THE WIRELESS AGE

DECEMBER, 1914

THE RADIO REVIEW

THE year is drawing to a close. This issue is the last one to carry the 1914 date line; it is therefore fitting to review one branch of activity of the twelve months past, even though their full term has not quite expired.

FOR the year has been a notable one in demonstrating the humanitarian values of wireless. A number of thrilling instances hold our attention. Taking them in chronological order, the wreck of the oil tanker Oklahoma, which broke in two about seventy-five miles south of Sandy Hook on January 4, effectively pointed out the necessity for wireless protection on cargo vessels. Twenty-seven of her crew of forty were lost in the small boats launched in a raging gale; thirteen were finally saved through the wireless appeal for aid sent out by a Spanish steamship which sighted the sinking vessel, but found itself helpless without further assistance.

IN striking contrast was the timely rescue effected when the Vanderbilt yacht Warrior ran ashore on the coast of Colombia on January 26. The wireless call was answered by the United Fruit steamship Frutera. Eight of that vessel's lifeboats when launched were crushed like eggshells or overturned in the sea in a vain attempt to reach the yacht. Then the Almirante was summoned by wireless from forty miles away, and finally succeeded in taking off all the Warrior's passengers. Aboard the yacht were Mr. and Mrs. Frederick W. Vanderbilt, the Duke and Duchess of Manchester and Lord Arthur George Keith-Falconer.

THIRTEEN days previous to this, on January 13, the Royal Mail steamship Cobequid lost her bearings in a blinding blizzard and stranded on Trinity Rock, in the Bay of Fundy. Every one of the 108 persons aboard were saved by the two vessels answering her wireless appeals for succor. Since wireless telegraphy first triumphed over the forces of nature no more remarkable rescue has been effected. Every other manner of signaling device, by sound or sight, was useless in this case. Sirens could not have been heard, nor "flare-ups" seen through the heavy blanket of fog that lay close to the water.

ON the morning of January 30 came the great horror of the Monroe disaster with the news of the heroic self-sacrifice made by wireless operator Ferdinand Kuehn when the Old Dominion liner slipped beneath the oily waters twelve minutes after coming into collision with the fog-bound Nantucket.

AND on March 17, when the seas were pounding the City of Sydney to pieces on the Sambo Rocks, near Halifax, N. S., her S O S brought the tug Rosemary to the rescue. Fifty-three persons were taken safely from the ships and not a life lost.

DESTROYED by flames in mid-ocean was the fate of the freighter Columbian on May 3. The crew had taken refuge in the small boats and become separated. One lifeboat was sighted by the Cunarder Franconia and the survivors were taken on board; immediately afterward a wireless appeal to watch for the others was sent broadcast. Thirty-four hours later the steamer Manhattan reported success in locating a boat containing fourteen men. The revenue cutter Seneca found the third boat holding four survivors some days later. In all, thirty-one lives were saved by wireless directing a search in lonely waters.

A THOUSAND souls suddenly ushered into eternity was the news that shocked the world on the morning of May 29. A heavy collier, the Storstad, crashed amidship into the passenger-laden Empress of Ireland and swept aft, opening up her whole side to the hungry waters. Seventeen minutes later the great vessel was at the bottom of the St. Lawrence. Wireless was directly responsible for the saving of 452 lives in bringing to the spot two rescue steamers twenty minutes after the disaster. This worthy achievement was recognized by the survivors by cheers for Marconi.

THESE are a few of the more important instances; and the considerable number of lesser incidents only serve to emphasize the truly marvelous humanitarian manifestations of Marconi's great gift to the world. All the important rescues of the year now drawing to a close were effected through Marconi wireless, just as all the great tragedies of the past have reflected their only gleam of brightness in the Marconi name. We hear of other wireless men and "systems" in the courts, in the laboratory, in the association forum. But when something is done, when wireless is needed urgently, it is always Marconi men and apparatus that respond to the emergency. The reason is of course that it is the one system that operates everywhere all the time.

THE theorist has his place in the scheme of living, the experimenter is valuable in wireless work. But the all-important fact that Marconi carries the burden of wireless commerce and unfailingly rises to all emergencies is worthy of thoughtful consideration in reviewing humanity's debt to Marconi for the past twelve months.

And that it has always borne the burden is an equally noteworthy fact.

THE EDITOR.

Important Injunction Issued to Marconi Company

JUDGE HOUGH, in the United States District Court for the southern district of New York on November 13, granted a preliminary injunction upon the application of the Marconi Wireless Telegraph Company of America restraining the DeForest Radio Telephone and Telegraph Company, the Standard Oil Company of New York, and Lee DeForest from manufacturing, selling or using wireless apparatus alleged by the Marconi Company and held to be an infringement of its patents. He declared in his opinion that the rental for the apparatus charged by the Marconi Company in the case in point was not unreasonable.

L. F. H. Betts, counsel for the Marconi Company, made the following statement regarding the case:

"The Marconi Company represented to the court that it had some time ago brought suits upon two of its important patents against the National Electric Signaling Company in the United States District Court for the Eastern District of New York, these patents being those granted to Oliver J. Lodge and G. Marconi. After an exhaustive litigation Judge Veeder sustained the validity of both of these patents and held the National Company to be an infringer. It was recognized by Judge Veeder that both of those patents covered inventions of extraordinary merit. Corresponding Marconi patents have also been sustained by the High Court of Chancery in England and also by the French Courts.

"About the same time the National Electric Signaling Company, of Pittsburgh, Pa., brought a suit upon two of its patents in the United States District Court for the Eastern District of Pennsylvania, against the Telefunken Wireless Telegraph Company, these patents having been granted to Fessenden and being commonly known as the high frequency or musical spark patents. The validity of these patents was sustained by the Circuit Court of Appeals for the Third Circuit, and after this litigation the National Company brought a suit against the Marconi Company upon these patents.

"Such being the situation, the National Company and the Marconi Company, each having valuable patents, decided that it was for the interests of the public, as well as themselves, that licenses should be granted, one to the other, under these valuable patents which had been upheld by the courts, in order that both parties might be in a position to supply the most efficient apparatus to steamship companies and others. Consequently they entered into a contract with that end in view, and this contract calls for the payment of royalties each to the other in the event that either company shall lease or sell wireless apparatus to steamship companies or others.

"It was also represented to the court that the Marconi Company had acquired and was now maintaining at great expense a large number of shore stations; that none of the steamship companies or the DeForest Company contributed to the cost of acquisition or maintenance of these shore stations, although the law requires that each shore station shall handle business from all ships even if they were equipped with competing apparatus.

"The Marconi Company thereupon informed the various steamship companies that it considered that it was entitled to receive a monthly rental of $100 for the main set of such wireless apparatus as it might lease. A number of steamship companies and others, including the Standard Oil Company, objected to this rate, some of them even going so far as to file a protest with the Department of Commerce in Washington. The Standard Oil Company, however, went to the DeForest Company and asked them to get up a wireless set which would not infringe the Marconi Company's patents, if

they could. The DeForest Company thereupon undertook this task and contracted to equip a number of boats of the Standard Oil Company with this apparatus. Of course this action on the part of the Standard Oil Company and the DeForest Company was immediately resented by the Marconi Company since it was believed by the Marconi Company that the apparatus which the DeForest Company had agreed to put on the Standard Oil Company's boats was an infringement of the Marconi Company's patents. A suit was promptly brought against both companies and a preliminary injunction asked for. Both defendants filed numerous affidavits, the two principal contentions being, first, that the DeForest apparatus supplied to the Standard Oil boats was not an infringement of the Marconi Company's patents, and second, that a preliminary injunction should not be granted in any event, because the rate which the Marconi Company proposed to charge of $100 a month was unreasonable.

"Judge Hough in his opinion overrules both contentions and holds that an injunction should be awarded against the DeForest Company's manufacturing and selling this wireless apparatus and the Standard Oil Company from using the same.

"Judge Hough makes it clear that he does not consider that the Marconi Company's rate of $100 per month is an unreasonable rate to ask in view of all the circumstances."

In his opinion Judge Hough said:

"After consideration of all the affidavits and further reflection, I think I made too much of complainant's action in raising the price of its patented article immediately after (and undoubtedly in consequence of) Judge Veeder's decision. The action of Judge Veeder and that of the courts of the Third Circuit in respect of the Fessenden patents, followed by a treaty of peace between complainant and the Fessenden party, has undoubtedly put the Marconi Company in a much stronger position than it previously occupied. I am convinced that down to the present time the expense of operation (and of litigation) has been so enormous that complainant has received no fair return from the invention which under decisions now ruling I must hold to be of the greatest value and worthy both of praise and reward.

"The situation presented by the ships of the Standard Oil Company differs greatly from that existing in the case of vessels affected by the various Acts of Congress compelling the use of wireless telegraphy on seagoing craft. Where the Sovereign with one hand grants a monopoly to private persons and with the other compels the public to use that of which a monopoly has been given, the situation is one that may cry for justice. But this motion does not raise that question.

"The Standard Oil Company is not bound to have wireless apparatus on its ships; it wants that apparatus for its own safety and profit, and I cannot say, and indeed do not think, that a hundred dollars a month is too much to pay for a device without which it is matter of common knowledge that the insurance premiums on a large and laden vessel would be greater by more than the amount of complainant's fees.

"I am not therefore disposed to withhold relief by reason of complainant's action in raising rates in this, the only, instance, really before this court.

"A reading of the affidavit submitted leaves me in no doubt that defendant Radio Company sold and delivered to the Standard Oil Company on board certain of its vessels a signalling apparatus which when put together and used in the normal way—the easiest way—and the most effective way—would infringe both the patents in suit.

"The whole defense amounts to this viz.: that defendants can take, and have taken, an infringing set of apparatus, and so arranged or co-ordinated it as to avoid infringing. This claim of defendants is I think advertised in the Radio Company's Bulletin A-14, wherein it is said that

"'With these improved forms of variable inductances any form of se-

(*Continued on page* 177.)

South American Stations

Some Interesting Observations on the Wireless Situation Below the Equator

THE interest which envelops wireless telegraphy and the men engaged in it has been heightened by the accounts of the progress of the art in South America—the land of romance and revolutions—where marconigrams are used as a means of communication over long distances both on land and sea. One station was built over the burial place of mummies hundreds of years old; another stands in a desert of white stand at a considerable distance from human habitation, while a third is on the summit of a peak more than a thousand feet above the level of the sea. These are some of the not unremarkable features brought out in the recital of the introduction of wireless in the tropics.

Perhaps the most interesting discovery made in constructing the stations was that revealed to workmen while digging in preparation for laying the foundations of the towers at the little town of Arica, a seaport in northern Chile. The story goes that as the men broke up the dry soil the shovel of one of them struck something which at first he believed to be a rock. He dug a little further into the ground and obtained a glimpse of part of the obstruction. What he saw stirred his curiosity and he redoubled his efforts. Soon the other workmen noticed his excitement. They, too, set to work to unearth the object which had aroused their interest, and in a few minutes it was exposed to their wondering eyes. Their amazement was mingled with something akin to horror when they found that they had uncovered what proved to be a well preserved mummy. A further search revealed other mum-

mies. Thus the site of a wireless station was established in a section that had been used by folk of the earlier ages for a mummy burial ground.

The traveler interested in wireless will profit by a visit to the port of Antofagasta further south. In a desert of white sand, far away from the town, stand the Antofagasta towers. The engineers doubtless had good reasons for choosing this site, but the operators who work in the stations see little of their fellow men and they speak of the "infinite distances" that must be traversed in order to reach the towers.

The tower of the wireless station at Lima, Peru, occupies a lofty elevation, being located atop of Cerro de San Cristobal, an imposing eminence overlooking the Rimac valley. Cerro de San Cristobal has an altitude of 1,386 feet above the level of the sea and is 919 feet above the city. The tower reaches a height of 348 feet above the point of the hill furthest skyward. The station was opened for wireless communication with Iquitos on the upper Amazon, 640 miles away, more than two years ago. The Lima station has a ten-kilowatt set and messages are exchanged without difficulty between the two points, although a mountain range 1,800 feet in height intervenes.

This photograph taken during the erection of the station at Porto Velho gives some idea of the type of high power equipment used in Brazil

There is much interest in the announcement that Ecuador intends to build a wireless station on Galapagos Islands. These islands are a group of small volcanic islands in the Pacific ocean, about 600 miles from Ecuador. The group has an area of 2,400 square miles, the largest island being Albermarle. The work of constructing the station may not be without danger, for there are supposed to be several volcanoes that are more or less active on the islands. The group came to notice early in the sixteenth century, being visited frequently afterward by pirates. There is no record of stories of buried treasure, however.

Quito, where Ecuador also proposes to establish a wireless station, has the advantage of a high elevation, being situated on a plateau 9,300 feet above the sea. Quito has had for a long time the reputation of being a very dull and quiet city. Its trade has not been active, this condition being attributed to its inadequate means of communication with the outside world. It is expected that the establishment of the station will better trade to a considerable extent.

Another place selected for the establishment of a wireless station by Ecuador is Esmeraldas, located at the south of the Esmeraldas river on the Pacific ocean. A commission has been appointed by Ecuador to investigate and consider propositions having to do with the proposed stations.

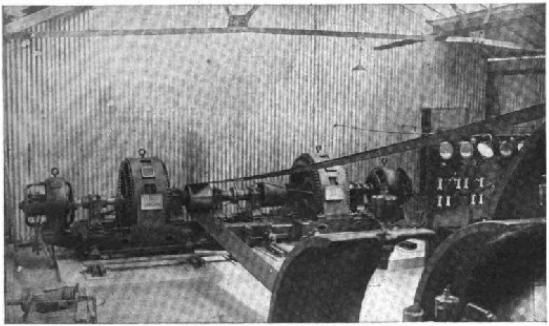
Bogota, where Colombia plans to erect a station, is, like Quito, located on a plateau. On all sides except one are high mountains. The city has labored under a great disadvantage because of its lack of communication facilities, despite the attempts of the government to remedy this condition by improving the roads and rivers. Medellin, which is the capital of the

Department of Antioquia, and has grown up between the ranges of the central and western Cordilleras mountains, is to have a wireless station and one will also be erected at Buenaventura.

Particularly picturesque is the site of the station at Montevideo, Uruguay. A great hill which is on the west side of the bay and opposite the entrance to the city forms the tower. The hill is called Cerro and was sighted by Magellan on his voyage of discovery.

tion that is located on one of the hills near Punta Arenas on the shores of the straits of Magellan. Punta Arenas can communicate with Puerto Montt, the capital of the province of Llanquihue, Chile, or any other stations within its range of 2,000 miles. In fact, the wireless has made Ushalia and the southern points of South America neighbors of the various sections that have stations as far north as California and Alaska.

A new bond will soon be added to those joining the United States and the



Close to 100 stations have been erected in Brazil, and the neighboring republics are looking forward eagerly to an equal acquaintance with wireless. This view shows the power plant of a long distance equipment

Discrimination between places and people are not recognized, it seems, where it is apparent that there is opportunity for the employment of wireless. This is illustrated by the fact that the insignificant native village of Ushalia, the capital of Tierra de Feugo, Argentina, on the Beagle channel, at the southern extremity of South America, has a station with a range of 275 miles. Thus by aid of marconigrams the little hamlet, whose inhabitants owe their knowledge of the English language to missionaries, is able to talk with passing ships or communicate with the more powerful stations in the republics of South America when arrangements are completed to send wireless messages by way of Paraguay and Bolivia to Manaos, Brazil, and thence to Washington. Manaos, which is the capital of the state of Amazonas, is located on the Rio Negro, ten miles before the latter joins the Amazon. The city is in communication with Para, the capital of the state of Para, on the Para estuary, by cable. Although Manaos and Washington have 3,100 miles between them they have exchanged wireless messages, the signals being "read consistently," according to reports.

In Argentine there are to-day more than 120 stations, and plans have been formulated for the construction of 30 more in this interesting country which ranks next to Brazil in size among the South American republics and has many forests and woodlands.

Throughout Brazil are nearly 100 stations. Brazil is a neighbor of republics which have in a measure been educated up to the value of wireless and are looking forward eagerly to a better acquaintance with the art. Among these republics are Ecuador, Peru, Bolivia, Paraguay, Argentina and Uruguay. Uruguay has twenty-four stations and Paraguay is erecting ten. Bolivia, which began the erection of seven stations two years ago, has formulated plans to extend her wireless system. The interest of this country in wireless was revealed in an article in The Wireless Age last June when tests of portable sets by the Marconi Company were described. Bolivia is an extremely high region, two parallel ranges of the Andes extending across the republic from northwest to southwest. With the aid of these mountains Bolivia should be able to obtain a vast range for her wireless.

In reviewing the facts and figures cited in this article regarding the status of wireless in South America today, it should be remembered that five years ago there were approximately only fifty stations on that continent. Which shows that the tropical countries are doing their utmost to keep pace with the wireless growth of their neighbor to the north—the United States.

RADIO INSTITUTE ISSUES NOMINATING BALLOT

Of special interest to men in the Marconi service is the announcement of the proposed list of nominees for officers in the Institute of Radio Engineers. The nominating ballots which have just been sent out, and which are returnable before December 9, are attached to a list of men chosen by the Board of Direction because of their marked qualifications for the several offices. Consideration has also been given to residence in or near New York so that the Board may not be embarrassed by lack of a quorum.

Selections are to be made among the proposed nominees for president, vice-president, treasurer, secretary and six managers. The Marconi staff is represented by H. E. Hallborg, engineer-in-charge of the New Jersey trans-oceanic stations, and Roy A. Weagant, designing engineer of the Marconi Company, proposed as nominees for election as managers, six to be elected for the year 1915. The institute's proposals for treasurer narrow down to Edward B. Pillsbury, general superintendent, trans-oceanic division of the Marconi Company, opposed to Warren F. Hubley, president American Transformer Company.

For secretary, Emil J. Simon, the present incumbent, is opposed to David Sarnoff, contract manager of the Marconi Company.

Readers of the Wireless Age are familiar with the activities of the Marconi candidates for nomination, with the exception of H. E. Hallborg, who it happens, had been awarded honor place of the month in the continent-to-continent division and appears under "In the Service" in this issue; and Roy A. Weagant, whose exceptional abilities and wide experience are to be chronicled in the near future. Edward B. Pillsbury, a newcomer in the ranks of wireless workers with many years of telegraph experience to recommend him for the responsibilities of the treasurer, was introduced to readers in the September issue.

As for David Sarnoff, candidate for nomination to the office of secretary, his adventures in the Arctic ice fields, experiences in the railroad wireless field, reports of tests with the direction finder, and his excellent paper, "Radio Traffic" (reproduced in the October issue), have placed him prominently before wireless men in a few of the forms of his many-sided activities as the Marconi Company's contract manager.

The Board of Direction of The Institute of Radio Engineers has placed in the field a strong list of eligibles for these important offices, and the result of the nominating balloting will be watched with considerable interest. Particularly is this true among Marconi men, who know from close association the qualifications of the candidates recruited from their ranks.

The Wireless Influence in the World War

Details of how the fate of the Cruiser Emden was sealed by an appeal for help from an island station—How a naval engagement off the Chilean coast was preceded by a portentous message—Some miscellaneous reports of other wireless activities

IT was one of the ironies of fate which decreed that wireless telegraphy—so frequently an aid to the German cruiser Emden in her depredations of the Allies—should prove to be her nemesis; for it was while men of the German craft were destroying radio apparatus on an island in the Indian ocean that she was attacked by a ship of the Allies which had been summoned by marconigrams before the station was demolished. Driven ashore and burned, the destruction of the Emden marked the end of a vessel which had been veritably a terror of the seas to the enemies of Germany.

This is only one of the recent incidents of the war in which wireless has been employed. The importance of the art was well illustrated by its use in the first naval engagement of consequence in the war which occurred off the coast of South America. In this duel between the vessels of Great Britain and Germany marconigrams were found to be of great service in conveying orders to the various ships of the English. That the Germans realized the value of wireless to their enemies is shown by an official report of the battle which relates that the latter attempted to "jam" or interfere with the radio messages of the English.

The mind of man has not invented a more thrilling tale for a place between book covers than that which fact has woven about the German cruiser Emden. For two months she cruised here and there, leaving in her wake a trail of sunken vessels. On November 9 she came to Direction Island—one of the Cocos group in the Indian ocean—where she was destroyed by the Australian ship Sydney which steamed to the aid of the little island in response to an S O S call.

In the November, 1914, number of The Wireless Age attention was called to the theory of a naval correspondent regarding the activities of the Emden. He suggested, and not without good reason, that she was in constant communication by wireless with someone in high authority in Germany. It was pointed out that it would be comparatively easy for an official in Berlin to issue orders for the carrying out of a master-stroke, using wireless to keep him informed regarding the positions of the Allies' vessels and also to convey his orders to the commander of the Emden. The activities of the raider would seem to bear out the plausibility of this theory.

A graphic description of the arrival of the Emden at the little island and the duel between her and the Sydney is told by one of the men detailed at the cable and wireless station there. He said:

"It was early in the morning that the unexpected arrival of the German cruiser Emden broke the calm of these isolated little islands, which the distant news of the war had hitherto left unruffled. One of the islands is known as Direction Island, and here the Eastern Telegraph Company has a cable station and a staff engaged in relaying messages between Europe and Australia. Otherwise the inhabitants are all Malays, with the exception of the descendants of June Clunies Ross, a British naval officer who came to these

islands ninety years ago and founded the line of 'Uncrowned Kings.'

"The war seemed to be very far away. The official bulletins passed through the cable station, but they gave us very little real news, and the only excitement was when it was rumored that the company was sending out rifles in case of a raid on the stations, and orders came that the beach must be patrolled by parties on the lookout for Germans. Then we heard from Singapore that a German cruiser had been dispatched to these islands, and toward the end of August one of the cable staff thought he saw searchlights out over the sea. Then suddenly we were awakened from our calm and were made to feel that we had suddenly become the most important place in the whole world-wide war area.

"At 6 o'clock a four-funneled cruiser arrived at full speed at the entrance to the lagoon. Our suspicions were aroused, for she was flying no flag and her fourth funnel was obviously a dummy made of painted canvas. Therefore we were not altogether surprised at the turn of events. The cruiser at once lowered away an armored launch and two boats, which came ashore and landed on Coral Beach three officers and forty men, all fully armed and having four Maxim guns.

"The Germans—for all doubt about the mysterious cruiser was now at end—at once rushed up to the cable station, and, entering the office, turned out the operators, smashed the instruments, and set armed guards over all the buildings. All the knives and firearms found in possession of the cable staff were at once confiscated.

"I should say here that in spite of the excitement on the outside, all the work was carried on in the cable office as usual right up to the moment when the Germans burst in. A general call was sent out just before the wireless apparatus was blow up.

"The whole of the staff was placed under an armed guard while the instruments were being destroyed, but it is only fair to say that the Germans, working in well disciplined fashion under their officers, were most civil. There was no such brutality as we hear characterizes the German army's behavior toward civilians, and there were no attempts at pillaging.

"While the cable station was being put out of action the crew of the launch grappled for the cables and endeavored to cut them, but fortunately without success. The electrical stores were then blown up.

"At 9 A. M. we heard the sound of a siren from the Emden, and this was evidently the signal to the landing party to return to the ship, for they at once dashed for the boats, but the Emden got under way at once and the boats were left behind.

"Looking to the eastward, we could see the reason for this sudden departure, for a war-ship, which we afterward learned was the Australian cruiser Sydney, was coming up at full speed in pursuit. The Emden did not wait to discuss matters, but firing her first shot at a range of about 3,700 yards, steamed north as hard as she could go.

"At first the firing of the Emden seemed excellent, while that of the Sydney was somewhat erratic. This, as I afterward learned, was due to the fact that the Australian cruiser's range-finder was put out of action by one of the only two shots the Germans got home. However, the British gunners soon overcame any difficulties that this may have caused and settled down to their work, so that before long two of the Emden's funnels had been shot away. She also lost one of her masts quite early in the fight. Both blazing away with their big guns, the two cruisers disappeared below the horizon, the Emden being on fire.

"After the great naval duel passed from our sight and we could turn our attention to the portion of the German crew that had been left behind, we found that these men had put off in their boats obedient to the signal of the siren, but when their ship steamed off without them they could do nothing else but come ashore again. On relanding they lined upon the shore of the lagoon, evidently determined to fight to the finish if the British cruiser sent a party ashore, but the dueling

cruiser had disappeared, and at 6 P. M. the German raiders embarked on the old schooner Ayessa, which belongs to Mr. Ross, the "uncrowned king" of the islands. Seizing a quantity of clothes and stores, they sailed out and have not been seen since.

"Early the next morning, Tuesday, November 10, we saw the Sydney returning, and at 8:45 A. M. she anchored off the island. From various members of the crew I gathered some details of the running fight with the Emden. The Sydney, having an advantage in speed, was able to keep out of range of the Emden's guns and to

bombard her with her own heavier metal. The engagement lasted eighty minutes, the Emden finally running ashore on North Keeling Island and becoming an utter wreck.

"Only two German shots proved effective. One of these failed to explode, but smashed the main range finder and killed one man. The other killed three men and wounded fourteen.

"Each of the cruisers attempted to torpedo the other, but both were unsuccessful, and the duel proved a contest in hard pounding at long range. The Sydney's speed during the fighting was twenty-six knots and the Emden's twenty-four knots, the British ship's superiority of two knots enabling her to choose the range at which the battle should be fought, and to make the most of her superior guns.

"The Sydney left here at 11 A. M. Tuesday in the hope of picking up any of the survivors of the Buresk, the collier that had been in attendance on the Emden and was sunk after an engagement on the previous day. Finally, with a number of wounded prisoners on board, the Sydney left here and our few hours of war excitement were over."

Another account of the destruction of the Emden says that the wireless and cable men on Direction Island were aware that they were under the protection of the British Admiralty, although war-ships were seldom seen near the island. It was evident some time before the Emden made her appearance, however, that protection had been withdrawn because wireless messages sent out were not answered. The men on the island believed that this cutting off of radio communication was part of a naval strategic scheme, and therefore were not uneasy about the matter.

When the Emden made her appearance she stood off three or four miles from shore. The men on the island, however, were given time to make their plans and as soon as there was no doubt that they were menaced by a German war-ship, the wireless operator began to send out the call, "S O S Cocos." This call was repeated many times and was finally picked up by the Sydney. A remarkable feature of the affair is that the commander of the Emden must have known that the wireless call for aid was being sent, yet he did not drop shells with the object of dismantling the mast of the station.

While the Germans were engaged in destroying the cable and wireless, the Sydney, summoned by the S O S calls, was steaming rapidly toward the Emden. When the British craft hove in sight the German officers and men made their escape.

One of the most formidable features of Germany's fighting force has disappeared with the destruction of the Emden. The feat which she performed last October will linger long in the memories of naval men. While British, French, Russian and Japanese warships were searching the seas for her, she unexpectedly put in an appearance in the Malacca Straits with a fourth funnel attached to her deck, and the Japanese flag flying from her mast. She steamed boldly into the harbor of Benang, right under the guns of the British fort. Then, when an opportunity presented itself, she torpedoed

the Russian Jemtchug and the French destroyer Mousquet, and before the guns of the fort could be trained on her, scurried out of the harbor. It is asserted that this story has been verified, although it has been denied by the British government.

. The Emden came into notice early in the war when it was reported that she had been sunk on August 6 by the Russian cruiser Askold off Wei-hai-wei. This was disproved, however, when the Emden sank the steamship City of Winchester in the bay of Bengal on August 10. A month afterward the German cruiser sent two more vessels flying the British flag to the bottom. Two days later she sank a British freighter. Thus her depredations continued from day to day and there was seemingly no way to stop them until she ran afoul of the Sydney.

Wireless telegraphy was also used extensively by the British in conveying orders to ships of the fleet in the first important naval engagement of the war which occurred on November 1 between the British and Germans off the Chilean coast. According to an official British report of the battle the English cruiser Glasgow left Coronel on the morning of the day that the vessels of the two nations met. She had been advised by Sir Christopher Craddock, commander of the British squadron, that the enemy's ships were to the northward. The Glasgow steamed northward, therefore, and toward evening she sighted a cloud of smoke which her commander assumed came from the funnels of the German craft. He reported his discovery to Admiral Craddock and the British fleet formed in battle line. The Good Hope led with the Monmouth, Glasgow and Otranto following. The German vessels, with the Scharnhorst and Gneisenau in the lead, had turned southward. Then Admiral Craddock sent this message to the Glasgow: "I am going to attack the enemy."

"The enemy was at that time 15,000 yards away," says the report, "and maintaining this range, at the same time 'jamming' the wireless signals. The sun was setting immediately behind the British ships, and while it remained above the horizon the British had the advantage in light, but the range was too great. When the sun had set and the visibility conditions were altered, the British ships were silhouetted against the afterglow, and the failing light made the enemy difficult to see.

"The Germans opened fire at 7 o'clock at 12,000 yards, followed in quick succession by the British. The growing darkness and heavy spray of the head sea made firing difficult, particularly for the main deck guns of the Good Hope and Monmouth.

"The enemy, firing salvos, got the range quickly, and their third salvo caused an outbreak of fire on the fore part of both ships, which were constantly on fire until 7:45 in the evening. At 7:50 an immense explosion occurred on the Good Hope amidships, the flames reaching 200 feet high. Total destruction must have followed.

"It was now quite dark. Both sides continued firing at the flashes of the opposing guns. The Monmouth was badly down by the bow, and turned away to get her stern to the sea, signaling the Glasgow to that effect.

"At 8:30 the Glasgow signaled to the Monmouth: 'The enemy is following us,' but received no reply. Under the rising moon the enemy's ships could be seen approaching, and as the Glasgow could render the Monmouth no assistance, she proceeded at full speed to avoid destruction. At 8:50 we lost sight of the enemy. At 9:30 we observed flashes of fire, which were doubtless the final attack on the Monmouth."

According to another official statement issued by the British the Monmouth was run ashore. The Glasgow was not badly damaged in the engagement.

On the ground that Ecuador and Colombia have violated their pledges of neutrality by permitting wireless messages to be sent to the German squadron off South America, telling of

the whereabouts of the English fleet under Admiral Craddock, Great Britain, according to dispatches from Washington, has decided to lodge a protest with the governments of the two tropical republics. Although it has not called upon the State Department in Washington to take action in the matter, it has brought the affair to its notice.

It is charged that the Galapagos Islands, off the coast of Ecuador, where that country plans to establish a wireless station, have been used practically as a coaling base for German vessels, and that news of the whereabouts of the British fleet has been conveyed to the Germans by means of wireless messages sent from Ecuador and Colombia.

In connection with the use by belligerents of wireless stations on neutral soil the Chilian ambassador in Washington received a message from the minister of affairs at Santiago, giving the latter's reply to the rumors that Chilians had been aiding the Germans. The foreign minister declared that Chili was rapidly "discovering and suppressing all wireless installations," and that the government "had adopted various measures to prevent the belligerents from making use of ports or territorial waters as bases of naval operations against their adversaries, and especially from installing therein radio-telegraphic stations or apparatus designed to serve as a means of communication."

