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 (6WX) 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. Luftkin (SC) can be heard off Mazatlán, 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 Luftkin, 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.
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 high 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 F and S, respectively. K is a fixed circuit 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 the audio-frequency transformer, and 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 passes through the telephones.

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 coupling 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.

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 OPERATING

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 Radiophone, he has probably armed himself with a rather depressing sense of operating unskillfully caused by the bother-some necessity of 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 on 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 by a 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 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 operation 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 neutralizing 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 lengths. Careful tuning will be required to prevent heterodyne and beat notes from lowering the speech.

PEKING EXPLAINS RADIO CONTRACT WITH FEDERAL CO.

Peking, February 11 (by the Associated Press) - Peking, 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 aeronautical department of the government to 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, Hankin, 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 Aeronautical 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 Aeronautical 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 that 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

S. S. "BLUE POINT" WINS THROUGH

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

"Walter F. 502G: 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 tossed 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 fished 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 Hohi, all equipment will be laid down in purely Japanese fashion. It is expected that when completed the station will be far superior to the Funahashi 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 Hohi.

A wireless apparatus is also to be attached to the recently established Ocean Meteorological Observatory at Koh, 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 weird 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. Suing 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 theorgan instrument 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 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. 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 Collins 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 daily 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 shore-side skippers 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. Schwein, 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 Bocquera.

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 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 $3,571,984. 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 $107,237, and reserves at $206,635.

The outgoing directors were re-elected.

—San Francisco “Examiner.”
TOUGHER THAN A GOAT

By Volney G. Mathison

TOUGHER looking pretty glum to-day," remarked Cunningham to Samuel Jones, moaning merrily contemplating the broad view of San Francisco Bay that was afforded from the audion-tube phone's office window.

"What's happened now?" I've been giving some crabby skipper a black eye again; or have you merely had another row with Carrazza?

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 glumness yourself."

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

"Well, I s'pose you will, if you don't. You always like to get hold of my don't 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 git 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 hell never hear about it from me," Cunningham assured him; "so play away."

"Well, it was sure one rip-snortin' adventure, an' I ain't forgotten it," he went on. "It was away either, lemme tell you. The old shellback tipped his chair back and hoisted one long, lanky leg up over the old coffee table.

"You know, about four weeks ago, the supervisor sticks me on the big oil tankers. He sent me, an' I went, up to the Sel'ville. The Sel'ville's got an arc set, an' she was workin' fine, but just when we was half way back home what happens but the damm arc blows. I go an' get an upset, 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, and 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 walk from in the static. The old man was in a big sweat about a message or I wouldn't have tried it; be cause, as was surly to see that darn arcuzzlin' all that good drinkable alcohol. Seemed like it took about five times as much to keep the arc burnin' steady as damn near anything, 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 outa NFX, though it was like tryin' to get a worm out of a tombstone. The end of the alco was in sight, an' I was wet with sweat an' clean distracted, an' wonderin' what in hell I ever learned to drive a wireless operator for, anyway, when all of a sudden, I hears some damp spark scratchin' out my call. Catlin' out my tickler an' tunin' in the signals, I hears XAE, the Mexican 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 that spig lingo, but I manages to copy the message pretty straight, an' I OK's for him.

"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, an' when he reads it, he just jumps outa bed in his pajamas an' raves like a wild man."

"Why did you give me this befo' he howls; then he rushes out an' rousers out the mate. 'Have the officer on watch blow the whistle every thirty seconds,' he says. 'Get a couple of sailors an' put 'em to ringing the ship's bell for all they're worth; an' then go an' get 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' shinny worse'n a Jane at a jazz dance, there was racket enough to give a wooden Indian a earache. Everybody piles out, wonderin' what in blazes is the matter, but the old man wouldn't say nothing, only to keep yellin' for more speed. Early in the mornin' we makes Cape San Lucas, which is about nine miles off the coast of Lower California; an' then the old man runs the ship up to San Jose Del Cabo, which is a Mexican boat 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 Mexican in flannel uniforms, comes out to us from the beach.

"Be ready to sail at six tonight," barks the old man; an' then, without another 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 full of guessin' whether the Japs had declared war, or if the old man had gone batty, and 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 Vela dinero," he says, in hum Eng.

"How much American dough is that? I demands.

