenth Ave.	San Francisco, Cal.
6AMC	R. J. Stull	467 S. First St.	San Jose, Cal.
6AMD	C. Fee		Sisson, Cal.
6AME	L. R. Cormack	1819 San Andreas St.	Santa Barbara, Cal.
6AMF	R. H. Potts		Riverbank, Cal.
6AMG	F. G. Leal	P. O. Box 100	Irvington, Cal.
6AMH	C. A. Burrows	Pacific Union College	St. Helena, Cal.
6AMI	S. Haughton	242 Elm St.	San Mateo, Cal.
6AMJ	G. O. Brown	318 Trinity St.	Vallejo, Cal.
6AMK	N. D. Foster	642 N. Newlin St.	Whittier, Cal.
6AML	R. J. Miller	Glen Una Ranch	Los Gatos, Cal.
6AMM	F. Burgess	State Hospital	Agnews, Cal.
6AMN	G. F. Crowley		Port Costa, Cal.
6AMO	A. A. Crawford	1737 Mission St.	South Pasadena, Cal.
6AMP	W. K. Downey	1725 Downey Ave.	Modesto, Cal.
6AMQ	H. G. Morgan	N. Orange Grove Ave.	Pomona, Cal.
6AMR	H. M. Wouam	7155 Converse St.	Los Angeles, Cal.
6AMS	R. F. Jennings	4170 Glen Allyn Drive	Los Angeles, Cal.
6AMT	F. W. Hadley	72 Henry St.	San Francisco, Cal.
6AMU	P. P. Boardman	Tucson Ave. and E. Fifth St.	Tucson, Ariz.
6AMV	T. E. Robinson	3793 Thirty-first St.	San Diego, Cal.
6AMW	A. P. Montiero	1312 Ninety-seventh St.	Oakland, Cal.
6AMX	W. E. Wohler	R. F. D. 2	Sebastopol, Cal.
6AMY	J. P. Bradley	2716 Pacific Ave.	San Francisco, Cal.
6ANZ	Sanger U. High School		Sanger, Cal.
6ANA	H. A. Mauser	807 Prospect Row	San Mateo, Cal.
6ANB	E. Gassman	Route E. Box 270	Fresno, Cal.
6ANC	F. W. Donkin	1210 Eleventh St.	Modesto, Cal.
6AND	J. H. Gibson	2600 Woolsey St.	Berkeley, Cal.
6ANE	B. M. Spencer	Box 368	Gridley, Cal.
6ANF	B. M. Spencer	Box 368	Gridley, Cal.
6ANG	B. Harper	435 Mission St.	San Francisco, Cal.
6ANH	T. E. Soderlund	2829 Tenth St.	Berkeley, Cal.
6ANI	D. E. Chambers	639 E. St.	San Diego, Cal.
	E. Thayer	12 Hayward St.	San Mateo, Cal.

Seventh District Amateur Stations

Call	Name	Residence	Location
7IA	J. E. Jenkins	Route 2	Olympia, Wash.
7IB	J. G. Nordahl	809 Twenty-fourth Ave. N.	Seattle, Wash.
7IC	Albert Onsum	806 E. Fifty-fifth St.	Seattle, Wash.
7ID	Benedict Barr	Mt. Angel	Benedict, Ore.
7IE	C. J. W. Tibbetts	1813 Broadway	Helena, Mont.
7IF	R. M. Dansfield	662 Charnelton St.	Eugene, Ore.
7IG	P. B. Jackson	434 Broadway	Seaside, Ore.
7IH	G. W. Selvidge	4321 Ninth Ave. NE	Seattle, Wash.
7IJ	A. B. Rotering	Box 43	Glasgow, Mont.
7IK	Harry H. Olson	310 Fourth Ave.	Seaside, Ore.
7IL	T. C. Hall	1126 Taylor St.	Eugene, Ore.
7IM	L. J. Simms	311 N. Twenty-seventh St.	Billings, Mont.
7IN	A. L. Adams	321 W. Main St.	Silverton, Ore.
7IO	H. E. Welch	Route 8	Salem, Ore.
7IP	A. A. McCue		Kalwook, Alaska.
7IQ	Donald C. Gannon	Central Ave.	Kent, Wash.
7IR	J. R. Harris		Cohagen, Mont.
7IS	F. W. Lawrence	406 S. Crosby St.	Tacoma, Wash.
7IT	Roy Anderson		Ketchikan, Alaska.
7IU	George Mecham	7748 Wilson Ave.	Seattle, Wash.
7IV	Arthur Fletcher	Woodbine St.	Boise, Idaho.
7IW	F. R. Hoppe	633 Willamette St.	Eugene, Ore.
7IX	T. L. Estes		Snohomish, Wash.
7IY	Danzil Cutler		Vashon, Wash.
7IZ	Chas. Burson	1921 Third Ave.	Seattle, Wash.
7JA	E. L. Crawford	1340 Court St.	Salem, Ore.
7JB	Fred H. Stephens	822 Halsey St.	Portland, Ore.
7JC	Keith Frazier	829 Third Ave.	Glasgow, Mont.
7JD	Francis McKee		Cambridge, Idaho.
7JE	H. C. Boardman	112 W. Fifth St.	Port Angeles, Wash.
7JF	Claude Anderson	5095 Washington St.	Moscow, Idaho.
7JG	H. R. Drinker	497 E. Sixteenth St.	Portland, Ore.
7JH	J. D. Hartz	Route 3	Vancouver, Wash.
7JI	Albert McGuffin	316 First Ave. N.	Glasgow, Mont.
7JA	Radio Corp. of America		Portland, Ore.
7JB	Montana State College		Bozeman, Mont.
7JC	Kilbourne & Clarke Co.		Seattle, Wash.
7JD	Univ. of Washington		Seattle, Wash.
7JE	School District No. 10		Boise, Idaho.

(Calls Heard by Western Amateurs—
Continued.)

**HEARD BY I.A. WEIHE, AT
SPARKS, NEVADA**

No amplification necessary

6ACA, 6ACM, 6ADL, 6ADQ, 6AH,
6AI, 6AJ, 6AN, 6AT, CDK, 6DP, 6EA,
6EB, 6EG, 6EJ, 6EK, 6EN, 6ER, 6FE,
6GE, 6GP, 6HH, 6HY, 6IH, CJD, 6JI,
6JR, 6MY, 6OH, 6OT, 6PQ, 6PR, 6QR,
6SK, 6ZM, 6ZN, 6ZO, 6ZR, 7CC, 7DA,
7EX, 7GJ 7IN, 7ZI, 6MX, 6IF, 6PR,

7GQ, 7PQ, 6ACR, 6AGF, 6ZR, 6SK,
6OC, 6GY, 6AT, 7BJ.

This is with a Tresco 200-meter tuner.

**CALLS HEARD AT 6FZ, BER-
KELEY, CALIF.**

6AT, CDH, 6EB, 6ED 6EK, 6FH,
6FI-cw., 6GP, 6HH, 6IC, 6IU, 6KM,
6KS, 6MN, 6OT, 6OW, 6PO, 6QR 6TC,
6ZA, 6ZM, 6ZN, 6ABP, 6ACR, 6ADA,
6ADL, 6AFN, 6ALA, 7BC, 6BJ, 7BP,
7BQ, 7BZ, 7CC, 7DA, 7DP, 7ED, 7FB,
7LN, 7ZJ.

CALLS HEARD AT RADIO 6EB

5XD, (6AE), (6AT), (6BJ), (6BQ),
6BX, (CW), 6CH, 6CZ, 6FI, 6GK,
(6HC), 6HH, (6IG), 6JJ, 6JT (6KL),
6MQ, (6OH), 6PO, 6QY, (6TV), (6ZK),
6ZO, 6ZR, "FD", (7BP), 7BQ 7CW,
(7DA), 7DR, 7DS, 7FB, (7GQ) (7IN),
(7YA), 7ZJ, 7ZK, 6AAL, 6AAW, 6ACI
6ACM, (6AFN), 6AIL, 6EB heard at
9CA.

**CALLS HEARD AT 6AIL, DECEM-
BER 15 TO FEB. 15, SELMA, CAL.**

5HH, 5ZA, 6AF, 6AH, 6AK, 6AM,
6AN, 6BJ, 6BK, (C.W.) 6CD, 6CV,
6DA, 6DH, 6DJ, 6DK, 6DM, 6DP, 6DT,
(C.W. phone), 6DW, 6EA, 6EB, 6EJ,
6EL, 6ER, 6FE, 6FI, 6GA, 6GF, 6GI,
6GM, 6GT, 6GS, 6HH, 6IC, 6IF, 6IG,
6IH, 6IK, 6IV, 6JD, 6JE, 6JI, 6JJ, 6KM,
6LO, 6LR, 6MK, 6PC, 6PG, 6PO, 6PQ,
6PR, 6QK, 6QR, 6QS, 6SK, 6TC, 6TF,
6TO, 6UB, 6UC, 6XZ, 6ZA, 6ZH, 6ZN,
6ZR, 6AAT, 6ABP, 6ACY, 6ADL,
6AFN, 6AFY, 6AJY, 7AR, 7BD, 7BQ,
7BV, 7CC, 7CJ, 7DO, 7FI, 7FL, 7GK,
7GM, 7GY, 7IN, 7IR, 7IY, 7LN, 7ZI,
7ZJ.

**CALLS HEARD AT RADIO STA-
TION, 5JY, DALLAS, TEXAS**

(5AI), (5AJ), 5AL, 5AO, 5BV, 5BJ,
5BI, (5BM), (5CE), (5CG), (5CI)
(5DW), 5EA, 5ER, 5ES, (5EW), 5EG,
5EL, (5FE), 5FB, (5GU) (5HF), 5HI,
(5HV), 5IC, 5IE, 5IF, (5IP), (5IH),
(5IS), 5JA, (5DJ), (5JG), (5JL), 5JE,
5JC, (5JT), (5JU), (5KF), 5KK, (5LC),
(5LR), 5LS, (5LT), 5MC, 5MF, 5XA,
5XB, (5XG), 5YH, 5ZA, (5ZB), (5ZC),
5ZE, 5ZF, (5ZG), 5ZK, 5ZL, 5ZP, 5ZR,
5ZS, 5ZU, 5ZW, 5ZX, 8CO, 8KP, 8HG,
8AKV, 9AAV, 9AAC, 9AEG, 9AEQ,
9AFX, 9EL, 9FU, 9HI, 9JA, 9JN, 9LA,
9LR, 9LC, 9OE, 9OR, 9UQ, 9WU, 9XM.

**Calls Heard by Hugh Compton, San
Diego, Cal., on Crystal**

5ZA, 6AK, 6AQ, 6EN, 6IL, 6IG, 6JD,
6KP, 6MZ, 6OC, 6SK, 6UM, 6ZA, 6ZN,
6AAK, 6ABP, 6AIL.

