THE WIRELESS AGE

JULY, 1914

THE RADIO REVIEW

THE disaster upon the lower St. Lawrence which suddenly ushered into eternity more than one thousand souls has shocked the world and brought poignant grief into the homes of many nations.

The Necessity for Fog Signaling Apparatus

In its own way, by a cunning that no art of man has yet accomplished, the hand of the sea has taken another staggering total of lives. In recent years the Titanic tragedy alone surpasses its gruesome record.

There is little instruction or wisdom to be gained by the story of the collision. The impact of the heavy collier came amidship at the weakest part of the Canadian liner and swept aft, apparently opening her whole side to the sea. Against so destructive a blow not even the most modern bulkheads can keep a ship long afloat. Wireless did its work swiftly and effectively as usual. In the narrow reaches of the St. Lawrence help was only a few miles distant and only a few minutes in arriving, but disaster was so savage and complete that few survived the maelstrom of the foundering ship.

Certainly the invention of wireless telegraphy which saved many of the passengers of the Empress of Ireland by summoning aid should also have availed to apprise these steamers each of the other's near presence. The fog was the primary cause of the collision and it may be well for the marine constructors who will readily determine the defects that led to the sinking of the vessel in such a remarkably short period of time to study the defects of a signaling system that leaves ocean travelers still largely at the mercy of the dread conspiracy of the sea and fog.

The recent inventions in wireless communication cannot be too speedily installed on all steamships; for the radio-goniometer or "direction finder" in operation over a distance of even a few miles would be sufficient to guard vessels from collision in even the densest fog.

THE need of better means for the protection of human life in case of fog at sea is just as surely indicated by the happy escape of the New York and the Pretoria from destruction, as it was by the recent terrible disaster on the St. Lawrence. It is very reassuring to know that two ocean steamers can come to collision in a fog with so little damage to either, that both may proceed on their way with most of their passengers unaware of the mishap. It is not reassuring, however, to learn that such a collision has occurred. The blow the Titanic received from the iceberg and that which the Storstad administered to the Empress

The Lesson from the Second Collision

of Ireland produced as little shock, it seems, as the Pretoria's glancing blow near the bow of the New York, but, as there was no loss of life, the incident will probably be quickly forgotten.

The Canadian disaster startled the whole world, excited a tumult of emotional comment and led to protracted investigation; but the inquiry into the harmless collision should be just as careful and as fruitful as that which has been begun at Montreal. And the principal object of both should be to officially recognize the fact that through wireless apparatus collisions in fog can be prevented.

In Appreciation of the Marconi Men

WHEN it is considered that a brief seventeen minutes elapsed from the shock of collision until the time that the Empress of Ireland sank beneath the waters, the wonder of it is that the doomed vessel was able to send out the news of her tragedy and call for aid. The men responsible for this are two clean-cut Englishmen who quietly upheld what we like to term the Marconi tradition.

Their story is very matter-of-fact; there is nothing of the heroics about it. Indeed, both of them have been exceedingly reticent about their part in the sad affair. Bamford, the junior operator, was on duty when the collision occurred. At once he called his chief, Ferguson. The latter took charge and, when the order came from Captain Kendall, as it did promptly, the S O S call was instantly flashed out. Father Point was first to catch the call and the operator on duty there called his chief, Whiteside, and the latter at once got into communication with the government boats at Rimouski wharf and dispatched them to the scene.

Ferguson continued his call until he learned that Father Point had heard and then began to give some particulars. Time was up then and both operators left the wireless room and went overboard.

The story is simple; yet it is as effective as any epic to duty ever written.

Wireless in Modern Warfare

WITH our war thoughts principally turned toward Mexico, America will not be much excited by the news that Tazza has fallen. Few of us have ever heard of Tazza and fewer still have any interest in its fate. Nevertheless there is one feature in connection with the capture of this ancient Morocco town by the French soldiers that has more than passing interest. Two columns of French troops approached Tazza from opposite directions. One marched westward from Algiers and the other eastward from the coast. Between the two columns were the hostile Moors and prompt communication between the two coöperating French columns would have been difficult and perhaps

impossible except for the employment of wireless telegraphy; but by this modern aid in warfare, messages were flashed over the heads of the Moors and kept the two columns in touch and in harmony.

One of the difficulties in war heretofore has been to synchronize the movements of separated bodies of troops when a simultaneous attack was desired, or when the effort was being made to have troops advancing from different directions arrive at a given point at the same time or at times definitely related. Many battles have been lost through failure in coöperation. This is the main reason why the wireless telegraph is indispensable. Sections or divisions of an army, widely scattered, are able to keep accurately informed of what all divisions are doing. Of course if one army has such an equipment and the opposing army lacks the equipment and the knowledge of its operation, the advantage is evident.

This advantage the French troops in Morocco possess. In a campaign between two up-to-date armies, such messages might have been interrupted or captured by one to the discomfiture of the other, a few years ago, but with the close tuning now possible and special cipher codes, the interception of messages has been virtually eliminated.

THE EDITOR.

The Phillips Memorial Unveiled

THE cloister erected at Godalming, England, to commemorate the courage of Jack Phillips, a native of the town, who was the chief wireless operator on the Titanic, was opened on April 15. The high sheriff of Surrey, J. St. Leo Strachey, who conducted the ceremony, delivered an address containing high praise for Phillips. He spoke as follows:

"I shall never forget, I do not think any Surrey man or woman will ever forget, the feeling of intense relief and of thankfulness which they experienced when during the agony of the Titanic disaster the story of Phillips' heroism blazed out like a star. It would be doing wrong to the many men and women who acted a brave part on the Titanic to speak as if Phillips' act was the only heroic deed done. There were plenty of others worthy of our admiration.

"But I think we may claim that there was something specially splendid, something specially great, in the way in which Phillips died and did his duty. No man could have called him coward, or thought of him otherwise than as a brave and a good man if, when the captain released him from his work in the wireless cabin, he had abandoned his efforts to call aid across the waters to the sinking ship. Instead Phillips stuck to his post and disdained even to say to himself: 'I have done all that is required of me, all that any man can expect me to do, and I may now fairly look out for myself.' He did not reckon like that. He kept no ledger account with Duty. He drew up no moral balance sheet with its nicely calculated less or more. He spent himself fully and without reserve in the service of his fellow men. Therefore, we are right to honor him in this haven of rest—a place as quiet as, on some halcyon day of summer, is that expanse of blue Atlantic water which is his noble tomb. Of a death such as this we can truly say:

" 'Nothing is here for tears; nothing to wail;
Or knock the breast; no weakness, no contempt;
Dispraise or blame; nothing but well and fair,
And what may quiet us in a death so noble.'

"The simplicity, the nobility that brought us this quiet, this relief in the passion, the disturbance and the discouragement of the great disaster, is reflected in the work of two Surrey artists, Mr. Thackeray Turner and Miss Jekyll. We owe to our noble dead all that is highest in the world of beauty, all that is appropriate to a deed of courage done with perfect unconsciousness of self, and perfect sincerity. These are the qualities that marked the deed. These are the qualities which are held sequestered in this gentle garden cloister. Let us hope that Phillips' example and Phillips' memory may become a part, as it were, of the building—a spell to bind the spirits of those who enter here. May no man or woman who seeks rest in the cloister leave without an inspiration toward that high courage which is in truth the liberator of souls.

"Few of us are ever likely to be called upon to face death in so appalling a form as that in which Phillips encountered it. But that need not in the least cut us off from communion from him. We can share his sacrifice on a lower plane. We are told of deeds that won the empire, and hear of great battles by sea or land, or great transactions of statecraft and politics. These are often worthy in themselves, no doubt. But, after all, the real deeds that won the empire were deeds of the spirit, deeds such as that of Phillips. In the last resort the empire was won and the empire will be sustained by the spirit of the English-speaking race, and that spirit rests on the sense of duty. As long as Englishmen feel and obey the call of duty without question and without stint, so long and no longer will the nation and the empire survive.

"Let no man be disheartened by the thought: How are we to define the word duty? None of the greatest things in the world—time, space, death, birth, love and life itself—are capable of definition. Nevertheless, we know what they are. In the same way we know what duty is. One of the early fathers of the church was asked what time was. He replied: 'I know when you do not ask me.' So we may say of duty. We know when we are not asked, when we do not try to find a definition. In the abstract we may discuss and find great difficulty in deciding what it may be our duty to do in this or that circumstance. When the moment for action comes we ought to know in an instant what we ought to do, though we may not always have the courage to do it. Duty once accepted becomes an exaltation of the spirit. Many a man has been dejected and unhappy because he realizes that he has not done his duty, or again, before he has done it. While doing his duty he

"'Is happy as a lover and attired
With sudden brightness like a man inspired.'

"The Titanic, on the tablet on which I am about to unveil, is called ill-fated. I have no quarrel with the word. It is a natural and reasonable phrase, and represents the universal thought as to that poor ship and the end that came to all her strength and her majestic beauty. But never can we think of Phillips as ill-fated. He died for his fellow men and followed the great, the divine example, which we have just commemorated in our Easter prayers. He was happy in his death. He fought a good fight. He is now God's soldier.

"On behalf of the subscribers I now unveil the memorial tablet and hand over the memorial to the mayor of Godalming on behalf of the town. May Phillips' example be an example to her citizens for all time."

H. Colpus, mayor of Godalming, responded to the address, in a short speech in which he accepted the memorial on behalf of the town.

Occupying an area of about eighty square feet, the cloister has three cloistered sides and an arcaded wall, from the arches of which can be obtained excellent views of the surrounding country. The cloister was erected by subscriptions from all parts of the British Isles, Europe and the United States. The cost of the cloister was approximately $3,500. A garden has been laid out around the memorial.

There are large tubs of agapanthus (the African lily) and a border of evergreens and flowering plants along the arcaded wall. Oak pillars support the roof. It is likely that the walls of the cloister will be used for tablets to commemorate deeds of bravery by other Godalming folk.

The Postal Telegraph Clerks' Association gave a small fountain which has been placed in the cloister. Above this is a memorial tablet, surmounted by the Godalming borough arms and bearing the following inscription:

"S O S.—This cloister is built in memory of John George Phillips, a native of this town, chief wireless telegraphist of the ill-fated SS. Titanic. He died at his post when the vessel foundered in mid Atlantic on the 15th day of April, 1912."

A portrait of Phillips in oils has been presented to the Godalming Corporation by former and present students of the Godalming Grammar School where he was educated. In Farncombe church, where he was formerly a chorister, a brass tablet has been placed.

WIRELESS STUDY IN ENGLAND

Word has been received from London that a state organization to study in the public interest the science of wireless telegraphy, ordinary telegraphy and telephony is proposed by the Postmaster General and a committee of experts.

The committee, which has issued a report, suggests the establishment of a national research laboratory and a national committee of research to conduct theoretical investigations and experiments, and to coördinate and supplement the work now being done in the Government departments.

A tablet to the memory of Ferdinand J. Kuehn, the youthful wireless operator of the Old Dominion Steamship Monroe was unveiled in Public School No. 40, on May 22nd. The tablet is a gift from the Alumni Association of the school, of which young Kuehn was a member.

Confessions of a Wireless Freelance

An anonymous sequel to

"Is the Game Worth While?"

Photographs by the author

WHEN I entered the sanctum sanctorum of the Pacific Coast main office, the Man at the Desk raised a pair of sharp, searching eyes and looked me over quickly but thoroughly. I handed him the letter of introduction from the chief of the division I had just come from.

He read it quickly. He did not seem to be visibly affected, which surprised me, for I had had great faith in the job-securing qualities of that letter. It really was a crackerjack.

Out of a clear sky he shot the question: "Are you a tourist?"

'Way down in my heart I knew exactly what he meant: Was I seeking a position because it would enable me to visit foreign countries, and just how much did I have the interests of the company at heart?

So I sidestepped. "What do you mean—tourist?" I asked, innocently.

"I mean," and he tapped the desk with the edge of his hand and shot me a cold, calculating glance from a pair of steely eyes, "did you come out to the coast to work or to travel?"

Although I realized the necessity of being cautious, I hated to commit myself and run the risk of being sent out on some short-run coaster—when Japan, China, the South lay so alluringly before me. "To work, of course," I said, heroically. "Put me anywhere you need me, it doesn't make any difference." I think I must have uttered that last with the self-sacrificial air of a martyr walking into the lion's den.

"Where would you *like* to go?" he asked.

Although I was not at all aware of the fact, this was bait, cunningly concealing a lurking hook.

And I bit.

"Well," I said, luxuriously, "I had rather thought of a trip to China and Japan—"

"And after that, where?" he asked, affably.

"I thought that Australia would be a nice run."

"One of the best. And then the South Coast—to Panama?" he suggested, politely.

"Just the thing!" I exclaimed. "Fine!" I could not have ordered an itinerary more satisfactory than this was working out.

"And where next — say, Alaska?" This time I caught an ironical twinkle in the back of those 60 H.P. eyes, and I fell to earth with a crash.

"Oh! send me wherever you need an operator—it really makes no difference," I managed to say.

"China? Australia? Alaska?" he laughed; and I squirmed.

"Anywhere at all," I replied. "Put me on a fish tug in the harbor."

"That's the way to talk," he said,

Corinto, Nicaragua. We made every port from Mazatlan to Panama

parenthetically. "You drop around to the office at nine sharp to-morrow morning. I'll probably have an assignment for you."

I had come all the way from the eastern coast, paying my own expenses, just in the hope that I would be able to land a job that would enable me to see something of the world. I did not realize then that what I was doing had probably been attempted by dozens of other operators; I did not at that time consider the "Tourist" phase of it from the standpoint of The Man at the Desk. That the really "preferred runs" were on those ships which traveled to the far countries, and only the most reliable operators were placed on them.

"Tourists not wanted," was the spirit as plain as words could say.

When I applied at the San Francisco office for a position I did not entertain the slightest doubt that I would be sent to China. It was quite a shock to me to learn that about four-fifths, if not five-fifths, of the new arrivals have the same sanguine expectations; also, that the majority of the operators in the western division secretly nourish that identical ambition!

But I realize my mistake. When I told the Man at the Desk I would be satisfied with a berth on a fish tug, I had a sudden change of views: I looked at the situation through the patient eyes of this executive. My attitude had certainly been wrong; and I decided to try out a steady conservation policy again, putting so much enthusiasm into whatever position was given me that a preferred run would just naturally fall into my lap.

At San Blas, Mexico, I had my first glimpse of the tropics; it was just as I expected

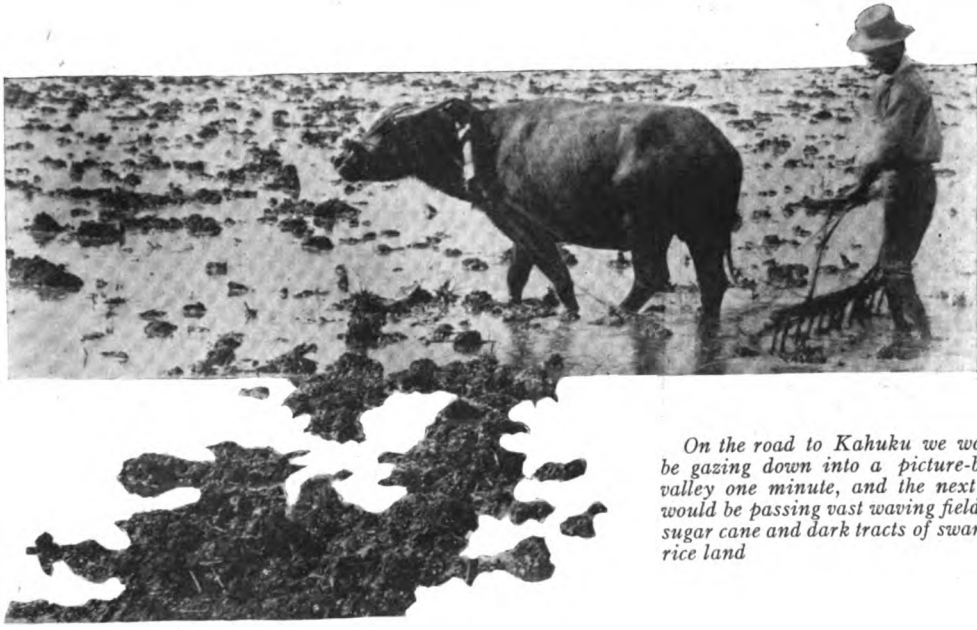
I have always had the interests of the company at heart, for the reason that I am a firm believer in the law of the conservation of energy. You get exactly as much out of anything as you put into it; whether it be school, business, athletics or—anything! I entered commercial wireless because it was fascinating to me. I worked diligently. I introduced new and original (at least, original to me) sales schemes for "selling" messages. In one month on an ordinary steamer on an ordinary run, by using a personal contact method of following up prospects, I turned in more paid business than any operator who had ever held the job. I do not say this in a boasting spirit but because it concretely illustrates my contention that you get out of anything just what you put into it.

The next season I was put on a new ship—one of the most desirable runs in the division. I have never cared for a berth at a shore station, for I like to meet people and I think I am better fitted to serve the company and myself in the capacity of a ship operator. Then, too, I will admit that I like to travel.

My first run was one which, for some reason I could never fathom, is not very popular with operators. It was a most delightful and interesting experience for me.

It was a slow boat of the Pacific Mail intermediate service to Panama, via Mexico and Central American way ports. We touched every village of consequence on the Western coast from Mazatlan to Panama. We were in a new place, usually a new country, each day. All were equally quaint and different and absolutely unspoiled by tourists.

San Blas, Mexico, a week out from San Francisco, was our first stop. It was my first glimpse of the tropics, and the best part of it was that it was just as I had expected and wanted it to be. A sweetly pervasive odor of pepper trees and tropical flowers saturated the atmosphere. The dobe houses, white or pink or blue, gleamed in an olive green setting of palms and shrubbery. The natives all wore wide sombreros. Naked babies and squealing pigs played in the houses and the streets. The señoritas were lovely. There were old monks in cassocks and armed to the teeth with knives and revolvers. Such was the conglomerate impression of my first tropical city.



On the road to Kahuku we would be gazing down into a picture-book valley one minute, and the next we would be passing vast waving fields of sugar cane and dark tracts of swampy rice land

One of the greatest advantages in being a wireless operator is the great clientèle of friends you may gain. I have usually found it best to meet people halfway—at least. It has always seemed to me that the people most difficult to meet are often the most desirable to know

in the end. I have friends—not mere acquaintances—in nearly every state of the Union, the result of ship-board intimacy one time or another. I can claim friends in nearly every country of the world; especially the out-of-the-way places. And they are not the "How do you do! Good-by!" variety by any means; they are the sort that slap you feelingly on the back and shout, "You're coming right out and stay with us as long as you're here!" So if I have nothing else in the world I will always have the memories of these friendships of mine made in the democratic atmosphere of a wireless office. For instance, there's "Jack," who owns a sheep ranch 'way down on the Straits of Magellan; "Ikuta," the young Japanese watch inspector of the White Pass & Yukon River Railroad, at Skagway; "Eddie," of Hong Kong, who used to play me "Just a little love, a little kiss" on the grafonola all evening; "George," the young missionary located near Delhi, India, who tried to cure me of cigarettes; "Dolores," of Paris; we met in Nicaragua and—but this is not a love story; "Mel," who saved me from being stabbed at Acapulco, Mexico, and now wants me to join a cruising party to the South Seas—I really believe I could name so many that I'd have room for nothing else in the space allowed me.

So travel is broadening, if you allow it to be so. It is not easy to assimilate if you do not care to assimilate. I have met people reputed to be "globe trotters" who possessed 2 x 4 visions and insular opinions simply because they have always worn figurative blinders. Their main topic of conversation is a sort of com-

When I had returned to San Francisco, my next trip took me to Japan; fortunately this trip was made at a time when it was closed season for tourists

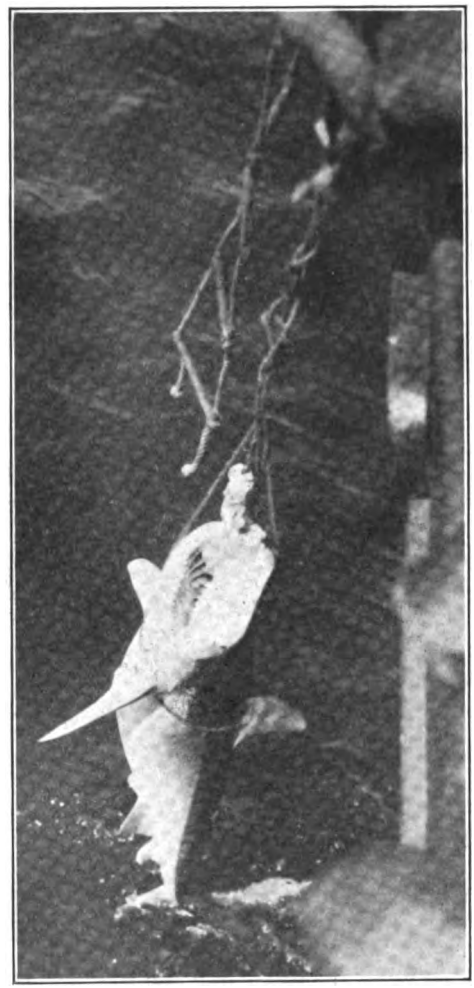
posite grumble concerning hotel accommodations.

On the other hand, you are constantly meeting interesting people and interesting types; mining engineers, army and naval officers, politicians. These are men of the world—it is good for you to know the sort of people who do things. You meet hundreds of people, lots of them bubbling over with big ideas and with enough time on their hands to talk to you.

Is it valuable? It certainly is if you're the right sort. If you are not, you speedily degenerate; you become blasé—hope-

lessly bored and equally boring. But if you keep your nose to the assimilation grindstone you will be surprised to discover how broad your views are becoming, how deep your insight is growing, how keenly analytical and accurate are your judgments, how adept you are to intuitively read character in the face and attitude. Moreover, you become interested in everything that's worth while; you can talk intelligently upon practically every subject that may come up, simply because you have had contact with scores of people who individually have talked to you knowingly upon many subjects. That is not an idle theory; it is straight-from-the-shoulder logic.

But the outcome, the effect, is really the most interesting part. Perhaps, just perhaps, you find that you are not particularly fitted for life-long service in the wireless profession. If you are you soon find it out; you just naturally find the groove and rise right up through the service. But do not think for a minute that if you are not fitted for wireless, wireless leaves you stranded high and dry without a profession.



I never caught a really large shark, but the photograph shows one I landed about seven feet long and weighing between 300 and 400 pounds

Wash-day in Panama; two thousand miles, as the wireless waves travel, from New York

All this contact with people and experience you have been having has been developing your bump of perception. The many-sided mind knows many prizes, and if you are not naturally adapted to "life on the wireless wave" you have every possible opportunity to discover just what vocation you are fitted for—a privilege that never comes to those who are plugging away in some one's office back home.

I am sure that this statement cannot be misconstrued if it is read intelligently. Even if you went into the Marconi ser-

vice with the fixed determination of using your position as a tool to fashion the key with which to open the door to your destiny, you would be still giving your employers a square deal for the simple reason that you would *have* to give absolutely irreproachable service in order to gain your ends. And the Marconi Company could ask no more than that. It is another illustration of a favorite rule of energy conservation: "As ye sow, so shall ye reap."

The author of the exceedingly interesting article, "Is the Game Worth While?" did not go very far beyond the fact that wireless, directly, offers excellent opportunities for the operator. My aim is to point out, as I mentioned in the foregoing paragraph, that even if you eventually discover that you are not naturally adapted to follow the wireless game to a successful issue, even then your experience as a wireless operator will have proven invaluable.

The very least it can give you is self-confidence, breadth, resourcefulness and poise.

A great many operators who have traveled many thousand more miles than I have, may not have been quite so fortunate in the way of experiences.

One ship I was on last year performed so inopportune a feat as to pile up on the rocks. The incident was quite tragic until the receiving operator (he was rather green, I guess) who received my S O S and position report, came back with yesterday's ball scores. When he found out that "Help! Help! Assistance!" was wanted instead of Ty Cobb's latest performance he nearly tore his key off the table in order to get things straightened out. I can hear that key stutter yet!

Then, on the South Coast trip, a fireman was killed in cold blood about ten feet away from where I was standing. It was the most deliberate murder I have ever heard of—the result of a century old tribal feud 'way back in Spain. It happened on board the ship while we were anchored at the port of Acajutla, Salvador. The captain's room boy shot the fireman through the head with a dum-dum bullet. The next morning we steamed slowly to sea, and the burial services were held. There was a humorous touch to this grewsome affair, though, in the fact that the native judge who came aboard to review the case was woefully intoxicated. He looked like little Jeff, and the more serious he attempted to be, the funnier he became. I was

Transportation problems as they are handled in Hawaiian waters and Chinese highways

court stenographer at the burlesque of a trial and the hardest part of my job was to keep from laughing in the face of the judge.

One of my liveliest experiences, and incidentally one I have already made passing reference to, occurred at Acapulco, Mexico. I was nearly stabbed by a gentleman who came up from behind while I was fistically engaged with one of his *comradios*. But this friend of mine, who has a fist resembling a piece of rock, intercepted the good work of the would-be surgeon with a left swipe to the jaw. The trouble concluded on the edge of the dock with, as he described it afterwards, "A loud splash, and all was quiet,"—which is an appropriate and accurate ending.

Several times, fishing for shark provided an innocent diversion when we were in port. It is keen sport when one of those sleek, tiger-striped man-eaters lunges through the water and seizes the tempting two-pound morsel of salt pork you are dangling on a hook and line, particularly when you realize at the time that he would be every bit as willing if you were substituted for the unfortunate bait. I never caught a really large shark like those to be angled for in the waters of Hawaii, so that I have not the grounds for a good fish story; but the accompanying photograph is of "my shark," about seven feet long and between 300 and 400 pounds in weight. I have seen sharks of that size pulled in along the coast of Florida and called large, but they would not be considered worth pulling out of the water in Central America and Hawaii.

You are constantly meeting interesting people and interesting types

There are many varied and interesting experiences which one constantly meets in traveling in the strange countries that are not tourist-infested. Earthquakes and volcanoes have contributed to my enjoyment of life—when the excitement was over. And I was lucky enough to see some "real war" while in Mexico; it was a rebel and federal skirmish in which several score of rounds were fired. But as for actual damage done, the bullets might just as well have been caught in a basket and used for sinkers, which would not have been wasteful and eminently more charitable in spirit!

Then there was "Dolores" — but this is not a love story

I have always gone out of my way to meet people and be courteous to them because I seemed to have been born bashful, and in the wireless service I was given an excellent opportunity to overcome the foolishness and to cultivate conversational ease.

I tried it one time in my hotel at Panama and met a man who later proved of inestimable value to me. After a brief chat he said:

"Without asking you, I'll bet the cigars you're a newspaper man."

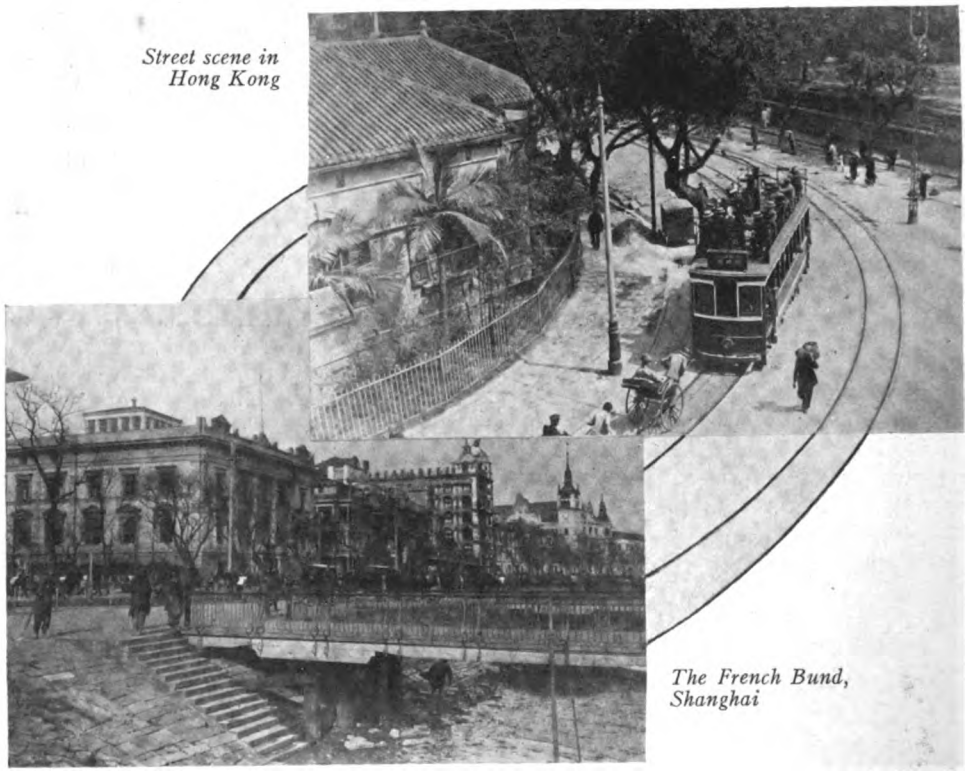
"You lose!" I laughed; "I'm a wireless operator."

"Anyway," he replied, "you *look* and *talk* like a newspaper man."

I made some inquiries about this gentleman of the proprietor of the hotel; he proved to be the representative of one of the biggest magazines in America. His opinion and advice were worth having; for it had suddenly dawned upon me—why not a journalistic career? I had been dabbling in it more or less, and when I acquainted my magazine friend

with the idea, he plumbed me for tendencies, weaknesses and ability. He said then that I could succeed in the journalistic field. And that is how I found my groove—2,000 miles, as the wireless waves travel, from New York. Penned up in a two by four office at home, how many years would it have taken me to work out the problem? Yes—just about a thousand.

When I returned to San Francisco, my berth was changed—I *think* as a result of practicing my conservation policy—and I was assigned to one of the magnificent Hawaiian liners. It was a wonderful trip to Honolulu and a great experience. A friend, one of the J. G. White engineers directing the erection of the Oahu link of the Marconi world chain, took me in the company machine to view the work on the new stations. It was raining when we started and it drizzled on and off during the entire day. But I had become so accustomed to it from my other trip to the tropics that I was growing to consider it "liquid sunshine," quite as the Kanakas do. But the protracted rains had left the roads in a terrible condition. At the end of the hour and a half of continual bumping and jolting I felt as if I had been through an earthquake. On the grounds we were met by the construction superintendent and had lunch immediately. And such a lunch! We ate in a large mess tent, for an army of men are working there, and the meal, the best I ever tasted, was prepared by Japanese cooks, past-



Street scene in Hong Kong

The French Bund, Shanghai

masters at the gentle art of cooking food as it was intended to be cooked.

Then we went on a tour of inspection. The mile long aerials seemed unbelievable; the paradoxically complex but simple method of receiving and sending two messages at the same time seemed positively uncanny, but the two things which tickled me beyond all else were the operators' hotel and the bungalow for the engineer in charge. The hotel's billiard rooms, good old-fashioned fireplace and snug, homelike quarters certainly go to make an operator's life there highly de-

sirable, and when you are ready to cap the climax of your career, there's a cozy little bungalow for you and "She," and a nice fat little salary check every two weeks. Our companies have been thoughtful enough to provide a sufficient number of these little bungalows to go around. All you have to do is to make good.

We took the road to Kahuku on the second morning; there the 300 k.w. transmitting stations are situated, 30 miles from the plant that I had visited the day before. There are two separate transmitting machines at Kahuku; one will shoot the 75-word-a-minute messages across 4,000 miles to Japan and the other will track off the little dots and dashes along the receiving tape at Marshalls, in California. The trip down was wonderful: Just imagine a fifty mile automobile trip along an excellent road amid the most beautiful scenery in the world! The road winds in and out, up and down, in a great valley, and on either side of you rise the sweeping hillsides of the two

That travel is broadening is illustrated in this glimpse down Desveaux Road, Hong Kong

I was lucky enough to see some "real war" in Mexico; it was a rebel and federal skirmish

miniature mountain ranges of the island. We passed quaint little Japanese and Chinese settlements, vast waving fields of sugar cane, dark tracts of swampy rice land, tall sullen breaks of bamboo, and fragrant fields of pineapple, arranged with geometric neatness.

Occasionally a wonderful view of the sea, shading from a delicate emerald green to a tremendous purple would spread out before us. We crossed countless little narrow-gauge plantation railroad tracks whose engines looked like those little toy engines we used to ride behind at the fairs. Now and then through the mountains on either side beautiful alluring valleys would appear, and as suddenly disappear. They were just the kind of valleys you've dreamt of—wonderful with riotous color, invariably dissolving in the distance into a blend of vague, hazy purple.

The most striking feature of the whole trip was the ever-changing and endless variety of the views. One minute we

would be gazing down into a picture-book valley of trimly arranged and brightly flowering truck gardens across to the beckoning hills when a sudden bend in the road would blot out these beauties entirely and present instead to our eyes a sweeping vista of rocky coast hundreds of feet below with the waves beating and bursting upon the pitch-black coral reefs. Or else, after a seemingly endless green dash along a sugar cane lane, all vegetation would abruptly cease, and the smooth, curving road would swing out alongside an apparently endless stretch of gleaming sandy beach with the waves, oh, so gently, lapping the shore.