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

"If I'm sitting here, this thing is comin' to come with me, but they wouldn't take no chances; so I goes ashore alone. When I gets to the beach I sees an old shack and 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 kis a gasoline en eye if that bunch of booze-hounds on the ship ever sees it there.

"Here's this Del Rio, or whatever you call it? I asks the Mexican; for there ain't nothin' on the beach but the shack an' the bushes, and a road points out a road that runs back from the beach, an' I starts off. The road straggles along through the palm trees and a lot of other tropical stuff for a couple of miles, an' then I comes to a old tumblin'-down shed, with a big high fence around it. At first I just looked up pretty close, what does I see lyin' inside the fence but an ugly monstrous snake. Say, I've seen them pythons in the zoo, but they 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 sitting here, the thing was over fifty feet long, if it was an inch an', it was about three feet through in its thickest part. It was black as I could see it, grey and black color, an' it had a wide, flat head an' a pair of jaws big enough to swallow a cow easy. I was movin' an' comin' around an' away, 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' wanderers around like a cow-trail between a couple of rows of flashy 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 shish-kebobs; 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 was the only peacock around the engine, though; an' I notices that the sound is comin' from a big shack standin' on a hill well off to the side, which has a wooden lattice mast on each side of it. I makes this out for a wireless station, 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. I was hearin' the vertical wires strung off the cable, with their lower ends all runnin' into the station.

(Continued on page 302)
NEW STATIONS OF THE AERIAL MAIL SERVICE

By H. L. Rodman

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

East Tower and Station Building at Elko, Nevada

Operating Station at Elko, Nevada

What 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 Station 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 routed 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 a telegraph standard 1420 receivers and two step amplifiers, utilizing both Moore and vacuum tube amplifiers.

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 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.

Elko 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 landing fields.

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

The station at Elko, Nevada, cuts of which is shown herewith, is typical of the Air Mail constant, 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 topsmats 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, 3 feet 3 inch spreaders apart on 15 feet, and between the antennas is 150 feet, and between the antennas is 150 feet.

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 from ground 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 1,240 meters. A 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 either 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 is contemplated on shorter wave-lengths, it was apparent that a lower field strength than that created by the four field coils in series was desirable.

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

With the series-parallel 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 is not proportionately great, due to the low voltage used, this latter being made possible by the low antenna and ground resistances of the wave-lengths employed.

The method of signalling used at Elko and other air mail arc stations is the combined compensating method, using two turns of radio-frequency cable loosely coupled to the antenna leading inductors. 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 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 yet equipped for wireless. This will doubtless 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.
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 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 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.
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 circuits. 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 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. Burdhead, radio officer of the local Presidio, spoke to the members on the uses of wireless in directing the air forces in the 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 fourteenth message was sent just as day broke, at which time Paul Oard sent the final check with station 712 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)
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. Those of the rapid strides taken by the art within the past few years have resulted in rendering a service to shipowners 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 critical distinctions in the radio enterprise are the direct result of amateur research.

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 use the word.

A device which was designed for use in the trenches and enabled men in a dugout, 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 devote time and energy to experimentation with radio must be kept within certain 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 naturally, realizing that commercial and government communication must not be interfered with. In addition to this, he has developed apparatus of such extreme technical and commercial value that it cannot be encroached upon.

There are certain electrical characteristics which render the use of great power ineffective, if the law is followed. Under these circumstances, he has developed apparatus which allows him to use one kilowatt or about one and one-third horsepower. That is, he uses about half the amount of the rated power of many marine installations. With even this power, we find but few instances of vessels communicating with each other. But consider the accomplishment of this one wireless telephone feat, only one-fifth the lawful power was used, or one-tenthth 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 fitting impromptu, point-to-point radio equipment, using about as much power as is necessary for the lighting of two 100-watt lamps.

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 it is evident that we are not yet a dynamic force for the promotion of international as well as domestic communication. Rather we are at the initial stages of the rise of the radio nation. A coastwise service and an international service are on society's agenda, and one which will need a vast quantity of apparatus 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 much training or drilling, and some of the others was the signal system. Many amateurs were immediately capable of maintaining radio posts, while others were far enough advanced to make it possible for them to be put on productive work in a very short time.

Many of them have since been productive of great value in the signal system, some as operators, and some as designers of radio apparatus, or making it, for one of the companies which were called upon to furnish.