The following statement was issued in Washington:

"The Colombian Legation here has given to the State Department the following information, with permission to make it public:

"The Colombian Government has no wireless station on the Pacific Coast. A private company owns a radio station on the Atlantic Coast at Cartagena, but the Government has a contract giving it full rights of inspection and censorship in case of war.

"Complaints having been made by the British Legation that the office was not in the hands of a characterized expert, the station was closed. Afterward the Colombian Government employed a professional expert and opened the station.

"Further complaint having been made against the employment of aliens, all foreign employes were dismissed, and since that time it has been handled by the Government expert. Later a complaint has been made on the ground that plain words and phrases may be used with a conventional and secret meaning, but the Colombian Government had not felt that this was a sufficient reason for closing the station to commercial uses. This is the only pending question.

"Upon information received from the British Legation that it feared that the Germans might be hidden in Uraba and using occult stations, the Government made investigations at Cartagena, at Turbo, and at Quibdo, and found an abandoned ship, the Oscar of the Compania Bananera, with wireless apparatus out of use. A special official was sent to bring back the apparatus, and the British Government tendered its thanks to the Government for its zeal."

The wireless happenings of the war published in The Wireless Age last month have aroused considerable interest. One of the incidents in particular —the chase after the German warships Goeben and Breslau by the British ship Gloucester—has brought forth comment from E. Helken, a wireless operator. Regarding the story, which was contained in a letter written by T. Marsden, wireless operator on the English ship, Helken said:

"I happened to be bottled up in Messina harbor as operator on the Hamburg-American steamship Ambria when these two ships (the Goeben and

Breslau) came in. They had been chased by ten or fifteen English ships, I was told, from the African coast. If this is the chase that the operator on the Gloucester means (and I think it is) he is very much mistaken in saying that the Breslau was damaged. I was aboard both vessels and spoke to a number of the officers and crew, but I neither saw nor heard anything about either being damaged in any way.

"The operator on the Breslau told me of an incident during the chase. He said an English ship wirelessed them and asked if they could give them some coal so that they could go faster. The Breslau answered, 'No, but maybe we can help you with some.'

"The next day they left for Turkey, passing the English warships at the mouth of the Straits. It seemed that the German vessels escaped without harm, for the next day an English four-funnelled battleship passed through the Straits to see if the German ships were still there. But by that time they were nearly to Turkey."

Helken said that he told this story, "not to criticize your magazine, but to give an unprejudiced version of the incident by an American who likes to see fair play."

An English correspondent in Belgium tells of a British patrol coming suddenly upon a German touring car stalled in a quiet highway and effecting a capture without resistance on the part of the two officers seated in the machine. The Germans were questioned closely regarding their activities in the locality, but remained noncommittal. As they were descending from the automobile one of the patrol noticed a very fine wire connection to the framework of the raised top. Following the course of this wire he came upon a telephone headgear under the seat and, placing it over his ears, was startled to hear a message spoken in German. Further investigation showed that the automobile top's skeleton was equipped with a wireless telephone receiving aerial and that the message came from the nearby headquarters of the army corps to which the automobilists belonged.

Wireless telegraphy was recently employed to discover the whereabouts of the United States battleship North Carolina, which was ordered to Beirut, Turkey, for the protection of American interests there. There were reports for a time that the craft had been blown up at Smyrna, Syria, and every effort was made to locate her. To this end wireless was used to reach out over the sea and land. Information was finally received to the effect that she was safe at Beirut.

Newspaper dispatches from London relate that the police have seized a wireless receiving apparatus at the home of Professor Arthur Schuster, near Wokingham, Berkshire. Professor Schuster admitted that he was able to receive messages from Berlin or the Eiffel Tower in Paris with his apparatus. He is a brother of Sir Felix Schuster.

An investigation of a number of buildings in London used ostensibly for a factory was made recently, according to a newspaper report. The factory is located near Woolwich. All of the buildings are of reinforced concrete of strength and thickness quite out of proportion to the necessities of their use. From the roofs of the structures can be obtained an uninterrupted view of some of the most important points of London. It has been pointed out that certain of the buildings could be used as aeroplane sheds and that the existence of a powerful electrical plant would make easy the installation of a wireless set. Many Germans were employed in the buildings under the direction of a German manager.

A dispatch from Paris is to the effect that wounded soldiers have told General Pierre Cherfils that a hidden wireless station is being used by the Germans to convey information regarding the movements of the Allies' troops to the Kaiser's officers. Despite diligent efforts to find the station, it is still undiscovered and in operation.

Taunting one another by means of rude verse sent by wireless is the prac-

tice of the operators at the German station at Nauen and the Eiffel Tower in Paris. After they had discovered that their messages were tapped by the French, the German operators sent the following message in German to the Eiffel Tower:

"Where did you cause our plan to fail? Where did you thrust our armies back The news is improbable and scanty, Eiffel Tower, and is not very honest."

This was the reply of the Frenchmen:

"Oh, German Army, have you forgotten that Paris expected you for luncheon on Sedan Day? Where have you dawdled?"

When the Sant' Anna of the Fabre Line reached New York on November 16, after a voyage from Mediterranean ports, her commander—Captain Pavey—told a story of what he believes to be an attempt to trap the craft by means of wireless messages. When in mid-Atlantic, he said, many mysterious messages were picked up by the operator on the Sant' Anna. One of the marconigrams requested that all craft report their positions immediately. Suspecting that it came from a German warship, Captain Pavey asked the other vessel to reveal her identity and position. There was no answer to this request.

IMPORTANT INJUNCTION ISSUED TO MARCONI COMPANY

(*Continued from page* 166.)

lective receiving circuit can be quickly formed and tested. The maximum possible selectivity of circuits is assured with this Radio Apparatus.'

"It seems to me that it would be (under familiar cases) proper to grant a preliminary injunction here on the sole ground that the apparatus vended and used by defendants was capable of infringing and would when ordinarily used by operators be so adjusted as to infringe. But defendants' explanations may be considered a little further: The only reason alleged in argument why the apparatus arranged as shown in defendants' drawings does not infringe the Lodge patent is that the variably acting inductance coil at the transmitting station is not directly in the antenna circuit, but is in a closed circuit which is so connected to the antenna as to control the radiation therefrom.

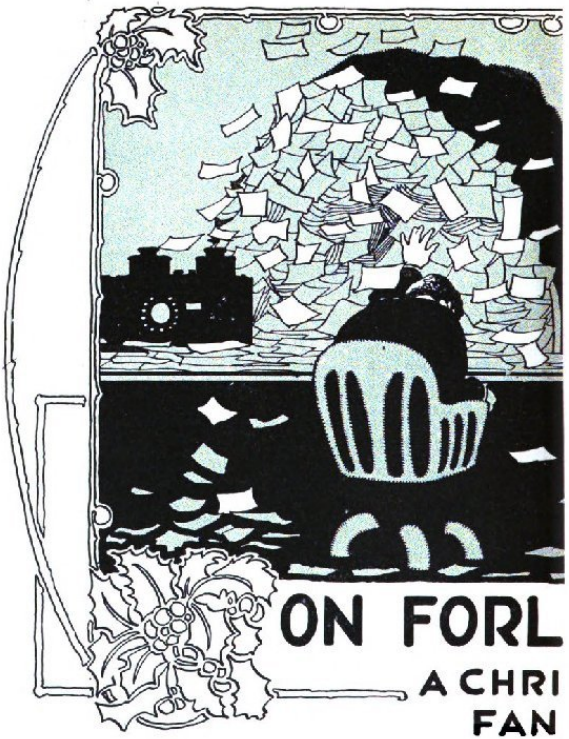
"Even if this is true I do not think that infringement is escaped, because the principal Lodge claims do not require a direct connection; it is enough if the self-inductance coil is electrically inserted between the capacity areas.

"It is alleged that the transmitting claims of the Marconi patent are not infringed because the closed circuit is not in tune with the open radiating circuit. But tune, or syntony, may be produced by the variable inductance shown, and it is inconceivable that the inductances would be shown if it were not intended thereby to produce syntony.

"It is also alleged that the condenser coupling shown in the defendants' drawing is not the equivalent of the transformer coupling shown in the Marconi patent. I think it proven that defendants' expert Mr. Stone not only says that the two devices are equivalent, but that he found out that they were.

"If the defendants' device diagramatically shown in the affidavits be considered with respect to the receiving claims of the Marconi patent, complainant admits that if used exactly as shown no infringement is proven. It is on this head that the capacity for infringement is important. I do not believe that a non-infringing device which could be made more efficient by an operator after he got to sea, or just before starting, by making it infringe, would be permitted to remain in the non-infringing and less efficient form.

"The injunction may issue as prayed for."



PEACE . . GOOD WILL TOWARD MEN. LOVE TO THE KIDDIES AND MERRY CHRISTMAS ALL AROUND. TOM.

By actual count it was the 297th fond Christmas tiding which had reverberated through the little room of the wireless station. Banter slid forward in his chair, his finger dropped from the key; he was tired, physically and mentally exhausted. In a series of jerks his head slipped down on his folded arms, his eyes closed. Outside the wind howled dismally over the marshes, fitful gusts of sleet rattled against the window pane. The dull boom of the surf brought to his ears its monotonous obligato to the shrieking fortissimo of the raging gale. Christmas Eve . . . what a Christmas Eve!

ORN ISLE

STMAS TASY

All the world, that great, big, lovable, loving outside world, a world of mothers and small brothers and sisters—Banter's world of, oh, so long ago—was already tasting the anticipatory sweets of the most beautiful day in the year. Sparkling eyes and ruddy cheeks flashed by in kaleidoscopic review; memories of years gone by swept in on noiseless wings and hovered about the dingy little room. The single tiny sprig of holly over the doorway rustled disconsolately. A window rattled. And the storm began anew.

Borne on the furious onslaughts of the rising gale came mystical sounds that a trick of memory formed into the high falsetto voices of gleeful children, and long-drawn ohs and ahs of ecstasy too exquisite for words.

Then a door banged somewhere.

The lone figure of the operator stirred. Slowly the head raised from the folded arms and the heavy-lidded eyes struggled with visions of candle-lighted trees and flashing tinsel intruding between the cold reality of four drab cabin walls.

"Must have fallen asleep; dozed off . . . won't do," he murmured, "mus' get res' mess'ges out of way." Instinctively a heavy hand moved toward the key. The slight pressure met with no response. With a jerk the weary figure straightened and into mobile features crept an expression of alarm. Something . . . somewhere . . . something was wrong . . .

Then Banter laughed; a chuckle first, which grew into the proportions of what in a woman would be called hysterics, and the huge masculine frame shook in gusts of a mirthless agitation that frazzled nerves brought perilously near to sobs. A suspicious moisture gathered on his lashes and he blinked rapidly. Then his sense of the ridiculous saved him! He looked about. Everything was all right; he had done his duty; not a single message remained. All that rumpus over nothing. The key dead? Of course. He had switched the motor generator after signing off that last message. It was quiet again. Everything was over; his work done.

The weary eyelids drooped, stubbornly unresponsive to his passive efforts to open them, and a heavy chin sank slowly into an unresisting forearm. For the first time since four that afternoon the telegraph sounder was silent, the rotary gap at rest. Fully half the people in the universe it had seemed were either out to sea or had dear ones on the water. And every last one of them simultaneously hit upon sending Yuletide greetings by wireless during the eight hours of Banter's trick. But it was over—at last.

The battered brass clock ticked off comforting assurance: three minutes to twelve. Cochrane was due back at midnight; Banter's day was done. He smiled weakly, wearily.

And Cochrane became good old Cochrane, cheery and fun-loving, tender and kind; for somewhere out there he was wading through snow waist-high, bending against the rising gale and steadily ploughing his way back. Not one in a thousand would have ventured out on a night like this; not one in a million have made that perilous trip to the mainland. And all because during the past summer two freckle-faced washerwoman's kids had heard of Santa Claus and Christmas trees and it simply couldn't be that they should be disappointed in the morning. Good old Cochrane, bless his heart.

Handling the heavy trick alone had been hard, but any fellow would . . . o'course . . . anything . . . why the dear old derelict . . . not a soul on earth . . .

The pillowed head sank lower and settled firmly in the crook of his arm. Banter slept the deep, unmoving, silent sleep of utter exhaustion.

Rat-tat! A particularly vicious blast of sleet crashed against the window pane. The howling wind tore at the eaves of the little house and rose to a maudlin shriek as it whipped the thundering waves to frothy fury. But the sleeper never stirred. Gradually a roaring wind came up out of the west, gaining in strength until the building rocked on its very foundations. Then only did Banter seem to sense without looking up that the roof was raising, slowly moving upward from the supporting beams. A shingle cracked and snapped as the roof settled back in place; the wind whistled in the tiny aperture and tugged manfully to rest the shingle loose. Suddenly it was gone and a small black square of sky looked down accusingly in its place. Then great oblong patches of snow began to fall about the prostrate operator; covered first his arms, then the instruments, and rising steadily piled up over his shoulders and head and began to bank against the wall.

It was different snow than any he had known before, lighter and stiffer, and it rustled as it fell. Strangely, too, there were no disagreeably melting crystals; just large rectangular pieces that drifted slowly down and settled about him with that faint rustling sound. Banter dimly wondered how he knew these things; he seemed to sense

them rather than to see, for his head was still securely pillowed on his arm. And somehow he knew that the heap was steadily rising, rising, rising on up over his head. The weight began to tell on him; his breath came shorter and faster; it seemed that he would suffocate, slowly but inevitably.

With a choking and inarticulate cry he struggled to free himself, turned and twisted until one hand finally grasped the arm of his chair. Then with an almost superhuman effort he wrenched the other loose, reached up and——

Bang! wh-i-i-p-p! woo-o-ooo-o-o! whistled the wind as he sat bolt upright just in time to see the heavy door slam shut.

"Asleep again," he murmured, rubbing his eyes.

"Asleep? Well, I should say yes," came in a laughing voice from the doorway.

Banter sat up with a start. "Who are you?" he demanded.

"Who am I? Who am *I*? Well, now that's funny! Whom am *I*—" and the voice fell away into long rumbling, laughing cadences.

Banter blinked, rubbed his eyes and stared into the semi-darkness. Gradually a dim shape outlined itself in the shadows whence came the deep-voiced chuckling. He looked again, scarcely crediting his eyes. "Why . . . why," he stammered, "you are——"

"Santa Claus; none other."

"Is it possib——"

"Not only possible, but probable; I might even say, actual, my sleepy friend with the unique distinction of having asked the best known person in the world who he was."

"It was dark," explained the operator. "Of course I know now."

The little old man rocked in a paroxym of mirth, holding his sides as his fat stomach bobbed up and down like a fishing cork and his shoulders swayed from side to side. "Sure you know?" he finally managed to gasp. "'Cause if you're not sure——"

Banter mumbled something about rubbing in it on a fellow.

Instantly the jolly little person sobered up and into the twinkling eyes came suspicion of remorse. "I'm sorry," he murmured. "I didn't mean to hurt your feelings; it was funny, though," and with a distinct effort another gale of laughter was suppressed.

"But to come to my errand," he continued, "I dropped off here to see if you didn't want to go with me over to the mainland. I'm paying a little visit to the washlady's kiddies——"

"It's pretty far," objected Banter.

"Far? Not far for two. Let's see. I believe it's twelve miles."

"That's six miles apiece," interposed Banter, and he wondered at the vaguely strange sound of his answer.

The old saint apparently saw nothing wrong with this reasoning, however, so he thought it must be correct.

"Perhaps you're too tired," suggested the other. "You should never sleep on a full stomach—even if it is your own. It sets you a week back."

"Sets me a week back?" repeated Banter, wonderingly. Conversation seemed difficult with this old fellow. Besides, it wasn't true, and he began excitedly: "I haven't been set a week back! Every single message——"

"Tut! tut!" interrupted the other. "You are circumambiating. I've no fault to find with your wireless traffic. You've done nobly to-night; nobly, my son. I'm proud of you—not finding fault. Why, think of all the happiness you've transmitted through the air to loved ones ashore and at sea. Find fault? Why, for you I have a penchant; you're my very first lieutenant in dispensing Christmas cheer of the 1914th year."

Banter wished his visitor would not talk in jingles; it was ever harder to follow him. He saw the old man's eyes were fixed upon him, however, and he evidently expected a reply. So he began: "Er, don't mention it, the little bit I did amounts to nothing; 'twas up to me to help, you see, in sending greetings out to sea—" and broke off in confusion. What was this? He, too, was talking in jingles. He bent an eye filled with suspicion on the placid figure in the doorway.

Santa appeared totally oblivious of the interruption. "And, my son, since you have proven so unselfish I have done what little I could to secure you some appreciation. Lift your hand."

The operator did as he was told and

immediately a shower of wireless message blanks fell to the floor. He moved, and a veritable paper landslide resulted; from the table and from his chair, from the instruments and from the walls swept a deluge of yellow slips. There seemed to be millions of them.

He glanced apprehensively at the stranger. "What's this?" he demanded.

"My little surprise. Don't you like it?"

Banter groaned. More messages! In silence he pointed toward them. "Do I have to send all these?" he asked.

The snow white eyebrows of his companion jerked upward in surprise. "Send them? Why——"

"So I'm the dispenser of Christmas cheer," interrupted the operator listlessly. "I suppose, your reindeer sleigh or something else has broken down and I'm elected to get all these—off to——"

"Tut-tut! tish-tish! tut-tut!" interposed the other. "You don't understand. Do you think Santa's gratitude takes the form of more work? Never; you are not expected to send a single one of them. They are all *addressed* to you."

"Addressed to *me?*"

"Yes, to you," and the old fellow chuckled. "You thought everyone had forgotten Charlie Banter on Christmas eve, eh? Well, they haven't. Each yellow slip in that pile contains a message of good will to the lone operator on Forlorn Isle. And there are quite a few. Count them."

"Count them?" repeated the operator helplessly, as he gazed at the mass of marconigrams.

"Why certainly; it's very easy. Let me show you how." And a roly poly arm took his and guided finger tips from heap to heap with a rapidity that made his head swim.

"How many?" queried the visitor as their hands came to rest a few seconds later.

Banter was puzzled; he felt certain somehow that all had been counted—but then it didn't seem possible. "Two hundred and seventy-eight thousand, seven hun—" he began.

"Exactly. You have a good head for figures, my boy. There are just 278,710 messages there."

"And all for me?"

"Every one of them. Take this one, for example; it reads: 'Just a word of Christmas cheer to the faithful wireless operator who sent the timely message of my daughter's illness on September 28, 1910. May Christmas on Forlorn Isle bring to him the good wishes of thousands like myself who are enjoying the good things of life while silent workers stand faithfully by their humdrum tasks.'

"Now, isn't that fine?" finished Santa. "That's what Christmas has done for you this year—278,710 presents—words of appreciation—and each one from some person you have sent a marconigram to in the past."

Banter looked puzzled. "But how have you kept account——"

"Nothing easier," interrupted his visitor; "my books show every deed, good and bad, done by every single person in the universe. I have everyone's record at my finger tips. I happen to know, for instance, that you have been in the wireless service five years, in which time you have worked 14,000 hours and sent messages to 69,742 people. That's a good record, and because I liked your conduct otherwise I planned a special celebration in your case. Message for message, every marconigram you have sent has been returned by all the 69,742 receivers in the form of an appreciative word for one of our greatest silent workers in the cause of humanity."

"But how in the name of all that's good and worthy did you ever——"

"Reach them? Ah! you must not be too inquisitive. Santa Claus does not reveal his secrets. If you knew," and the deep rumbling voice sunk to a confidential whisper; "if you knew, the whole world's system of communication would be rendered obsolete. Telegraph and telephone wires, great wireless plants, operators and messenger boys—all would no longer be needed. My system, the secret of which will be forever locked within

my bosom, reaches straight to the person I want—straight to the heart."

"I see," murmured Banter, shamefacedly. "What a lot we don't know when we think we know it all."

A heavily mittened hand rose to the snow white beard of the little Saint. He stroked it reflectively for a moment. "Yes," he began ponderously, "and what a lot we have known and forgotten. That's what makes it so very difficult to think up proper presents for grown-up folks, deserving young men like yourself who have lost the implicit faith in and forgotten the glamour of old Kris Kringle's doings, but still in a measure retain their youthful dreams."

"And have I dreams?" inquired the operator. "I am not so sure. Most of my illusions have been spoiled and my visions died of neglect on these wind-swept wastes."

"As bad as that, eh?" laughed the little man. "Don't you believe it. You're dreaming right now, this very minute."

"Dreaming? . . . Why, I . . . I thought this was all. . . ."

"And so it is. Just as real as the feeling of lonesomeness you were experiencing when I came in, just as real as that the dreams are merely sleeping which you thought forever dead, and visions still are beckoning through the years that wait ahead; for the white and scarlet berries of the season still remind us that we've never quite forgotten all the years that lie behind us."

Banter started. That disconcerting trick of rhyming had begun again. The old man went on:

"Oh, wireless man it's Christmas and the world is merrymaking. Oh, wireless man, it's Christmas and you've come from far away; and in these lonesome shadows you are waiting, waiting, waiting; with those who've lost the road that leads to home on Christmas day."

The operator's head sank silently on his breast; a great wave of loneliness swept over him and engulfed his thoughts. His visitor's voice droned on:

"Gray ghosts across the drifting years, they come upon your dreaming; the little stockings by the hearth, the kettle there a-steaming; the kid you used to be before you knew the rover's fate, and your weary eyes had looked in vain for that dear old-fashioned gate. Oh, wireless man, to-morrow you'll come right down to earth again, and have your dear old Cochrane friend back with a cheery word; but now you'd give your soul to go on that Christmas highway back again, to whisper, 'Mother' . . . 'Mother' . . . and to know that she had heard."

"Don't! don't!" protested the prostrate operator. "It isn't fair."

"I know, I know," returned the other soothingly. "There, there, now. I see I have hurt you, but I only meant it kindly. Just a little trick of remembrance used to make you realize that the world at large and poor old Santa Claus hasn't forgotten his lonesome children who in their hearts never quite grow up. You lost your last love, your mother's, in your boyhood. And you thought you were all alone? Never, my boy, never. Just so long as Christmas comes around you may be sure you're not forgotten. On that one day in the year, at least, a lot of people will give a thought to the faithful wireless operator on Forlorn Isle. You've never realized that before. But there is the proof—those messages.

"It may be many years before you will see and talk with Santa Claus again, just as you did in your boyhood. But bear in mind that you are never quite forgotten. The messages will help. I'd keep them if I were you. Gather them up; it will take a long time, but give you a lot of pleasure."

Dazedly, the operator leaned forward and began the slow work. He stopped to read the first one, and the second; then he wondered where he could put them all. What a treasure——

The slam of the door interrupted his thoughts. He looked up. Santa was gone. And there, as his foggy vision cleared, there in his place stood a familiar form. He looked again. It was Cochrane.

The battered clock was just striking twelve.

"Back on the stroke of the hour."

came his co-worker's cheery voice. "And just in time to wish my good old bunkie a Merry Christmas!"

"Huh?" returned Banter dazedly.

"Why, you old bouncer, you," boomed the new arrival's voice, "you've been asleep!"

"Asleep?" repeated the other wonderingly. "Yes . . . I . . . guess . . . I must have been."

A hearty laugh fairly shook the little building. Banter was gazing about him uncomprehendingly. "Where are the messages; the two hundred and seventy-eight thousand——"

"Messages? Two hundred and seventy— What in creation are you talking about?" broke in the other. And another great gust of laughter reverberated throughout the room.

"Why, in the dream——"

"In the dream, yes. But you're wide awake, now, old top—and it's Merry Christmas! Get that? Merry Christmas!"

Banter turned slowly and looked at the clock. "All within three minutes," he murmured. "And the sweetest dream. . . ."

For a full minute he sat gazing wonderingly in front of him. In the shadowed corner Cochrane stood, silent. He looked uncomfortably about him; then quietly turned away.

BOOK REVIEWS

"Text Book on Wireless Telegraphy," by Rupert Stanley, B.A., M.I.E.E., Professor of Physics and Electrical Engineering, Municipal Technical Institute, Belfast; Extra Mural Professor of Electrical Engineering, Queen's University, Belfast, is the latest addition to the literature on wireless telegraphy.

The author explains that his book is the outcome of innumerable requests from students to recommend an elementary text book on electricity and magnetism, a request difficult to answer. Elementary text books are for the most part hopelessly out of date, and labor over Faraday's crude though pioneering experiments and fog the practical student with long dissertations on potential gradients or moments of complex arrangements of magnets. Many of them are written to serve as a preliminary to the study of general electrical engineering and are therefore not at all adapted to the elucidation of the principles of energy radiation; also few, if any, elementary text books on magnetism and electricity adequately introduce the most important phenomena applied to radio telegraphic circuits, such as self-induction, mutual induction, oscillatory currents and the true significance of magnetic lines of strain in the all-pervading ether.

To correct these faults the author introduces in the opening chapter the subject of radio telegraphy by demonstrating its place in the natural order of things and its intimate relation to other branches of science. The vague fluid theories are replaced by the electron theory, on which has been based all theoretical considerations.

Copies of this work may be secured through the Book Department of The Wireless Age, price $2.25 net.

* * *

In "Wireless Telegraphy," a handbook on the fundamental principles and modern practice of radio telegraphy by A. B. Rolfe-Martin, the author has covered a good deal of ground already well sown with learned treatises and more popular expositions, and has followed the familiar arrangement of preliminary instructional text without introducing any particularly novel features. Yet the work has a value all its own in bringing commercial wireless practice up to date and clearly explaining the merits and functions of the every day workable features of modern ship and shore installations. It is as a reference work that the volume will be most welcome, although it must be said that its instructional features are no worse and considerably better than others of its kind.

Profusely illustrated and containing 248 pages, this book sells for $2.00; The Macmillan Co., New York.

IN THE SERVICE

CONTINENT-TO-CONTINENT DIVISION

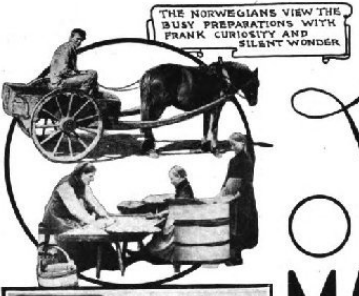
While the rulers of Europe are struggling to grasp one another's throats and the warring factions in Mexico are fighting for supremacy, it is refreshing to stumble upon folk who are in a happy, contented frame of mind. In Henry Emmanuel Hallborg is found an illustration of a man who belongs in this category. This statement is made after a process of deduction from Hallborg's assertion that he was "attracted to wireless mainly because of its many big problems." It would seem, therefore, that he ought to be extremely well satisfied because in the task of supervising the operation of the Marconi station at New Brunswick and Belmar, N. J.—one of the links in the trans-oceanic service—he should find full opportunity for the exercise of his talents.

The responsibilities of Hallborg in his capacity of engineer in charge can best be understood when it is explained that his duties consist principally of seeing that the apparatus of the huge continent-to-continent links are in perfect working order at all times. Any failure in the operation of the mechanism means that he has a problem to solve. So he makes his headquarters in an office in the power-house at the New Brunswick station, where he can practically keep his fingers on the pulse of the wireless mechanism. Another of his duties is to exercise supervision over the mast line or aerial system. In order to inspect the tall masts he has been provided with a pair of field glasses.

Hallborg was born in Stockholm, Sweden, thirty years ago. He was educated in this country, having been graduated from Brown University in 1907. Then he entered the testing department of the General Electric Company at Schenectady, N. Y., where he remained for two years. His next important work was as electrical sub-inspector of the Brooklyn Navy Yard. Soon afterwards he became interested in wireless telegraphy. His interest and pursuit of knowledge won recognition for him and he was employed by Professor Fessenden as experimental engineer at Brant Rock, Mass., being placed in charge of the 100-k.w. Fessenden set during the tests conducted by the navy with the scout cruisers Salem and Birmingham.

His service with the Marconi Company began in the spring of 1912. During the early part of his employment he was sent to England with five other engineers for instruction in high-power wireless work. On his return to this country he was appointed engineer-in-charge of the New Jersey stations.

Hallborg has just been awarded a membership in the honorary society of Sigma Xi of Brown University in recognition of practical work in the art. He is interested in the activities of the Institute of Radio Engineers and recently read a paper before that organization.



In NOR WI MASSAC

HOW TWO NEUT ARE CEMENTING BONDS OF FRI COMMERCE TH TRANS-OCEA

IN the midst of Christmas festivities, and with the end of the year in sight, comes the realization that this has been a remarkable twelve months of progress in wireless telegraphy. One great feat stands above all others. Six Marconi trans-oceanic stations in America have reached completion; an achievement of no mean proportions and carrying a tremendous appeal to the imagination. For, aside from the details of linking up nations by wireless, the business of constructing these great Marconi trans-oceanic stations represents an enormous amount of labor and the expenditure of vast sums of money. And for these very reasons the wireless girdle of the world has so far overshadowed other achievements that little has been heard of that otherwise great 1914 enterprise—linking the United States with Norway.

Two neutral countries are thus cementing closer the bonds of friendship and commerce, needful in time of war and invaluable when peace again shall reign. Little Norway, as your average man would call it—and never consider that this country ranks fourth in tonnage among all the maritime powers of the world—has made this connection possible through its Storthing, acting under suggestion from Colonel Heftye, Admiral Starre and Chairman Mowinckel, a Bergen shipowner. And now at Stavanger and Naerbo, in Norway, and Chatham and Marion, in Massachusetts, tall steel masts and towers with their spidery webs of steel cable supports and miles of antennae wire, are springing up to crackle forth the messages which are soon to wing their way through thousands of miles of space. Two more of

King
WAY
TH
HUSETTS

RAL COUNTRIES
CLOSER THE
ENDSHIP AND
ROUGH MARCONI
NIC STATIONS

the great Marconi trans-oceanic stations are nearing completion.

As originally planned, the American stations are expected to be ready within a few months, but a considerable delay is anticipated at the European end, where the war has already materially blocked delivery of material. Full preparation, however, has been made by the Norwegian Government to expedite the work; trunk lines have been equipped from all the strategic points to Stavanger, and arrangements made to utilize water power from the mountains to run the 30,000 volt dynamos of the Naerbo transmitting station.

Returning travelers speak of amazement beyond expression from the natives who are busily watching the preparations at Stavanger. In this fine old city of 37,000 inhabitants woolen, linen and cotton goods, soap, preserves, hardware, pottery, ships and fish are the familiar implements of modern commerce, and the addition of a gigantic wireless telegraph system has quite taken the community's breath away. For although there are other wireless stations in Norway; six of them in fact at Ingo, Bergen, Rost, Sorvaagen, Flekkero and Tjomo, they are open only to ship and shore communication, and as some are not always effective, a goodly portion of the population has not yet conceived the true meaning of the constructional activities on the hill called Ullenhaug, two miles outside the City of Stavanger.