And this is the paradise to which a score or more of faithful ones will duly direct their steps! "Well done, good and faithful operator!" the master executives of the Marconi Company may exclaim regarding your record. "Now pack up your carpet bag and catch the first boat out for Hawaii, earthly paradise-by-the-sea, with lucrative, interesting and instructive work and promotion if you continue to make good!" And the chances are they will surreptitiously slap you on the back and informally add, "Go to it, my boy—good luck!" For the Marconi Company, although a money making corporation, is, strange to say, occasionally quite human and always humane.

When I had returned to San Francisco, my next trip took me to Japan and China. Fortunately, this trip was made at a time when it was closed season for tourists, so I not only saw these places as they really are but I had the advantage of native prices. For example, rickshaw service was fifteen instead of fifty cents an hour and hotel accommodations for about one-half of the tourist rates.

Our stops were brief but frequent, and I managed to see a great deal of both Japan and China. I learned sufficient Japanese and Pidgin-English to make myself understood the same as I had done with Spanish in Central America. Pacific Mail, the same as Ward Line Spanish, is comparatively easy and quite useful to cultivate.

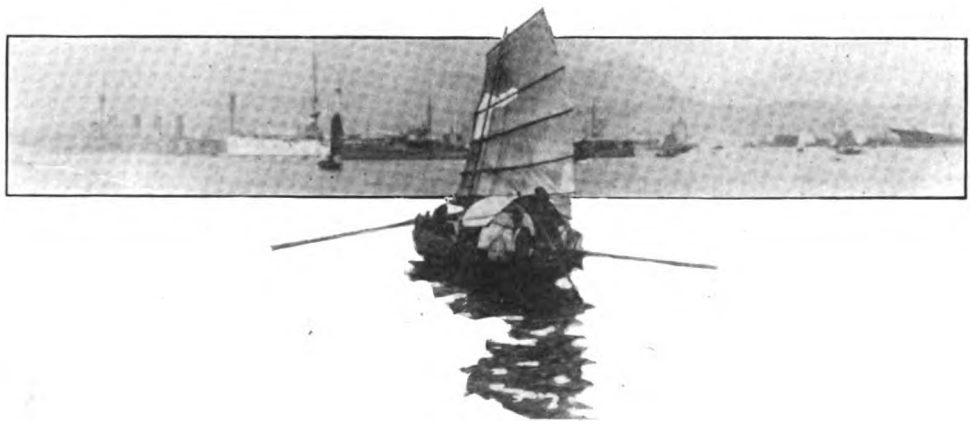
In Tokyo, the old capital of Japan, I was fortunate enough to witness the famous Geisha "Cherry Dance," a yearly event. And in the Yellow Empire I made the rather doubtful acquaintance of real Chinese food. Do you imagine you would care for such tempting articles of diet as eggs that are eighty years old, black of

How Hong Kong Harbor looks from the Peak

color and salt to the taste, but quite odorless? Or bird nest soup, which lives up to the name, fricaseed rat tails, broiled octopus tips? If you think it is a joke, some time when you get over to China, just obtain an invitation to a genuine Chinese banquet and see for yourself; or ask any operator who has been there. I will warn you beforehand, however, that if you should stop eating for the briefest time the Chinese gentleman on your left will promptly take it upon himself to cram food into your mouth. Which is perfectly good Chinese etiquette but rather trying at times.

Little experiences such as these, and you will meet with them all over the world, do one great thing for the receptive mind: they broaden you until you view life from more angles than you ever thought existed. You acquire the knack of meeting people favorably; you understand them and they accept you as a widely traveled but very democratic person, which means a welcome in any walk of life. Wide experience makes you appreciate the good things in life, takes the conceit from your make-up, and leaves instead, poise—*if* you will allow it!

But whatever you make out of your position as a wireless operator, or any position that you ever hold, the one limiting clause, "If you will," will form the dominating feature of your progress whether in the direction of success or failure. Quite aptly it illustrates that every action, physical, mental and moral, has an equal and opposite reaction: The law of the conservation of all energy—you get out of a thing exactly what you put into it.



BULLETIN ON THE GREAT LAKES

The announcement that the daily wireless bulletin to vessels on the Great Lakes from the station at Arlington was to become a regular service was received with expressions of approval from all the vessel owners. The passenger steamships of the Lakes are now equipped with wireless and many of the package freighters and other cargo vessels carry installations. It is expected that many more vessels will now install wireless.

The service commenced on June 1, and weather forecasts are to be sent out each night, shortly after ten o'clock, including barometric pressure, direction of the wind and the force of the wind on the Beaufort scale.

Weather Forecaster Cuthbertson, of Buffalo, stated on the opening of the service: "I regard the system of wireless transmission of weather messages to mariners on the Lakes as the greatest improvement in the Weather Bureau in the last twenty years. Mariners from Duluth to the St. Lawrence River whose vessels are equipped with wireless apparatus will be able to receive weather reports and storm warnings while far out in the Lakes, and will be able to plan accordingly. There is no doubt that the new system will prove a tremendous factor in making travel on the Great Lakes as safe as human ingenuity can make it."

Wireless Telegraphy in Railroad Service

An address read before the Convention of Railway Telegraph Superintendents New Orleans, May 19-22

By DAVID SARNOFF

Contract Manager the Marconi Wireless Telegraph Company of America

MR. L. B. FOLEY has so ably covered the subject in his paper (published in the June issue) that I feel there is little left for me to add on the subject of "Wireless Telegraphy in Railroad Service." I wish, however, to take advantage of the opportunity offered me by the Association of Railway Telegraph Superintendents to discuss the subject of wireless generally, so let me first impress upon the gentlemen present the fact that communication by wireless telegraphy over land is an established fact.

A great deal has been heard of the accomplishments and the possibilities of wireless telegraphy in connection with the maritime service; only recently have the merits of the Marconi system been thoroughly demonstrated over land as well.

The first practical use of the Marconi system for land communication was made by the Wanamaker stores in New York and Philadelphia, and from the very day the installations were completed up to the present time, the circuit has been used for many purposes. The sets installed at each end are of 5 k.w. power and the service rendered by this Marconi apparatus is, in my opinion, as well as in the opinion of the Wanamaker people, equal to that of any land line service.

Four to five thousand words are handled daily between the two points, during the business hours of the stores—9:00 a. m. to 6:00 p. m.—and as an indication of the class of service rendered, I cite an every-day example:

A customer comes into the New York store and requests a certain article which that store may not have in stock. The head of the department or the salesman immediately telephones to the wireless station on the roof of the building, requesting the operator to communicate with Philadelphia and ascertain whether or not such an article is in stock at that store. The salesman holds the wire and the customer; within a minute or two the reply is received, and very often a sale effected. This example is drawn from my personal experiences, for I served a long period in the capacity of wireless operator at the Wanamaker station.

When the advantages of the Marconi system as an auxiliary means of communication for railroad work when all other means of dispatching are made impossible through storms or other causes were perceived by Mr. Foley, the first installations were made at the Lackawanna Railroad stations at Scranton, Pa., and Binghamton, N. Y. At both places standard Marconi 2 k.w. equipments of the latest design and construction were installed. It was thought at first that difficulty might be experienced in communicating between these two points by reason of the fact that the intervening country is very mountainous. No such difficulty was experienced, however, and signals received at either end are sufficiently strong to be copied on a typewriter.

A question often asked is: What speed can be attained in the transmission and reception of wireless messages? The answer is: Given a good outfit, it depends *entirely* upon the personal skill of the

wireless operator. I have handled from fifty to sixty messages an hour over a wireless circuit—messages of average length. And the only reason I can give for not handling more is that perhaps I am a "ham."

The installation on board the Lackawanna Limited train was not so simple a proposition as at the fixed stations. Several factors had to be considered—first, economy of space; second, the limited height available for the erection of the antenna; third, the low potential furnished by the train batteries.

To overcome the first difficulty, it was necessary to design special equipment which would be compact and yet efficient. Accordingly, a 1 k.w. Marconi quenched gap set was designed and installed, and a cabin specially built for the purpose. This cabin is about the same size as a standard train lavatory compartment. The booth affords ample accommodation for the installation of the apparatus and is sufficiently large to allow the operator easy manipulation of the various parts of the apparatus. The motor generator was designed especially for the purpose, the motor being wound to operate on 30 volt direct current, which is obtained from the train's lighting system. The motor generator is installed in the train's lavatory, which is directly opposite the wireless booth, and is controlled by the operator from the radio room by means of an automatic starter. Mr. Foley described in his paper the arrangement of the antenna on board the train.

Our experience with the wireless operations on the train has shown us that wave-lengths of the order of 1,500 to 2,000 meters are considerably more effective than wave-lengths below that value. We also learned that the speed at which a train is running does not seem to affect the transmission or reception of signals.

An interesting fact in connection with train work is that about three miles east of Scranton the train runs through a tunnel for about five minutes, and while in the tunnel, signals can be received on board the train from the Scranton station with perfect ease; in fact, no perceptible diminution in the intensity of the received signals is noticed. Some of the gentlemen present have been with me on the train during these experiments, and have themselves listened to the signals while going through the tunnel. This tunnel is of hard rock and dry; but I have carried on communication while in this tunnel when its surface was covered with snow. It is also worth mentioning that the noise of the train does not interfere with the reception of the signals, for the booth, being fairly soundproof, permits the operator to read the wireless signals without difficulty.

A question that is frequently asked is: How can interference be prevented when more than one or two stations are transmitting at the same time?

You have heard a great deal about tuning in wireless telegraphy; the subject is one that requires considerable explanation and I shall not take up any more of your time than I can possibly help in describing this method of interference prevention, but will simply endeavor to give you an idea of what is meant by tuning.

When an equipment is installed at a wireless station, whether it be on land or sea, the apparatus is so adjusted as to produce electrical vibrations of a definite periodicity in the ether. Such adjustment of apparatus is commonly called tuning the set to a certain wave-length. In order that wireless work may be harmonious, the government requires vessels at sea to use certain wave-lengths and reserves for naval and military use wave-lengths not used commercially. For example: all merchant vessels have their transmitting apparatus adjusted to operate on wave-lengths of 300 and 600 meters. The naval vessels and shore stations utilize wave-lengths between 600 and 1,600 meters. Wave-lengths above 1,600 meters can be used for any other purpose; and as the longer waves are more efficient for land communication, we have practically an unlimited range of variation.

Two or more stations may thus be transmitting simultaneously, and their signals will be received easily and distinctly at the separate receiving stations; provided, however, that the transmitters are adjusted to send on different wave-lengths, and the receiving apparatus adjusted to receive the different wave-lengths. In addition, the Marconi system provides a method of group tuning, which simply means that the receiving telephones and circuits are adjusted to respond to the pitch or frequency of the

spark being produced at the transmitting station. Thus there are two effective means of tuning: wave-length tuning and spark frequency tuning.

As an instance of the effectiveness of these methods, I cite the recent case of the Lackawanna Railway's operation of the Marconi stations temporarily installed at Hoboken, N. J., and Dover, in conjunction with the Scranton and Binghamton stations—furnishing an absolutely reliable means of communication during a severe snow storm that crippled all land line communication on that road, and many other roads. The Hoboken station is but within a stone's throw of three or four other wireless stations situated in the city of New York. The other stations are constantly conducting business with the ships at sea. The Wanamaker station, also but a mile or two from the Hoboken station, is busy most of the day; yet it was possible for Hoboken to send and receive wireless messages without interference during all of the time that the other stations were operating.

In concluding, let me state emphatically that wireless telegraphy as an auxiliary means of communication will, in my opinion, be of inestimable value to the railroads of this country. While there is no doubt of the practicability of wireless communication aboard moving trains, I feel that its greatest utility at the present moment is perhaps in the way of fixed stations, which are ever ready to be set into operation when all other means of communication fail.

Unlike the land lines, wireless does not suffer from storms. As a matter of fact, the weather conditions during the winter months are most favorable towards the efficient working of wireless telegraphy; this means that just at the very time that land lines are most likely to be destroyed by storms or floods, wireless telegraphy is at its best.

The same operator used for land line work can take charge of the wireless, for it takes the ordinary land line operator but a short time to become familiar with the Continental Code and the Marconi system, which is simple in operation, and should the railroads of this country adopt wireless as a means of communication, it is not altogether unlikely that the government authorities may see the justice of permitting the railroads to use the American Morse code, since the railroad wireless communication is quite different from the general wireless service at sea.

The best indication of the confidence the Marconi Company has in its apparatus and its ability to accomplish all that is claimed for it, is the fact that no immediate profit is sought; that is to say, the apparatus is not sold outright to the steamship owners or railway men, leaving them to work out their own salvation and the best method of operation. Instead, the Marconi Company designs and furnishes the apparatus at its own expense, charging the users of the apparatus a rental figure, for which the lessee enjoys the advantages of all additional improvements—a considerable advantage, for the wireless art is continually being developed. Further, the Marconi Company makes regular inspections of its equipments, maintains the apparatus in good and operative condition and effects necessary repairs.

Such an organization has made possible the present entirely practicable wireless communication at sea, and the same Marconi organization will make possible reliable communication over land, regardless of the number of wireless stations erected in your vicinity.

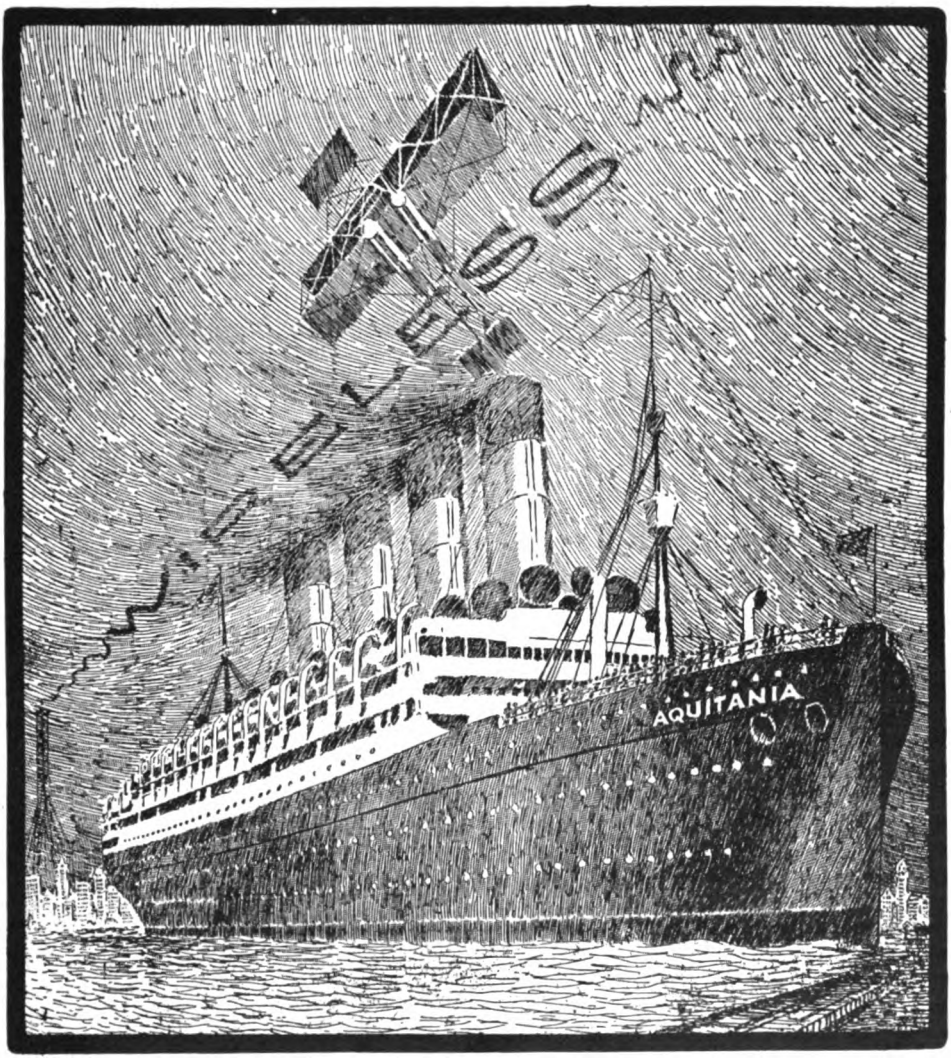
PROGRESS OF WIRELESS TELEPHONY

A cable dispatch from London says that Com. Marconi hopes to connect his office in Marconi House, London, and his country home at Fawley, Hampshire, by wireless telephone within a short time. The distance between the points is sixty-seven miles.

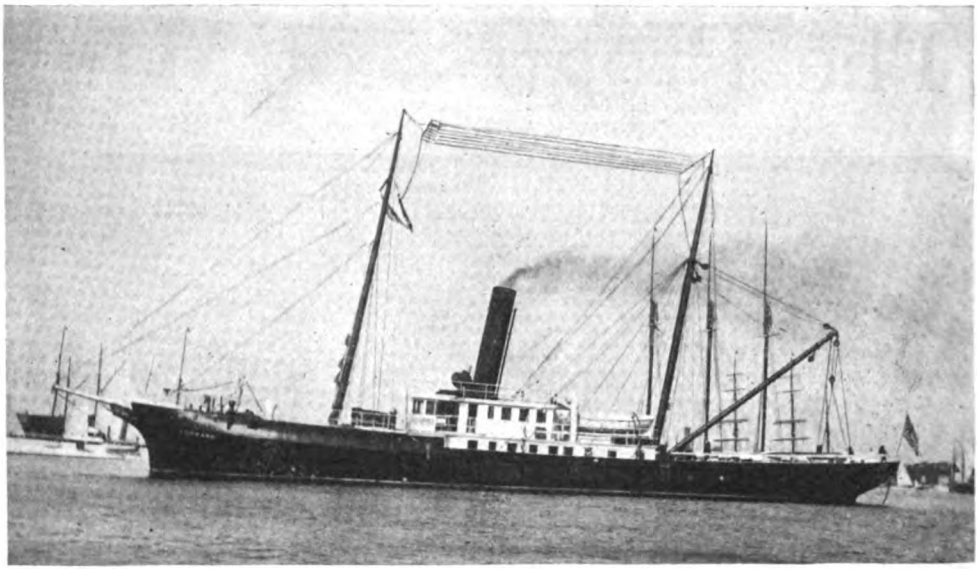
"Already we have had conversations with Berlin," he said. "We could not hear all the words, but the test was very promising, seeing that we were talking over 600 miles. Recently we had wireless telephone communication between warships forty miles apart which was entirely satisfactory. In fact we could hear conversations going on in the room. 'I want a drink' was one of the scraps we overheard."

There is almost daily communication between Marconi House and the Chelmsford works, thirty-one miles away.

The Progress of Man!



It is significant of the high place in modern commerce which wireless has attained that with the arrival of the greatest of all British liners this cartoon by the famous artist Winsor McCay should appear in the New York American. The drawing, to quote that newspaper, "shows the degree to which man has to-day conquered the forces of the air, the water and the earth. Man's inventions carry him through the heavens above, the earth beneath and the waters under the earth. The air is frequently dotted with air craft and in the clouds wireless conversation is daily held. All these are twentieth century achievements. Ours is the age of wonders."



The Yankee Salvage Association's tug "Forward," which sends ashore the press reports

Reporting the Yacht Races by Wireless

THE reporting of yacht races for newspapers is not what it used to be—and for this changed condition many newspaper men are duly grateful. The day has passed when the reporter had to stand with face upturned to the sky and entreat obstinate carrier pigeons to come to earth and yield the bulletins of the contest which they bore; no longer is it necessary for him to risk his life in a balloon high above the waters in order to serve his newspaper.

Wireless telegraphy has brought about a new and better method of getting the news. To-day while the yacht races are in progress the city editor of a newspaper does not concern himself with the problem of how the bulletins and story of the contest will reach the office. He knows that they will be flashed to land from the press boat as soon as the "copy" is handed to the operator, thereby insuring quick transmission into the proper hands.

On the eve of an international yacht race some years ago a brand new idea for reporting the contests was evolved in a Park Row newspaper office. It was proposed to obtain a flock of carrier pigeons to carry bulletins of the race from the observation boat to the office. The scheme was carefully discussed, but only one flaw could be pointed out. The carrier pigeons were obtained from Staten Island and it was feared that no matter how well they were trained in their lesson to fly directly from the observation boat off Sandy Hook to the newspaper office some of them might return to their old home. In order to guard against the failure of the plan in the event that this occurred the reporters detailed on the press boat were instructed to write duplicates of each bulletin and to liberate simultaneously several pigeons bearing the same reports. Reporters were assigned to the home of the owners of the pigeons to get the bulletins carried by the birds which might fly to their former home, and telephone their contents to the office.

As soon as the race began the reporters wrote bulletins announcing the fact, attaching them to the pigeons which were freed. Some of the birds started toward the newspaper office, while others flew for Staten Island. In a tower on the newspaper office building were men waiting to receive the pigeons and the bulletins were

hurried to the editors as fast as they arrived. As the race progressed and other bulletins arrived, however, it was found that some of the later bulletins of the contest were arriving before the earlier ones.

On Staten Island the reporters were confronted by difficulties which they never before had faced, for the pigeons took refuge on the roof of a barn and could not be persuaded to come within reach of the newspaper men. The reporters tried to capture them by climbing to the roof, but as soon as the birds caught sight of them they flew away. When the reporters left the roof the pigeons returned to their roosting place. One of the men attempted to drive them to the ground by throwing stones, but this brought upon him the anger of the wife of their old owner and he was compelled to abandon this plan.

In the meantime the city editor was impatiently awaiting bulletins of the contest. But some of the important bulletins were attached to the pigeons roosting on the barn roof, while others were being carried by birds that were loitering somewhere between the race course and the newspaper office. Therefore the method of obtaining the yacht race news by carrier pigeon was declared a failure.

As the time for the next International races approached the same problem again confronted the newspapers. This time it was suggested that a reporter in a balloon be sent up over the course to observe the race. The reporter, who was also an expert telegrapher, planned to send the news of the contest by telegraph to a tug which was anchored below him. A telegraph wire extended from the balloon to the tug and the latter was in telegraphic communication with land by cable.

The balloon bearing the reporter ascended without mishap, but when the yachts started it began to turn around. Although he had made many ocean voyages the reporter was made violently ill by the motion. In fact he was so much affected that he was unable to telegraph the news of the race and was compelled to descend.

The facility with which the reports of the trial races, held recently to determine the selection of an American Cup defender, were transmitted by wireless telegraphy furnished a marked contrast to the efforts along the same lines previously described. On the tug Forward, of the Yankee Salvage Association, is a Marconi wireless telegraph set. George N. Robinson and J. F. McQuaid, operators, were assigned to the tug, which kept close enough to the yachts to enable the reporters on the Forward to observe the progress of the race. The messages were sent to the Sea Gate station from which they were transmitted by a direct wire into the offices of the Associated Press.

On one day of a race off Glen Cove, L. I., between the Vanitie and the Resolute 2,968 words were sent by wireless. On another day the story was told in 1,520 words. The following dispatch, which was sent by wireless, is an example of the service which was provided:

"ASSOCIATED PRESS BOAT, off Sandy Hook, June 10 (by wireless).—The first race of Defiance, the Tri-city cup defender, was a dismal failure, and at 12:37 P. M., an hour and twenty minutes after the start, she was so far behind Resolute and Vanitie that she withdrew. Her poor showing was due, to a large extent, to the fact that she could not hoist her club, and had to be content with a working topsail.

"In the windward work Resolute gained more than three minutes on Vanitie rounding the outer mark at 1:11:56, Vanitie turning at 1:16:11.

"Resolute finished at 2:33:07 and Vanitie at 2:37:57, Resolute having gained half a minute on the leeward run, winning by about four minutes elapsed time.

"Resolute led the way over the line to-day in the first of the series of three races of the America's cup defenders over the regular course off Sandy Hook, crossing at 11:16:27. Vanite and Defiance were timed by the two-minute rule at 11:17, Vanite being handicapped three seconds and Defiance twenty-nine seconds for late crossing.

"At the end of the first hour of sailing the windward course of eleven miles, Resolute still held the original lead over Vanitie, but Defiance was fully three miles astern and losing minutes to the mile in the eight-knot breeze.

"Defiance's skipper made no effort to mix with his rivals. He had hard work holding the nose of his sloop up into the wind, and started a hunt for conditions favoring his crippled rig. Defiance chose a course very close to the Jersey shore,

where she picked up a strong wind, which came more from the west than that which the other two boats were encountering. This enabled her to cut down some of the long lead, because she was able to make a long fetch down the shore without tacking. In this maneuver, Captain Zelah Howell, whose home is at Highland Beach, showed his intimate acquaintance with local airs.

"Meanwhile, Resolute and Vanitie were making a thrilling contest. Both pointed high in the wind, with their baby jib-topsails, and negotiated the swelling sea with little difficulty. Resolute seemed the quicker in stays. An hour after the start she led her rival by a quarter of a mile. The breeze picked up a bit as the leaders approached the first mark off North Long Branch, and headed out to sea on the starboard tack. Resolute was then more than holding her own.

"After rounding the mark, spinnakers were set, and as the wind still held strong in the south-southwest, and the boats ran down toward the home mark with such speed that some of the excursion fleet were hard put to it to keep up with them. Resolute gybed as she rounded so that her mainsail went to port. She then set her spinnaker. While Vanitie moved very fast on this point of sailing, she was making what appeared to be a hopeless race of it, as she not only had to overcome the lead of her rival, but also had to give her a time allowance of three minutes."

A conference concerning the races for the America's cup to be held off Sandy Hook on September 10, 12 and 15 was held recently between Secretary Redfield of the Department of Commerce and Secretary Cormack of the New York Yacht Club. It has been decided that, as the success of the races depends upon a clear course, only one press boat, as within previous years, be allowed within the lines. The vessel for the purpose must be approved by the Secretary of Commerce and the New York Yacht Club.

Special arrangements will be necessary to insure the successful transmission of wireless bulletins from the course during the progress of the race. The indiscriminate use of wireless will interfere with these messages and deprive those waiting before bulletin boards the world round of instant news of the progress of the races. Such indiscriminate use will also interfere with the necessary daily communication by wireless between ships at sea and the port of New York, which must not be disturbed. Accordingly, Secretary Redfield will make use of the law to prevent wireless interference and will restrict wireless messages relating to the races during their progress to the wireless apparatus on the press boat.

Special arrangements will be made to prevent or detect violations of the law punishing wireless interference. The press and wireless boat will in all respects be under the control of an officer of the Government, and Secretary Redfield will ask Secretary Daniels to detail Captain W. H. G. Bullard, U. S. N., superintendent of the Naval Radio Service, for this purpose.

The international yacht races held off Sandy Hook in September and October, 1899, were reported by wireless telegraphy. Com. Marconi came to this country especially for the purpose of making the arrangements for the transmission of the messages.

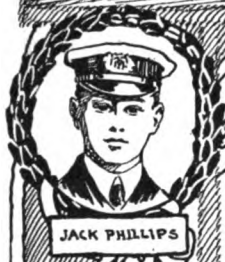
THE NORTHLAND ASHORE

In times of peril the first thought of those concerned is of the wireless. This was shown when the Northland of the Main Steamship line ran hard aground on the rocks of Bartlett's Reef in Long Island Sound in a fog early in the morning of June 5. The wireless set, in charge of H. Bondeaux, and Carl Krech, first and second Marconi operators respectively, was used to send out calls for help and the passengers were taken off by the Tasco, an ocean-going tug of the Scott Wrecking Company, which responded to the summons from New London, Conn.

The Northland was three or four miles out of her course when she struck. Captain Johnson, her commander, was on the bridge at the time.

Officers were quick to assure the passengers that there was no danger.

The wireless was picked up by several Sound vessels and on the New London shore. Captain Johnson, in his call for help, asked that a revenue cutter be sent. Thirty minutes afterward he sent out another message to the effect that assistance was not needed.



"S O S"—Unspoken anguish
Wings the message o'er the waves!
While men's spirits droop and languish
Facing death in watery graves!

But the hero's soul, afire,
Brooks no thought of death or fear;
His the one, the sole desire
That the sister ship shall hear.

Hear him call! and swiftly heeding,
Answer his persistent calls—
"Save our people," he keeps pleading—
Pleading!—Then the silence falls.

Speed the rescuers; and tireless
Snatch their brethren from the deep!
While the hero at the wireless
Rests now in immortal sleep.

There's another meaning dwelling
In those letters "S O S";
"Sons of succor," they are spelling
Heroes of the wireless.

CHARLES J. MASON.

DEDICATED TO THE MEMORY OF ALL THE WIRELESS HEROES

The Brigantine

A Wireless Detective Story

by Roland Irevor

Illustrations by F E Bissell

AT first the proposition didn't appeal to me and I told the Superintendent so. "You're a funny fellow, Harper," he said to me; "I don't believe any other wireless operator in the service would pass up the chance of exchanging a coastwise vessel for a nice trim steam yacht—particularly when her owner happens to be Vincent Dalyer."

"Vincent Dalyer, eh? . . . Why the deuce do you hold that interesting detail till the last?" I demanded with a familiarity which I always assumed but never felt in this man's presence. A twinkle in his eyes and a slow smile was the only answer. He turned to some papers on his desk and, while running through them, observed over his shoulder:

"Of course, Harper, if you've changed your mind about this berth, I'll arrange things accordingly. You know, just because the Avencia is the biggest steamship afloat that is no reason why I should put the best operator in the service in charge of her wireless room. Besides, after one trip, you'd want to change again, I know. Aboard the Dalyer yacht things'll be a lot more interesting and it will mean, most likely, a long and comfortable cruise in pleasant waters. Then suppose Vincent D. takes a fancy to you. Likes the way you comb your hair or some little thing like that, and decides he needs a new secretary—you never can tell."

"Me for the prospective, rosy little secretaryship," said I. "Put me down for the yacht; that is, if she don't sail within ten minutes. There is a certain little party up town, and—"

"Sails day after t'morrow; go aboard at Erie Basin," growled the Superintendent as he scratched off the necessary memorandum.

And that was all I really knew about my assignment when, two days later, I located the Athor, the most widely photographed of yachts, for the simple reason that her owner was many times richer than the next richest young man in the universe. She was a trim little vessel, staunchly built for ocean-cruising and magnificently equipped and furnished. Besides the captain, two mates, steward, cook and the owner's personal servant, she carried a crew of seventeen men. From innumerable newspaper reports I knew that Dalyer was himself an able seaman and, for some months now, had made his yacht his home. After I had presented my credentials to the captain and signed ship's articles, I inquired what manner of man was the owner. I learned that he was very

democratic, a remarkably good sailor and displayed a pretty wit at the table. In place of the society circus set with which the average yacht owner burdened himself, Dalyer preferred to surround himself with the vessel's officers at meal times and, while a strict disciplinarian, his relations with the men were always very friendly.

This sounded enticing and I ventured to remark to the captain, "Well, I'll have to think up some merry quips to pass out over the soup."

"You?" sneered the captain.

"Yes, me," I replied. "I rank as a ship's officer—"

"Ship's cabin-boy, you—"

"Not on your life. Haven't I just signed on as a petty officer?" I waxed indignant. "And as such I am entitled to—"

"That's right, Captain Thomas," a voice interrupted. "Dead right."

There in the doorway stood the owner, readily recognizable through my having seen his pictures in the illustrated papers some thousands of times. He was smiling easily, and as he came forward he extended his hand to me. I recall now how distinctly I was impressed with its strength and slimness as I grasped it and mumbled some inane conventionality. "The new wireless man, I suppose," he remarked, "and being put over the jumps by our excellent skipper, I presume, from what I overheard as I came along. We'll have to save you from further initiation," he grinned, "thus cheating Captain Thomas out of a portion of his greatest diversion." He nodded and smiled at the captain, and I noted the grim visage of that old seadog relax into a suggestion of amiability in return.

"Your name?" Dalyer was saying, as my amazement subsided over this phenomenon.

"Harper . . . er . . . Frank Harper," I stammered.

"I am Mr. Dalyer."

Thus was my introduction to the richest young man in the world made, and it seemed even then that I would find him very interesting and the trip eventful.

I was not disappointed in either respect.

Long before we reached the Azores he had singled me out for his almost constant companion. Just how this happened, I do not know; but there were two contributing causes: I had more time on my hands than any other man in the ship's company—in fact, I had little or no wireless business to transact—and then the dog, Bob, almost as famous as his master, as you well know, had conceived a great liking for me. And, by the way, that strapping big mastiff quite won my heart. Stately, high-bred, intelligent and lovable, he was a thoroughbred from the jet of his handsome muzzle to the tip of his tawny tail. I had never appreciated before how much of a companion a dog could be. Meeting on the common ground of fondness for Bob, and, owing to the fact that I had little or nothing to occupy my time, Dalyer and I became so well acquainted that I expected by the time we arrived at Lisbon to be calling him by his first name. We were to run down the Mediterranean to Naples, stop there for a while, then double back to New York over the route we had come.

Scarcely had Sao Miguel been lost to sight, when Aeolus became capricious and stirred up about the roughest sea I had seen in many a day. For three days we tossed madly and uneventfully in the trough of the heavy sea. On the morning of the fifth of April, however, the sun shone beautifully, the waves had gone down and the surface of the sea was all aglitter with little ripples. The owner's spirits rose as, soon after nine o'clock, we sighted a sail about three points off the port bow—the only thing in sight on the broad expanse of blue, shining ocean.

