



CQ

**"The Commercial Radio
Operators' Magazine"**

Price 15c
Per Copy

\$1.50
Per Year

VOL. II

OCTOBER, 1932

No. 3

Harry Wells W6YLC 11-3-71

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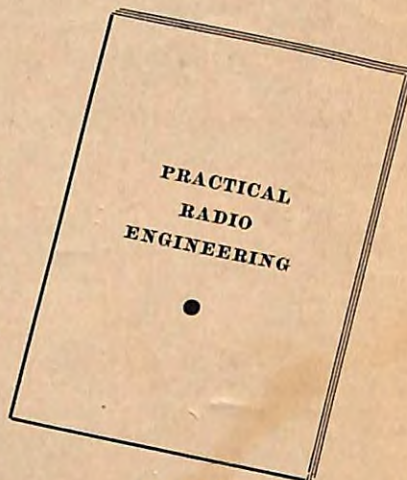
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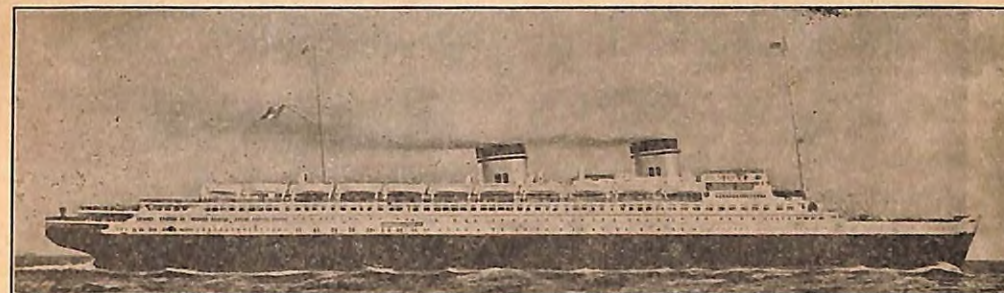
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THE ITALIAN LINER "REX"



The "Rex" is the latest beauty in foreign ships to touch our shores. She is 880 feet long with 102 foot beam. Of 51,000 tons, the boat is capable of 28 knots.

Of interest to any radio operator going aboard the "Rex" is the radio cabin, located in the port side of one of the upper of the eleven decks that the ship has. No longer is this a radio "shack." It is, on such liners as the "Rex", a radio cabin de luxe. One compartment of about 14 feet by 8 feet is the workroom, mostly used for the keeping of storage batteries in shape. Immediately adjoining this is the motor generator room, with three separate units, all operating from ship electric line. Two of these units are 3 kilowatt, and one is one and a half.

Just next to the motor generator room is the operating cabin, and what an operating cabin it is. All the transmitters used in telegraph operation are located in this cabin which is about 20 by 20 feet. On the operating desk are two keys, one for short wave use, and the other for intermediate and long waves. All the transmitters are enclosed in neat metal frames with the tubes easily showing through metal lattice. Walnut desks and fixtures make this look more like the captain's office than the radio room.

The ship's radio telephone is in a small room adjoining the operating room. Draped much the same as an early type of broadcasting studio, so as to make it entirely sound proof, it is always available to passengers day or night. The telephone transmitter itself is located at the after part of the deck, the receiver at the fore part of the deck above.

On its maiden trip to our shores the ship sent about 850 messages, receiving about 725. There are seven operators aboard, two spending their time mainly on the telephone work, and five on the telegraph installation. This allows two men on a watch at all times. The Chief, or First Telegraphist as he is known, rates high up on the ship officer personnel. All men are members of the regular Italian Marine organization of seamen, the Associazio Marinara Fascista, local branch. No Italian radio operator ever loses his rating regardless of what ship he may be assigned to. A method of seniority fixes their pay and rating, and whether on a large or small boat his rating is continued. As a result of this plan, those holding seniority are usually found only on the largest and finest boats, as their pay rating demands this work.

The call letters of the "Rex" are ICEJ. The telephone transmitter is rated at 20 K.W. The short wave at 3 K. W. and the regular or long wave transmitter at 4½ K. W. The antenna current on the intermediate and long wave transmitter runs between 20 and 25 amperes. The channels used by the ship on short wave are 17.9, 23.9, 24, 36, 42, and 53 meters. The intermediate and long wave channels are 600, 705, 800, 2000, 2100, 2200, 2400, 2800 and 3200 meters.

It is claimed that the ship's wireless phone service was at all times, up to U. S. quarantine, in touch with Italian shores. The same continuous contact with American shore through the ship phone service is expected all the way back to Italy.

On the telegraph installation there are three separate receivers in constant use. The usual

practice of sending an Inspector who is in charge of radio operations for the first trip was followed on the maiden voyage. He will probably be relieved for shore service when the boat returns to Italy, and the other six men are looking forward to holding their fine sleeping quarters on the boat. These quarters would make most ship operators quite happy. They are located just forward of the operating room on the upper deck, are as large as most hotel rooms, one cabin to an operator, with running hot and cold water in each cabin. A large clothes closet, dresser, wash stand, lounge, and built in bed along with numerous smaller lockers finished in beautiful wood, make up the radio men's cabins.

S. A. Longardi and F. Lecco, of the radio staff, were busy making up the ship's papers when the "CQ" representative made his tour of the boat, but took time off to show the ship's hospitality. Thanks are hereby extended to the boys, and we hope them many happy, pleasant voyages.

Amateurs Increasing

On August 5th the Federal Radio Commission granted licenses to 193 Amateur transmitting stations. On August 16th to 108 new amateur stations. On August 23rd to 77 new amateur stations, and on August 30 to 140 new amateur stations. This shows a total of over 500 new amateur licenses for transmitting stations for the month.

In September the rate was bettered as on September 23rd 237 new licenses were granted, on September 27, 217 new ones were granted, and on September 30th 60 more new ones. October is stepping along lively as 103 new amateur licenses were granted in one day, October 4th, and on October 7th 247 new licenses were granted.

La Guardia Selected

At a recent meeting of the A. R. T. A. it was unanimously resolved that Fiorello H. La Guardia, of New York, be solicited to act as the champion of the American radio operator in his fight for equitable radio legislation.

Mr. La Guardia has had unparalleled success in the House of Representatives in his successful introduction of legislation, seldom if ever suffering defeat when his energies were directed in favor of a measure.

His answer to the A. R. T. A. appeal should be received before this issue goes to press and will be published elsewhere in these pages. When Mr. La Guardia decides to take up our cause we need have no fear of the outcome.

New Orleans Delegate

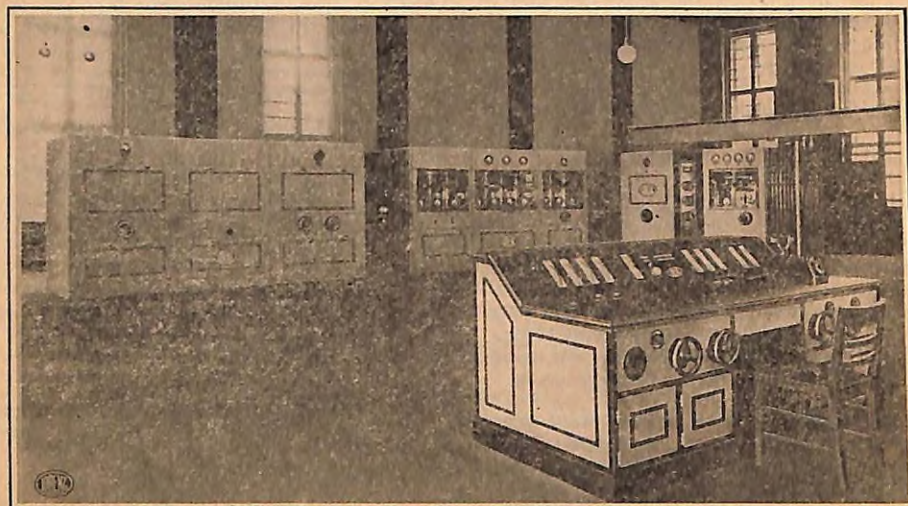
Forrest H. Flanders, mentioned in a previous issue as being one of our most active members on the Great Lakes, has changed his base of operations to New Orleans for the winter season. Pending an assignment, which from all indications is not likely to be soon, Mr. Flanders will serve as A. R. T. A. representative at this southern port.

The Association is fortunate, indeed, in securing the services of this brilliant, energetic and likeable type of delegate. With Mr. Hadcock of Port Arthur and Mr. Knudsen of Baytown covering their respective areas we should have the Gulf 100 per cent A. R. T. A. within a very few months.

After serving in the Malang, of the Mallory Transport Line, for a year or so, Joseph L. Bergman is now at North Little Rock, Arkansas taking treatments for rheumatism.

A World War veteran gassed and otherwise injured, Mr. Bergman has since earned a living in the radio field. For some reasons, the skipper finding him ill on his last voyage in the Malang, reported him "drunk" and he was relieved from his post.

In all fairness, however, Mr. Bergman reports that officials apparently paid no attention to the charge. The question remains, just how far these skippers can go.



A neat example of a broadcast station control room is shown in this illustration of the Station at Heilsberg, Germany, rated at 75/150 K. W. The station was built by C. Lorenz, A. G. of Berlin.



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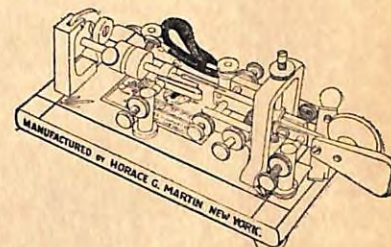
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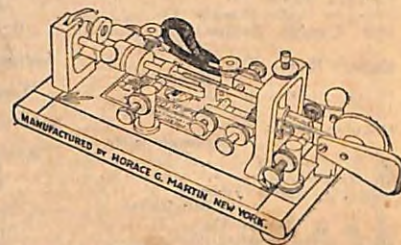
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October, 1932

"CQ"

7

PIONEER RADIO OPERATORS

By **DR. LEE DE FOREST**

The United States was now focusing its thought on the forthcoming World's Exposition, then in frantic preparation at St. Louis. My Company was invited to make a wireless exhibit there and I was summoned from the bleak isolation of Bay View Buffalo to direct those installations. We had several, chief of which was that installed on the de Forest Tower, by far the tallest structure at the Fair.

That installation, in a glass house on the first platform a hundred feet above the ground, attracted unprecedented interest among the public. None had ever seen a wireless station, few knew that wireless telegraphy was an accomplished fact. The staccato crackle of our spark brought them swarming from all over that end of the Exposition grounds.

I had sent for two of the best and most reliable operators I had trained in Canada, Billy Fennell and Charley Cooper, to come on to help me install this first tower station and the one at the Exhibit of the American de Forest Wireless Telegraph Company in the Palace of Electricity. These clever, enthusiastic, and hard-working boys were kept so busy at installing new stations, and in explaining the mysteries of wireless to the gaping, questioning multitudes that it was at once evident local St. Louis telegraph talent must be immediately broken in. Candidates were not hard to find. Fascinated by the glamour, the wonder, of sending on a Morse key and receiving code in buzzing dots and dashes in a pair of telephone receivers, with absolutely no wire whatever extending between the two stations, every telegrapher in St. Louis came up to see us, perhaps to test his skill with "the cans," at his first day off.

I remember especially two of these, W. W. McQueen and Wm. Acker, bright, clean cut, fast operators.

Before the Fair was a week old the St. Louis Post Dispatch requested me to install a receiver at their down-town station, some five miles distant, for a regular press news service from the Fair. When Fennell shot the first message "like a ton of bricks" into Cooper at the Post Dispatch Office from Governor Francis of the Exposition to the St. Louis Mayor, flaring headlines heralded this "triumph of Science!" Soon these four men of mine were all swamped in work. Other recruits eagerly offered and the best only were chosen.

Harry Reynolds was put in charge of our exhibit transmitter in the Electricity Building, while Charley Cooper moved to Springfield, Ill.,

to put in the first of the two-link wireless chains already mapped out to give commercial telegraph service with Chicago.

Bright minds now began to concoct all imaginable kinds of stunts for this new, rapidly spreading wonder, American wireless. Roy Knabenshue, renowned balloonist, undertook some flights from the Exposition grounds. "Could wireless reach far above the earth's surface?" Our theory taught us that these new strange hertzian waves were "grounded" to the earth, their feet slid over the conducting surface, their heads extending up some distance, none knew how high, above the earth. That was why we could telegraph over mountains and the earth's horizon. Wireless to a balloon had never in all the world been tried.