The employment of this site is just another instance of the queer highways on which the wheels of progress run. Almost beside the spot where the towering masts are rising stands an

The handsome and cosy home provided for the chief engineer at Marion is ready for occupancy

old stone structure, crumbling away to dust, but still proudly bearing an inscription acquainting the passerby that it was here, in A. D. 872, that Harold Haarfager, the fair-haired, won a great naval victory off the coast and became the first King of United Norway. And now, when a thousand years later the conquest of the elements is to be staged on the same scene, one can almost see reflected in the faces of the flaxen-haired natives the bewilderment to be expected of that doughty ancestor should he return to-day.

Frank curiosity and silent wonder such as this is refreshing and leads us to pause and smile our superior knowledge. We even think pityingly of Stavanger provincialism, yet the full wonder of every day trans-oceanic wireless communication does not break on us until we recall that only a few years back we were silently applauding a certain scientist's characterization of the experiments of Marconi as another prank of "the young man with a box."

We are very sophisticated now. Turning toward home shores we find that the American end of this link presents the expected contrast between the old and new world. Up in Massachusetts, wireless is an old story to the natives, and the busy preparations at Marion and Chatham excite their curiosity only through the magnitude of the work. Every ancient mariner among the weather-beaten fisherfolk of Cape Cod has been speaking more or less authoritatively on ether-wave communication ever since the Marconi towers at South Wellfleet reared skyward some eleven years ago, and the main burden of the daily conversation now has to do with the vast improvement trans-oceanic communication has brought to station structures.

At Chatham the receiving section will include an operating building, power plant for lighting and pumping, a hotel and seven cottages for the accommodation of about thirty-five operators, the men working in three shifts during the twenty-four hours of the day. Six tall steel masts will carry two aerial wires back about a mile and a half from the operating house. A balancing aerial, supported on structural steel towers one hundred feet high, will be placed at right angles to the main antenna.

At Marion there will be a power house where the electricity will be changed in form from the 60-cycle

2,400 volt current to the high frequency oscillating current required to send the dots and dashes thousands of miles across the ocean. A small fortune will be represented in the condenser bank of 390 large stoneware tanks, containing about forty tons of glass. Near the power house will be an auxiliary operating building, where messages will be received if, for any reason, the Chatham section should be out of commission. The aerial wires will be supported by fourteen steel masts each 423 feet high. These masts will be arranged in pairs placed about 900 feet apart; between each pair will be stretched a cable from which the aerial wires or antenna are to be suspended. Thirty-two wires will rise from the power house and fan out to the first set of masts, then run horizontally for about a mile and a quarter.

As with the high-powered stations already completed, the Massachusetts equipments will be arranged for duplex working; that is, sending and receiving messages at the same time. Thus the sites of the stations had to be selected with a view toward favorable physical advantages and definite directional relation, presenting a rather difficult problem to the Marconi engineers. The transmitting and receiving units had to be located more than twenty miles apart and the lay of the land permit the erection of the aerials so that they pointed toward the distant station with which communication was to be established. The transmitting half of the gigantic wireless plant required a narrow strip of land about a mile and a half long and at least a thousand feet wide. The receiving half required a T-shaped tract, each limb about a mile and a half long and 500 feet wide. Both sites had to be near the ocean or located on some waterway affording a direct electrical connection with the sea, and preferably on low marshy land. It was only after many days of searching that the proper sites were selected by the engineers who then experienced a long period of negotiation before the properties were acquired at a figure which represented a personal triumph for Frederick M. Sammis, Chief Engineer, and Charles H. Taylor, Supervising Engineer.

The distance separating the two units allows the station to employ the Marconi duplex system of sending and

Where the brush has been cleared away to provide space for tennis courts for the Chatham operators

receiving wireless messages simultaneously, a new and valuable principle in radio communication. Under it twice the number of messages usually transmitted and received can be handled, an ingenious arrangement being provided for high speed operation. All signals are to be received and transmitted automatically, thus a hundred or more messages can be filed at the same time and received within the space of a very few minutes. A dozen or a score of messages filed at the same time for example will be immediately distributed among as many operators as are necessary and the dots and dashes punched in a paper tape by a machine which operates like a typewriter. The tape will then be fed into an automatic sender and at a speed which is greater than that used by a fast talker, the words will come under the stylus of the transmitter at Chatham and instantaneously the high power current will leap from the aerial at Marion. A telegraph land line will connect the Chatham and Marion sections, carrying the dots and dashes which actuate the automatic relays and free the powerful high frequency current in corresponding dots and dashes. Thus, in the infinitesimal part of a second the signal emitted from the transmitter at Chatham will have leaped from the aerial at Marion and been received at the Norwegian station.

Messages hurled through the air at the rate of one hundred words a minute will be received automatically on specially constructed dictaphone machines, and as fast as a cylinder is filled with the dots and dashes of an incoming message it will be handed to an operator who will transcribe it into a typewritten message through a dictating machine running at normal speed.

With the buildings nearing completion and the workmen busy on interior finishing, the erection of the masts has begun at both places. At this writing they are about half completed and their steady climb skyward presents a most interesting feature to the spectator. Thirty-one composite steel cylinders, made in quarter sections flanged vertically and bolted together, comprise the lower section and the main portion of each mast. These stand in concrete foundations and are stayed with steel cables. The main steel column is surmounted by a wooden topmast, squared and set in square openings in the plates between the steel cylinders and the hoisting arms attached to the upper end. Fitted with blocks and hoisting cables, chain hoists depending from these arms support a square wooden cage for the workmen which can be lowered and raised at will while the sections are being bolted together. At a signal from the foreman a huge steel section is raised by a steam winch, placed in position and secured temporarily by a heavy flexible steel cable. Pulling this cable lifts the topmast the length of one cylinder, where it is pinned by means of holes in both steel and wooden masts. The pin supports the topmast until it is raised again with the addition of a new steel cylinder. As the erection proceeds the stays are attached at the required points. This method of construction is very rapid, the record performance being an average of more than fifty feet a day.

Although the complete masts seem small in diameter in comparison to their height, they are very rigid and offer little resistance to the wind. To stay each mast 12,000 feet of cable is required and great care has to be taken that the elastic extension of these stays is not too great, for the masts are likely to vibrate in high winds. This is made a more difficult problem through the necessity of breaking up each stay into short lengths, connected with huge porcelain insulators so the electrical energy will not be absorbed, led to earth by the stays and lost to wireless working. Special bridge sockets, insulators and anchorages were designed to meet this condition and to do away with splicing, thus permitting a perfect and straight pull which develops the full strength of the cable. The stay anchorages are heavy concrete blocks, four to each mast, located 250 feet from base.

Although this work is considered extremely hazardous and the type of mast construction a new one, not a single workman has been seriously injured in the construction of any of the

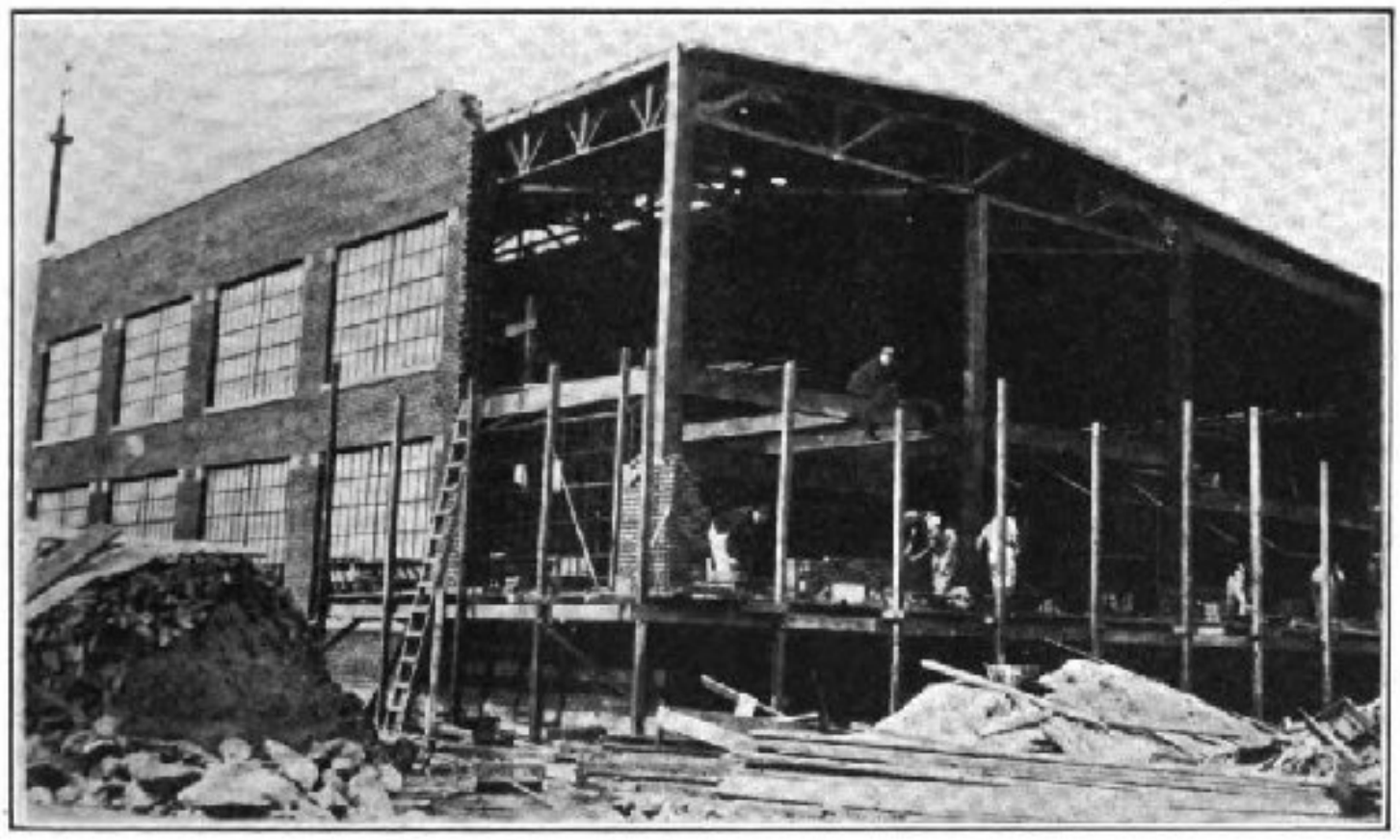
trans-oceanic stations. During the erection the steel workers are raised and lowered by a steam winch, but the riggers who string the aerial wires are raised to the top of the mast by clinging to a tiny bos'un's chair, attached to a steel cable running through a pulley at the top and drawn by a team of horses. The trip takes about ten minutes, during which the occupant of the chair is tossed about by the heavy winds and is in momentary danger of being dashed against the steel column. The wireless men scoff at any suggestion of peril, however, and point with pride to their record of successful erection without any casualties.

The aerial or antenna wires are the keynote of successful communication over long distances, and the distinctive feature of the aerial to be used in the Norwegian-American link is that the antenna is directional; that is, the radiation of the wireless signals in the desired direction is very much stronger than in any other. The receiving aerial will have only two wires, both pointing towards the Norwegian station from which the messages are to be received; and at the nearest end the wires will be led down to the operating building. Thus the sending and receiving aerials will be approximately parallel to each other, an arrangement which minimizes the prospect of the receiving aerial absorbing energy when the transmitting unit is sending.

The direction of the electrical impulses from the Massachusetts stations will be regulated by the aerial wires being brought down to ground at the power house end, the end nearest Norway.

As a further precaution against interference between the two Massachusetts stations a balancing aerial will be added to the receiving antenna, placed at a right angle and forming the T-shaped aerial in the horizontal plane. This balancing aerial will point toward the Marion station to receive and absorb whatever electrical energy is emitted at right angles from the directional aerial of the sending station, thus taking up and destroying the radiating electrical energy and leaving the incoming Norwegian messages free from interference.

As already explained in previous issues the Belmar and New Brunswick



With the superstructure finished the power house at Marion is being rapidly brought to completion

plants afford direct wireless communication between European points and New York; the Bolinas and Marshall equipments, in California, connect Honolulu and the East with San Francisco; and the remaining great American seaport, Boston, will be provided for in the Chatham and Marion stations. The importance of this connection is revealed in a glance at the activities of the State of Massachusetts. Its annual manufactured products reach a total of more than one billion dollars a year and in this respect it is the fourth State of importance in the United States, being exceeded only by New York, Pennsylvania and Illinois. In the manufacture of textiles Massachusetts ranks first. It has always held first place in the making of cotton goods and produces nearly one-half of the total amount of leather boots and shoes made in the country. In the manufacture of paper and wood pulp Massachusetts has long held first position, and it is estimated that three-quarters of all the fine writing paper made in the United States is made within its borders.

Approximately one-quarter of all its industrial activities center at Boston, which city has a population of 670,585 and, according to the last census there were 3,366,416 people in the State, the sixth of importance in population in the country.

CANADIAN NOTES

After three months of the severe restrictions which were imposed by the censor on the trans-Atlantic wireless and cable services on account of the war, messages in code are again permitted. On November 10th the Imperial Government advised that marconigrams to and from the United Kingdom may be sent in the following codes:

Western Union, Liebers, A B C, 5th Edition, and Scott's 10th Edition. The name of the code must appear in the preamble of the message. The use of any codes other than those authorized will result in the stoppage of the message by the censors.

Code addresses registered prior to July 1st, may be utilized in marconigrams to the United Kingdom, but all signatures must be in plain language.

The other services, namely those applying to Deferred Marconigrams, Wireless Night Letters, and Week End Letters in plain language, will still continue in effect as hitherto.

The Marconi Wireless Telegraph Company of Canada, on instructions from the Donaldson Line, have equipped the steamships Iona and Jacona with ½ k. w. wireless sets. These vessels were under charter to the Admiralty as transports.

The same company has also fitted the steamship Tuna belonging to the Department of the Naval Service of the Canadian Government with a ½ k. w. set, and the H. M. C. warship Sheerwater with a 1.7 k. w. set.

TAX ABATEMENT FOR THE MARCONI COMPANY

The Supreme Court of Massachusetts has decided that the Marconi Wireless Telegraph Company of America is entitled to an abatement of a $2,000 excise tax paid to that State on the ground that the company does not transact domestic business in Massachusetts, but is exclusively engaged in foreign commerce. Chief Justice Rugg in his opinion said:

"The Marconi Wireless Telegraph Company of America is organized under the laws of New Jersey. It maintains in Massachusetts near the ocean three wireless stations, each consisting chiefly of a high pole having at the top a wire or wires with bare ends from which are sent through and taken from the air currents of electricity, whereby messages are transmitted and received. Connected with this apparatus are rooms similar to ordinary telegraph stations, for use of the wireless operators. At each station it transmits and receives messages for hire to and from ships on the high seas and foreign countries. It neither transmits nor receives any messages whatever over land or on or through this Commonwealth. It has no property in the Commonwealth except as above described. It is plain that this company is engaged exclusively in foreign commerce."

Intercepted in Transmission

Three letters selected at random from the miscellaneous correspondence addressed to Mr. Marconi which never reaches the busy inventor. Names of the writers deleted by the censor.

Dear Sir:—

As a verry importent inquery i beg for the liberty of asking you for a little imformation regarding your wireless telegraph system.

Can your system of wireless be used for taking a persons record. Operaters receiving the minde thaughts and general personality of a person conected. Can or is it used in the Medium-Clairvoyant business operater receiving the minde thaughts of one person and giving them to another both parties conected by curant. Voices given threw viberating voice sound, etz.

Will you please give me names and adresses of all parties having your wireless telegraph system installed in New York City, and oblige,

Verry Respectfully Yours,

.....

Dear Sir:—

I am a Christian, trying to make science fit itself into religion. Did I not read from your pen, that your invention was the instrument that gathered up words, and that words floated, upon the air for an indeafinite length of time? If there is any foundation for this question, in anything that you have ever said, will you please tell me in a personal letter, how long you think words will float on the air and can yet be gathered up? You will very greatly oblige,

Yours truly,

.....

Dear Sir:—

Please, I am very anxious to know how the Marconi Sisteam Wireless Telegram it is operate, if is operate onder the superficial of the grown; or upper the superficial of the grown.

Your rispectfully curious

.....

THE LONG ARM

A WIRELESS FICTION STORY

BY RICHARD HARDING DAVIS

FAMOUS WAR CORRESPONDENT

AUTHOR OF "SOLDIERS OF FORTUNE" etc.

THE safe was an old one that opened with a key. As adjutant, Captain Swanson had charge of certain funds of the regiment and kept in the safe about $5,000. No one but himself and Rueff, his first sergeant, had access to it. And as Rueff proved an alibi, the money might have been removed by an outsider. The court martial gave Swanson the benefit of the doubt, and a reprimand for not taking greater care of the keys, and Swanson made good the $5,000.

Swanson did not think it was a burglar who had robbed the safe. He thought Rueff had robbed it, but he could not possibly prove that. At the time of the robbery Rueff was outside the Presidio, in uniform, at a moving-picture show in San Francisco. A dozen people saw him there. Besides, Rueff held an excellent record. He was a silent, clerk-like young man, better at "paper work" than campaigning, but even as a soldier he had never come upon the books. And he had seen service in two campaigns, and was supposed to cherish ambitions toward a commission. But, as he kept much to himself, his fellow non-coms could only guess that.

On his captain's account he was loyally distressed over the court martial, and in his testimony tried to shield Swanson, by agreeing heartily that through his own carelessness the keys might have fallen into the hands of someone outside the post. But his loyalty could not save his superior officer from what was a verdict virtually of "not proven."

It was a most distressing affair, and, on account of the social prominence of Swanson's people, his own popularity, and the name he had made at Batangas and in the Boxer business, was much commented upon, not only in the services, but by the newspapers all over the United States.

Every one who knew Swanson knew the court martial was only a matter of form. Even his enemies ventured only to suggest that overnight he might have borrowed the money, meaning to

replace it the next morning. And the only reason for considering this explanation was that Swanson was known to be in debt. For he was a persistent gambler. Just as at Pekin he had gambled with death for his number, in times of peace he gambled for money. It was always his own money.

From the start Swanson's own attitude toward the affair was one of blind, unreasoning rage. In it he saw no necessary routine of discipline, only crass, ignorant stupidity. That anyone should suspect him was so preposterous, so unintelligent, as to be nearly comic. And when, instantly, he demanded a court of inquiry, he could not believe it when he was summoned before a court martial. It sickened, wounded, deeply affronted him; turned him quite savage.

On the stand his attitude and answers were so insolent that his old friend and classmate, Captain Copley, who was acting as his counsel, would gladly have kicked him. The findings of the court martial, that neither cleared nor condemned, and the reprimand, were an intolerable insult to his feelings, and, in a fit of bitter disgust with the service and every one in it, Swanson resigned. Of course, the moment he had done so he was sorry. Swanson's thought was that he could no longer associate with anyone who could believe him capable of theft. It was his idea of showing his own opinion of himself and the army.

But no one saw it in that light. On the contrary, people said: "Swanson has been allowed to resign." In the army, voluntary resigning and being "allowed to resign" lest greater evils befall, are two vastly different things. And when it was too late no one than Swanson saw that more clearly. His anger gave way to extreme morbidness. He believed that in resigning he had assured every one of his guilt. In every friend and stranger, he saw a man who doubted him. He imagined snubs, rebuffs, and coldnesses. His morbidness fastened upon his mind like a parasite upon a tree, and the brain sickened. When men and women glanced at his alert, well-set-up figure and shoulders, that even when he wore "cits" seemed to support epaulets, and smiled approvingly, Swanson thought they sneered. In a week he longed to be back in the army with a homesickness that made everyone who belonged to it his enemy.

He left San Francisco, where he was known to all, and traveled south through Texas, and then to New Orleans and Florida. He never could recall this period with clearness. He remembered changing from one train to another, from one hotel to the next. Nothing impressed itself upon him. For what he had lost nothing could give consolation. Without honor life held no charm. And he believed that in the eyes of all men he was a thief, a pariah, and an outcast.

He had been in Cuba with the Army of Occupation, and of that beautiful island had grown foolishly fond. He was familiar with every part of it, and he believed in one or another of its pretty ports he could so completely hide himself that no one could intrude upon his misery. In the States, in the newspapers he seemed to read only of those places and friends and associates he most loved. In the little Cuban village in which he would bury himself he would cut himself off from all newspapers, from all who knew him: from those who had been his friends, and those who knew his name only to connect it with a scandal.

On his way from Port Tampa to Cuba the boat stopped at Key West, and for the hour in which she discharged cargo, Swanson went ashore and wandered aimlessly. The little town, reared on a flat island of coral and limestone, did not long detain him. The main street of shops, eating houses, and saloons, the pretty residences with overhanging balconies, set among gardens and magnolia trees, were soon explored, and he was returning to the boat when the martial music of a band caused him to halt. A side street led to a great gateway surmounted by an anchor. Beyond it Swanson saw lawns of well-kept grass, regular paths, pretty cottages, the two-starred flag of an admiral, and, rising high above these, like four Eiffel

towers, the gigantic masts of a wireless. He recognized that he was at the entrance to the Key West naval station, and turned quickly away.

He walked a few feet, the music of the band still in his ears. In an hour he would be steaming toward Cuba, and, should he hold to his present purpose, in many years this would be the last time he would stand on American soil, would see the uniform of his country, would hear a military band lull the sun to sleep. It would hurt, but he wondered if it were not worth the hurt. A smart sergeant of marines, in passing, cast one glance at the man who seemed always to wear epaulets, and brought his hand sharply to salute. The act determined Swanson. He had obtained the salute under false pretenses, but it had pleased, not hurt, him. He turned back and passed into the gate of the naval station.

From the gate a grass-lined carriage drive led to the waters of the harbor and the wharves. At its extreme end was the bandstand, flanked on one side by the cottage of the admiral, on the other by a sail loft with iron-barred windows and whitewashed walls. Upon the turf were pyramids of cannon balls and, laid out in rows as though awaiting burial, old-time muzzle-loading guns. Across the harbor the sun was sinking into the coral reefs, and the spring air, still warm from its caresses, was stirred by the music of the band into gentle rhythmic waves. The scene was one of peace, order and content.

But as Swanson advanced, the measure of the music was instantly shattered by a fierce volley of explosions. They come so suddenly and sharply as to make him start. It was as though from his flank a quick-firing gun in ambush had opened upon him. Swanson smiled at having been taken unawares. For in San Francisco he often had heard the roar and rattle of the wireless. But never before had he listened to an attack like this.

From a tiny white-and-green cottage, squatting among the four giant masts, came the roar of a forest fire. One could hear the crackle of the flames, the crash of the falling tree trunks. The air about the cottage was torn into threads; beneath the shocks of the electricity the lawn seemed to heave and tremble. It was like some giant monster, bound and fettered, struggling to be free. Now it growled sullenly, now it lashed about with crashing, stunning blows. It seemed as though the wooden walls of the station could not contain it.

From the road Swanson watched, through the open windows of the cottage, the electric bolts flash and flare and disappear. The thing appealed to his imagination. Its power, its capabilities fascinated him. In it he saw a hungry monster reaching out to every corner of the continent and devouring the news of the world; feeding upon tales of shipwreck and disaster, lingering over some dainty morsel of scandal, snatching from ships and cities two thousand miles away the thrice-told tale of a conflagration, the score of a baseball match, the fall of a cabinet, the assassination of a king.

In a sudden access of fierceness, as though in an ecstasy over some fresh horror just received, it shrieked and chortled. And then, as suddenly as it had broken forth, it sank to silence, and from the end of the carriage drive again rose, undisturbed, the music of the band.

The musicians were playing to a select audience. On benches around the band-stand sat a half dozen nurse maids with knitting in their hands, the baby carriages within arm's length. On the turf older children of the officers were at play, and up and down the paths bareheaded girls, and matrons, and officers in uniform strolled leisurely. From the vine-covered cottage of Admiral Preble, set in a garden of flowering plants and bending palmettos, came the tinkle of tea-cups and the ripple of laughter, and at a respectful distance, seated on the dismantled cannon, were marines in khaki and bluejackets in glistening white.

It was a family group, and had not Swanson recognized among the little audience others of the passengers from the steamer and natives of the town who, like himself, had been attracted

by the music, he would have felt that he intruded. He now wished to remain. He wanted to carry with him into exile a memory of the men in uniform, of the music, and pretty women, of the gorgeous crimson sunset. But, though he wished to remain, he did not wish to be recognized.

From the glances already turned toward him, he saw that in this little family gathering the presence of a stranger was an event, and he was aware that during the trial the newspapers had made his face conspicuous. Also it might be that stationed at the post was some officer or enlisted man who had served with him in Cuba, China, or the Philippines, and who might point him out to others. Fearing this, Swanson made a detour and approached the bandstand from the wharf, and with his back to a hawser-post seated himself upon the string-piece.

He was overcome with an intolerable melancholy. From where he sat he could see, softened into shadows by the wire screens of the veranda, Admiral Preble and his wife and their guests at tea. A month before he would have reported to the admiral as the commandant of the station, and paid his respects. Now he could not do that; at least, not without inviting a rebuff. A month before he need only have shown his card to the admiral's orderly, and the orderly and the guard and the officers' mess and the admiral himself would have turned the post upside down to do him honor. But of what avail now was his medal of honor? They now knew him as Swanson, who had been court martialed, who had been allowed to resign, who had left the army for the army's good; they knew him as a civilian without rank or authority, as an ex-officer who had robbed his brother officers, as an outcast.

His position, as his morbid mind thus distorted it, tempted Swanson no longer. For being in this plight he did not feel that in any way he was to blame. But with a flaming anger he still blamed his brother officers of the court martial who had not cleared his name and with a clean bill of health restored him to duty. Those were the men he blamed; not Rueff, the sergeant, who he believed had robbed him, nor himself, who, in a passion of wounded pride, had resigned and so had given reason for gossip; but the men who had not in tones like a bugle call proclaimed his innocence, who, when they had handed him back his sword, had given it grudgingly not with congratulation.

As he saw it, he stood in a perpetual pillory. When they had robbed him of his honor they had left him naked, and life without honor had lost its flavor. He could eat, he could drink, he could exist. He knew that in many corners of the world white arms would reach out to him and men would beckon him to a place at table.

But he could not cross that little strip of turf between him and the chattering group on the veranda and hand his card to the admiral's orderly. Swanson loved life. He loved it so that without help, money or affection he could each morning have greeted it with a smile. But life without honor! He felt a sudden hot nausea of disgust. Why was he still clinging to what had lost its purpose, to what lacked the one thing needful?

"If life be an ill thing," he thought, "I can lay it down!"

The thought was not new to him, and during the two past weeks of aimless wandering he had carried with him his service automatic. To reassure himself he laid his fingers on its cold smooth surface. He would wait, he determined, until the musicians had finished their concert and the women and children had departed, and then—

Then the orderly would find him where he was now seated, sunken against the hawser-post with a hole through his heart. To his disordered brain his decision appeared quite sane. He was sure he never had been more calm. And as he prepared himself for death he assured himself that for one of his standard no other choice was possible. Thoughts of the active past, or of what distress in the future his act would bring to others, did not disturb him. The thing had to be, no one lost more heavily than himself, and regrets were cowardly.

He counted the money he had on

"Captain Swanson, sir?" asked the orderly.
Swanson did not speak or move.

his person and was pleased to find there was enough to pay for what services others soon must render him. In his pockets were letters, cards, a cigarette case, each of which would tell his identity. He had no wish to conceal it, for of what he was about to do he was not ashamed. It was not his act. He would not have died "by his own hand." To his unbalanced brain the officers of the court martial were responsible. It was they who had killed him. As he saw it, they had made his death as inevitable as though they had sentenced him to be shot at sunrise.

A line from "The Drums of the Fore and Aft" came back to him. Often he had quoted it, when someone in the service had suffered through the fault of others. It was the death-cry of the boy officer, Devlin. The knives of the Ghazi had cut him down, but it was his own people's abandoning him in terror that had killed him. And so, with a sob, he flung the line at the retreating backs of his comrades: "You've killed me, you cowards!"

Swanson, nursing his anger, repeated this savagely. He wished he could bring it home to those men of the court martial. He wished he could make them know that his death lay at their door. He determined that they should know. On one of his visiting cards he penciled:

"To the Officers of my Court Martial: 'You've killed me, you cowards!'"

He placed the card in the pocket of his waistcoat. They would find it just above the place where the bullet would burn the cloth.

The band was playing "Auf Wiedersehen," and the waltz carried with it the sadness that had made people call the man who wrote it the waltz king. Swanson listened gratefully. He was glad that before he went out his last mood had been of regret and gentleness. The sting of his anger had departed, the music soothed and sobered him. It had been a very good world. Until he had broken the spin of things it had treated him well, far better, he admitted, than he deserved. There were many in it who had been kind, to whom he was grateful. He wished there was some way by which he could let them know that. As though in answer to his wish, from across the parade ground the wireless again began to crash and crackle; but now Swanson was at a greater distance from it, and the sighing rhythm of the waltz was not interrupted.

Swanson considered to whom he might send a farewell message, but as in his mind he passed from one friend to another, he saw that to each such a greeting could bring only distress. He decided it was the music that had led him astray. This was no moment for false sentiment. He let his hand close upon the pistol.

The audience now was dispersing. The nurse maids had collected their charges, the musicians were taking apart their music racks, and from the steps of the vine-covered veranda Admiral Preble was bidding the friends of his wife adieu. At his side his aide, young, alert, confident, with ill-concealed impatience awaited their departure. Swanson found that he resented the aide. He resented the manner in which he speeded the parting guests. Even if there were matters of importance he was anxious to communicate to his chief, he need not make it plain to the women folk that they were in the way.

When, a month before, he had been adjutant, in a like situation he would have shown more self-command. He disapproved of the aide entirely. He resented the fact that he was as young as himself, that he was in uniform, that he was an aide. Swanson certainly hoped that when he was in uniform he had not looked so much the conquering hero, so self-satisfied, so supercilious. With a smile he wondered why, at such a moment, a man he had never seen before, and never would see again, should so disturb him.

In his heart he knew. The aide was going forward just where he was leaving off. The ribbons on the tunic of the aide, the straps on his shoulders, told Swanson that they had served in the same campaigns, that they were of the same relative rank, and that when he himself, had he remained in the service, would have been a brigadier-general, the aide would command a battleship. The possible future of the young sailor filled Swanson with hon-

orable envy and bitter regret. With all his soul he envied him the right to look his fellow man in the eye, his right to die for his country, to give his life, should it be required of him, for 90,000,000 people, for a flag. Swanson saw the two officers dimly, with eyes of bitter self pity. He was dying, but he was not dying gloriously for a flag. He had lost the right to die for it, and he was dying because he had lost that right.

The sun had sunk and the evening had grown chill. At the wharf where the steamer lay on which he had arrived, but on which he was not to depart, the electric cargo lights were already burning. But for what Swanson had to do there still was light enough. From his breast pocket he took the card on which he had written his message to his brother officers, read and reread it, and replaced it.