Within the hour we had approached the stranger near enough to see that she was a brigantine, under short sail, and in a little while we were within hailing distance. Through the glass I made her out to be a smart looking and beautifully modeled craft and after a few minutes I read the name in gilt letters on her quarter as Ionia. Except her jib and a staysail, she had not a stitch of canvas set. Dalyer lowered his glass and I saw in his eyes what I knew he must have read in mine. Somehow she impressed us with a sense of deathlike stillness and mystery. I could see that her wheel was loose and that there was no one on her deck. The slight breeze that still prevailed was from the north and the brigantine was on the starboard tack while our yacht lay to leeward.

After another short survey Dalyer lowered his glass and told Captain Thomas to hail. The captain, as we neared her, called

repeatedly in stentorian tones, but no answer came and no kind of life appeared on board the strange vessel. When we were within three hundred yards of her we slowed up, a boat was lowered away and Dalyer and I, the first mate of the Athor and two seamen rowed alongside. Slowly drifting to leeward, she was barely moving and Stevens, the mate, clambered aboard by the bowsprit stays. He threw out the line, and making the boat fast we quickly followed him. He and the two men went forward and I followed Dalyer across the deck to the companionway, which we found open, and entered the cabin. It was empty.

The men forward found no one; so all five joined in and searched the vessel fore and aft and high and low. There was not a living being besides ourselves on board.

She had evidently been deserted. But why? As far as we could see, she was perfectly sound and we failed to discover the least apparent cause for her abandonment. Her hold was exceptionally dry, with not enough bilge in it to fill a hogshead. Her cargo consisted of casks marked as containing alcohol, all of which were still in good order and condition, except one, which had been started. The exterior of the hull above the waterline did not exhibit the slightest trace of damage, nor was there the least evidence, on the interior, that the vessel had been repaired in any way or was at that time in need of any repairs.

We also discovered that the vessel was amply provisioned and that she had plenty of good water in her casks. A number of articles found among the seamen's effects bore witness to the fact that the men were comparatively well to do, which was sufficiently unusual in men of their class to arouse speculation.

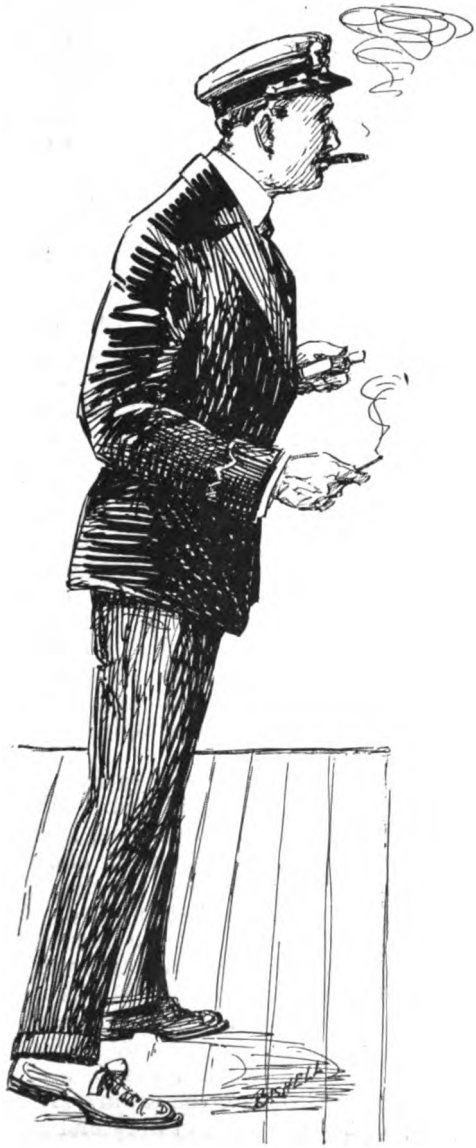
Her cabin was nothing short of luxurious. I must say that I had no idea there was a merchantman afloat so comfortably and attractively equipped in this respect. The apartment was large, high and well lighted, with four staterooms opening from it, two forward and two aft. Along the bunks on either side were broad thick cushions, covered with crimson velour. The center table was stationary and in the space between the staterooms forward was a reed organ, open, and in the corresponding space aft stood a sewing machine, also uncovered. Several music books and loose sheets of music lay on a stand beside the organ, and on the sewing machine we found a pattern in muslin, evidently a child's garment in process of making, also a small phial of machine oil, spool of cotton and a thimble; all three were in a perpendicular position, attesting that the vessel could not have encountered any stress of weather, else these lightly balanced articles would have been upset.

Under the berth in the forward port stateroom we found an open box, containing panes of glass packed in hay and unbroken. Hanging on the partition, opposite the berth in the corresponding room forward we found a cutlass of somewhat ancient pattern, which, on extracting it from its scabbard, I discovered to be stained with what seemed to me to be blood. I called Dalyer's attention to this and, after a careful examination, he agreed with me and concluded that we had perhaps found a clue to the mystery. Later we discovered marks on the main rail, apparently of blood, but by that time we had been forced to give up the idea that there had been any violence on board the vessel; everything was in well-nigh perfect order. We returned to the cabin and inspected the remaining articles of furniture. There were two large easy chairs upholstered in leather and several smaller lighter chairs. The carpet was a heavy Brussels and the woodwork was painted a pale soft gray, with bluish trimmings. All the brass mountings of the lights were bright and shining; in fact the whole apartment was pervaded by an air of quiet order which only heightened the mystery. It was clear that it had been occupied in part by a woman and child, and these we naturally supposed to be the wife and child of the captain.

Dalyer proved that he could be practical when occasion required and at once set about making arrangements to work our prize to Gibraltar. He left the mate aboard the vessel, and with the two men and myself returned to the yacht. It was then nearly noon and after he had issued some orders to the captain he invited me to join him in a snack of lunch, which had been ordered from the cook. This cook, by the way, was an Indian of truly remarkable appearance; tall, with black hair and clear complexion, he reminded one of nothing short of an Indian prince in disguise. He took an inor-

dinate amount of pride in his culinary achievements and never failed to flush to the roots of his hair with pleasure whenever the rich young owner complimented him upon some special delicacy. These compliments were given frequently, for the man was certainly remarkably adept in his chosen vocation and was ever and anon preparing new surprises.

This afternoon he insisted upon personally serving Dalyer and myself with what he termed, "Le triump' av meeny year devoshun to cook art. A morsel, O masters, as cud not be have less if in India palace."



Dalyer smiled at this elaborate introduction and replied, "I am quite sure it will be especially nice. Mr. Harper and

I distinctly saw a man step from the rail at the port quarter; he was dripping wet and hatless

myself feel greatly honored. We both thank you for your consideration, Archie." This little by-play concluded, the Indian withdrew smilingly, and we began an assault on what could be best described as a confection so skillfully blended that not a single one of the various ingredients could be recognized by sight or taste. The dish was so distinctive and appetizing that I suggested to Dalyer he inquire its name and the recipe. He said that this would be useless; no one had ever been known to extract any of his culinary secrets from Archie. He then volunteered the information that the cook's name was not Archie; that he fixed that designation upon him because his real name was positively unpronounceable, being spelled something like K-h-d-r-a-c-d-o-x-t-h.

I recall this incident because of Dalyer's concluding remark: that he kept both Archie and the dog Bob on board because

both were highly ornamental, useful and, in their respective ways, thoroughbreds.

Luncheon over, Dalyer told Captain Thomas to collect five men from the crew, one to be in authority as sailing master, and send them aboard the brigantine prepared to take up their quarters. After sending off a wireless report of our prize to C N W, I accompanied the owner, at his request, and returned to the cabin of the brigantine. He engaged himself in looking over the log-book and some papers he had found in the captain's room and I went forward to poke about in the seamen's quarters which were to be occupied by the Athor's men.

About fifteen minutes later, as I was standing by the foremast facing aft, I struck a match to light my cigar. As I raised my eyes I distinctly saw a man step from the rail at the port quarter, move quickly across the deck and disappear in the companionway. I caught but the briefest glimpse of his face and figure; but they were not to be forgotten. He seemed to have clambered aboard from the sea, for he was dripping wet and hatless, and his light hair was matted or glued about his head and face by the water, while his clothes clung to his body and limbs and glistened and dripped in the sunlight. His figure was gigantic. His face and trunk were bloated or distended like those of a man who has been drowned; there was not a vestige of color in his face, which was ghastly horrible and expressionless, even to the eyes. I was considerably startled and received a distinct shock by the suddenness of his appearance and his extraordinary condition, yet I managed to shout "Hey, there!" as I caught sight of him.

He neither answered nor hesitated. He did not even look toward me. Before my voice had died away he had disappeared, as I have said, down the companionway.

I hurried aft and entered the cabin. There alone, with his feet on a chair before him and the log-book on his knee, sat Dalyer quite unconcerned and half facing the companionway. All the stateroom doors were wide open and, as I looked around and saw no one else, I exclaimed in amazement, "Where is he?"

"Where is who?" drawled Dalyer.

"That man," I shouted, excitedly. "That man who just came in here! Here, right here! I saw the man come in here this moment. He's here somewhere," I added as I dashed from room to room, in vain. I tried to open a door in the forward starboard stateroom, leading, as I supposed, into the between decks space. The door was fast and bolted on my side of it. No one had gone through there. I tugged and wrenched at this door and finally it came open. It led into the between decks space and the ship's storeroom, which we had entered and examined during our original search of the vessel. The casks of alcohol composing the cargo were undisturbed. There was nothing else to be found and no possible corner where anyone could have been concealed.

I turned back to the cabin, where my rich young employer stood gazing at me curiously. He stood close to me and, after a careful scrutiny, he said rather sharply:

"What's the matter with you, old man? What is all this about? How could anyone come in here without me seeing him?"

I described the man I had seen, adding that I could swear I had seen him enter the cabin three seconds before me.

Somewhat impressed by my positiveness, Dalyer preceded me to the deck, where hailing the yacht, he called out: "Take the dinghy and have a man bring the dog over here." And then to me: "If there is anyone on board here, Bob will find him."

As we turned back to the cabin, I noted the part of the deck over which I had seen the stranger pass, dripping with water, five minutes before, was perfectly dry; and so were the brass plates on the companion ladder, down which I had seen him disappear. This discovery bothered me not a little, but I still remained firm in my conviction that I had actually seen the man and had not, as Dalyer evidently believed, simply suffered an optical delusion.

I paced the deck until the yacht's boat arrived with the men and Bob. When they had boarded the brigantine, Dalyer came on deck again and we made another thorough search of her, with the dog running on ahead and with the aid of two bull's-eye lanterns that the men had brought over. This second search was as barren of results as the first. It was after five o'clock when we finished and we were on the point of returning to the yacht to prepare for dinner when it was decided it would be best to lock the cabin. After having secured the doors of the staterooms

and closed the port we turned to leave, Dalyer preceding me toward the deck. Halfway up the companionway I remembered that I had left my cigarette case on the table and I returned to get it.

Hardly had I again stepped into the apartment when I saw, clearly defined, at the upper end of the bunk, on the starboard side of the partition close by the stateroom door, the shadow, in profile, of the face and figure of a man. The shadow appeared to be cast by some very tall person sitting on the bunk to my right; but there was no one there. I began to doubt the evidence of my senses and stood, for a moment, looking about me in bewilderment. Then I approached the corner convinced that the dark gray shadow was a stain upon the paint. Then I saw it was not. To verify this conviction, I took a loose sheet of music from the chair near the reed organ and, holding it between the shadow and the light, I looked behind it and there a portion of the shadow—part of the head—had been obliterated. Turning to the surface of the paper in my hand, I saw the missing portion of the shadow clearly silhouetted thereon.

Certain then, that it was a shadow, and one cast by some invisible and impalpable thing or substance, I became somewhat excited. I shouted to Dalyer, who immediately ran back into the cabin, followed by the dog. I gave him the details and told him of my test; which he repeated with exactly the same result! Then we turned to speak to Bob and found, to our surprise, that he had left us; and, although we put forth our best efforts, in turn persuading and commanding him to enter the cabin, we could not move him.

Dalyer and I looked at each other for a long period in silence. Mingled with my feeling of triumph at having thus convinced him that there were others besides ourselves aboard the mysterious derelict was an uncomfortable consciousness that the wierd annoyance was beginning to strain on my nerves and excite my imagination disagreeably. I wondered what was to come next.

"Well," said Dalyer, as he lighted a cigarette, "this is a queer proceeding and it is really a very interesting one, in spite of the fact that I have not the least doubt that we are the victims of some vulgar jugglery, practiced upon us for some unexplained reason by some one about."

I nodded an affirmative, for I was morally certain that this was the case. Of course I had not time to reason with myself as to the logic of the conclusion; it was the only natural one, and certainly no other explanation for what I had seen occurred to me. Consideration of possible supernatural causes as a solution was out of the question with both of us. Vincent Dalyer was as free from all superstitious fancies as he was incapable of fear, and I trust I will be allowed to claim to have been his counterpart, in at least the former respect.

As we looked, the strange shadow slowly faded out. Then followed a vain search for half an hour and fruitless experiments with the lights and shadows of the cabin, after which we locked the companionway and returned to the yacht to dine.

It was easily seen that Dalyer was annoyed; not so much over the fact that it appeared some one was playing a joke on us, but as to the identity of the one behind it all. During the course of the dinner he was for the most part silent and it was evident he was figuring out something in his mind. With the arrival of the salad he announced that he had formulated a plan to turn the tables. He asked me if I could get a wireless message over to C R F, at Lisbon; and when I told him that was a cinch he left the table, returning in a minute with a code book. He inquired if I had ever seen one like it before. Naturally I had not, as there were only half a dozen copies of this private code in existence. In a few minutes he had prepared a message, which, to my amazement, was addressed to the chief of the police detective bureau at Lisbon. "A very clever fellow and a personal friend of mine," he volunteered. "He is really in the government service, but I am quite sure he will be more than pleased to unravel this little problem for me. We will have some fun. Should he be able to come right away, how long do you suppose it would take him to get here?"

I replied that in a good fast boat four to five hours would be sufficient.

I dispatched the message straightway and within ten minutes had a reply that the detective would start immediately. Dalyer cautioned me to silence and

warned me that I must be sure to treat this man as a guest when he arrived.

By eight o'clock our arrangements were complete and we went back to the brigantine to pass the night in her cabin. Bob remained on deck and we tried again, but in vain, to induce him to enter the apartment with us. His refusal annoyed us both, but cataloging it as incomprehensible, we prepared ourselves for the night. Dalyer established himself in the forward starboard corner on the bunk looking aft; the shadowed corner. I made myself comfortable in the port corner aft, diagonally opposite and facing him. Thus, between us, we commanded a full view of the cabin and the four staterooms, the doors of which we had reopened. The dog roamed restlessly about the deck until a little before midnight, when I heard him lie down across the entrance of the companionway.

I was dozing lightly, when a slight sound caused me to start up. I looked at my watch. It was a quarter to one. Just at that instant the three cabin lamps suddenly became dim. This was surprising, as we had carefully trimmed and filled them all before lighting them. I got up to examine that nearest me, turning my back to Dalyer. As I did so, I heard the unmistakable double click of the hammer of a pistol. Turning again, I saw my companion, with his cocked revolver in hand, step to the floor. His face was pale and rigid and his eyes fierce and fixed. He moved the table and raised the weapon. With an indescribable and fearsome sensation, I looked in the direction of his aim and, there, not five feet from where I stood on the inside edge of one of the ports, I saw a large coarse bloated hand clinging, and behind it outside, the ghastly brutal face of the man I had seen cross the deck in the afternoon. The dull lead-colored eyes seemed peering into the cabin. No words can convey an idea of the loathsomeness of this man's appearance, except that I was almost overcome by mingled horror and disgust. Then the clear cold tones of Dalyer's voice broke in:

"Now, my man, I have you in range. I'm a passable shot and if you move I shall fire. Who are you and why are we honored with this visit?"

There was no reply. After a pause, Dalyer spoke again:

"I intend to have an answer. If you don't speak up before I say 'three,' I shall fire anyway! I mean this; and intend to prove that we are not to be trifled with."

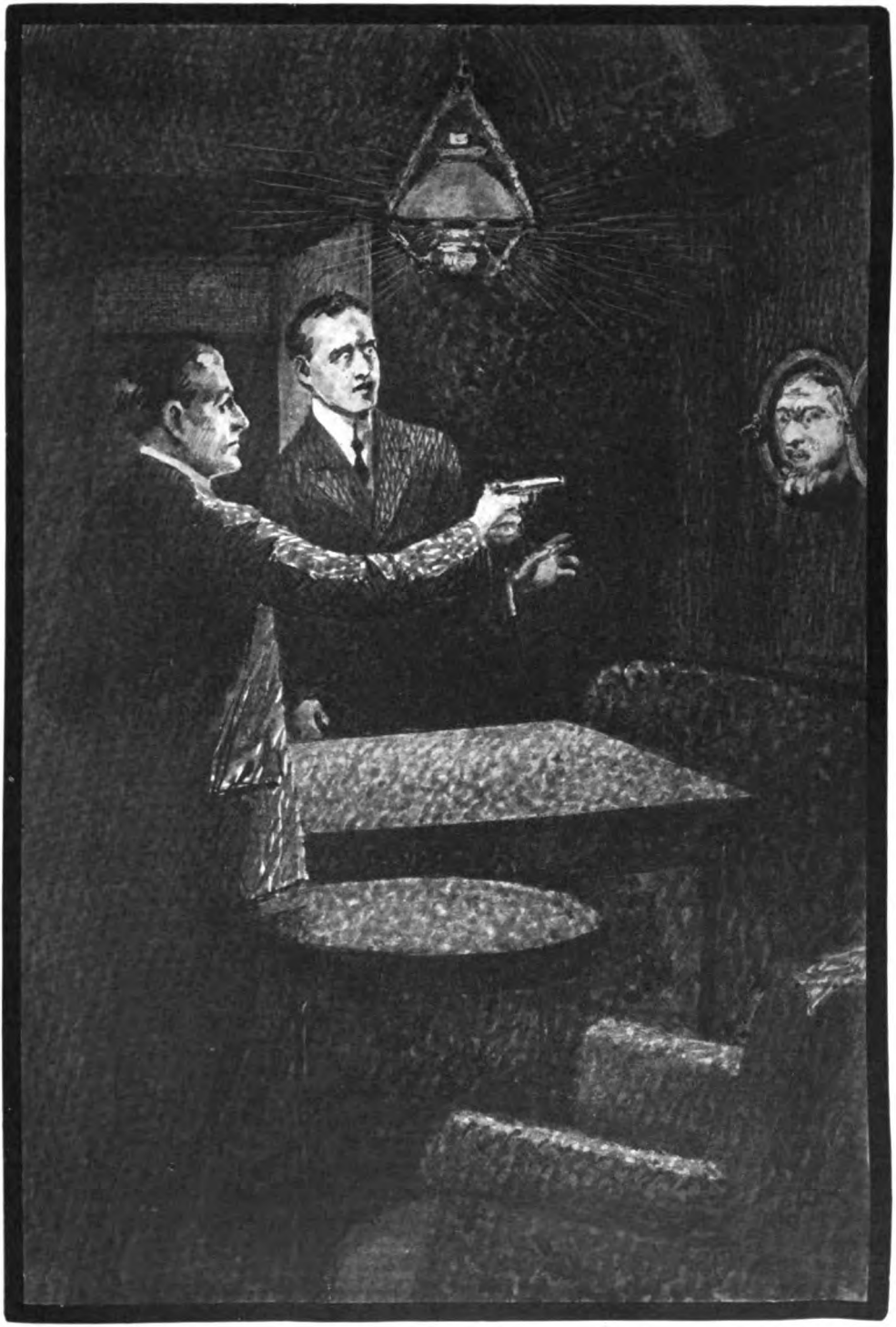
Still there was no reply and, after a pause of about ten seconds, Dalyer counted very slowly, "One—two—three," and then followed the flash and report of the pistol.

The man at the porthole did not move. Dalyer, with wonderful nerve, raised the weapon again; but, even as he did so, the face and hand disappeared; not instantly, but as if drawn slowly back, they seemed to be swallowed up in the darkness without. As they faded away, the lights in the cabin waned again; and crying to me, as the dog bounded into the cabin, "Stay where you are and keep Bob with you," Dalyer dashed up the companionway to the deck.

As I seized Bob's collar the doors of all four staterooms slowly but steadily swung and silently closed, although there was not the slightest lurch of the vessel; the same happened with the skylight supports and the sliding hasps in the doors of the companionway, shutting me in alone with the dog.

My recollection of what followed is perfectly clear. Without any attempt at description, I will relate what occurred as I actually saw and felt it. Appreciation of my horror of my position I must leave to the imagination of the reader.

Finding myself thus closed in, my first undefined idea, naturally, was to reach the deck and call Dalyer. I was startled, but I do not think I was afraid, at first. Some new trick was about to be played upon us and I wanted him to see what it was with me. It did not occur to me that the companion hatch could have been made fast, so I turned to the steps, the dog accompanying me closely—too closely, in fact. As I raised my foot I felt that I was unable to place it on the first step. It was as though the exit from the cabin had been walled up. A second attempt was equally in vain. I endeavored to precipitate myself into the companionway. I might as well have tried to walk through a wall of solid rock and, still, in extending my hands and looking before me, I felt nothing but a soft though forbidding pressure, and saw nothing but the open stairway. I cannot say whether my sensation was one of terror or bewilderment—perhaps it was a mingling of the two. I called aloud with the full strength of my



After a pause, Dalyer spoke again: "I intend to have an answer. If you don't speak up before I say 'three,' I shall fire anyway!"

ungs. The sound of my voice was strangely muffled, even while I was perfectly conscious that I had full possession of my senses.

During all this time the dog had been pressing close against me, trembling like a leaf and shuddering. I laid my hand on his head. It was hot to the touch. I looked down at him. His ears laid back, his eyes protruding and his tongue hanging out, he was the picture of terror . . . such a picture as I hope never to see again. A great, fearless, noble mastiff, utterly abject and cowering like any little cur.

And now the cabin lamps were suddenly extinguished and only a small lamp was left burning on the table. The atmosphere became oppressively hot and a musty, moldy odor pervaded the apartment. In the deepened darkness, I turned to look behind me with an added foreboding. Beneath the door of the stateroom forward I saw a brilliant line of light and, in the same place as before, the wierd shadow of the afternoon, now bent over as though he who cast it there were listening at the door. With my hand still on the mastiff's head, and impelled by some power not my own, I moved toward the shade. My third step placed me directly in front of one of the large leather lounging chairs, so situated as to squarely face the dreadful corner. In this chair I sank, not only involuntarily, but seemingly by compulsion. The dog stood against it, beside me. I laid my hand upon him and felt that he was rigid and strained in every muscle. As I gazed at the shadow it slowly became upright and huge and cast itself clearly upon the door, which immediately swung open without sound. A sensation of almost intolerable pressure came upon me. I felt as though bound with iron or incased in lead. The chair seemed to hold me in a viselike embrace. All power of motion left me. I tried to speak. I was dumb. The silence was awful; my sense of loneliness appalling. My mind, however, was most active and acute. After a moment, every faculty seemed to be concentrated upon what was going on before me.

Under a hanging lamp which shed a brilliant light over the stateroom, I saw within, a short thick-set man, seated on a camp stool beside the berth. His face was in his hands and his head leaned against the partition before him; he seemed asleep, but I could not see that he breathed. Behind him and half turned toward me, I saw one standing who seemed to be the original of the shadow, and who as I looked raised his right arm in the air and dealt the sleeping man a terrible blow at the back of the head with a heavy marlin-spike, crushing his skull like tissue paper. The victim had evidently been killed instantly. Yet no blood followed the stroke and, although the room was brilliantly illuminated, I saw no shadow. The murderer seized the corpse before it fell to the floor, and opening the forward door leading into the between decks space passed out, dragging the body with him, and disappeared in the darkness. In an instant he had returned and as he came toward me into the cabin I again recognized the horrible face of the giant I had seen cross the deck above in the afternoon—the face of the man at whose hand, Dalyer, with unerring aim, had fired in the open porthole a little while before! I sat transfixed, but followed him with my eyes. He entered the apartment and I saw him extend his hand and take from the bunk, where he might have been sitting a few minutes earlier, what appeared to me a carpenter's chisel or a screw driver. With this he again vanished into the darkness between decks.

Simultaneously the forward door of the stateroom closed behind him, the light within went out and the lamps in the cabin were restored to brilliancy, while the doors in the porthole, skylight and companion hatch were, I felt, reopened. My hand being still upon the dog I perceived a tremor or shudder pass through his entire frame, and, with a deep sigh, he instantly dashed from the cabin to the deck. I heard Dalyer's voice call loudly, "Bob! Bob!" and then a splash in the silent sea.

Freed from the terrible pressure, I then arose blindly to make my own way to the deck from the pressing atmosphere of the cabin; the walls and furniture seemed to whirl and spin around and around me—and I remembered no more. . . .

When I recovered consciousness I was again seated in the heavy chair. The cabin was cool and there was an odor of brandy about. Dalyer was standing over me, with his hand on my forehead. I heard the tramp of feet on the deck above. I looked at my watch, which I had laid open on the table a couple of hours earlier, and

it told me that I had been in the cabin alone with the dog ten minutes at the most.

From my companion I learned that after leaving me he had called the forward watch and one of the men from the deck house and searched fruitlessly for trace of the man of the porthole. As he had approached the companionway the dog had dashed from it, foaming at the mouth and, in his madness, leaped into the sea. Every effort was made to save him, but we never saw the poor animal again.

During the next hour I related to Dalyer what I had seen in the cabin and we agreed that whatever the power that was exhibiting itself aboard the brigantine—whether human or superhuman, natural or supernatural, it was one that we certainly could not account for, try as we might.

We discussed the pros and cons of the situation, Dalyer finally remarking, "It must have been something in the nature of an intuition that made me send for my friend at the Lisbon police headquarters. In view of what has happened, no doubt he will find his visit very interesting."

Hardly had the words left his mouth when I discerned the light of an approaching vessel, scarcely a quarter-mile away. She was making toward us under full head, throwing spray high into the air. It proved to be the expected detective and in a few minutes later he was seated comfortably at my right, asking for full particulars of everything that had transpired. I gave them to him approximately as I have set them down here. When I had concluded and he had offered no comment, Dalyer asked him if he didn't want to immediately visit the brigantine. He replied that he would rather postpone his visit until daylight; he preferred just then to turn in for a few hours' needed rest.

Breakfast was served early the next morning and Archie, who had been informed of the arrival of a guest during the night, must have made a special effort to please, for the victuals were exceptionally fine. Mr. Hawkes, which was the name the detective had announced as his official designation for the present, remarked in the most casual manner imaginable toward the end of the meal, that he would like to see the cook who had prepared that meal. Dalyer sent for Archie, who entered the cabin solemnly and stood motionless in the doorway.

"My good friend, Mr. Hawkes," the owner said, "has been so pleased with our breakfast, Archie, that he wished to especially compliment you."

"Which I now do; and heartily," interposed the detective; "it's many a long day since my palate has known the taste of distinctive and delightful flavorings such as these; yes, half a dozen years have elapsed—fully that; for it must have been when I was in Rajputana, in the Arvalli Range——"

"Das where me come from," offered Archie, with a pleased gleam in his eye.

"Yes, I thought so," returned the detective significantly, yet with scarcely any perceptible change in his voice or manner.

Archie was dismissed a few moments later, following the exchange of a few banal compliments. When he had gone Hawkes arose from the table saying, "If I am not mistaken, right there is the key to the mystery. I will have a longer and private talk with him later." And totally disregarding the curiosity which was plainly written on our faces he announced that he was now prepared to make his inspection of the brigantine. Examination was first made of the room in which had occurred my hair-raising experience of the night before. Then the between decks space forward was inspected, but nothing was revealed so far as Dalyer and myself were concerned. At the edge of the porthole, however, at the spot where the hand had been, we found a bullet from a revolver buried in the wood.

By this time the seamen had got an inkling of the character of the ship, but as none of them had actually seen anything or, strange to say, had not heard the shot, Dalyer's good sense and firmness of manner triumphed over their superstition.

The stains on the old cutlass and on the vessel's rail were next examined by the detective. He studied them carefully through a glass for many minutes, looking at them from various angles; then he suddenly whipped out a little phial, sprinkled a few drops, and an instant later announced, "They are *not* blood stains."

Then I accompanied the detective below, for the purpose of pointing out the movement of what he termed the "phantom" murderer, although I repeatedly insisted that he seemed no less real flesh and blood than myself. Hawkes subjected me to an ingenious cross-examination concerning the chisel or screw driver for

which the assassin had returned after the murder. On my remaining firm in my conviction as to what the tool appeared to be, he announced that he would confine further examination to the fatal stateroom and the between decks space forward, his object being to discover some evidence of the use for such tool, to the appearance of which he attached the greatest importance. I will not attempt to describe how infinitely carefully and patiently this search was pursued, but some idea of it may be had when I say that at least ten minutes was spent over each lineal inch. Hours had passed when, at a point but a few feet distant from the stateroom, he found a narrow strip of oak about an inch in thickness and five feet in length, projecting by its thickness beyond the smooth surface of the vessel's inner shell, less than the proverbial hair's breadth. The same careful scrutiny revealed that it had been fixed in its place by means of five screws, apparently of brass, as the heads were incrusted with bright green rust or mold. Hawkes immediately dispatched me for a screw driver and when I returned he removed the strip. We discovered that the strip had been affixed over the perpendicular succession of the joints of the narrow points of the vessel's interior hull, which sprung out as they were released far enough for the detective to insert his fingers behind them. We tugged and wrenched together until they came off. Then, to my horror, we found wedged in the inner space a grinning skeleton of a man, upon which hung shreds of clothing. As this skeleton was lifted out, something dropped to the deck with a metallic sound and rolled to my feet. I stooped and picked it up. It was a plain band of gold—a ring. On the inside was engraved "From B. A. to H. T." The clothing of the unfortunate man appeared to have been partially eaten by rats. At the time it flashed on me that it was a fortunate thing this had not been entirely destroyed, as the ring, which had been retained in one of the folds, would long before have slipped from the bony finger to the bottom of the hold and, perhaps, have rendered positive identification impossible. The skeleton was clean, dry and white, and on further examination we found that the back of the skull had been fractured; apparently by a blow from a club!

Hawkes closed and bolted the door leading into the between decks section and ordering that a guard be placed in the stateroom leading to it and permit no one to pass until he returned. Then he disappeared.

I learned later that he had gone over to the yacht and had a long talk with Archie, the Indian cook.

Some time later I returned to the cabin of the brigantine; there I found Hawkes absorbed in the log book and covering some sheets of paper at his side with unintelligible memoranda. I stood there quietly for quite a time, and so absorbed was he in his task that I figured he did not know of my presence; but suddenly and without as much as a flicker of an eyebrow he said: "Mr. Harper, please send out this message broadcast—a C Q, you know," and as I turned to leave: "Stay by your instruments, please, and when you get a reply such as I am looking for send the yacht's dinghy over for me immediately, please. I think I have our nice little mystery cleared up."

He dismissed me with a nod.

Arrived aboard the yacht, I told Dalyer of my instructions and so interested was he that he came and sat beside me in the wireless cabin. The message given to me by the detective was but a brief and universal inquiry as to whether any ships within range had picked up survivors of the crew of the Ionia. I sent this out broadcast, and one by one the replies came that no such crew had been found; then finally the word for which I was waiting came from a tramp steamer. From the deck of the yacht I megaphoned of my success and, a few minutes later, the great police detective was at my side.

"Where are they?" he inquired. And when I informed him that the vessel was then nearing Gibraltar, he grunted: "Never mind them then, just now; get this message off, please." He sat down and scribbled off a twenty-word marconigram. "It is to the Special Police Agent at Lisbon," he volunteered, as he handed the message to me. "If the cables are in working order to-day we should have a reply in less than half an hour. Then I may have something interesting to tell you."

In less than the time prescribed I heard C R F calling me. I took down a message in cipher. There were only three words

I could distinguish; "Portland" and "Henry Tait," although there were several hundred words in all. Hawkes excused himself for a few minutes when I gave him the message, presumably to decipher it. Then he called us into the cabin and, with a slow smile, announced: "Gentlemen, allow me to relate the strange story of the mystery aboard the Ionia."

"First of all, although I have unearthed a murder, the rest of the crew was not made way with by wholesale butchery. The corpse, I have every reason to believe, is that of the brigantine's captain, Henry Tait—corresponding to the H. T. initials in the ring. This, my agent informs me, was the name of the captain of the Ionia. The man was murdered by a powerful Swede or Norwegian—my advisers tell me there were several such in the crew—and the murderer was undoubtedly insane. Somehow he must have later taken posession of the ship; which I think will account for the desertion of the crew. Unfortunately, I expect to find that this was not accomplished before other fatalities had taken place. . . . And, gentlemen, I think that will be about all for the present. I presume, Mr. Dalyer, you will hold to your purpose of taking the brigantine to Gibraltar, there to turn her over to the Vice Admiralty Court; and if you feel that you can leave things in charge of your captain and accompany me on my boat, I shall be more than pleased to arrange for you and Mr. Harper to be present when I interview the surviving members of the Ionia's crew, who will arrive in port about the same time we will."