The St. Louis "Star" asked the question. Knabenshue offered the means for the experiment. McQueen, our fearless Irishman, volunteered for the test. I was in New York at the time. McQueen had been carefully taught that to send, or receive, messages by wireless an upright antenna and an earth connection were indispensable. So he threaded the aerial wire high up into the net of the balloon bag. The problem of an earth connection in a free balloon stumped him not at all. At the last moment before the take-off he appeared with a large tin pail filled with nice fresh earth, heaved it into the basket, stuck the ground-wire from his portable receiver deep into this "earth," and the pair cut loose for a wireless flight for Science!

I doubt if a single one of the wondering throng standing about the basket thought for an instant of the absurdity of the thing. Acker at the Tower key was blazing away and the balloon became a small bubble in the sky, then a speck on the horizon.

They descended in Illinois, and McQueen was soon telephoning triumphantly to the "Star" copies of the fragmentary messages he had received all the way up and down. Proof positive that wireless waves traveled high, but nevertheless always sought the shortest path to "earth."

Wireless history again in the making—easily made in those primitive days of beginnings.

Charley Cooper began to bring in the de Forest Tower station at Springfield 110 miles north, as soon as he had his mast and aerial up. But the signal strength, especially during the severe static of that 1904 summer, convinced me that we could never raise Chicago with that 10 KW transmitter located so high above the

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earth's surface, and its antenna necessarily so close to the steel frame work.

Immediately plans were outlined for a new giant station, the largest yet dreamed of in America. For not in all the world had anyone yet dared to aspire to do commercial wireless over 300 miles across dry country. Up on Art Hill, above the "Jerusalem" concession a great gaunt wooden cross of latticed timber was erected 210 ft. high. In the neat shack near its base a 20 KW spark transmitter was erected—with huge glass plate condensers immersed in oil, contained in four stout wooden "coffins," and connected series-parallel. But there I soon learned that if electrical energy increases as the square of the voltage, troubles and breakdowns increased as the cube!

Shortly before the new Jerusalem "record-breaker" (of condenser plates) was begun an eager-eyed, curly-haired, gaunt-faced operator had introduced himself to me at the Tower as Frank E. Butler, a New York Central train-dispatcher from Toledo, on a hurried sight-seeing visit to the Fair. He simply would not leave the wireless stations. At one or the other I invariably found Butler. When I told him I had no present vacancies he told me, very simply, and with a snap of his firm jaw: "I'm going to be a wireless operator. Pay or no pay, I won't go home again." I smiled approvingly, understandingly, for I knew exactly how he felt. "Wireless!" Repeated refusals meant nothing to "Frank." Up in the new shack he volunteered to help unpack the newly arrived equipment from the Jersey City factory. A huge pile of excelsior was left in a corner. "I'm nearly broke, Dr. deForest. Can I sleep on that tonight? I'll watch this apparatus for you." I said "Yes"—to test his sincerity. When I arrived early next morning he had cleaned up the place and most of the condenser plates were coated with tin foil and properly arranged in their tanks. That was too much for me. "Butler, if you want to work for me here I'll try to get you on at half pay—the best we can do just now." "Doctor, I'm going to be your assistant if you'll just tell me what to do. Damn the salary. Wireless is enough." So Frank Butler, of Toledo, went wireless, and is at it in his home town even unto this day. Because of his intelligence, keen interest, demonstrated loyalty, and willingness to do anything and everything quickly, nearly, without question of complaint, day or night, I soon placed Butler in charge of that new big station at the Fair.

There we experimented for many weeks in privacy and free from the maddening crowds around our other wireless exhibits. Butler, I found, could not only telegraph well but had a pleasing address, was a fine demonstrator, explainer, and could express himself clearly, graphically. I'll let him describe for you those

early weeks in St. Louis in his own words:

"This new experimental one, the 'Jerusalem Station,' was the first high-powered wireless station in the world. It was soon found that many of the principles employed in the ten-kilowatt station at the de Forest Tower did not apply to the new station with its 60,000 volts of oscillating current. Heretofore we had been handling just a big lot of current, while now, comparatively, we were playing with miniature lightning of static electricity and did not know very well how to handle it.

"The spark-gap condensers, instead of being Leyden jars, were made in heavy two-inch plank boxes, seven feet long, two and one-half feet high and equally wide, and liquid-tight to hold kerosene. Immersed therein were two large sections of plate glass upon which heavy sheets of tinfoil were pasted on both sides. Each complete tray weighed about a ton, and from four to six of these tanks were used. Huge transformers six or seven feet high 'stepped up' the tremendous voltage. The spark gaps had terminals one and one half inches in diameter upon which a cold blast of air from an electric blower was constantly blown. Telegraph keys, even of extra large design, were impossible to use, so we devised a long handle arrangement which operated like a pump. The contact points were encased in a tank of oil to prevent arcing and fusing. Imagine pumping water at the old town pump for half an hour—that's how we sent signals before we discovered a better way. Our test signal was always the Morse letter 'D' consisting of 'dash, dot, dot.' This would be sent out for hours at a time. We occasionally changed the helix adjustment or the condensers.

"Our experiments continued to result in nothing but one failure after another. Sometimes, after days and nights of hard, painstaking work building up the series of condensers, we would 'blow up' the entire set in an instant, smashing the heavy glass plates to small pieces, blowing kerosene all over us and over the premises, only to gather up the fragments, rebuild with new glass and tinfoil, change the experiment, and try another hook-up. Static electricity was so free and unharnessed in this station, that it was not at all uncommon to get a 'poke' in the head or elbow if one came within a foot of the apparatus while it was sending. The roar from the spark gap could be heard a block away and it held its own in noise intensity with the ballyhoo bagpipe of the Jerusalem exhibit on the one side and the cannonading in the Boer War Exhibit on the other. The odor of ozone mixed with kerosene, was always present, if not pleasant.

"And hour after hour, one of us was listening-in with the headphones with ears strained

(Continued on Page 21)

Great Lakes Notes

We understand that R. C. A. has recently supplied a few operators for one-trip storage grain jobs with the Boland and Cornelius line on the Lakes. Hithertofore, this line has required the operators to do "deck" work but is not asking it of the men borrowed from R. C. A. It is possible that they were not entirely satisfied with the class of men they were getting when deck work was among the duties of the radio operator.

The three passenger ships of the Great Lakes Transit Corp., were laid up at Buffalo on the tenth of September while the Detroit and Cleveland line ceased operations on the thirtieth. A number of vessels are laying at the Buffalo breakwall with storage grain . . . so it looks like an early finish for the 1932 season on the Lakes.

Some American coast-wise vessels are laying off the operator upon arrival at American ports . . . as another measure of economy. We know of one radio operator whose pay averages one dollar a day as the result of this.

A correspondent writes us that of the thirteen vessels (operating on American capital) arriving at the Port of New Orleans on the day of his writing, only four were of American registry. He concludes by asking us, "Just what country is this?"

We learn that because of disorderly and destructive conduct among the fraternity, the R. C. A. office in New Orleans has been forced to close their static room to unemployed operators.

Thomas O'Leary, attached to the M/S City of Rayville, and who is at present "down under," leaves Sydney on November 7th . . . bound for New York and the associated bright lights.

BOSTON NOTES

A. R. T. A. organization work in Boston continues at a satisfactory pace considering that over half the fishing trawler fleet and many of the coal boats are temporarily tied up. Members here are busy promulgating knowledge of the Association, its accomplishments so far and its aims for the future. Reported hostility in this locality toward the organizing efforts of radio operators is non-existent.

That elusive dame, Prosperity may be lurking around the corner, but the Eastern Steamship Company doesn't see her. This line has just sliced ten per cent off the wages of its radio operators. Other members of the crew got a five per cent cut. Why did the radio operator get a double dose? Because he's a radio operator, says a local wit. Which isn't so comical, when you come to think of it.

(Continued on Page 24)

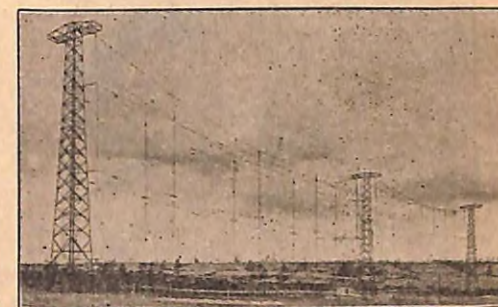
A 500 KILOWATT VACUUM TUBE

By M. R. RATHBORNE

A recent development is said to be the world's largest and most powerful vacuum tube, which is now in service in a long-wave transmitter in the British post office station at Rugby, England.

This giant "bottle," manufactured by the British firm of Metropolitan-Vickers, is made entirely of metal and may be taken apart for inspection or repair, then reassembled and returned to service. The difficulty of maintaining a vacuum in an all-metal tube and the impracticability of sealing, make it necessary to connect valves of this type to a vacuum pump while they are in operation. Because of the necessity of using mercury vapor in high-vacuum pumps the process of continuous evacuation for high-power tubes has been rendered commercially impracticable in the past. Using mercury vapor pumps it has not been possible to maintain the necessary degree of vacuum unless recourse was had to the expensive and unwieldy process of cooling the mercury with liquid air.

The discovery by the French experimenters, Belin and Holweck, of oil distillates that boil at fairly low temperatures, and yet at room temperature can be placed in a radio tube without impairing its vacuum, has led to the development of a high-vacuum pump in which the mercury vapor is replaced with these distillates and the cooling effected with water. A pump of this type is employed for the evacuation of the 500 KW Vickers tube during the time it is in operation.



The above illustrates the Antenna Array in use at the Rugby, England, broadcast station. This station is the largest in England.

The giant Vickers tube is built of steel, porcelain and copper and weighs more than 2,000 pounds. Its mounting is a steel bedplate 8 feet long and 3 feet wide. The tube stands more than 10 feet high. The water-cooled plate, which is made of steel, weighs 350 pounds and is equipped with hydraulic jacks to facilitate dismounting and reassembly. A current of 500 amperes in the filament results in an emission of 160 amperes.

Another type of British 500 Kilowatt tube, manufactured by the Marconi-OSRAM Valve Company, is similar in construction to conventional glass-and-metal high power tubes. The

Marconi valve has the following characteristics:

Filament voltage	32.5 volts
Filament current	400 amps.
Amplification factor	45
Mutual conductance	50 ma/v
Normal filament emission	100 amps.

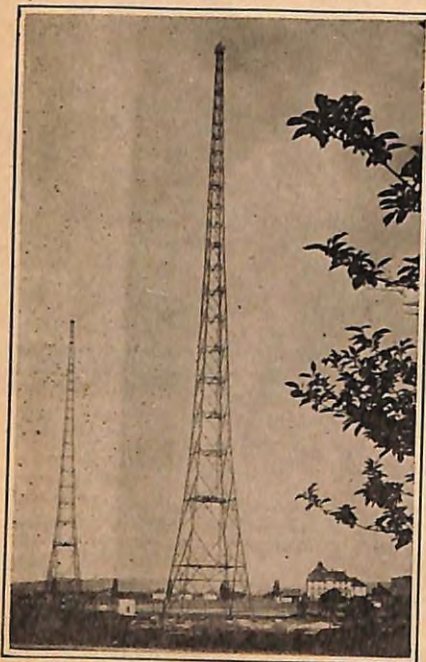
The tube is designed to meet the following approximate operating conditions.

Telegraphy

	Normal	Maximum
Plate voltage, volts	18,000	20,000
Plate current, amps	17.5	25
Input, KW	315	500
Output, KW	250	375
Necessary cooling water, 20 gallons per minute.		

"Sparks"

When the engines have stopped and she's lost her way,
A grey embittered ocean's helpless prey,
Wallowing in midst of a wolflike pack;
That pounds on rusty decks, opens a cavernous crack,
And she's taking water; sinking by the head;
The crew gone batty, driven by their dread
Of foundering, going to their death,
Green waters snatching away their breath.
To whom do they beseech in their fright,
To call for help, rescue them from their plight?
Who is the hero at the clattering key
When the ship's in trouble, beset by ravaging sea?
To whom do they yell to get a tug?
Why, the wireless operator, with his bug.
WILLARD BLISS



The above is a general view of the Prague broadcast station. It is owned by the government of Czecho-Slovakia, and the largest broadcasting station in the World, rated at 200 K. W.