Save for the admiral and his aide at the steps of the cottage, and a bare-headed bluejacket, who was reporting to them, and the admiral's orderly, who was walking toward Swanson, no one was in sight. Still seated upon the string-piece of the wharf, Swanson so moved that his back was toward the four men. The moment seemed propitious, almost as though it had been prearranged. For with such an audience, for his taking off no other person could be blamed. There would be no question but that death had been self-inflicted.

Approaching from behind him Swanson heard the brisk steps of the orderly drawing rapidly nearer. He wondered if the wharf were government property, if he were trespassing, and if for that reason the man had been sent to order him away. He considered bitterly that the government grudged him a place even in which to die. Well, he would not for long be a trespasser. His hand slipped into his pocket, with his thumb he lowered the safety catch of the pistol.

But the hand with the pistol in it did not leave his pocket. The steps of the orderly had come to a sudden silence. Raising his head heavily, Swanson saw the man, with his eyes fixed upon him, standing at salute. They had first made his life unsupportable, Swanson thought, now they would not let him leave it.

"Captain Swanson, sir?" asked the orderly.

Swanson did not speak or move.

"The admiral's compliments, sir," snapped the orderly, "and will the captain please speak with him?"

Still Swanson did not move.

He felt that the breaking point of his self control had come. This impertinent interruption, this thrusting into the last few seconds of his life of a reminder of all that he had lost, this futile postponement of his end, was cruel, unhuman, unthinkable. The pistol was still in his hand. He had but to draw it and press it close, and before the marine could leap upon him he would have escaped.

From behind, approaching hurriedly, came the sound of impatient footsteps.

The orderly stiffened to attention. "The admiral!" he warned.

Twelve years of discipline, twelve years of recognition of authority, twelve years of deference to superior officers, dragged Swanson's hand from his pistol and lifted him to his feet. As he turned, Admiral Preble, the aide, and the bare-headed bluejacket were close upon him. The admiral's face beamed, his eyes were young with pleasurable excitement: with the eagerness of a boy he waved aside formal greetings.

"My dear Swanson," he cried, "I assure you it's a most astonishing, most curious coincidence! See this man?" He flung out his arm at the bluejacket. "He's my wireless chief. He was wireless operator on the transport that took you to Manila. When you came in here this afternoon he recognized you. Half an hour later he picks up a message—picks it up 2,000 miles from here—from San Francisco — Associated Press news—it concerns you—that is, not really concerns you, but I thought, we thought"—as though signaling for help, the admiral glanced unhappily at his aide—"we thought you'd like to know. Of course, to us," he added hastily, "it's quite superfluous—quite superfluous, but——"

The aide coughed apologetically. "You might read, sir," he suggested.

"What? Exactly! Quite so!" cried the admiral.

In the fading light he held close to his eyes a piece of paper.

"San Francisco, April 20," he read. "Rueff, first sergeant, shot himself here to-day, leaving written confession theft of regimental funds for which Swanson, captain, lately court martialed. Money found intact in Rueff's mattress. Innocence of Swanson never questioned, but dissatisfied with findings of court martial has left army. Brother officers making every effort to find him and persuade return."

The admiral sighed happily. "And my wife," he added, with an impressiveness that was intended to show he had at last arrived at the important part of his message, "says you are to stay to dinner."

Abruptly, rudely, Swanson swung upon his heel and turned his face from the admiral. His head was thrown back, his arms held rigid at his sides. In slow, deep breaths, like one who had been dragged from drowning, he drank in the salt, chill air. After one glance the four men also turned, and in the falling darkness stood staring at nothing, and no one spoke.

The aide was the first to break the silence. In a polite tone, as though he were continuing a conversation which had not been interrupted, he addressed the admiral. "Of course, Rueff's written confession was not needed," he said. "His shooting himself proved that he was guilty."

Swanson started as though across his naked shoulders the aide had drawn a whip.

In penitence and gratitude he raised his eyes to the stars. High above his head the strands of the wireless, swinging from the towering masts like the strings of a giant aeolian harp, were swept by the wind from the ocean. To Swanson the sighing and whispering wires sang in praise and thanksgiving.

OLD "D F."

Some years ago, following the early development of wireless, a station stood in a low section of swamp land a short distance from Manhattan Beach, N. Y. Various powers were in use from time to time and the range was always unusually great. Incredible distances were covered even with low powers and the nightly press was copied by ships near and far. Old operators of that day will recall the low frequency spark of D F and how well nigh impossible it was to "tune him out," for owing to the broad tuning in those days the signals were generally "all over the tuner," and although the press sent out was sought after and welcomed, the interference at other times added not a little to the trials and tribulations of the operators of that day. It was an ordinary occurrence to learn from operators that DF had been copied in many far-away corners of the earth, such as Alexandria, Egypt, and in South American waters. While no real explanation was given for the unusual carrying power it was generally considered that the extremely good ground and clear range to sea, combined with some other freakish condition, placed D F in a class by itself. The following verses (with apologies to Kipling) were composed in 1907 by the late Neil McIntyre, a former Marconi operator. They have never before appeared in print:

Way up mid the Labrador icebergs, workin a C.P.R. boat,
W'en you thinks you're free from jammin, doesn't it get your goat?
You've given 'im "G" for twenty, wiv 'is signals weak as bref',
We'en 'es just startin up wiv 'is third one
You're jammed all to h—— by "D F."

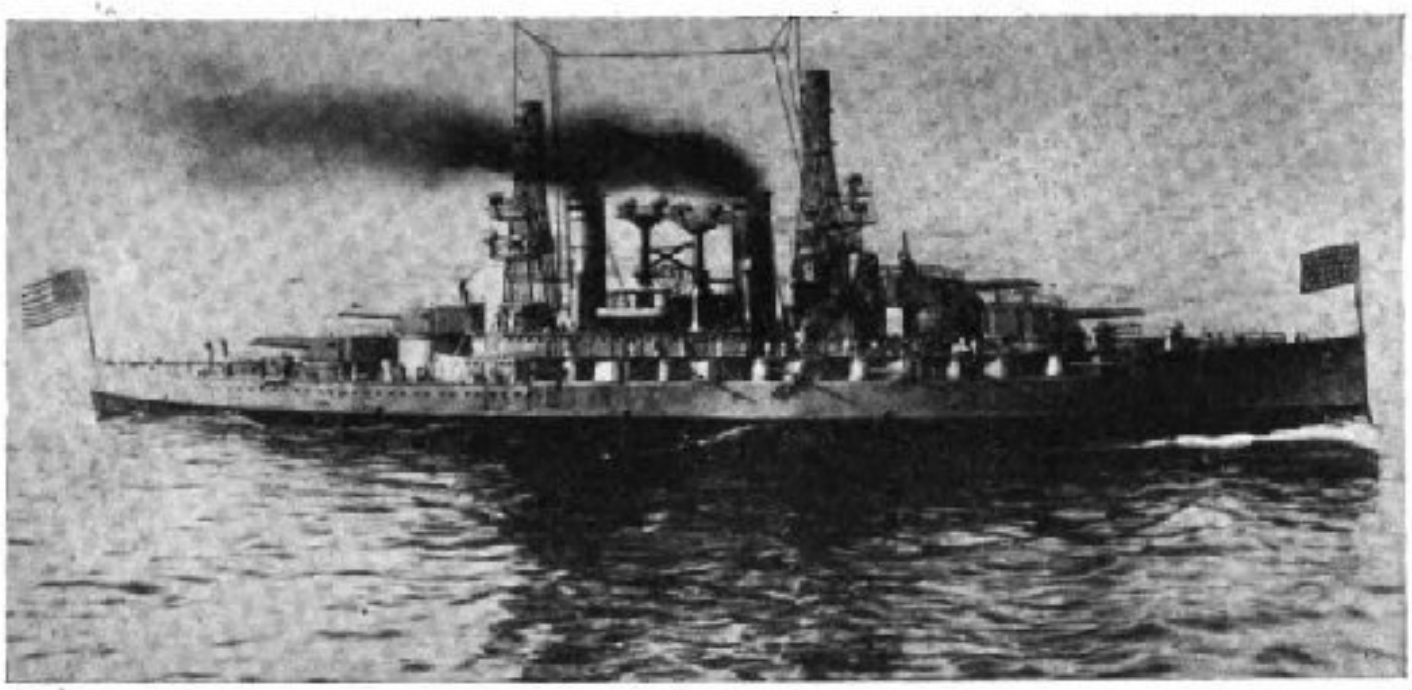
For we all 'ears the bounder a sendin, but the bounder 'e don't 'ear us,
So we just throws the fones on the table and gives vent to an impotent cuss.
'Is signals get stronger an' stronger, till they bloomin nigh render you deaf;
You may go where you please, from Cape Race to Belize,
But you can't get away from "D F."

They talks about multiple tuners, and valve sets and such sort of guff,
We consign the whole lot to the junk pile, we'en "D F" is 'andlin the stuff.
'Is percentage of dampin is awful, and the thing that puzzles me yet,
'Is 'ow in the 'ell does 'e do it,
Wiv a simple two kilowatt set?

For we all 'ears the bounder a sendin, but the bounder 'e don't 'ear us,
So we lays the fones down on the table, 'an gives vent to an impotent cuss.
'Is signals get stronger and stronger, till they bloomin nigh renders you deaf;
An' you can't get away, from the call of "H A,"
Sent out by "F G" at "D F."

Of course 'e 'as got a big aerial, and an acre of ground plates we know,
But only two kilowatts power, tho you 'ear 'im wherever you go.
From forty-two degrees right to Sea Gate, 'e follers you up like a ghost,
You can't get away from 'is music,
From Belle Isle to the Mexican coast.

For we all 'ears the bounder a sendin, but the bounder 'e don't 'ear us,
So we just lays the fones on the table, and gives vent to an impotent cuss.
From the cold Arctic sea down to Cuba, 'is signals would render you deaf;
You can go where you like, anywhere on the pike,
But you can't get away from "D F."



Automatic Wireless on a Miniature Battle-ship

SAMUEL ORKIN, of Boston, has designed and completed a perfect working model of a United States battle-ship of the superdreadnought class, which he has named the Massachusetts. This remarkable little craft is thirteen feet in length and is constructed entirely of steel. Her extreme breadth is twenty-four inches and she has a displacement of 750 pounds. Equipped with a wireless set and guns, she is veritably a smaller brother of Uncle Sam's big fighting machines. Among the other noteworthy features of the Massachusetts are electric searchlights, aeroplane guns of the Ardoie system, an automatic steering device, and a dummy crew that moves about.

The automatic timing device in the little ship is set for any desired time, and after that no human hand touches the craft while it goes through various maneuvers. When the automatic device is released and the motors begin to work, magic seems to reign. Suddenly the clash of a military band playing "The Star-Spangled Banner" is heard; the flags are hoisted slowly, signal lights begin to flash in the fighting mast, wireless messages are sent, and miniature metal figures of men run along the decks opening and shutting doors, saluting exactly as though they were human. They climb the shrouded ladders and begin to operate the twelve searchlights, throwing powerful rays in all directions and elevating them at various angles.

Sparks fly from the tiny aerials and signal lights flash messages to other ships to fall into double battle line.

The doors in the superstructure swing mysteriously open and more than 200 bluejackets, coming from all parts of the deck, disappear through them into the heart of the ship. The siren whistle signals to clear the harbor, the anchors are hoisted automatically, the three propellers begin to revolve, and the rudder turns in response to the touch of the officer on the bridge. The ship's decks are cleared for action and her crew, except for a little group clustered about the commanding officer, go below. She steams away with a trail of smoke coming from her stacks. As she maneuvers, the lower and the superimposed turrets swing to the right and the guns speak.

The turrets swing again to the left and a broadside is fired. Now the Massachusetts draws near her enemy and the miniature six-inch guns come into action, swinging to a new angle with each shot.

The ship is steered automatically toward the shore and wireless messages telling of the victory are sent automatically from the station.

From and For those who help themselves

Experimenters' Experiences.

FIRST PRIZE, TEN DOLLARS

An Aerial Change-Over Switch

An important piece of equipment at any amateur station is a well constructed antenna or aerial change-over switch. The writer has been particularly struck by the fact that in many amateur stations this switch is badly constructed, and, on the other hand, he has noted that at United States Government stations great care is taken both in the construction of this switch and in the manner of wiring it up.

The double pole double throw switch aerial switch of the ordinary type in use by amateurs is not sufficient to handle the energy of a set greater than ½ k.w. capacity.

The switch about to be described has been used with great success and has a neat appearance. The base is of hard rubber, measuring 7¼ inches by 6 inches by ½ inch, and allows a very much more rapid change from a transmitting position to a receiving position. Then, too, it occupies a smaller space than switches of the ordinary type. Referring to the drawing, the knife blade clips used are taken from any ordinary type of switch such as is used on regular lighting circuits. The hard rubber or fibre for the base may be purchased from various companies advertising in THE WIRELESS AGE.

The parts necessary for assembling this instrument are listed in the table at bottom of page.

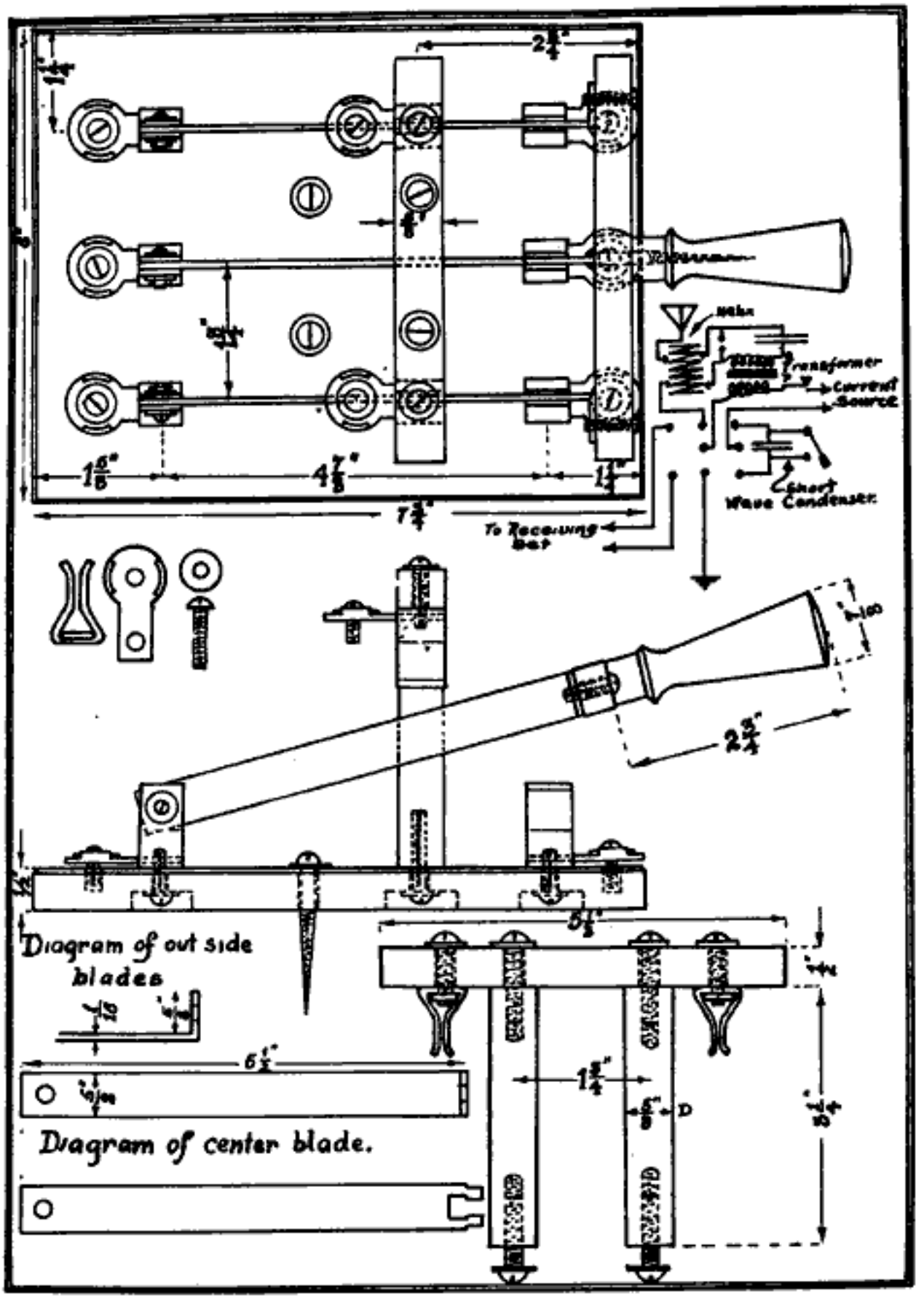
The base is cut and slightly beveled. It is then drilled and countersunk, as shown in the accompanying drawing. Next cut two round uprights and carefully drill a hole in the center of each end about 1 inch deep with a No. 29 drill. These holes are then tapped for an 8/32-inch thread. Next cut the two strips called "cross bars," one to join the switch blades to fasten the handle, the other resting upon the uprights. The blades are then cut and finished as shown. The metal parts are highly polished and given a good coat of lacquer or thin orange shellac.

A circuit diagram for the proper connections of this switch is shown in the accompanying drawing. By reference to the diagram it will be observed that this aerial switch is connected to the low potential side of the oscillation transformer. It is preferable to connect it in this manner, for if it were placed on the high potential side of the oscillation transformer considerable leakage might ensue.

The short wave condenser, as shown in the drawing, should have a short-circuiting switch so that if it is not required it may be quickly removed from the circuit.

A. J. GREEN, *New Jersey.*

No.	*Part of Switch*	*Size*	*Material*
1	Base	7¼" x 6 " x ½"	hard rubber or fibre
2	Cross bars	5⅛" x ⅝" x ½"	hard rubber or fibre
2	Uprights, round	3¼" x ⅝"	hard rubber or fibre
1	Handle	2¾" x ⅞"	hard rubber or fibre
3	Blades	6⅛" x ⅝" x 1/16"	brass or copper
8	Contact Ys	———	brass or copper
22	Machine screws	8 " x 32"	brass or copper
22	Washers	No. 7	brass or copper



Drawing, First Prize Article

SECOND PRIZE, FIVE DOLLARS

Rotary High Frequency Apparatus

Every amateur desires to possess an open core transformer operating on high frequency A. C. current, but how to obtain the high frequency current is a question many would like solved.

The accompanying drawings and descriptions tell how anyone may construct a peculiar, but very practical machine to change, not manufacture, his D. C., into high frequency A. C. even from a single dry cell or any voltage D. C. from any source.

The three principal parts of this rotary converter and synchronous gap are as follows: A small "Voltamp" battery motor, a specially made eight section commutator and a Marconi type synchronous gap.

A new shaft is made for the motor, as shown in Figure 1, and a fibre commutator shown in Figures 1 and 2, is fitted to the shaft of motor, as shown in Figure 1, on the motor commutator side. The other end of the motor shaft is fitted up, as shown in Figure 1, with a hard rubber extension shaft carrying a threaded rod and the two revolving plugs as shown in the drawings. Electrical connection is made to the revolving plugs by the extension shaft shown in Figures 1 and 3.

The stationary plugs, eight in number, are carried by a brass ring as shown in Figures 1 and 3.

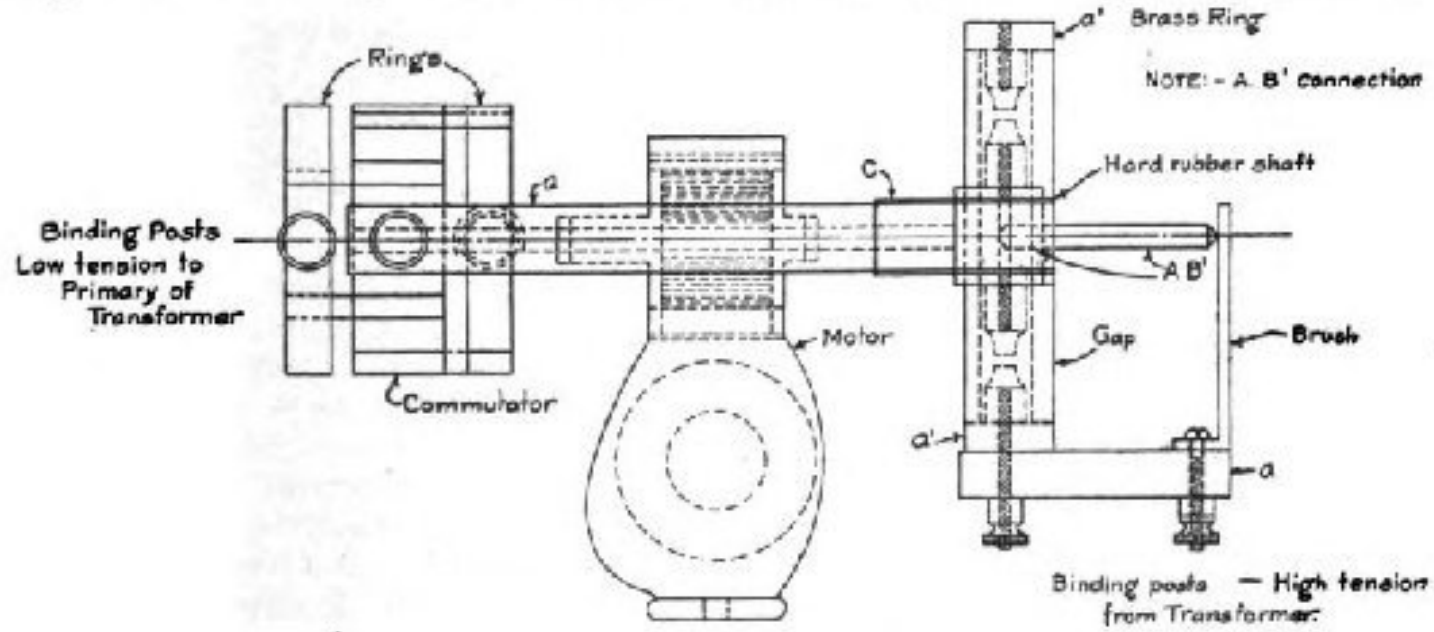
The electrical connection to the ring is made through a bottom binding post, as shown in Figure 1. Connection to the converter commutator is made by four brushes, two placed on the commutator as shown in Figures 1 and 2 and one on each ring on the sides of the commutator, as shown in Figures 1 and 2. The brushes are all of the same width as the commutator and rings, respectively, and each terminates at a binding post as shown in Figures 1 and 2.

The action of the machine is as follows: Each and every bar on the converter commutator is connected alternately to a collector ring on the side of the commutator. The remaining bars are connected to the other ring, as clearly shown in Figures 1 and 2.

The rings are charged, one positive, and the other negative, from a battery or other source of D. C. and the bars around the commutator become alternately charged, p. and n. The bars across the diameter will also become pairs, first charged in one direction, the next pair being charged in the opposite direction and so on.

If the current flows on the brushes and is conveyed by them to the commutator bars which in turn make connection with their brushes as shown, it can readily be seen that the machine will, upon rotation, produce A. C. from the D. C. at the rate of four cycles per revolution of the commutator.

At 3,500 revolutions, which is a speed at which it can be driven, it will be readily seen that 233 1-3 cycles per second will be produced. Of course, by placing twice as many bars on the commutator, just twice the frequency will be obtained.



Second Prize Article, Fig. 1

The spark gap shown in the drawings is so set that when a pair of bars on the commutator come in contact with the converter brushes, the two rotary plugs are also opposite two stationary plugs on the ring. This arrangement of the gap and commutator of course makes the whole outfit synchronous, which is the best way to operate a set if highest possible efficiency is desired.

This apparatus is very efficient and interesting to say the least, and a very high and clear tone is obtained, which is much desired by all amateurs.

HOWARD W. LANDIS
(No address given).

THIRD PRIZE, THREE DOLLARS

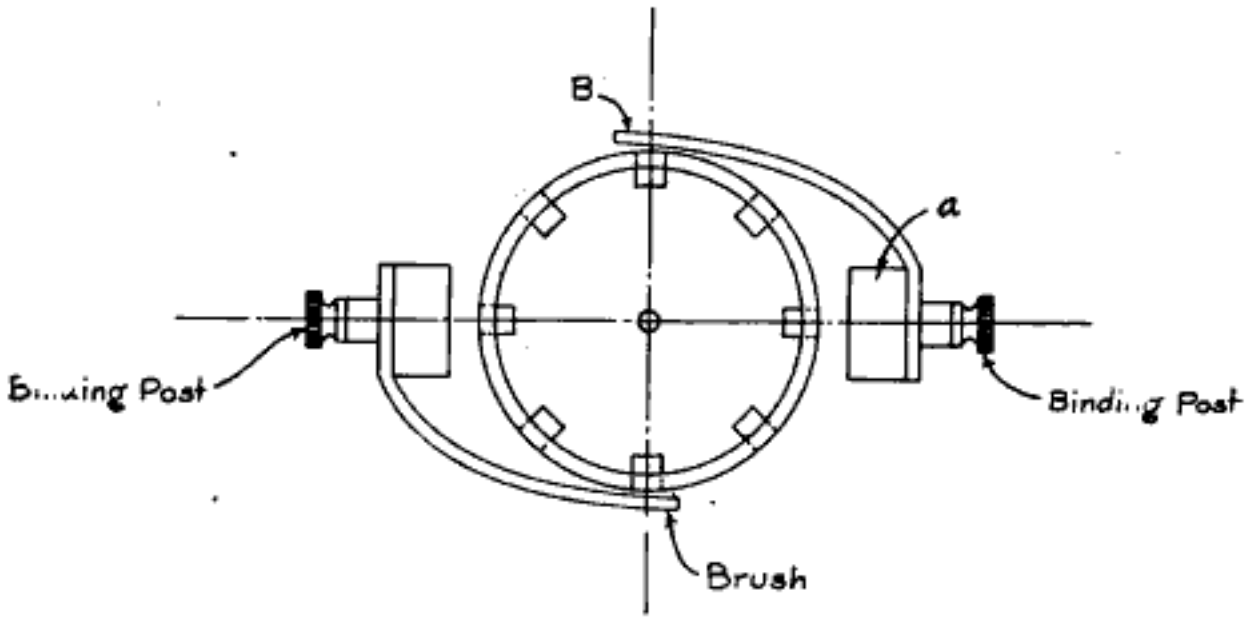
Essentials of Rotary Spark Dischargers

Many articles have appeared from time to time in reference to rotary spark gap construction, but I am led to presume that a resume of the essentials might be appropriate. Unless properly designed, a spark gap may constitute one of the most serious losses in the wireless set. Its construction therefore should be carried out with the greatest precision.

In the construction of a rotary spark gap four rules must be carefully observed:

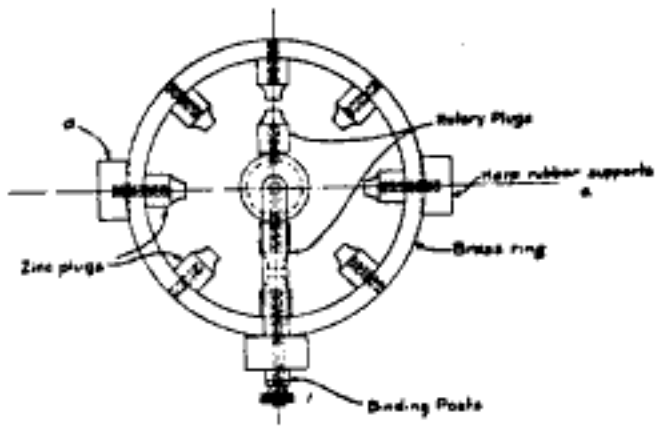
(1) The rotary electrodes must be evenly spaced about a given circumference on the face of the disc. (2) The disc must run absolutely true. There must be no play in the shaft and all electrodes must be in an absolute line—that is, they must set on a line concentric with the shaft. (3) The electrodes must be of ample size to insure a large spark on the surface. The electrodes for spark gaps used on sets up to 1 k.w. capacity must not be smaller than ⅜ of an inch in diameter. (4) The faces of the stationary and rotary electrodes must be absolutely flat to insure their being absolutely parallel, this condition allowing them to come close together.

Taking these four essentials into further consideration, we find that when the electrodes are not spaced evenly about the circumference of the disc, the note will be broken and scratchy and therefore hard to read. Also, if the disc does not run absolutely true the distance between the rotary and stationary electrodes will vary. Consequently the voltage at the gap will be raised and lowered and as this voltage is raised the amperes flowing into the antenna will decrease directly as the voltage increases. This condition gives to the note a kind of "beat" system, which by amateurs is sometimes called "hitting the cycles."

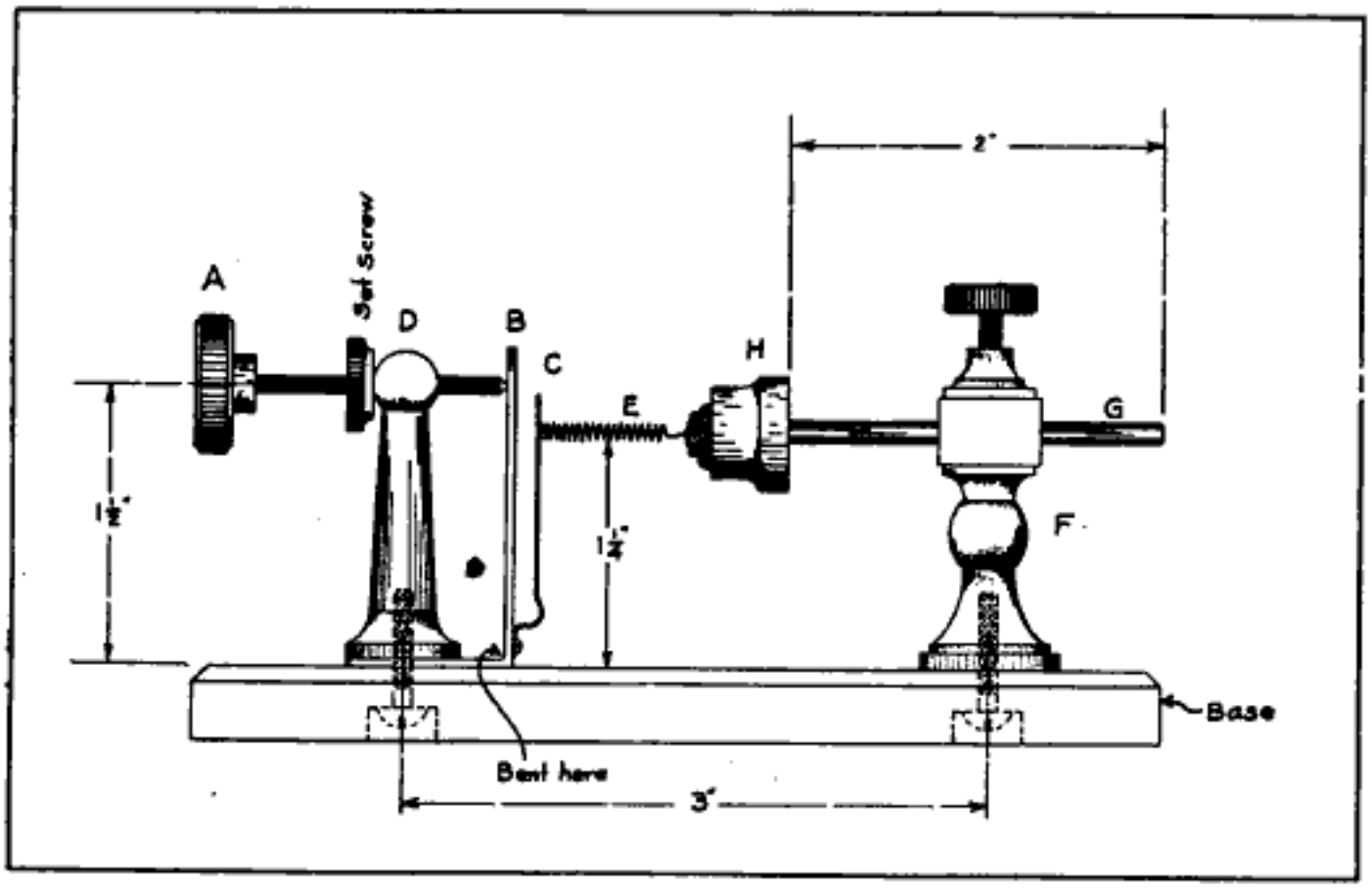


Second Prize Article, Fig. 2

I have found from actual experience that by employing a good sized stationary and rotary electrode, the radiation is materially increased, and the electrodes have greater sparking area; they therefore remain cooler. In quenched gaps a large sparkling area is provided and the sparking distance is very small in proportion to the area. This is one reason for the good tone



Second Prize Article, Fig. 3



Fourth Prize Article, Fig. 1

effects and large radiation emitted by this type of apparatus. We should do well to take an example from the quenched and rotary quenched gaps used in commercial stations.