This proposition appealed to my employer and he very graciously included me, as suggested by the detective.

Nothing further could be learned from Hawkes, although we both tried every artifice at our command to make him talk. Once aboard his own rakish craft, he turned in for what he termed: "A well earned snooze, after a fairly strenuous day."

The next day proved even more interesting than we expected, for, from the mouth of Mr. Riggs, recent mate of the Ionia, we heard this verification and amplification of the detective's theory:

"The brigantine was built for Horn & Weeks, about two years ago, at Portland, Me. Including her present voyage, she had made four in all. The first ones were long and on neither of them did anything out of the ordinary run occur. Captain Henry Tait had been in the Company's employ for many years and had commanded the same vessel on her three preceding voyages.

"Among her crew was a Swede or Norwegian by the name of Stefan, a gigantic, ill-favored fellow, who had been injured in our service some time before by a fall from the rigging, in which he sustained a severe concussion of the brain. For several months he lay in the hospital in what was believed to be a hopeless condition of imbecility; but finally, having recovered or apparently recovered, he applied for and secured a berth on the Ionia.

"About the eighth day out from New York, Stefan developed symptoms of a relapse of his disease, which seemed, however to affect his mind only with a sort of intermittent stupor. He exhibited no signs of mania or violence and was capable of performing his light duties about half of the time. Consequently he was not confined and the master did what he could for him, treating him with the utmost kindness and advising him to lay off from his work. This he did for several days, but apparently without beneficial effect.

"On the night of April 5, Captain Tait turned in at eight bells (12 o'clock). The weather was clear, the wind over the port quarter and the moon lighted up the deck. The vessel was then about latitude 38 degrees north; longitude 17 degrees west; near the point at which you gentlemen picked her up. Just before two bells (one o'clock) the man at the wheel saw Stefan, whom he recognized by his great size, cross the deck amidship to the starboard rail, and throw something into the sea. On being hailed by this man, Stefan went aft and said that he had thrown a pair of old shoes overboard. He was in his stocking feet.

"In the morning, the master failed to appear and, after waiting a reasonable time, the steward knocked at his door. Receiving no response, he called me and I entered the stateroom and found it empty; the berth had not been occupied. When, after a search, it became evident that the captain could not be found, Miller, the man who had taken the wheel at midnight, told the mate of Stefan's appearance and his conversation with him.

The Swede was sent for and found in his bunk, apparently sleeping. He was aroused and brought on deck in a very excited condition and, when I questioned him, he became incoherent and violent. I ordered two of the men to seize him and, as they approached to do so, he eluded them and scrambled up the ratlines. It seemed clear that in a fit of insanity, he had murdered the captain and thrown his body into the sea, during the night. How this was accomplished, no one knew, for no noise was heard nor were there any traces of violence found about the vessel. Just at this time a sharp blow came up and we had all we could do to manage the vessel. The Swede was forgotten in the excitement and it was only after the wind had subsided, perhaps an hour later, when we were forcibly reminded of his presence. It seems that while we were engrossed in handling the vessel, the maniac had searched her from stem to stern and gathered up every single firearm on board. Our first intimation of our perilous situation came with the crack of a pistol aft. The man at the wheel dropped. Stefan, with a howl of joy, grasped the wheel and swung her over to the opposite tack. As a man, the whole crew rushed aft to take away the wheel from him. Three shots rang out in quick succession and three men dropped.

"Then we resorted to strategy. All through a horrible night we tried, time and time again, to steal upon him unawares. When morning came two more lives had been sacrificed and nothing accomplished. As the day advanced, the seaman's wild cries became wilder and he joyously shot two or three holes through the topsail. We were helpless. I had my wife and my little six-year-old girl aboard, and after several hours of deliberation, it was decided that the only safe course would be to take to the small boats, leaving the big Swede in full possession.

"This was done, as you know and—well, here we are."

"While your man Stefan, the cause of all the trouble, lies at the bottom of the sea," added Hawkes, quietly.

"How do you know that?" asked Riggs.

"Oh, it's very simple. There are certain marks . . . but there now, that is a professional secret."

* * *

We three, the detective, Dalyer and myself, dined together again that evening. Both my rich young employer and myself had not recovered from our astonishment that the mate's story should tally in every respect with the theoretical outline of the strange occurrences given by Mr. Hawkes aboard the yacht the preceding night. And, as you can well imagine, we were consumed with curiosity to learn how these able deductions had been made.

Dalyer finally said:

"Mr. Hawkes, it is no doubt quite evident to you that Mr. Harper and myself are only too willing to play Dr. Watson, if you will kindly assume the rôle of Sherlock Holmes and, true to character, reveal the interesting processes by which you solved the mystery of the Ionia."

The detective smiled. "That, my dear Dr. Watson-Dalyer, is only done in story books. It is really not ethical and, as I am in the Government Service, I fear you will have to bespeak permission from my superiors to read the official report, when I have delivered it."

"That, I presume, is next to impossible?" drawled Dalyer.

The detective did not answer. A slight elevation of one eyebrow and the almost imperceptible shrug vouchsafed might have meant any of a dozen things.

"But can't you give us some inkling?" Dalyer persisted. "For instance, how did you know that this madman had sailed the boat after the murder? I imagine, of course, that there was some indication of the identity of the murderer, but I'm blessed if I see how you learned of his possession of the vessel."

"I see you gentlemen are not to be set aside," said the detective, "but if you will give me immunity from further questioning, I will satisfy you on this one point." We nodded assent and he continued: "One of the first things I examined when I arrived aboard the yacht were her charts, which showed that you had boarded the derelict at latitude 38° 20′ north, longitude 17 15′ west. Then, aboard the brigantine, I found her log book in its proper place, but her chronometer, manifest and bills of lading were missing. The log showed the last day's work of the vessel had been on the twenty-fourth of March, sea time, when the weather allowed an observation to be taken that placed her in latitude 36° 56′

north; longitude 27° 20′ west. The entries on her slate log were, however, carried down to eight o'clock on the morning of the twenty-fifth, at which hour she had passed from west to east to the north of the island of St. Mary's, in the Azores, the eastern point of which then bore S-S. W., six miles distant. Now, the distance in longitude from the island of St. Mary's to the point at which you fell in with the Ionia is 7° 54′; the corrected distance of latitude from the position last indicated in the log is 1° 18′ north; and the brigantine had apparently held on her course for ten days after the twenty-fifth of March, the wheel being loose all the time. But during the period from the twenty-fifth of March to the fifth of April the wind had been more or less from the north continuously, and it appeared to me impossible that the derelict could have covered within that time a distance of 7° 54′ east; at any rate on the starboard tack. The obvious inference was, therefore, that she had not been abandoned until several days after the last entry made in the log."

This, to us, was astonishing in its simplicity. Still, it was readily seen that here was but one of a thousand details that must have entered into the solution of the problem, and it merely whetted our appetites for further revelations. Perhaps we would have learned more had it not been for a chance remark I dropped. This was to the effect that the solution quite remarkably dovetailed with what I had seen in my vision, dream, or whatever it could be termed.

"That, my dear Mr. Harper," said the detective, "gave me the key to the situation. The rest was simple."

Now, while my experience had been very real to me, I was amazed at hearing that the detective had taken my story so seriously at first. It was evident that he had, for the discovery of the skeleton hinged directly upon the cross-examination he had subjected me to in the cabin of the brigantine. I felt that, under the same conditions, I personally would not have taken the unsupported word of a stranger, should one have related to me what would ordinarily be termed a ghost story. I said so.

"I didn't take the account of your experience so seriously at the very beginning, Mr. Harper," explained the detective, "although I tried not to show any skepticism. My conviction that it would prove the key to the whole situation was born at the breakfast table. The presence of the Indian servant you call Archie made many things clear."

"What in the world has Archie to do with this?" I exclaimed.

"You have Archie to thank for your vision, or whatever you care to term it—*that* I learned at the breakfast table. You see the business of being a detective makes one observant of trivial things; for instance, the unique flavoring of the very delightful meals served aboard Mr. Dalyer's yacht. You had already related an experience which bordered on the supernatural, and therefore it was plain to me I must look for a reason for this mental disturbance or brain excitation. Once given the effect, we must search for the cause; and had you any knowledge of Indian drugs, the mere presence of Archie fairly shouted a clue."

I started from my seat. "Well, of all the—er—dirty——"

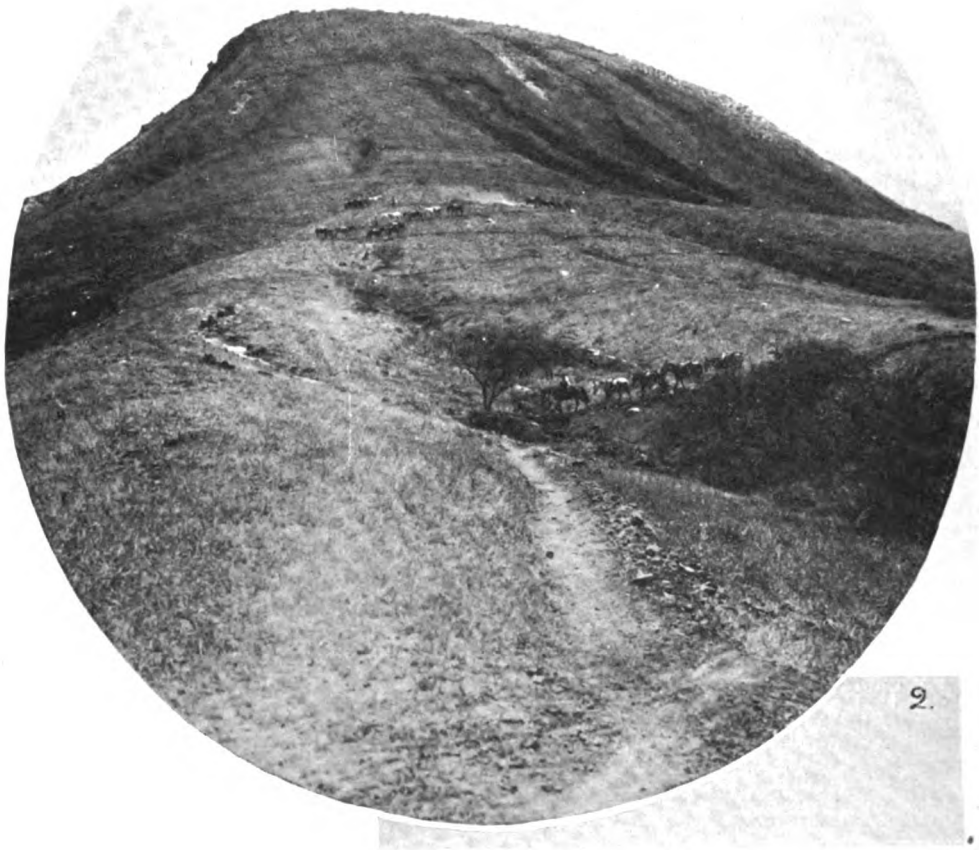
"Whoa! Nothing to get excited about, Mr. Harper," the detective broke in. "It was a perfectly harmless drug that Archie administered to both you and Mr. Dalyer and you really have something to thank him for. It isn't often, in these days, that two young men like yourselves undergo such an unusual experience. Rather savors of the times of the buccaneers, eh? But it was unfortunate, wasn't it, that Mr. Dalyer lost such a fine animal as I understood the dog Bob to be? . . . But then, no matter how great the pet, one should make it a rule not to feed animals at the table."

That was the last word that came from the lips of the detective on the subject.

I have set down all I know about the strange occurrences aboard the Ionia and detailed my part faithfully and without exaggeration. To this day I cannot account for many things, and have not here attempted to. My sole intention has been to report without flourishes an unusual experience, solely for your entertainment. My success or failure rests solely upon how seriously you consider what I have written here and your knowledge of the innocuous effects of the resinous matter exuding from the tender sprouts of *Cannais indica*, and other Indian plants.

The Marconi Trans-Oceanic

1.



2.

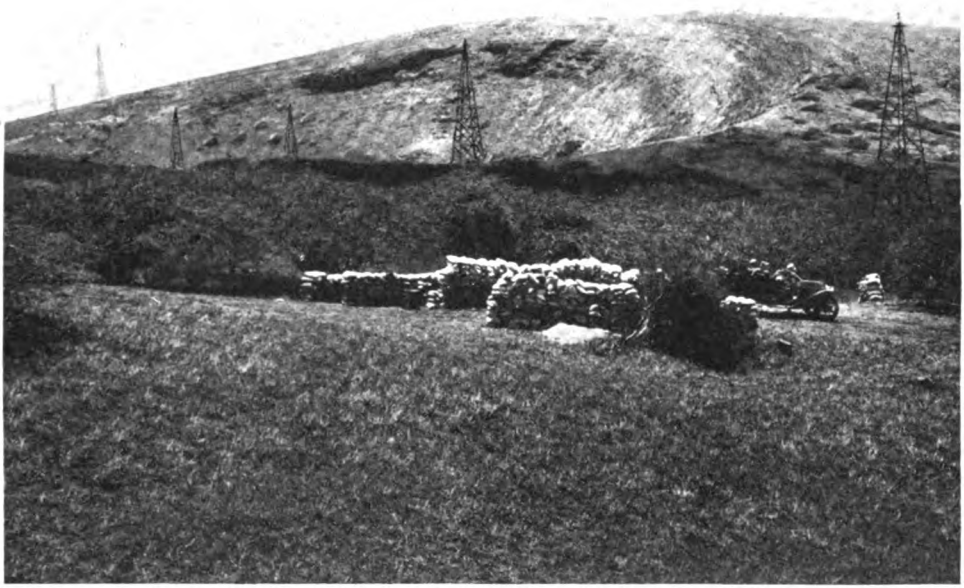
(1) *Looking up Koko Crater with a view of the trail and pack animals descending*

(2) *The line of masts, balancing line towers, water tower, lighting plant and hotel, seen from the foot of the trail*

(3) *Six of the balancing line towers and the rock and sand stores at the base of the crater*

Station at Koko Head, Hawaii

3.



2.

The Year Book for 1914

WHAT you don't know about wireless will be found in "The Year Book of Wireless Telegraphy and Telephony" for 1914, published by the Marconi Publishing Corporation. This volume is a veritable wonder book, for it contains knowledge which even the best informed wireless men will be glad to avail themselves of.

It is safe to say that you, for instance, do not know the locations of all the principal wireless telegraph stations of the world. In the Year Book you will find a complete list of installations. You may be interested in the International Convention on Safety of Life at Sea. If you are you will be gratified to find the proceedings of this important assemblage published in detail. And there are a thousand and one matters—some big and some small—but all of vital interest to the wireless man which he can find out about and study by means of this volume.

As wireless grows the Year Book develops correspondingly. This is attested by the fact that there are 745 pages in the Year Book for 1914—approximately 200 more than there were in the volume for 1913. The object of the Year Book is to place at the disposal of the reader all of the information available concerning wireless in such a way that he will be able to obtain it without difficulty or the expenditure of useless effort. This information covers a multitude of subjects, including the wireless stations of the world, the rates for all messages, the laws and regulations concerning wireless telegraphy and the progress of experimental work.

One of the first features that strikes the eye is the "Record of the Development of Wireless Telegraphy." This epitomizes the history of wireless telegraphy from the time in 1831 when Michael Faraday discovered electromagnetic induction between two entirely separate circuits to 1913 when Marconi portable sets were used in the second Balkan war.

This part of the record appears under the heading 1913:

"The Roumanian Army during the second Balkan war was equipped with seven Marconi portable sets which ensured regular radio telegraphic communications between the headquarters and various Roumanian commanders in the field."

The record covers eighteen pages.

Every person interested in wireless telegraphy will be eager to know all about the laws and regulations governing the art. The articles of the International Radio Telegraphic Convention held in London, July 5th, 1913, are published in full, covering thirty-four pages. They are accompanied by an appendix containing abbreviations.

The following quotation is from the text of the law governing the transmission of messages:

"Ships in distress shall make use of the following signal, . . . — — — . . . repeated at short intervals, followed by the necessary particulars.

"As soon as a station hears the signal of distress it must suspend all correspondence and must not resume the same until after it has made sure that the communication consequent upon the call for help is finished.

"The stations which hear a call of distress must act according to indications given by the ship which makes the call with regard to the order of messages or their cessation.

"When at the end of a series of distress calls there is added the call signal of the particular station, the reply to the call is proper to that station only, unless that station does not reply. Failing the indication of a particular station in the call for help every station that hears the call shall be bound to reply thereto."

Twenty-five pages are devoted to the proceedings of the International Convention on Safety of Life at Sea held in London on January 20, 1914. The results of the convention are published in detail. The Convention contains seventy-four articles, all of which cannot fail to interest the followers of wireless.

Take Article 8 on page 77:

"The master of every ship which meets with dangerous ice or a dangerous derelict is bound to communicate the information by all the means of communication at his disposal to the ships in the vicinity, and also to the competent authorities at the first point of the coast with which he can communicate.

"Every Administration which receives intelligence of dangerous ice or a dangerous derelict shall take all steps which it thinks necessary for bringing the information to the knowledge of those concerned and for communicating it to the other Administrations.

"The transmission of messages respecting ice and derelicts is free of cost to the ships concerned."

Article 37 prescribes:

"Every master of a ship who receives a call for assistance from a vessel in distress is bound to proceed to the assistance of the persons in distress.

"Every master of a vessel in distress has the right to requisition from among the ships which answer his call for assistance the ship or ships which he considers best able to render him assistance, but he must exercise this right only after consultation, so far as may be possible with the masters of those ships. Such ships are then bound to comply immediately with the requisition by proceeding with all speed to the assistance of the persons in distress.

"The masters of the ships which are required to render assistance are released from this obligation as soon as the master or masters requisitioned have made known that they will comply with the requisition, or as soon as the master of one of the ships which has reached the scene of the casualty has made known to them that their assistance is no longer necessary.

"If the master of a ship is unable, or considers it unreasonable or unnecessary, in the special circumstances of the case, to go to the assistance of the vessel in distress, he must immediately inform the master of the vessel in distress accordingly. Moreover, he must enter in his log book the reason justifying his action.

"The above provisions do not prejudice the International Convention for the unification of certain rules with respect to Assistance and Salvage at Sea, signed at Brussels on September 23rd, 1910, and, in particular, the obligation to render assistance laid down in Article II of that Convention."

The Convention is divided into chapters covering navigation, radio telegraphy, life-saving appliances and fire protection, ice and derelicts, and meteorological information. Codes and examples of messages are given.

Following the London Convention are found the wireless regulations and laws of all countries, from the Argentine Republic to Uruguay, arranged in alphabetical order. The text of these laws occupies 177 pages.

What is probably the most useful feature of the book is the list of wireless telegraph stations of the world to be used in connection with the map issued with the volume. The stations have been arranged under the names of the countries in which they are located and the latter have been placed in alphabetical order. This serves to obviate any difficulties in finding the location of stations. Private stations, or those which were constructed for experimental purposes are not generally included in the list.

Virginia Beach, for example, is given in the list of land stations in the United States. A reference note shows that the station transmits weather reports daily at 8 A. M. Its geographical position is given as Virginia, entrance of Chesapeake Bay, 75° 58′ 58″ W. and 36° 50′ 36″ N. Its call signal is WSY and its range 150 nautical miles. The station is controlled by the Marconi Company and has a wave-length ranging from 300 to 600 metres. It is used for general public correspondence and has continuous service.

The Arlington (Va.) station, as shown in the list, has a geographical position near Washington, D. C., 77° 04′ 47^{20}″ W., 38° 52′ 05^{20}″ N. Its call signal is NNA. It has a range of 1,000 nautical miles, is controlled by the United States Navy and has a wave-length of 2,500 meters. The nature of its service, which is continuous, is official correspondence.

A reference note declares that "The station sends time-signals for five minutes on wave-length of 2,500 meters commencing at 11.55 A. M. and 9.55 P. M. every day, Sundays and holidays included. Final signals at 12 noon and 10 P. M. (time of the meridian 75° west of Greenwich). Every tick of the standard clock

of the Naval Observatory, Washington, is transmitted as a dot, omitting the 29th second of each minute, the last five seconds of each of the four minutes, and finally the last ten seconds of the last minute. The 12 noon and 10 P. M. signal is a dash."

Sixty-five pages are devoted to this list. The compilers of the volume have worked to good purpose in giving the combination of letters belonging to the various countries. Great Britain, it is shown, has all combinations commencing with B, G and M. The United States has all combinations of letters commencing with N and W, as well as the combinations KIA to KZZ.

Another valuable feature of the book is the list of the ship stations of the various countries, giving their call signals, range in nautical miles, the steamship lines to which they belong, the wave-lengths, the nature of the service performed, the hours of service and the charge for sending messages. One hundred and forty-five pages are given up to this subject.

A list of call letters of the land and ship stations, alphabetically arranged, will undoubtedly meet with the favor of readers. It occupies thirty-four pages.

Other noteworthy features of the book include "Waves and Wave Motion," by J. A. Fleming, M. A., D. Sc., F. R. S.; "The Function of the Atmosphere in Transmission," by J. Erskine-Murray, D. Sc.; "The Measurements of the Strength of Wireless Signals," by E. W. Marchant, D. Sc., M. I., E. E.; David Jardine, Professor of Electrical Engineering in the University of Liverpool; "Problems of Wireless Telephony," by C. E. Prince; "Wireless Telegraphy in the Merchant Service," by G. E. Turnbull; "Wireless and Life-Saving," "The Application of Wireless Telegraphy to Meteorology," by R. G. K. Lempfert, M. A., Superintendent of the Forecast Division of the Meteorological Office; "Wireless Time Signals and Longitudes," by Arthur R. Hinks, M. A., F. R. S., assistant Secretary of the Royal Geographical Society; "International Time and Weather Signals;" "Radio-Telegraphic Investigations" and work of the British Association Committee, by W. Eccles, D. Sc., Secretary to the Committee.

Included in the book also are useful formulae and equations, a glossary of terms, a dictionary of technical terms, useful data, comprising tables showing the length of a degree in latitude and longitude and other valuable information; a list of wireless patents, a list of the companies engaged in the commercial development of wireless, biographical notices, literature of wireless telegraphy and telephony and a directory of wireless societies.

The features mentioned in this review do not include by any means all of those in the book. There are handsome illustrations—thirty-two in all—some of which are photographs of stations and apparatus and others of men identified with wireless. The volume is tastefully bound in buckram. The price is one dollar.

In conclusion it may be said that the wireless man who once looks between the covers of the Year Book will always have one at hand, for he will depend upon it for information concerning all phases of the art.

EXPANSION OF WIRELESS IN THE BRITISH EMPIRE

Apart from the Imperial Wireless Chain, there are many schemes of wireless communication now being carried out in various parts of the British Empire.

The most important relates to radio communication, between London and the Eastern Colonies, Australia, New Zealand and the Pacific. The Australian Government has decided to offer greater inducements to the public to utilize the stations by reducing the charge for messages for coastal vessels from 20c to 12c per word, and by inaugurating a scheme for furnishing persons at sea with a daily record of current news items.

In regard to the Pacific, it has been decided, in addition to the high power stations in Australia and New Zealand, that medium power stations shall be erected in Fiji, Ocean Island, Solomons and New Hebrides. The total cost of these is estimated at $210,000, of which the British Government bears more than half.

Substantial progress has been made in India and stations will be erected in British Borneo and British Guiana, in addition to those already sanctioned for Ceylon, the Straits Settlements, the Federated Malay States and Hong Kong.

INSTRUCTION TO BOY SCOUTS

By A. B. COLE

CHAPTER XII

A Transmitting Set for Station Use

THIS transmitting set is designed to operate on an electric lighting circuit of from 100 to 125 volts, 60 cycles. Alternating current circuits of 60 cycles frequency are the ones most generally available.

The set is mounted on a panel, in the same manner as the receiving set described in Chapter XI, and for the same reasons.

The Transformer

The transformer used to generate the high voltage currents for transmission is that described in the November, 1913, issue of THE WIRELESS AGE. It is rated at ¼ k. w., and in connection with the rest of the set and a good aerial will enable communication to be maintained over a sufficient distance to meet all requirements of any Scout troop. The radius of operation of a set depends on so many factors, of which the size and construction of the aerial is one of the most important, that any attempt to state a definite transmitting distance is always only an estimate, but a ¼ k. w. set, properly tuned, is generally found in practice to be capable of covering from 25 to 50 miles over level land or water under ordinary weather conditions.

The Spark Gap

The use of a rotary spark gap improves the efficiency and radius so much over that of a plain gap that no modern station is considered complete without one. A rotary gap consists of a disk with a number of spark electrodes, driven by an electric motor, and revolving between two stationary electrodes, so that where a single spark might pass with a plain gap, a large number occur on account of the high speed of rotation of the rotary gap disk and electrodes.

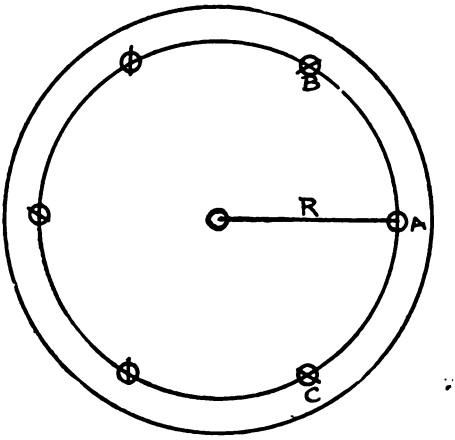


Fig. 73.—Spacing the electrodes

Two types of motor may be used in the construction of the gap. One to operate on the electric light circuit, and the other to be driven by battery power. The motor

need be only a small one, but should be able to carry the disk at a speed of from 3,500 to 5,000 revolutions per minute. When a small 110-volt motor is used to drive the gap, however, there is always

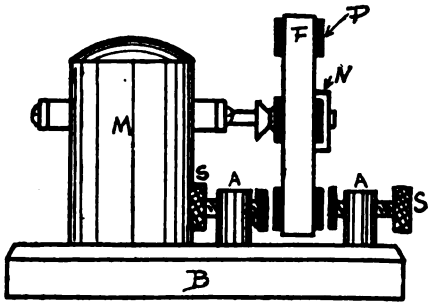


Fig. 74.—Rotary spark gap

danger of burning out the windings on account of the high voltage currents which are induced in the lighting circuit by the transmitting apparatus, and these are liable to cause much trouble in the motor, even if a line protector is employed to prevent it.

It is therefore suggested that a battery type motor, wound for 4 or 6 volts, be chosen, as this will eliminate all chance of trouble. Such a motor consumes little current, and since it is used only while the operator is transmitting, a set of dry cells or a storage battery will give long service at low expense while operating it.

The disk of the gap is of hard rubber, ¼ of an inch thick and four inches in diameter. Six holes are drilled ⅜ of an inch from the edge at equal distances apart for the spark electrodes, as shown in Fig. 73. In order to do this accurately, a circle having a radius R of 1⅝ inches is drawn on the disk, and starting at any point on the circumference of the circle, such as A, with a compass set at the distance R, arcs are described, cutting the circumference at points B and C. Then taking these two points as centers, the same procedure is followed until the six points are found, at which holes ⅛ of an inch in diameter are drilled for the electrodes.

The electrodes are made from the machine screws used in the carbon posts of dry cells, filed off to the proper length, and held in place by the nuts drawn up tightly against the hard rubber disk. On account of the high speed of rotation, these nuts must be as tight as possible.

The motor shaft is threaded next and to accommodate it a hole is drilled exactly in the center of the disk. In case the motor has no pulley, a nut must be put on each side of the disk. It is essential that the motor revolve anti-clockwise, that is, opposite to the direction of movement of the hands of a clock, looking at it from the end on which the disk is placed, as otherwise the nuts would come loose and the disk would fly off. If the motor does not revolve in this direction it will only be necessary to reverse the armature connections, so that the current will flow in the opposite direction in the armature, but in the same direction in the field winding.

Since the set is mounted on a panel, no base is required for the spark gap. The stationary electrodes are the same as those of a plain gap, ⅜ of an inch in diameter, on brass rods passing through binding posts, arranged with hard rubber or fiber knobs for adjusting the length of the spark. They are mounted as shown in Fig. 74, so that when an electrode on the disk passes between them, the spark passes from one to the moving electrode,

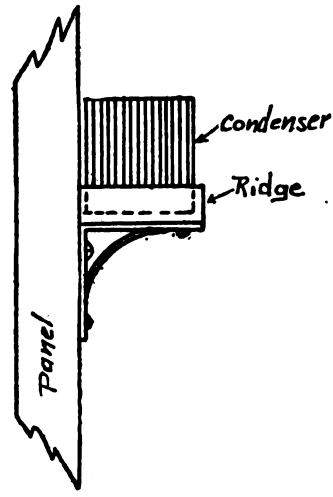


Fig. 75.—Shelf for condenser

and back to the other stationary electrode, giving a double spark. The terminals of the stationary electrodes should be preferably of zinc.

The transmitting condenser is made of glass plates and tinfoil sheets in the manner described in the May issue. The glass plates are 21 in number, and measure 9 by 7 inches. The foil sheets are 7 by 5 inches, and have a connection lug at one end, as in that previously mentioned.

The condenser is made into a solid unit by means of two strips of tape, wound sev-

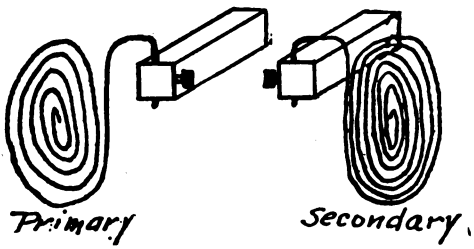


Fig. 76.—Oscillation transformer

eral times around the plates. When finished it is supported from the back of the panel by means of a bracket holding a small wooden shelf, around the edge of which is a ridge 2 inches high, as in Fig. 75, into which the condenser fits closely. The purpose of the ridge is to hold the condenser in place.

The Key

A good wireless key should be purchased, as the cost is low, and a well balanced key cannot be built easily with ordinary tools. It should be capable of breaking at least 5 amperes at 110 volts.

The Oscillation Transformer

A very simple and easily constructed oscillation transformer is used with this set. It consists of two spirals of No. 6 copper or aluminum wire which are readily shaped by hand. The primary spiral has six turns, the smallest being 4 inches in diameter and the largest 9 inches. The secondary has 9 turns, the smallest 3 inches and the largest 11 inches in diameter. The outer ends of the spirals are bent, as shown in Fig. 76, and pass through two large binding posts, A B, for support. They may be turned from one side to the other quickly, so that this arrangement provides ready means of changing the "coupling" between them.

Two clips are needed, one for the primary and one for the secondary. A good form of construction is illustrated in Fig. 77, where a hard rubber or fiber rod, H, ⅜ of an inch in diameter and ¾ of an inch long is slotted to take 2 brass strips, T, bent at one end to accommodate the wire of the windings. These strips are held in place by a binding post, N, with washers, M and L, and this also provides a means of connection for a flexible conductor which passes through the panel.

The binding posts supporting the two windings are set 2½ inches apart on the panel, so that when the spirals are parallel considerable energy will be transferred from the primary to the secondary, but when they are turned apart, the magnetic coupling between them will be "loosened." This arrangement is required by the regulations governing wireless stations. When the proper relative position of the two windings is once found, there will be no need of changing them, and the thumb screws of the binding posts may be set to hold them in place.

The Aerial Switch

Any one of several types of aerial switches now on the market may be used to connect the aerial and ground to the transmitting or to the receiving set, but one built like that illustrated in Fig. 78 is recommended. With this type of switch,

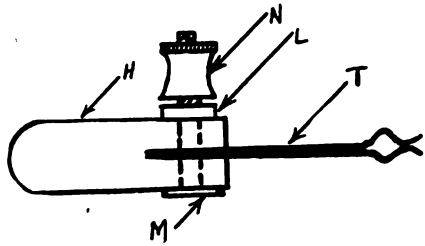


Fig. 77.—Connecting clip

the throw is only about 30 degrees, enabling the operator to change quickly from sending to the receiving position or vice versa. The third blade in the center is a short one, and is used to break the primary circuit of the transformer when the blades are in the "up" or receiving position, so that if the key were accidentally depressed the transformer could not be set in operation. The blades of the standard switch are 8 inches long, ⅜ of an

inch wide and ⅛ of an inch thick. The switch jaws and other parts may be taken from a standard switch. The cross bars between the blades are of fiber, and the base is of wood. The vertical block supporting the upper jaws may be of wood or

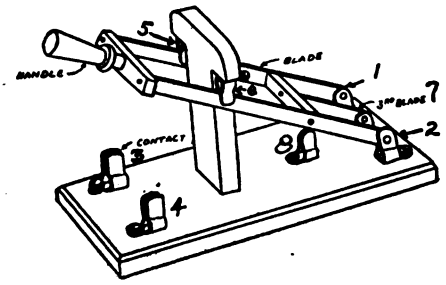


Fig. 78.—Aerial switch

fiber, but the latter is suggested for purposes of better insulation.

The aerial and ground are connected to the hinges, 1 and 2, of the two long blades, and jaws, 3 and 4, are connected to the secondary winding of the oscillation transformer. Jaws 5 and 6 connect with the aerial and ground terminals of the receiving set. These connections are shown in Fig. 82, by these numbers, as possibly some other type of aerial switch may be used by those who build the set.