**Calls Heard by Wm. D. Wood, 6KL,
Feb. 1 to 26 (Oakland, Cal.).**

5ZA, 6ED, (6EB), 6EN, (6ER), (6CZ),
6DP, (6GF), 6HH, 6IG, (6JD), 6JM,
(6KA), (6KP), (6PR), 6PQ, 6OT, 6RN,
6SK, 6ZA, (6ZN), 6ACA, 6AET, 6HY,
6AGH, (6BK), 6IL, (7BO), 7BP, (7DA),
(7CC), 7ED, (7GQ), 7FK, 7YA (7ZI),
(7ZJ), 9LR.

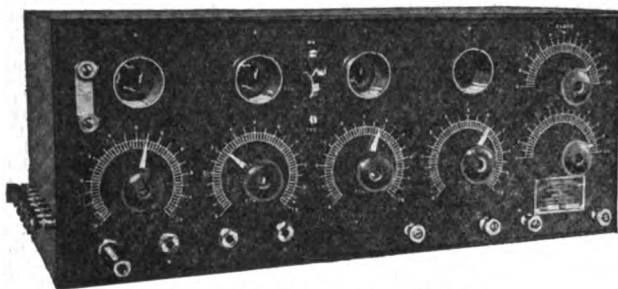
**Calls Heard by S. S. "Steel Inventor"
(KDJL) at Seattle Wash.**

5ZA, 6EB, 6ZM, 6ER, 6OT, 6DD,
6AFD, 6SV, 6DP, 6AFN, 6VS, 6CC,
6AT, 6JD, 6AK, 6PM, 7FL, 6AN, 6AE,
8:46, 6ZM, very QSA; 8:47 p. m., 6LR,
very QSA; 9:10, 6ZR, very QSA; 9:18
p. m., 6VX, QRK.

Calls Heard by 6ZH, Richfield, Utah

(5ZA), 5XB, 5XD, 5IH, 5IF, 5BI,
5ZJ, 5ZL, 5ZP, 5JT, 5ZT, (6JT), 6ZA,
(6ZM), 6EC, 6EB, (6EJ), 6ZN, (6IG),
(6RE), 6JD, 6FI, 6PO, 6GL, (6MK),
6BA, (6AE), 6WV, mod. (6GE), (6BQ),
6EA, 6JR, (6SK), 6KP, 6VL, (6BJ),
(6EN), 6EB, 6UO, 6PR, 6KA, 6DP,
6OT, (6AK), (6YS), 6IF, 6BP, 6FH,
6IL, 6AK, 6ZR, 6OR, 6AH, 6MH, 6GY,
(6AJX), 6ZX, 6ZO, 6PO, 7EX, 7YA,
(7ZJ), 7CC, 7LN, 7XD, 7JX, (7ZG),
9ASF, 9EE, 9OE, 9YY, 9JN, 9ABX,
9AEG, (9WU), (9LR), 9SC, 9AIG,
(9YW), 9AEY, 9YI, 9LW, 9AEQ,
9AFX.

Do You Like Pigs?



Z-Nith Amplifigon Type AGN-3

No? Well then you probably don't like the pig-like squeal of the ordinary three-step amplifier.

Our Amplifigon Type AGN-3 detector and three-step amplifier absolutely *does not squeal*, but it sure makes signals roar in.

The ideal audion control cabinet for use with a Regenerative Receiver, because of plate battery controls found on *no other* control panel.

Used by 9ZN throughout the record-breaking "Transcons," linking the Atlantic and Pacific.

Our new Bulletin F-21, out March 1st, tells all about it, as well as the new Z-Nith Multiceiver and many other new products. If your name is not on our mailing list write us.

The Chicago Radio Laboratory

Offices: 1316 Carmen Ave. Testing Station: 9ZN, 5525 Sheridan Road
CHICAGO, ILL.

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 Thursday 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. —adv.

Calls Heard by 6DK

6IV, (6TC), (6AH), 6IV, 6KL, (6AN), (6JR), 6IC, (6AGF), (6ER), (6AIO), 6ABP, 6ABW, 6ACA, (6ADL), 6ADA, 6ACM, (6AGF), (6EA), 6EB, 6EK, (6EX), 6EN, 6FI, (6FD), (6GP), 6HC, (6HH), 6IL, 6IT, (6IF), (6JD), (6KP), 6MN, (6OL), (6OH), 6OC, 6PC, 6PQ, 6QR, (6SV), (6TF), 6TY, 6VH, 6XZ, (6ZN), 6ZH, (6ZR), 6AE, 6AT, (6AK), 6DP, 7AD, 7BP, 7BC (7BQ), 7CC, 7ED, (7GQ), 7IN, 7ZI, (7ZJ). My new address is L. E. Martin, 100 Olive Avenue, Fresno, Cal.

Editor, Pacific Radio News,
Dear Sir:

Have enjoyed reading "Calls Heard" in "Pacific Radio News" and think the publication of same is encouraging to the amateur, especially when he is often prevented working some distant station because of QRM.

Herewith list of stations heard and worked by 6ABP, Long Beach, Cal., from January to February 20, using one electron relay for receiving, and 1/2 KW. Packard for transmitting:

(5ZA), 5IF, 6IG, (6ZH), (6AIL), 6ZR, 6CC, 6AIM, (6EJ), (6IC), 6ACR, 6AGF, 6FI, 6IY, cw., (6XZ), (6HH), (6ZB), (6VL), (6ADA), (6AJH), 6AH, 6FD, 6AE, 6OH, 6OC, 6JR, 6EX, 6AK, 6PR, 6ZA, 6AHM, (6AAW), 6GY, 6AIW, 6JJ, 7BC, (7IN), (7GQ), 7FL, 7ED, 7BG, 7BF, 7DA.

CALLS HEARD BY LEONARD TATE, ANACORTES, WASH.

Canadian: 5CP, 5DC, 5FK, 5LS, 5FL, 5NN, 5BL, 5CJ, 5BA, 6AC, 6AE, 6AH, 6AK, 6AP, 6CH, 6CV, 6DP, 6DA, 6EA, 6EC, 6EJ, 6ER, 6FE, 6FI, 6IC, 6KM spk. and cw., 6KL, 6KP, 6KT, 6LC, 6LM, 6LN, 6MK, 6MO, 6OC, 6OH, 6PI, 6KN, 6TC, 6TV, 6WV cw., 6ZE, 6ZM, 6ZO, 6ZR, 6AAT, 6ACM, 6AFN, 6AFY, 6AGF, 6AGM, 6AOV, 6TAM, 7AD, 7BJ, 7BP, 7BQ, 7BH, 7BR, 7CA, 7CC, 7CE, 7CM, 7CR, 7CW, 7CU, 7DF, 7DS, 7ED, 7EX, 7FI, 7GG, 7HE, 7IN, 7JN, 7KT, 7LJ, 7LN, 7LS, 7XQ, 7YA, 7YG, 7YW, 7YS, 7ZB, 7ZD, 7ZG, 7ZH, 7ZJ, 7ZK, 7ZT, 8EC, 9EE, 9GA, 9LR, 9MF, 9UM, 9UT, 9YW, 9JN, 9YA cw., 9QC, 9ZG, 9AEI, 9AGN.

Here is a list of amateurs I have copied in the last couple of months. Am 76 miles east of Bakersfield in the Kern River Mountains: 6AE, 6AH, 6AR, 6AT, 6BQ, 6DK, 6DP, 6EJ, 6EN, 6ER, 6DA, 6FE, 6FA, 6GI, 6GM, 6GY, 6HC, 6HY, 6ID, 6IF, 6IP, 6IO, 6IR, 6IT, 6IV, 6JJ, 6JM, 6JR, 6KA, 6KP, 6MK, 6NH, 6OH, 6PK, 6PQ, 6PR, 6QY, 6RN, 6SD, 6SK, 6TC, 6TF, 6TU, 6TV, 6VO, 6AJH, 6ACR, 6AFN, 6ZN, 6ZR.

C. P. Altland, Kernville, Calif., Care of Southern California Edison Company., K. R. No. 3.

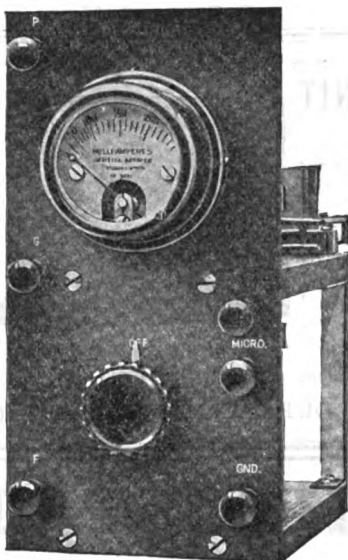
CALLS HEARD BY ASA S. KELLER CASHMERE, WASH., JAN. 8 TO FEB. 17.

6AA, 6AC, 6AD, 6AE, 6AF, 6AG, 6AH, 6AK, 6AN, 6AS, 6BJ, 6CV, 6DJ, 6DP, 6EJ, 6EN, 6FC, 6FH, 6FI, 6FL, 6GF, 6GK, 6GY, 6HH, 6IC, 6JA, 6JZ, 6KL, 6LH, 6LI, 6LJ, 6LK, 6LR, 6OC, 6OH, 6PQ, 6PR, 6RK, 6ZA, 6ZR, 6ZE, 6AAR, 6ACD, 6AuQ, 6AFY, 6LLI, 7AD, 7BC, 7BH, 7BJ, 7BP, 7BQ, 7CC, 7CH, 7CK, 7CO, 7CW, 7DA, 7DC, 7DI, 7DJ, 7DO, 7DP, 7DQ, 7DS, 7ED, 7EP, 7FB, 7FL, 7GJ, 7GK, 7GQ, 7GY, 7IC, 7IN, 7JR, 7JX, 7JZ, 7LR, 7MD, 7OH, 7OQ, 7RS, 7WC, 7YA, 7ZB, 7ZI, 7ZJ, 7ZK, CLI (one), CL2.

(Continued on page 307)

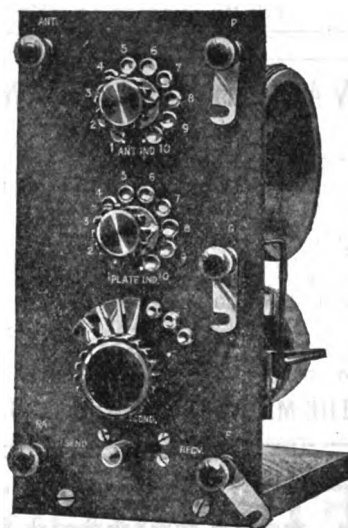


**ANY AMATEUR CAN TALK
30 Miles by Wireless Telephone
WITH THIS NEW MIDGET
"RADIOPHONE" * Transmitter**



Aerial Oscillating Circuit Panel

(Type OT-3)



Power Tube Panel. (Note clamps for fastening panels together into simple unit).