A New Mexican Worry

The Mexican government has granted a permit for the construction of a 150 kilowatt broadcasting station, which will be located on the United States' border. This plant, the highest powered BC station on the American continent, will use the frequency now occupied by WRVA. It is expected that this new Mexican station will be heard throughout the United States and that it will cause considerable interference with North American stations on or near its frequency.

Five-Meter Police Radio

J. G. (Joe) Rosso, Radio Supervisor for the Los Angeles Police Department, has designed and built a successful five-meter transmitter for radio police cars. Joe has been working with five meter apparatus for several months during his spare time. Inspector Hawtrey, Chief of the Communications Division for the Department, has requested a mobile license from the FRC in order that Rosso may install five meter transmitters in scout cars attached to outlying police divisions in the Los Angeles area. It is expected that the new service will greatly increase the value of radio as a means of capturing criminals and preventing crime, in that it will enable police captains, and other high ranking officers, to direct the movements of patrol and scout cars directly from the scene of a crime or disturbance. Also, this system will enable officers who are pursuing malefactors to call for assistance, or to direct other cars so that all avenues of escape may be closed.

KELW and KTM "on Pan"

As a result of alleged unethical business practices and poor programs an examiner for the FRC has recommended that stations KELW and KTM be denied license renewals. KTM is owned by the Pickwick Broadcasting Company and is located in Santa Monica, California. KELW, which shares time with KTM on 780 kilocycles, is located in Burbank, California. Both these stations employ 500 watts. KECA, companion station of KFI, owned by Earle C. Anthony, Inc., has applied for the frequency and time of KTM and KELW. KECA now operates on 1,430 kilocycles using 500 watts.

Madrid Delegate Returns

Mr. Charles J. Pannill, of the Radiomarine Corporation, who was a delegate at the International Radio Conference at Madrid, recently arrived back in America. The conference is still going on at Madrid, and Mr. Phillips is reported to have stated that if the desires of American and European broadcasting stations were met it would mean that 10,000 ships at sea would have to be re-equipped at a cost of \$7,500,000. It is not expected though that the broadcasters will have their way in moving their band up to 750 meters, and on the other side down to 1,400 meters as they request.

After a short lay-off Kenneth Taylor is back at KMPC. Edwin Poorman recently lost his job at KTM. "Politics" is given as the reason. Ed Ruggles, formerly of KELW, is now at KMPC, replacing Ed Davies who resigned. The RI's office in Los Angeles has been moved to 1106 Rives Strong Building, 112 West Ninth street. "Jimmy" Chapple, popular Assistant RI, is in charge. Mr. Chapple is assisted by John and James Homsy.

Characteristics of Class "A", "B", "C" Amplifiers

By E. H. RIETZKE

Member, The Institute of Radio Engineers, President, Capitol Radio Engineering Institute

Of all the questions reaching the writer's desk concerning the new commercial license exams probably none is so frequent as that dealing with Class A, B, and C amplification. Just what are these systems? What are the real differences between them? When should each be used?

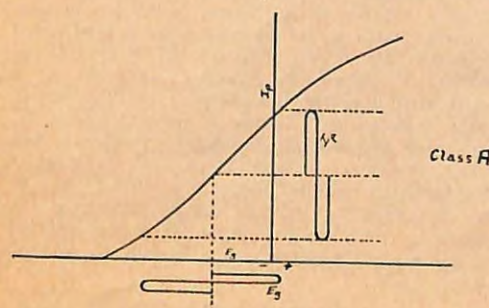
The Standardization Committee of the Institute of Radio Engineers defines amplifiers as follows:

Class A Amplifier. A class A amplifier is an amplifier which operates in such a manner that the plate output wave form is essentially the same as that of the exciting grid voltage. The characteristics are low efficiency and output with a large ratio of power amplification.

Class B Amplifier. A class B amplifier is an amplifier which operates in such a manner that the power output is proportional to the square of the grid excitation voltage. The characteristics are medium efficiency and output with a relatively low ratio of power amplification.

Class C Amplifier. A class C amplifier is an amplifier which operates in such a manner that the output varies as the square of the plate voltage within limits. The characteristics are high plate circuit efficiency and output with a relatively low ratio of power amplification.

Now in plain language, just what do these definitions mean and exactly how is the tube operated in each case? This is most easily shown by reference to the diagram. Here we have plate current plotted against grid bias for each type of amplifier. All radiomen should be familiar with the use of the $E_p I_p$ characteristic curves to show the operation of the tube. In this case the characteristic curve is plotted and then the grid excitation voltage E_g and the actual plate current variations I_p are superimposed.



CLASS A AMPLIFIER: This amplifier operates in such a manner that the form of the power supplied to the plate output circuit is essentially a reproduction of the grid excitation voltage, that is, the plate current varies directly with the grid voltage, thus, since the tube is being worked well within the limits of the straight portion of the $E_p I_p$ characteristic, the plate voltage also varies in the same form as the grid voltage. The tube is operated in the center of the straight portion of the characteristic curve and the grid is not permitted to swing either positive or into the lower curvature of the $E_p I_p$ curve.

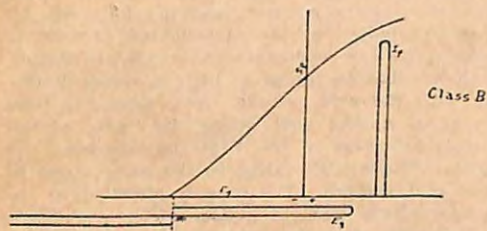
Plate current flows at all times and the voltages are such that the tube operates as a linear amplifier. The amount of second harmonic present in the output that was not present in the input is taken as a measure of the distortion. This is usually limited to five per cent. Whenever the plate current, due to excessive excitation extending beyond the straight portion of the characteristic or to a flow of grid current, is distorted out of the form of a sine curve harmonics in the output circuit will result. The greater the distortion the greater the harmonic content in the output. Thus in a carrier which is being modulated over fairly wide limits, as in a broadcast transmitter, care must be taken that the amplitudes of the modulation peaks do not extend beyond the proper limits.

The characteristics of this amplifier are low efficiency and output with a large ratio of power amplification. The low efficiency is due to the fact that plate current flows all the time thus causing a continuous expenditure of power in the tube itself. Theoretically the limit of efficiency will be 50 per cent; actually this limit is not reached in practice, the practical limit being a little over 30 per cent.

The low power output is due to the fact that, worked in this manner, the tube cannot be pushed hard. Due to the low operating efficiency the plate power input must be kept comparatively low because the larger proportion of this input is dissipated in the tube itself. The high ratio of power amplification is due to the fact that high excitation voltages cannot be used therefore the power requirements for excitation are not high. The diagram clearly shows the low excitation voltage required as compared with the other two types of amplifier.

In practice, where distortion must be kept to a minimum, the excitation voltage is kept be-

low the amplitude that would cause a flow of grid current. When properly adjusted there should be no supply plate current variation with excitation, the plate current variations being equal above and below the normal value. If on the peaks the plate current rises, the grid bias is too high; if the plate current drops on the peaks of excitation, the grid bias should be increased.



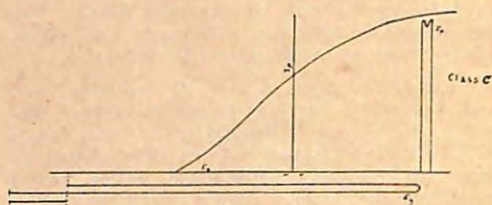
CLASS B AMPLIFIER: The class B amplifier operates in such a manner that the power output is proportional to the square of the grid excitation voltage. An inspection of the diagram will show that the grid is biased to the cut-off point there being little or no plate current flow without excitation. It can also be seen that plate current flows only during the positive alternation of the excitation cycle. In order to increase the power output the grid may be allowed to swing actually positive on the excitation peaks. If this is done suitable filters must be used to remove the harmonics from the output circuits. Also the exciting stage must BE ABLE TO SUPPLY SUFFICIENT POWER while the grid is actually positive so that the excitation voltage itself is not distorted. It would seem that operating at the cut-off point would cause considerable distortion due to the lower curvature of the E_{sp} curve. However with the use of high plate voltage and negative bias the dynamic characteristic curve is comparatively straight almost to the cut-off point and the slight amount of distortion due to this curvature is not objectionable. Such distortion will not occur until a high percentage of modulation is reached, in other words, the lower curvature distortion occurs only on the modulation peaks. The use of a push pull circuit is generally used to keep the percentage of second harmonic energy in the output circuit to a minimum. In such a circuit the even harmonics developed in the two tubes cancel.

The characteristics of the class B amplifier are fairly high efficiency and output with a relatively low ratio of power amplification. The former is due to the fact that plate current flows only one-half of the time of excitation. The latter condition is due to the power required to produce the high excitation necessary. This type of amplifier can be operated at approximately 60 per cent. efficiency.

Due to the high efficiency of operation and to

the very high peak outputs that can be obtained from comparatively small tubes class B amplification is becoming widely used in the last stage of broadcast receivers. However this required the development of special tubes and circuits and introduced special problems that had to be solved and which are beyond the scope of this paper.

The class B amplifier is excellent for use in the intermediate and final power stages of a radio telegraph transmitter both on account of its high efficiency and power output and because of the ease of keying. Since it is biased to the cut-off point there is no plate current flow without grid excitation. Therefore in order to key such an amplifier it is simply necessary to key the exciting low power circuit ahead of the power amplifiers. This can be done without breaking either high voltage or high current circuits.



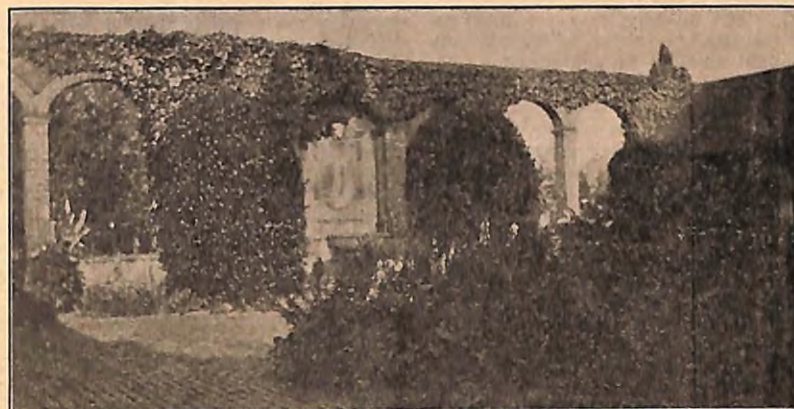
CLASS C AMPLIFIER: This amplifier operates in such a manner that the power output varies as the square of the plate voltage within limits. The grid bias is adjusted to approximately double the cut-off bias. Sufficient excitation is then applied to cause saturation plate current, that is, until the positive excitation alternative is well past the point where further increase in excitation will not further increase the plate current. Operating under this condition the plate current will depend only upon the value of the plate voltage, increasing and decreasing directly with plate voltage. It is well to have a surplus of excitation.

The class C amplifier is used largely as a "modulated amplifier." Since most modern modulation systems modulate in the plate circuit this amplifier, in which the power output is strictly a function of the plate voltage, is particularly suitable for operation as a modulated amplifier. When all voltages are properly adjusted to operate the class C amplifier as a modulated amplifier an increase or decrease of plate voltage will cause a corresponding increase or decrease of current in the circuit into which the tube operates. If the plate voltage is decreased to one-half the output current should be decreased to one-half, thus decreasing the power in this circuit to one-quarter the original value, etc. (The power in a circuit is proportional to I^2 .)

(Continued on Page 28)

GODALMING*

By K. BAARSLAG



The illustration is a photo taken by the author showing the John C. Phillips Memorial in the center

Godalming probably means little or nothing to most American radio operators. A few of the old-timers may vaguely recall having heard of it once years ago, but how many have visited this quiet Surrey village with its charming relics of old England? Yet Godalming is, and should be, of more than passing interest to all wireless men.

On a perfect summer's evening last July, the writer made a special trip from London to Godalming for "CQ". Only a few fellow travelers descended from the Waterloo train when it arrived at Godalming, a town which could scarcely be called "bustling," for, although its population exceeds ten thousand, its mills and small industries have been hard hit by the well-known depression.

A few steps down a quiet road which leads toward the center of the town, bring one to the grey and venerable Parish Church, whose church-yard on the right is marked with many ancient head-stones. Stoke Pogis, the inspiration of Gray's deathless "Elegy," might have looked like this. No hurrying tides of humanity such as sweep past Trinity or St. Paul's, no war and swirl of traffic here! Naught save peace and quiet; the sort of restful, green English countryside that one's imagination might pic-

ture, only far more serene, far greener and lovelier.