MUCH DISREGARD FOR LAWS

The fault is not entirely with the law-makers, but is the result of unlawful activities 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 with in the law." It must not be forgotten that the amateur development of today finds its commercial application tomorrow, and the amateur becomes the manufacturer.

To suppose that eliminating the amateur would be of value to our communication is to overlook a fact which has been well-nigh short sighted. It would reduce the amount of interference, to be sure, but it would also reduce the pace at which radio development advances. A field of pleasant and instructive occupation for the youth, who would confine some of which might be afterward regretted. It would do away with the preliminary education self-appointed, that has aided us, and is now aiding us in commercial development. Many of the radio engineers of the country would be at the positions they now hold, were it not for the fact that their interest in radio was nurtured when they were youths.

What must be understood is that there has been a more direct application of improvements by the experimenters than we have 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, and though there are many instances of commercial stations not living within the law, and causing interference in the amateur's already contracted field.

Instead of trying to abolish the amateur and pass radio blue laws, it would be far better to be more 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 radio for making the law applicable, 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 do everything possible for the cutting down of interference caused by the less experienced or the neglected, and increase the value of 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 section of the Kenney 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. HONOLULU HEARS 6ZR

MR. A. E. BESSEY has just received verification of the reports that he was heard by ZTT 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 Detroit, Michigan, heard the signals very QSA at the time that they were intercepted by ZTT. 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 hereewith 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 QRM 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.

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 heard here when the Q. R. N. lets up.

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

On Sunday night the static was so bad that we could not hear 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

Applications 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, 6Z, 6BR, 6ZK, 6GP, 7ZJ, 7BJ, 6SJ, 6Q, among 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 stations call 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 Firm in and Point Huemene.

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 Huemene will handle ships passing through the Santa Barbara channel, and the station at Point Firm in, 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 messages only a few inches from the sending station was reported recently by Dr. S. N. Baruch, electrical engineer, who returned from Honolulu on the T. T. K. liner "Shinto Maru." Baruch 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 anywhere in 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 establishment of a low-powered wireless station in Copenhagen, and the Belgian government has made overtures to the company to make a plan for stations in Brussels and in the Congo. This was made known at the Federal's annual meeting by Mr. 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 proceeding with full 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 filled by Travers Campbell, also of Bremerton.

Two committees were appointed, a Rules and Regulations Committee, to draw up necessary constitutions for 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 local experience, H. S. Pyle and H. R. Andrews, will serve as 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 in 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 plans to welcome visitors from other radio clubs, and solicit their correspondence.

CW STATIONS HEARD AT AVALON

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

Ed.: "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 operated by one coil on one wire, 90 feet long and 40 feet high. Have heard most all the amateurs in California and am on the form for the following: 91R, 7YA, 7CC, 52A, 51F, and am also surprised to hear the following CW stations: 72J, 9XM, 9X1, 9XG, 61T, and all the Los Angeles men.

March 11, 1921.

SUT. TAVERS, who has been operating station 6XW at the Presidio of San Francisco, has read several verses over the air from the Russian telephone that he is using. His voice has been heard reported heard by vessels 750 miles away from the net to the coast of the Pacific Coast. Mr. Theodore A. Cutting, of Campbell, California, is the writer of the verse that was read by Sut. Tavers several weeks ago. It is entitled "Vibrations" and a copy is published herein with the benefit of the many amateurs the opportunity of hearing it via radio.

VIBRATIONS

Radio music, ecstatic, high, Falling clearly from the sky; Nothing since God's first creations Has thrilled mankind like these vibrations! Last Wednesday night soon after seven, Heard the Havanese sing from heaven, They sang a sweet and sweetest tune, That made one wish that he were there. The hums and sighs, 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 voice wonders to rescue, 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—did seem quite near; Instead of lifting the poor world's faults, "We'll have first a two-step and then a Waltz!"—Theodore A. Cutting.

Station 6XW operates on a wave-length of 345 meters. Radio concerts are held every 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 Stuart St., San Francisco, is operated by A. F. Pendleton of the Radio Telephone Shop, transmits press by voice and CW on Sunday nights from 8 P.M. to 9 P.M. Several musical numbers are also provided on both nights. Signals from the Presidio's station (6UV) have recently been heard with good audibility in Portland, Oregon.

AMRAD TRANSCONTINENTAL LINE—BULLETIN NO. 20

FEBRUARY 15, 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 QRM in the East. We appreciate deeply the services of those who have contributed to making famous the Amrad Quenchs.