The Radiation Indicator

It is always desirable to have some indicating device in the station to show comparatively how much energy is being transmitted at any time. In many outfits a hot wire ammeter is used for this purpose and while this is a very satisfactory instrument, a good one is rather expensive; then, too, if left in circuit when the set is being used for transmitting it will reduce the radius of the station to some extent on account of its resistance.

A good and inexpensive type of indicator consists of 40 turns of No. 14 insulated magnet wire wound in a single layer on a cardboard tube 3 inches in diameter. The insulation is scraped off along a line to permit a sliding contact to touch any turn of the wire, so that more or less may be placed in circuit as desired. The ends of the coil are connected across from 6 to 10 feet of the ground wire of the station and a small battery lamp is connected between one end of the coil and the sliding contact, as illustrated in Fig. 79.

When the transmitting set is in operation the lamp will light if the sliding contact is in a position to cut in a sufficient number of the turns of the wire on the coil. To tune the set to greatest radiation, it is simply necessary to adjust the number of turns in use in the primary and secondary windings of the oscillation transformer and change the coupling between them by moving these windings until the lamp of the indicator attains maximum brilliancy. When it becomes too bright for the safety of its filament its intensity is reduced by moving the sliding contact.

This indicator may be left in circuit at all times and will always show whether or not the set is radiating; for if a connection in the set should become broken, the lamp will not light if the outfit is set in operation. The indicator assists materially also in adjusting the spark gap to the best efficiency, since when the spark is "ragged" or of poor quality the lamp of the indicator will flicker.

The Line Protector

In a set of this size it is necessary to employ a line protector on account of the

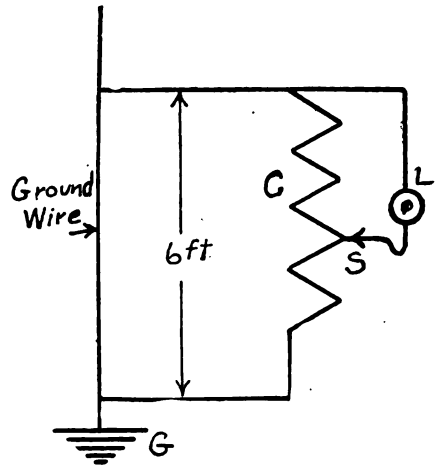


Fig. 79.—Radiation indicator

high voltage currents mentioned. These are set up in the electric light wires due to induction between them and the aerial system. These currents are liable to pass

through weak places in the insulation of the wires, carrying with them the lighting current, which may cause much damage. This generally occurs in the fixtures.

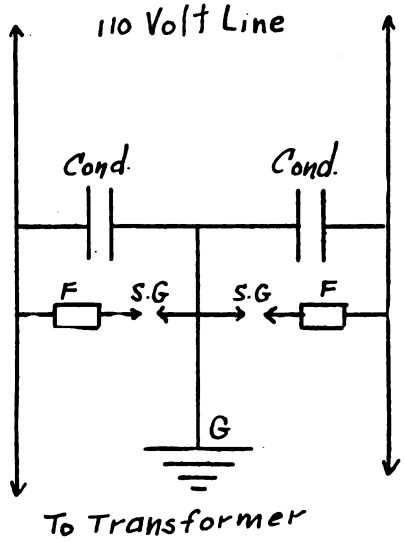


Fig. 80.—Line protector

The purpose of the line protector is to offer a shorter path for the high voltage induced currents. It consists of two condensers each of ½ or 1 M. F. capacity, connected in series across the lighting circuit with their common terminal grounded; across these condensers two small spark gaps are connected, in series with 3 ampere fuses, as shown in Fig. 80. The spark gaps are made of pointed brass rods supported in binding posts, and set ¼ of an inch apart.

Unless the condensers can permit the high voltage currents to pass through, a spark will appear at one or both of the gaps, and if these are insufficient the fuses will burn out. This happens very seldom, however, and would indicate possibly a path somewhere between the high voltage circuits of the sending set to the lighting line or primary circuit. Of course this should be corrected at once.

It will be noticed that the two small spark gaps are directly across the 110-volt line, and if short-circuited, they would short-circuit this line. If properly adjusted, there will be no difficulty from this source.

In Fig. 81 the set is shown on the panel, and Fig. 82 illustrates the wiring system. All secondary or high tension wires should be of the quality known as "high tension" cable, such as is used in connecting the coils and spark plugs of automobiles or motor boats.

The panel itself may be of wood, but either fiber or hard rubber is recommended. Slate must not be employed, as it is a poor insulator at the high voltages used in this work.

The transformer and condenser are placed in back of the panel, which should be supported from the rear by brackets of large size on account of the weight of the condenser and other apparatus.

The aerial switch may be mounted on the panel if desired, but a better place for it is on the table between the sending and receiving sets, quite close to the key. In Fig. 81, A and G are the aerial and ground terminals of the set, and are connected to jaws 3 and 4 of the aerial switch. The wires for the primary circuit of the transformer are run under the table in loom.

In Figs. 81 and 82 the letters apply to the same instruments and binding posts,

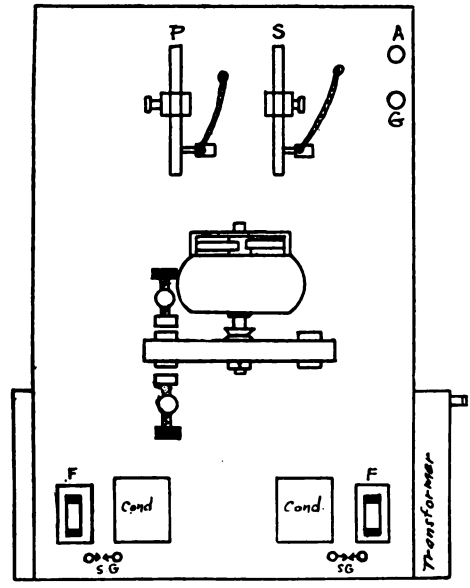


Fig. 81.—Instruments on panel

and the numbers apply to those of the same parts of the aerial switch shown in Fig. 78, if this type is used.

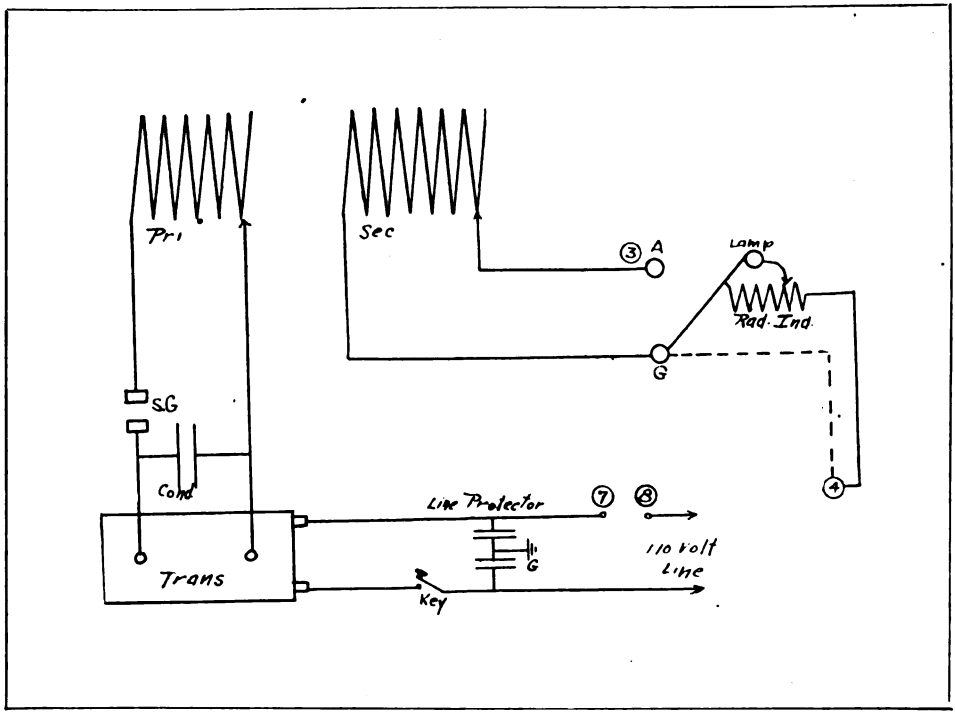


Fig. 82.—Wiring diagram of set

Licenses

The government requires no license to operate a receiving station only, nor for a sending station, except where the range of transmission is beyond the border of the state in which the station is located. In this case a license is required for the station and also one for the operator, for which there is no charge. In this case the station must comply with certain regulations, and must be tuned so that its transmitted wave-length is 200 meters or less. The use of a wave-meter is needed for this purpose, and this can be purchased for $6 or $8, together with full directions for using it, so that little difficulty will be met in tuning the set to the proper wave-length.

Complete information can be obtained concerning licenses by writing to the radio inspector (Dept. of Commerce), governing the district in which the station is located. The various district headquarters are as follows: First district, Boston, Mass.; second district, New York, N. Y.; third district, Baltimore, Md.; fourth district, Savannah, Ga.; fifth district, New Orleans, La.; sixth district, San Francisco, Cal.; seventh district, Seattle, Wash.; eighth district, Cleveland, Ohio; ninth district, Chicago, Ill.

THE END

CAUGHT IN AN ICE FLOE

Malcolm Brainard, of Hartford, Conn., who is chief electrician and wireless operator on the naval tug Potomac, is credited with having walked 150 miles on the ice when the ship was caught in an ice floe off the Banks of Newfoundland and had to be abandoned about six months ago. As soon as the ice broke up he joined the ship, which had not been injured, and is expected to arrive in New York soon.

Comment and Criticism

ONE of our correspondents has found that the Blitzen tuner can be made receptive to the signals from the Arlington station in a simple manner. He has made note of the inquiry in the March issue from C. K. of St. Louis in which the statement is made that with a similar outfit he is unable to receive the time signals from Arlington. We advised that we had studied C. K.'s diagram carefully and found that the connections were correct with the exception that he had the fixed condenser connected in series with the local circuit instead of in shunt to the head telephones. A typographical error was made in our answer. It should have read, "with the exception that the fixed condenser should be connected in shunt to the head telephones not in series."

Now it is plainly evident that if the fixed condenser is connected in series with the head telephones the local battery current cannot flow, and therefore no signals will be received. We are of the opinion that C. K. will have no difficulty in reading Arlington signals in St. Louis, Mo., if he will make this correction in his circuits. Our correspondent describes the results he obtains in the following manner:

I have taken notice of the question asked by C. K. of St. Louis, in the March issue of THE WIRELESS AGE, in which he asks why he does not get the time signals from Arlington, with his Blitzen tuner. I wish to state that I am using a Blitzen tuner and get the time signals almost every night and seldom fail to hear it at 10.55 to 11.00 A.M. Central time.

My aerial is but 80 feet long and 70 feet high. I have been experimenting with loading coils of every kind before using the instruments that I am using at present, but on no occasion did I get the time signals. I then bought two rotary variable condensers from the Clapp Eastham Company. I filled one with castor oil, making the capacity .004 and the other has a capacity of .0008 mf. The oil-filled condenser is connected across the primary of the tuner while the other is connected across the secondary. I use a galena detector connected in series with phones and tuner. A small fixed condenser is shunted across phones. This, however, is not essential. With this arrangement I can receive from stations using waves as high as 3,500 meters. Sayville (WSL), which I think uses a wave between 2,500 and 3,000 meters, can easily be read during severe static. C. B. H.

Generally, better signals are received with the use of a loading coil in the aerial circuit rather than with a variable condenser in shunt to the primary of the receiving tuner. However, the construction of the apparatus may make either one of the methods desirable.

* * *

The use of single wire aerials is still the subject of considerable discussion among our amateur readers, as is evidenced by the following communication, dated from Los Angeles, Calif.:

I note with considerable interest the controversy in regard to the advantages of a long one-wire aerial over a short aerial having several wires, for long distance receiving. The criticism in the March WIRELESS AGE, by "L. M.," "W. W.," and the President of the Talo Wireless Club, of Mr. Dreher's article in the January, 1914, issue of THE WIRELESS AGE surprises me greatly.

I have tried out several short aerials, 100 feet and under, and am now using a one-wire aerial 450 feet long, averaging height 55 feet, having a natural wave-length of 600 meters. I find that I am able to get much greater distances with this long single-wire antenna.

Following are some of the results I have obtained:

NAR (Key West, Fla.), distance from Los Angeles 2,200 miles.

NVP (Unalga, Alaska), distance from Los Angeles 2,500 miles.

KHK (Kahuku, T. H.), distance from Los Angeles 2,000 miles.

NPW (Eureka, Cal.), *daytime*, 650 miles.

Pacific mail liners bound for Japan as far as 3,000 miles.

The above results were obtained using an ordinary loose coupled receiving set and a crystal detector. H. V. R.

The figures speak for themselves. No special comment is required with the exception that it is a well-known fact that better distance work can be done both in transmitting and receiving on the Pacific than on the Atlantic coast.

Another of our readers who formerly criticised C. Dreher, writes. "I give in, and now agree with Mr. Dreher on

the desirability of single wire aerials." He then goes on to describe some unusual long distance work he has accomplished which we have not published on account of the lack of verification. He says, "I think the foregoing statements point to the desirability of the single wire aerial," and incidentally makes the statement that he has found the galena detector more sensitive than the audion.

Having no data as to the design of his receiving tuner we can offer no comment. A receiving tuner for the audion should be so proportioned as to allow a given wave-length to be attained with the use of a small amount of capacity in shunt to the inductance.

* * *

A subscriber after commenting favorably upon our magazine in general writes as follows:

I notice a discussion on aerials running in your magazine. Permit me to relate an experience I have had using IRON wire for the aerial. About a year ago I had in use an aluminum wire aerial strung from a tree to a pole. The height was 60 feet at the tree end and 30 feet at the pole, length of wires 160 feet. With this aerial I had heard NPE (North Head, Wash.), distant about 950 miles, and several ships about the same distance at sea. One night a heavy wind storm came up and carried it away. Although I used a weight on the end of the rope running through a pulley to take up the slack as the tree swayed in the wind, the strain was too great and the wires broke. I decided to put up an iron wire aerial. I was of the opinion that good results were out of the question with such an aerial, but as copper or aluminum would not hold up in a wind storm, I decided to make a trial. I erected a four-strand aerial of GALVANIZED iron wire No. 14, the same length and height as the former aluminum aerial and the same number of strands and same size wire. With this aerial I obtained good results. I heard NPE a number of times and the signals seemed to come in just as loud as with the aluminum wire aerial. All stations that were heard on the aluminum aerial could be heard on the iron wire aerial with equal strength. Longer distances could probably have been covered under better conditions but my station is located on low ground surrounded by hills. The explanation of this phenomenon is that all high-frequency currents travel on the extreme outside of the conductors, and as the galvanization on iron wire is of zinc it works similar to a zinc wire aerial. The difference is that the iron would probably have a magnetic effect. Can you explain what the magnetic effect would amount to? Although I obtained excellent results with the iron wire aerial, I do not wish to say that it should be used if it is possible to use copper or aluminum, but in places where the wire is subjected to great strain, galvanized iron wire will give highly satisfactory results. It is also very cheap.

It is preferable at all times to construct an aerial of wire having the highest possible degree of conductivity, but as the writer states, it is the surface of the wire which principally needs to be considered. Assuming that an annealed copper wire has a percentage of conductivity equal to 100, then as a basis for comparison we may tabulate the specific resistance, of these elements as follows:

Annealed Copper.....	100%
Commercial Aluminum....	59.8%
Zinc.....	27.7%
Iron Wire.....	16.2%

This tabulation is based on the specific ohmic resistance of the wire and does not take into account the mere surface conductivity. The high frequency resistance of a conductor varies with the frequency of the oscillation passing through it and is therefore not a constant at all wave-lengths. While the table indicates the resistance of zinc a little more than twice that of aluminum when a steady current is flowing, this same ratio does not hold good in terms of high frequency resistance.

Calculations based on the well-known Rayleigh formulæ indicate that at frequencies of a million corresponding to a wave-length of 300 meters, the high frequency resistance of zinc (ignoring the magnetic effect due to the iron core) is 4.1 times the steady current resistance, whereas for aluminum it is 6.1 times the steady current resistance. The magnetic permeability of the iron core of our correspondent's aerial will have the effect of increasing the high frequency resistance which would make the ratio of high frequency resistance to the steady resistance about the same or slightly greater than that of aluminum. Therefore, about equal results are obtained, but the total resistance is greater in the case of the zinc-coated wire.

When a high frequency current flows through a conductor it tends to remain on the surface of that conductor because of the fact that a counter-electromotive force is set up in the center of the wire which opposes the variation of current. It will be readily understood then that in the case of a large wire having a low value of steady current resistance the counter-electromotive force in the center will be correspondingly large and therefore the increase of the high frequency

resistance, size for size of wire will be greater than with the conductor having increased value of steady current resistance.

In plain words, the increase in the *ratio* of the high frequency resistance to the specific resistance of any wire varies with the size, and the smaller the diameter the less the resultant value. For diameters below one-tenth of a millimeter the high frequency of a wire does not differ from its resistance to direct current, but with larger wires having a diameter of, say, 2 centimeters, the high frequency resistance may be eighty times the value of specific resistance. It should be understood that our statements are made in the sense of ratios. We do not mean to infer that the poorer conductors such as zinc, iron and aluminum as an aerial will give results equal to that of copper wire, we simply desire to make plain that in a case of these poorer conductors, the difference between the steady current resistance, and the high frequency resistance is not so great as with the better conductors.

The difference in the value of high frequency resistance between our correspondents' zinc and aluminum aerials is therefore not so great as might be supposed.

* * *

The motive that animates our monthly prize contests is best expressed by the great Scotch essayist Carlyle, who said: "The merit of *originality* is not novelty; it is sincerity."

And knowing this, it does seem unfortunate that the material sort of encouragement should be vitiated by individuals, who, lacking the sincerity of originality, attempt to advance themselves by appropriating the ideas of others.

Our attention has been recently called to the honorable mention article in the May issue in which is described a method for the operation of a quenched or rotary gap in connection with an ordinary coil. Its critic says the context of this article was plagiarized from his contribution to the January, 1913, issue of Modern Electrics. He sends a copy and requests that we draw our own conclusions.

The two contributions in question are so obviously alike that there can be no doubt that the honorable mention article is a direct copy of C. Ballantine's contribution to Modern Electrics.

To the sincere workers in the amateur field we offer an apology for having allowed this contribution to receive an honorary award; to our critic we offer our sincere thanks for calling our attention to the matter.

We trust that the offending contributor will come to the front and acknowledge that the idea upon which the article is based is not original with him, and at the same time will publicly apologize to Mr. Ballantine for appropriating the latter's ideas to his own benefit.

Had the contribution described an improvement on Mr. Ballantine's idea and acknowledged prior use, the article would have been welcome for its sincerity of purpose; but under the conditions we cannot let the matter pass without comment, and in defense of Mr. Ballantine quote as follows:

"This method as far as I know was first applied by myself back in 1911 and a description of it appeared in Modern Electrics, in January, 1913. I am enclosing a copy of the original article. Read it over and draw your own conclusions. I am not claiming credit for myself," etc., etc.

Further on he says:

"It seems to be a fad lately for contributors to draw on old numbers of magazines for their 'original' ideas."

Thanks for the warning. We shall take special precautions from now on and we expect to bring this fad to an untimely end; we hope that "faddists" will take note accordingly. We do not propose to censure the rehearsal of an old idea for the benefit of new readers, if the originator is given full credit or some improvement of note has been made, but in the language of the street, when a contributor tries "to get away with it" in this manner, he will certainly be exposed and we may, if the case is particularly flagrant, let the law take its course.

* * *

A still more flagrant instance is the awarding of a prize to an amateur for a contribution which appears to be based on the research work of a western correspondent. In this case reference is made to the second prize article in the May issue, wherein the writer shows how the

sensitiveness of an audion may sometimes be increased by the application of an external magnetic field.

In commenting on the article, we remarked that the method described was not new, but was well known in 1907. We deemed the article of sufficient interest to amateurs to award a prize to the writer, but we had no knowledge of a similar article written by Ellery Stone in a previous issue of a contemporary publication.

It seems that Mr. Stone has done considerable research work on the effect of magnetic fields on the audion and in a complete exposition of the results published in March he advances some original theories for which he is justly entitled to credit. He writes that A. A. Skene's article in the May issue is obviously based on the results of his (Stone's) research.

A careful comparison of the two articles reveals that some of the words in Skene's article are identical with those in Stone's contribution and we therefore believe that an apology is due the latter. The curves, however, are slightly dissimilar.

We quote Mr. Stone as follows:

> Inasmuch as my article set forth the results of considerable research on my part and advanced some original theories, I think you can understand the natural feeling of resentment I have upon seeing it presented as another man's work. Even the curve accompanying the article in your magazine is almost an exact replica of one of the curves I published.
>
> I would not write this letter to you if I did not feel confident that the publication of plagiarized material and the awarding of prizes for the same was not in accordance with the policy of your magazine. I feel sure that you did so wholly unconscious of the fact that the article in question was a clear case of plagiarism.
>
> It is only by an exposé of such methods that irresponsible young writers can be brought to a realization of the gravity of such an offense.
>
> I trust you will take some steps to set forth to your readers the true facts with regard to the source of the material presented concerning the magnetic effects on an audion detector.

We assure Mr. Stone that the awarding of this prize, under such conditions, was not in accordance with the policy of this magazine and we thank him for calling our attention to the matter.

It is now in order for the author of the second prize article to state the conditions under which the data for the curves accompanying his article was obtained; also the apparatus used and the exact date at which such tests were made.

A correspondent refers to the "How to Conduct a Radio Club" articles appearing from time to time in the following manner:

"Offer you profound congratulations for being the first to offer the amateur any real solidly interesting matter on the new things in wireless. Does a fellow good to get hold of something original once in a while and your articles make the magazine for me."

We are pleased to note that these articles are meeting amateur requirements, and we can assure wireless organizations that future issues of this series will contain new matter of no little interest.

* * *

Another subscriber wonders what range of wave-lengths may be expected from the hinged-back receiving tuner described on page 735 of the June issue in the Radio Club series.

We reply that, under test, when the secondary winding was shunted by a variable condenser of .001 mfds., it had a wave-length of 4,000 meters.

This will allow reception of signals from the Arlington station at its longest wave-length.

With the average amateur aerial, an aerial tuning inductance should be connected in series, with the primary winding per adjustments to this wave-length.

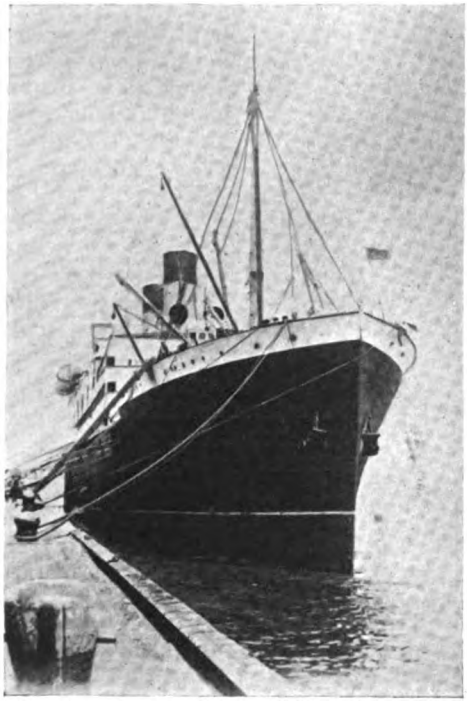
* * *

The following advice is offered to amateurs from a fellow worker in Buffalo, N. Y., who has done considerable experimenting with audion bulbs. He says:

"I might . . . advise the fellows that if they find their valve works best on the highest point of the high voltage battery, it would be well to add a few more cells. I have had the air specially extracted from some bulbs and found them to work twice as well as an extra grade bulb but the vacuum was so high that they required 55 to 60 volts for satisfactory operation; furthermore an air dielectric variable condenser of reliable make always bettered my results when used in the circuit in place of the fixed condenser."

The higher degree of vacuum with a corresponding increase of voltage "steepens" the volt ampere curve of the audion and hence the increased sensitiveness.

Air condensers are free from dielectric losses and therefore may give increased strength of signal.



The Empress of Ireland leaving Liverpool. Her side was torn open for half her length when she and the Storstad crashed

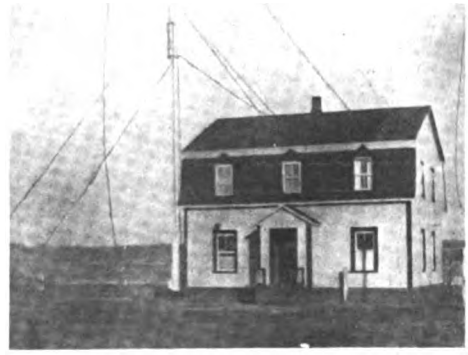
The Collision on the St. Lawrence

Illustrating the Importance of Wireless on Land-locked Waters

ANOTHER disaster of the waters has furnished an impressive story of how lives were snatched from a grave made by the fog—one of the terrors with which mariners are compelled to contend —by means of wireless telegraphy. The efficacy of the art during a time when speed and potency were most essential brought timely assistance, resulting in the rescue of almost half a thousand persons. The saving of these lives, despite the loss of more than a thousand others, is the only gleam of brightness in an awful accident and should bring a thrill of gratitude throughout the world for the genius which placed this means at the disposal of those in peril.

The wireless operators have come in for praise, and justly, too. None of the masters of fiction have drawn figures which are more heroic than these men of the key. One of them, saved from death after he had remained at his post sending out the S O S even as the ship was being drawn down as if by unseen hands, thus tersely sums up what wireless did in depriving the waters of their prey:

"I do not think it has been realized what a part wireless played in the affair. Only eight minutes was I able to work, but without that the only boats that



In the wireless station at Father Point the operator was aroused from a doze by the S O S. He ran from the station in his night clothes and hurried rescuers to the spot where the Empress sank

would have been available for the passengers would have been those on the starboard side . . . and it is not likely that more than forty or fifty would have been saved."

The Empress of Ireland, bound for Liverpool, with a number of distinguished passengers aboard, left Montreal on the afternoon of May 27, in command of Captain Kendall. She stopped at Quebec, steaming away from that port at half past four o'clock in the afternoon of the following day. Several hours afterward a thick fog enveloped the waters and all of the craft upon them. As the night wore on the mist still prevailed and the Empress, in order to insure safety, reduced her speed.

This was about two o'clock in the morning when the liner was in the St. Lawrence river, not far from the shores of Father Point, 150 miles from Quebec and about ten miles from Rimouski. Feeling her way through the fog, inward bound, was the Danish collier Storstad, with Captain Andersen in command. She had fifty men aboard.

After a while the collier approached close enough to the passenger steamship for those on the latter to distinguish her lights. The proximity of the Storstad was then called to the attention of Captain Kendall, who was on the bridge. He, according to reports of the disaster, signaled with three blasts of the whistle, "I am continuing my course."

The collier continued to approach the Empress and Captain Kendall, realizing the peril of his ship, signaled for full speed astern. The order came too late to avoid a collision, however, and the collier steamed ahead on her course, crashing bow-on into the side of the liner. She struck her about midway of her length and tore her side open to the stern.

Edward Bamford, the second Marconi operator, was on duty when the crash came. He sent a summons for the first operator, Ronald Ferguson, who was in his cabin, off duty. The latter ran to the wireless room and sent a message to Father Point, telling the operator there to "stand by" as the Empress had "struck something." Then First Officer Steade ran up and directed that the S O S call be flashed.

Far and wide the summons for aid reached out into the darkness. In the station at Father Point the operator was following his custom of taking the opportunity offered during a slack period in the early morning hours to doze on his cot. The buzzing in his head phones aroused him, however, and in an instant he had the tuner adjusted and his hand on the key. At the second call he answered:

"Where and who?"

"Empress of Ireland, off Father Point," was the response.

The land operator responded to the message and then called his chief, Whiteside; without stopping to change his night clothes for other apparel, he hurried from the station to the pier where he found the Canadian government boat Eureka tied up and every one aboard sleeping. The operator aroused the Captain, J. B. Belanger.

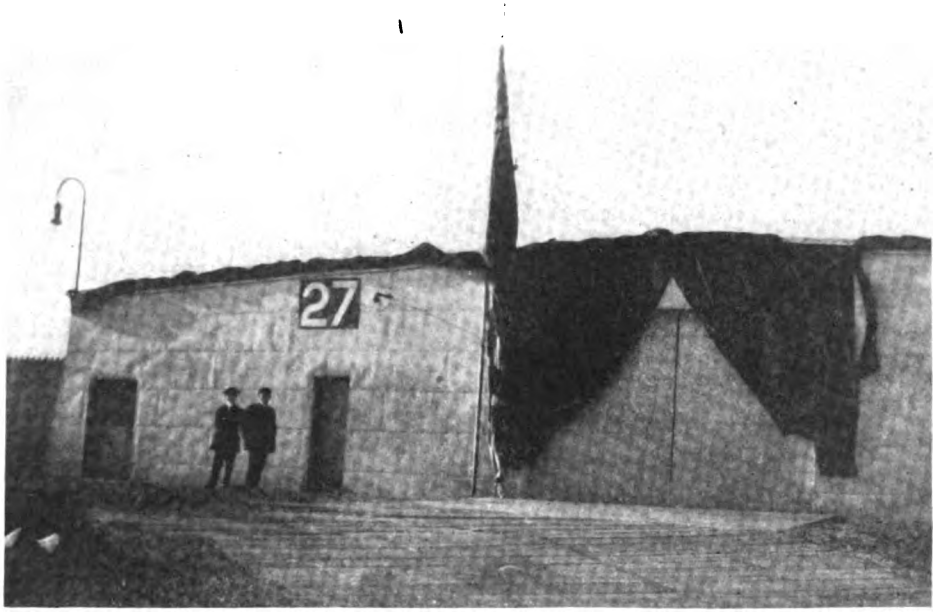
"For God's sake, get up steam," cried the former, "the Empress of Ireland has gone under."

The captain awakened his crew and gave orders to prepare the Eureka for a rush trip. The Lady Evelyn, also a government boat, was notified of the disaster and both craft steamed at high speed to the spot where it was believed the Empress had gone down.

While these preparations for rescuing were being made the water was pouring like a mill stream through the great gap in the Empress' side. The disaster came so suddenly that there was no time for many of those on the vessel to even attempt to save themselves. They were trapped in their cabin by the waters and drowned before they could reach the deck. The majority of those whose lives were saved leaped from the starboard side of the ship when the deck was almost perpendicular.

When the Empress listed her lights went out and the confusion in the darkness which resulted added to the horror of the situation. This was alleviated to some extent by the fact that most of those on board knew that the ship carried a wireless equipment which was in itself a guarantee that there was a possibility at least of obtaining aid.

As the vessel was being swallowed up by the waters those who slid off the deck on the low side were either killed by the fall of deck structures or boat tackle, or were carried down by the suction as the



The bodies of the victims were taken to Quebec for identification. In the building shown in the photograph many heartrending scenes were witnessed as relatives and friends came in search of their loved ones

craft careened and sank. There was no lowering of boats. They broke away and floated off. The life belts were of little use except to the members of the crew, because only a few persons among the passengers had an opportunity to adjust them.

On arriving at the point where the Empress sank the rescuing boats, the Eureka and Lady Evelyn, found a scene which was not unlike that presented to the rescuers of the Titanic's victims. There was no sign of the Empress, for she sank seventeen minutes after the collision; but in the vicinity were to be seen many life boats and much wreckage. The occupants of the boats were transferred to the rescuing craft as quickly as possible and taken to Rimouski.

Both of the Marconi operators on the Empress were saved. Bamford fell into a life-boat and was picked up by a rescuing ship. Ferguson, however, was carried down with the wrecked vessel and was compelled to swim about for a considerable time before he was picked up.

"I had left the apparatus to my junior just five minutes before the collision came," he said, "and I turned into my bunk on the port side. My cabin was on the top deck, and though I could not see the Storstad, immediately after the shock I saw lights passing.

"I ran to the wireless room, took over the telephones from my junior and called all stations: 'Stand by for distress signal, have struck something.' In a minute, the chief officer, Mr. Steade, ran into the room and told me to call S O S, so I sent out the message 'S O S—Have struck something, sinking fast, send help.'

"The station at Father Point replied right away, asking where we were. I replied that we were twenty miles past Rimouski, and was trying to confirm this in answer to a request from Father Point when the power was cut off. The water had got into the stokehold, cut off the steam and put the dynamos out of commission.

"Before I was forced to sit before apparatus that was useless, I got the message from Father Point: 'O.K. Am sending out Lady Evelyn and Eureka to your assistance.' Eight minutes had elapsed between the first and last calls.

"Knowing this I rushed out of the cabin and shouted to the passengers that there was plenty of assistance coming and

that the two boats would be on the spot in an hour. Then I went back to the cabin and tried to put the emergency gear in operation. But it was too late. The ship was sinking fast and listing so much that all the emergency apparatus fell over.

"I went out and picked up a deck chair as I ran, with the idea of getting something to keep me up, if necessary. I kept to the port side, for had I gone to the starboard, I should undoubtedly have been killed like many others by the boats that were rolling down the decks with a noise like thunder.