A street lined with several old taverns and shops, architectural gems of a vanishing England, leads to the right and to the center of the town. Here one will find a traffic policeman, modern houses and stores including the ubiquitous Woolworth. However, we did not come for this so we turn to the left and go down a winding lane bordered by stone walls almost buried in the greenery so characteristic of rural England. Trees on either side form a canopy which in places is so heavy that it has the appearance of a tunnel.

The object of our visit and search lies just beyond the Parish Church, a square edifice which lies a little below the level of the highway, and is almost hidden in the shrubbery. Two stately, shimmering poplars stand solemn guard in front. An appropriate weeping willow and a withy form the rear-guard. A few downward steps and the visitor stands in a square cloister formed by ivy-covered walls and oaken columns, but open to the sky. The center of the quadrangle is taken up by a lily pond in a setting of flowers and ferns. There are some benches along the front wall for the meditative visitor. A woman artist sketching in water colors and the writer were the only visitors.

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On the back wall the omnipresent ivy has
(Continued on Page 22)

Radiotelephone vs. Radiotelegraph on Boston Beam Trawlers

By RICHARD GOLDEN

No Boston radiotelegraph operator picks up the Sunday supplement of his newspaper now without a slight shudder of apprehension. The experimental installation of radiotelephones on three fishing vessels is furnishing subjects for many publicity yarns in the news columns of Boston papers, and every story conjures in the minds of operators here the spectre of forty-odd radiotelegraphists permanently assigned to the lengthy unemployed list at this none too busy port.

There are, or were two winters ago, forty-seven radiotelegraph-equipped trawlers fishing out of Boston, each carrying one operator. Over half this fleet is tied up at this time, due to market conditions, but it is probable that most of them will be placed back into service eventually. About two-thirds of Boston's radio-telegraph operators depend for a livelihood upon these trawlers. It can be imagined with what grave concern Boston operators are watching the experimental work of the New England Telephone Company.

In this machine age, with labor saving devices steadily thinning the ranks of skilled workers, it would be nonsensical to refuse to recognize the possibility of radiotelephones replacing radiotelegraph instruments and trained operators in many positions. And when the threatening ogre is, as in this case, the great Telephone Company which already has succeeded in relegating to the human scrap heap about two-thirds of its employees by the use of mechanical devices, radio operators have ample cause for alarm. The question appears to be not, "will we lose our jobs?" but "how soon?"

Fishing boat captains and company officials agree that it is much more satisfactory to talk direct to each other than to exchange radiotelegrams. Market conditions may be discussed more fully, the captain may describe the way fish are running, and a decision immediately arrived at as to the day on which the vessel is to return to market. With the elaborate telegraphic cipher system most fishing companies use, such discussions may be carried on satisfactorily by the exchange of a series of radiotelegrams, but the incontestable fact is that telephonic conversation is much more satisfactory. Situations necessitating prolonged conversation very seldom occur, however, and the present system entailing the transmission of a daily message from the boat to shore containing its distance from port and its total catch, and a single message from the office ashore

ordering the vessel to market, has proved quite efficient.

If communication between ship and shore were the only service demanded of radio apparatus on fishing trawlers, fishing companies could immediately dispense with rented radiotelegraph instruments and radio operators in favor of the less costly radiotelephone. Such communication, however, is only one of the several important services that make radio apparatus invaluable in the business of catching and marketing fish.

Radio-compass bearings and depth soundings are the two means by which fishermen determine their positions at sea. In clear weather and in fog, the radio operator several times a day obtains group bearings which keep a trawler captain accurately informed as to his position at all times. Radio-compass stations along the New England coast and the coast of Nova Scotia are ideally situated for this service. Knowledge of his position on the fishing banks is of the utmost importance to a fisherman. Certain kinds of fish inhabit certain parts of the Banks. The bulk of fish constantly varies in location. And too, there are places on the Banks which much be avoided for the wrecks of vessels and the rocks that lie on the bottom ready to tear to shreds nets worth hundreds of dollars. A fisherman does not fling out his net in haphazard fashion. He carefully chooses his location. The sounding rod serves generally as a check on radio bearings. It is for the most part useless alone because of the similarity of depth along wide stretches of the fishing banks.

The use of a radio direction finder on board the trawler has been suggested to perform the highly important service of position determining which manifestly can not be performed by a radiotelephone. This, however, is generally believed to be impractical at this time because of the situations of radio beacons and because of the distance from shore at which a trawler operates. Several years ago a Boston trawler was equipped with a very efficient direction finder which was found to be of use on the fishing banks in locating other trawlers, but which was of no value in determining the boat's position. And too, the cost of a direction finder together with that of a radiotelephone would bring the expense of radio equipment closer to that of the radiotelegraph set, without ap-

(Continued on Page 24)

By PIETRO RAMETTA

I sat by a harbor at sundown,
As the sleepy sun tinted the west;
Soft night winds began to whisper,
The world seemed at peace and at rest.

From the ships that lay in the harbor,
Riding lights flashed clear and bright
To passing ships flashing a warning,
Thru the pale of the lowering night.

The roar of the city beyond me,
Seeming to me miles away,
As the smoke plumes twisted and gathered
Like a shroud from the dying day.

And I thought of the great ships before me,
Of the treasures their depths might hold—
Of the sea's trackless paths they have travelled,
That their owners might gather more gold.

Tramps, nomads of the ocean,
Rusty, decrepit, and old,
Bound for a port off'ring cargo
To stow in their cavernous hold.

The ill-painted name of their home port,
Only proof of their place of birth,
Doomed forever to wander along
The trade routes of the earth.

All too soon their days will be numbered;
The last port of call they will reach,
Or their rusty ribs will be bleaching
On the rocks of some treacherous beach.

Slowly I bowed low in silence,
My eyes welled up with salt tears;
Seemed I heard soft voices a-calling
'Cross a vale of long wasted years.

Like ships that lay in the harbor,
I had traveled the trade routes in vain
Since the day that I sailed from my home-port
That some other person might gain.

As I gazed out across the grey harbor,
There the anchor lights flashed clear and bright,
To the hulks in the shadows I whispered
"Good night, my comrades, good night."

ODD FACTS

DO YOU KNOW THAT:

That an unusual fact of San Francisco is indicated in the strange behavior of lower Market street; the sidewalks are now a foot below the street level with the shops or public houses still lower?

La Paz on the Peninsula of Lower California, Mexico, known as the "Pearl of Lower California," now a defunct pearl center, dispenses the most expensive beer in the world where it reaches the absurd price of \$1.50 Mex per pint bottle?

Buenos Aires and not London boasts the most scientifically directed corps of police?

When in Tangiers, Morocco, should one desire the concoction of Gin and Vermouth the client will discover the mixture to be referred to as the "Bloody Fool"?

A tiger is allowed to roam about the shrine's compound in the town of Megapatam, India, a pilgrimage center, so as to safeguard the precious jewels and gold images after sunset?

Italy introduced the "Royal Drink" of coffee into Europe during the Roman Empire epoch? After the conquest of Egypt where the Roman officials discovered the Egyptian aristocrats enjoying a hot drink brewed from a bean, which was so scarce and expensive that only the extremely rich indulged, the Romans adopted it as well, it later being connected with wealth and aristocracy earning the above reference.

Mexico City was founded by a wandering tribe of Indians in search of a capitol? The group of natives inadvertently stumbled across an eagle in the Chapultepec lagoons devouring a serpent. Considering this a lucky omen they filled in the spot adopting the present Mexican tricolor with Eagle and Serpent upon a background of Red, White and Green.

Spain holds Commercial Radiotelegraphist governmental examinations once annually so that directly after the examinations the country has an excess of operators and towards the end of the year she suffers a serious scarcity of licensed men?

Chinese merchants can detect counterfeit silver dimes by balancing them on their finger tips, the false failing to come up to weight?

The South American republic extending from Peru to the Straights of Magellan on the western fringe of the continent is really Chili as it was originally named and not Chile as is now commonly called? Agitation has been underway for some time now to adopt her former name.

Universal Microphone Co., Inglewood, Cal., have just issued a new illustrated 29 page booklet, with blueprints, charts and diagrams, of all their microphone products. The booklet may be had for the writing, as no charge is made.

Correction: On page 12 of the September "CQ" in Problems of Audio Frequency Amplification, by E. H. Rietzke, the item reading: "—23.1 Adding Algebraically. Thus .03 MW expressed in decibels as power level is —23.1 db." The author advises that this item should read as follows: "—24.9 Adding Algebraically. Thus .03 MW expressed in decibels as power level as —24.9 db."

Some Facts on Radio Operators

1. On Dutch and Italian vessels a 1st Class Radio Operator receives more money than the Chief Mate.
2. On British and German vessels, a 1st Class Radio Operator receives more money than the 2nd Mate.
3. On Danish vessels the Operator gets \$24.00 more than the 3rd Mate.
4. On Norwegian vessels the Operator gets \$8.00 less than the 3rd Mate, but \$2.00 more than the 2nd Assistant Engineer.
5. The lowest paid foreign operator is the Spanish, \$23.00 less than the 3rd Mate, but same pay as Chief Steward.
6. THE AMERICAN OPERATOR THUS BECOMES THE LOWEST PAID OPERATOR IN THE WORLD, RECEIVING ABOUT \$45.00 LESS THAN THE THIRD MATE.
7. Every country except the United States, Norway and Sweden pays the Radio Operator more money than the Chief Steward.
8. The United States, however, stands alone in placing the operator (if he happens to be fortunate) on the same financial level as the cook.

The figures given below are taken from Department of Commerce statistics on average wage scales paid by foreign and American vessels.

Average Monthly Wages of American and Foreign Seamen on Steam and Motor Cargo Vessels of 5,000 Gross Tons and Over on January 1, 1930

Compiled by U. S. Department of Commerce, Bureau of Navigation

Position	American Shipping										
	Priv.	Board	British	Danish	Dutch	French	Ger.	Ital.	Norw.	Span.	Swed.
Deck department:											
First mate	\$180	\$185	\$112	\$138	\$111	\$102	\$91	\$71	\$155	\$99	\$109
Second mate	159	165	77	105	84	62	74	59	121	66	82
Third mate	144	149	58	60	54	62	56	54	94	56	61
Fourth mate	121	120	51	60	..	..	40	..	71	..	..
Boatswain	74	75	51	47	46	26	38	36	48	29	46
Carpenter	77	80	63	47	46	24	38	35	47	27	44
Seaman, able	61	62	43	42	40	22	32	28	43	26	42
Seaman, ordinary ..	45	47	28	21	20	20	17	19	23	23	30
Engineer department:											
Chief engineer	273	265	147	167	151	151	141	90	141	158	146
2nd engineer	182	187	112	120	103	97	94	71	104	99	92
3rd engineer	161	167	76	89	72	63	77	59	84	68	69
4th engineer	145	151	58	71	50	63	59	54	71	..	55
Jr. engineer .....	..	..	51	51	..	..	39	..	..	..	..
Fireman	64	66	46	43	42	26	37	30	44	26	37
Greaser	70	72	48	47	46	23	39	..	25	26	43
Water tender	70	72	48	43	..	..	39	..	..	29	..
Coal passer, wiper ..	55	58	43	28	34	22	32	28	25	23	24
Radio operators (Class I):											
Grade I	100	105	83	84	145	41	79	86	86	33	54
Grade II .....	..	..	51	64	..	27	..	71	..	..	..
Grade III .....	..	..	34	40	24	19	..	58	..	..	..
Steward department:											
Chief steward	123	121	68	78	..	39	38	26	102	33	74
Second steward ..	97	90	45	..	..	..	32	..	..	..	..
Cook	100	100	65	57	58	23	38	31	80	30	50
Second cook	78	80	43	28	52	16	23	29	..	..	16
Mess steward	51	47	39	..	..	19	15	29	..	17	..
Mess boy	44	42	..	10	10	9	7	15	14	12	13

MACKAY RADIO GROWTH TOLD

New York "Times" Article Presents Company's Fine Position



These Mackay teletype operators are dressed in the costumes designating the points to which they send messages. Left to right they are: Miss Flossie Lou Thompson, Pan America; Miss Gladys Pringle, sailor; Mrs. Juanita Davis, Hawaii; Mrs. Leta Thomas, supervisor, Miss America; Mrs. Rhett Edwards, aviation; Miss Marie Newman, Europe; and Miss Frances Suda, Orient.