At 1XTA QRM of the season. No DX heard, except 2PL.

At 1TS: QRM terrific. Heard 1XT, 3V, and 8ML. 1TS doing great work since getting tuned up. Worked 80J, 8MH, 8AB, 8ID, 8ES, 3GO, 3VQ, 8WY, 8ZD, 8AIO, 8XE, and 3PB, 2CP 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, 8KX, 8ZL, 8BO, 8FK.

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

At 3VV: Heavy QRM 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 Quenchs seem to get through dead air better than rotaries.

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

At 9PV: Heard 1XE, 3VQ, 8FK. Took eastbound No. 6 and No. 8 from 9PFX 300 and 330, C. 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 wire 900 feet long 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, 23, and 25. Eastbound will be followed but note the substitution of Thursday for Tuesday morning in this next test. We propose to have additional relays on March 18th, April 12th, May 17th, and June 14th. We would appreciate receipt of call letters of any stations interested in Amrad Gap. All may be heard. Eventually we hope to organize a chain of Amrad Gap stations encircling the United States. 79's. 2PL.
CALLS HEARD AT 6TL, JANUARY 22 TO FEBRUARY 22.

5ZA, 6A, 6AH, 6AI, 6AK, 6AR, 6AT, 6CP, 6DK, 6DP, 6EE, 6EX, 6H, (6IC), 6IG, 6IH, 6IY, 6J, 6K, 6L, 6LM, 6N, 6I, 6J, 6K, 6L, 6M, 6OA, 6AB, 6AK, 6AT, 6AK, 6AB, 6AC, 6AC, 6AG, 6AI, 6AK, 6AL, 6A, 6A, 6B, 6C, 6D, 6E, 6F, 6G, 6H, 6I, 6J, 6K, 6L, 6M, 6N, 6O, 6P, 6Q, 6R, 6S, 6T, 6U, 6V, 6W, 6X, 6Y, 6Z, 6D, 6N, 6O, 6A, 6AB, 6AK, 6AT, 6AK, 6AB, 6AC, 6AC, 6AG, 6AI, 6AK, 6AL, 6A, 6A, 6B, 6C, 6D, 6E, 6F, 6G, 6H, 6I, 6J, 6K, 6L, 6M, 6N, 6O, 6P, 6Q, 6R, 6S, 6T, 6U, 6V, 6W, 6X, 6Y, 6Z.

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

ERRATA

The station of Mr. C. Maass (6AHK) is located at 250 21st Avenue, San Francisco, instead of 520 21st Avenue, as listed in the call directory of our last issue.
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 audio 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 Multicrceiver 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 frat 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
61V, (6TC), (6AH), 61V, 6KL, (6AN), (6RK), 61G, (6AGF), (6ER), (6AO), 6AGP, 6BY, (6ACA), 6AGD, 6ACM, (6AGF), (6EA), 6EB, 5EK, (6EX), 6EN, 6FL, (6FD), (6GP), 6HC, (6EL), (6FL), (6EL), 6FH, (6FL), 6FM, (6GL), 6GC, (6GP), 6GQ, (6FV), 6FV, 6VH, 6Z, (6AN), 6ZH, 6AR, 6AT, 6AY, 6AW, 6BH, 6DP, 7AD, 7BP, 7BC (7BC), 7CC, 7ED, (7CQ), 7IN, 7ZI, (7ZJ).

My new address is L. E. Martin, 100 Olive Avenue, Fresno, Calif.

Editor, Pacific Radio News, Fresno, Calif:

Have enjoyed reading "Calls Heard" in "Pacific Radio News" and think that the publication of same is encouraging to the interest in QRM because of the fact of stations heard and worked by 6ABP, Long Beach, Calif., from January to February 20, using a single antenna, relay for receiving, and for KW. Packard for transmitting:

(5HA), 5IF, 61G, (6ZI), 61AIL, 6ZR, 6CC, (6AM), (6EM), (6IC), 61CR, 6AGF, 6FI, 61Y, (6ZI), (6HH), (6ZI), (6VL), (6ADA), (6AJH), 6AH, 6FD, 6AE, 6OH, 6OC, 6IR, 6EX, 6AIK, 6PR, 6ZI, 6AMA, (6AAN), 6GQ, 6AIW, 611, 7BC, (7IN), (7CQ), 7FQ, 7ED, 78B, 7BP, 7DA.