*"Radiophone"—name copyrighted. Here is the most remarkable radio telephone for its size ever made. Complete in every detail. Works on any source of direct or alternating current, supplying up to 500 volts. Tuning done by tapped switches. Only one 6-volt storage battery required; for filament, microphone and "B" battery. Rectifier or Motor Generator supply may be used. Tests show a 30-mile telephone range, and greater range is possible. Set mounted on two Bakelite panels, each 4 1/2 x 9 inches. Aerial Oscillating Circuit Panel, with all necessary controls and transfer key switch. Price—\$55.00 (without microphone). Power Tube Panel contains tubes, ammeter and filament rheostat. Price—\$45.00 (without tubes or power supply). Entire set well made and nicely finished. Get full details at once. Order early to assure prompt delivery, either through your regular dealer or direct from us.

DeForest Radio Telephone & Telegraph Co.

Inventors and Manufacturers of High Grade Radio Apparatus
1425 SEDGWICK AVENUE NEW YORK, N. Y.



SOMETHING NEW IN HEADSETS



"Navy Type, 50,000 Ohms, A. C., Weight 9 oz., complete with head band and polarity indicating cord. Price \$14.00"

Send 5c for Catalog "C"

With recent improvements in our Navy Type Headset we have succeeded in bringing out a headset with an A. C. resistance of 50,000 ohms at 800 cycles, a thing which has never before been accomplished in a commercial headset. It has a natural high pitch and will bring in thousand cycle notes clearly and distinctly and undamped waves can be read clearly and distinctly through static.

The improved Navy is peculiarly adapted to vacuum tube reception.

They are permanently adjusted at their highest point of efficiency and then carefully matched in tone. Because of their rugged construction they remain adjusted indefinitely.

The most exacting comparative tests have convinced us that our High Impedance Navy Type Headset is the best on the market, regardless of price. It is the most sensitive, most durable, and at the same time the lightest high-grade headset built. Our guarantee stands back of every one of these claims.

If you need a reliable and super-sensitive headset, you cannot afford to be without this new high impedance model. Send us \$14 and we will mail you a Navy Type Headset. Try it for 10 days. If you are not absolutely satisfied with your purchase, return the headset and we will refund the money immediately.

C. BRANDES, Inc.

Room 819, 32 Union Square, New York City
Also makers of: Trans-Atlantic Headsets, \$12.00.
Superior Headsets, \$8.00.

VACUUM TUBES REPAIRED

RELIABLE SERVICE TO THE RADIO AMATEUR

MARCONI VT's, MOORHEAD VT's, ELECTRON RELAYS **\$3.50**

CASH MUST ACCOMPANY ALL ORDERS

Eastern Vacuum Tube Laboratories

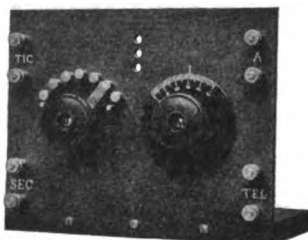
178 Washington St. Boston, 9, Mass.

VACUUM TUBE CONTROL UNIT

Type MW

Adapted to any modern hook-up. Best appearing and highest type Vacuum Control Unit at the price in the market.

Grained formica panel, 5½x6¾ ins., lettered in white, graduated rheostat dial, variable plate control. Tube socket (standard 4 prong). Grid condenser and leak mounted in back of panel and so wired that it can be adapted to any modern hook-up.



Price \$10
Parcel post prepaid in U. S.
Immediate shipment.

Write for descriptive Booklet MW. Sent free on request

THE MIDWEST RADIO CO., Dept. D. 3423 DURY AVE. CINCINNATI, O.

FILAMENT RHEOSTAT



A 7 ohm rheostat for regulating the filament current in either receiving or transmitting tubes, carries 1.5 amperes. Smooth operation of switch arm. No grating, no clicking. Cut shows Type 214A for mounting back of panel. Type 214B made for portable or front of panel use.

PRICE \$2.50

Made also with resistance of 400 ohms and with potentiometer connection suitable for grid biasing.

PRICE \$4.00
Described in Bulletin 904C

Type 214 A FOR PANEL MOUNTING

GENERAL RADIO CO., Cambridge 39, Mass.

A New Invention



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

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

No. 50 .001 mf Unit alone, may be mounted on any shaft....\$1.50 postpaid
 No. 51 .001 mf Unit with knob, pointer, etc., as shown.....\$2.00 postpaid
 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.

MOVING AUTOMOBILE SIGNALS

(Continued from page 294)

entire receiver was self-contained in a cabinet about the size of an ordinary suit case.

The first tests were made on top of Twin Peaks and proved so successful that the automobile was driven down into the city where the signals continued to be clearly audible even when in the traffic near electric cars in operation. Some of the Atlantic Coast stations heard were WSO (Marion, Mass.), NSS (Annapolis, Md.) and WII (New Brunswick, N. J.)

The tests were conducted by Colin B. Kennedy and Emile A. Portal.

RADIO CLUB NEWS

(Continued from page 293)

the other schools follows the suggestion of the University of Washington Radio Club that the schools perfect a method of inter-school communication, especially for the transmission of game scores.

The Gonzaga radio plant, purchased last summer, is ready for use following the erection of suitable aerials. The aerial will be strung up within a month, Mr. Prange stated, and will consist of a four-strand line from the east spire of the St. Aloysius Church to the university roof.—Spokane "Press."

MISSING!

Anyone having information as to the whereabouts of Wesley Wedel, aged 15, 5 feet, 9 inches tall, slim, blue eyes and fair complexion, will please notify his mother, 417 Guerrero st., San Francisco. Wedel is a local radio amateur and has been missing from home for a period of three weeks.

WANTED!

CALLS HEARD BY SEVENTH DISTRICT AMATEURS
 SEND YOUR LIST TODAY!

NO TUBES SOLD

without complete instructions for operating efficiently.

ELECTRON RELAYS and A-P AMPLIFIERS

personally tested on actual receiving. A new tube or your money refunded if you are not satisfied.

For prices see front cover of this magazine.

B. F. McNamee
2436 Stuart St., Berkeley, Calif.

Another Grebe Triumph!

150-3000 Meters

After much experimental work, we have succeeded in adopting the Armstrong Regenerative circuit to a receiver having a wave-length range of 150-3000 meters. The result is the



Type CR-5

Regenerative Receiver



This is a complete receiver. The only additional equipment needed are phones, batteries and a detector tube. Included in its range are amateur, navy and commercial wave-lengths, special land stations, ship CW stations, navy low-wave arcs, all radio phone work and "Time." In operation, it is the last word in simplicity. Ask to see it at your dealer's today.

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

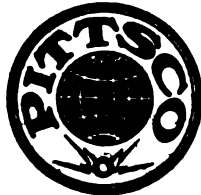
Central Radio Institute, Independence, Mo.
Continental Radio and Electric Corp., New York.
Detroit Electrical Co., Detroit, Mich.
Doubleday-Hill Electric Co., Pittsburgh, Pa.
Electrical Specialty Co., Columbus, Ohio.
Holt Electric Utilities Co., Jacksonville, Fla.
Hurlburt Still Electrical Co., Houston, Texas.
Kelly & Phillips, Brooklyn, N. Y.

U. of I. Supply Store, Champaign, Ill.
Klaus Radio Company, Eureka, Ill.
Manhattan Electrical Supply Co., New York, Chicago, St. Louis.
Leo. J. Meyberg Co., San Francisco, Cal.
Pacent Electric Co., Inc., New York City.
F. D. Pitts Co., Inc., Boston, Mass.
Philadelphia School of Wireless Telegraphy, Philadelphia, Pa.
Western Radio Electric Co., Los Angeles, Cal.
The Newmap Stern Co., Cleveland, Ohio

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

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



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All We Ask is a Trial!

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When you say "PITTSO" you think of Everything in Radio!

AMPLIFYING TRANSFORMERS

- No. 166A Gen. Radio, unmounted....\$4.50
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- No. Z7392 Clapp Eastham, unmount. 4.00
- No. Z7392A Clapp Eastham, mounted 6.50

COIL MOUNTINGS

- No. LC-101 with gears and base....\$12.00
- No. LC-201 with gears and base and primary switch.....13.00
- No. LC-100 with gears but no base. 9.00

CONDENSERS (Variable)

- No. F-800 .0006 Clapp Eastham Bal. \$7.50
- No. F-800A .001 Clapp Eastham Bal. 9.50
- No. F-800B .0015 Clapp " Bal. 11.50

CONDENSERS (Low Voltage)

- No. ES-355 1 MF 500 Volts.....\$1.25
- No. ES-356 2 MF 500 Volts..... 1.25
- No. 21 AA Western Elec. 1000 volts A.C. 2.50

OMNIGRAPHS

- No. 2 15 Dial Machine.....\$30.00
- No. 2A 5 Dial Machine.....22.00

REGENERATIVE RECEIVERS

- No. CR-1 Grebe 175-680 Meters.....\$90.00
- No. CR-2 Grebe 175-680 Meters.....51.00
- No. CR-3 Grebe "Relay Special" 175-680 Meters65.00
- No. CR-3A Grebe's Latest with tube control, 175-680 Meters45.50
- No. CR-6 Grebe 175-680 M. Det. and 2-step amplifier200.00

- No. CR-7 Grebe 500-20000 Meters "Long wave Special".....\$210.00

TELEPHONES

- Baldwins Type C, Navy Standard. \$16.50
- Baldwins Type E, "Super sensitive"20.00
- Baldwins Type F, very small, light. 21.00
- No. CW-834 Western Electric.....13.50
- No. P-1 Brown 4000 ohms, extremely sensitive and light.....20.00

VACUUM TUBES

- No. UV-200 Radiotron detector.....\$5.00
- No. UV-201 Radiotron amplifier..... 6.50
- (These are the Radio Corp's new tubes)

CONDENSERS & TRANSMITTING (Dubilier)

- No. D-100 250 W. 10,000 V. .007 mf. \$19.00
- No. D-101 500 W. 14,000 V. .007 mf. 30.00
- No. D-102 1000 W. 21,000 V. .007 mf. 45.00

ROTORS

- No. 443 Murdock, 3-16, ¼ or 5-16" shaft\$3.00
- No. T-1 Thordarson 8 to 16 pt. 6.00
- No. B-1 Benwood 8, 10 or 14 pt. 8.00
- No. H-1 Hyrad 10 point, 9ZN type.....10.50

QUENCHED GAPS

- No. G-1 Amrad 1 K.W. Size.....\$41.50
- No. G-2 Amrad ½ K.W. Size.....24.50
- No. G-3 Amrad ¼ K.W. Size.....12.00

TRANSFORMERS (Transmitting)

- No. F-1 Acme 500 Watt with Bakelite panel, completely mounted. \$30.00
 - No. H-1 Acme 1000 Watt with bakelite panel, completely mounted. 45.00
 - No. P-1 Thordarson, 250 Watt Type "R" old model.....15.00
 - No. P-2 Thordarson 500 Watt Type "R"24.00
 - No. P-3 Thordarson 1000 Watt Type "R"39.00
- Note—These Thordarson transformers are splendid values at above prices.