The Mackay Radio and Telegraph Company has made greater progress in the last two years of depression than in the preceding two years, according to A. Y. Tuel, operating vice president, and developments are being pushed so that the company will be ready to handle a larger proportion of business when conditions improve.

Operations in the ship-to-shore communications business have been extended and improved recently, especially on the Atlantic Ocean, where the Mackay company has operated this type of business for only two years. Today the company has more than 200 ships under contract for radio repairs, radio servicing and supplying radio operators; it maintains stations for servicing ships at all important United States and foreign ports, and it is contracting regularly for the supply of modern radio apparatus and radio compasses to a growing number of vessels.

The Federal Telegraph Company, affiliated manufacturing concern, makes the radio apparatus supplied to vessels, and the Kolster radio compasses that are leased or sold by Mackay Radio. Through the combined efforts of the manufacturing, communications and sales divisions and affiliates and their relationship with

other companies in the International Telephone and Telegraph System, Mackay Radio and Telegraph covers the complete range of operations in the radio field. Mr. Tuel pointed out, and can devote its chief efforts to obtaining new business and to demonstrating its capacity for all-around service.

The company arranged recently to equip with radio the entire fleet of twenty-one ships of the Standard Oil Company of California, four new vessels of the American Export Line, five ships of the Clyde-Mallory Line, five Baltimore Mail Liners and others. Each vessel is to get one intermediary wave set and one short wave set.

Special high-power radio equipment is being built for the Manhattan and her sister ship, latest additions to the fleet of the United States Lines. Four sets will be supplied to each vessel, comprising one long wave, one intermediary, one short and a reserve. In addition, each liner will have two lifeboats equipped with radio transmission sets.

The short wave apparatus developed by the company, Mr. Tuel stressed, permitted the Atlantic and Pacific Coast radio stations of Mac-

(Continued on Page 28)

ASSOCIATION NEWS

Authorized representatives of the American Radio Telegraphists Association, 20 Irving Place, New York City.

Boston, R. J. Golden, 79 Otis street
New York, Pietro Rametta, 20 Irving Place
Baltimore, Christopher Kelley, 650 West Fayette Street

Miami, D. W. Scott, P. O. Box 2254
New Orleans, Forrest H. Flanders, Y.M.C.A., Box 314, 936 St. Charles at Lee Circle
Baytown, Texas, Ralph Knudsen
Port Arthur, Texas, Hoyt S. Haddock
Ashtabula, Arthur Freitag, Box 1076

Mr. Karl Baarslag, whose article "Godalming" is the feature of this issue, has kindly offered to be a regular contributor to CQ. He remarks that he has reams of such "stuff." After reading "Godalming" we hasten to assure Mr. Baarslag that we shall enlarge CQ if necessary, in order to include his material. Fine stuff!! Next month he writes of radio operating conditions in Holland and of the Dutch Radio Operators' Association. Others of you fellows step up and send your material in.

A very fine letter has been received from two operators in the Royal Dutch Navy, serving at Sourabaya, Dutch East Indies, requesting that American operators who wish to communicate, get in touch with them by letter. Their letter indicates that they are a very sprightly pair of lads and members with a writing yen who wish to make their acquaintance should post card them right away. Address: Peter Huigens and/or E. L. Nich van Loo, care Department of Marine, Batavia Central, Dutch East Indies.

Residents of The Lynmore now include Joseph P. De La Hunt, Duncan Currie, Pietro Rametta, Herbert W. Martin, James J. Delaney, Robert Merrill and A. Minzey.

Recent departures were James M. Tasker and John Lafferty.

Duncan Currie calls to our attention the fact that his donation to the organization was not mentioned in the list published in the August issue. Our error, Dunc very kindly presented us with a half interest in the Underwood duplicating machine formerly used in the American Farmer.

Mr. J. Madsen, President of the International Federation of Radiotelegraphists, writes from Copenhagen, Denmark:

Dear Mr. Delaney:
I have recently received a communication from Mr. H. A. Hooper, Secretary-Treasurer of the Canadian Association, in which he states that there is every possibility of your organization's affiliation with the I. F. R. In connection with the same subject I have exchanged a considerable amount of correspondence with Mr. Rathbourne of your Association. It would be of great assistance to the I. F. R. if we could count your organization amongst the affiliated unions.

It very often happens that we could wish to approach the Radio Authorities of the United States and on such occasions it would materially help matters if your Association would serve as the representative of the I. F. R.

Mr. Hooper was kind enough to state that you desired him to convey your greetings to

Mr. O'Donnell and myself. I am very pleased indeed to learn of this friendly gesture; I would ask you to receive my best thanks and to believe that I wish you and your organization the best possible success to the benefit of our colleagues in the U. S. A.

Yours sincerely,

J. Madsen

Dear Editor:

A point, perhaps of major importance, to those members that may be termed martyrs to the cause, those members that have stood by, and that have striven thru the difficulties underlying organization, and the various veils and cloaks of reluctance met with during our period of adolescence, or from the inception of the association, (for I term this period, one bordering on maturity) certainly should be enthused, if not thrilled at the words of Mr. H. A. Hooper, Secretary-Treasurer of the "Electrical Communication Workers of Canada."

In which he states, "We have watched the rapid growth of your organization with much interest." Just these few words constituting a fraction of a paragraph, should be sufficient. However, I may state, I have had the opportunity during the past five months, while at sea, to make an unofficial survey, a survey that has indicated that the "association" IS growing with astounding rapidity.

This survey was carried on by communicating with, (during routine business) and querying operators on vessels along the Atlantic seaboard, whether or not they were members. At first, alas, there were many "nays," but now I may say with added zest, the watchword of the day seems to be "yes."

Seemingly this gratifying state most certainly should inspire and impress our brothers in the field, that remain non-members of the association, that will undoubtedly be the making, and the putting on stable footing a field that is in dire need of reconstruction, a profession that is situated in a rut, one that is in distressing need of assistance. Why have they not come in? Perhaps they fear we need still more support, what is it? Probably a solution to that problem is herewith.

As we read further down thru Mr. Hooper's communication, we find that he predicts: "The only safe and positive road to eventual success, lies along the plane of affiliation, especially with the I. F. R." an inference that is most assuredly logically advocated, if one looks back, and remembers the "British Operators Walkout" of a few years ago. How they lost, why they lost, the contributing causes. That, is most interesting, and it was done thru a point, unforeseen, perhaps?

British vessels were allowed to sail from British ports minus operators, but when they reached their American destinations, (in this case) American operators were acquired. In many cases, I am told, "in order to cover the law compelling vessels having over fifty souls aboard, two operators." In these cases of course the American men were generally acting under orders, and/or apparently gave the situation not the slightest thought, perhaps, were not sympathetic, although our poor brothers across the sea certainly fought a losing battle. Little wonder tho, no affiliation, no connection whatsoever, "no hands across the sea," a deplorable condition.

I conclude with, it may be distinctly seen that, "aggregate strength lies in international union." This business of "fraternizing" is a mere shake of the hand, the most desirable state being, "a policy encircled by bonds that will not break."

However, "aggregate strength" is not the sole point to be gained from such a move, recognition is also most vital. As an international body of men, little doubt remains, that our profession will hereinafter be looked upon as a "mere blade of grass in a field of great dimension."

With all the assistance I can possibly render, I am,

Fraternally yours,

Some More Letters Written

Boston, Mass.

To James W. Baldwin, Secretary,

Federal Radio Commission

It is suggested that now the transference of the Radio Division, Department of Commerce, to the Federal Radio Commission has been consummated the regulations relative to the issuance of licenses to commercial and broadcast radio operators be revised. The following changes in these regulations have been suggested by experienced commercial radio operators and engineers. They deserve your attention.

1. An apprenticeship should be required for all applicants for commercial and broadcast licenses. A six month's apprenticeship period is suggested.

2. The system of handling the license questions as used at present is very faulty. Many prospective applicants for the licenses mentioned above receive copies of the examination questions from radio schools and other sources before taking the examination. The examination questions must be kept secret if their full value is to be attained.

3. Applicants for licenses should demonstrate their ability to operate and repair standard radio apparatus of the type used in the service which their license specifies.

Present regulations regarding the issuance of commercial radiotelegraphist and broadcast licenses are inadequate and must be made more strict if the full protection that radio offers to the passengers and property of our Merchant Marine as well as the service rendered by radio telephone stations is to be realized.

Respectfully,

The Honorable — — — — —
Washington, D. C.

Our present Radio Laws were made in 1912 and very little changes effected since. Today they are inadequate and day by day it is more evident that improvements are necessary. Ills of radio-communication today are mostly due to the radio laws and regulations now in effect. If a bill,—such as attached herewith—is passed by Congress the situation shall be greatly improved. The reasons for such or similar necessary improvements I will give below, so that you,—being acquainted with it—will support the Bill if, and when, introduced.

The general belief is that if a ship is equipped with radio-telegraph apparatus and sufficiently manned to send and receive distress signals, it is safe to travel by. This belief is erroneous. The greatest safety factor contributed by radio lies in the reception of storm and hurricane warnings, ice reports, obstruction reports (dangers to navigation), weather forecasts, time signals, radio bearings from points ashore and information about changes of lights on buoys and points ashore. There may be lights extinguished on buoys or their characteristics changed and if navigators are not acquainted with the fact it becomes a grave danger. There may be drifting buoys, mines, derelicts, ice bergs or growlers. All these in-

formations are important and they are being broadcast daily several times. Time signals are necessary to check chronometers to enable navigators to obtain accurate positions. When the sky is overcast or in a fog bank no observations can be made of celestial objects to ascertain the vessel's position, radio bearings from points ashore will establish the ship's position. When in fog banks, especially on the North Atlantic, all vessels transmit their positions, speed, direction and local weather, doing this every thirty minutes, exchanging them in order to avoid collision.

It is evident that vessels should be required to be equipped with radio-telegraph apparatus and manned sufficiently to handle the work efficiently. Since all the above enumerated informations are being transmitted at a code speed of 20 to 25 words per minute it is obvious that men able to transmit and receive only 16 words per minute are not only useless, but when permitted to use the apparatus they will retard communication by congestion. Neither is a man efficient if he is fatigued by 12 hours continuous watches day in and day out.

There are ships carrying passengers plying between New York and Mediterranean ports which carry two radio-operators each standing 12 hour watches daily for 23 or more consecutive days and even their rest is being broken up by relief three times daily at meal hours. These ships carry two radio operators ONLY TO COVER the radio laws, with no regard for the safety of their passengers and crew, their cargoes and the ships themselves being insured to cover material losses.

When the SS Vestris foundered there were at least two passenger ships of the Clyde Line, each capable to attain a speed of over 20 knots, within 150 miles from the scene of disaster; but the distress signals were not received by them until many hours after the first was transmitted, because the two operators were required to stand 12-hour watches, were also required to copy press bulletins and cut stencils and mimeograph them to be circulated among the passengers. Had they been well equipped and sufficiently manned these ships could have been on the scene of disaster seven and a half hours after the first distress signals were emitted.

It is therefore my honest belief that a bill such as, or similar to, the one I have attached herewith should be passed, to remedy this condition. I hope that you will investigate this matter and if you find that they deserve it, you will support such or similar bill when introduced.

Yours very truly,

Dear Senator:

As a member of the radio operating profession, I respectfully make the following requests:

1. An apprenticeship of at least six months under experienced radio operators for all applicants for a license as commercial or broadcast operators.
2. Abolition of the twelve hour working day for radio operators in both marine and land radio stations.
3. License examinations of increased severity, which, in addition to a written theoretical test, should require an applicant to demonstrate his ability to actually operate and repair commercial radio transmitting and receiving apparatus.
4. An age limit requirement for applicants for licenses as radio operators (commercial or broadcast).

We seagoing men are at a distinct disadvantage when it comes to protest legislation aimed at lowering the ethics of our profession. Our only recourse is to write to those who have shown an interest in our behalf.

We only ask measures to protect ourselves
(Continued on Page 29)

PERSONAL MENTION

Alex Vadas and John Dudor returned in the Scanmail after her second voyage and were relieved by John P. Hall and T. R. McCarthy. McCarthy has been on the beach nearly a year.

Walter R. Weer has been assigned to the Cableship Guardian, stationed at Miami.