CALLS HEARD BY LEONARD TATE, ANACORTES, WASH.

Canadian: 5CF, 5DC, 5FK, 5LS, 5FL, 5NE, 5NH, 5GP, 5AC, 6AC, 5RAI, 5RAJ, 6AP, 6EC, 6B, 6EJ, 6ER, 6FE, 6FL, 6IC, 6KM, 6FM, 6G, 6K, 6L, 6MN, 6NK, 6AT, 6AK, 6AY, 6AIW, 611, 6AJH, 6AIW, 611, 7ZB, 7LQ, 7LS, 7QX, 7YA, 78V, 7YS, 7ZB, 7ZD, 7ZG, 7ZI, 7ZK, 7ZL, 5E, 5EF, 5EE, 5AG, 5R, 5BF, 60T, 60Y, 60F, 5RAJ, 6AF, 6AN, 6AS, 6BF, 6CV, 6D, 6ZK, 6FL, 6FM, 6G, 6H, 6CA, 6CM, 6DR, 6EC, 6EL, 6FI, 6FL, 6G, (6AGF), (6EA), 6EB, 5EK, 6EX, 6EN, 6FL, (6FD), (6GP), 6HC, (6EL), (6FL), (6EL), 6FH, (6FL), 6FM, (6GL), 6GC, (6GP), 6GQ, (6FV), 6FV, 6VH, 6Z, (6AN), 6ZH, 6AR, 6AT, 6AY, 6AW, 6BH, 6DP, 7AD, 7BP, 7BC (7BC), 7CC, 7ED, (7CQ), 7IN, 7ZI, (7ZJ).

Here is a list of amateurs I have copied in the last couple of months. Am 7 miles east of Bakersfield in the Kern River valley. (6AH), 6AK, 6AT, 6B, 6BF, 6CM, 6DR, 6EC, 6EL, 6FI, 6FL, 6G, (6AGF), (6EA), 6EB, 5EK, 6EX, 6EN, 6FL, (6FD), (6GP), 6HC, (6EL), (6FL), (6EL), 6FH, (6FL), 6FM, (6GL), 6GC, (6GP), 6GQ, (6FV), 6FV, 6VH, 6Z, (6AN), 6ZH, 6AR, 6AT, 6AY, 6AW, 6BH, 6DP, 7AD, 7BP, 7BC (7BC), 7CC, 7ED, (7CQ), 7IN, 7ZI, (7ZJ).

C. P. Atland, Kernville, Calif. Care of Southern California Edison Company.

K. R. No. 5.

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

6AA, 6AC, 6AD, 6AI, 6AF, 6AG, 6AH, 6AK, 6AN, 6AS, 6BJ, 6CV, 6D, 6ZK, 6FL, 6FM, 6G, 6H, 6CA, 6CM, 6DR, 6EC, 6EL, 6FI, 6FL, 6G, (6AGF), (6EA), 6EB, 5EK, 6EX, 6EN, 6FL, (6FD), (6GP), 6HC, (6EL), (6FL), (6EL), 6FH, (6FL), 6FM, (6GL), 6GC, (6GP), 6GQ, (6FV), 6FV, 6VH, 6Z, (6AN), 6ZH, 6AR, 6AT, 6AY, 6AW, 6BH, 6DP, 7AD, 7BP, 7BC (7BC), 7CC, 7ED, (7CQ), 7IN, 7ZI, (7ZJ).

(Continued on page 307)
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

VACUUM TUBE CONTROL UNIT
Type NW
Adapted to any modern hook-up. Best appearing and highest type Vacuum Control Unit at the price in the market.
Grained formica panel, 5½ x 6¾ ins., lettered in white, graduated rheostat dial, variable plate control. Tube socket (standard 4 prong).
Price $10
Parcel post prepaid in U. S. Immediate shipment.
Write for descriptive booklet NW. 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
Type 214A for panel mounting
PRICE $4.00
Described in Bulletin 904C


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

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

No. 50 .001 mf Unit alone, may be mounted on any shaft... $1.50 postpaid
No. 51 .001 mf Unit with knob, pointer, etc., as shown... $2.00 postpaid
No. 52 .001 mf Unit with knob, etc., and 3-inch black dial... $2.50 postpaid

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.