By having almost flat surfaces on the rotary and stationary electrodes we are permitted a very small sparking distance which will give a quieter gap and greater antenna current. In looking over several rotary spark gap articles in this magazine I have found that few amateurs take into consideration these essentials. In one article the writer recommends the use of a 1/16-inch aluminum disc as the rotary element. I will acknowledge from my recent experiments that this disc will give a good note and permit of quick starting with a small motor, but it will not radiate half so well as the one described in this article, because the sparking area is too small. Also, these electrodes will wear down very quickly.

I have had a similar gap as described by the author of the article referred to for some time and thought it could not be excelled for tone, but the radiation was not near that expected with a given input, and after some deliberation I decided to build the gap here mentioned. I was well pleased with the results when the amateur hand passed beyond its old mark with the following results: Good tone; input in set with old gap, 330 watts; antenna current, 1¼ amps.; input in set with new gap, 330 watts; antenna current, 2¼ amps.; clear note, no undertones.

A word in regard to the motor. The one preferably used should have quick-starting characteristics and very little play in the shaft. It should also be fastened to a heavy base if possible to prevent vibration. The amateur with the gap making the deafening roar will be found to have the least radiation due to the fact that most of the energy is expended at the gap.

Last, but not least, the stationary electrodes must be set so as to meet the rotary electrodes at the same instant. I would not advocate the use of stationary electrodes that are threaded for the reason that when they wear down a slight turn will throw them out of line with the rotary electrodes and only a small portion of the stationary electrode will be used as a sparking surface. It will take time to wear this little hump down again to insure their being brought up closely to the rotary electrodes.

I believe that the best material for

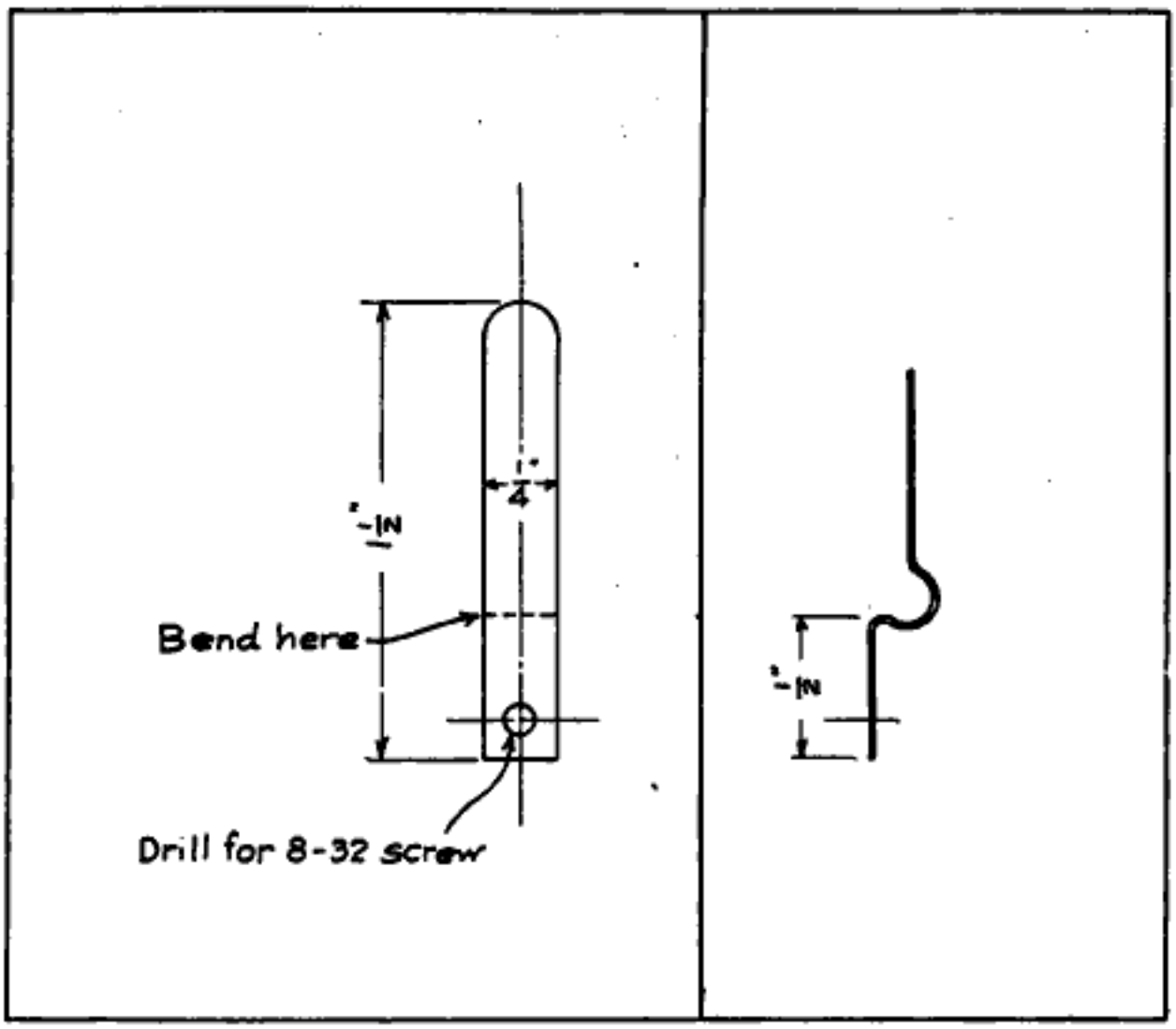
the rotary electrodes is copper and for the stationary electrodes zinc.

The fellow with the noiseless operating gap will be found to have the greatest radiation. Look them over for yourself and see.

G. SHERIDAN OHL, *Missouri.*

D is a brass post, the shape of which may be modified, but that shown in the diagram is very good; E is a small wire spring about ¾ of an inch in length and is soldered to C.

Now C is soldered to B and the whole section is slipped under D and



Fourth Prize Article, Figs. 2 and 3

FOURTH PRIZE, SUBSCRIPTION TO THE WIRELESS AGE

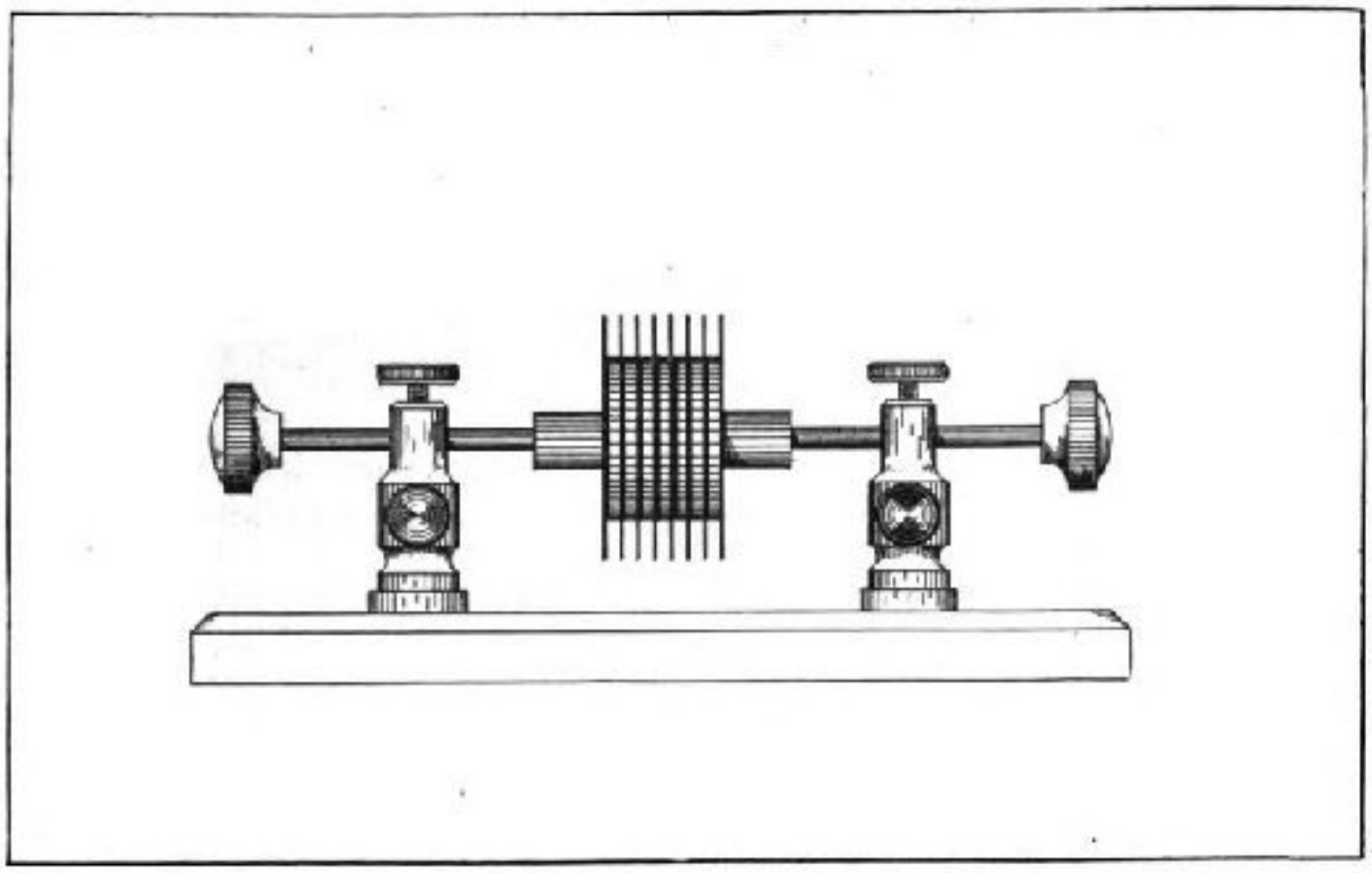
A Serviceable Receiving Detector

A high-class receiving detector is an instrument that all amateurs desire. The following is a description of a detector which I have found to be sensitive and likewise to have a neat business-like appearance:

A is a hard rubber knob fastened to an 8/32 brass screw; B is a piece of brass 2¼ inches in length, ¼ inch in width and about 1/32 inch in thickness. It is rounded at the top and a bend is made at right angles about ¾ inch from the end, as shown in Figure 2; C is a very thin piece of brass 1½ inches in length and bent, as shown in Figure 3, and also rounded at the top; screwed to the base. A lock nut should be placed on the screw to help the detector hold its adjustment.

F is a large binding-post with an ⅛-inch hole through it; G is an ⅛-inch round brass rod to which the cup, H, is soldered. An excellent cup can be made by taking a piece of round brass, ½ inch in diameter and ½ inch in length, and drilling it with a ¼-inch hole, ⅜ of an inch deep. Then from the other side drill a ⅛-inch hole until it meets the larger one. Now push the brass rod into the cup and solder. Setscrews can be placed in the cup to hold the mineral, but a good way is to jam it in with tinfoil. The detector is now complete except for mounting it on a suitable base.

JOHN SHALER, *California.*



Honorary Mention Article, Lorlys R. Rogers. Fig. 1

HONORARY MENTION

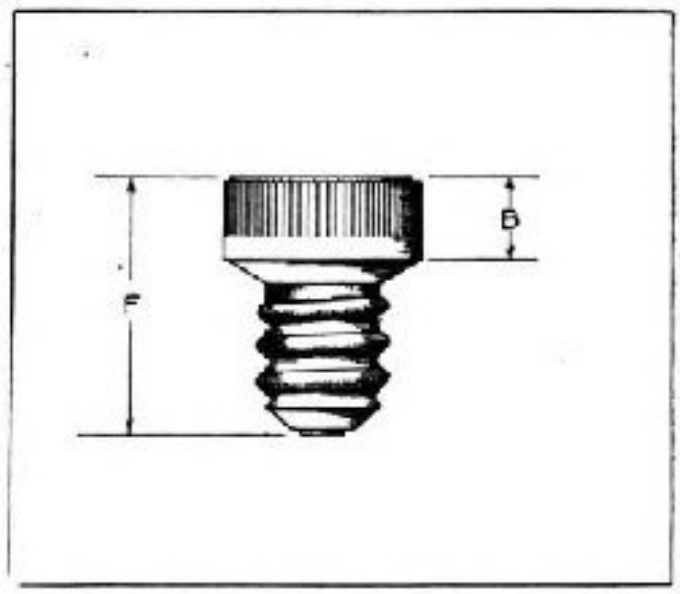
A Seven-Cent Quenched Spark Gap

One of the ambitions of the amateur of to-day is to be able to produce a high, clear tone from the ordinary low frequency spark that most coils produce. The main difficulties encountered are the large expense of the quenched or rotary gaps that will produce the required tone, and the lack of power to operate them. I am an amateur of limited means, so I know and understand.

I have made and am using a quenched spark gap that I find gives the desired high tone spark, and yet only costs seven cents. This gap is not a loss in any way, for one may take the seven cents and spend them, if he wishes, after they have been used. The gap, therefore, proves a good savings bank as well as a good instrument.

There is very little description needed for the construction of this instrument and that will be made quite plain by referring to the accompanying drawings.

Figure 1 shows the gap when it is completed. Any ordinary straight gap that can be opened for ¾ of an inch between electrodes will do for the base. Figure 2 at F shows a plug fuse that has been blown. Obtain eight or ten of these from the nearest electrician. He will make no charge, for they are useless after they are fused. Remove the brass gap B (Figure 2) and there



Honorary Mention Article, Lorlys R. Rogers, Fig. 2

will be found under it a round plate of mica or isinglass. In this cut, the hole H (Figure 3A), make the hole so that a cent will overlap it as C does in Figure 3C. Then place the isinglass and the cent together as in Figure 3D.

Do the same with the other pieces of isinglass, each time adding a cent,

as in Figure 3D. After they have been prepared, place them between the electrodes of the gap as in Figure 4, S being the electrodes. Then tighten the gap so as to hold everything in place and you have the completed quenched spark gap. The number of pennies required varies with the size of the coil and can best be determined by a little testing. I use seven cents on ¾ of an inch coil and get fine results.

LORLYS R. ROGERS, *New York.*

Note.—Suppose the toothsome amateur with a relish for sweets, after he had constructed this gap, should suddenly look across the street and espy in the family bakery shop some new form of delicious pastry, particularly pleasing to his palate. He might then be tempted to remove the seven cents from the quenched gap and satisfy his desires, whereupon the great advantages of this wonderful quenched gap would become nil. In other words, his set would immediately change from one emitting a single wave-length to one with a double wave-length and therefore he would be at the mercy of the government inspectors, to say nothing of the doctor's bills which he might encounter later.

Again, suppose the amateur possessed a considerable leaning towards thrift and should decide that his savings bank ought to contain more than seven cents. He would then add and add to the savings bank until the actual spark gap became so great that undoubtedly the secondary winding of the induction coil would become punctured or the condensers ruptured. We have great misgivings as to the final outcome of this construction and design, for we see that it may be productive of much trouble.

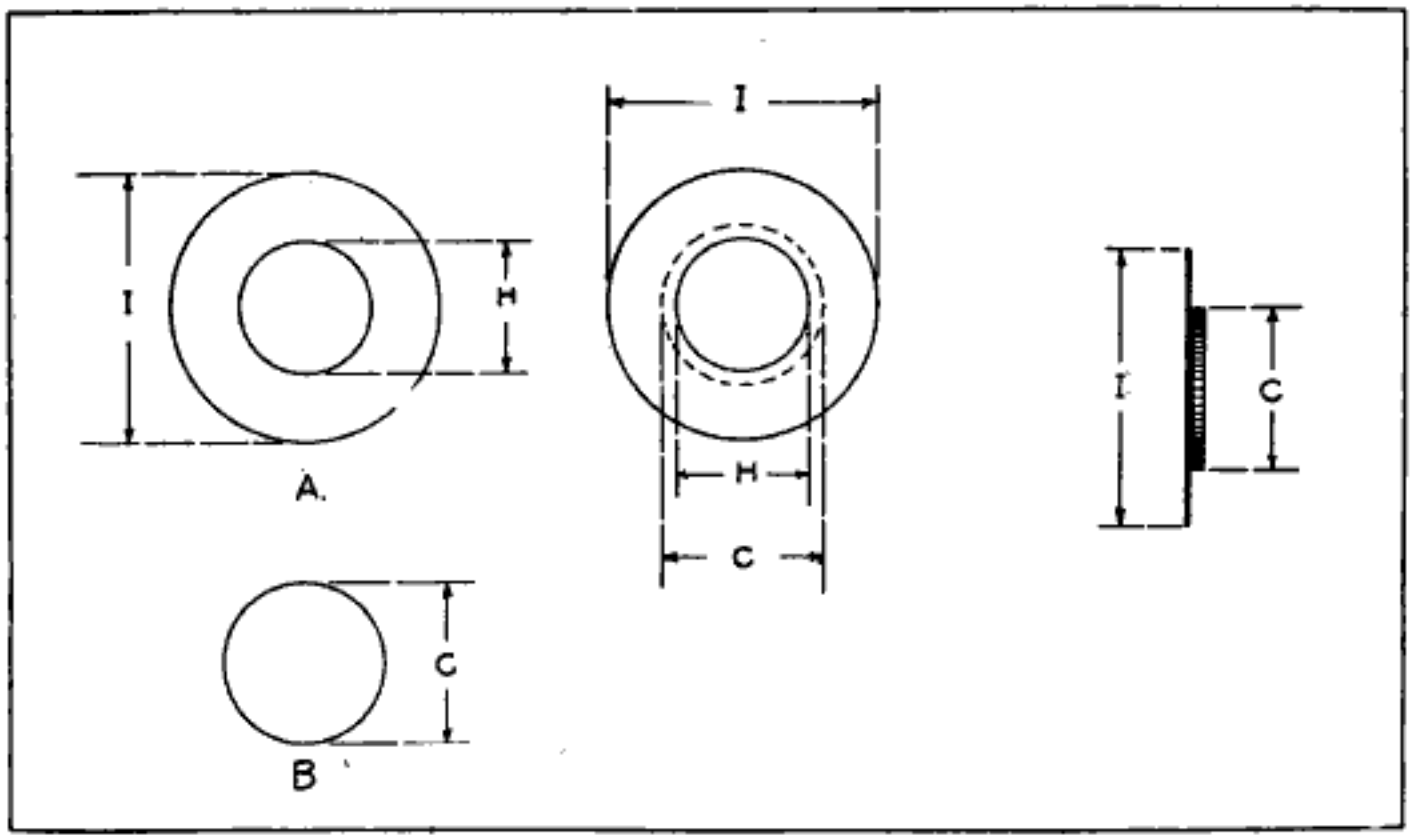
Really, we do not think it safe to allow a quenched gap of this design to remain in the presence of some amateurs we know. We do, however, congratulate our contributor on the originality of the idea and assure him that it excells anything at present in the amateur field. All hail to the quenched gap savings bank! We suppose that millionaires' sons will use gold eagles rather than the cheaper "American Indian" spark discharge surfaces. —Technical Editor.

HONORARY MENTION

A Satisfactory Tikker

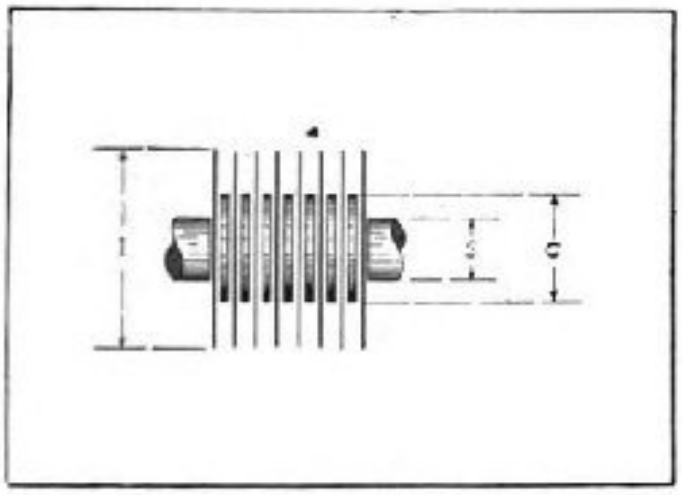
I have seen a number of inquiries in your magazine regarding the construction of a tikker and I herewith offer the following as an inexpensive and satisfactory device. The main feature of this apparatus consists of the movement from an old eight-day clock. This movement should be fastened securely to the base. A standard is then erected to which is attached a phosphor bronze strip, as indicated in the diagram.

If the wheel is rotated at a very high rate of speed and one side of the detector circuit connected to the wheel and the other to the phosphor bronze contact, this arrangement will make audible undamped as well as damped oscillations. The arrangement I con-



Honorary Mention Article, Lorlys R. Rogers, Fig. 3

structed will run for two hours on a single winding and consequently gives very little trouble.



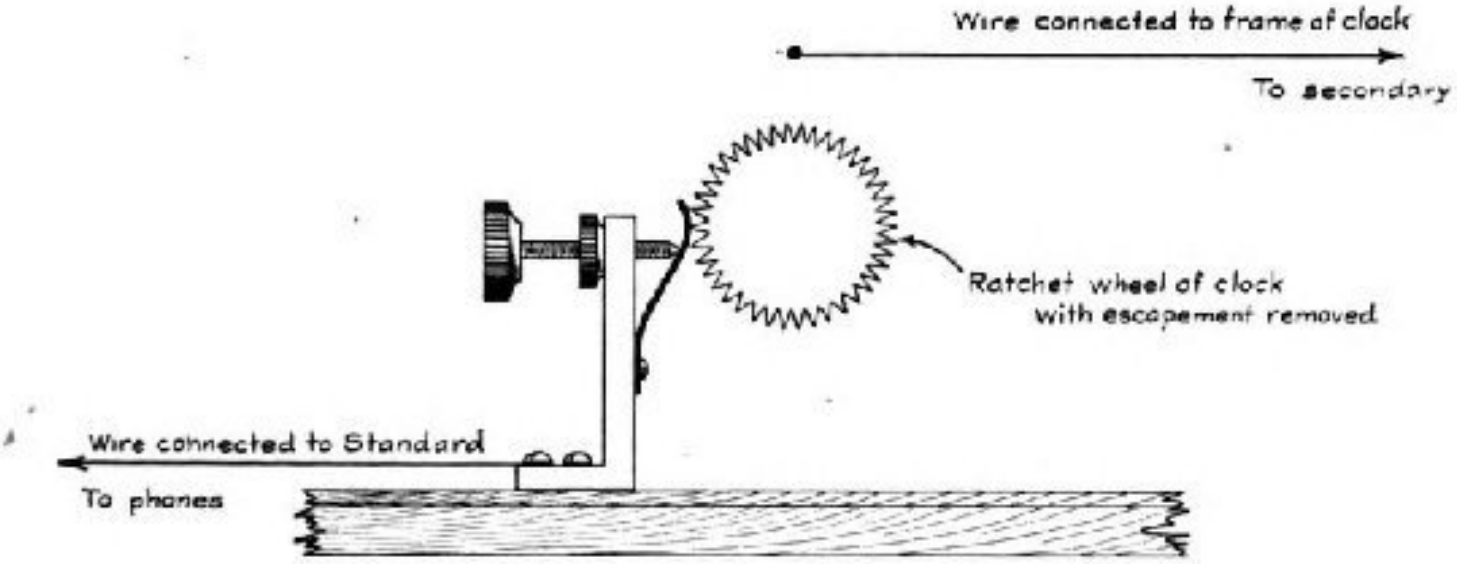
Honorary Mention Article, Lorlys R. Rogers, Fig. 4

The thumbscrew on the standard should be adjusted until the note in the receivers is smooth and clear. The note produced in the head telephones is not that of a distant transmitting station in the case of spark sets, but is responding to the tone produced by the spark set at Cape Cod, Mass.

In addition to hearing continuous waves this device seemingly only gives results on high frequency stations using wave-lengths of more than 1,000 meters. Apparently the longer the wave-length the better the signals. I have no difficulty in receiving such stations as NAI, NAM, NAA, WCG, in the daytime without the use of crystal detectors whatsoever.

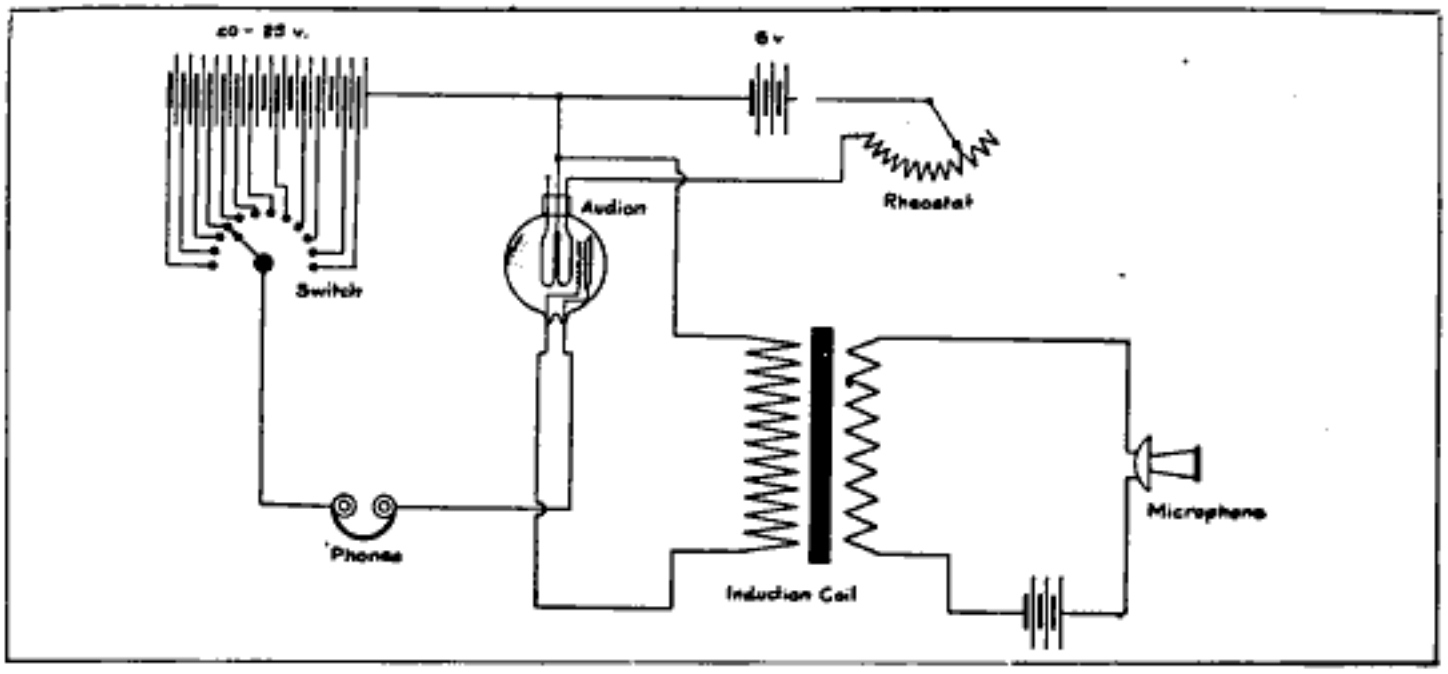
A. L. GROVES, *Virginia.*

Note.—A little explanation of the statement made in the latter paragraph may clear up the ambiguity. Apparently our contributor has removed his crystal detector from the local tuning circuit and inserted therefor the tikker as described. When the crystal detector is shunted across the secondary inductance of the receiving tuner, the wave-length of the circuit is that value due to the natural period of the coil of wire (and its distributed capacity). When, however, the crystal detector is removed and the tikker substituted, owing to its very low value of resistance,



Drawing, Honorable Mention Article, A. L. Groves

that due to interruptions made by the teeth of the wheel. Therefore, better results will be achieved when signals from spark set stations have a frequency of 500 cycles. I find the best results are obtained from 500 cycle stations when the spark note produced in the receiving telephones is about the same as the note from the Marconi station at Cape Cod, Mass., on the ordinary receiving apparatus. The tikker is revolved at such speed as to give a note from a 500 cycle station, corthe stopping condenser in the closed circuit becomes active and the wave length of *said* circuit is governed by both the stopping condenser and the secondary inductance. Hence a considerably smaller value of inductance for a given wave-length is necessary under these conditions than when employing a crystal detector. It may be found of value to have the fixed stopping condenser of variable capacity so that the constants of the circuit may *thereby* be altered. Thus a short wave-length adjustment is readily obtained.—Technical Editor.



Drawing, Honorary Mention Article, F. J. Suchanek

HONORARY MENTION

A Novel Dictograph

I herewith present the amateur readers of The Wireless Age with a description of a novel dictograph with which I have conducted interesting experiments. I believe the device should be of interest to amateur readers, particularly those interested in "detectiphone" work. By reference to the drawing it will be observed that I employ an ordinary microphone transmitter in connection with an induction coil, the secondary terminals of which are connected to the grid and filament respectively of the DeForest Audion. I do not wish to infer that I have discovered anything new, because I have been advised that Dr. Lee DeForest has demonstrated a similar device. I have, however, never seen a diagram of connections employed by him, and it is for this reason that I am sending the accompanying diagram for the amateur readers.