CW INDUCTANCES

- Type 181 Tuska\$7.50
- Type 181A Tuska, K.W. type..... 5.00
- Type 182 Tuska (Magnetic type).....10.00
- Type 183 Tuska (Tickler type).....12.50
- Type 170 Tuska Filter16.00

CW TRANSFORMERS (Phone Work)

- Acme 200 Watt, mounted\$20.00
- Acme 200 Watt unmounted.....16.00
- Acme 50 Watt mounted15.00
- Acme 50 Watt unmounted.....12.00

CHOKO COILS (Phone work)

- Acme 1½ Henry 500 MA double coil. \$8.00
- Acme 1½ Henry 500 MA single coil 6.00
- Acme 1½ Henry 150 MA double coil 6.00
- Acme 1½ Henry 150 MA single coil 4.00

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OF ALL THE PRINCIPAL COMMERCIAL TRANSMITTERS

Kilbourne and Clark 500 cycle Transmitters, impulse type.
 Marconi 240 and 500 cycle Transmitters.
 Independent 500 cycle Transmitters.
 Arc Ignition Key System.
 Splendid material for reference and home study.

\$2.00 A SET

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 433 CALL BUILDING SAN FRANCISCO, CAL.

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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

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 625 Market St., San Francisco, Cal. 411 S. Main St., Los Angeles, Cal.
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CHELSEA Variable Condensers

Condenser No. 3



(Die-Cast Type)

No. 1—.0011 m.f. mounted	\$5.00
No. 2—.0006 m.f. mounted	4.50
No. 3—.0011 m.f. unmounted	4.75
No. 4—.0006 m.f. unmounted	4.25
Bakelite Dials only .....	.75

Top, bottom and knob are genuine bakelite, shaft of steel running in bronze bearings, adjustable tension on movable plates, large bakelite dial reading in hundredths, high capacity, amply separated and accurately spaced plates. Unmounted types will fit any panel and are equipped with counterweight. Purchase from your dealer; if he does not carry it, send to us. Bulletin upon request.

CHELSEA RADIO COMPANY
 13 FIFTH STREET CHELSEA, MASS.
 Manufacturers of Radio Apparatus and Moulders of Bakelite

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You who have tried "HICO" service know it means prompt shipments and guaranteed satisfaction. Formerly we confined ourselves to a very few lines, mainly our F-F Bantam Battery Booster at \$15.00. Now we are adding other well-known instruments such as Benwood Gaps, Eldridge meters, Baldwin phones, Acme apparatus, Vacuum tubes, detectors, amplifiers and transmitters, etc., etc. Magnavox are now within reach of every amateur, price prepaid, \$45.00. Send us your order for goods from the above lines. It will receive prompt shipment and be prepaid. Practically every order we receive is shipped within four hours.

HICO, Box B268, MARION, ILLINOIS

"TOUGHER THAN A GOAT"

(Continued from page 290)

"I drifts up pretty close an' notices a big sign that says *Telegrafos Federales de Mexico*, an' somethin' about *no se admite*, which I figures means to keep to hell out, or somethin' similar, an' I was just decidin' I'd better not butt in, when all of a sudden what does I hear but old NAA'S big, strong five hundred cycle spark, sendin' the noon weather! I thinks to myself I must be dreamin' or crazy, because NAA's about four thousand miles from this place, an' it's broad daylight, an' I'm standin' a hundred feet from the Mexicans' station. I pulls out my watch, an' sure enough! it was just a little before ten, ship's time, which accordin' to the longitude would figure out to be around about noon by New York time.

"Well, right then, I makes up my mind I'm goin' to have a look at the Mexicans' receivin' outfit, even if I land in the caboose an' get shot for a spy at sunrise. So I drifts up to the door of the station, where I was headed off by a big, well-built Mexican with a uniform cap that says *jefe* on it. He was blacker than most Mexicans, an' his eyes was kind of wild an' dangerous lookin'. He asks me what I want in pretty slick English, an' I tells him I'd like to see his station; so he lets me in an' shows me his coal oil engine an' his dynamo an' his sendin' gear—an old kilowatt an' a half, straight-gap Telefunken, built in Germany in 1903, an' doin' good work yet.

"That was all interestin', but I was burnin' up to see that chile con carne receivin' outfit that could bring in Arlington from four thousand miles in daylight, loud enough to hear a hundred feet from the station, an' although I was lookin' everywhere, expectin' to see an eight or ten step amplifier, I couldn't spot it no place.

"Where's your receivin' gear?" I asks, at last, as casual like as I could.

"Ah, *senor*, I have the most wonderful receiver on earth—a marvelous instrument of my own invention," he exclaims, unlimberin' himself with a gesture like a country rube stoppin, the mornin' milk train. He leads me into another room an' points to a rig lyn' on his operatin' desk. There was absolutely nothin' to it but a little mahogany box, about seven inches long an' four deep, an' maybe a foot long. It had a bakelite front with three little knobs an' pointers, runnin' on scales like variable condensers, an' it had four bindin' posts. Two of 'em was connected to the aerial an' ground, an' the other two was hooked up to one of them magnavox loud-speakin' horns—an' that's all there was to it. There wasn't no tunin' inductances, no audions, no nothin'.

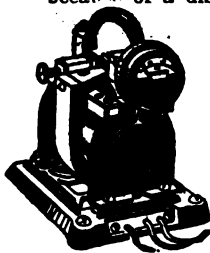
"This controls all the tuning," the Mexican code-slinger says, takin' hold of the knob on the left-hand end of the little panel. 'With this simple knob, together with the little vernier device you see underneath it, I can adjust the instrument to any wave length from twenty meters to fifty thousand meters.'

"The dickens you say," I exclaims, feelin' considerably surprised.

"The second knob controls a sound frequency tuner," the *jefe* goes on, takin' hold of the middle knob on the panel. 'With this control I cut out every signal that has a tone frequency the least bit different from the signal I am adjusted

(Continued on page 305)

10c Charges Your Battery at Home With an F-F BATTERY BOOSTER
and your station will never be closed because of a discharged battery.



Is it not gratifying to feel that your filament battery will always be ready when you want it and that you will never have to give up in disgust when working a distant station?

F-F Battery Boosters are automatic and operate unattended. Screw plug in lamp socket, snap clips

on battery terminals and see the gravity come up.

The ammeter shows you just the amount of current flowing. The full wave of current is rectified through adjustable carbon electrodes which maintain a constant efficiency and last for thousands of hours. Everything complete on one compact, self-contained unit.

The F-F Booster is a Magnetic Rectifier for 105-125 volt 60 cycle alternating current.

Bantam Type 6 charges 6 V. Batt. at 6 Amps. \$15

Type 16 charges 6 V. Batt. at 8 Amps. 24

Type 166 charges 6 V. Batt. at 12 Amps. 32

Also Boosters for 12 Volt Batteries. Shipping weight 10, 12 and 15 lbs.

Order from your dealer or send check for prompt express shipment.

If via postoffice, have remittance include postage and insurance charges. Will also ship C. O. D.

Also F-F Battery Boosters for charging batteries from Farm Lighting Plants, Direct Current Circuits and D. C. Generators.

For group charging use the Full Wave, Automatic F-F Rotary Rectifier of 100 volt 36 cell capacity.

Order now or write today for free descriptive Bulletin No. 33.

THE FRANCE MFG. CO.

Office and Works CLEVELAND, OHIO

QST TO ALL SUNKIST AMATEURS

After an extended tour of the principal radio factories, I have selected the following lines as being worth your gold any my time. I would be pleased to receive your orders for any of them. I can make immediate delivery of many items.

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MURDOCK
NATROMETER
OMNIGRAPH
PACENT
PACIFIC RADIO
PARADEX
PARAGON
PARKIN
RADIO CRAFT

RADIO SHOP
RADIOTRON
RADISCO
RAVENSWOOD
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RADIO 6ABA

2940 MAIDEN LANE

ALTADENA, CALIFORNIA

WHY THE Q. R. M.?

Use undamped wave transmission. Now made possible by the "MIDGET" Motor Generator unit, designed for that vacuum tube of yours.

A "MIDGET" Motor Generator unit installed on your radiophone eliminates cumbersome transformers and rectifiers. No induction hum. Constant voltage. Efficient operation. Self regulating.

No starting device or field rheostat necessary. Mounted any place, back of panel, in cabinet, under table. Amply supplies three five watt vacuum tubes.

Motor—Universal wound. Operates satisfactorily on A. C. or D. C. 110 or special for 220 volts.

Generator—Shunt wound. 15 watt capacity at 300 volts D. C.

Dimensions—3½" x 4" x 11½". Net weight, 9 pounds. Shipping weight 15 pounds.

Both machines mounted on common cast iron sub-base, coupled together with flexible insulating coupling, allowing quiet operation and perfect alignment.

Can be supplied in voltages suitable for amplifier and detector service. Special voltages to order. \$42.35 f. o. b. Chicago. Can be shipped via Parcel Post.

ONE DEALER SAYS: "For simplicity it is a Find. The design and workmanship is beyond doubt the finest we have seen on machines of this size. Using one Western Electric VT2 the fone was workable at about 25 miles and the CW was replied to with "QSA" and "QRK" by stations, some of which were 100 miles distant. So all in all the "MIDGET" is there with the goods, ship us another."

RAY-DI-CO
(Ray-dee-ko)
Radio 9 AG

2653 CN. CLARK CHICAGO

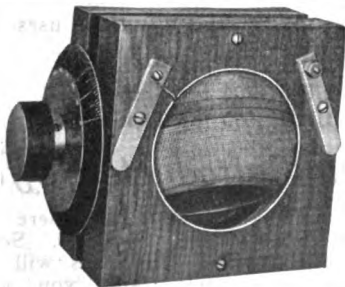
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Your name and address and 25c brings you a copy by return mail. The quarter doesn't cover half the cost to print—it's just to show good faith, and will be credited to your first order of \$2.50. Don't delay. Thousands will read this ad, and the edition is limited. Send for your copy today. Do it NOW!
KELLY & PHILLIPS
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NORTHWESTERN RADIO INSTRUMENTS

—A Quality Line, made on the Pacific Coast



Northwestern Variometer

An instrument second to none in design and workmanship. Rotor and stator turned to close limits, giving high maximum and low minimum.

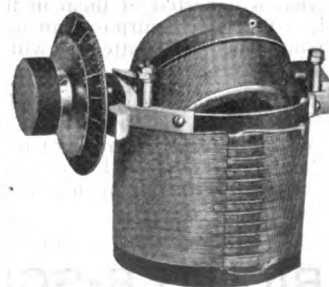
Price, \$9.00

Mounted as above with turned Bakelite dial and knob, \$11.25.

After 18 months of constant research and development work, we have perfected a complete line of Radio receiving apparatus, which we know will fill the wants of the most exacting radio man. Our instruments are designed and built by men who have been constantly in radio work for the past 12 years, and who understand amateur needs.

We are now printing a catalog of our complete line. Write for your copy now. We have a really superior line, and want you to become acquainted with it.

Northwestern Radio Manufacturing Co.
1556 East Taylor Street
PORTLAND, OREGON



Northwestern Variocoupler

Designed for use in connection with Northwestern Variometer and when so used will give superior results.