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

When writing to Advertisers please mention this Magazine
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

![Grebe Logo]

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, radio phone work and "Time." In operation, it is the last word in simplicity.

A Grebe is at your dealer's today. GREBE RADIO apparatus is licensed under the original Armstrong and Marconi patents.

Central Radio Institute, Independence, Mo.
Electric Specialty Co., Columbus, Ohio.
Hufford Still Electric Co., Houston, Texas.
Kelly & Phillips, Brooklyn, N. Y.
The Newman Stern Co., Cleveland, Ohio.
U. of I. Supply Store, Champaign, Ill.
Klaus Radio Company, Eureka, Ill.
Western Radio Electric Co., Los Angeles, Cal.

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

Radio Apparatus

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

AMPLIFYING TRANSFORMERS
No. 164A Gen. Radio, unmounted.... $4.50
No. 164A Gen. Radio, mounted.... 7.00
No. 278L Clapp Eastham, unmounted... 4.00
No. 278L Clapp Eastham, mounted... 6.00

COIL MOUNTINGS
No. LC-101 with gears and base... $12.00
No. LC-201 with gears and base and primary switch.... 15.00
No. LC-106 with gears but no base... 8.00

CONDENSERS (Variable)
No. P-800 .006 Clapp Eastham Bals. 5.50
No. P-800A .001 Clapp Eastham Bals. 9.50
No. P-800B .005 Clapp " Bals. 11.50

CONDENSERS (Low Voltage)
No. EB-30S 1 MP 500 Volts... $1.25
No. EB-36S 2 MP 500 Volts... 1.50
No. 31 AA Western Elec. 1000 volts... 8.50

OMNIGRAPH
No. 1 15 Dial Machine... $20.00
No. 1A 5 Dial Machine... 2.00

REGENERATIVE RECEIVERS
No. CR-1 Grebe 175-400 Meters... $90.00
No. CR-2 Grebe 175-800 Meters.... 51.00
No. CR-3 Grebe "Relay Special"... 18-460 Meters... 55.00
No. CR-4 Grebe 152-400 M. Det. and 1-step amplifier... 200.00

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

Baldwin Type C, Navy Standard... $18.50
Baldwin Type E, "Super sensitive"... 20.00
Baldwin Type F, very small light... 21.00
No. CW-824 Western Electric... 12.50
No. F-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
(Note: These are the Radio Corp's new tubes)

TELEPHONES
No. D-100 250 W. 10,000 V. 001 mf. 25.00
No. D-191 250 W. 11,000 V. 001 mf. 27.00
No. D-1018000 W. 21,000 V. 001 mf. 45.00

Note—These Thorndarson transformers are available at above prices.

"PITSCCO"
The Sign of Service and Prompt Delivery
All We Ask is a Trial
"REMEMBER"
When you say "PITSCCO" you think of Everything in Radio!

TRANSFORMERS (Transmitting)
No. P-1 Acme 100 Watt with Bake-lite panel, completely mounted... $20.00
No. H-1 Acme 1000 Watt with bake-lite panel, completely mounted... 65.00
No. P-1 Thorndarson, 250 Watt Type "B" old model... 15.00
No. P-3 Thorndarson 500 Watt Type "B"... 24.00
No. P-3 Thorndarson 1000 Watt Type "B"... 39.00

Consider the many important advantages of using the GREBE receiver in your station.

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

When writing to Advertisers please mention this Magazine.
BLUE PRINTS
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
PACIFIC RADIO SCHOOL—ARC & SPARK SYSTEMS
433 CALL BUILDING
SAN FRANCISCO, CAL.