This device is so sensitive that it will respond to the human voice at a distance of 20 feet from the transmitter. The microphone can be installed in some secret place and the two wires leading from it brought up to the telephone induction coil. Two or three dry cells are used in series with the primary winding of the coil. I have also found that any size of spark coil can be used in place of the telephone induction coil. Generally I find that from 20 to 25 volts is sufficient in the head telephone circuit.

For some reason which I do not understand, this device seems to work better if the connection from one side of the secondary of the induction coil to the lamp filament is left open.

The writer will be very glad to give additional information to anyone interested.

F. J. SUCHANEK, *New York.*

Note.—If a double audion amplifier is employed in place of the single bulb as described by the writer, this device is so extremely sensitive that conversation taking place several doors away from one's room may be heard even when the microphone is installed in the listener's room rather than near to the room in which the conversation is taking place. The human voice in whispering tones can be detected at a distance of 10 to 15 feet from the microphone if all of the apparatus is in proper adjustment.—Technical Editor.

HAWKINS' BOMB

BEING AN UNAUTHENTIC ACCOUNT OF CERTAIN EPISODES IN THE HIGH LIFE OF AN ALIEN INVENTOR

"SMART! Why, the men and women you run across now wouldn't have a chance with those I used to meet in my early days as a wireless man. Don't tell me about any experiences you've had. I could tell you something that would make them look as tame as the account of a wedding alongside the story of a big battle."

The Old Wireless Operator finished his declaration with a muttered phrase that more closely resembled a snort of contempt than articulate speech. It was Christmas Day, and he was one of the group of operators whiling away their time in the interim between assignments to outgoing ships. He had been moved to make this remark when the conversation turned to the mental agility of various persons whom the men of the key had met during their travels. For more than an hour he had listened in silence while stories and anecdotes were being exchanged.

There was a lull in the conversation for a short time after the verbal explosion. The Old Operator was known for equal dexterity in key manipulation and yarn spinning, and the clock hadn't ticked off many minutes before one adroit youth, obviously eager to unearth some of the narrative material locked up in the memory of the former, said:

"But you must admit that——"

The Old Operator turned a baleful eye upon him.

"Admit nothing! Bah! If you had ever known Billy Hawkins . . . but you didn't, of course. Talking about smartness, though, he was really smart, Billy was."

A portentious silence followed.

One of the men fumbled about in his pockets until he found a cigar. Without speaking he handed it to the Old Operator. Another member of the group produced a match, and when great clouds of smoke began rolling about, the irritated expression upon the Old Operator's face gave way to a reminiscent cast of countenance.

"You were speaking about Billy Hawkins," suggested the man who had produced the match.

"So I was," answered the Old Operator. "And that was because this is Christmas. Something mighty important happened to Hawkins on Christmas Day."

He puffed on his cigar until it showed red fire all around and began:

"I was on a tramp plying between New York and South American ports and as we were getting ready to steam away, Hawkins came on board. I caught sight of him as he came up the gangway and was struck with the big shock of red hair which spread down over his eyes. But even through that fiery thatch I could catch the orb sparkle that goes with real intelligence. I soon found out, too, that he wasn't any slouch when it came to information on wireless and everything in general.

"The voyage passed off without any incidents worth mentioning until we reached a place which for the sake of convenience I'll call Machrias. There was a heavy fog when we passed the reef at the entrance to the bay, but we seemed to be feeling our way without any trouble. Suddenly a big hubbub rose. I was in the wireless room, but I rushed out in time to see another craft looming up close to our starboard bow. There was a lot of hollering and yelling, and then the two vessels came together with a crash that knocked me spinning against Hawkins, who was running toward me. We untangled ourselves and then I sent out the S O S. The other craft—I can't just recall her name now—kept her nose jammed into the hole she had made in our ship and that saved us from going down right away. After a while she backed away, but I wasn't frightened an awful lot because I knew we were in the harbor and a dozen ships were within call.

"Pretty soon there came an answer to our S O S from the one warship of the Machrias navy. We told her where we were and it wasn't five minutes before she came up out of the fog within two hundred feet of us and dropped boats over the side. There weren't any passengers on our ship except Hawkins, and it wasn't much of a task to transfer the officers and crew to the warship.

"When we got aboard the warship we were questioned about the accident by a pompous looking man who afterwards turned out to be the Admiral of the Machrias navy. No one of us except Hawkins could speak the lingo he talked. He had been in Machrias a few years before and picked up a smattering of the language. The Admiral took a shine to Hawkins at once and soon the two were chatting together like old friends. That pompous officer left the rest of us standing together on deck after a while and invited the American into his cabin. They remained together a considerable time. Finally I became impatient and hunted Hawkins up. I found him and the Admiral seated together at a table with a bottle and glasses before them, and, although the Admiral did not seem to be particularly pleased at the intrusion, I was invited to sit in.

The Admiral did not seem to be particularly pleased when I was invited to sit in

"The Machrian and Hawkins talked together in that jargon for more than an hour, and I was curious as they come regarding the subject of their conversation. I didn't dare interrupt them, however, because every time I made a motion as though to speak the Admiral person turned a ferocious glance in my direction and I could see

that Hawkins was apologizing for me.

"When the Admiral finally left us alone I asked Hawkins what it was all about. He was mysterious and cagey at first—tried to tell me that the navy man had been simply trying to find out about the accident. But I wouldn't stand for that story and finally got at the facts.

"It appears that the Admiral was an enthusiastic admirer of wireless, although the navy over which he lorded naturally possessed but one wireless set. The entire fleet of one vessel disposed me to look on the navy and the responsibilities of the Admiral somewhat lightly, but Hawkins with a grave countenance announced that he had interested in that dignitary in an invention of great importance.

"'You know,' Hawkins explained, 'inventing is my regular business and I have recently planned a wireless apparatus which will set bombs off at a distance of from fifteen to twenty miles.'

"This was news to me, but I was prepared not to be surprised at anything that Hawkins said, or did. He had, it seems, told the Admiral about his invention and the latter was anxious for him to make some tests.

"The Admiral returned about that time and held another conversation with Hawkins. The latter turned to me and after a while said that he had been invited to be the guest of the Machrias navy at the Admiral's home while the tests were being made. Hawkins explained that I was to assist him. The idea didn't look so bad in view of the fact that our ship was slowly settling toward the bottom of the bay when I last saw her, and I had only a small amount of cash with me. So I went along.

"Well, when the warship docked at a pretty little city nestled on the edge of the harbor Hawkins left the vessel arm in arm with the Admiral, while I walked along in the rear. The chief of the Machrias navy did not encourage any intimacy on my part; in fact, when I made bold to edge toward him he turned his back on me; and once when I smiled at some remark by Hawkins which had sent the Admiral into convulsions the naval man sobered instantly and frowned.

"THE Admiral didn't live a great distance from the pier where we landed and I followed him with Hawkins to his home. We were given comfortable quarters, where we changed our clothing for apparel provided by a servant, and made our way to a banquet hall on the floor below. Here we found a crowd of half a hundred persons who had been invited by the Admiral to meet Hawkins. My companion was introduced as a distinguished inventor and he bore the honors as easily as though he were accustomed to being the principal guest at dinners every day.

"He quickly proved to be the shining light of the party. What he didn't know about how to act in polite society he guessed at, although he had me worried once or twice. That was the only trouble with Hawkins—he was so sure of carrying things out that he never saw difficulties, and plunged right ahead as though they didn't exist. An incident of this kind came up before the dinner was fairly started. One of the guests was the Admiral's sister—the Dowager—whose tender years were far behind her. Hawkins started in at once to play the courtier. He told me afterward that he understood the best way to get on in social gatherings was to show by some little act that you were perfectly at ease. So when the Admiral led the Dowager up to him he promptly favored her cheek with a resounding kiss. The only person in the company who looked pleased was the lady. She tittered and blushed, but the others were both amazed and hopping mad. The Admiral's face got red and his eyes rolled around so much that I thought they would fall out of his head.

"Hawkins saw at once that he had done something which was way off color, and without batting an eyelash he explained quietly that it was a custom he had learned while visiting at a

court in Europe. 'Sometimes I forget where I am and imagine I am back in that same court,' he said.

"The explanation went with the Admiral and most everyone else. A thin man with a large nose, who had been pointed out to me as Chancellor of the Treasury, however, was a notable exception. He barked out that it would be a mightly unlucky thing for Hawkins if he had many lapses of memory.

"Aside from this little—well, I guess you would call it an error of judgment on Hawkins' part—the dinner passed off well enough. Hawkins had a seat opposite the Admiral's sister and did all that he could to arouse her interest in him, notwithstanding the fact that she was easily fifteen years his senior. He was so open in his attempt to make an impression that the little Chancellor was just burning up with jealousy. He never let his eyes stray from the couple during the entire evening, and every time my friend opened his mouth to utter some great truth about wireless and his accomplishments in the art he sneered or laughed. Poor little fellow; he must have been hard hit.

"But the way he acted made me uneasy. When the dinner was at an end I drew Hawkins aside and told him to be careful and not get into trouble. You see, while I knew Hawkins was a pretty wise guy, I had never heard much about him as an inventor—in fact, I never knew that he was an inventor at all until he made the announcement—and I was afraid that he would get us into hot water. He laughed at my fears and said there was nothing to worry about. He sized it up that the Dowager was rich and the Chancellor was trying to induce her to marry him.

"'But I don't think he'll succeed,' he said with a laugh. When I asked him why he replied that he intended to marry the lady himself. The statement did not surprise me as much as it would have ordinarily. I was ready for almost anything in the way of the unexpected by this time. I warned Hawkins, however, that he'd better be careful and watch out for the Chancellor fellow.

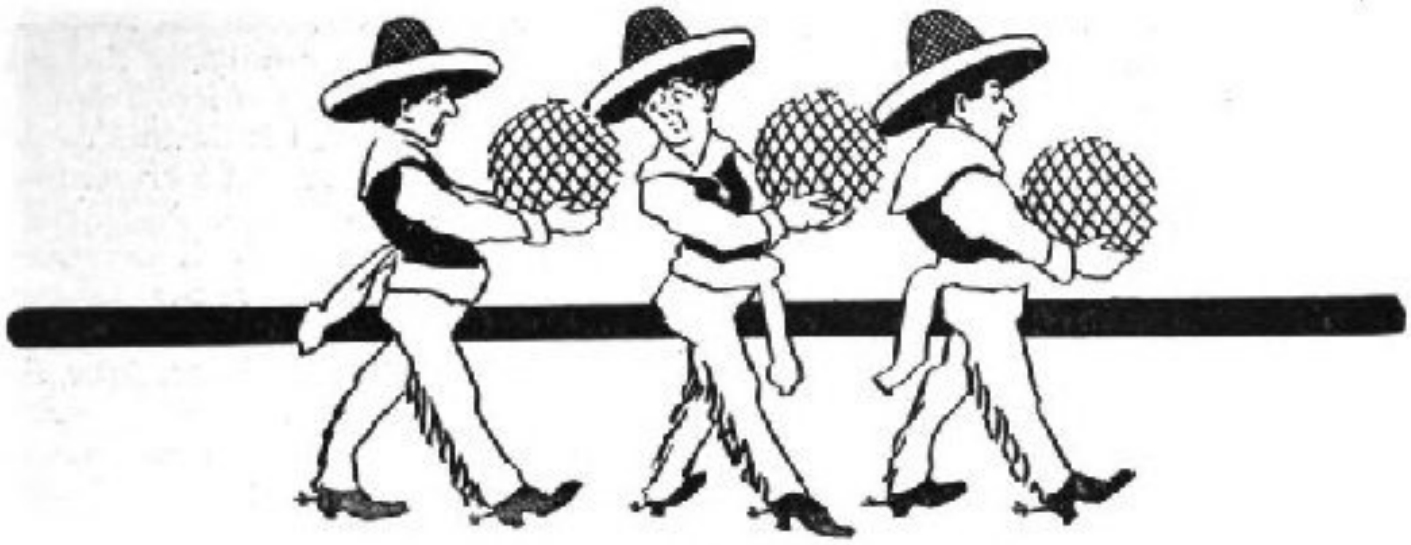
"Two or three days passed and my red-haired friend didn't do anything but talk about his invention. He made himself so important that the dinky little Admiral consulted him almost every day. The official government newspaper published interviews with him, and the Admiral had a laboratory constructed at his request.

"Hawkins began to spend a lot of his time in the laboratory which he kept securely locked. No one, not even me, was allowed to enter it. He explained that he wished to conduct his experiments in secret.

"After a while the Admiral began to grow impatient and asked him almost every day when the tests would take place. The repeated inquiry never disturbed Hawkins in the least; each time he smiled in a mysterious manner and observed that some details were yet to be completed, but the demonstration would be given within a short time. Four weeks wore away in this manner, and during this time Hawkins' courtship with the Admiral's sister progressed rapidly. He had a very likable manner and was friendly with everyone else, too, except the Chancellor. That functionary never had a good word to say for Hawkins, and as the day set for the demonstration was put off from time to time, he emphatically and openly expressed his doubts of Hawkins' ability to carry out his plan.

"There is no telling how long Hawkins would have postponed the test if I had not become anxious. I didn't like the way the Chancellor was talking and it looked to me as if there would be a bigger explosion than any that Hawkins bomb would make if something in the way of a demonstration didn't come off right away. So I went to Hawkins and told him that he would have to get busy and show that he knew what he was talking about or I would hire one of the boatmen along the waterfront to take me out on the ocean and wait for a vessel to come along and pick me up. Hawkins told me not to do that. He said he wanted me around to answer little questions about the details of wireless. 'I'll take care of the big things,' he said.

"Shortly afterwards a day was appointed for the test. A large crowd of



Three men, each one carrying a bomb

spectators gathered on the shore of the bay. A committee which included the Admiral and the Chancellor, representing the government, had been appointed to witness the test and the members of this body were awaiting Hawkins when I arrived. He had said that he would be on hand promptly at ten o'clock in the morning. He did not arrive at that hour, however, and I began to grow a little apprehensive. I am free to confess that while I admired Hawkins in many ways and thought he was a smart fellow, I always felt safer when I had my eyes on him and knew that I was present to answer for anything he might say or do. I was not the only one that noticed that Hawkins was late. The Chancellor had called attention to the fact with a sneer and volunteered the opinion that perhaps the test would not take place after all.

"Just as he was uttering this remark there was a hum and roar of an automobile rapidly approaching, and the next instant Hawkins leaped from the car and made his way towards the committee. He was accompanied by three men, each of whom carried a bomb. As the men neared the spot where the members of the committee were standing even the Chancellor's face lost its sneering expression and he made as if to step backward.

"Hawkins smiled reassuringly. 'Do not be afraid, gentlemen!' he said. 'There is no danger whatever.'

"Whether this statement was made to allay the uneasiness of the committee or to draw attention to himself I do not know. It sufficed at any rate to attract a glance of admiration from the Dowager, who was near by, and Hawkins looked satisfied.

"'Now, gentlemen,' he said nonchalantly, 'here are my bombs. Ask me what questions you will about them.'

"The members of the committee, with the exception of the Chancellor, seemed to be content with an examination of the bomb. The Chancellor, however, threw question after question at Hawkins.

"'What's this for?' he asked, indicating a flange of brass which stood out plainly on the iron jacket of the bomb. Hawkins did not hesitate an instant in replying.

"'That,' he responded easily, 'is the point of electrical contact for my waves.' The Chancellor passed by this statement with only a muttered exclamation which might have meant nothing or considerable.

"'And this?' he asked, pointing to the perforations in the jacket. Hawkins did not reply; instead he turned a glance full of caution and wariness toward his questioner.

"'That,' he responded, 'is part of my secret. I cannot answer your question.'

"The Chancellor flushed up and seemed about to make an angry reply when the other members of the committee interfered and said that Hawkins had furnished all the information necessary. So Hawkins led the way to a launch which was to take the committee to a point in the harbor fifteen miles away, where the bombs

were to be submerged. During the entire trip Hawkins talked so much and so loudly that the Chancellor was fairly drowned out when he attempted to raise his voice.

"The submerging of the bombs was carried out under the direction of the Admiral and two other members of the committee. 'Place them where you will,' said Hawkins. 'I can set them off anywhere.' This having been done, the launch returned to the shore. Hawkins, taking his watch from his pocket, said:

"'It is now eleven-forty-five. I shall go at once to the wireless station in my laboratory. At twelve-thirty the bombs will be exploded.' He made this statement with so much certainty that there was no room for doubt left. In the eyes of the Chancellor, however, was still a sardonic gleam and if it had not been for Hawkins' reassuring words I should have suspected that the former possessed knowledge which he was able to use to the undoing of my friend.

"But I had little time for conjecture. The official party was dissolving itself into two bodies as arranged, the Admiral and Chancellor with several high potentates taking up their positions on the shores of the bay, while half a dozen dignitaries of lesser rank were climbing into automobiles which were waiting to take us to Hawkins' laboratory.

"There we arrived in silent pomp and critically viewed the maze of queer-looking apparatus. To me it looked like an early orphaned wireless telegraph set with an additional few cranks and gew-gaws. But I could see that the others were impressed by the array and watched in hushed awe as the inventor rolled up his sleeves and commenced making many mysterious adjustments. Finally, with one free hand, he reached for his watch and turned.

"This was evidently a prearranged signal, for one of the members of the committee with us—the General of the Machrias Army, who was the equal in pompous mannerisms of the Admiral—strode to the wall telephone and nodded that all was ready.

"A great hush fell over the room, the silence being broken only by the nervous movements of the deeply absorbed inventor as he darted from this to that, turning a screw here and a crank there. Suddenly all was silent. I began to get nervous, wondering if something had gone wrong. Seconds dragged. Then, like the crack of a pistol shot, came a deep base 'Ugh!' from the General party at the telephone. I turned to find him beaming. Yes, the first bomb had just gone off . . . amazingly successful. . . . The Admiral from the other end of the wire tendered congratulations.

"I was unquestionably the most surprised person in the room. I looked at Hawkins with new interest. His infernal apparatus really worked! I resolved then and there to make early amends.

"Four satisfied grunts then told me that news of the explosion of the second bomb explosion had come over the telephone. A moment later the third and last one was reported successful. Hawkins talked and smiled easily as he rolled down his sleeves and made ready for the return. The members of the party crowded about him and showered him with congratulations, which he acknowledged merely with an I-told-you-so sort of nod.

"But when we reached the bay, some twenty minutes later, enthusiasm went beyond all restraint. The Admiral was beside himself with excitement and openly exulted over the Chancellor and what he termed the vindication of his judgment in Hawkins. Every high potentate and functionary of Machrias was there and it seemed as if all were trying to shake the American's hand at the same instant.

"In the midst of the excitement I stepped aside and joined the Dowager, who beamed benignly on me as the friend of her attentive inventor. As usual, the Chancellor had sought a place at her side and was vainly trying to distract her attention from the Hawkinese plaudits of the crowd. She was totally oblivious of his importuning, however, and I could understand little of what he said. One word several times repeated in his harrangue caught my attention and, coupled with his

gesticulations, enabled me to make out that he was talking a whole lot about some barges that were just then putting out to sea, and mixing in generous abuse of Hawkins.

"By then a triumphal procession was forming to escort that individual through the city. My eyes swept over the crowd out to the bay beyond and I thought of the inventor's prospects. A fleet of barges being towed out to sea represented but a trifling portion of the Dowager's huge fortune. Speculating on the probable extent of her scream from the Dowager, who promptly reeled over in a dead faint. A raucous laugh from the Chancellor then rang out and an accusing finger pointed towards Hawkins. The crowd swayed and closed in on the inventor. I pushed my way through to him, arriving in time to hear the Admiral, purple with rage, spluttering a demand for the explanation of the extraordinary outcome of a test supposed to be ended with the explosion of three bombs in harmless waters.

"Hawkins smiled engagingly

All were trying to shake the American's hand at the same instant

holdings, my eyes became fixed on the slowly moving objects. Suddenly I saw two of these rise from the water and break into fragments as a cloud of smoke arose, followed by a tremendous detonation.

"Another explosion came a moment later; then a third and fourth. The whole barge fleet had been wiped off the ocean!

"A great gasp followed by a concerted groan arose from the crowd. All eyes turned in the direction where Hawkins stood. He was fixedly gazing out to sea as if in a trance; something had very evidently gone wrong.

"The tension broke with a stifled throughout the tirade. I waited anxiously for his answer.

"'Explanation?' queried Hawkins blandly. 'There is no explanation. To be sure three bombs were placed in the water. But that is no reason why there shouldn't be more than three explosions. That is the beauty of my invention.'

"This sounded a trifle vague to me, but Hawkins had a way of talking so that you couldn't help but believe what he said. The Admiral softened a little.

"But the Chancellor was not so easily satisfied. 'How did it happen that the barges five miles away from the

bombs were blown up?' he inquired scathingly.

"This sounded to me like a knock-out question. I could see that the Chancellor considered it so and the Admiral's face began to redden again. Hawkins' answer to this was that the current had undoubtedly carried one of the bombs away from the place where it had been submerged. The Admiral's face cleared again, but the Chancellor walked away, muttering angrily.

"The members of the committee, however, with the exception of the Chancellor, were convinced that Hawkins' invention was a success. The Dowager was a business woman, with an eye to the main chance, and I expected to hear that she would demand damages of Hawkins for the loss of her barges. She did, too. But he succeeded in getting into her good graces again by telling her that he would reimburse her as soon as he had disposed of the patent on the bomb to the Government.

"The matter of the sale remained unsettled for quite a while because of what Hawkins called the unjust prejudices of the Chancellor. Notwithstanding that opposition, however, Hawkins made rapid progress with his courtship and as Christmas approached he had obtained the consent of the Dowager to have his marriage to her celebrated on that day.

"Everything looked rosy for Hawkins and the happy outcome of his plan. The Chancellor was very quiet during the preparations for the wedding. That alarmed me because I am a firm believer in that lull-before-the-storm stuff. It didn't seem natural for a man who had lost out so hard to be taking things so easy.

"Well, we got ours. It was a fine little bump when it came. It had been arranged that the Dowager and Hawkins should use the Admiral's yacht on their honeymoon trip. I invited myself to accompany them. The Dowager didn't seem to be overjoyed with the idea, but it made no difference: I didn't relish the thought of being left in Machrias with the Chancellor plotting for the downfall of Hawkins and anyone who had been associated with him.

"The wedding passed off without any untoward incidents. The Chancellor was not present, but I didn't think much of his absence in view of the circumstances. After the wedding festivities were over, the bridal couple and I made our way to yacht landing. We had taken only a few steps on the pier when we heard a great outcry and, turning about, saw a crowd running toward us. It was headed by the Chancellor and the members of the committee, each of whom was carrying one of Hawkins' bombs. Shouts of 'faker' and 'fraud' filled the air.

"It looked to me like an opportune time for disappearing.

"Hawkins had suddenly grown pale and was looking longingly at an American tramp making ready to sail. Then he turned and without a word ran towards a boat tied to the pier. I followed and in less time than it takes to tell we were making the best speed we could towards the tramp. As we climbed the ladder over the sides of the steamship I looked back and saw the Dowager leaning on the shoulder of the Chancellor. The others were shaking their fists at us.

"And that's about all. The captain of the tramp quickly grasped the fact that we wanted to get out of Machrias as rapidly as we could, and being an American himself he got us out. We steamed out of the harbor within a few minutes after we boarded the craft."

The Old Operator tossed away the stub of his cigar and rose as if to indicate that the story was at an end.

"But what happened to Hawkins afterwards?" asked one of his auditors.

The narrator settled down in his chair again.

"I haven't seen Hawkins since the day we steamed into New York Harbor from Machrias," he said. "He practically admitted to me that his invention was more or less of a myth and that he knew the jig was up when he saw the crowd running towards us, carrying the bombs, but I never knew how much of a myth it was until one

night a year afterwards when I was on Broadway and came face to face with the Dowager and the Chancellor. Apparently they didn't have any grievance against me, and we all went into a restaurant for a bite to eat after the usual polite preliminaries. Then I learned the story of how the Chancellor had upset Hawkins' plan.

"It seems that this Chancellor party had such positive suspicions concerning Hawkins that he started in to show him up as soon as the Admiral established a laboratory for him. A few nights before the test took place he forced an entrance into the building and got a good idea of how Hawkins worked his scheme. The wireless control was all bunk. What aroused his suspicions was the discovery of a quantity of sodium. Now, as everyone knows, sodium when it comes into contact with water will ignite. The Chancellor figured out correctly enough that the brass flanges from the bomb were simply a blind for the perforations which allowed the water to enter the jackets of the bombs. Cotton packing prevented it from reaching the sodium until after the bombs had been submerged in the water for the forty minutes required by Hawkins to 'get things properly adjusted.'

"This explained how the bombs were set off, but I was still puzzled as to how the Dowager's barges had been blown up. The Chancellor cleared this up, too. He was responsible for the destruction of the barges, for he had made several bombs similar to those in Hawkins' laboratory, packed them with much heavier cotton to retard the flow of water and submerged them in the harbor early on the morning of the tests. This accounted for the numerous explosions. It all sounded simple enough as it was explained to me and then I asked how it was that the Dowager and Chancellor were together. She took up the explanation and said that she had succeeded in having her marriage to Hawkins annulled within a few days after he ran away. Then she married the Chancellor.

"You had to hand it to that Dowager. I won't forget her parting remark in a hurry. I had asked whether she was still sore on Hawkins for his deception and wondered how she felt towards the Chancellor blowing up those barges.

"'I might have been grieved at first over the financial loss; but that has since been made up, and more, too. On our wedding day the Chancellor gave me a check covering the cost of the fleet he blew up to win me; then, shortly afterwards, I figured out a use for Hawkins' wireless bomb and finally sold the patent to the Government. They are using them now to blast submerged rocks.'"

IN THE SERVICE

Some men find profitable employment in studying figures with the object of making them conduct themselves in an orderly, consistent manner. In this category should be placed Reuben S. Harlan, assistant auditor and assistant treasurer of the Marconi Wireless Telegraph Company of America. When the ciphers and the numerals take a refractory turn and decline to remain in their proper places, he invents means to make them do so. He has had considerable training in this arithmetical discipline, for he took a course in finance and accounting in Baltimore, Md., and has spent all of his business life in keeping digits on their good behavior.

Harlan was born in Harford County, Md., in 1886. The Northern methods of transacting business appealed to him, and as soon as he had completed his education he came to New York. This was in 1903. His career in that city was not that of the young man who comes to the metropolis prepared to engage in the first business which presented itself. Then as now there was a demand for the specialist and Harlan discovered that the field of expert accounting offered well-paying opportunities. He found a chance to make practical use of his ability in the auditing department of Arnhold, Karberg & Company, exporters and importers.

He next transferred his activities to firms carrying on the business of expert accounting, being employed by Deloitte, Plender, Griffith & Company, and Arthur Young & Company. The work entailed long hours and considerable traveling. On one occasion Harlan was asked to pack his suit case for a week's stay in Washington, D. C. When the week was ended he was asked to go from Washington to Jacksonville, Fla. There he remained for five weeks, devoting as much as sixteen hours a day to the task in hand.

Destiny might have ordered a life made up for the greater part of travel, but the subject of this sketch decided that as he was a resident of New York he ought to spend a fair share of his time in the city. He had heard much that was interesting about wireless telegraphy, too, and that induced him to attempt to find his way into the Marconi service. So in 1912 he became chief accountant of the Marconi Wireless Telegraph Company of America. Then he was promoted to be assistant auditor and he afterward became assistant treasurer. During his service with the Marconi Company he has done much to improve the auditing system, having taken part in establishing the method now in vogue in the accounting department.

Harlan's maxims for business success include the following:

"Be willing. If you are asked to do anything, try to do it if you possibly can."

It should be mentioned that he is a bridegroom, his marriage to Miss Helen K. Schade, of Brooklyn, having taken place on September 29 at the home of the bride's parents. The ceremony was performed by the Rev. Dr. Herman C. Weber.

Mr. and Mrs. Harlan have returned to New York after a honeymoon spent in the South.

VESSELS EQUIPPED WITH MARCONI APPARATUS SINCE THE NOVEMBER ISSUE.

Name	Owner	Call Letters
Great Northern	Spokane, Portland & Seattle Railroad	WIR
Burmese Prince	Prince Line	GRP
Portuguese Prince	Prince Line	
Maracas	N. Y. Trans-Atlantic Steamship Co.	
Winchester	Irving Cox	KZD

INTERESTING EQUIPMENTS

The steamship Great Northern has been equipped with a standard Marconi 2 k. w. 500 cycle quenched gap set and also a standard Marconi ½ panel set as an auxiliary equipment to be operated from an independent storage battery plant. The Great Northern, which is in course of construction in Philadelphia, will be operated on the Pacific coast.

The steamship Maracas, formerly owned by the Trinidad Trading and Shipping Company, has been purchased by the New York Trans-Atlantic Steamship Company, a new corporation, for passenger and freight service between New York and Italy. In addition to a Standard Marconi 2 k. w. set she has been equipped with a ½ k. w. panel set to be operated in case of emergency.

PERSONAL ITEMS

Owing to the resignation of Charles J. Pannill from the Marconi service to accept the position of expert radio aid, with headquarters at Radio, Va., T. M. Stevens has been appointed acting superintendent of the Southern Division, Marconi Wireless Telegraph Company of America, with headquarters in Baltimore.

G. W. Nichols has been temporarily assigned to the district superintendency vacated by the transfer of Mr. Stevens from Boston.

KAHUKU MISUNDERSTANDING ADJUSTED

The misunderstanding which recently arose between the Navy Department of the United States Government and the Marconi Wireless Telegraph Company of America regarding the dispatch of an alleged unneutral message from the Marconi transoceanic station at Kahuku, near Honolulu, has been amply adjusted by an explanation on the part of the superintendent in charge of the wireless station. He explained that the message had been received as an ordinary news item at the station and was transmitted by the operator then in charge in the absence of the censor and the superintendent. This was done in the regular course of business.

The station at Kahuku, which was never closed, is conducting its regular business in the usual way, being hampered only by the order of the Navy Department, which precludes the transmission of messages in code by wireless. As this order does not apply to the cables or the landline companies, the Marconi Wireless Telegraph Company of America has protested to the United States Government.

It was on October 16 that the Honolulu Station of the Marconi Wireless Telegraph Company announced the arrival at that port of the German gun boat Geier. The information came to the Navy Department and an explanation of the alleged violation of the President's neutrality order was demanded.

The article on the share market is omitted from this number of The Wireless Age because of the closing of the exchanges, due to the European war.

In Holiday Spirit

It may be of interest to you to know that the commercial and amateur operators of this city (New Orleans) all agree in saying that The Wireless Age is in a class by itself. So numerous are the praises which I have heard of your magazine it would be impossible to recall them all.