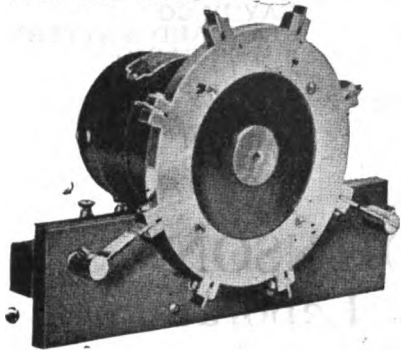
Price, \$8.50

Mounted as above with turned Bakelite dial and knob, \$10.50.



DUCK'S New Big-200 Page No. 14 Wireless Catalog 21 and 27

Mailed for 12c, either in stamps or coin, which amount you are privileged to deduct on your first order of \$1.00. Catalog positively not sent otherwise. This edition of our wireless catalog is the most complete and elaborate we have ever put out. It embraces everything in wireless worth while. As an encyclopedia of information it is invaluable. It is printed on excellent paper with a beautiful cover. Your amateur friend will tell you that there never has been any wireless catalog to take the place of Duck's, and above all, that you can absolutely rely on the quality of every instrument listed in this catalog. In a word it is all worth while catalogs in one.



Improved Type Sayville Rotary Gap

Embodies the latest and best features in Spark Gap Construction.

Our New Type Sayville Rotary Gap is, we believe, far in advance of any rotary gap on the market within a range even of twice the price. It is the final development of many different types made in our experimental Radio laboratory. It fulfills every requirement of the ideal rotary gap. It is neat and attractive in appearance; simple and durable in construction; possesses a wonderful motor; has a cast aluminum rotary wheel, beautifully polished; every part is in perfect alignment; there is no wobbling of the motor; produces and maintains a clear and pure 500-cycle note; is instantaneous in action; permits of no dragging of the spark;

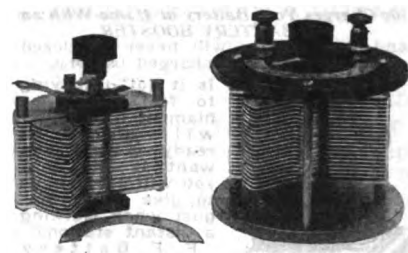
has contacts of tempered flat copper of proper length and width, easily and quickly removable, and inexpensively renewable; the stationary contacts are adjustable to any length.

The picture above really does not do it justice. There is no rotary gap we have ever sold that we consider in the same class with this gap, and we have therefore, discontinued the sale of all other types listed in our catalog.

Any purchaser is privileged to return it within three days if it does not come up to all the high claims we make for it. A first-class Rotary Gap is the very heart of an efficient transmitting set, and we cannot too strongly emphasize care in the selection of this instrument if effective and dependable results are desired.

- No. A1798—Improved Type Sayville Rotary Gap (shipping weight 9 lbs.).....\$27.50
- Renewable Rotary Electrodes (not less than five sold), each..... .05
- Renewable Stationary Electrodes, each..... .10
- Type A Motor as supplied with above gap (shipping weight 6 lbs.)..... 15.00

THE WILLIAM B. DUCK CO., 210-212 Superior St., Toledo, Ohio



THE "ILLINOIS" VARIABLE CONDENSER

The Condenser with "Star Spring" Tension

MADE RIGHT - STAYS RIGHT
Hard Rolled Aluminum Plates

These condensers are made by a watch mechanic, schooled in accurate workmanship and who can't get over the habit of critical inspection.

Three Styles: No. 1, Panel; No. 2 Open Type as shown; No. 3, Fully Encased. Anti-Profiteer. Less than pre-war prices. Fully assembled and tested.

	Style No. 1	No. 2	No. 3
67 Plates	....\$7.00	\$	\$
43 "	.... 3.50	4.50	4.75
23 "	.... 2.75	3.75	4.00
13 "	.... 2.25	3.25	3.50

Money back if not satisfied. Just return condenser within 10 days by insured P.P.

With Style No. 1, we will, if desired, furnish 3 inch Dial with large knob, instead of Scale and Pointer. Extra Price 75 cents.

Sent Prepaid on Receipt of Price

Except: Pacific States, Alaska, Hawaii, Philippines and Canal Zone, add 10c. Canada add 25c. Foreign Orders other than Canada not solicited.

Kindly note: We issue no Catalog, and make no "trade discounts." We set our prices at the lowest limit, and leave the "middle man" out for the sole benefit of the "consumer."

G. F. JOHNSON

626 Black Avenue Springfield, Ill.

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Amateurs to Secure Subscriptions

PACIFIC RADIO NEWS

Pacific Radio Pub. Co.
50 MAIN ST. SAN FRANCISCO

A Word To the Wise!

The "STANDARD VT BATTERY" is made by people who specialize. They concentrate their facilities upon the manufacture of plate circuit batteries. They know how and why plate circuit batteries are used, and what is expected of them in the way of service—for which purposes an assembly of common flashlight batteries will not serve efficiently.



Dealers who sell any of the three types of the "STANDARD VT BATTERY" guarantee them fully. They know of their excellent qualities, and offer you the benefit of their knowledge and selection when they sell you the "STANDARD VT BATTERY." Still, they're not expensive. This, combined with A-1 quality, is the secret of their extensive use.

Treat yourself to a full round of satisfaction by purchasing the "STANDARD VT BATTERY" from your nearest dealer.

RICHTER-SCHOTTLER CO., MFRS.
293 CHURCH STREET NEW YORK, N. Y.

PACENT ELECTRIC CO., Sole Eastern Agents, 150 Nassau St., New York City

Hams—

Why not get in on the long wave stuff?

Use Radisco coils.

Here is a combination that gets fine results for everybody that uses it.

- LRD 1200 for Primary
- LRD 1200 for Secondary
- LRD 550 for Tickler

Special introductory offer

This combination sent anywhere in the U. S., postpaid, for \$6.00. Send your order today. The coils will be shipped immediately, and you can start right in on your long range work.

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You Save 75c.

Pacific Radio Pub. Co. - 50 Main St.
San Francisco, Cal.

When writing to Advertisers please mention this Magazine

"TOUGHER THAN A GOAT"

(Continued from page 302)

for.' With this the Mexican throws in his aerial-switch an' first adjusts the tunin' knob an' the vernier until he had brought in about forty stations, all on six hundred meters.

"You hear them all now, because the tone selector is cut out for standby work,' explains the jefe. He throws over a little two-point switch, just over the control knob, an' right away all the signals went out except one solitary five hundred cycle spark. The jefe turns the knob about an eighth of an inch—bingo! out goes the high pitched spark an' in comes another guy with just a little bit lower note. Pretty soon the Mexican turns the knob a little farther, cuttin' out goes the high pitched spark an' brings in a low-toned rotary gap.

"Holy gosh!" I ejaculates, gettin' more flabbergasted all the time. 'What's the third knob for?'

"That, *senor*,' says the jefe, with another one of his sweepin' motions, like a swimmin' girl doin' a fancy dive, 'that is what you might call an intensity control. It is the most marvelous part of the instrument; with it I can bring in any signal as loud as I wish—no matter how far or how little be the transmitter. *Escuche!*'—an' he turns the tunin' knob an' vernier until we hear POZ comin' kind of weak on the loud-speaker. That third, intensity knob has a scale marked from one to one hundred, an' the pointer is on three—the jefe turns it up to seven, an' say! ol' POZ comes screechin' in like one of them steam calliopes in a circus parade.

"Sufferin' smokes!" I splutters. 'I never seen anything like it!'

"That is nothing, *senor*; POZ is a very powerful station,' says the jefe. 'Let us try two hundred meters,—he turns the tunin' knob down a ways an' sets the intensity control at thirty-five—an' a racket comes crashin' out of the loud-speaker that sounds like a Chinese orchestra celebratin' New Year. The jefe switches in the tone selector, an' we listens to a fellow in Chicago playin a game of checkers by 'wireless with another kid down in Joliet!'

"I was so clean stupefied, I couldn't do nothin' but just stand an' listen. Pretty soon, the jefe turns the tunin' knob way down close to the end of the scale, an' sets the intensity jigger at seventy-five. It kind of makes me wince when he does that—I half expects to see the loud-speaker go up through the roof in a cloud of smoke, but she hangs together, however, an' I hear a lot of queer stuff that sounds just like a bunch of bumble bees buzzin' around in a flower garden. I couldn't make head or tail out of 'em at first; an' then all of a sudden I realizes that I'm listenin' to some Canadian amateurs, hammerin' away on their fifty meter wave—on little spark coil sets! Just think of it! Hearin' spark coils on fifty meters in broad daylight, thousands of miles away! An' not a tickle of static, either!

"Holy sufferin' Jerusalem!' I gasps, hardly believin' my ears. 'why in blazes haven't you took out a patent on this rig? You'd get millions for it!'

"No, *senor*, never!' exclaims the Mexican, a wild look comin' into his eyes. 'I have offered the secret of its make to Don Enrico Velasquez, in exchange for the hand of his daughter, *la Senorita Esmeralda*, who is the queen of my life and the goddess of my dreams; but faugh! the proud and hard Don Enrico only kicked me like a dog, and spit on

(Continued on page 306)

ACME

TESTIMONIAL



January 30, 1921.

The Acme Apparatus Co.,
Cambridge, Mass.
Gentlemen:

I consider it a pleasure to tell you that I have succeeded in working past the four boundaries of our U. S. with one of your 1 KVA old type transformers. Really it is a wonder and it has a real "kick". My sigs heard aboard a ship 1400 miles east of New York, 2300 miles in all. 9EQ is reported QSA by several stations on the Pacific Coast, including Santa Barbara, Cal., and Vancouver, Wash. 9EQ was reported QSA at Napanee, Canada, and I talked to a ship at Tela, Honduras, 1500 miles south of St. Louis.

All this work is due to you, gentlemen, and I wish to thank you and offer you my best wishes for continued success in the future. *Your ACME can't be beat!*

Yours very truly,
(Name on request)

"The Apparatus with a Guarantee."

Acme Apparatus Co. BOSTON, MASS. 21 Windsor St., Cambridge, 39
Transformers and Radio Engineers and Manufacturers

SPECIAL OFFER

Prices Effective Until April 15th

Perfection Tubular Tron Panels and Parts.....	\$5.95
Clapp-Eastham 43-Plate Condensers, in metal cases.....	4.95
Goose-neck Bakelite VT Sockets.....	1.75
Murdock No. 367 Variable Condensers.....	3.95
Murdock No. 368 Variable (interior only).....	2.95
DeForest Honeycomb or Duo-Lateral Coils (full mounted—Sizes 25 to 500).....	20 per cent discount
DeForest D101 Galena Detector.....	1.95
DeForest CV500 Variable Condenser (complete).....	4.95
LC-100—Triple Coil Gear Mount.....	7.25
UD-101—Unit Panel Galena Detectors.....	3.45
S-200—Anti-Capacity Switch—4 pole.....	2.15
U-200—"A" Battery Switch and Telephone Jack on Standard Unit Panel.....	2.65
Amrad Induction Coil and ¼ K.W. Quenched Gap Combination, Value \$47.75; now.....	35.75

(Include postage charges when ordering)

(Send 4c in stamps for our 55 page catalog)

KARLOWA RADIO CO.