"TOUGHER THAN A GOAT"
(Continued from page 290)
"I drifts up pretty close an' notices a big sign that says 'Telegrafo de Federales de México', an' somethin' about no se ad- mite, 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 think to myself I'm startin' to get a little crazy, because NAA'S about four thou- sand miles from this place, an' it's broad daylight, an' I'm standin' a hundred feet from the Mexicans' station. I pull 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 car- boose 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 ieie on it. An' I finds out that 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 engines an' his dynamo an' his sendin' gear an' an' old kilowatt an' a half, straight-caps 'Telefunken, built in Germany in 1903, an' doin' good work ye'et.
"That was all interesting, but I was burnin' up to see that chile con carne receivin' outfit that could bring in Arling- ton from four thousand miles away, light, loud enough to hear a hundred feet from the station, an' although I was lookin' everywhere, expectin' to see an right or another, 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 wonder- ful receiver on earth—a marvelous in- strument of my own invention, an' I claims, unlimberin' himself with a gestu- re like a country ruber stoppin', the mornin' milk train. He leads me into another room an' points to a rig he kept in 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 condens- ers, 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' inductance, no auditions, 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 to- gether with the little vernier device you see underneath it, I can adjust the in- strument to any length from twenty meters to fifty thousand meters.'
"'The dickens you say,' I exclaims. feelin' considerably surprised.
"'This second knob controls a sound frequency tuner,' the ieie goes on, takin' hold of the middle knob on the panel. 'With this control I get ever signal that has a tone frequency the least bit different from the signal I am adjusted
(Continued on page 305)
OST 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. You can make immediate delivery of many items.

PACIFIC RADIO NEWS

PAUL F. JOHNSON
Altadena Radio Laboratory
2940 MAIDEN LANE
ALTADENA, CALIFORNIA

WHY THE Q. R. M.?

Use undamped wave transmission. New 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.

Efficient operation. Self-regulating. No starting device or field rheostat necessary. Mounted any place, back of panel, or under table. Simply supplies three volts vacuum tubes.

Motor—Universal wound. Operates satisfactorily on A. C. or D. C. 110 or special for 220 volts. Generators—Shunt wound. 15 watt capacity at 360 volts D. C. Dimensions—4½" x 4½" x 1½". 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.

NORTHWESTERN RADIO INSTRUMENTS

-A Quality Line, made on the Pacific Coast

Northwestern Variometer
A new, second to none, in design and workmanship. Rotor and stator turned to close limit, giving high maximum and low minimum.

Price, $6.00
Mounted as above with turned Bakelite dial and knob, $11.25.

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

When writing to Advertisers please mention this Magazine

NORTHWESTERN RADIO INSTRUMENTS

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-Paragon

-Electrode

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(Ray-dee-co)

Radio 9 AQ

CHICAGO
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 purpose 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
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Amateurs to Secure Subscriptions
PACIFIC RADIO NEWS
50 Main St.
San Francisco

WANTED
312 Flatbush Ave., Brooklyn, N. Y.

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.
"TOUGHER THAN A GOAT"
(Continued from page 302)

"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, first adjusting the tuning knob an' the vernier until he had brought in about forty stations, all on six hundred meters.

"'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 I wish.—no matter how far or how light the transmitter. Escuché!—an' he turns the tuning knob an' vernier until he hears 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 forty—turns it up to seventy; an' say! ol' POZ comes screechin' in like one of them steam calliope in a circus parade.

"'Sufferin' smokers! I splatters. I never see anything like it!'

"That is nothing, senor; POZ is a very weak signal," says the jefe. "Let us try two hundred meters,—he turns the tuning 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 listen to a fellow in Chicago playin' a game of checkers by wireless an' don't do anything either!"

"I was so clean stumped, I couldn't do nothin' but just stand an' listen. Pretty soon, the jefe turns the tuning 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, but I begin to expect it. The loud-speaker goes 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 realize that I'm listenin' to some Canadian amateurs, hammerin' away on their fifty-meter wave—an' spark coil set! Just think of it! Hearin' spark coils on fifty meters in broad daylight, miles away! An' not a tickle of static, either!"

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

"'No, senor,' never!" explains the Mexican. "I sold my soul into his ownin' for that. I've 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 laugh! The proud and hard Don Enrico only kicked me like a dog, and spit on me. (Continued on page 306)"

"ACME TESTIMONIAL"

January 30, 1921

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

Dear Sir: I am very happy to tell you that I have succeeded in working the five boundaries of our U. S. with one of your 1 KVA old type transformers. Really it is a wonder and has a real "kick!" It is a sign that I have found the right key. In several stations on the Pacific Coast, including Santa Barbara, and Vancouver, Wash., it was reported QSA at Nap- anee, Canada, and I talked to a ship at Tela, Honduras, 1600 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.

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Yours very truly,

(Name on request)

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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).
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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

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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—cora! 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's gettin' a-killin' with a attack of bull-shevik, 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, but, I see a flash an' my jack-knife an' ties to try to darn thing loose. While I'm busy as a burglar crackin' a safe, don't this, I hears the Mexican's jaw ain't no more in there an' he rushes in and stands right behind me!