L. B., *Louisiana.*

o o o

The Wireless Age is the only worth while magazine of its kind in existence.

R. P., *Iowa.*

o o o

I consider your magazine as the best yet and one which should be highly appreciated by all radio enthusiasts. Would rather read one copy of The Wireless Age than half a dozen of your contemporary, into which are consolidated three of the formerly best magazines.

D. S. I., *Missouri.*

o o o

I cannot speak too highly of the magazine and could not be without it.

B. C. M., *Illinois.*

o o o

The November issue of The Wireless Age is fine!

A. H. G., *California.*

o o o

You have done exceptionally well with your illustrations. Even though I am a wireless "bug" of the most violent order, a steady diet of diagrams would, I am sure, impede my literary digestion. It is quite a relief to find a technical paper editor who has some sense of decoration.

H. B. H., *Connecticut.*

o o o

I have sent the first twelve numbers of The Wireless Age to be bound in leather—calfskin—that's how I value them!

J. E. L., *Maine.*

o o o

In my opinion text books don't stand one-two-three with your magazine when you are up against a problem. I have saved every issue since the first.

W. T., *Georgia.*

o o o

My introduction to The Wireless Age was made on a railway newsstand. I subscribed soon after and it is the only subscription I have renewed this year.

D. I. W., *Nebraska.*

o o o

A better wireless magazine could not be made; nor, for that matter, another as good.

S. C., *Tennessee.*

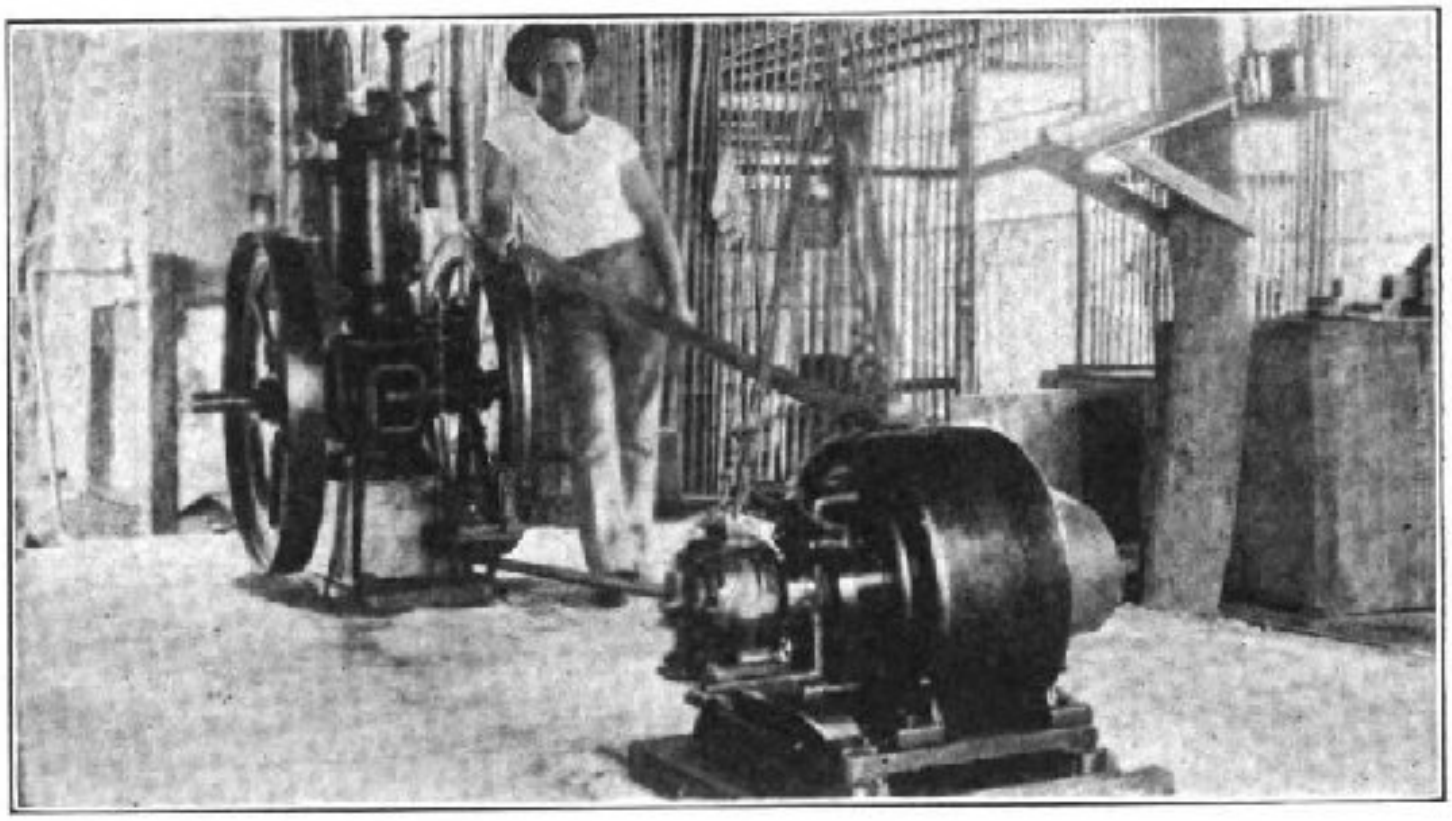
The tower at Malabang

Wireless *in the* Philippines

IT is curious that wireless telegraphy should be used so extensively as a means of inter-island telegraph communication in such out of the way places as the islands of Mindanao and Jolo, situated in the southern end of the Philippine Archipelago. But as far back as 1905, when wireless telegraphy was still in its infancy, three stations were erected at Jolo, Malabang and Zamboanga by the signal corps. At first they were employed solely for military purposes, on account of the extremely unsettled conditions among the savage Moros of the southern islands. When hostilities ceased finally and the merchant and planter opened up the country these stations were turned over to the Bureau of Posts of the Philippine Islands and operated for commercial purposes. They proved much more successful than the ordinary telegraph, always the prey of destructive typhoons and tropical rain storms which sweep over the islands. Many times, miles of land wire have been destroyed during a single typhoon lasting but a few hours. The natives also purloin the lines for the sake of the copper and the nails, which they use for making tools and weapons.

The Malabang wireless station is situated on the southern shores of Mindanao. Here the messages are received from Manila by wire, and transmitted by wireless to Zamboanga, from whence they are relayed to Davao, Jolo, Puerto-Princessa, and Cuyo. The apparatus is installed on the top floor of a small nipa shack, made of dried nipa grass and bamboo, raised about 8 feet from the ground on piles. The tower is made of steel lattice work about 130 feet high and carries an 8-wire antenna,

Zamboanga station is the most powerful of the six stations, and works continuously from daylight to sundown. The instruments used are of no particular type, being more or less dis-



A view of the Malabang engine room

carded Signal Corps apparatus. The power is obtained from a 6 K. W. dynamo driven by a 10 H. P. gasoline engine. The tower is made of wooden beams 175 feet high, carrying a 16-wire umbrella-shaped aerial.

Heavy static and lightening prevents these stations from working after sundown. Immediately at sundown the static and lightening increases to such a surprising extent that further work is impossible, no matter how strong the incoming signals may be.

The Insular Government of the Philippine Islands found the wireless telegraph stations so successful for handling its telegraph business that it is contemplating the erection of 35 more land stations in different parts of the islands, with the intention in time of doing away as far as possible with the land lines. Not only have these stations been found to be more dependable during the rainy seasons, but much cheaper to erect and maintain.

A native operator of the type that works at some stations under the supervision of white men

The Zamboanga operating house situated in a lonely region and exposed to danger from raiding Moros

Marconi Men

The Gossip of the Divisions

Eastern Division

Arthur Cohen has been transferred from the Guantanamo to the Platuria. The Platuria is one of the Standard Oil Company's boats recently captured by the British and escorted to an English port. The Platuria is a newly equipped vessel.

C. L. Biddinger is now senior operator on the Parima. L. L. Beard, of the Marconi School, is second man.

Earl Wellington, one of our old Pacific coast men, is on the El Oriente temporarily. He will rejoin the Energie on her return to Baltimore.

E. J. Quinby, who was relief operator on the Pilot Boat New Jersey at the time she was rammed and sunk by another steamer off the Jersey coast, has been assigned to the Grayson.

G. N. Robinson has relieved L. R. Schmitt as senior operator on the Momus. The latter has taken Robinson's place as senior on the Trinidad.

F. J. Murphy, who was on the Noordam when she was captured by the English warships, has returned here and is now detailed on the Antilles.

S. Rosenfeld is back on the Princess Anne.

J. A. Nash, who acted as relief operator while Rosenfeld was off the Princess Anne on sick leave, has been assigned to the Lenape.

M. Beckerman is back on the Hamilton.

C. M. Sherwood, of the St. Louis, has resigned. His place has been taken by A. C. Cruttenden, formerly of the S. Y. Niagara.

O. Shaw and C. Stellmach have been assigned to the Caracas as first and second operators respectively.

L. Brundage is now senior operator of the Morro Castle, relieving O. Shaw, who took his place on the Caracas.

A. C. Brinsmade, formerly of the Vesta, has been assigned to the Colorado.

G. B. Ferguson has been assigned to the newly equipped Mills.

M. Hanover is now on the Korona.

J. R. Conway is now on the Arapahoe. J. M. Bassett has succeeded Conway on the Mohawk.

Charles S. Gould, of the Marconi School, is making a trip as emergency operator on the Delphic, going across to England.

Harold Tuttle has resigned from the service. His post on the Monterey has been taken by R. T. Willey, formerly of the El Siglo.

L. H. Marshall has resigned.

M. G. Grinnell and A. E. Ericson have replaced N. W. Filson and M. Stearns as senior and junior operators respectively on the Nacoochee.

W. J. Swett has been assigned to the City of Atlanta, vice A. E. Wells, on leave.

K. McAlpin has returned to the Kentra, having been replaced on the Finland by C. A. Geare.

Henry Markoe has been assigned to the El Occidente as junior.

W. V. Moore has been assigned to the Calabria, an English ship, in response to an emergency call.

C. V. MacPherson and K. H. See have relieved H. E. Ingalls and E. W. Arnold as first and second operators respectively on the Seguranca.

J. Churchill and L. Martinez, first and second respectively on the Old Colony, have been transferred to the North Star, the Old Colony having been "laid up."

D. J. Surrency has replaced M. Z. Bishop, resigned, on the City of Montgomery.

E. I. Quigley has resumed duty on the Bermudian. His second man is C. A. Lewis, who has re-entered the service.

P. K. Trautwein and J. Devenport, of the DeSola, which has been "laid up," have been transferred to the Panuco and El Rio, respectively.

E. A. Beane is now second on the Comus.

C. E. Heinline, of the Marconi

School, has been doing duty on the P. B. New York.

H. B. West has been transferred from the Apache to the Byron, L. C. Driver taking his place on the Apache.

S. Hopkins has been assigned to the Stephano as junior operator, relieving O. C. Temple, who has been transferred to the Antilla.

A. Fraser is second operator on the Byron. Fraser recently came from the Great Lakes Division.

H. A. Pendleton has been assigned to the Seminole.

P. S. Lewis has been assigned to the Demara, a Pacific Coast Division steamer, relieving J. J. O'Brien, who has been transferred to this Division.

R. W. Richardson has returned to the Matura.

P. H. Manning has been assigned to the Christian Knudson, a newly equipped vessel.

R. C. Massoneau, who recently returned as passenger on the Chicago, says he had an interesting trip, having visited Bordeaux, Paris, Rome and Havre.

A. J. Costigan has been transferred from the Alamo to the Seminole.

L. W. Peterson of the Governor Cobb, has been transferred to the Dorothy Bradford. G. L. Roberts has resigned.

J. A. Kilton has been assigned to the Winifred.

A. E. Ridley has been transferred from the Calvin Austin to the Government Dingley.

G. F. Shecklen has relieved C. M. Eagan on the Minnesotan. Eagan takes Shecklen's place on the Comal.

C. S. Rice is senior operator of the Huron.

The following graduates of the Marconi School have recently been assigned to ships: L. L. Beard, C. V. Lowe, C. S. Gould, C. E. Heinline.

Pacific Coast Division

A. Dezardo, formerly of the Speedwell, has been assigned to the Adeline Smith. Dezardo has some good work to live up to and will surely deliver the goods.

W. P. Giambruno, who spent three months on the Argyll, was temporarily relieved on October 29th on account of sickness. He has the good wishes of his fellow workers for a speedy recovery.

C. H. Canfield, who for the last eighteen months has played hide-and-seek with the good ship Atlas, is at it again. This time, after a five-month "lay-over," he has resumed his duties as operator in charge.

H. Oxsen, of the Aztec, will celebrate his anniversary as operator in charge in the near future. Besides attending strictly to his wireless duties, Oxsen finds considerable time to exercise his artistic tendencies. Still, you can always raise him. He draws while he "listens in."

A. S. MacKenzie, formerly of the Santa Catalina, left here in charge of the Bessie Dollar, October 29th. MacKenzie was transferred from the Santa Catalina two days before she blew up.

H. J. Tannenbaum, a member of this Division for the last year and a half, recently resigned his position as operator in charge of the Camino at New York. Tannenbaum, we understand, is to resume his studies and join us again when they are completed.

J. H. Baxter, of the Hilonian, has relieved O. Theiss as wireless operator and purser of the Enterprise.

J. C. Mitchell has been granted a leave of absence on account of ill health.

H. Dickow, an old reliable, was assigned to the Henry T. Scott on her first trip to New York through the Canal.

C. F. Fitzpatrick has joined the Hilonian as wireless operator and purser.

C. Thomas and H. G. Austin, of the Honolulan, have the dictinction of being the first two wireless men to make the round trip from San Francisco to New York and return on a Pacific coast passenger vessel via the Panama Canal

The Hermosa recently made a special excursion trip between East San Pedro and Avalon in charge of H. Grundell.

A. Koch and I. Farwell left November 3d as chief and assistant of the Klamath. R. Nelson, formerly in

charge, was granted a furlough on account of ill health.

When Operators Kleist and Woods, of the Manchuria established their record of 1,176 newspaper sales last spring, many believed the mark would hold for some time, but they did not count on Operators F. V. Griffin and J. S. Johnston, of the Mongolia, who obtained a sales record of 1,402. This happened on the Mongolia's last arrival, with the Korea only two weeks behind. On the Korea's arrival, Operators W. E. Gawthorne and L. T. Franklin placed the high record in their pockets with the number of sales at 1,417. "We are only at the warming-up stage," is the password.

G. D. Smith and C. J. Murray recently left San Francisco as first and second of the Knight of the Thistle.

The Lurline, which "laid up" October 21st, has been placed on the Honolulu run. Operators W. E. Gawthorne and N. A. Woodcock are acting as first and second respectively.

B. McLean and E. S. Howard have been assigned to the Mongolia as first and second respectively.

J. E. Dickerson recently left San Francisco as operator in charge of the Mazatlan.

L. O. Marsteller, assistant on the Columbia, has been transferred to the Navajo as operator in charge.

F. V. Griffin and W. Ruddock have been assigned as first and second of the Persia, leaving here November 7th.

Recent advices report Operators J. F. Smythurst and E. E. Castle are enjoying their extended trip as first and second of the British transport Nile.

George Jensen, in charge of the President, who was temporarily transferred to the City of Seattle for two trips, is now back on his old job. During the absence of Jensen, H. C. Moore was placed temporarily in charge.

J. S. Johnston, formerly in charge of the Mongolia, has been temporarily assigned to the Rose City as assistant.

F. W. Brown has relieved H. M. Currie as assistant aboard the Sonoma.

C. W. Schmidt, one of the veterans, has rejoined the service after an absence of nearly two years. He is acting as assistant on the Santa Clara.

J. M. Chapple has been assigned as operator in charge of the Argyll.

G. Harvey acted as wireless operator and freight clerk of the Aroline for one trip, with Retla Alter as assistant, while T. I. Atwood enjoyed a few days' vacation.

W. D. Collins, after a two weeks' vacation on account of the "laying up" of his vessel—Barge 19—rejoined the ship November 1st.

M. L. Bergin and A. S. Cresse were recently assigned to the Camino as first and second respectively at New York. This will be their first trip to the Pacific as wireless men. We are wondering if they have equipped themselves with six-shooters to meet the wild men.

The construction department of the Southern District have been actively at work recently installing the new type of antenna switch aboard a number of vessels during the last month, and taking out the ground plates. During the month G. O'K. Kendrick returned from East San Pedro. He was relieved by P. J. Townsend, whose remarkable recovery is known to all. W. A. Vetter, one of the old-timers in the shop, left for the North on the SS. City of Topeka to make repairs to the SS. George W. Elder.

Operators wishing to enter the engineering department should make application to the District Superintedent. In judging the ability of men for this department their record in connection with the upkeep and cleanliness of the equipment under their charge as operators will be given careful consideration.

The following open letter has been received from G. E. Baxter, manager of the Bolinas station:

"Just a few lines from our little settlement up here to inform you that we are all enjoying our release from the 'Pay as you enter' and 'Step lively, please,' life; and, while we envy to a certain extent those who secure 'shore leave,' we are making the most of the good weather and numerous opportunities for amusement afforded by the ideal location when through with our daily duties.

"At present there are five operators

at Ket. S. W. Bartlett is working the first trick at Bolinas, being relieved by C. E. McNess at 5:30 P. M. McNess holds it down until '30,' about 1 A. M. F. M. Roy, familiarly known as 'Red,' is working a 'split trick,' four hours in the morning and four hours at night, doing principally wire work. The remaining two operators are at Marconi (the new name of the settlement near Marshalls), where 'Anthony' E. Gerhard works first trick and A. W. Peterson relieves him at 6 P. M.

"It is reported that the latter has a pet 'coon' and is spending a great deal of his spare time teaching it tricks with a view to entering it in the World's Fair next year. McNess tried to capture a rabbit one Sunday morning with the same idea, but, unfortunately, was too short winded, and abandoned the chase after covering a mile in nothing flat.

"Haradon Pratt, of the engineering force, is promoting a club called the 'Early Risers,' or the 'Perhaps We Will Association.' His idea is to benefit the health and self-will of the camp by getting up at 5:30 A. M. daily and walking many miles into the hills, returning for breakfast. At the present writing he has captured one follower in the person of 'Slim' Bartlett, who has been absent the last two mornings, but who shows signs of weakening.

"Every day finds some of the boys on the tennis court vieing with each other in long distance drives as a rule. On Sunday, however, the big tournament is pulled off between the operating and engineering forces. We don't like to talk about ourselves, but we are thinking of annexing the cognomen 'Champions.' After the tennis match, a few take a dip in the surf, which is reported to be 'not a bit cold,' although some of the more timid ones regard this with skepticism.

"There are dances in Bolinas occasionally, and upon these occasions one usually finds several of the staff tangoing with the village queens.

"Pennies are being laid away for the purchase of a sun dial, or an hour glass, which is to be presented to 'Red' Roy. Very often he loses all track of time, and consequently does mysterious, unheard-of things, such as arising an hour before breakfast, or reporting for duty a half hour early. Possibly it is the 'specs' that is causing the trouble.

"Slim Bartlett was found one day bemoaning the fact that his 'Bug' was rusting. All at once he was seen to make a dive for the soundproof room, and soon he cried, "Eureka.' Upon investigating we found that he had discovered a way of hooking the 'Bug' to the wireless. As a result, the men at Honolulu will soon be requisitioning '1 Morse printer.' Seems like old times to Slim.

"Business is good, and we are gradually getting the routine hammered into shape, and soon all will be running like clockwork."

Seattle Staff Changes

In KPA—the Seattle station—William Christensen is now on second trick and A. E. Wolfe on third. I. A. Julien, formerly on second trick, is helping D. I. Moir with the construction of the new high-power Astoria station.

M. Thompson has been transferred from Ketchikan (Alaska) station to San Pedro, Cal., the change being made in the hope of benefiting his wife's health.

C. F. Trevatt has been temporarily in charge of Ketchikan, but is now back on the City of Seattle, and J. A. Buchanan, formerly in charge at Friday Harbor, has been permanently assigned to KPB.

The new Seattle station in the L. C. Smith Building has proven so efficient that Friday Harbor station is now being manned singly by W. B. Wilson.

H. F. Wiehr and M. A. Obradovic have exchanged ships, the former now being on the Dolphin and the latter on the Humboldt.

M. Dinsdale, formerly on the Reuce and Delhi, is now on the Northwestern.

G. P. Williams, formerly on the Spokane, is wintering on the tug Wallula at Astoria because of the "laying up" of his vessel.

F. Mousley, who last his happy home when the Santa Catalina burned on the Columbia, is temporarily on the fishing vessel Chicago and is enjoying the experience.

IN THE SERVICE

SHORE-TO-SHIP DIVISION

It's the quiet, secluded place that the seeker after adventures selects as his home after years spent amid stirring scenes on land and sea. At least this is true in the case of John Cowden. He had heard the whistling of bullets in war times, he knew something at first hand of the perils that beset those who live much on the water; yet to-day finds him comfortably established at Siaconsett, Mass., a small settlement on Nantucket Island, twenty miles from the mainland, where he is manager of the Marconi station.

From Siaconsett to Albany, Western Australia, where Cowden was born in 1885, is a far cry. He developed a bent for telegraphy at an early age, and when he was thirteen he became a messenger in the Australian government telegraph service. He applied himself with so much zeal that a year afterward he was given a position as operator.

Then the wanderlust in his make-up began to assert itself. This was heightened no doubt by the fact that the Boer War in South Africa was in progress at that time. Warfare was suited to the adventurous spirit of young Cowden and he immediately set out for the scene of hostilities.

On his arrival at Durban he found that operators were in great demand. So he accepted a chance to enter the service of the military telegraph service at Pretoria. There he remained until peace had been declared when he was appointed post and telegraph master in Eastern Transvaal. No English was spoken in the community where he worked, the greater part of the section being utilized as a Dutch farming district. Cowden found himself at a loss for a while because of his lack of knowledge of the languages and was compelled to acquire a smattering of the Dutch and Kaffir tongues in order to carry on his work.

He was seized again with the desire to travel in April, 1904, and this time he chose the United States as his destination. He had become interested in wireless, and when he found an opportunity to enter the Marconi service he accepted it and was sent to Siaconsett. The cold climate of New England, however, induced him to leave the little colony and take a detail as ship operator on craft plying between New York, South America and the West Indies. A year on the ocean was sufficient to make him yearn for a detail at Siaconsett again, and in 1907 he found himself at the Siaconsett station. He served as operator at Siaconsett for a year when he was promoted to the managership of the station.

"As a vocation wireless has unlimited opportunities, as will be proven in the next few years more markedly than in the past," said Cowden. "Efficient, well kept apparatus and close attention to all ends of the business, regardless of conditions or hours, are essential to success."

Directors and Officers

MARCONI WIRELESS TELEGRAPH COMPANY OF AMERICA

WOOLWORTH BUILDING

233 BROADWAY, NEW YORK

Board of Directors

Hon. John W. Griggs
Commendatore G. Marconi
Edward J. Nally
John Bottomley
Major S. Flood-Page
James Van Vechten Olcott
Godfrey C. Isaacs
James W. Pyke
George S. De Sousa
James R. Sheffield
John L. Griggs
Edward L. Young

Executive Committee

Hon. John W. Griggs, *Chairman*
Commendatore G. Marconi — John Bottomley
Edward J. Nally — James R. Sheffield
James W. Pyke

Hon. John W. Griggs . . . *President*
Edward J. Nally . . . . . *Vice-President and General Manager*
John Bottomley . . . . . *Vice-President, Secretary and Treasurer*

George S. De Sousa . *Assistant Treasurer*
R. S. Harlan . . . *Assistant Treasurer*

Legal Department

Hon. John W. Griggs . . *General Counsel*
William B. Vansize . . *Patent Attorney*
Sheffield, Bentley & Betts, *Patent Counsel*
Gifford & Bull . . . . . *Patent Counsel*

Engineering Department

Frederick M. Sammis . . *Chief Engineer*
Harry Shoemaker . . *Research Engineer*
C. H. Taylor . . . *Supervising Engineer*
Roy A. Weagant . . *Assistant Engineer*
C. D. Warner . . . . *Assistant Engineer*
Lynn C. Everett . . *Assistant Engineer*
Julius Martin . . . . *Assistant Engineer*

Auditing Department

John Young . . . . . *Auditor*
R. S. Harlan . . . . *Assistant Auditor*

Traffic Department

George S. De Sousa . . *Traffic Manager*
David Sarnoff . . . *Contract Manager*

TRANS-OCEANIC DIVISION

Edw. B. Pillsbury . *General Superintendent*
Lee Lemon . . . . . *Superintendent*
William A. Winterbottom *Commercial M'g'r*
Harry Chadwick . . . *Office Manager*
Paul C. Kast . . . . . *Cashier*

Manufacturing Department

Aldene, N. J.

G. W. Hayes . *Superintendent of Factory*

Purchasing Department

G. Harold Porter - - *Purchasing Agent*

Publishing Department

J. Andrew White . *Editor of Publications*
Wheeler N. Soper . . *Assistant Editor*

Pacific Coast Division

Merchants Exchange Bldg., San Francisco

A. H. Ginman . *General Superintendent*
John R. Irwin . *Supt. Northern District*
George J. Jessop . *Supt. Southern District*

Eastern Division

Operating Department, 29 Cliff St., New York

Ernest T. Edwards . . . *Superintendent*
T. M. Stevens . . *District Superintendent*

Southern Division

American Building, Baltimore, Md.

Charles J. Pannill . . . *Superintendent*

Gulf Division

Metairie Ridge Road, New Orleans, La.

A. Mowat . . . . . *Superintendent*

Great Lakes Division

Schofield Bldg., Cleveland, Ohio

E. C. Newton . . . . *Superintendent*

Queries Answered

Answers will be given in this department to questions of subscribers, covering the full range of wireless subjects, but only those which relate to the technical phases of the art and which are of general interest to readers will be published here. The subscriber's name and address must be given in all letters, and only one side of the paper written on; where diagrams are necessary they must be on a separate sheet and drawn with India ink. Not more than five questions of an individual can be answered. To receive attention these rules must be rigidly observed.

Positively no Questions Answered by Mail

J. C. E., Melrose, Mass., writes:

Ques.—Please give me data on a ½ k.w. closed core transformer for wireless purposes; secondary voltage 15,000, to operate on 110 volts, 60 cycles. It is to be used with a reactance regulator.

Ans.—The following data is applicable to your case:

Length of core 9½ inches; width of the core, 7 inches; thickness of core, 1¼ inches; number of primary layers, 14; width of the secondary sections, 5½ inches; thickness of insulation between core and primary, ¼ inch; kind of insulation between core and primary, Empire cloth; size of primary wire, No. 14 D. C.; weight of primary wire, 5½ pounds; approximate number of pounds of secondary wire, 9; size of secondary wire, 34 enamel; length of windings, 2½ inches; thickness of separators for secondary sections, ⅛ inch; thickness of separators in the secondary, ¼ inch; number of sections in the secondary, 7; thickness of insulation between the core and secondary, ¼ inch; kind of insulation between the core and secondary, Empire cloth.

This data is taken from a table which appeared in an issue of Popular Electricity.

Your query in reference to the size of a coil of wire to give a wave-length of 3,000 meters we cannot answer because we do not know in what manner you intend to use the coil. Is it to be used in series with an antenna or as the secondary winding of a receiving tuner to be shunted by a variable condenser?

* * *

A. B., New York, N. Y.:

Your receiving set, as described, should have a daylight range of somewhere around 250 miles and a night range of 1,200 to 1,400 miles. The maximum range of wave-length is about 3,000 meters.

The hook-up shown in Figure 1 should be satisfactory for your equipment. We do not know how you intend to use the Mascot tuning coil, but we have placed a double pole double throw switch in the circuit and used it as a direct coupled oscillation transformer.

* * *

W. R. R., Kirkland, Wash., asks:

Ques.—(1) Please give data and instructions for the construction of an open core transformer to work on about 12 volts, using dry cells as a source of energy.

Ans.—(1) We suppose you desire data for an induction coil with a magnetic interrupter. If so, the following dimensions will be satisfactory: length of core, 8 inches; diameter of core, ¾ inch; insulation over the core, two layers of Empire cloth.

The primary winding should then be covered with ten layers of Empire cloth to act as insulation between the primary and secondary windings. The secondary winding should consist of 1½ pounds of No. 36 wire and should be made in two sections, 6 inches in diameter. This coil is to be used in connection with a magnetic vibrator which should be shunted by a condenser having 2,500 square inches of tin-foil. The dielectric is of thin paraffin paper.

Ques.—(2) What size condenser would you recommend with this and what is the approximate sending range over timbered country?

Ans.—(2) A condenser for this coil should consist of four plates of glass, ⅛ inch in thickness, and 8 inches square, covered with tin-foil 6 inches by 6 inches.

Ques.—(3) There are two 175-foot trees 150 feet apart. What aerial should be used to give best results and to comply with the Radio Regulations?

Ans.—(3) You cannot comply with the United States Radio Regulations with an antenna of these dimensions. If you desire to transmit on a 200-meter wave your antenna should be no more than 50 feet in height and 40 feet in length.

* * *

J. A. M., Milford, Utah, asks:

Ques.—(1) What company sells audions for $3.50 without buying a cabinet set?

Ans.—(2) These bulbs cannot be purchased independently of the set.

Ques.—(2) Can the cabinet audion set, type R10, consisting of two audions advertised by Edgecomb-Phyle, Pittsburg, Pa., be re-wired so as to be used as an amplifying set?

Ans.—(2) This set may be re-wired for amplification purposes, but you will require an additional filament rheostat and another high voltage battery. You will also need a one-to-one auto transformer, as described in the January issue of The Wireless Age. The connections given in that issue may be used.

Ques.—(3) What are the dimensions of a horizontal aerial 50 feet in height, best adapted to respond up to 16,000-meter wave-lengths?

Ans.—(3) The aerial should consist of a single wire about 6,000 feet in length.

Ques.—(4) What are the dimensions and sizes of wires on the primary and secondary of a loose coupler to be used in conjunction with the aerial referred to?

Ans.—(4) The secondary winding of this tuner may be 11 inches in length and 6¾ inches in diameter, wound closely with a single layer of No. 32 S. S. C. wire. The primary winding may be 11 inches in length and 6½ inches in diameter, wound closely with one layer of No. 24 or 26 S. S. C. wire. See also the article entitled "My Radio Station," which appeared in the November, 1914, issue of THE WIRELESS AGE. The tuner described by the author in that article had the following dimensions:

The secondary winding is 16 inches in length, 5¼ inches in diameter, and wound full with No. 24 or 26 S. S. C. wire. It is shunted by a variable condenser of about 0.004 Mfds. capacity. The primary winding is 6 inches in diameter, 16 inches in length and wound full with No. 24 S. S. C. wire. The loading coil is about the same size as the primary winding and is wound full of No. 22 S. S. C. wire with about ten or twelve taps taken off.