611 BEST BUILDING

ROCK ISLAND, ILL.

D. C. METERS

Three Laboratory Type Voltmeters, scale 0-100, 0-150, 0-300..	\$10.00
One Laboratory Type Ammeter, 0-100.....	10.00
Ten Combination Zero Center Voltmeters with scale lamp.	
Scale: Amps. 15 (0-30); Volts 7.5 (0-15).	
Ten Switchboard Ammeters with scale lamp. Scale 20-0-20..	8.00
Fifteen Ammeters with shunt. Scale 0-100.....	8.00
Twenty-five small Ammeters, zero center. Prices...\$2.50 and 3.50	

ETS-HOKIN & GALVAN

RADIO ENGINEERS

10 MISSION STREET

SAN FRANCISCO, CAL.

When writing to Advertisers please mention this Magazine

Resonance Tuner -- Something New -- Used with Bulb Only

Built on the resonance principle of the new Coils of the U. S. Signal Service. It is a wonder tuner and is wound with pure copper strip with split phase coil inside and out of the winding. IT GETS ALL THE 200 meter stations going and the tuning is done merely with a 21 Plate Condenser in series with the aerial.



Amplification up to 100 times with variometers in series with grid and plate. This tuner will permit you to make a regular paragon at a very small price.

It is truly the wonder tuner and will revolutionize the tuner industry. These have been tested everywhere before being offered to the Amateurs and we will absolutely guarantee every one. Special price—one to each city \$6.00, add parcel post.

TRESCO, Davenport, Iowa.

Send 10c. for
16-page Catalog

"The Radio Telegrapher"

Official Organ
UNITED RADIO TELEGRAPHERS' ASSOCIATION
Room 303

44 Broad Street, New York

Read about what's going on among the Commercial, Navy and Army operators

ON SHIPBOARD
AT SHORE STATIONS
AT HOME AND ABROAD

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--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.

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Phone Douglas 3030

335 New Call Bld., San Francisco

Elements of Radiotelegraphy

By Lieut. E. W. Stone

400 PAGES OF VALUABLE RADIO DATA, PRINTED ON EXCELLENT GLAZED PAPER. 122 DIAGRAMS AND HALF-TONES.

EVERY RADIO MAN NEEDS THIS BOOK.

\$2.50

Price per copy, postpaid anywhere in the United States

Free with a two-year subscription to "Pacific Radio News"

\$2.50

PACIFIC RADIO PUBLISHING CO., San Francisco, Cal.

When writing to Advertisers please mention this Magazine

"TOUGHER THAN A GOAT"

(Continued from page 305)

me; so, soon I destroy the wonderful instrument and my secret shall go to the grave with me—*corajo!* it shall be my revenge!

"Just then, the Mexican's oil-engine, which is out in a shed back of the station, starts in to barkin' an' spittin' like it was gettin' afflicted with an attack of bullsheviki, an' the *jefe* rushes out to see what's the matter with it. Soon as he was out of the room, I takes a close look at that devilish receiver, an' I notices that the top of it is hinged an' fastened with a little hook. Here's where Mr. Samuel Jones finds out what's inside of this blasted little box, I says to myself, an' I unfastens the catch. The top wouldn't come up, though; so I gets out my jack-knife an' tries to pry the darn thing loose. While I'm busy as a burglar crackin' a safe, doin' this, I hears the scrape of a chair. I swings around quick—an' there's the Mexican standin' right behind me!

"Peeg! Dog! You would steal my see-cret! he screeches, his eyes spittin' poison an' fire like a double-barreled volcano. '*Carramba! a la muerta!*' he howls, an' he whips out a big, wicked-lookin' sheath knife. He makes a spring at me like a mad bobcat, but I dodges like a flash an' grapples with him. I manages to get a hold on his knife arm, an' we clinches for a couple of seconds. The Mexican was stronger an' heavier than me, but I matched him, anyway, by knowin' a little more about scraffin' than he did. I puts all my strength in a quick jerk an' twists the *jefe's* wrist so hard he lets out a squeal an' drops his gizzard-slicer. I kicks the knife into a corner, an' then breaks the clinch.

"The Mexican comes at me like a wild bull an' I smashes him square in the mug, but he just snarls like a mad dog an' comes back for more. I gives him another crack in the face, but he only grunts, an' punches right an' left at my ribs, an' then slips me a killin' snag under the jaw. This kind of fazes me an' I clinches. That was a bad mistake, though; the Mexican grips me like a vise an' gets a clutch on my throat like a maniac. My wind was clean shut off an' it was a case of root hog or die; so I tears my right arm loose by pure desperation an' uses it like a person can only when he's fightin' for his life. I lands about half a dozen wicked kidney blows, an' the *jefe's* grip on my wind-pipe slackens up a little. With all my might, I breaks loose from his choke-hold, an' then I fights like I never fought before an' like I never hope to fight again. I smashes my right fist into the Mexican's jaw, an' something busted. Right an' left I drives into him, but he bangs me one in the mouth that sends blood flyin' all over an' checks me a little. But I was feelin' pretty damn mad now, an' I tears into the Mexican with a string of rights an' lefts that makes his head rock, an' then I slugs him a slantin' crack on the collar-bone, an' he piles up on the floor like a sack of corn-meal.

"I was pretty dizzy, but I runs to the table, unhooks that receivin' box, puts it under my arm, an' lights out. I thinks to myself I'll be doin' the world a lot of good by savin' his wonderful invention from bein' lost just on account of a fool lovesickness, an' besides, I'll be a millionaire, ten times over, an' then maybe I can split with the *jefe* an' pacify him.

"So I goes dashin' down the road full
(Continued on page 308)



Paragon Rheostat

has become the standard filament resistance. For back of panel or table mounting. 2 1/4-in diameter. 6 ohms., 1 1/2 amps.

\$1.75 Postpaid Immediate shipment.

Standard VT Socket \$1.00. Why pay More?

44 Volt Variable "B" Battery, \$3.60

Include Postage on 4 Lbs. Complete in handy wooden case and adjustable phosphor-bronze "Jiffy" connectors. Better than block batteries! If one 4.4 V. unit weakens prematurely, it can be removed and replaced, thereby not impairing the total voltage—making this the best battery value on the market.



Audiotron Adaptor

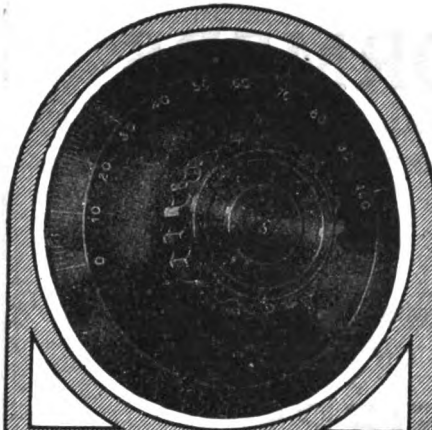
Consists of standard 4-prong base with brass supporting connectors. Permits mounting tube in vertical position, so filament will not sag and touch grid.

\$1.75 Postpaid Aerial Wire 1c Per Foot 7 strands No. 22 solid copper—tin plated to prevent oxidation. Include postage on 15 lbs. per 100 feet.

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

Radio Equipment Co.

630 Washington St. Boston-11, Mass.



CORWIN DIALS

There are two kinds of amateurs, those who get real pleasure and satisfaction out of their radio work, by using dependable equipment, and . . . the rest.

There are two kinds of dials, Corwin Dials and . . . the rest.

The first class of radio men almost invariably choose Corwin Dials.

3" Dial, 75c—with knob, \$1.30

3 3/4" Dial, \$1.00—with knob, \$1.70

At all Radisco agencies, and other reliable dealers, or sent postpaid anywhere

A. H. CORWIN & CO.

4 West Park St., Newark, N. J.

CALLS HEARD—(Continued)

CALLS HEARD BY 6EA—Addit'onal

Heard: 6ABM, 6AIL, 6CZ., 6EM, 6HH, 6HP, 6KM, (PX-c.w.), 6RA, 6SV, (VL, 6WZ, 7BJ, 7BR, 7ZK, KDEH, NRRS-c.w., and "R.M.")

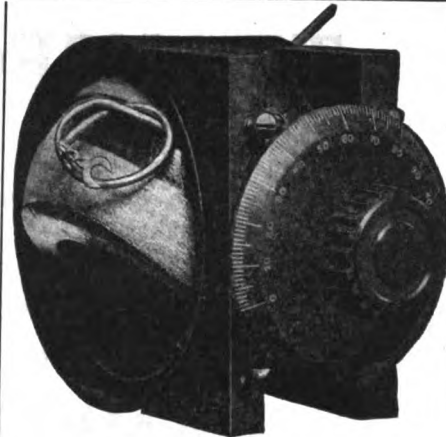
Worked: 6AAT, 6ACM, 6AGF, 6AH-c.w., 6CH, 6JJ, 6TV, 6ZM, 7BP, 7DS, 7IN and "SC"-c.w. Station 6EA worked 7DA, 7IN, 7ZI and 7ZJ on low power used for local work (139.5 watts as tested by a watt-meter as used by the Southern California Edison Company.) Radiation on a Westinghouse thermo-coupled meter in 2 amps. Station 6EA was reported heard by 9MS at Davenport, Iowa on February 21st.

CALLS HEARD AT 7HE, KALAMA, WASHINGTON

5ZA, 6AD, 6AF, 6AH, 6AK, 6AN, 6AT, 6BJ, 6CV, 6DP, 6EA, 6EJ, 6FE, 6FG, 6FS, 6GF, 6GR, 6HF, 6IC, 6IN, 6JD, 6JR, 6KM, 6LK, 6MK, 6MN, 6NH, 6OH, 6PR, 6QM, 6RE, 6TA, 6TC, 6TU, 6ZF, 6ZK, 6ZM, 6ZR, 6ZU, 6AAT, 6AAW, 6ACM, 6AFY, 6AGT, 7AD, 7AE, 7AI, 7BC, 7BG, 7BH, 7BJ, 7BK, (7BP), 7BQ, (7BR), 7BS, (7BV), 7CA, 7CC, 7CE, 7CH, (7CU), 7CW, (7DA), 7DK, 7ED, 7EJ, 7FG, 7FH, 7FK, 7GA, 7GF, 7GI, 7GM, 7GQ, 7GS, 7GY, 7HN, 7IM, 7IN, 7IV, 7JF, (7JG), 7JM, 7JP, 7JR, 7JX, 7KB, 7KM, 7KV, 7LR, 7LW, 7YA, 7YG sparks and phones, 7YS, 7ZD, 7ZI, (7ZJ), (7ZK), 9LR.

Anyone hearing 7HE please write.

When writing to Advertisers please mention this Magazine

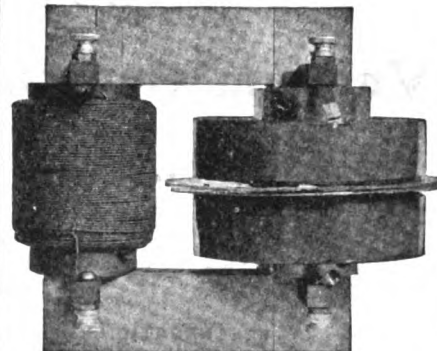


TYPE Z. R. V.