Karl K. W. Baarslag of the Yacht Chalena has returned to America and is now awaiting another assignment. During his stay in Rotterdam Mr. Baarslag made the acquaintance of officials of the Dutch Operators' Association. He gives us some interesting information in this issue.

Virgil C. Ellis finally made the grade, receiving an appointment to the City of St. Louis.

Mike De Martino had a few weeks' work when the Cableship Edouard Jeramec made one of her rare trips to sea.

William Vogel had a short stay at WSL having received his "notice" from Mr. Lee, manager of the station at Southampton, before ever taking a watch. The Mackay Company, however, sent him out on the City of Newport News and everybody is satisfied. Bill must acquire that Mackay spirit before he is eligible for WSL service.

Irvine Finver relieved Mickey Bamberg in the Yorba Linda. Mickey needed more time ashore. He was recently married if you remember.

Joe Gately was relieved in the J. M. Danziger (Standard Shipping) by Herbert O. Fairfield.

Roy H. Roberson returned from his long voyage with the Isthmian Line and is now sojourning at the Staten Island Marine Hospital.

Herman Michaelson is still a patient at Ellis Island. His friends are requested to drop him a line or two. Ellis Island, it is understood, is the place where long term patients are taken.

W. E. Fleck, Second Operator of the President Roosevelt for eighteen months, has swapped with Charlie Sheblack of the Munargo. Sheblack wanted the Hamburg run to meet his wife while Fleck wanted the change to get away from the girl friend over there.

Operators of the United States Lines were given orders to stand radio watch at all times while their vessels are in Hamburg. The reason given for this order was "In case of fire."

The President Roosevelt carried the majority of the radio delegates to the Madrid Conference. Rubber stamp messages kept the operators busy during the trip. There was a daily average of forty deadheads.

A. C. Cosmas, staunch supporter of the A. R. T. A., is making a round-the-world trip on the Steel Scientist.

While wages of the United States Line steadily decline, the boys complain that prices in Hamburg maintain their usual high level.

Louis Kleinklaus finally interrupted his long stay on the beach with an assignment to the Exarch.

After a short stay in the J. M. Danziger, Standard Shipping, Joe Gately is on the beach at New York.

Alex Vadas and J. P. Kelley took the Santa Rosa out on her trial run.

Kenneth Wright made a pier-head jump in Los Angeles for the Nevadan.

Pop Murray, after a record stay on the beach at New York, finally clipped the Fairfield.

Clarence Scruggs was shifted from the Mohawk to the Cherokee—Clyde Line.

Noel V. Waldron was assigned to the Mohawk.

Si Avery was assigned to the Santa Barbara.

Walter Hoffman puts in his time in the Dunganon.

Leonard Pratt is in the Cities Service Empire.

Abraham Katzman has the R. W. McIlvain, Sabine Transportation Company.

M. Monroe has the Gulfmaid.

James M. Flaherty left the Livingston Roe (Standard Shipping) for hospitalization and expects to be on the beach for some time.

Otto Theiss relieved Phillip S. Rice in the Barbara (A. H. Bull and Co.) for one trip and is back on the beach again. While taking his vacation Mr. Rice devoted his time to aviation and has taken quite a few hours in the air. C. B. Judson is senior in the same vessel.

Fred C. Hubbard was transferred from Musel Rock, KTK, to the Dollar Liner President Grant.

Charlie Scanlon and B. H. Duncan are on the President Wilson.

G. C. Fitzsimmons went to the George Washington as Chief.

"Doc" Forsyth, formerly of the Yoro, had an operation on his eyes and is now at the Christopher Hotel in New York. As "Doc" cannot see for the time being he requests his friends to visit him during his period of convalescence.

A. H. Phelps is now in the Reaper of the Texas Oil Company.

James A. Richardi is in the Seminole, Clyde Line.

Robert W. Annett is shining brass in the Exarch.

Donald C. Mealey is doing the same in the Executive.

Herbert O. Fairfield relieved Joe Gately in the J. M. Danziger.

L. R. McMahon is in the J. N. Pew.

Charles C. Berger is now with the motor-yacht Vagabondia.

Theodore O. Spank has the trawler Whitecap.

Albert H. Zafft is now in the Siboney, Ward Line.

(Continued on Page 29)

PIONEER RADIO OPERATORS

(Continued from Page 8)

to the utmost. Nothing in that long period of experimenting was more tiresome than this.

"Thus, blazing the tradio trail, we encountered the immensity of space. We listened-in on this infinite space and heard nothing. The silence was at times unbearable; the waiting, nerve racking; but always there were hope and expectancy. It was a royal game of angling. We changed things, fussed and fussed and experimented, still hearing nothing except an occasional rift of static which at that time was a blessing, because it meant that we were at least 'getting something.' Often times we were awed at the thing we were trying to do. There was something uncanny in trying to snatch the tangible out of the intangible nothingness of the free air. No wonder folks doubted our sanity. However, our longest waits were always rewarded, and finally, we accomplished what we had aimed to do. The thrill then was indescribable because the very thing we had just accomplished had never before been done by man. We never thought then that in our little way we were piecing together some of the foundation stones of the huge radio structure which exists today. In my memoirs of those days, I wrote:

"Night and day there is no respite from care, from toil, from interest. But it is a life well worth the living, the full accomplishment such, perchance, as is not given to many. Those who once enter this work, on whom the enticing spell of the wireless once falls, never quit it, no matter what the demands on patience nor how great the sacrifices—always hopeful, always in effort, fascinating forever."

"Control of the apparatus having been achieved, we immediately began to smash records for distance. The first event was on September 5th, when communication was established between St. Louis and Springfield, Ill., a distance of 105 miles. On this occasion, President Francis of the World's Fair sent the following wireless message to Governor Yates of Illinois:

"I salute you as the distinguished executive of a great commonwealth by the modern means of communication, the wireless telegraph, a great achievement of science, of the marvelous advancement of which this universal exposition furnished many interesting evidences. I hope to see you within these grounds often during the remaining three months of the St. Louis World's Fair."

"Shortly afterwards communication was established with the Railway Exchange Building in Chicago, a distance of 300 miles.

"This was indeed a stride in progress, fulfilling careful promises, crowning long and discouraging efforts. Especially significant was it that the formal opening of the St. Louis-Chicago service should occur on Electricity Day at the Fair with the Jury of Awards and the Delegates of the Electrical Congress present.

"It is amusing to recall the elaborate precautions this austere body of officials took to make certain that this new service was actually by wireless. Some of the party was stationed at Chicago and the remainder at St. Louis. Complete communication was maintained all afternoon to their entire satisfaction and as a result we were awarded the Grand Prize which was one of the highest honors bestowed upon any exhibitor.

"Upon the strength of these singular accomplishments the United States Government became so interested that a contract was signed to erect five similar high-powered stations in the West Indies, each station guaranteed to work successfully one thousand miles. This was a distance three times greater than that we had just bridged, but with light heart and high hopes we packed up our tools and started south for new worlds to conquer.

"Little did we dream of the tremendous difficulties awaiting us and the months of tedious, sweltering days ahead before our task was accomplished."

NEW BCL STATIONS APPLIED FOR

America's Wage Earners Protective Conference, Newark, N. J., asks for construction permit to use 1100 kcs., 5 KW power.

Edwin Drillings, Middle Village, N. Y., asks for construction permit for new station to use 1500 kcs., 100 watts power.

Arkansas Radio and Recording Co., Little Rock, Ark., asks for permit to use 890 kcs., 250 watts nighttime, 500 watts daytime.

Atlas Broadcasting Corp., Fort Lee, N. J., asks permit to construct station to use 1450 kcs., 500 watt power.

Joseph DePalma, Jeanette, Pa., asks for permit to construct station using 590 kc., 100 watts power.

Roanoke Broadcasting Company, Roanoke, Va., asks for permit to construct new station to use 1410 kcs., with 250 watts power.

The Building Industries Broadcasting Co., Cincinnati, Ohio, ask for construction permit to use 900 kcs., 250 watts power.

A. S. Shiffer & A. H. Bennett, Lansing, Mich., ask for permit for new station to use 1210 kcs., 100 watts power.

Juneau Broadcasting Co., Juneau, Alaska, request construction permit for new station to use 1310 kcs., 100 watts.

Lancaster Broadcasting Service, Inc., Lancaster, Pa., request permission to construct station with 500 watts power, to transmit on 1230 kcs.

Joseph DePalma, Jeanette, Pa., requests construction permit for new station on 590 kcs., with 250 watts power.

The WNPB Company, New Philadelphia, Ohio, ask for construction permit to use 850 kcs., and 50 watts of power.

GODALMING

(Continued from Page 13)

been kept clear from a tablet surmounted by the Godalming arms. There one reads:

"DIENDE

LIBERA

FIDELIS

This cloister is built in the memory of

JOHN GEORGE PHILLIPS

a native of this town, Chief Wireless Telegraphist of the ill-fated Titanic. He died at his post when the vessel foundered in mid-Atlantic on the 15th day of April, 1912."

This cloister was built with subscriptions from all over the world, was unveiled by the High Sheriff of Surrey on April 15, 1914, two years after the disaster. It was designed by another native of Godalming, the eminent architect, Mr. Thackeray Turner. He was assisted by Miss Gertrude Jekyll, a well-known authority on country gardens.

In this arboreal retreat, so serene and peaceful, one's mind quite naturally reverts to that awful night just a little over twenty years ago when the world's largest, newest and most luxurious passenger ship collided with an iceberg and sank in less than three hours with over 1500 people, passengers and crew. She took down with her, besides the Captain, E. J. Smith, Commodore of the White Star Line, the Chief Officer, Chief Wireless Telegraphist, the entire engineering staff of 35 to a man and many prominent people in finance, the arts, and in public life. The physical loss including cargo and mails was valued at over twelve million dollars. She never completed her maiden passage.

More than mere measurements of time and space seem to separate this sequestered cloister, with its ivy, flowers and greenery, from the cold, grey Atlantic; the silent, slinking berg; the slowly sinking liner.

No crackling snarl of MGY's rotary as Phillips reaches out thru space and informs his fellow operators on the Olympic, Birma, Frankfort, Mt. Temple and the rescuing Carpathia, of the Titanic's distress; no roar of escaping steam which so hampered his work for a time; no creaking of boat falls as load after load of women and children are lowered to the distant and cold water. Only the gentle wind rustling thru the poplars.

No great drifting ice monsters or field-ice stretching, as Rostron reported, as far as the eye could see. Water lilies float placidly on the pool offering hazards of navigation only to the cruising water-bug. The air is soft, warm and drowsy; unlike the cold, crisp, starry night

that numbed the huddled survivors in the boats and froze those who perished in the icy waters. The last slanting rays of the setting sun pierce leaf and vine to illuminate in letters of gold the chiselled words of the memorial tablet.

It seems fitting here to recall the eulogy spoken by Harold Bride, the surviving junior, when he landed at New York. "He was a brave man. I learnt to love him that night, and I suddenly felt for him a great reverence to see him standing there sticking to his work while everybody else was raging about. I will never forget the work Phillips did during the last awful 15 minutes." Bride first put an overcoat on his Chief, then, while Phillips was sending in a clear, even "fist," he placed a life-belt around him.

Bride was picked up on the collapsible raft which held so many that fearful night, all standing in ice water almost to their knees, afraid to move lest they upset their tender craft. Jack Phillips left his key a few minutes before the Titanic sank. He and Bride could hear the water swishing over the boat deck, normally fifty feet above the water line. He was last seen walking aft toward the high point of the ship. The last boat had left more than a half hour before.

The great liner sank lower and lower by the head until she stood poised absolutely perpendicular with all the lights burning brightly. A great rumbling roar was heard across the water as the heavy machinery tore free from its beds and crashed thru bulkheads. The lights went out, flashed on again for a moment, and then went out forever. Still the great, black finger pointed straight to the cold starry skies for what seemed several minutes, and then the liner sank, or rather slid, into the depths without any noticeable suction.

From Phillip's sister, who still lives in Farncombe Godalming, the writer learned that Jack was an only living son, born at Farncombe on April 11, 1887. He therefore celebrated his 25th birthday the day after the ill-fated liner sailed from Southampton on the maiden passage which she was never to complete. In his early youth, Jack sang in the Godalming Church choir and attended Godalming Grammar School. Then he entered the Post Office to learn telegraphy, later going to Liverpool where he entered the Marconi school.

Mr. Blinkhorn, his technical instructor, is still with the Marconi Company in London. He remembers Jack Phillips as "a pleasant boy, well-spoken, good-tempered and friendly."