Ronald Ferguson, the first Marconi operator on the Empress. He stuck to his post, even while the ship was sinking

"Just as I was getting on the rail, the ship gave a final plunge and I was thrown clear into the water. I went down, and the suction took me to a great depth, and when I came to the top, no boat was in sight. I swam about for three-quarters of an hour, and then was picked up by one of the Empress' boats in charge of the boatswain.

"I was taken on board the Storstad, and was so weak that I had to be dragged aboard. I stripped myself, and helped to strip others, then went below to warm myself and dry some clothes. While I was there, some of the survivors came down shouting for Marconi.

"When I got on deck, I found the Lady Evelyn alongside. Although she had wireless, there was no operator. I was so eager to get aboard that I did not notice I was nearly naked. As I climbed over the rail one of the survivors gave me an overcoat, and then I jumped on to the Lady Evelyn.

"The wireless room was locked and the key was not there, so I broke a window and two men pushed me through. I geared up the apparatus, called Father Point and gave all the information I had, asking for clothes, supplies and a train to be sent to Rimouski wharf. I remained at the apparatus until the Lady Evelyn came alongside the wharf at Rimouski.

"I do not think it has been realized what a part wireless played in the affair. Only eight minutes was I able to work, but without that the only boats that would have been available for the passengers would have been those on the starboard side of the Empress, and it is not likely that more than 40 or 50 would have been saved.

"Had the Empress kept afloat a little while, the two boats coming to the rescue could have taken on all her passengers and crew. As it was, when the Lady Evelyn did arrive boats on each side were out, ready for the water, and those in the river were picked up very quickly."

Ferguson's home is in Liverpool. He is not unused to marine perils, for he was on the Ambrose when she rammed the Beta and sent her to the bottom in the River Mersey, England, on January 9, 1913. Bamford lives in Manchester, England. At one time he was an operator on the Warren liner Michigan and made his hime in Boston. Bamford studied at the Manchester Wireless School, afterward going to London where he obtained employment with the Marconi Company. He made three voyages on the Michigan and, being ambitious for an assignment on a larger vessel, succeeded in obtaining a detail on the Empress of Ireland. He is twenty-three years old. It was his first trip on the Empress.

Accounts of the wreck show that Captain Kendall maintained the traditions of bravery among seafaring men that have been handed down since craft began to sail the seas. He stood on the bridge as the Empress foundered and was picked up by one of the small boats. He directed the work of saving others until the boat was filled to its capacity.

Dr. James F. Grant, ship's surgeon, won praise for his coolness and the services he rendered to the survivors as a physician. He was pulled from a porthole by those who stood on the side of the ship after she had canted over. As the great hull dropped from under him he slid into the water and swam toward

the Storstad. He was picked up by one of the collier's boats and aided in the rescue work. His story of the disaster is as follows:

"We left Quebec on May 27 and had an uneventful trip during the evening. During the early morning a fog dropped around us and we proceeded slowly. At 1:30 A.M. we put the pilot off at Father's Point. At 1:52 the collier Storstad rammed the Empress of Ireland. The vessel's lights had been sighted by the watch, who reported to Captain Kendall, who was on the bridge.

"The captain signaled with three blasts of the whistle, 'I am continuing my course.' The collier answered but what the reply was I have not learned. Captain Kendall sounded the whistle twice, saying, 'I am stopping.'

"The light of the collier could be seen approaching. The captain of the Empress signaled to reverse and steam full astern. But the big liner could not avoid the small ship. She was rammed amidships in the engine room on the starboard side. The plates were ripped open to an enormous length. Then the collier backed off about a mile.

"In a few moments the Empress began to list to one side. She made an attempt to right herself, and then canted still further to starboard. As the water forced its way in through the gaping break in her side she lurched further and was doomed.

"An attempt was made to lower the boats on the starboard side. The first one was thrown clear and the sailors in it were thrown out. That boat was overturned. Then some of the port boats were flung across the deck by her list and several persons were killed.

"They were crushed to death against the rail. I believed that the chief officer, Mr. Steade, lost his life when these boats catapulted their way through the crowd.

"There was no disorder among the crew. The captain and other officers remained on the bridge until the vessel sank. It was just seventeen minutes from the time she was rammed until she sank below the surface. Comparatively only a few were able to obtain life belts, and practically all were forced out in their night clothes into the water.

"Several hundred clung to the ship until she sank, holding to the rail until the vessel canted over so far that it was necessary to climb the rail and stand on the plates of the side. Then as she keeled over further they slid down and into the water as though they were walking down a sandy beach into the water to bathe.

"The lifeboats in the Storstad were launched, and came rapidly to the rescue. Not one went back that was not well loaded. About five of the Empress' boats also got away. The entire catastrophe was so sudden that scores never left their bunks.

Edward Bamford, the second operator on the ill-destined craft, who was on duty when the collison occurred

"The passengers had been on the ship only a day, and were not yet familiar with their surroundings. In the confusion and the semi-panic, many could not find their way to the decks, and only a few knew how to reach the boat deck. This was largely responsible for the terrible toll of death."

Figures said to be official place the death list at 1,024 and the number of saved at 452. J. McWilliams, wireless operator at Father Point, said: "The prompt Marconi service doubtless saved many lives, as one of the rescue steamers, the Eureka, was on the spot about twenty minutes after the disaster, and the Lady Evelyn was close on her heels. The prompt arrival of these vessels enabled the lifeboats to be overfilled without danger."

It is gratifying to be able to record another triumph for wireless telegraphy and one naturally asks, What would have happened without it? The fact that the accident occurred within a short distance of the shore and was a disaster of the river and not of the sea makes the Marconi achievement a noteworthy example of the value of wireless. It drives home the fact that wireless

telegraphy is as much of a necessity on inland waters as it is on the ocean.

But when all is said and done the thought occurs that one of the recent developments of wireless—the Marconi-Bellini-Tosi direction finder—might have been employed to advantage in averting the disaster. This instrument, which is also known as the radiogoniometer, is designed particularly to defeat circumstances such as those which arose when the Empress of Ireland and the Storstad came into collision.

If the Empress and the Storstad had been equipped with direction finders the instruments would doubtless have indicated by an increased strength of signaling that the vessels were nearing each other. There is a possibility that there might have been doubt as to whether one ship was approaching the other on the port or starboard side. A wireless message from one craft to the other, asking as to her course, would have done away with the difficulties of this problem, however.

The steamship Lady Grey which conveyed the bodies of the victims to Quebec after the collision which cost more than a thousand lives

Captain Kendall's story is to the effect that while the weather was still clear he sighted the Storstad which at that time was about two miles away from the liner. Then a fog bank came between the vessels and each lost sight of the other. Signals were exchanged by whistling, but notwithstanding this precaution, the ships crashed together.

In view of the fact that the whistling signals did not prevent the disaster, the warning issued by the Buoy List of the Coast of Massachusetts, published by the Federal Lighthouse Service, has a pertinent interest. This cautions seafaring men concerning relying on sound in a fog because in the "silent areas" created by special conditions the signals may not be heard even when the vessels are a short distance apart. An explanation of the collision between the Empress and Storstad may lie in the fact that it was impossible to distinguish the sirens of the two vessels.

This possibility again draws attention to the advantages of the direction finder. It is already in use in the American Navy, having been thoroughly tested and found to operate successfully. Facts concerning the instrument were placed before the Board of Steamboat Inspectors investigating the collision between the Old Dominion liner Monroe and the Nantucket of the Merchants and Miners Transportation Company which came together in a fog.

It was pointed out that the device shows accurately the direction from which wireless signals come and locates the vessels from which the signals come in a fog. It was also pointed out that with two operators on duty many messages are exchanged between ship and shore station, resulting in the distribution of considerable information concerning vessels in the harbor.

The instrument, the sole object of which is to determine the direction from which wireless signals are being sent, has a range of from forty to fifty miles. It can be operated either by the wireless operator or the navigating officer.

The Empress of Ireland was a steel twin-screw steamship of 14,191 tons, 518.9 feet long, with a beam of 65.7 and a draft of 36.7 feet. Her passenger capacity was 350 first cabin, 350 second cabin and 1,000 steerage.

She was built in 1906 for the Canadian Pacific Railway Company, and has plied between Quebec and Liverpool since she went into commission. Captain Kendall, the commander of the Empress, was on his first trip on the sunken vessel.

Book Reviews

WIRELESS TELEGRAPH CONSTRUCTION FOR AMATEURS

By ALFRED P. MORGAN

D. Van Nostrand Co., N. Y. Price $1.50

The author of this volume evidently anticipated the needs of amateurs who desire to construct their own equipment, but lack the necessary instruction and data; and by avoiding the cut-and-dried "how to make" style has delivered his message entertainingly.

No attempt has been made to cover the entire field of elementary electrical engineering, which is the evident purpose of most writers to the amateur. Instead, the first chapter deals directly with the principles of wireless telegraphy, giving simple explanations of the fundamental phenomena, and commendably leaves the discussion of the elementary principles of electricity to other volumes. The description of actual amateur apparatus logically follows the order in which the amateur experimenter takes up wireless work—receiving apparatus first. The construction of the transmitting apparatus follows in due course, and the author, recognizing that there has been a deplorable lack of published data on the actual construction of induction coils, transformers and other parts of the complete transmitting apparatus, supplies this material. Not only are the fundamentals of a complete transmitting and receiving apparatus covered; working drawings of all auxiliary devices used accompany the description.

A new chapter has been added in this edition in which the recently enacted U. S. amateur regulations are referred to and amateur equipment to comply fully with the regulations is described. This chapter includes the description of oscillation transformers, quenched and rotary spark gaps, a variometer for receiving purposes, "kick-back" preventers or protective devices, crystal and audion detectors.

Your reviewer takes exception to the explanation of Fig. 9 on page 12. Upon investigation, the path of the open circuit is found to be from the aerial contact B, through the closed circuit contact A, across the spark gap to the earth connection G; or, more plainly, when the earth connection is placed as shown in the diagram the path of the open circuit energy is invariably across the spark gap to earth rather than through the condenser C to earth.

And in the wiring diagram Fig. 15, page 19, we believe that more consistent and better results would be obtained if the fixed stopping condenser were connected in shunt to the head telephones.

On page 24, the statement is made that the loop aerial formerly used by the United Wireless Company is well adapted to long waves and close tuning, whereas experience covering a number of years disclosed the fact that unfortunately the loop aerial was found to be more suited to the reception of short wave-lengths.

To bring the volume more up to date, the statement on page 24, that the pyramid aerial is debarred from extensive installation on account of the large cost of erection but is a type used by Marconi in long distance ultra powerful stations, should be amended. The inverted "L" type of aerial is now invariably used by the Marconi Company in the ultra powerful stations.

On page 29 it is stated that the standard wave-length of the United States Navy ship installations is 425 meters. The Navy has been allotted wave-lengths between 600 and 1,600 meters. For long distance communication at the higher power stations, wave-lengths in excess of 3,000 meters are employed.

The statement on page 25 "an increase in the capacity (of an aerial) enables more energy to be accumulated in the antenna, and consequently greater radiation results," is open to criticism in the latter half. If the antenna is kept at the same height and its capacity increased, and all other conditions increased proportionately, we agree that greater radiation will result; but suppose an antenna of given construction should gradually be lowered nearer to the earth. An increase of capacity would result, and even though conditions of resonance in the transmitting circuits were maintained the radiation from this aerial would be decreased as the earth was approached.

Taking the volume on the whole, however, it should be an excellent guide for the beginner and is worthy of recommendation to the amateur field.

MISS REYNOLDS

Christening the North Sixth Mast

By EVA H. REYNOLDS

Miss Eva H. Reynolds recently rode through the air in a bo'sun's chair to the top of one of the 425-foot steel masts that support the aerial of the new Marconi Wireless station at New Brunswick, N. J. Standing in the workmen's box, at the top of the mast, Miss Reynolds named the station "Scio," breaking a champagne bottle over the point of the mast. The account of her adventures which follows was written at the request of the New Brunswick Home News. In the May issue of THE WIRELESS AGE *appeared an illustration of Miss Reynolds making the ascent.*

TO the recreation seekers strolling along the towpath to the upper lock on half holidays and Sundays, the scene of varying beauty environing the wireless plant is so satisfying and entrancing that I would hesitate to change the reel to mid-winter, to a tempest and disaster, were it not for the patience, heroism and final success which crowned the work of the engineering corps.

For more than half a century, the property where the "tall thirteen" stake out the Marconi boundary has been called and known as Scio Estate; and this fact is the pivot around which centers the incident which follows. N. Covas, a Greek, the former owner of the estate, named it Scio, after a beautiful and fertile island in the Ægean. The inhabitants were aristocrats, and felt themselves upon a higher plane than their countrymen; yet they were unwarlike, cultured and refined, the result of mild government.

The name Scio admirably fitted the conditions. The people felt they knew how, and so, when the masts of the Transoceanic Aerial Message system began to climb higher and higher toward completion, I, too, felt that some one knew how, and poetic justice suggested that the name be ceremoniously given to the last completed of the thirteen shining steel beauties.

A shade of seriousness crept over the face of the official to whom I first applied for permission to use the tower swing.

He explained that the men who used the ropes were veritable steeplejacks; that they had been trained from boyhood for the work. Many were sailor mast climbers, and all were as much at home swinging from a crass-bars four or five hundred feet above the ground as in a porch rocker.

Three months later, as the sun was measuring off the second half of the day, word was passed me by a younger member of the office force to bestir myself as the last opportunity to go up was at hand. I had been waiting for weeks for a possible chance, and my fixings were all ready. Men were working overtime and with feverish haste fastening stay wires and making all secure against a possible storm.

Superintendent Rossi was to personally inspect the north sixth mast and to make the ascent. It appeared that in some way I had "qualified" to the satisfaction of the Superintendent and others for the trip, and my plea to make it was granted.

La Fayette Stone house was the starting point, and here in the large council room, where strategic plans for independence had been whispered over crude maps in the French general's soldier days, two documents were handed me to sign.

"Your death release," it was explained. For the first time the gravity of the situation impressed me, and my hand was "infirm of purpose," but it was only momentary. The J. G. White Engineering Co. and the Marconi Wireless Telegraph Co. of America were both freed by my

signature from any responsibility whatever.

The great blizzard had not yet set in, but previous snows had made the walking laborious. When the principals in the little drama reached the mast, we found my father and our faithful collie waiting for us. The former tried to look pleased, the latter whined as I swung out beyond his reach in the open. Two swings were provided; in one sat the Superintendent. Simple board swings they were, without even the mast for company, raised by an engine. Not knowing what to do with the christening outfit, as both hands were needed to grasp the ropes, the Superintendent kindly packed the articles in the tops of his rubber boots. So absorbed was I with the details of the christening, and the object for which I had set out, that fear never once found a foothold.

A weather-beaten steeplejack stood in a box at the mast-head to receive us. I recall with keen pleasure his honest greeting as I stepped out to praise his crowning work. Crash goes the bottle. "I name thee Scio." Then hands full of confetti were swiftly thrown out, described by those below us as a light cloud of shining atoms gilded by the sun. Next, there seemed to fly out from the tower a flock of pigeons. Slow and undulating in movement, they were not winged messengers of feather and flesh, but were copies of the Home News and the New Brunswick Times, cut in squares and flung into space that there might ever be a bond of friendship between our local printing press and its distinguished neighbor the wireless dispatch bearer.

A half hour amid aerial trappings impressed one with the difference of temperature, and becoming uncomfortably cold, the swings were adjusted for the descent. The pushing out from the mast as the swing leaves the box, is to my thinking the most perilous act of all, and no one, be it man or woman, who is subject to vertigo or heart trouble or of doubtful courage, should ever entertain the thought of a rope trip.

The sun which had burst through the clouds long enough to cheer the occasion, now drew back, and the twilight, as the little party started for home, seemed touched with atmospheric caution-whispers. The Superintendent looked grave and stopped at the north fifth mast to encourage the men who were still working like mad on the anchorage cables—far past union hours they tugged and struggled regardless of self.

There had been unforeseen obstacles to delay the completion of the station, due to waiting for machinery and supplies.

Twenty-four hours later the blizzard rushed upon all with incredible speed, strength and fury. The intricate yet geometric arrangement of the wires, resembling on a fair day the riggings of stately ships in repose, now hissed and whistled and boomed in the blackness of the night. Anyone bold enough to open a door quickly closed it. Had not the laboriously constructed Hatteras wireless tower gone down a few years before in a hundred mile an hour hurricane! Could "Scio" hold its own?

A messenger volunteered to reconnoiter the wireless tract and bring word of the tempest. As he passed the north fifth mast, two figures muffled to their eyes stood like snow statues, with looks riveted on the tortuous black supine steel giant that a moment before writhed in its fall before them. They were Superintendent Rossi and his head surveyor. The former, turning with a half hopeless gesture toward the next mast, the lately christened Scio, whose tip in alternate spasms quivered and bent and straightened, said: "Nothing but a miracle and the grace of God can save it." They walked slowly away, while the messenger, choosing another route, was lost in the woods, returning later in the night, panting, exhausted and wet to the skin.

Referring to the north sixth he said, "She can't stand another hour of this." Hour succeeded hour with no abatement of fury through the long stretch till daybreak. If there could only have been a short interval of rest from the storm current, so that the neck of the giant could hold its poise for a space! But it was not vouchsafed. Meanwhile, weird sounds and wind moans chanted dirges while the snow drifted and flung itself. At daybreak I crept to an attic window. The storm had spent itself, leaving destruction in its wake—great trees were snapped off like saplings, but towering above all, like a knotted giant, with its spine made of the steel of Damascus, and its tip glorified by its supreme struggles, stood "Scio." It knew how! The Storm King!

An automatic warning gun for isolated beacons

Some unique applications

A NEW application of wireless has been found by the English Marconi Company in the invention of a device for the distant control of fog signals at sea. The system is designed to prevent marine disasters which occur because of a lack of proper fog signals. The apparatus will also control safety signals in mines, on railroad trains, for blasting purposes, alarm signals between vessels and call signals for wireless telephones.

The Technical Committee of the Marconi Company had this to say in its report concerning the device:

"Now that the dots and dashes of the Morse code can be transmitted with regularity over thousands of miles, it would seem only reasonable to suppose that with the help of suitable relays, valves could be turned on and off, helms moved to port or starboard, machinery checked and started, alarms run—in fact, a whole number of useful operations could be controlled by the electric waves used in wireless telegraphy. Hitherto of the many inventions along these lines not one has come to any good result.

"Now, however, the Marconi Company has an apparatus for distant control which has been tested under the most adverse conditions possible: for from the very start it has been combined with an automatic fog gun erected on an isolated beacon in mid-sea, and has not only been left unattended for weeks on end, but has all this time been exposed to all weathers and to the interference from strong signals from ships passing close by."

A long time ago it was decided that for the safety of ships at sea passing near to the English coast it was desirable to install fog signals or isolated beacons. The Clyde Lighthouse Trust felt particularly the need of signals of this kind and the automatic gas gun provided the Trust with exactly what was needed. These signals,

unlike the wave-worked whistling buoy, would operate equally well in rough or calm seas.

Six of these guns have already been installed in Scotland and one has been sent to America. These signals not only give vessels the information that they are in the neighborhood of one of these beacons, but also (each particular beacon having its own particular signal rate of so many per minute) aid them to locate their exact position.

Once this gun is started it will continue to feed and fire itself until its fuel is exhausted. But to leave it in continual action in all weathers would obviously be wasteful and extravagant. It might be arranged to adjust the gun for firing when fog prevailed by means of a submarine cable. This would mean considerable expense, however, and besides, a cable laid on such a bottom would be liable to break at a critical time. Therefore it was decided that wireless control of the guns would be a feasible plan, and the Marconi Company undertook the solution of the problem.

In a comparatively short time the company's Research Department had patented and prepared for demonstration an apparatus which fulfilled all requirements. A trial was then arranged and the test was successfully made.

Two sets of the apparatus are now working on the Clyde. Roseneath Patch, located almost in the middle of the Firth of Clyde, has one which is erected on an isolated beacon and operated from the Coastguard station at Gourock; Fort Matilda has the other. Other sets will be put into service shortly and the Marconi Company is designing apparatus suitable for greater distances.

The fog guns, when once started, will continue to fire at intervals of about twenty seconds until the supply of acetylene gas is exhausted, which would take two or three weeks. The function of the wireless control is to enable the coast guard station to turn "on" and "off" the gun as desired, by this means prolonging the time for which the gun may be left without attention from three to four months, according to the period of foggy weather experienced.

The Marconi apparatus is applied to a Stevenson-Moyes acetylene gun. It contains a gas-admission valve introduced between the gas generator and the gun itself. This needle valve is controlled by two electro-magnets, so arranged that when the first magnet is energized the valve opens wide and allows the gas to pass freely. When the second magnet is energized the valve shuts firmly against a pressure of twenty pounds a square inch—a pressure considerably in excess of the maximum used in the acetylene gun.

Next to the valve is a water-tight metal box containing the wireless receiving gear. Connection to the receiving aerial is made through an insulator; the received signals pass through the receiving apparatus to earth. A special form of detector is used which actuates a special relay which is so constructed that, although very sensitive, it has a large movement and is therefore capable of keeping in adjustment under all kinds of temperature conditions. This end is further assured by the provision of counterbalancing springs.

Two synchronizers are an essential part of the apparatus, and make it immune from the two great troubles of wireless—atmospherics and interference from powerful signals from passing ships. It enables the same apparatus to perform two distinct functions—to turn "on" and "off" the gun. One of these synchronizers is connected to one of the two electro-magnets of the gas valve, so that when one synchronizer is actuated by the relay, it energizes one magnet and opens the valve, which remains fully open until the second synchronizer, actuated by the same relay, energizes the second magnet and closes the valve.

The second synchronizer is also in an air-tight case containing a clockwork mechanism which runs for four months with one winding. This clockwork performs a useful function every ten minutes; it strikes a sharp blow with a hammer, which gives the relay contacts a shake, gets rid of any stickiness, either in the pivots or at the contacts themselves, which might develop after several months, and at the same time causes a momentary current to flow through the detector.

A battery of dry cells provides the driving power for the whole receiving apparatus. A small fourfold aerial supported from a short mast about 14 feet high, completes the receiving apparatus.

The transmitting apparatus, installed on shore and in charge of the coastguards,

is very simple. For short distances, such as four-mile communication, it consists of a small transformer, a transmitting jigger and condenser, and the transmitting synchronizers corresponding to those of the receiving set. For greater distances the same apparatus will serve if a greater aerial height is available; failing this, a dynamo is used to provide the additional power.

The wireless control of fog signals, however, is only one application of the Marconi distant control apparatus. On all sides can be seen the opportunities for the great utility of such an apparatus. These present only a small part of the difficulties which have already been overcome.

Operations in blasting on a large scale would be rendered much safer and more certain if controlled by this apparatus instead of by time fuses, with their element of risk and uncertainty, and alarm signals for ships in a fog, worked on a separate small aerial and in no way affecting the ordinary wireless would without fail call the attention of the captain of a ship to another ship within a distance of say, four miles, in a fog which might deaden the carrying power of the siren and which might be accompanied by sufficient breeze to cause any audible alarm signal to miscarry. There are other numerous applications of the distant control apparatus.

THE USE OF WIRELESS BY THE BLIND

Following King George's appeal on behalf of the National Institute of the Blind in London, which was sent out to ships at sea by wireless on March 28, the possibilities of the service of the art to those without the power of seeing have been considerably discussed. This is what a blind man in England who is much interested in wireless telegraphy had to say concerning the matter:

"The sense of hearing is extremely keen in the case of a blind person, and this is a valuable asset to anyone taking up 'wireless.' To learn a system of signalling like the Morse code is comparatively child's play, and many blind men would have no difficulty in putting it into practice.

"The sense of tone is often very acute in the blind man, and among my acquaintances is a man who has a note for everything which will produce a sound when struck, and with the more resonant materials, such as china and glass, he will state what the note is.

"Wireless receiving outfits would undoubtedly keep the more progressive type of blind man in touch with the daily events of life. The daily news service which is sent by 'wireless' to ships at sea would be a blessing to those who are unable to get some one to read the newspapers to them every day, and it must be remembered that the blind person is entirely dependent upon others for his news of common events. Imagine with what eagerness a blind man would put on the 'phones and listen for the Poldhu daily news, and in the morning at breakfast tell of the happenings of the day before!"

He said that wireless is regarded as a coming essential in the life of the educated blind. The simplicity of the receiving apparatus, the delicacy of touch which will enable the blind man to handle an ordinary crystal detector, and the fact that batteries and other accessories are not required, makes the outfit ideal for the individual in question.

From a scientific point of view it has yet to be shown that the blind are incapable of advancing theoretical knowledge and practical applications of wireless. The educated blind men have extraordinary intuition and introspection. Many of them are firm believers in the possibilities of telepathy, and in wireless they perceive a valuable stepping-stone to that end.

TELEPHONE WIRES FOR ANTENNA

It is reported from London that the demonstration of the new style of radio telegraphic and telephonic receiver invented by Lieutenant Colonel George O. Squyer, Military Attaché of the American Embassy, created great interest at a recent meeting of the Royal Society. The invention embodies the use of ordinary street telephone wires as antenna requiring no mast.

Messages were received over long distances during the demonstration and were heard distinctly. The apparatus is inexpensive and simple and can easily be adjusted to receive a number of messages simultaneously, without interference or interruption.

New Honors for Marconi

IT has already been announced that the Council of the Royal Society of Arts, with the approval of its president, the Duke of Connaught, has awarded the Albert Medal for the current year to Guglielmo Marconi, "For services in the development and practical application of wireless telegraphy." The medal was instituted in 1862. The first was given to Sir Rowland Hill. The King received it last year.

And right behind this comes the announcement of a still greater honor to be conferred by the King of Italy. It is reported that Com. Marconi, having reached the requisite age of forty, the King of Italy will soon appoint him a Senator.

The office carries no stipend and appointment is for life. In the Senate sit all the princes of the blood who have reached their majority. A seat in the Senate is coveted by every Italian who has been of distinctive service to the world.

The royal princes are the only members of the Senate who enter automatically. All the others are appointed by the King. The number of members is unlimited, but ordinarily it does not much exceed three hundred. To be eligible, candidates must have held high office under the government or must come within certain specified categories, which keeps the standard, for the most part, high. Though the Senators receive no salaries, they are given passes over all the railroads of Italy and passes on certain steamship lines.

Com. Marconi will not be required to attend every session of the Senate, but will be summoned by the president of that body when matters of importance are pending and his presence is needed.

Besides exercising its legislative functions the Senate is the highest court in the kingdom when political offense or the impeachment of any of the Ministers of the Cabinet is involved.

While the world gratefully receives announcements of honors bestowed on this great benefactor of the human race, very little is known of Com. Marconi as a man. This is due, mainly, to his aversion to personal publicity. Thus the question is often heard, "How does he look and act?"

He has best been described as follows: "Marconi is a human dynamo. He is happiest when he is busiest."

He stands about 5 feet 10 inches, has a slim but well-knit figure, evidences energy and great capacity for work, and in face, form or characteristics shows little trace of his Italian paternity. His head is large and well shaped, with a high forehead and sloping crown. His manner is reserved, his carriage erect and his bearing confident.

While his relations with his assistants are pleasant and comrade-like, he never permits to be forgotten who is the master spirit. He impresses one as a man possessed of a great idea, an all absorbing thought, from the contemplation of which he detaches himself with difficulty.

In social life it is different, but in business he displays neither the volatility of the Italian nor the cheery cordiality of the Irishman. He most resembles the cold, deliberate, almost stolid Englishman—a strange fact, in view of his parentage. In only one respect does he show evidence of Irish blood—in the genial, winning smile which sometimes flickers on his face for a moment or two, giving way again to his ordinary aspect of extreme gravity.

A REVIEW OF NAVAL WIRELESS

The progress of wireless telegraphy in the Navy is interestingly told in a report presented to the Naval Institute by Captain W. H. G. Bullard, U. S. N., who is in charge of the naval radio service. He has his headquarters under the shadow of the three great steel masts which form the center of the naval wireless system at Arlington, Va.

It was during 1899, the year after the Spanish-American conflict, that the British Navy became the first of all of the naval powers to try the new means of communication upon the three warships —Alexandria, Europea and Juno. These ships succeeded in communicating up to a distance of 74 miles.

The first trial of wireless on American warships was made late in 1899, directly after the British ships had proved its possibilities, and to-day practically every vessel in the United States Navy is equipped with radio apparatus. The armored cruiser New York (now the Saratoga), the battleship Massachusetts and the torpedo-boat Porter were the first to be equipped. At about the same time the Highlands Light Station in New York Harbor was established as the first shore station of the naval wireless system.

In 1907–8 the development of the wireless seemed to warrant the erection of high-powered stations at Washington, on the Pacific coast, at Hawaii, Guam, Samoa and the Philippines, so that wherever it might be the United States fleet would be at all times in communication with Washington. The success of long distance communication was established during 1908, when the Hawaiian Islands exchanged messages with Farallon Islands, Cal., and later during the cruise of the Atlantic fleet around the world, when messages were received across Central America by Pensacola and Washington. By a system of relays the fleet was in touch with Washington practically every minute during the trip across the Pacific until after New Zealand was reached.

Congress for the first time took notice of wireless in the act of June 24, 1910, which was amended by the act of July 23, 1912. The Titanic disaster of April, 1912, riveted the attention of lawmakers anew to the necessity of government control over wireless apparatus and its operation. Further laws were passed, and the president proclaimed the Berlin wireless convention, since succeeded by the London wireless convention, establishing general rules for wireless as to ships throughout the world.

The Mexican trouble led to further extension to take the place of interrupted land lines and for exchanges with the ships. Isabel, Texas, near the mouth of the Rio Grande, was chosen as the central point of operation on the Atlantic side and San Diego on the Pacific side.

The chief work of the naval stations is to keep the Navy Department in connection with its ships at sea, either by direct or relayed messages. This service extends to all bureaus, offices and divisions of the Navy Department, those in command of navy yards and stations, and to officers of fleets, divisions and ships.

The daily weather reports and storm warnings are sent from Arlington and Key West a few minutes after the 10 o'clock time signal at night, but important storm warnings are sent whenever necessary. Incoming ships are compelled, under the London safety convention, to report information concerning ice and derelict; this goes through the hydrographic offices to the Arlington station and then eastward and to other stations.

This information being of an urgent character—icebergs, derelicts, cyclones and typhoons—is sent under a special signal, called the safety signal, repeated at short intervals, ten times at full power (T T T). On receiving this all wireless stations are required to keep silent, in order to let the danger warnings go broadcast.

More recent developments of the naval wireless work are the fog signals and direction finders, by which the dangers attending fog are overcome, and the location and direction of ships in reference to shore stations are established; also, a rapid development of commercial work by which the general public and the press are allowed to use the wireless equipment aboard warships and at shore stations, on payment of land and sea charges. These charges are regulated under the London convention, and the amounts collected by naval coast or ship stations are turned into the Treasury as miscellaneous receipts.

How to Conduct a Radio Club

By E. E. BUTCHER

ARTICLE VI

IN the June issue of this series the writer described an opposition method used in connection with a break-in system in which the receiving detector is completely protected from the transmitter by the simple use of a coil shunted across an anchor gap in series with the earth. The same results may be obtained if the opposition coil is used after the manner shown in Fig. 1. In this method the connection is somewhat simplified, as no extra contacts are employed to break the circuit of the opposition coil during the periods of reception. This is explained further on in the article.

In the drawing, Fig. 1, the aerial at any station is represented at A, the aerial tuning inductance at L_2, the secondary of the transmitting oscillation transformer at L_1, the primary of the latter at L.

The receiving tuner has the primary winding L_5 shunted across the earth gap S, and the secondary winding L6. As explained in the previous article, the receiving tuner is connected to the aerial at all times and during the periods of transmission the energy in the open circuit discharges to earth across the gap, S.

In place of the connection shown in the June article, the energy for the opposition coil, L_4, is taken by inductive coupling from the closed circuit of the transmitter through the coil, L_3. The entire opposition circuit, L_3, C, L_4, is so proportioned as to have about the same wave-frequency as the incoming signals. Of course the wave-length of this circuit may be varied over a considerable range by the variable contact on each coil, as indicated in the drawing.

For actual working these elements may be proportioned as follows:

The condenser, C, should have capacity of the order of .002 or .003 mfd. The coil, L_3, should be made similar to winding L—that is, it may consist of 6 to 8 turns of, say, No. 8 wire spaced about ½ inch. L_3 should move freely and be so arranged that a reasonable degree of coupling between it and L may be obtained. In operation, however, it will be found, in the majority of experiments, that the value of coupling between the two coils is very small indeed. The winding, L_4, is made similar to the primary winding of the tuner, L_5. It is placed in inductive relation to L6, as shown in the drawing.

It is of course apparent that the values of the elements composing the opposition circuit must be varied according to the wave-lengths it is desired to receive. A little experimenting will determine the correct values of inductance and capacity to be used.

The operation of this circuit is as follows:

When the transmitting key (not shown) is depressed, if it were not for the opposition circuit, considerable energy would flow in the receiving tuner circuits, destroying the sensitive adjustment of the crystal; but owing to the presence of the opposition coil, L_4, and the fact that the energy absorbed from the closed circuit by L_3 flows through it (L_4), the current which otherwise might flow through the detector circuit is opposed and annulled. Thus, each time the transmitting key is raised the receiving apparatus is in working condition and an efficient "break in" system is effected.