Variometer has unit construction with bakelite shell and hardwood ball. Has low dielectric losses and a range of inductance of 1.25 mil henry max 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.

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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

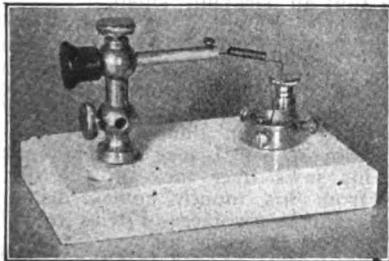
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PRICE \$2.25 EACH

Including Parcel Post Charges

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Size, 7/32x7/32

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Price with shank and brass nut 30 doz.

Price of extra nuts for same 10 doz.

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500 Watt Size.....\$26.75
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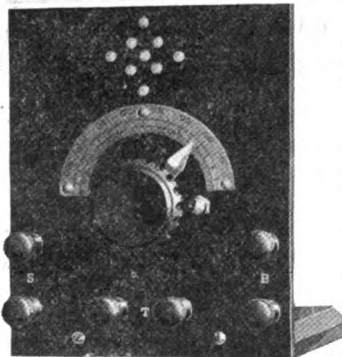
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Panel: Formica Dilecto, grain finish. Filament Rheostat: our special back-mounted type. Vacuum tube socket; standard four-prong type. Base: hand-rubbed Birch-Mahogany finish. Grid Condenser: correct capacity. Furnished complete with hook-up and instructions.



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Can you beat a dial four and three thirty seconds of an inch in diameter, of No. 16 Gauge Hard Brass, figures and scale divisions in black enamel and etched in, surface silver plated and lacquered, scale 0 to 100 clockwise, on one half, three concentric circles on the other half, like a Navy Dial, only better.

PRICE \$2.00

Postpaid in the U. S.

Efficient Radio Apparatus Shop

BOX 662

DAYTON, OHIO

"TOUGHER THAN A GOAT"

(Continued from page 306)

speed, but before I gets anywhere I runs into worse trouble. Somebody's opened the gate to that there snake ranch, an' here's that big, ugly boa right out in the road waitin' for me. I comes to a halt darn pronto, but before I got time to think what to do now, I sees that the snake is navigatin' in my direction.

"Well, believe me, I just turns right around an' breezes back up the road about thirty times faster'n I came down it—an' that blasted snake comes lickety split after me. I gets into the middle of town in about thirteen seconds, but all the buildin's bein' barred an' ironed up, there's no place I can get into, unless I go back to the Mexican wireless station. I sure hates to do that, but that damn snake is comin' on like an old clipper with every rag set an' a stiff breeze on the quarter; so there's nothin' for me to do but scoot back to the jefe's hangout.

"I comes dashin' madly in, drops the receivin' infernity on the floor, an' starts to slam the door shut, when bingo! somethin' cracks me over the bean an' makes me see about three million stars shootin' in every direction. I sinks down onto my knees, an' sees the jefe standin' over me. His face is all battered up an' bloody, but he's pretty well awake now, an' he's got a gunny-sack with a few pounds of iron nuts an' bolts in it. He lands me another skull-mashin' crack with that sack of ironware, an' I lies down on the boor.

"Then the door busts open an' that big, hideous snake comes slidin' into the room. He gets about half of himself inside an' then the place is full up with him. The big coils of his body are all around me, an' I sees that his under part is a dirty white color with big, hard, smooth scales, the size of meat-platters, while his top side is black an' sweaty, an' full of dull gray blotches. His eyes is big as port-holes, but they are squinty-shaped, like diamonds, an' cold like glass or steel. A nesty gluish slime is drippin' out of his mouth, an' he had a foul an' sickenin' smell.

"Corajo! I will feed you to the culcra!" howls the Mexican, who seems to know the snake. Again an' again he cracks me in the head with his sack of scrap-iron, until my skull feels like it's smashed to jelly, an' things begins to get pretty dim. Then I sees the big snake open his jaws over me, an' the dirty slime from his mouth comes drippin' down, right in my face. I tries to yell, but I'm too far gone an' can't make a sound—not even when I feel the snake's hot, slimy jaws closin' around me. Talk about a horrible sensation—that was one! School is out an' the dance is done now, all right, I thinks to myself, an' I closes my eyes—an' then, all of a sudden everything whirls like a merry-go-round, an' I seems to be runnin' an' jumpin' an' flyin' an' standin' on my head all at the same time, till I feel about like a dish of scrambled eggs—an' then, the next thing I know, the Mexican wireless station has turned into my own shack on the 'Selville,' an' the snake has withered up until he is nothin' but my transmitter aerial-inductance hangin' on the ceilin'. An' then I realizes I'm lyin' on my own leather couch, an' the Mexican with the sack of scrap-iron is the ship's steward, who's standin' over me an' slaopin' me in the face with a towel soakin' with ice-water. That alcohol bottle is still standin' on my desk, an' it's bone dry.

A R C RADIO MANUAL

THE ONLY BOOK
OF ITS KIND ON
THE MARKET

Compiled by the Engineers of the
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Written in a Non-Technical Man-
ner. Any Amateur can
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The best control panel for the money; has polished formica panel mounted on oak base and equipped with tube socket, grid leak, condenser, rheostat, and nickel-plated binding posts. Price without B batteries or tube, \$10.00.

Wireless apparatus made to order; sets designed to use material you now have on hand. Send for price list.
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Best results with Knight Equipment

We make everything that
can be had in radio apparatus

Radio Telephone parts in
knock-down form, complete,
\$51.00.

43 Plate V. C. Condenser,
\$3.75. Write for our prices on
your needs.

Knight Electrical Laboratories
6053 Hollywood Boulevard
Los Angeles, Calif.

"Some kick to that grain alco of yours," I says, tryin' to set up, an' failin' in the attempt.

"Well, there wasn't any grain alcohol about it but the label, you damned chump!" snaps the steward, moppin' the sweat off'n his own face with the cold towel. "That was just an old bottle that I've been dumping all kinds of leavin's into for the last three years. It was a mixture of wood alcohol an' carbon disulphine an' witch hazel an' ether an' the Lord only knows what else! Why, a spoonful of it would kill a goat!"

"Well, I reckon I'm tougher'n a goat, then," I says, beginnin' to feel kind of proud of myself, even if I was sicker'n a poisoned cur-dog, because there was nearly a quart of the blasted stuff, an' the arc never got more'n half a pint of it."

(The End.)

HIGH SCHOOL RADIO CLUB DECLARED TO BE UNIQUE

The newly formed Radio Club at the San Diego high school is declared to be unique in that no similar organization will give the embryo scientists an opportunity to learn wireless telegraphy and allied subjects.

Edward Kinney got permission from Principal H. O. Wise and the executive committee of the high school to form the organization. The first meeting, for the election of officers, was held.

Those who will make up the Radio Club are: Edward Kinney, Burton McKim, True Robinson, William Wright, Hugh Compton, Homer Hostetter, William Clark, Richard Ball, Gardner Hart, L. Stewart, Raymond Jacob, Thomas Kelly, George Hulstede, William Copeland, Morrison Ball, Harry Sortais, Lester Picker, Robert Hill, Sanford Griffin, Richard Cox, Haley Iams, William Beran, Dudley Chambers, Hugh Young, Robert Rogers and Ralph Rogers.—San Diego "Union."

"Elements of Radio Telegraph"—a good book on various radio subjects. Lieut. E. W. Stone is the author. Many good photographs and diagrams. \$2.50 per copy, postpaid. For sale by Pacific Radio Publishing Company, San Francisco.—Advt.

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	From	To
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1/2 KW	\$27.00	\$22.00
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1 KW	45.00	40.00

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Get your new Moulded Radisco Varlo-Coupler, as described on back cover of this issue from us. Large supply of first shipment on hand. Price \$7.50, postpaid.

Universal Coil-Mounting Plugs—

Anyone can easily make smooth-running mountings with these plugs. Exceedingly accurate. Made to fit Radisco and all hand wound coils.
Price 80 cents, postpaid

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With No. 67 Dial add \$1.00

Murdock 366	\$4.75
Murdock 367	4.75
Murdock 368	3.75
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Complete with dial
Shipping weight One Pound.

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Two step Amplifier	50.00
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Radisco No. 1, 2 lbs.....	\$1.50
Radisco No. 5, 5 lbs.....	2.65

Eveready Storage battery prices on application

TUSKA C. W. APPARATUS

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Shipping weight, 2 pounds

All orders for apparatus not listed as postpaid must be accompanied by postage charges.

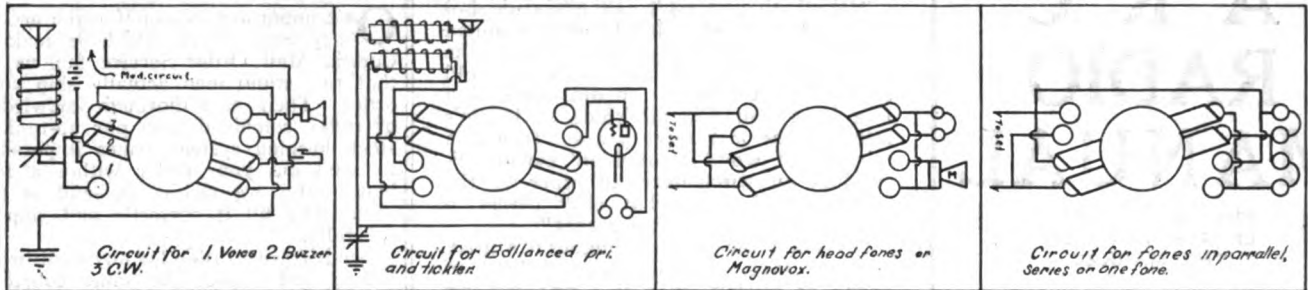
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RADIO TELEPHONE CONTEST

The prize this month was a Pen Brand one-step amplifier unit, and was awarded to Mr. Carroll Kennedy of Kelso, Wash. (7BY), who picked up the necessary one item of press sent by voice and C. W. and mailed us the report by postal before noon the following day.

In this contest, for those who do not know of it, we are offering a prize each month to the amateur hearing the press sent out by voice and C. W. The one hearing the press at the greatest distance will be awarded the prize.

RULES OF CONTEST—The amateurs hearing our press must send us word by mail, giving an item of the press we have transmitted. Contestants must mail all letters before noon of the following day. We reserve the right to accept or reject any contestants.

Schedules: Tuesdays and Fridays at 8:00 p. m.
Wave length, 200 meters. Press by voice 8:00 p. m.
Call letters, 6UV. Press by C. W. 8:20 p. m.
Music 8:30 p. m.

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This month we are offering our new Pen Brand Detector Unit and Amplifier Units. They are the best value in that line ever offered. Moderate in price, neat in appearance, and unexcelled in efficiency. Formica Panel, 4 OHM RHEOSTAT, Bake-lite Socket, Pen Brand Grid Condenser.