It seems appropriate to close with that fine eulogium given by Lord Mersey who presided over the Court of Inquiry at London. "It thus seems that the Marconi apparatus was at work until within a few minutes of the foundering of the 'Titanic.'" Surely these dispassionate judicial words uttered in an official report form a far nobler eulogy than any possible polished and studied panegyric.

"The Marconi apparatus was at work until within a few minutes of the foundering of the Titanic."

100 WATT TELEPHONE TRANSMITTER

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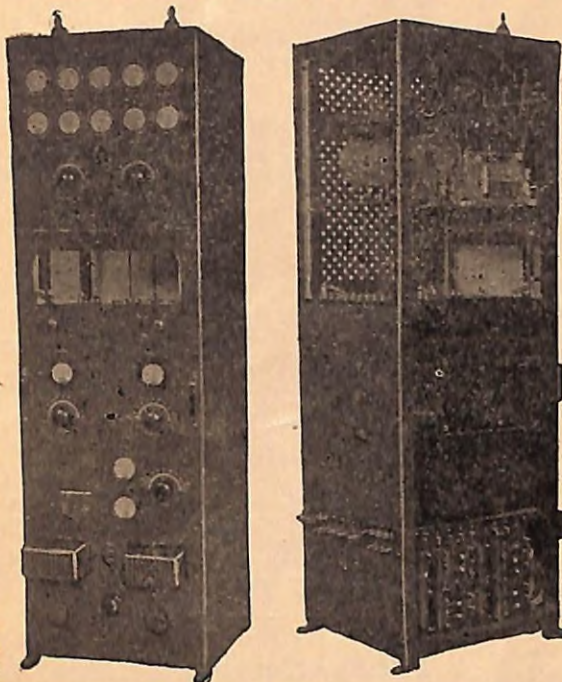
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COMMERCIAL TYPE TRANSMITTERS

100 Watt Tel. and Tel. Transmitter

Cat. 256—Code "Edshu"



The above illustrates front and side views of the Cat. No. 256 transmitter. Note that the design allows ready accessibility to all parts. The illustration to the right clearly shows the plug-in cabinet arrangement and underneath this the "C" bias voltage divider resistance bank. The push button mounted in the lower center front automatically controls the motor generator. The plug-in crystal temperature compartment fitted with a thermometer is shown on the front illustration.

graph output 100 watts carrier—Keying relay adapted for high speed transmission—All power obtained from one 3 unit motor generator set—Oscillator, buffer and intermediate amplifier circuits individually shielded in plug-in tray arrangement—Automatic overload relay gives full protection for generator and tubes—Full complement of meters.

Equipment comprising complete Cat. No. 256 transmitter installation: One Cat. No. 256 transmitter unit—One complete set of tubes—Two quartz crystals—One motor generator unit—One automatic starter—One Cat. No. 255 station amplifier and mixing panel completely equipped with tubes and batteries—Two microphones with floor stands, cords, plugs and studio connection plates.

The only other material necessary and not supplied is the antenna equipment and the electrical fittings and wire required for interconnecting the various units.

Size transmitter unit: 20" wide, 5'-10" high, 28" deep.

Size motor generator unit: 14" wide, 5'-0" long, 16" high.

Total net weight: 970 pounds. Total shipping weight: 1,270 pounds.

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Radiotelephone vs. Radiotelegraph on Boston Beam Trawler

(Continued from Page 14)

proaching in efficiency or duplicating in service the work of a radiotelegraph operator.

Inter-fleet communication on the fishing grounds is an important function of radio apparatus. Captains keep each other informed of the location of fish by exchanging messages at scheduled times throughout the day. Every trawler has a series of schedules with other boats in the fleet. Some boats have hourly schedules from six in the morning until nine at night. All vessels exchange messages frequently during the day. Of course, these schedules could be maintained on a single-frequency radiotelephone through the shore telephone station, but while inter-fleet communication adds nothing to the cost of radiotelegraph equipment, radiotelephone rates would bring the operating cost of a telephone far above the rental rate of a telegraph set and the wages of an operator. And the importance of being in constant touch with other boats in the fleet can not be overestimated. It means a good catch instead of a poor one. A profit instead of a loss.

The Telephone Company has several difficulties to surmount before it begins to dispatch radio operators to join the army of unemployed telephone operators supplanted by the dial 'phone. Fishing companies have allowed the Telephone Company to install radiotelephones on their vessels for experimental purposes, and naturally they are interested in the results, but the general consensus of opinion at this time is that radio apparatus which cannot be used for determining latitude and longitude and which restricts or prohibits inter-fleet communication, is of little value on a beam trawler. These two factors greatly offset the value of direct telephonic communication from ship to shore, and it can be seen that until such a time when radio apparatus requiring no skilled operator duplicates the services and matches the efficiency of a radiotelegraph instrument, at reduced cost, fishing companies will continue to find it profitable to employ radiotelegraph operators on their trawlers. That time appears not in the immediate future.

Boston Notes

(Continued from Page 9)

Your alert correspondent has it from an unofficial but reliable source that the owners of one of the larger fishing fleets out of Boston, who were once enthusiastic about radiotelephones, have renewed their contract for radiotelegraph sets with RMCA for a long term. Perhaps the fishing companies have it figured out that al-

though a 'phone is great when a skipper wants to call his wife and bid her good night and sweet dreams, such husbandly solicitude, touching as it may be, doesn't materially increase the size of a vessel's catch, or aid in its safe navigation.

If, when your ship is passing Castle Island in Boston Harbor, you discern a vaguely familiar figure on the shore, it may be Dan de Coste of Boston RMCA. And if the vaguely familiar figure has a camera trained on the ship, it's Dan, sure enough, riding his pet hobby.

Ed Stewart, chief on the Saint John, defies the world to discover what his middle initial, U, stands for. No, it is not Ulysses. A guessing contest is being planned here. The prize is to be a relief trip on the Saint John to Canada, with no watches to stand coming back.

Tied up fleets of beam trawlers are gradually becoming smaller, and ops on the beach are directing lean and hungry looks in the general direction of the Boston Fish Pier. The spectacle of a radio operator actually longing for a job on a trawler is a sad commentary on the times. This reporter can remember when operators had to be bribed to take trawler jobs in the winter with offers of swell berths on the summer passenger runs.

Recent assignments in Boston . . . Francis Bearse to the K. I. Luckenbach . . . Ray Downing to the trawler Ocean . . . John Driver to the Suffolk . . . Leonard Wolfe, formerly of WCC, to the Katrina Luckenbach . . . Harold Stanley to the Di Giorgio banana boat Virginia . . . Richard Golden to the William N. Page.

FEDERAL RADIO COMMISSION

The Commission, on October 4, decided not to extend further the working of Rule 145 in case of broadcast stations that have installed approved frequency monitors but that have not obtained a satisfactory check of the calibration. All stations in this class should proceed immediately to obtain the necessary check. This must be done before it can be considered that the frequency monitor is in all details operating according to the requirements of Rule 145. However, if an approved monitor is installed and due diligence is being exercised in obtaining a check and the required calibration, Rule 145 may be considered satisfied.

The following proposal, submitted by Acting Chairman Lafount, was referred to the Legal Division:

"I desire at this time to make the following proposal:

That the terms of licenses issued by this Commission be extended as follows:

Broadcasting, from 6 months to 1 year.

Commercial, from 1 year to 2 years.

Amateur, from 1 year to 3 years.

I believe the time is at hand when we should give stability to broadcasting by issuing licenses for at least one year. It would have a very salutary effect upon the entire radio industry. This action would bring about a commensurate reduction in the routine functions of the Commission's staff."

If you want to advance in radio . . .

. . . it will pay you to send now for this new book, for 10 days' free examination.

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—more information on amateur operation, including unlimited amateur telephone operator's license

HERE is a book that will help you pass examinations and to know your stuff better in any field of practical radio. Gives over 600 questions and answers covering all radio operator license examinations. Planned especially for men shooting for operator licenses or for technical positions in radio, and for amateurs and short wave fans. New fourth edition covers broadcasting, marine, police, aeronautical and amateur radio operating.

Questions are taken almost entirely from government and other license examinations. They are typical and cover all subjects on which you need to be prepared. Questions are grouped under such topics as Tube Transmitters, Motors and Generators, Receiving Apparatus, etc. Other sections give requirements for various licenses and then show what sections of book to study to cover all the requirements for any given license. Answers are complete and made clear with descriptions, illustrations and diagrams.

If you want to advance in radio send for this book today. It will cost you nothing to examine it; it will point a quick, direct way to preparation for any license examination.

See this book for 10 days FREE

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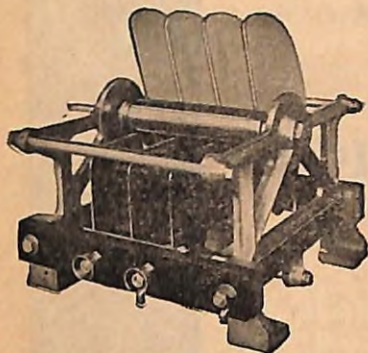
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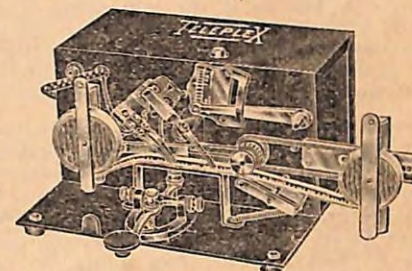
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J. C. LINDENMEYER, Prop.

MACKAY RADIO GROWTH TOLD

(Continued from Page 17)

kay Radio to keep in contact with all these vessels at any point on the globe at all times.

The company has established a marine bureau in New York, with its own telephone exchange, where information is available twenty-four hours a day as to the movement of any ship, and where messages are taken for any vessel afloat at distant or nearby points. Direct contact is maintained by this bureau with vessels entering or leaving New York Harbor.

In the field of International communications, Mackay Radio has also grown despite competition. The company was formed in September, 1927, to buy the operating properties of the Federal Telegraph Company of California, consisting of three coastal radio and ship-to-shore stations at Los Angeles, San Francisco and Portland on the Pacific Coast.

In 1928 the company leased the old German Telefunken station at Sayville, L. I., from the United States Navy, and re-equipped the station with modern radio apparatus. Early in 1929 it opened radio telegraph communications between the Pacific Coast station and Honolulu, a few months before the Sayville station was ready for marine radio business on the Atlantic seaboard.

Early in 1930 an additional marine radio station was opened at West Palm Beach, Fla., followed by the start of direct radio communications between New York and San Francisco. Another station was opened at Rockland, Me., later in 1930, and communications with Manila, P. I., were inaugurated late in that year. About the same time the station to serve New York Harbor was opened at 20 Broad street.

Sayville went into international communications early in 1931, its first European connection being with Vienna, and circuits to Lima, Peru; Buenos Aires, Argentina; Bogota, Colombia, and Camaguey, Cuba, were placed in service at brief intervals.

Characteristics of Class

"A", "B", "C" Amplifiers

(Continued from Page 12)

The characteristics of the class C amplifier are high plate circuit efficiency and output with a relatively low ratio of power amplification. The efficiency is very high because plate current flows during only a small portion of each excitation cycle. With such high efficiency the plate voltage can be increased considerably over that used with other types of amplifiers without the plate overheating. When operating as a modulated amplifier it is essential that

sufficient grid excitation is used so as to allow saturation plate current up to the highest plate voltage peaks. If the excitation voltage is less than this amount the plate current cannot be a direct function of the plate voltage over the entire plate voltage swing and the power in the output circuit will not vary directly as the square of the plate voltage variation.

An arrangement that is coming more and more into prominence in the design of high power broadcast transmitters is as follows: The radio frequency train of amplifiers is operated as class C right up to and including the final power amplifier stage. This final stage is then modulated by means of a comparatively low power class B modulator and the output transferred directly into the antenna. The use of the low power class B modulator to modulate a much higher power class C amplifier is practical in broadcast work because of the peculiarity of the make-up of speech and music. It has been shown that the AVERAGE amplitude of speech and music is only about 20 percent of the peak amplitudes. Thus while the modulator may have to supply 100 KW of power output to modulate the amplifier on the peaks it is only necessary that it supply an average output of about 20 KW. Since the power output of any tube is practically limited by the amount of power that must be dissipated by the plate and since, in the case of the class B amplifier the plate current varies with the variations in grid excitation voltage, the average plate current can be small even though the peak current reaches very high amplitudes. In the same manner, in broadcast receiver power amplifier stages, a pair of tubes which will supply a maximum undistorted output of about 4 watts when operated as class A can be operated class B and supply peak amplitudes up to 20 watts or more. It must be understood however that such operation is only feasible where the peak amplitudes form a comparatively small proportion of the entire excitation amplitudes.