Without much forethought it may appear highly desirable to break the circuit of the opposition coil while signals are being received, but it has been found by experiment that the opposition circuit need not necessarily be in resonance with the local detector circuit, for owing to the amount of energy available from the closed circuit, oscillations of a given frequency or wave-length may be forced

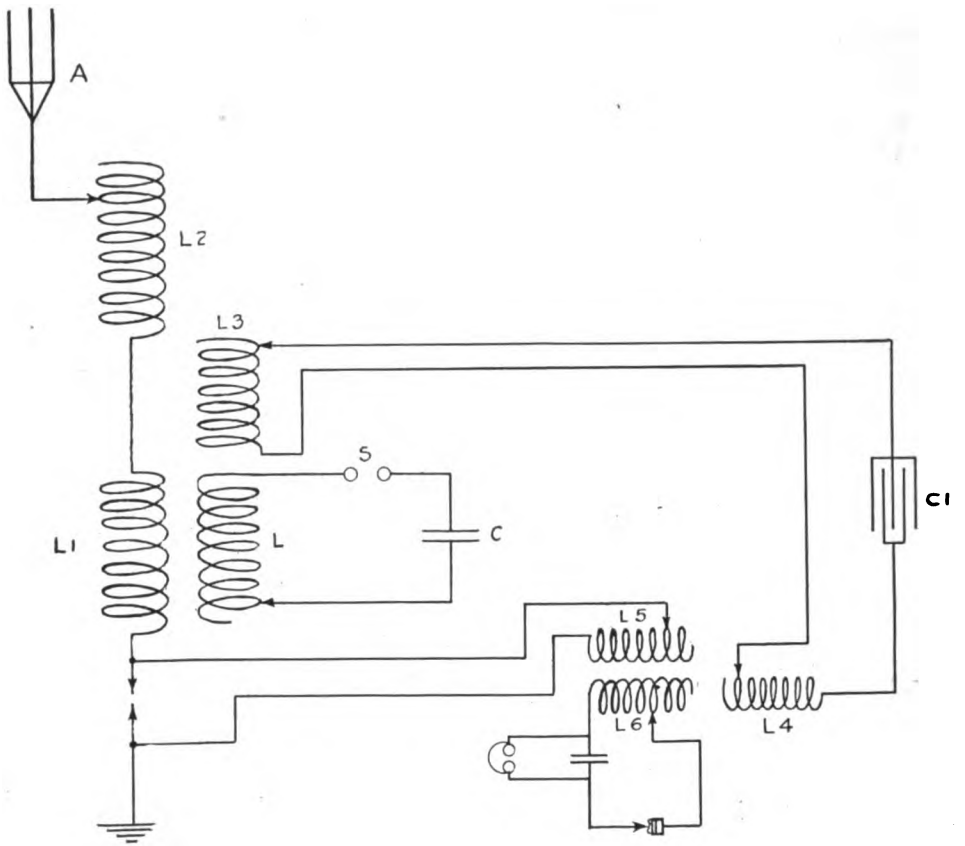


Fig. 1

into the opposition circuit whether it is in resonance or not; therefore a very small amount of the energy of the *received* signals will be absorbed from the local detector circuit on account of the difference in wave-length of the two circuits. However, if desired, the opposition circuit may be broken by an extra pair of contacts mounted on the transmitting key as shown in the previous article.

To bring this apparatus into efficient working condition, several trials are necessary. For instance: the coupling at L and L_3 must be of a certain value and the same statement applies to the relation of the windings, L_4 and L6. The number of turns at L6 must be varied until complete silence in the head telephones is attained.

When making the preliminary tests, it is preferable to use a carborundum crystal as the detector; when the proper adjustments have been made, crystals of the less rugged type may be substituted.

In connection with the various "break-in" methods described, it may be added that members of a radio club cannot overestimate the benefit to be derived in the adoption of one of these systems at the club station.

As a preventive of unnecessary interference it has no equal, for without effort on the part of the operator, he is able to hear while sending when other transmitting stations in his vicinity are interfering with the station receiving. Thus he is able to give slight pauses during his sending and literally pick his way through the atmosphere. Equal advantage is derived at the receiving station because the receiving operator is enabled to interrupt or stop the sending operator as he desires, notifying the sending operator when he (the receiving operator) is encountering hostile interference from stations in his vicinity.

Very frequently the writer has received requests from amateurs for a description of some method for the elimination of humming noises due to induction from nearby trolley, telephone or telegraph wires. It is a well-known fact that when a wireless telegraph aerial is placed near the alternating current power lines of high or low potential, particularly when in a parallel position, very objectionable noises are produced in the receiving head telephones. A number of experiments have revealed that such effects can be reduced to a minimum in a remarkably simple manner. With the aid of the diagram shown in Fig. 2, we shall explain how this may be accomplished.

P and S represent respectively the primary and secondary windings of an ordinary receiving tuner at a certain station. In this particular station, the aerial A is practically parallel and about 400 feet distant from a 2,200-volt A.C. power line. In addition, the house wiring was not placed in a metallic conduit, which amplified the effects. Very loud inductive noises were produced which seriously interfered with any except extremely strong signals, making long distance work entirely out of the question.

In an effort to eliminate the trouble, the wires, B, leading to a lamp socket in the radio room were interrupted at C and two leads connected to the winding, S1. S1 was of the same dimensions as P and readily moved in or out of S. S1 was also in magnetic opposition to S. By proper variation of the coupling between S and S1, the humming noises were almost entirely eliminated. Of course the presence of the winding, S1, had the effect of reducing the strength of the received signals, but it allowed the reception of messages which otherwise could not be heard.

Elimination of Arc Light Induction

Another flagrant case of induction trouble may be solved in the manner shown in the diagram in Fig. 3. Here the aerial wires, A, lay parallel to an arc light circuit of considerable potential, B. The inductive noises generally produced under such conditions are terrific and defy all attempts at elimination. Of course the arc light wires cannot be tapped and the opposition coil method adopted as described. But the effects may be reduced if a single aerial wire, B, is strong underneath or near the two power wires, C. This wire is then connected to a coil, S, which is inductively coupled to the secondary winding of the

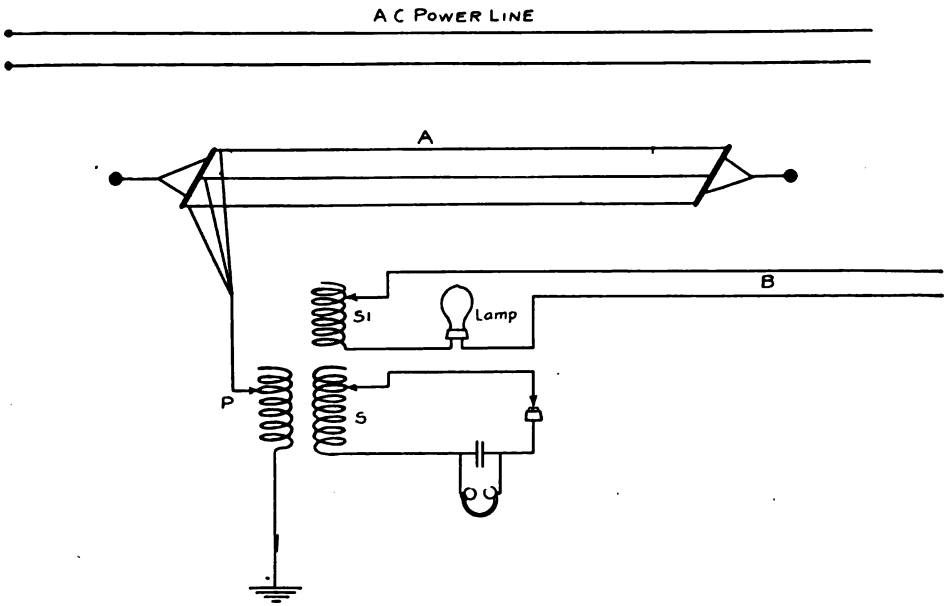


Fig. 2

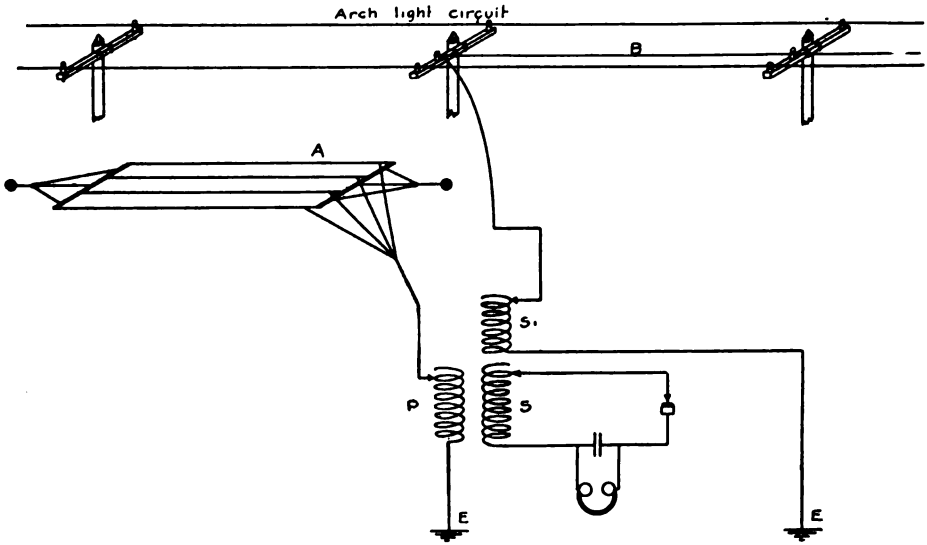


Fig. 3

receiving tuner, S. The energy set to by the power lines in A will be opposed by that flowing in the special aerial, B, and if proper coupling adjustments are made at S and S1, complete silence in the head telephones will be obtained. Care must be taken to see that these coils (S and S1) are in opposition; otherwise the induced noises will be increased.

It is best that the single aerial wire, B, be placed at a considerable distance from the receiving aerial A, and if possible B should be placed in the opposite direction to A.

(*To be continued*)

Wireless to Replace Cable

From all indications it would appear that the new Marconi station at Miami, Fla., will remain the only means of communication with Nassau, Bahamas, and the United States. Several months ago cable communication was interrupted and the new wireless station was called upon; according to P. H. Burns, superintendent telegraph department of the Nassau Government, the wireless service rendered since May 1 has been entirely satisfactory and the Nassau officials have decided to give the wireless service one year's trial. If it proves as satisfactory it is planned to adopt it exclusively in place of the cables.

It is understood that all negotiations for repairs to the present submarine cable or the installation of a new one have been called off, because, to quote Mr. Burns on Miami: "We are getting prompt attention and very satisfactory service."

While the message traffic with Nassau during the summer months is light, it is correspondingly heavy in winter, and the Miami station will become one of the most important on the East Coast.

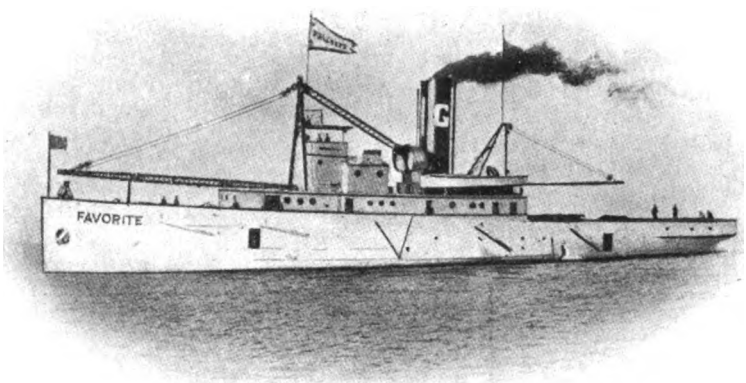
Although Great Britain has hitherto taken no very prominent part in the organization of an international wireless time service, there are indications that the subject is beginning to arouse public attention in that country. With the object of obtaining information concerning the matter a number of questions were asked in the House of Commons.

Interesting Equipments

THE Str. Favorite engaged in towing and wrecking on the Great Lakes for the past seven years, and owned by The Great Lakes Towing Company, has been recently equipped with a 2 k.w. Marconi set at Houghton, Mich.

The Favorite is a wrecking tug of 1,233 gross tons, 196 feet long, 43 feet beam and a depth of 19 feet, 6 inches. She has two Scotch Marine boilers 11 feet 6 inches long and 15 feet in diameter, each allowed a working pressure of 180 pounds; and has a triple expansion engine with 22 inch, 36 inch and 60 inch cylinders with a 30 inch stroke.

The tug is constructed of steel throughout and carries the following equipment: A steam windlass and steam capstan; an A. frame derrick forward, with powerful hoisting engine, operating a 3 ton grab bucket; a patent sectional collision mat to cover fracture 20 feet by 30 feet, a derrick with steam hoist aft, for handling equipment; a special towing machine with 1,800 feet, 2 inch steel towing cable; a complete machine shop and iron working tools to handle plate up to one inch in thickness. A stationary air compressor that will furnish 500 feet of free air per minute at 100 pounds pressure is installed as well as three portable compressors with portable boilers. Also ten large wrecking pumps and boilers, 30 100-ton hydraulic jacks and steel hutchicks; a power sawmill for handling lumber and blocking; a full equipment of submarine and portable electric lights and a powerful searchlight. The steamer has a full complement of supplies, ship chandlers stores and other materials for wrecking purposes, and a gasoline power launch.



Great Lakes Towing Company's wrecking tug "Favorite"

The Favorite carries a crew of 26 men, is commanded by Capt. Cunning of Port Huron, Mich., and is said to be the best equipped wrecking tug in the world.

Contract News

A contract has been closed for the equipment of Cornelius Vanderbilt's yacht North Star with a standard 2 k.w. Marconi set and an independent emergency plant. The apparatus has been shipped abroad and will be installed before the yacht leaves the English shipyard where is being built a special cabin for the apparatus and operator.

An interesting contract closed by the

American Marconi Company provides for the installation of standard Marconi sets and emergency plants on the Mallory Line freighters, Ossabaw, Satilla and Colorado. These three vessels have been chartered by the U. S. Government and will be used as transports for the troops in Mexico. The ships, which are being equipped in Galveston, will each carry two operators.

A 2 k.w. Marconi set is to be installed on the SS. Char Knudsen, under charter by the Inter-Ocean Transport Company.

The SS. Energie, owned by the National Railways of Mexico, is to have installed a standard Marconi equipment and emergency plant. This vessel is engaged in the oil trade between Mexico and American ports.

Engaged in the same trade, the SS. La Hesbaye, of the Freeport Tampico Fuel Oil Corporation of Houston, Tex., will carry a 2 k.w. Marconi set and independent power plant.

The Texas Company has contracted for installations of standard Marconi sets on the freighters Florida and Brabant.

VESSELS EQUIPPED WITH MARCONI APPARATUS SINCE THE JUNE ISSUE

Name	Owners	Call Letters
El Mundo	Southern Pacific Company	KKU
Paraiso	Craig Shipbuilding Company	WRI
North Star (tug)	Libby McNeill & Libby Co.	WHR
Brabant	Texas Company	OOB
Bessie Dollar	Dollar Steamship Company	VGZ
Florida	Texas Company	KUS

THE SHARE MARKET

NEW YORK, June 19.

In spite of the reorts of bumper crops and a healthier tone to business, persistent liquidation for many months seemed to have so weakened the market that favorable reaction is short-lived.

It is evident that confidence has not yet been restored, but with the quotations on standard industrials on a bed-rock basis, the future recovery to normal levels rests entirely with the general buying public. The professional speculators are inactive now and the stocks which have withstood their attacks should respond to any movement or influence based on the common sense view that securities are now selling below their intrinsic value.

Bid and asked prices to-day: American, 3¼—3½; Canadian, 1½—1⅞; English, common, 13—15; English, preferred, 10—12½.

It is reported that John Hays Hammond, Jr. has perfected at Gloucester, Mass., a wireless telegraph apparatus for aeroplanes which he intends to sell to the government.

SERVICE ITEMS

Announcement has been made of the marriage, on May 2, of Bertha Elizabeth Sanda to Edward Cole Newton, Superintendent Great Lakes Division, Marconi Wireless Telegraph Company of America. Mr. and Mrs. Newton will make their home in Cleveland, O. Mr. Newton has been associated with commercial wireless telegraphy for eight years, first as marine and land station operator, and has for the past five years served in his present capacity.

John R. Binns, the noted "Jack" Binns, of Republic fame, and Miss Alice A. Macnif were married on June 3, at the home of the bride, 1722 Caton Ave., Flatbush. The ceremony was performed by the Rev. Charles W. Flint, pastor of the New York Avenue Methodist Church, of Flatbush. The best man was E. T. Edwards, Superintendent of the Eastern Division of the Marconi Company, who has been a friend of Mr. Binns for twelve years. Mr. and Mrs. Binns spent a two weeks' honeymoon at Atlantic City, Washington and Old Point Comfort.

From and For those who help themselves

FIRST PRIZE, TEN DOLLARS

A Receiving Transformer of the Rotary Type

I have recently constructed a receiving tuner of the rotary type. An explanation of the figures accompanying my article follows:

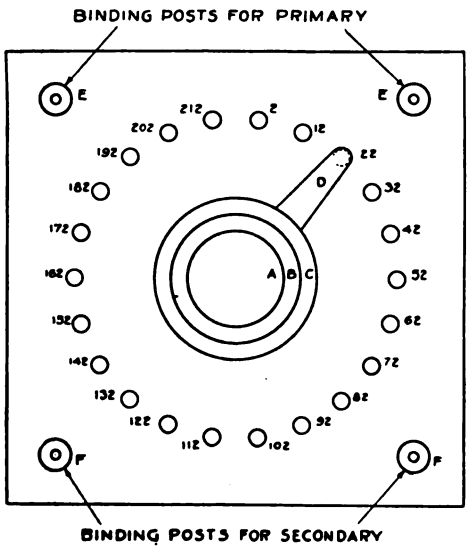


Fig. 1, First Prize Article

Fig. 1 is an elevation of the front of the tuner, showing the knobs for the adjustments of inductance in the primary and secondary circuits and for variations of the degree of coupling. Fig. 2 is a detail sketch of the mounting of the knobs to the various rods. Fig. 3 is a side elevation, showing the relation of the primary and secondary coils to one another. To construct this tuner, first make a box of quarter-inch wood, such as pine, 7 x 7 x 9 inches in size. If a variable condenser detector or other instrument is to be included in the set, the box should have dimensions 7 x 7 x 14 inches.

On the front side of this box mount a 22-point switch made of bright brass-headed tacks. This switch is for the purpose of varying the amount of wire in use on the primary winding. Next cut a ¼-inch wooden disc 2½ inches in diameter and mount on it an 11-point switch made of brass tacks which is connected to the secondary winding. The latter switch is fastened to the rear of the brass tube (to which reference is made further on) and soldered thereto as suggested. (Fig. 2, G).

Obtain a brass tube ¼ of an inch in diameter, about 7 inches in length and a brass rod a trifle longer to fit inside it, as shown at RT, Fig. 3. (I used a curtain rod.) Two pieces of glass tubing, ½ inch and 1½ inches long respectively, are fitted over the tube so that the latter fits tightly, but moves freely through the primary coil, as per Fig. 3.

Make three ¼-inch wooden discs, A, B and C. Disc A is 1½ inches, B is 2 inches and C is 2½ inches in diameter. On the back of A and at the center tack a small piece of tin. Then bore a hole the size of the brass rod through the tin and extend it halfway through the disc. Insert the rod and solder it to the tin. Bore a hole the size of the brass tube entirely through the center of B, soldering to this tube a piece of tin as with A. Next bore a hole in

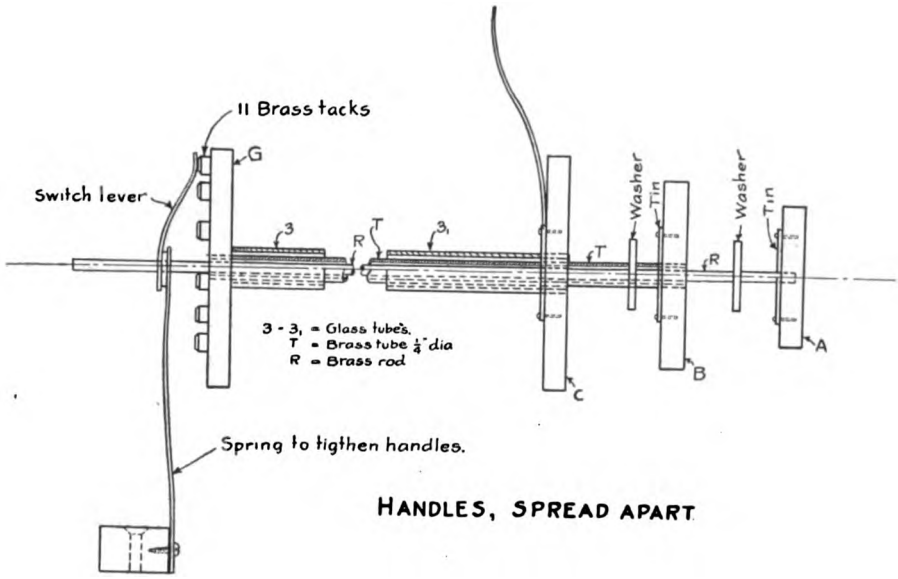


Fig. 2, First Prize Article

the center of C, and insert the longer glass tube, which acts as a hub for this disc as per Fig. 3 (3 and 3). C turns around readily on the glass tube.

The frame of the primary is made of two pieces of ⅛-inch wood taken from the back of a picture frame, reversing the grain of each piece to strengthen it and gluing it securely.

By means of a compass, draw a circle 6½ inches in diameter, and inside it, another of 5⅞ inches in diameter. These are then sawed out, making a strong grain. The other side of the frame of the coil is of course made in the same manner. A strip of strong cardboard 1½ inches in width is then made into a tube to fit the inside of the two circular pieces of wood, forming a barrel upon which to wind the wire. The cardboard is then glued in place firmly. This barrel is then wound with No. 22 wire and connected to the contact points of a 22-point switch.

The frame for the secondary is made from wood and cardboard in the same manner as the primary, but the circles are reduced to 5⅛ inches in diameter.

This barrel is fastened firmly to the brass tube by gluing it (after it has been wound) to the rod (Fig. 3). It is wound with No. 28 wire, taking the taps to the 11-point switch. As the secondary has an axis of a quarter a revolution, care should be taken to give enough slack wire to allow for this movement.

After the apparatus has been assembled, solder the brass switch lever to the back end of a brass rod as indicated in Fig. 2. A tension spring to hold the primary switch lever tight on the contacts is indicated at 4, Fig. 3.

The operation of the instrument is as follows: To vary the amount of wire on

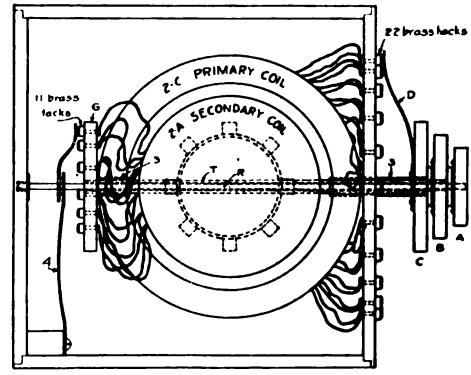


Fig. 3, First Prize Article

the primary, simply turn the switch handle C, Fig. 1, which swings the lever D, Fig. 1, over the contact points. To vary the amount of inductance in the secondary, turn the smallest handle to the right or left which moves the switch lever, Fig. 2,

over the contacts on the disc G, Fig. 2. In order to vary the coupling between the primary and secondary windings, turn the middle handle. This turns the secondary in or out of the primary coil, and also the disc G, Fig. 2. Of course this moves the small handle right with it, but the coupling is varied without changing the position of the switch lever, Fig. 2, on the disc G. CHARLES WALTER CUSHING,
North Dakota.

NOTE.—For best results from a tuner of this type, arrangements should be made for the use of a variable condenser in shunt with the secondary winding, and another in series, or in shunt with the primary winding. These will give a fineness of adjustment that cannot be obtained by the use of the multiple point switches alone.—*Contest Editor.*

SECOND PRIZE, FIVE DOLLARS

An Efficient Home-made Transmitting Condenser

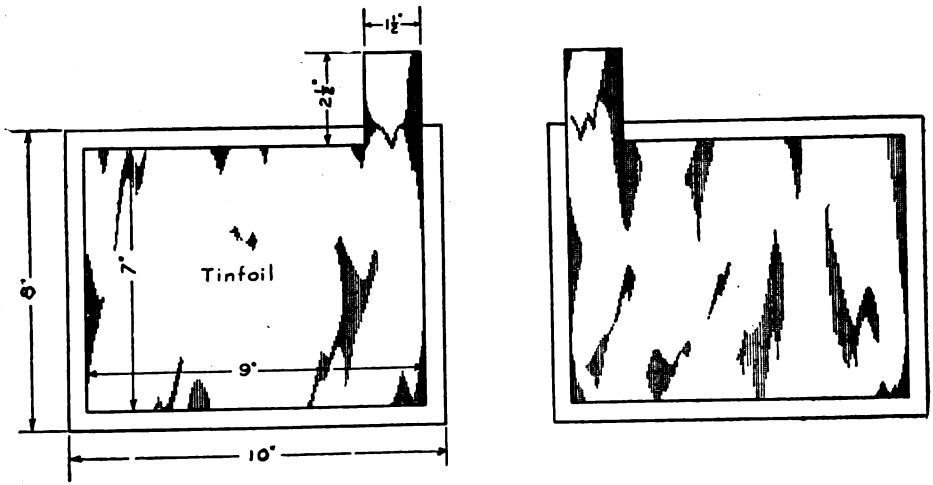
Many amateurs who own transmitting sets of ¼-k.w. capacity or over, experience trouble with the condenser. Home-made condensers are often a failure and those of good manufacture are generally too high-priced for the pocketbook. The condenser I am about to describe is cheap, easy to make and efficient.

First procure seventeen 8 x 10-inch glass plates from a local photographer. From an electrical store purchase ½ pound of heavy tin foil 7 inches in width, a small can of shellac and a gallon of transformer oil. If transformer oil cannot be secured, use linseed oil.

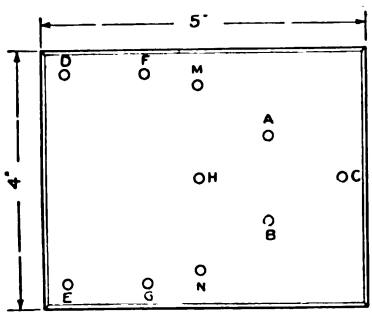
Give the tin foil to the washerwoman with instructions to iron to smoothness. Cut it into 16 sheets, each 7 x 9 inches, leaving on the right hand corner, in a lengthwise position, a tab about 2½ inches long and 1½ inch wide, as at A, in the accompanying figure. Round off all corners, as in the diagram. The plates are prepared for use in the following manner:

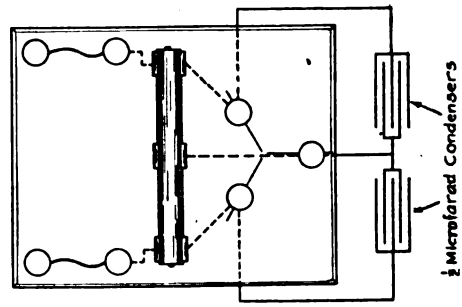
Set one plate down and cover it with a light coating of shellac on one side around the middle portions. Next place the tin foil exactly 1 inch from each edge of the plate, having the tab come out on the right as in the figure. Place another tab on top of the first one, laying the tin foil in the same position as in the first place. The tab of the second plate issues from the upper left hand corner. After the plates are completed, they are bound together with friction tape which is also wound over the tabs as a matter of protection.

When completed, allow the condenser to stand for two days until the shellac is thoroughly dry. Next secure a tin tray or pan of sufficient size to accommodate the condenser. It should have a depth of about 2½ inches. Place the condenser in the tray and pour in transformer oil until the plates are completely covered. Care should be taken to see that the tabs or foil do not touch or come within sparking distance of the pan. I have used the foregoing condenser on my 1-k.w. set and it



Figure, Second Prize Article





Figs. 1 and 2, Third Prize Article

has given excellent satisfaction. It has a capacity of .01 microfarad.

WILLIAM H. LYON,
Massachusetts.

THIRD PRIZE, THREE DOLLARS

An Absolute "Kick-back" Preventer

Many amateurs suffer much annoyance from the "kick-back" of high tension currents from the wireless aerial into the power line, the results being blown out fuses, burned out wiring meters and lamp sockets. In my case, the result was a grounded line which made the meters spin around at an enormous rate and at the same time burned out the wiring in a neighboring house. All this happened from the "kick-back" of a small ½-inch induction coil. The following is a positive and sure method for the prevention of potentials induced in this manner.

A base 4 x 5 inches is made of any suitable material, but preferably of slate. It is drilled for 8/32 bolts as shown in Fig. 1. Now put a 2-wire binding post in each hole; also insert three ordinary needles in the three binding posts, A, B and C, Fig. 1, and adjust them so as they form a gap of about 1/32 of an inch in length. At D and E, and F and G, place fuse clips and insert fuses at the amperage needed for protection. At M and N also put 2-fuse clips to hold a resistance rod of 3,000 or 5,000 ohms. These rods are of graphite and may be purchased from the Electro-Importing Company for fifty cents. At the center of this rod make a connection, fastening it to H. The wiring diagram is shown in Fig. 2, binding post H being connected to C underneath. Next connect two ½ microfarads condensers in series and shunt them across A and B and between the two condensers make a metallic connection, extending it to binding post C, and the preventer is finished.

It can be seen readily that an exceedingly small amount of line current will flow through 5,000-ohm resistance, and therefore the consumption of energy on this account is, practically speaking, nothing; but a high frequency discharge will travel through this rod quite easily and flow to the earth. Binding post C is connected to the ground and therefore induced potentials may take the choice of three ways to the ground: through the rod, the condenser, or the needle gap. Binding posts D and E are shunted right across the source of current. Fig. 3 shows the completed instrument.

HAYDEN P. ROBERTS, Ohio.

NOTE.—Apparently our correspondent has combined all the known methods for the prevention of the ill effects of electro-static induction into one piece of apparatus, and we agree with him, with the choice of paths afforded the high potential surges need not suffer from indecision as to which is preferable.—*Contest Editor*

FOURTH PRIZE, SUB CRIPTION TO THE WIRELESS AGE

A "Variable Fixed" Condenser for Amateur Use

The following is a description of an instrument comprising several fixed condensers of different capacities, so arranged that any or all may be connected in the circuit, making it variable to a considerable degree. A list of the materials required follows:

Seventy-four square inches of tin foil; 144 square inches of wax paper 0.001 of an inch in thickness; 25 square inches of brass 1/16 of an inch in thickness; 3 feet of ⅛ of an inch round brass rod, 3 feet of

cable composed of from 6 to 12 strands small copper wire (about 32 B and S); 8 6-inch cables (those of the cord type are preferable); 5 binding posts, and a case about 10 x 4 x 3 inches.

Cut the tin foil into sheets 1 x 1¾ inches and the paper into sheets 2 x 1½ inches. The dielectric of the first condenser should be composed of three thicknesses of paper and the next of two thicknesses. Each of these condensers have 2 sheets of tin foil. The dielectric of the remaining 5 should be a single thickness of paper and the number of sheets should be 2, 3, 5, 9 and 17 respectively.

If the dimensions given here are used, the approximate capacity of these condensers in their respective order will be 0.000018 mfd., 0.000042 mfd., 0.00016 mfd., 0.00033 mfd., 0.00066 mfd., 0.00133 mfd., and 0.00266 mfd.

Two rolls of brass plates, each plate having dimensions of 1 inch by 1½ inches, should be screwed into the top of the case as shown in the accompanying drawings. There are 13 plates in each row; short lengths of cable are used to connect these plates with the condensers after the manner shown in Fig. 1.

Next cut a number of plugs ¾ of an inch in length from the brass rod of the size to fit the hole. These should be tapered almost to a point; solder one of these to each end of 4 of the 6-inch cords and to one end of each of the other 4 cords. The remaining plugs are for use in establishing contact between the plates. Drill a 3/32 of an inch hole in each of the three brass plates and fasten these on the end of the case.

They are to be connected to the aerial inductance and the earth, and allow a quick change from a shunt to a series condenser if the condenser is used on the aerial circuit of the tuner. Having a maximum capacity of 0.005 mfd., and a minimum capacity of less than 0.00001 mfd., this condenser may be used across the phones or the secondary winding of a "loose coupler." By proper arrangement of the plates, the operator may connect several condensers in series, multiple, or series multiple. The 4 cords with plugs on both ends are used to bridge over the condensers not wanted in the circuit.

The plates in the top of the case should not be placed closer than 1/32 of an inch or a relative large capacity between them will result. Also, a thick dielectric with a small surface of tin foil is to be avoided or the capacity will be next to nothing.

The formula for condensers in series is,

$$C = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}}$$

and for condensers in parallel,

$$C = C_1 + C_2 + C_3, \text{ etc.}$$

Thus it may be seen that almost any desired capacity may be obtained.

AUGUST SCHMIDT, JR., New York.