Ques.—(5) Where is The Wireless News published?

Ans.—(5) The Wireless News suspended publication early in 1912. The steamship daily newspaper called The Ocean Wireless News is published at 450 Fourth avenue, New York City, by the Marconi Publishing Corporation.

* * *

M. G., Brooklyn, N. Y., writes:

Ques.—(1) I have an aerial 200 feet in length with a lead-in of 100 feet in length. What is the wave-length?

Ans.—(1) The natural wave-length of your antenna is approximately 425 meters.

Ques.—(2) Where can I purchase or get the plans of a register so that I can record messages which are too fast for me?

Ans.—(2) Apparently you are not fully familiar with the principles of wireless telegraphy and therefore we advise you to study the fundamentals of the art. You will probably find that apparatus sufficiently elaborate to record signals is far beyond the means of the average amateur. You cannot connect a Morse ink register to the ordinary receiving apparatus.

Ques.—(3) I have an 8-inch single slide tuning coil, a fixed condenser, one silicon detector, 2,000-ohm receivers. I should like to know what change I should make to get the Arlington time signals.

Ans.—(3) Add a loading coil in series with the 8-inch single slide coil. This loading coil should have dimensions similar to those of the turning coil.

Ques.—(4) Please advise regarding the transmitting distance and the wave-length of this set: one standard wireless key; one 2-inch spark coil; one spark gap; one 7-turn helix, and one 12-plate condenser?

Ans.—(4) The information given is rather vague for a definite reply. In the first place, after you connect up this set with the antenna mentioned it will not comply with the government law, for the emitted wave will be far beyond that allowed for amateur purposes. You have given no dimensions for the 12-plate condenser and, offhand, it seems too large for the size of the coil. The transmitting range is proximately 15 miles. The receiving range cannot be definitely stated, but at night time you should be able to receive 1,000 miles.

* * *

F. S., Irvington, N. J., asks:

Ques.—(1) What is the wave-length of an aerial 50 feet in length, 33 feet from the ground, consisting of 4 wires, stranded copper?

Ans.—(1) The wave-length of your aerial is 155 meters.

Ques.—(2) Please give an estimate of the receiving range of such an aerial properly constructed, assuming all local conditions, etc., to be perfect, and using the following instruments: Blitzen variometer, Murdock 31-rotary plate variable condenser, silicon detector and 2,000-ohm telephones.

Ans.—(2) The receiving range of your set is approximately 40 miles in daylight and, say, 500 miles after dark.

Ques.—(3) Would you advise adding any other apparatus to increase the range, or using a different detector?

Ans.—(3) If by the term "Blitzen variometer" you refer to the Blitzen rotary tuning transformer, you would then require a fixed condenser to be used in shunt with the telephones. The galena detector is somewhat more difficult to adjust than the silicon, but possesses increased sensitiveness.

* * *

F. C. M., New Orleans, La., writes:

Ques.—(1) I have a ¾-k.w. transformer of a well-known maker (Thordason). It gives 10,000 volts in the secondary. Could I wind another secondary to give 16,000 to 18,000 volts?

Ans.—(1) We suggest that you communicate with the makers of this transformer and secure data direct from them. It is possible to increase the voltage in the manner stated, but not being familiar with the present secondary winding of this transformer we can give no definite advice.

Ques.—(2) I have just moved into a new house and have no aerial. There is an old telephone wire that winds from the house to a 40-foot pole and goes through my room. If I use this as an aerial should I take the lead-in from one end, or can I take it off about 50 feet from the end? The latter would be more convenient. The wire is about 250 feet in length. I wish to receive only.

Ans.—(2) The lead-in may be taken off 50 feet from the end as desired. The wire will make a satisfactory aerial.

Ques.—(3) Is the Fleming valve as sensitive as the audion (DeForest)?

Ans.—(3) Used in the ordinary manner, the audion is more sensitive than the Fleming valve.

Ques.—(4) Is 36 volts enough in the telephone circuit of an audion?

Ans.—(4) Sometimes, depending upon the audion. Certain bulbs require as much as 65 to 70 volts, and some even more.

P. H. S., Franklin, Pa., writes:

Ques.—(1) My aerial is 350 feet in length and consists of four No. 12 solid copper wires spaced 18 inches apart stretched across French creek. At the end I take the lead-in from it is only 12 feet above the ground; the opposite end is 16 feet above the ground. This makes it about 20 feet above the water, possibly a little higher. At the end opposite the lead-in within 30 feet of the aerial pole is a high hill about 300 feet high. This is on the north side of the aerial. Sixteen pairs of telephone lines cross the creek about 25 feet from and on the east side of the aerial. The south and west sides are clear. My lead-in is 200 feet in length and consists of 2 strands of solid copper insulated No. 12 wire, used as a single conductor. My ground wire is 18 feet in length, of No. 10 copper wire, running to water pipe.

Of course, I do not do any sending on this aerial. I hear Arlington every night between ten and twenty-five minutes to eleven o'clock. The signals come in very loud and I can hear them with the receivers quite a distance away from my ears. This is the only station I can pick up; not once have I been able to tune in any other station.

I wish you would advise me through your magazine if I should not be able to get some other stations, especially those using long wave-lengths. Do you think I should be able to get Cleveland or Toledo, O., on a 300-meter adjustment?

My instruments consist of Blitzen receiving transformer, Blitzen duplex loading coil (said to add 1,600 meters to any transformer), two 31-plate Clapp Eastham variable condensers, one in shunt to primary and one in shunt to secondary, Ferron detector, fixed condenser and superior 2,000-ohm head set. These instruments are in a cabinet and wired with heavy copper stranded rubber insulated wire with the connections as short as possible.

Please give the natural wave-length of my aerial.

Ans.—(1) The natural wave-length of your antenna is approximately 1,000 meters and is therefore more suitable for the reception of long wave-lengths. Considering the height of your aerial, we think that you do very well indeed in hearing signals from Arlington. Your aerial, however, is too long for the satisfactory reception of 300-meter signals and too close to the earth.

Ques.—(2) What time besides twelve o'clock noon and ten P. M. does Arlington send, using 2,500 meters?

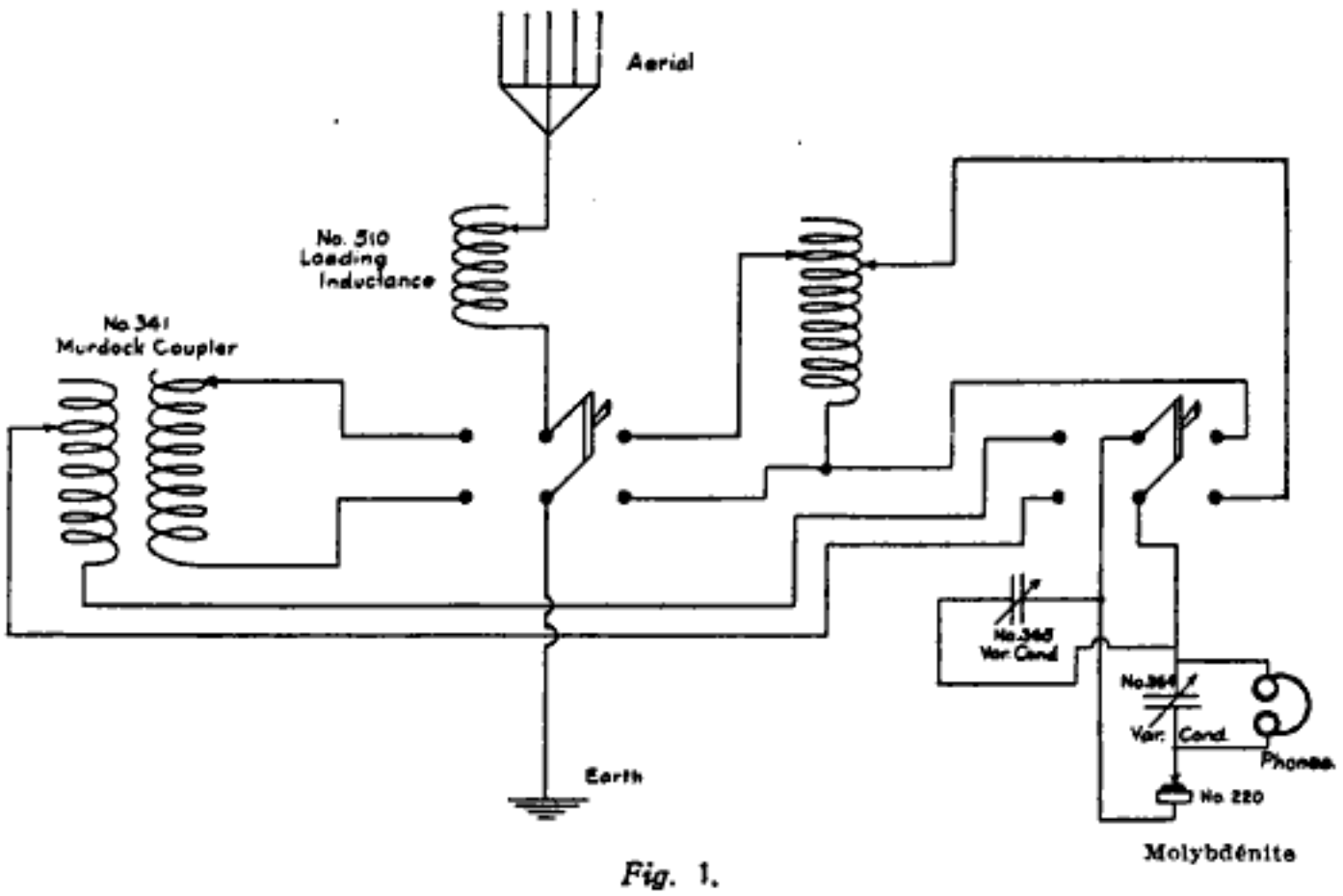


Fig. 1.

Ans.—(2) This station works on 2,500 meters at 7:00, 8:00, 10:00 P., M., 12 noon and 2:00 P. M., Eastern standard time.

Ques.—(3) What wave-length does Wanamaker's at Philadelphia, Pa., use?

Ans.—(3) 1,800 meters.

Ques.—(4) During the cold winter months should I be able to hear stations on the Atlantic coast with my aerial?

Ans.—(4) It is rather doubtful, owing to the height of your aerial. Perhaps during the night time you may be able to hear stations on the Atlantic coast, but we again advise that your aerial is too long for the satisfactory reception of the shorter wave-lengths, such as those of 300 and 600 meters.

Ques.—(5) I am constructing an induction coil and am winding the secondary on an old phonograph record (large size). The primary is smaller than the inside of the record by a quarter of an inch on each side. Will this cut down the efficiency of the coil? If so, is there

any way to remedy it? The coil should make about an inch and a half spark when completed, if correctly made.

Ans.—(5) Whether or not this will cut down the efficiency of the sets depends upon the constants of the secondary winding, but owing to the thickness of the average phonograph record, we suggest that you cut down the intervening space as much as possible.

* * *

O. E. C., South Baltimore, Md., writes:

Ques.—(1) In the system described in the January issue of THE WIRELESS AGE, page 276, for amplifying signals received on crystal detectors, could a 1,000-ohm duplex polarized relay be operated by the amplified signals? In this special case I am trying to operate a relay from Arlington's time signals, with my receiver 60 miles from Arlington.

Ans.—(1) It is possible to operate a polarized relay in the local circuit of an audion, but, generally speaking, the results obtained are unsatisfactory. The relay preferably has a higher value of resistance, say, 5,000-ohms. It will be found that the effect of the incoming signals is to stop the current flow in the telephone circuit rather than increase it. Therefore the local circuit of the relay is closed when the armature of the relay is in the position when no current is flowing. If you use an audion amplifier, the pulses of current in the local circuit of the third audion are often sufficient to cause deflections on an ordinary Millivoltmeter.

Ques.—(2) Should the relay be connected in the place of the telephones or how should it be operated?

Ans.—(2) The relay may be connected in place of the telephones.

Ques.—(3) Is the system of amplifying signals received on crystal detectors by means of an audion patented so that it may not be used for commercial purposes?

Ans.—(3) We understand that several applications have been filed in this respect, but cannot advise definitely. So far as we know, no patents have been issued.

Ques.—(4) Where would you advise me to have the 1-to-1 transformer constructed? I have written the Leeds & Northrup Company of Philadelphia, Pa., regarding it.

Ans.—(4) Why not construct it yourself? You may use the secondary winding of an amateur transmitting transformer or the secondary of an ordinary 3-inch or 6-inch spark coil. Some amateurs have achieved results using the secondary winding of the ordinary telephone induction coil. Strange to say, the dimensions of this transformer may vary widely, provided the other adjustments of the telephone circuit are varied accordingly.

* * *

G. E. W., Belfast, Me., writes:

Ques.—(1) Is there any apparatus to your knowledge by which a station not wanted may be eliminated? Take the case for instance of two stations located near each other, both using the same apparatus and sending out the same power and wave-length; both coming in at the receiving station with the same intensity, but one using a higher tone than the other and both sending at the same time? How can the signals from the station not wanted be eliminated?

Ans.—(1) We infer that the signals received from the two stations have different spark or group frequencies. It is possible to eliminate the signals of an unwanted station by means of a group frequency tuner as developed by the Marconi Company. The details of this tuner are not available for publication.

Ques.—(2) Please tell me the names of the following stations: DK, DY, DL, NU, MRA, and LKE.

Ans.—(2) MRA are the call letters of the steamship Mauretania. The remaining call letters are supposed to be those of foreign battleships operating in Atlantic coast waters and elsewhere.

The information requested in your third query is not available for publication.

Ques.—(4) What power does WBF, Boston, use?

Ans.—(4) This station is of 5 k.w. capacity.

Ques.—(5) Why is it I hear NAD twice as loud as NAC? The latter station is located nearly 50 miles nearer me.

Ans.—(5) Perhaps the former station is of greater power than the latter.

* * *

C. F. O., Boston, Mass., writes:

Ques.—(1) How many condenser plates, 6½ inches by 8½ inches, on photo plates, 8 inches by 10 inches, are needed in series with the ground to make a wave-length of 200 meters? The aerial is composed of 2 copper wires (7 strands) spaced 4 feet apart, 125 feet in length and 50 feet in height at both ends. The lead-in is 48 feet in length, of high tension cable (19 strands No. 25 B. S. copper wire). The ground lead is 3½ feet in length, leading to a gas pipe. The wave-length of the antenna is 290 meters; 65 meters are added by the secondary of the oscillation transformer. The series condenser will be 2½ feet from the gas pipe.

Ans.—(1) Having no data as to the thickness of the glass in the condenser, we cannot answer definitely, but we assume that the capacity of each plate is approximately 0.0005 Mfds. To protect the series condenser you should connect two plates in series; this reduces the capacity of the antenna so that the wave-length will be slightly below 200 meters. You should then add a sufficient number of turns either in the secondary winding of the oscillation transformer or in the aerial tuning inductance to bring the wave-length of the aerial back again to a value of 200 meters. A single plate of this condenser will reduce the wave-length to a value slightly above 200 meters, but if the glass is not thick the plate may not be able to withstand the applied pressure. Hence it is preferable to use two plates in series. See the method shown in the September, 1914, issue of THE WIRELESS AGE for measuring the capacity and inductance of an aerial. This appeared in the article entitled "How to Conduct a Radio Club."

Ques.—(2) Please tell me how many tinfoil plates, 6½ by 8½ inches, on photo plates, 8 inches by 10 inches, should be used on a rotary gap having 7 studs, 3 inches in diam-

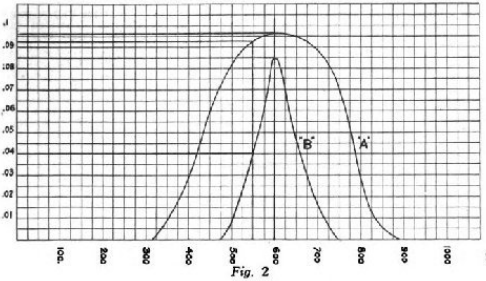


Fig. 2

eter; 2,500 R.P.M. or slower (speed optional). Are nine plates too many?

Ans.—(2) To answer this query properly we should have to know the secondary voltage of your transformer. Nine plates of this condenser in parallel will have a capacity of 0.0045 Mfds. For the average amateur's transformers a condenser of the size you suggest is quite satisfactory. We suggest that you increase the diameter of the rotary gap, making it 6 inches instead of 3 inches. This will increase the musical qualities of the gap.

Ques.—(3) Who is POZ and why does not Sayville send out press lately?

Ans.—(3) This is the Telefunken station at Nauen, Germany. The station at Sayville at times is in communication with the Nauen station and has therefore temporarily abandoned the long press schedule.

Ques.—(4) What system is in use on the British battleships? Is it the Jackson? Why is it kept so secret? During a discussion with a commercial operator, he said he had heard an English battle-ship talking with Whitehall, London, while off the coast of Venezuela. He is an English operator and he says this system is the most advanced of all the systems in present use. Is this so?

Ans.—(4) The wireless apparatus in use by the Admiralty has been developed by engineers in their own laboratories. The system employed is very efficient and the apparatus very powerful indeed. The statements regarding efficiency made by your friend are mainly correct. It is a known fact that battle-ships of the type recently constructed are able to communicate by wirless at a distance of 1,200 to 1,400 miles in daylight and up to 4,000 miles after dark. Vessels of this class carry 25-k.w. equipments. The aerials are very high and have a natural wave-length of 900 or 1,000 meters. We are not prepared to say that the Admiralty system is the most advanced of all, but we do admit that a high degree of efficiency has been attained.

Ques.—(5) Is one subscription good for only one set of questions?

Ans.—(5) We cannot undertake to answer all questions sent to us. We do, however, attempt to answer all of the queries of general interest which are received. In asking questions readers should be guided by a sense of the fitness of things.

* * *

C. P. L., St. John's, N. B., writes:

Ques.—(1) I have made two or three loose couplers and have noticed that sometimes I can get the loudest signals when the switch is just between two contacts, making connections with both. My theory is that the sending station is sending out two waves and I am getting the benefit of both to a certain degree. Am I correct? The loose coupler of which I speak is the navy type tuned by switches, both primary and secondary.

Ans.—(1) Your theory is incorrect. When you place the multiple point switch so that the lever touches two contacts you secure a fineness of adjustment not obtainable when the lever is on either one of the contacts. That is to say, you secure the correct value of inductance required when you bridge two contacts. This loss in fineness of adjustment with a multiple contact switch can be compensated for by placing a small condenser in shunt to the primary winding or a condenser of larger capacity in series with the antenna circuit itself.

Ques.—(2) I also understand that a condenser across the secondary winding increases the wave-length of that circuit, but find that when I am tuned for Sayville (which I understand is working on 2,800 meters), if I put the most of my secondary condenser in it brings in Cape Cod, which I think is about 1,600, thereby shortening the period of the circuit. Where am I wrong?

Ans.—(2) Perhaps the plates of your variable condenser do not bear the correct relation to the condenser scale—that is to say, the pointer on the scale may have slipped so that when you think you have the maximum capacity you in reality have the minimum capacity. You are quite correct regarding the

wave-length of Cape Cod and Sayville, which are 1,650 and 2,800 meters, respectively. We are of the opinion that the trouble lies in the variable condenser itself.

* * *

K. H., Marion, O., asks:

Ques.—(1) What stations are PAX, POZ and CTG, as called by Sayville?

Ans.—(1) PAX, test letters; POZ, Nauen, Germany; CTG, Cartagena, Colombia.

Ques.—(2) What is the wave-length of a single wire aerial 200 feet in length and 50 feet in height?

Ans.—(2) 365 meters.

Ques.—(3) What stations send press and to whom do they send?

Ans.—(3) Cape Cod, Mass.; Cape May, N. J.; Virginia Beach, Va.; Cape Hatteras, N. C.; Savannah, Ga.; Jacksonville, Fla.; Tampa, Fla.; Mobile, Ala.; New Orleans, La.; Galveston, Tex., and Sayville, L. I.

Ques.—(4) For the last few nights I have heard some one send time signals above NAA (Arlington). Can it be a new station or the radiation of Arlington's waves from another aerial?

Ans.—(4) It is rather difficult to answer.

Ques.—(5) How shall I apply for a license?

Ans.—(5) Do you desire a station license or an amateur license? Communicate with the United States Radio Inspector at the Custom House, Cleveland, O.

* * *

E. H. H., Salem, Wis., asks:

Ques.—(1) Would the secondary of a ½-inch spark coil contain a sufficient amount of wire so that it could be used as a one-to-one transformer for an audion amplifying set as described in the January issue of THE WIRELESS AGE?

Ans.—(1) Satisfactory results will be obtained with the secondary winding of a ½-inch coil, but still better results will be secured with a 2-inch or 3-inch spark coil winding.

Ques.—(2) Where can any one secure audion bulbs? The Radio Telephone & Telegraph Company will now only furnish them for renewal purposes.

Ans.—(2) These bulbs cannot be purchased except from that company.

Ques.—(3) What station does Sayville communicate with having a call signal of POZ?

Ans.—(3) POZ is the Telefunken Station at Nauen, Germany.

Ques.—(4) What station has the call signal of WCR?

Ans.—(4) WCR is the steamship The Harvester.

Ques.—(5) When will the new station at Lake Bluff, Ill., be completed? How much power will be used at this station? Approximately what wave-length will be used? Is the Marconi Company constructing this station and what is the purpose of such a station?

Ans.—(5) We have no information regarding this station. Communicate with the Superintendent of United States Radio Service at Radio, Va.

* * *

E. E., Jr., Philadelphia, Pa., writes:

Ques.—(1) Please give me the data for a ½-k.w. open core transformer using 110 volts, 60 cycles A. C. Also a secondary condenser to be used with the transformer.

Ans.—(1) See the reply to J. C. E., Melrose, Mass., in the Queries Answered department of this issue of THE WIRELESS AGE. This transformer has a secondary voltage of 15,000 volts. A condenser suitable for it may be made of 24 plates of glass, 8 inches by 8 inches, covered with tin-foil, 6 inches by 6 inches. These plates are to be connected in parallel. The glass should have a thickness of ⅛ inch. The construction of a condenser of this type was fully described in the November, 1913, issue of THE WIRELESS AGE.

* * *

A. L., Columbus Grove, O., asks:

Ques.—(1) Please tell me how many feet of wire used as a "loader" I should use with the following instruments to receive the time signals from Arlington: DeForest audion; 1 variable condenser, capacity 0.005 Mfds.; 1 fixed condenser; 1 1,500-meter tuner; 2,000-ohm receivers.

My aerial is a 6-wire "T," 70 feet in length, 60 feet in height at one end and 40 feet at the other; there is a lead-in of 6 wires about 18 feet in length, then one wire about 15 feet in length to my set. My ground is about 15 feet in length and is attached to a steel pipe 5 feet in the ground.

Ans.—(1) If a loading coil 7 inches in length, 3 inches in diameter, wound closely with No. 22 S. C. C. wire, is connected in series with the antenna circuit, you will be able to tune to Arlington's time signals.

Ques.—(2) How far should I be able to receive at night with this set?

Ans.—(2) Your receiving range is about 40 miles in daylight; its range after dark we cannot tell.

Ques.—(3) Does Key West give out time? If so, on what wave-length?

Ans.—(3) This station sends time signals at 12 noon, 75th meridian time.

* * *

F. I. T., Gilman, Ill.:

In reply to your first question we would say that your transmitting set should have a range of about 20 miles.

A wiring diagram for the type D tuner appeared on page 760 of the June, 1914, issue of THE WIRELESS AGE. If you desire a lighting switch of 100 ampere hours' capacity we suggest that you purchase an ordinary 100-ampere knife blade switch. Slate is the best material for the base.

We are unable to give you any information concerning the station you heard working with WGO, which is the Marconi station at Chicago.

The wireless station at Key West has a 500-cycle transmitter and the average speed of transmission is about 20 words per minute.

* * *

C. M. W., Jr., Hampton, Va.:

The double tone you heard from a certain wireless station probably proceeded from a quenched spark transmitting set which has a reactance or a resistance shunted across the telegraph key, allowing a portion of the

energy to flow across the spark gap at all times. When the key is depressed the full amount of energy discharges across the gap, giving a different note; hence you hear a double tone.

None of the call letters given in your second question are registered with the exception of NCY, which is the U. S. S. Cæsar, and NER, which is the battleship Don Juan de Austria.

The call letters of the battleship New York are NCC; those of the battleship Texas, NCD; those of the steamship Nueces, KEH; those of the steamship Proteus, KKP.

* * *

F. M. R., Seattle, Wash., asks:

Ques.—(1) Why are the waves radiated by a highly damped oscillator "broad"? The writer wishes to learn why waves of rapidly decreasing amplitude will affect a receptor tuned to a period differing greatly from that of the transmitting circuits, while those of but slightly decreasing amplitude may only be received with a receptor accurately tuned to the period of the transmitter. As the usual method of measuring damping in a transmitting circuit depends on this "breadth" of received signals, I am especially anxious to learn the relationship existing between damping and "breadth" of tune.

Ans.—(1) A proper answer to this question demands that you have some knowledge of the plotting of resonance curves of the emitted wave of a radio transmitter and a slight knowledge of co-ordinate geometry. Such curves are shown in Figure 2 and the method for obtaining the data in Figure 3.

In Figure 4, L is the inductance coil of a wave-meter, C the variable condenser, and W a high frequency watt-meter. L^1 is a coupling coil for transferring energy from the antenna circuit of the transmitting apparatus to L. If the transmitter is put into operation and a condenser of the wave-meter varied from a point before resonance to a point up to and beyond resonance, various current readings corresponding to these wave-lengths will be obtained on the watt-meter, W. The data so obtained may be conveniently plotted in the form of a curve as in Figure 3.

Curve B is a resonance curve of a transmitting set adjusted to 600 meters, the oscillations of which are said to be feebly damped. Curve A is a resonance curve of a transmitting set, the oscillations of which are highly damped. We may assume that the effective resistance of an antenna under the conditions of curve A is much greater than curve B; therefore there are fewer oscillations.

The ordinates of both curves B and A may conveniently represent the wave-lengths and the abscissæ the current amplitude corresponding to these wave-lengths. Suppose curves A and B were taken under identical conditions with the exception that the values of damping are different. Let us then ascertain what energy we may expect at a wave-length about 8 per cent. off resonance, say, 550 meters. If a line is drawn from the point where the division of 550 meters meets curve A to the reading in watts, it will be found that the drop in current value is very small indeed—that is to say, at resonance the current reading is 0.096 watts, while 8 per cent. off resonance it is about 0.0925 watts; therefore a distant receiving station will receive nearly as much energy at a wave-length of 550 meters as when adjusted to 600 meters. It is evident that when receiving signals from that particular station it will require a large change of inductance to eliminate the signals.

In the case of curve B, note that the current amplitude at resonance is 0.085 watts at a wave-length of 600 meters, while at a wave-length of 550 meters the reading drops to 0.04 watts. At a distant receiving station in this case it requires but a very small movement of the sliders of the receiving tuner to eliminate the signals of curve B, hence it is not difficult to see the connection between "breadth of tune" and decrement.

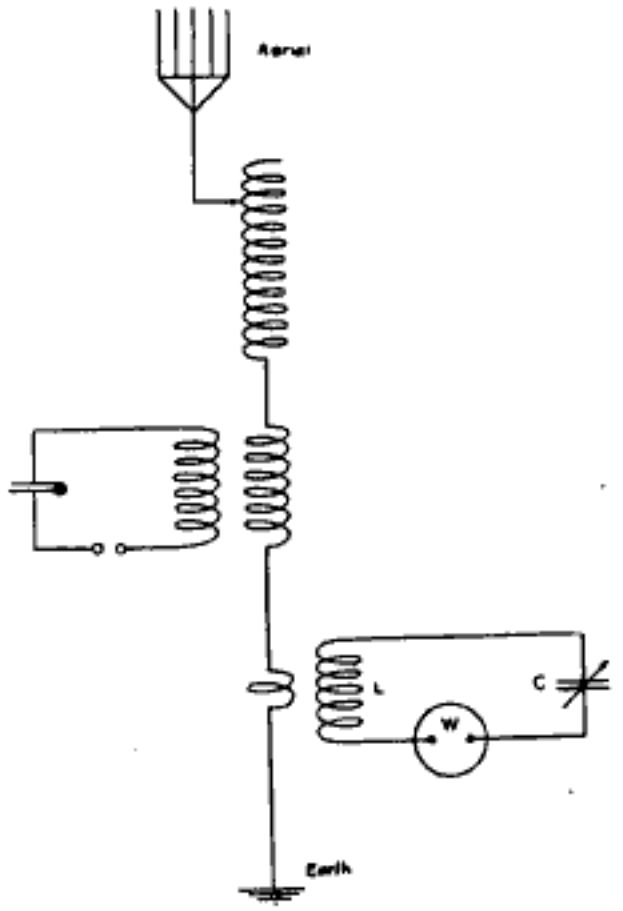
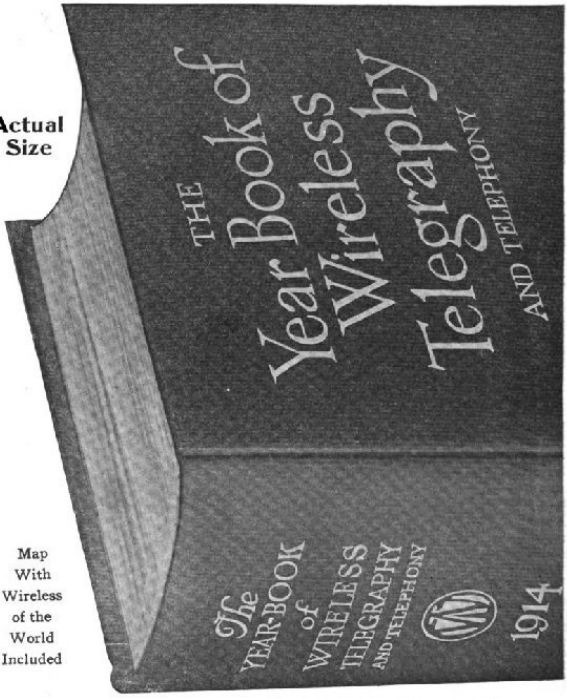


Fig. 3

The matter may be summed up by saying that when conditions of the oscillatory circuit are such as to allow but a few oscillations to take place per charge of the condenser, the energy resulting from these oscillations is distributed over a wide range of wave-lengths, while when the conditions of the circuit allow a greater number of oscillations to take place, the energy is distributed over a small range of wave-lengths and is therefore more easily tuned out. This matter is generally discussed in all standard text books on wireless telegraphy.

THE BOOK



ALMOST TWICE AS LA

THE FIRST EDITION WAS QUICKLY EXHAU

SEND ONE DO

MARCONI PUBLISHING CORPORATION,