WIRELESS OPERATORS' CREED

We believe in the service of mankind,
When we can serve him via the air,
We believe in keeping the brass hot,
Until our messages are there.

We believe in the care of apparatus,
In keeping each part shining bright,
We believe in keeping it ready,
For emergency day or night.

We believe in the advancement of radio,
Each new part of which helps this great
game,

We believe in our ability to hold our own,
And the success that comes with good name.

We believe in clearing our traffic,
With the use of either mill or pen,
But best of all we pride ourselves,
For being Wireless Men.

And those of you who read this creed
Please give us credit due,
Our sole aim in the wireless game,
Is to give service to you. "Anon."

Association News

(Continued from Page 19)

and the lives of thousands of men, women, and children depending on our ability. Ours is a responsible work, yet there are many who propose measures to endanger the lives of those who follow or travel upon the sea.

On behalf of the American Radio Telegraphists Association and myself, we would appreciate your support on the requests outlined above.

Very sincerely,

RADIO COMMISSION

APPLICATIONS OTHER

THAN BROADCASTING

City of Muskegon, Mich., Police Dept. for 2414 kc., 50 watts. Municipal police.

Bayonne Police Dept., Bayonne, N. J. 43,000-52,000 and 63,000-72,000 kc., 6 watts. Experimental. Also a 12.5 watt station on same basis.

National Broadcasting Co., Inc. for 34,600, 41,000, 51,400, 60,000 to 400,000 kc., 1/2 watt.

Northern Radio Co., Seattle, Wash. for all experimental frequencies, and power up to 1,000 watts.

City of Shreveport, Police Dept., Shreveport, La. 2340 kc., 100 watts. Municipal police.

Pioneer Mercantile Co., Bakersfield, Cal. 1550 kc. 500 watts. Sound track in connection with visual broadcasting.

Red River Lumber Company, Westwood, Cal. Special Emergency station 3190 kc., 500 watts.

American Airways, Inc. New licenses for aircraft on 3105, 3222.5, 3242.5, 3257.5, 3447.5, 3457.5, 3467.5, 3485, 4917.5, 5602.5, 5612.5 and 5632.5 using 50 watts.

Seattle Broadcasting Co., Seattle, Wash., new construction permit for 1270 kc., 100 watts.

W. B. Neal, Gallipolis, Ohio, asks construction permit for 500, 2000 kc., 30 watts.

Mackay Radio & Telegraph Co., Palo Alto, Cal., asks construction permit for six new transmitters point to point telegraph stations, 20 KW each.

Mackay Radio & Telegraph Co., Inc., Sayville, N. Y., asks construction permit for four 20 KW point to point telegraph stations at Sayville, N. Y.

Pan American Airways, Inc., Miami, Fla., asks construction permit for 51,400, 200,000 and 300,000 kc., 1 watt portable station.

City of Dayton, Police Dept., Dayton, Ohio, asks license for construction of station on 2430 kc., 150 watts.

New England Telephone & Telegraph Co., 114 High St., Boston, Mass., asks construction permit for experimental 2322 kc., 50 watts.

City of Anderson, 708 Main St., Anderson, Indiana, asks for construction permit for new Municipal Police station on 1712 kc., using 50 watts power.

Department of Conservation & Development of the State of New Jersey asks construction permit of Portable Station using 34,600, 41,000, 51,400, 60,000 to 400,000 kc., 5 watt power.

Chicago Federation of Labor, Chicago, Ill., asks construction permit for portable station using 60,000 to 100,000 kc. with 30 watts power.

National Air Transport, Inc., asks license for Aircraft Station on 3105, 3162.5, 3172.5, 3182.5, 3195, 3162.5, 3172.5, 3182.5, 3222.5, 5572.5, 5582.5, 5592.5, 5662.5 kc. using 50 watts power.

Racine Broadcasting Corp., Racine, Wis., asks construction permit for station on 2390 kc., 7 1/2 watts power.

Personal Mention

(Continued from Page 20)

John W. Geweken is now in the Fairfax.

Alfred W. Turner was assigned to the West Calumb.

Clyde P. Ennis has the San Juan.

Adalbert Sopko is in the Jeff Davis.

R. W. Terry pounds brass in the Alabama.

Bernard C. York works in the Cities Service Oklahoma.

Aviation Station Map Available

The important part being played by radio in the wonderful growth and development of commercial aviation in the United States is emphasized by a map just prepared by the Commission, revised as of June 30, 1932. It can be obtained only from the Government Printing Office at ten cents per copy.

The map discloses there are now 132 ground radio stations devoted to the exclusive use of aviation. Included in that list are 69 aeronautical point to point stations. In addition there are 20 airport stations located at strategic points.

335 transport passenger planes—those carrying passengers and mail—are daily in direct communication with the ground stations, as well as 20 itinerant aircraft. Thus many of the hazards of flying are removed.

The map gives, in colors, the three major transcontinental aviation routes, as well as the two routes to South America and the two to Canada.

A special block of frequencies has been set aside by the Commission for the exclusive use of the commercial aviation communication system.

A NEW TELEPLEX

Announcement comes to our office of the New Master Teleplex. Incorporating many new and novel features, this new device developed by R. G. Miller of the Teleplex Company, just about fills the bill of any man intending to develop speed and perfection in his sending. It will accurately record at any possible speed of sending, and then on re-run reproduce the message so that inaccuracies can immediately be noted and checked.

Instead of perforations as was formerly used on the teleplex tape, a fine marker or pen arrangement fed by an inked wick reproduces on the paper strip every signal sent over the key in the form of a permanent deposit on the paper. This deposit on the paper when re-run instantly reproduces the signal using the equipment furnished with the Teleplex.

A service of exchange of tapes is suggested by the Teleplex Company so that a student may not only get his own sending faults, but those of others, and in this way fit him for any commercial work, at any desired speed.

One previous complaint was the limited number of messages at a reasonable price that a user of any machine could afford. Because of the new design and system used this is entirely overcome in the new Teleplex.

F. R. C. ACTION

Lawrence C. F. Horle, Newark, N. J., granted new general Experimental license freqs. 51,400 and 60,000-400,000 kc., 10 watts power.

Wichita Falls Police Dept., Wichita Falls, Tex., granted license for police service on 1712 kc., 50 watts power.

Mackay Radio & Telegraph Co., Sayville, N. Y., granted permit for four new transmitters. 1. WIH to: Vienna, Austria, and Budapest, Hungary; 2. WIQ to: Lima, Peru, and Bogota, Colombia; 3. WMD to: Bogota, Colombia; 4. WMS to: Lima, Peru.

Mackay Radio & Telegraph Co., Palo Alto, Cal., granted permit for six new transmitters. 1. KNK to: Honolulu, T. H.; 2. KWJ to: Honolulu, T. H.; 3. KNW to: Honolulu, T. H., and Japan; 4. KWQ to: Honolulu, T. H.; 5. 17140

kc. to : China and Japan; 6. 19,560 kc. to: China and Japan.

Federal Telegraph Co., Newark, N. J. granted license to frequencies 34,600, 41,000, 51,400, 80,000 to 300,000, 100,000 to 300,000 kc. with 500 watts power for general experimental.

City of Newton, Police Dept., Newton, Mass., granted permit to construct transmitter of 50 watts using 1712 kc.

● ● ● ●
The Federal Radio Commission granted licenses to the following:

Charles Shannon Breeding, Glendale, Cal. granted aviation-airport authority, 278 kc., 15 watts.

City of Philadelphia, Police Dept. Mobile on Police Scout car for emergency police service, 2470 kc., 25 watts for 90 days. Experimental.

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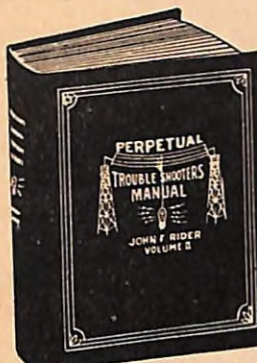
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Radio Mfg. Supply Co., Los Angeles, Calif.	Coast to Coast, New York, N. Y.
Radio Supply Co., Los Angeles, Calif.	Ft. Orange Radio Dist. Corp., Albany, N. Y.
Offenbach, San Francisco, Calif.	Kronson, Buffalo, N. Y.
Warner Bros., San Francisco, Calif.	Maurice Schwartz & Son, Schenectady, N. Y.
Electric Supply Co., Oakland, Calif.	Roy C. Stage, Syracuse, N. Y.
Vreeland, Denver, Colo.	Sun Radio Co., New York, N. Y.
Star Radio Co., Washington, D. C.	Wholesale Radio Service, New York, N. Y.
Electric & Radio Supply Co., Chicago, Ill.	Baltimore Radio, New York, N. Y.
Klaus Radio Co., Peoria, Ill.	H. L. Dalis, New York, N. Y.
Mid-West Radio Mart, Chicago, Ill.	Federated Purchaser, New York, N. Y.
Newark Electric Co., Chicago, Ill.	West Side Y. M. C. A., New York, N. Y.
Pioneer Auto Supply Co., Chicago, Ill.	Shaw's, Charlotte, N. C.
The Swords Company, Rockford, Ill.	Aitken Radio Corp., Toledo, O.
Allied Radio Corp., Chicago, Ill.	Burns Radio Co., Dayton, O.
Chicago Radio Apparatus, Chicago, Ill.	Goldhamer, Inc., Cleveland, O.
Grant Radio Co., Chicago, Ill.	Hughes-Peters Elec. Corp., Columbus, O.
Kruse Radio Co., Indianapolis, Ind.	Kladag Radio Labs., Kent, O.
State Radio Co., Indianapolis, Ind.	Lew Stores, Toledo, O.
Sidles-Duda-Myers Co., Des Moines, Ia.	Progress Elec. Co., Cleveland, O.
P. O. Burkes & Co., Louisville, Ky.	Ross Radio Co., Youngstown, O.
Schuler Radio Service, New Orleans, La.	Steinberg, Inc., Cincinnati, O.
T. F. Cushing, Springfield, Mass.	Uncle Sam Stores, Akron, O.
H. Jappe Co., Boston, Mass.	United Radio Stores, Akron, O.
Mutt's Radio Labs., Boston, Mass.	J. K. Gill Co., Portland, Ore.
Trade Contact Corp., Boston, Mass.	Johnson-Weller Co., Inc., Portland, Ore.
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Mattson Radio, Baltimore, Md.	Hall's, Harrisburg, Pa.
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Vedemeyer Radio Co., Ann Arbor, Mich.	J. L. Perry, Nashville, Tenn.
Lew-Bonn Company, St. Paul, Minn.	Service Parts Co., Inc., Abilene, Tex.
Radio Maintenance Co., Minneapolis, Minn.	Southwest Radio Svc., Dallas, Tex.
Southern Minn. Supply Co., Mankato, Minn.	Strauss-Frank Co., Houston, Tex.
Walter Ashe Radio Co., St. Louis, Mo.	Walter Tips Co., Austin, Tex.
Burstein-Applebee Co., Kansas City, Mo.	Wilkinson Bros., Dallas, Tex.
Van Ashe Radio Co., St. Louis, Mo.	Johnston-Gasser Co., Richmond, Va.
Sidles-Duda-Myers, Lincoln, Neb.	General Radio, Inc., Seattle, Wash.
Bennetts Radio Supply, Perth Amboy, N. J.	Spokane Radio Co., Spokane, Wash.
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Radio Mfg. Supply Co.	Kronson	Kronson	Buffalo
Radio Supply Co.	Maurice Schwartz & Son	Maurice Schwartz & Son	Schenectady
Offenbach	Roy C. Stage	Roy C. Stage	Syracuse
District of Columbia	Sun Radio Co.	Sun Radio Co.	New York City
Star Radio Co.	Wholesale Radio Service	Wholesale Radio Service	New York City
Illinois	Ohio	Aitken Radio Corp.	Toledo
Electric & Radio Supply Co.	Burns Radio Co.	Burns Radio Co.	Dayton
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Mid-West Radio Mart	Hughes-Peters Elec. Corp.	Hughes-Peters Elec. Corp.	Columbus
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