HONORABLE MENTION

An Efficient Pocket Wireless Set

The accompanying photograph shows a pocket receiving set which I constructed some time ago and with which I have ob-

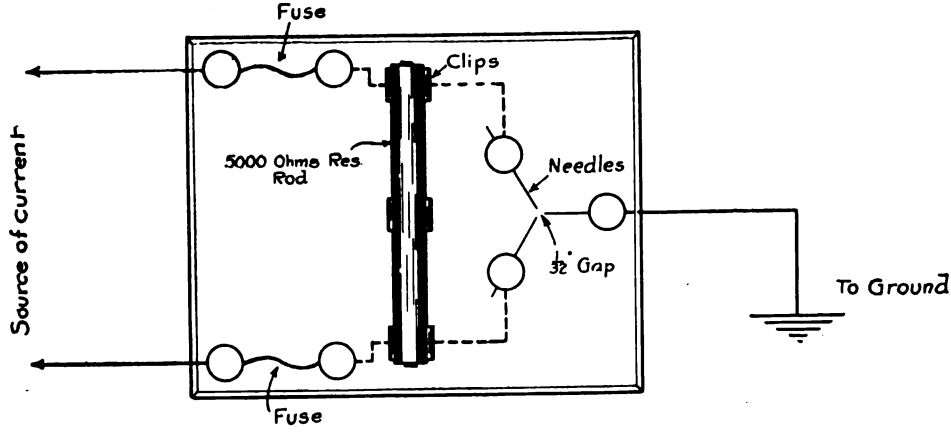
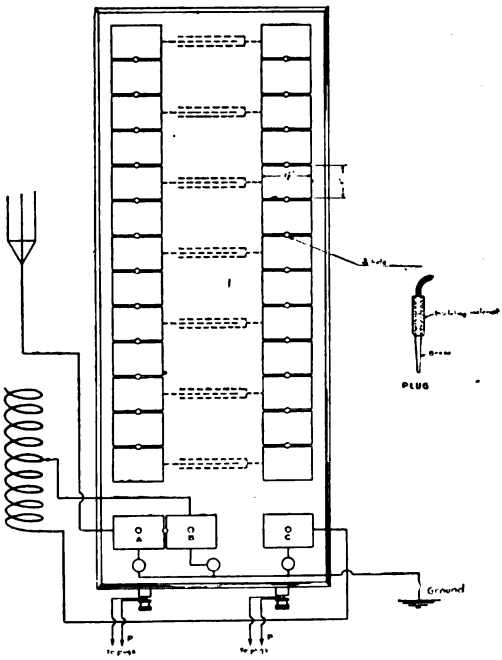


Fig. 3, Third Prize Article

tained excellent results. An Ingersoll "Yankee" watch is shown beside the set for comparison. With this outfit in connection with an aerial 60 feet high and 100 feet long, I have been able to hear NAM, NAI, NAA, WSL, WCC and many other



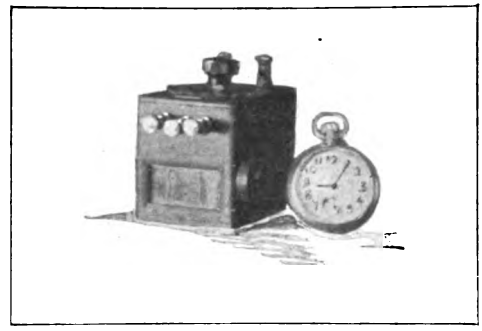
Figure, Fourth Prize Article

government and commercial stations along the Atlantic coast. Without using a loading coil, I have heard WCC fifteen feet away from the receiver. NAA and WSL come in equally as loud with this set, using a loading coil and the antenna referred to.

For construction, a box is made of 1/8-inch mahogany, the outside dimensions 3 1/2 inches long by 2 3/8 inches wide by 2 3/4 inches high. A window is cut through one end of the box which measures 1 3/4 inches by 7/8 inch. It is cut 3/8 of an inch up from the bottom and 3/8 of an inch from either side. A piece of glass or mica is glued over the window on the inside of the box.

The loose-coupled receiving tuning coils are made as follows:

Primary tube 2 5/8 inches long by 2 inches outside diameter, wound with one

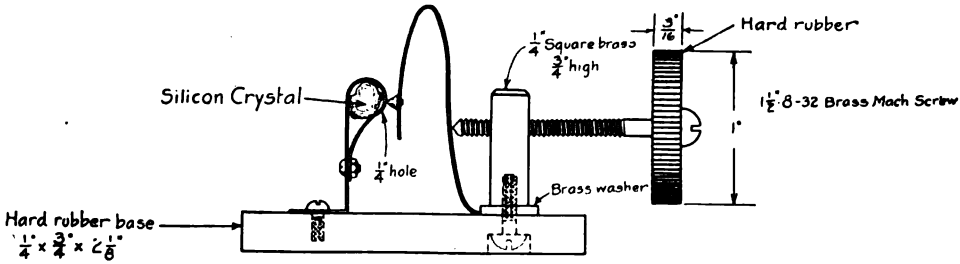


Photograph, Honorable Mention Article, James B. Armstrong

layer No. 30 enameled wire, tapped every 1/8 of an inch. Secondary tube 2 5/8 inches long by 1 5/8 inches outside diameter, wound with No. 30 enameled wire, no taps necessary.

The primary taps are connected to the points on a 20-point rotary switch on the box cover. An electrose knob is used to rotate the switch arm.

DETECTOR CONSTRUCTION



Figure, Honorable Mention Article, James B. Armstrong

Two medium sized binding-posts are fastened to the cover near the back. One of these posts is connected to the switch arm while the other is connected to the remaining end of the primary winding.

A silicon detector is made as per sketch, of springy brass ribbon about 3/8 of an inch wide. The detector knob is of hard rubber.

Without any loading inductance, the set will tune up to 1,800 meters in connection with an aerial 100 feet long, or more. A loading coil made of 200 turns of No. 30 enameled wire 1½ inches in diameter will bring the wave-length up to 2,500 meters. A loading coil like this may be

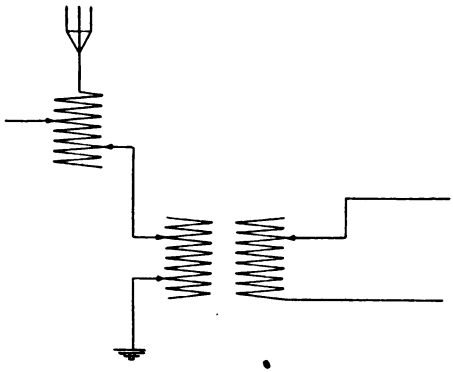


Fig. 1, Honorable Mention Article, Thomas W. Benson

placed in the box and connected to a suitable shorting switch on the rear end.

A fixed condenser is shunted across the binding-posts on the front end of the case, which is intended for the receiver connections. The detector is glued to the bottom of the box just behind the window, the knob projecting through a hole on one side, as in the photograph. The middle binding-post shown is to be used to connect in an extra detector from outside. I often use galena.

In conclusion I would say that I have had considerable success with a receiving set inside of an old Ingersoll watch case, the instruments consisting of inductive tuner and detector.

JAMES B. ARMSTRONG,
Massachusetts.

NOTE.—With a non-adjustable secondary of this type, the oscillations are necessarily forced, but if very tight coupling is used, the set will be responsive over a wide range of wave-lengths. Tests made on a secondary coil of similar dimensions, when shunted by a condenser of .001 mfd. maximum capacity, indicated a range of wave-

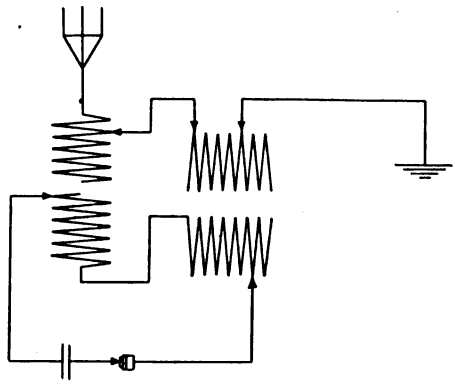


Fig. 2, Honorable Mention Article, Thomas W. Benson

lengths of from 200 to 1,600 meters. With tight coupling this secondary should respond to 2,500 meters.—*Contest Editor.*

HONORABLE MENTION

Loading Coils

As far as amateur sets are concerned, this is the day of loading coils. This is because the large commercial and government stations use waves far in excess of the range of the regular tuning apparatus in the amateur stations. I intend to describe a few methods of proven value that will enable the amateur to receive

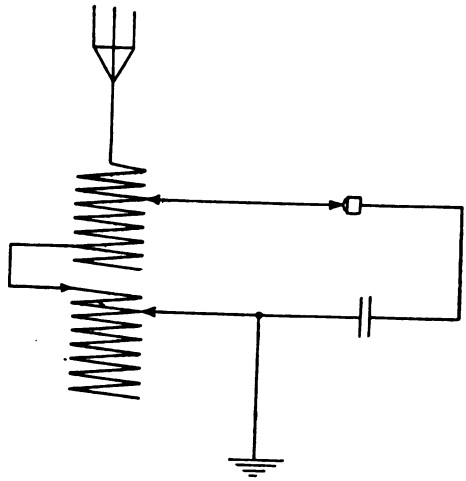


Fig. 3, Honorable Mention Article, Thomas W. Benson

signals from high power stations and therefore increase the value of his set.

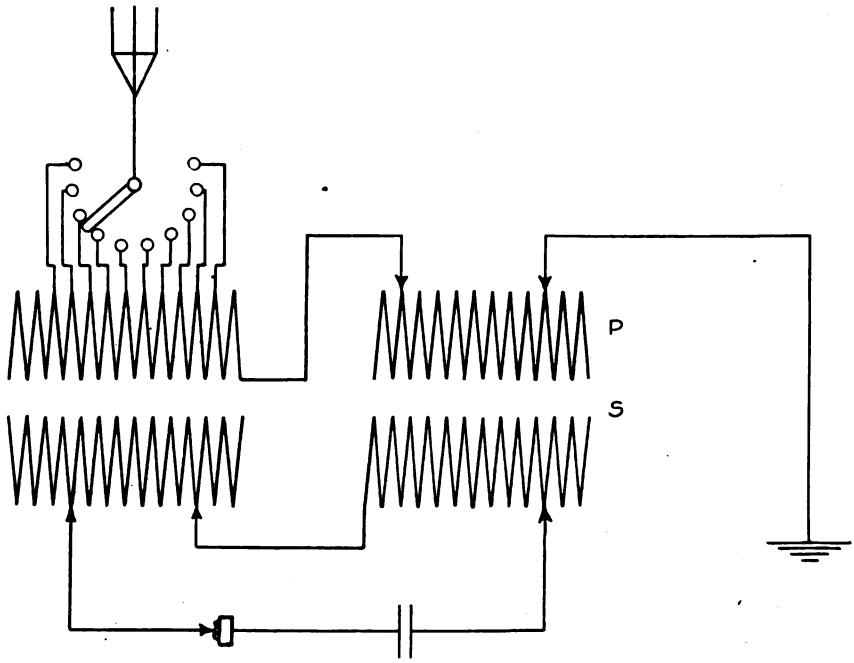


Fig. 4, Honorable Mention Article

Two methods can be used, one in which inductance is added in the circuit and the other in which capacities are placed in parallel with the regular inductances, thereby increasing the wave-length of the circuit.

I shall deal with the first method only. Many are "loading" with a tuner connected as shown in Fig. 1. This will work, but a better way to use a double slide tuner is shown in Fig. 2. Here the wire on the tuner is divided into 2 coils by cutting out 1 or 2 turns. This change will greatly increase the intensity of the signals as the secondary can be balanced up by adding inductance, which is also inductively coupled to the primary circuit.

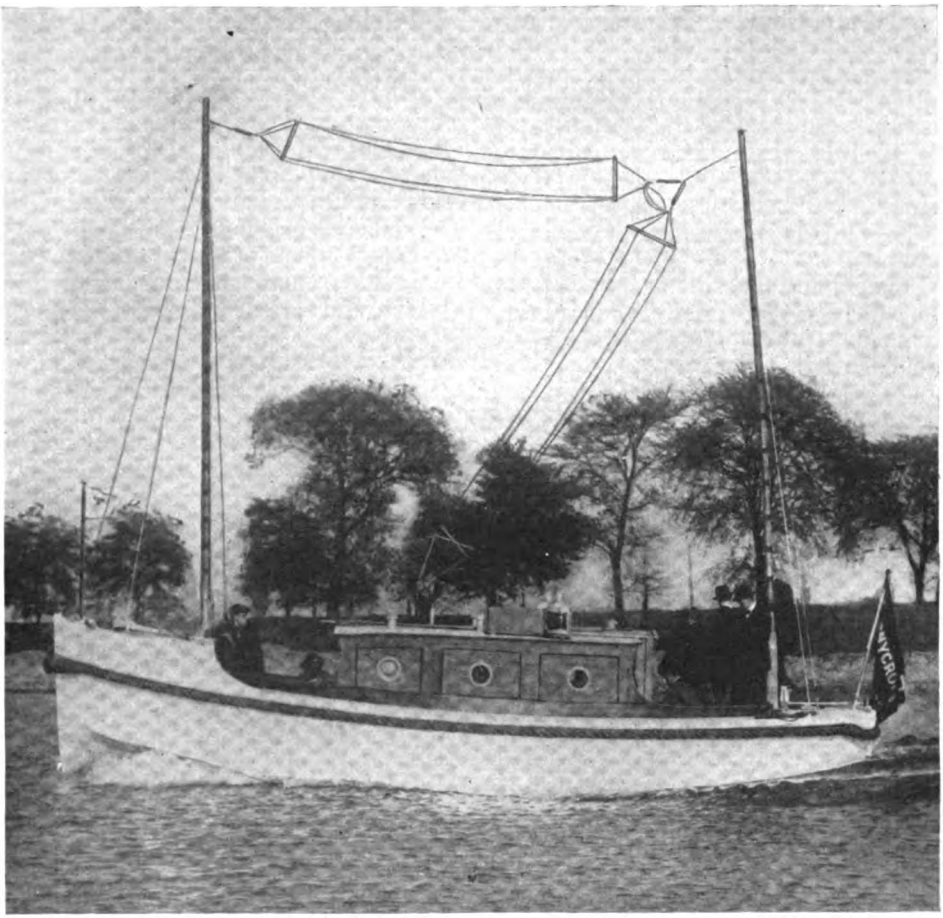
If a double slide tuner is used in connection with a single slide tuner as a loading coil use the hook-up shown in Fig. 3 for the best results.

The three methods described are really nothing more than new hook-ups, so I shall now describe a good loading coil that is worthy of a place on any amateur's table. A core 3 inches in diameter and 10 inches long, of wood or cardboard, is wound with one layer of No. 26 SCC wire. Cotton covered wire is used to get the full inductive effect and diminish the condenser action that would be present if enameled wire were used. This layer is tapped at 9 equidistant places and leads are connected. Over this two or three layers of paper are wrapped and then another layer of No. 26 SCC wire is wound neatly over it; no taps are taken from this layer. This coil is now mounted between two heads and two slide rods and sliders are mounted on it similar to a regular 2-slide tuner; a switch for the secondary turns is placed on one end.

For use connect as per Fig. 4. This will give a sliding adjustment in both circuits, allowing close tuning. Taps may be taken from the outer coil if so desired, but with the 2 sliders a change of coupling is possible by sliding them simultaneously away from the active section of the interior coil. In fact this coil will make a good loose-coupler if used as directed and it is easy to construct.

This article, I am sure, will be of some assistance to the experimenter in his efforts to increase the range, usefulness and efficiency of his set.

THOMAS W. BENSON,
Pennsylvania.



Wireless Equipment of Motor Lifeboats

WHEN measures are taken to make more secure the lives of those on board ships at sea, wireless telegraphy is almost sure to be used as one of the main factors in the plan. This was shown by the fact that the motor lifeboats with which the British Board of Trade Departmental Committee on Ships' Boats and Davits recommended that vessels be supplied, have been equipped with Marconi sets.

The Aquitania of the Cunard line and the Alsatian and Calgarran of the Allan line have been provided with motor boats equipped with Marconi sets.

The Aquitania, which has been added recently to the Cunard fleet, has been supplied with two motor boats. Their dimensions are as follows: length, thirty feet; breadth, nine feet and six inches· depth, four feet and six inches. Each boat is equipped with a motor arranged to start on petrol until the vaporizer is sufficiently heated, and then turned over to paraffin, thereby insuring an immediate start. The motor boats are designed to tow away the ordinary rowing lifeboats from the scene of a disaster. Each of the Aquitania's boats would be able to tow a considerable number of lifeboats. They make excellent sea boats because of their wide beam and specially designed lines.

The motor is housed in a cabin amidships, the forward end being divided off by

a sound-proof bulkhead, forming a room for the Marconi apparatus. These compartments are lighted by eight portholes and ventilated from the roof. Provision has been made for the comfort of passengers in emergencies, each boat being fitted with space for medical chests and food supplies.

The wireless sets on the boats of the Aquitania transmit on a wave-length of 300 meters and receive on a wave-length of 600 meters. The aerial is of the L type, twenty-five feet in length, and twenty-five feet in height, made up of four wires supported on wood spreaders. Single ebonite rod insulators insulate the horizontal portion of the aerial from the mast halyards. Earth connection is obtained from some part of the engine near the propeller shaft. An aluminum water-tight box contains all of the transmitting and receiving apparatus. This box has a driving handle from the magnetic detector, and, where the alternator is hand driven, another handle is provided for the purpose. Current for the wireless telegraph apparatus is supplied by a small alternator driven by the engine. In the event that the engine power is not available an arrangement is provided for driving the dynamo by hand.

The magnetic detector has an aerial tuning inductance coil, which, with the jigger secondary and aerial, tune to 600 meters. A tapping is made on the inductance if 300 meters are required. An earth gap is provided and one change over is therefore necessary from transmitting to receiving.

The exhaustive tests to which the wireless apparatus on the motor boats has been subjected leave no doubt as to its efficiency. The box which contains the set occupies only a small space. One of the advantages of the box is that it is water-tight. This is important, for when a liner's lifeboats are compelled to do rescue work the weather conditions are apt to be such that the strength of the wireless equipment will be severely tested.

The necessity for motor boats equipped with wireless apparatus has been felt for a long time. When disasters occur at sea the lifeboats are generally widely separated. The wireless-equipped motor boats will enable the craft to be gathered together and held until the S O S brings rescuing vessels.

WIRELESS SUPPLEMENTS WIRE TELEGRAPH

High-speed wireless is to supplement the existing telegraphic system between England and the north of Scotland. The decision to employ wireless as a means of overcoming the havoc caused by Highland storms was made some time ago, but the employment of high-speed wireless was only agreed upon after a demonstration which was recently given by the Marconi Company. On that occasion messages were successfully transmitted between Chelmsford and Letterfrack in Galway, at the speed of 100 words a minute. Two systems of high-speed transmission have been standardized for wireless telegraphy, said a Marconi official. For messages sent at a speed not exceeding 60 words a minute an electrically operated switch is used, working in conjunction with a relay. For messages sent at speeds up to 150 words a minute a compressed air engine is used to operate the switch. In each case, however, the machines are primarily operated by Wheatstone's automatic transmitters, using a Wheatstone perforated tape. For high-speed recording a recording phonograph is used, in which the signals are magnified by valves and relays. The record is taken on a wax cylinder with the phonograph running fast. It is then transferred to another machine and reproduced to an operator at such a speed as gives the dot and dash effects in a distinguishable form. The Marconi Company claim for this high-speed telegraphy, which shows at least four times the sending rapidity of the hand-transmitted wireless, several advantages in time of war. By high-speed work a very long message can be gotten through in a very short interval. The same high speed also prevents an enemy from tapping a message, unless, of course, the enemy obtains a high-speed receiver and runs it continuously.

The verses which accompanied the article on "War and Wireless" in the June issue of THE WIRELESS AGE were by Ernest Dupuy; the photographs were by F. M. B. de Stefano. Through an oversight the writer and photographer did not receive credit when the article was published.

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

C. B., Brockport, N. Y., asks:

Ques.—(1) What is a good method of eliminating static when receiving?

Ans.—(1) This problem has never been solved. The effects of static may be reduced by the employment of an inductively coupled receiving tuner, using the least possible degree of coupling between the primary and secondary windings, consistent with the strength of signals.

The interference preventer circuits of Fessenden are of some value in this respect. This circuit is described in article 198, Naval Manual of Wireless Telegraphy for 1913.

A receiving aerial placed near to the earth is influenced by atmosphere electricity to a less degree than one erected at a great height.

Ques.—(2) Which would be better for general work, a straightaway type aerial or a loop type when 2 wires 300 feet long and about 60 feet high are to be used?

Ans.—(2) As far as transmission is concerned, it makes no difference because aerials arranged in the "looped" form for receiving generally act as a plain straight-way aerial when sending.

Are you sure that you thoroughly understand the points of difference between the loop and the straightaway types? If you are a beginner we suggest that the straight-way aerial be adopted.

* * *

S. C., Brooklyn, N. Y., writes:

Ques.—(1) Can you tell me the trouble with my receivers? They are 2,000 ohms resistance. When I use my navy phones, signals come in quite loud, but when I use the other pair even NAH comes in faint. The magnets seem to be all right.

Ans.—(1) It is rather hard to say without closer investigation. The diaphragms may be bent or too close to the magnets. The windings of the magnets may be partially short-circuited. There may be considerable difference of resistance between the two telephones, which may account for the difference in sensitiveness.

Ques.—(2) My aerial is 85 feet long; 2 strands, 4 feet apart; lead-in, 30 feet; ground lead-in, 15 feet; using loose coupler, silicon detector, fixed condenser and navy phones. Why can't I tune in amateur stations?

Ans.—(2) You require a short wave condenser placed in series with the antenna circuit in order to hear amateur stations. Any of the small variable condensers to be found in the open market may be used.

Ques.—(3) Please show in a diagram how to take taps off the secondary of a loose coupler.

Ans.—(3) The turns in use in the secondary winding of a receiving tuner are ordinarily varied by means of a multiple point switch, as shown in

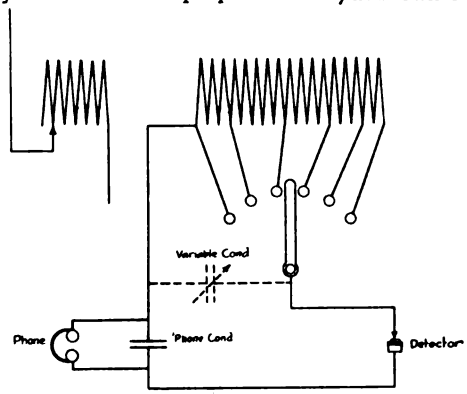


Fig. 1

Fig. 1. The turns are usually divided equally between the taps on the switch. For the average secondary, not more than 10 taps are necessary; this is particularly the case when a variable condenser is connected across the terminals of the secondary winding.

* * *

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

Ques.—(1) Will you kindly explain why I hear wireless signals clearly and distinctly when the detector is not making contact? This has happened twice and I am anxious to know what causes it. The Norfolk Naval Station is heard by me in this manner. This station is 20 miles from mine.

Ans.—(1) We have carefully noted the hook-up accompanying your query, but do not understand it thoroughly. If your aerial was very near to the Norfolk station it could be accounted for in the phenomena of electro-static induction. A detector is unnecessary to read signals when the head telephones or its associated circuits are in the static field of the aerial, but since you are at some distance, we cannot account for it.

Ques.—(2) Give the number of watts at which the average 1½-inch spark coil is rated.

Ans.—(2) Thirty watts.

Ques.—(3) Give the approximate wave-length of the following instruments: 1½-inch coil; 1

pint Leyden jar; oscillation transformer, primary 18 feet of brass ribbon, 1¼ inches in width, secondary 30 feet of ribbon; aerial 50 feet by 55 feet high, 90 feet long; 10 dry cells as power.

Ans.—(3) The approximate wave-length of the aerial is 280 meters; it will be increased to about 340 meters by the use of an oscillation transformer.

Ques.—(4) What is your opinion on the distance that I may send and receive with an aerial 36 by 30 by 90 feet?

Ans.—(4) You will be able to send 15 to 20 miles under best conditions, and receive 200 miles.

* * *

T. E. M., Stanislaus, Cal., writes:

Ques.—(1) Please tell me the natural wave-length of an inverted L aerial consisting of 2 wires 300 feet long and spaced 10 feet apart; the horizontal part 200 feet long and the vertical part 100 feet. The average height from the ground is about 150 feet. The aerial consists of No. 12 B. & S. gauge stranded (7 strands of No. 20 B. & S. gauge copper-clad wire). The aerial is suspended across a canyon with considerable vegetation growing on its sides.

Ans.—(1) The natural wave-length of this aerial is about 460 meters.

Ques.—(2) What is the natural wave-length of an aerial of the same dimensions as that referred to in question No. 1, except that it consists of 3 wires spaced 8 feet apart?

Ans.—(2) About 500 meters.

Ques.—(3) How many amperes should a hot wire meter read, placed in the "grounded" side of the secondary of the oscillation transformer of a well tuned 1½-k.w. transmitting set? (60 cycles).

Ans.—(3) With the plain type of spark gap, 5 amperes should flow.

* * *

T. D., Columbus, O., inquires:

Ques.—(1) The wave-length of my aerial is 260 meters and with an oscillation transformer I have about 600 meters' wave-length. What size series condenser would bring it down from 600 to 190 meters?

Ans.—(1) This query cannot be answered, for we do not know the capacity (in microfarads) of the present aerial. It is a very inefficient method to attempt transmission on a 600 meter circuit reduced to 160 meters by a series condenser. You will find that there will be practically no radiation from the aerial. Your queries Nos. 2, 3 and 4 may be placed in the same category and cannot be answered unless the capacity of the aerial is known. Query No. 5 cannot be definitely answered as we do not know the order of the capacity of the condenser used in the spark gap circuit.

* * *

J. F., Tampa, Fla., sends us a number of queries. He asks:

Will you please tell me how much wire should be put on the primary and secondary of an oscillation transformer for use with a 550-watt transformer? The secondary will be similar to the ones used by the Marconi Company and I intend to use a loading coil to vary the wave-length of the open circuit.

About what length should my aerial be from the lead-in to secure 200 meters' wave-length? It will be about 54 feet to 58 feet high and of the inverted L type.

I have some 8-inch by 10-inch glass photograph plates to use for a condenser. Will you please tell me how many should be used for the transformer mentioned? The voltage is about 9,600.

Also, please give a diagram for connections of set including transformer, rotary gap, glass plate condenser and oscillation transformer.

Ans.—We shall first begin with the rotary gap. You have given us no data whatsoever concerning it. We should know the speed and the number of points on the disc. Assuming that your disc gave 400 sparks per second, the maximum power your transformer would absorb at the secondary voltage of 9,600 would not be more than 200 watts.

This is based on a condenser capacity in the spark gap circuit of .01 mfds., which is the maximum allowable at a wave-length of 200 meters. Using 8 by 10-inch glass plates covered with foil 6 inches by 8 inches, 18 are required to obtain a capacity of .01 mfds.

For the data as to an oscillation transformer suitable for a 200-meter amateur set, see the article entitled, "A 200-meter Amateur Set," in the November, 1913, WIRELESS AGE. You may increase the size of the wire suggested in that article.

Note past issues of THE WIRELESS AGE for proper connections of your apparatus. It seems that a wave-meter would be a desirable asset at the stations of the majority of our correspondents. If the flat top portion of the aerial you describe consisted of 4 wires spaced 2 feet apart it should be 40 feet in length for a natural period of 200 meters.

* * *

L. W. B., Waterford, Conn., asks:

Ques.—(1) Please tell me if a register such as the Electro Importing Co. puts out can be hooked up with the following instruments to register wireless messages: A relay 50-ohm coherer and decoherer and a 175-foot 2-wire aerial and ground. If so, will you send me a hook-up for it?

Ans.—(1) The relay may be used for short-distance work, but is preferably of higher resistance—150 to 500 ohms. Relays formerly used by the Marconi Company in connection with the commercial coherer sets had resistance of from 8,000 to 10,000 ohms.

If you have not had experience with the coherer type of receiver you will find you have much to learn. It is a delicate arrangement, requiring considerable skill in adjustment for working results.

We have never witnessed the small register you refer to, in operation, but if it will respond on a wire line circuit, it should give results in connection with the coherer.

Please bear in mind that the average amateur signaling in the United States is too rapid for the ordinary coherer, and further, that the sending must be done more carefully to give intelligible signals at the receiver; again the armature of the Morse register must be adjusted to act sluggishly, because a dash otherwise will be recorded as a succession of dots. This is due to the action of the decoherer.

The following hook-up may be used (Fig. 2):

R and R1 are non-inductive resistances to eliminate sparking at the contacts of the relay and

decoherer. R2, R3 and R4 eliminate the counter-electromotive force in the magnet windings. The resistance winding placed across the contacts of the decoherer is not shown, but should be readily understood.

The actual value of resistance employed will depend upon the resistance of the coils of the various magnets. For instance, R should be of sufficiently high value not to close the battery circuit of the register and decoherer. C and C1 are choking coils, consisting of two or three layers of No. 36 wire wound over an iron core 2 inches in length and ¼ of an inch in diameter.

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A. L. G., New York City, asks:

Will you kindly explain the use of cerusite as a detector? I have tried to use it in the same way as silicon and galena but without results.

(20,000 volt secondary). The oscillation transformer primary consists of 10 turns of ¼-inch wire on a 14½-inch frame spaced 1 inch apart. The secondary winding has a fixed value of inductance consisting of about 4 turns of Packard combination high tension cable, wound on a drum 20½ inches in diameter. My aerial tuning inductance is wound on a frame 30 inches in length and 13 inches in diameter. The winding is of 7-strand copper wire spaced 1½ inches apart. For the rotary gap, I intend to use a Barnes variable speed motor and a 12-point disc turning at a speed of 3,000 R. P. M. My aerial consists of 4 No. 12 wires spaced 30 inches apart, 165 feet in length by 55 feet in height.

Will you please give me the correct number of plates of this size for best efficiency and the method of connection?

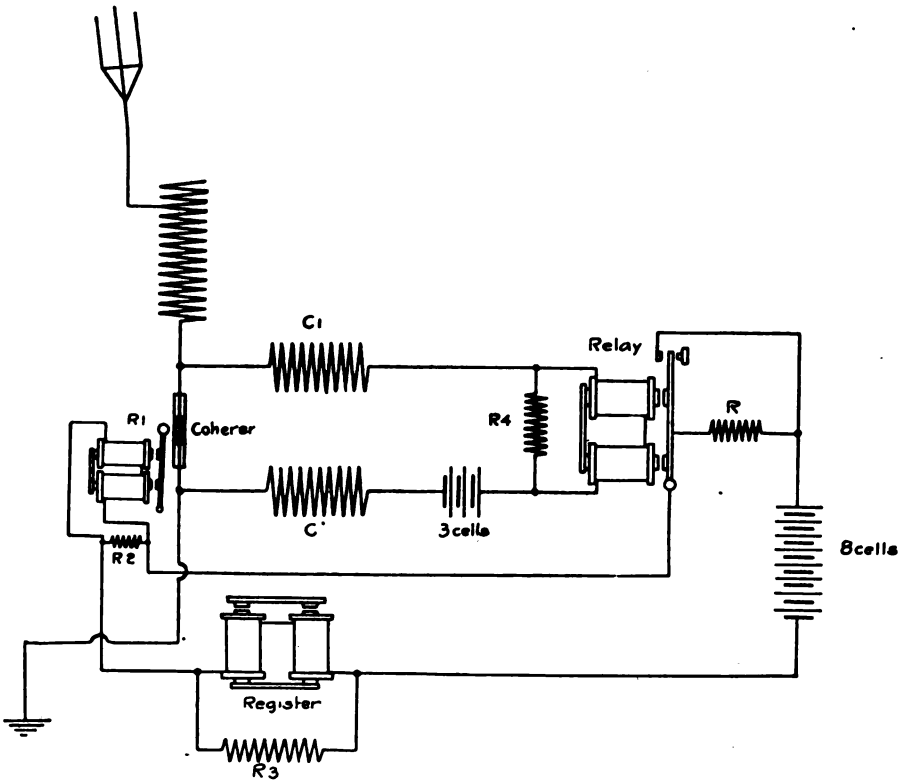

Fig. 2

Ans.—Cerusite crystals other than those furnished by the Marconi Company are apt to be insensitive. It is used in the same manner as silicon or perikon. The contact point is generally steel. Cerusite detectors may be purchased from the Marconi Company for $50 each.

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J. E. C., Waterbury, Conn., writes:

Ques.—(1) I have constructed a condenser of the type shown in the November, 1913, issue of THE WIRELESS AGE, in the article entitled "A 200-meter Amateur Set." The remainder of my set is of the standard Marconi 1-k.w. boat type. (60 cycles A. C.) I use a Thordarson transformer

Ans.—(1) With the disc traveling at this speed, the condenser should have capacity of 0.0083 mfds. You therefore require 16 plates in parallel. This calculation is based on a 20,000 volt secondary.

Ques.—(2) What is the natural wave-length of my aerial?

Ans.—(2) About 410 meters. This value will be boosted considerably by the oscillation transformer and aerial inductance.

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M. C. C., New York:

The information you request concerning the magnetic detector is not available for publication.