"Heg! Dog! You would steal my see-cret!" he screeches, his eyes spittin' poison an' fire like a double-barreled volcano. 'Carrumbes! a ia muerto!' 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' springs at 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 scrappin' than he did. I puts my strength in a quick jerk an' he's have his 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 smash his square in the mug, but he just snarls an' jumps 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' let it at my ribs, an' then the pulls me an' I goes to the ground. This kind of fazes me an' I clinches. That was a bad mistake, thought the Mexican grips me like a vice 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 'ght again. I smashes my right hand on the Mexican's jaw an' something busted. Right an' left I drives into him, but he hangs me one in the mouth that sends blood flowin' all over an' it beaks 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 cornmeal.

"I was pretty dizzy, but I runs to the table, unhooks that receivin' box, puts it under my arm, an' fighters out. I thinks to myself I'll be doin' the world a lot of good by savin' his wonderful invention from bei'n 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, 2¼-in diameter, 6 ohms, 1½ amp. $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 44 V. unit weakens prematurely, it can be removed and replaced, thereby not impairing the total volt-age—making this the best battery value on the market.

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CALLS HEARD—(Continued)

CALLS HEARD BY 6EA—Add’l.
Heard: 6ABM, 6AIL, 6EZ, 6EM, 6EH, 6IP, 6KM, 6PX-c.w., 6RA, 6SV, 6VL, 6WZ, 7BJ, 7BR, 7ZK, KDEH, 7RRS-c.w., and "R.M."
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Station 6EA works 7DA, 7IN, 7ZI and 7JZ 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 thermocoupled meter in 2 amperes. Station 6EA was reported heard by 9MS at Davenport, Iowa on February 21st.

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Anyone hearing 7HE please write.

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Fast Mail Order Service

Northwest Radio Service Co.
609 FOURTH AVENUE SEATTLE, WASH.

"TOUGHER THAN A GOAT"

(Continued from page 306)

speed, but before I get anywhere I run 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 door of Stroto, but before I do, I come 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 shots, but all the buildin's bein' barred an' ironed up, there's no place I can get into, unles' 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' instrument 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 after the war 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' other things in it. He gives me another skull-mashin' crack with that sack of ironware, an' I lies down on the floor.

"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 see 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 nasty gluish slime is dripin' out of his mouth, an' he had a foul an' sickening smell.

"'Corajo! I will feed you to the culbro!' 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 a little dim. Then the snake, open his jaws over me, an' the dirty slime from his mouth comes dripin' 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 whirles like a merry-go-round, an' I seems to be runnin' an' jummin' 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 taken over, there's a shock on the 'Selville,' an' the snake has withered up until he is nothin' but my transmitter aerial-inductance hangin' on the ceiling. An' then I realizes I'm lyin' on my own leather couch, an' the Mexican with the sack of scrap-iron on the shelf, an' the snake's dead, slappin' 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.
“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 breast for ten dollars, molasses 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 know what else! Why, a spoonful of it would kill a goat!”

“Well, I reckon I’m tougher’n a goat, then,” I says, begin to feel kind of proud of myself, even if I was sick’en a poisoned cur-dog, because there was nearly a quart of the blasted stuff, an’ the arch 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 embattled boys 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.


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IT IS A PEN BRAND PRODUCT
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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.

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Consolidated Radio Call Book Co., Inc.
BOX 141, 41 PARK ROW, NEW YORK CITY

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JAPANESE RADIO OPERATORS ACCUSED OF “HOGGING AIR”

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 American 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 wirelessing 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 municipally-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 Killbourne and Clark mercury bulb transmitter and a continuous watch maintained.

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 shifting, 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 shipping interests.

The Pacific Coast chain of arc stations for the Federal Telegraph Company will be in operation within three months.
FELLOWS
People who are using RADIO SHOP Variometers and Vario-Couplers are

GETTING RESULTS!

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THE RADIO SHOP
SAN JOSE, CALIF.

PUGET SOUND STRAITS
TO GET RADIO COMPASS

WITHIN the course of a few weeks vessels entering Puget Sound by way of the Strait of Juan de Fuca will be able to navigate with the assistance of radio compass stations, according to advice reaching local shipping circles from the North.

The report further indicates that a series of compass stations have been established 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."

CALLS HEARD AT 6PB

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