DETECTOR UNIT AS DESCRIBED \$6.50
IT IS A PEN BRAND PRODUCT

AMPLIFIER UNIT TO MATCH \$13.25
Same dimensions as detector unit throughout.
Has Acme Amplifying Transformer.....

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192 pages. (32 pages more than 2nd edition,) better paper, stiff covers, etc.

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The Consolidated Radio Call Book is the only book in print officially listing all the Radio calls as issued by the Bureau of Commerce. Every vessel and land station in the world is represented and listed alphabetically, according to names of vessels or land stations, and according to call letters; Revision of American coastal stations under U. S. Naval control, and their new calls.

EVERY NEW AMATEUR CALL IS LISTED

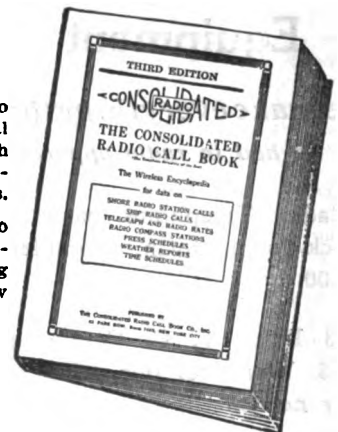
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Not a single copy of the first issue is left

The dealer's demand for
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that our supply is exhausted.

The March issue contains
articles by Dr. Lee De Forest,
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JAPANESE radio operators have been
"hogging the air" and preventing the
sending of wireless messages, according
to the complaint of the Radio Operators'
Association which will formally file a
protest with Federal Radio Inspector
Dillon.

Claims are made that the Japanese
operators, by continuous use of their
keys, have effectively prevented Ameri-
can and other ships from communication
with other vessels and shore stations.

Specific complaints are made against
the Siberia Maru of the T. K. K. line
that its operator spent several hours in
private wirelissing for a distinguished
Japanese aboard, preventing an American
steamer with a disabled rudder from
calling for help. Similar complaint was
made in the case of the Dutch steamer
"Arakan", which recently went ashore
at Point Reyes.—S. F. "Call."

PROBABLY the only municipal-
owned radio station handling ship
business in the United States is KPE
on Pier 1 in the port warden's office
of the Harbor Department of the City
of Seattle.

Service was first inaugurated May 14,
1915, with a small set of no special
manufacture. An eight-hour watch was
maintained during the daylight hours
and its value to the department and the
shipping interests proved to be so great
that after the armistice was signed KPE
was equipped with a two Kilowatt Kil-
bourne and Clark mercury bulb trans-
mitter and a continuous watch main-
tained.

On August 16, 1917, during the early
war days, the naval authorities removed
the apparatus at KPE to the Naval
Training School on the campus of the
University of Washington.

Together with the radio service, a log
is kept of all movements of ships in
the harbor, such as arrivals, departures
and shiftings, whereby ship owners and
operators are constantly advised as to
the positions of their vessels.

All ship business sent to or from
the pier station is handled free of
charge.

The Harbor Department is the nucleus
for all the shipping information on Puget
Sound, as it has every facility for the
purpose and its usefulness is becoming
more pronounced from the meritorious
service this department allows the ship-
ping interests.

The Pacific Coast chain of arc stations
for the Federal Telegraph Company will
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Current Microphone Trans-
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Adaptors, 85c; Type 5-meters, now \$6.00
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amplifiers. You start with the re-
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ABC sectional unit cabinets look like
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The report further indicates that a series of compass stations have been erected by the Navy Department from Cape Flattery to the vicinity of Port Townsend, and that these stations will be in operation soon at the entrances to the Columbia River, Grays Harbor and Willapa Harbor.

Cape Flattery will be marked by a station at Tatoosh Island, west and south of the cape, while another station will be located at New Dungeness, a long split projecting into the strait between Port Townsend and Port Angeles. Cattle Point, the south end of San Juan Island and across the strait from New Dungeness, is the site of another station, while another station is located between these two on Smith Island.—San Francisco "Journal."

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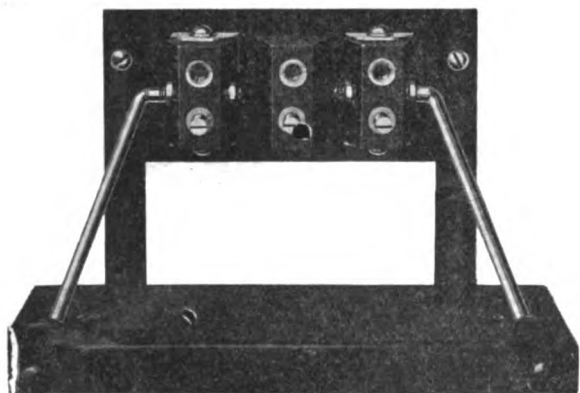
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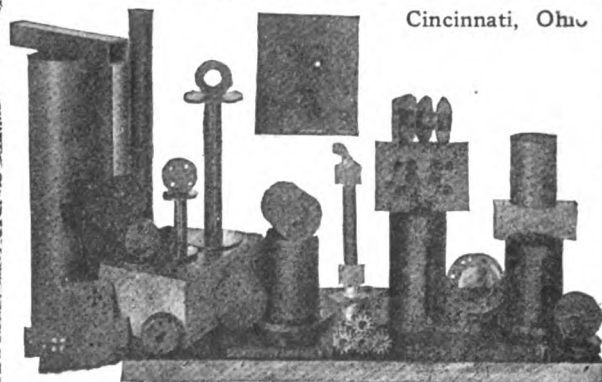
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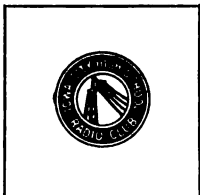
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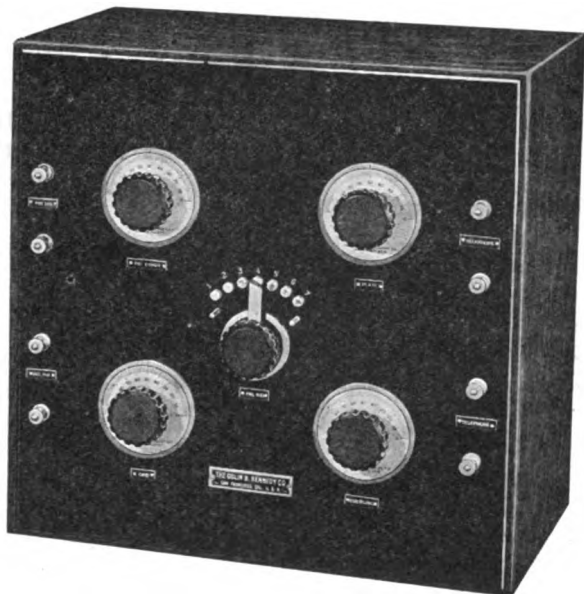


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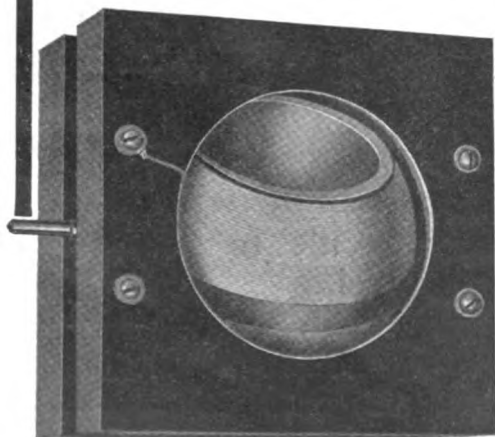
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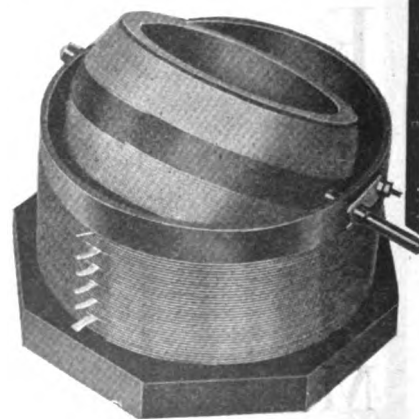


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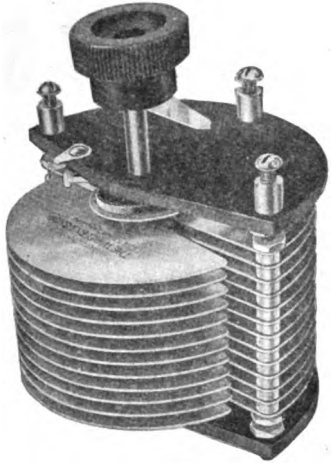
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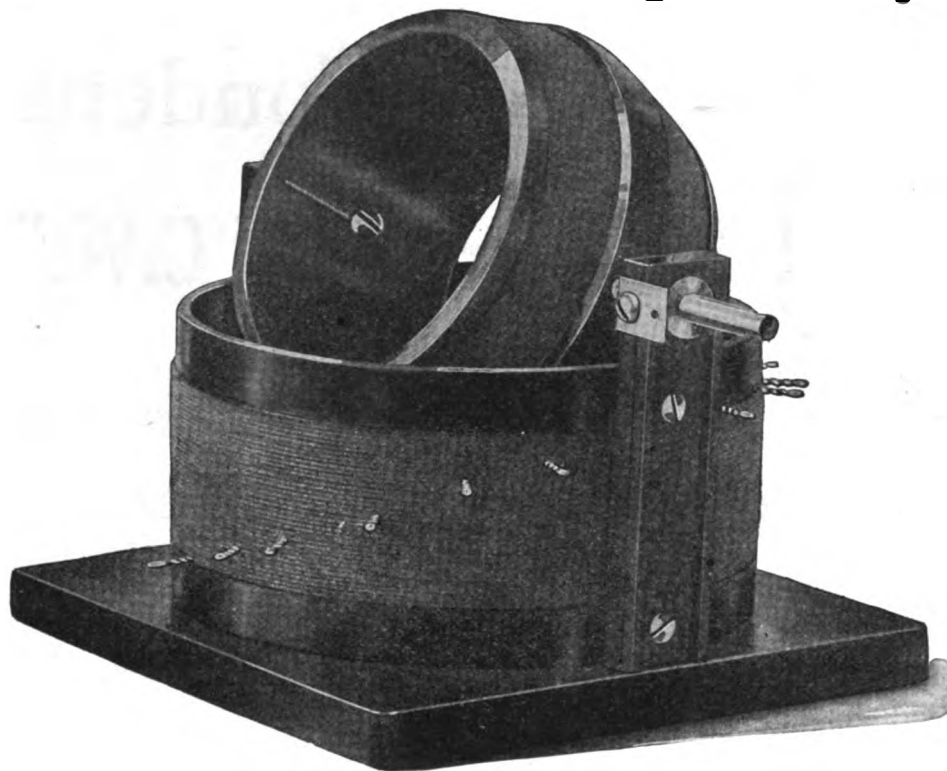
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