



"That thing? Good enough for experiment, but will it avail in the hour of need?"

"We can try it. We have spoken with it and heard it speak before. Why not now?"

Anxious faces group around the table on which stand the receiver and transmitter of the wonderful new system of telegraphing without wires, in which lay the only hope of safety for the crew.

A hand touches the commutator of the big Ruhmkorff coil. The primary current is turned on and at once the long ten-inch spark, leaping between the poles of the secondary wire, shows it to be in order and ready for the work. Then the spark oscillator is connected and adjusted and the signaling begins.

As rapidly and steadily as the anxious mind can dictate and the trembling hand touch the manipulator the intense charge generated in the instrument is sent into that far they can know it goes. Does it go farther?

"It does go farther, it does all that it is

expected to do. From the wire another medium, invisible and immaterial to the human sense as it may be, takes the message signals.

With each electric wave from the instrument below charging the wire there is set up in the air about it a series of undulations akin to those by which sound and light are propagated through space, and these, moving away in concentric waves in every direction from the wire, carry the signals to the point desired. There a cunningly devised and skillfully constructed, delicate instrument will respond to their impulse and make known their presence to listening ears.

First the manipulator sends out by the Morse system of signals, South Foreland's "call," VVV VVV:

"ARE YOU THERE, SOUTH FORELAND?"

No answer. Repeated again and again, each time with increasing fearful anxiety. Awful suspense. Seconds seem interminable.

Then comes a response:

"READY, GOODWIN. PROCEED"

"HELP, WE HAVE BEEN STRUCK; ARE SINKING."

South Foreland received the call for help all right and in a few minutes had dispatched swift tugboats to the rescue of the sinking lightship sinking in the sea and fog ten miles away.

And that's the way wireless telegraphy demonstrated its success and introduced itself to the workaday world last week.

Why is this a more practical test and what does it prove more than the demonstrations conducted by Marconi himself? For several weeks past scientists have been carrying on regular communications between the stations on either side of the English Channel, some thirty-four miles apart, at all hours of the day and night, during sunshine, fog, rain, snow and hailstorms, with entire satisfaction, even when the wires of land lines refused to work.

Marconi even won the approval of roy-

ally itself by setting up a station at Osborne House, on the Isle of Wight, and having her Majesty converse by signals with the Prince of Wales on his yacht, equipped in like manner, at the time the yacht was some miles away from the island.

Everything that he had hoped or claimed was satisfactorily realized. Indeed, while his experiments were going on a vessel passing out struck on the sandbar near one of the Goodwin lightships, which called assistance from land by his system.

Marconi, a "practician," as he calls himself, is but a pioneer in the application of the principles enunciated by Hertz. Others are in train to follow. Already a Belgian experimenter claims to have succeeded in telephoning without wires, and we must learn to use our ethereal ears as well as our ethereal eyes.

The Goodwin lightship incident will give renewed impulse to inventors and experimenters in the new field.

Pictures Successfully Sent by Telegraph at Last.

The New York Herald has just perfected a system by which portraits have been reproduced by telegraph between points over 1000 miles apart. The cities chosen were Boston, Chicago, Philadelphia, New York and St. Louis. The tests were so severe that there is no possible doubt now but what the problem of sending pictures by wire, the same as messages, is at last successfully solved.

CIVILIZATION was shoved ahead many notches by the New York Herald on Wednesday night, and a new milestone planted when a picture of the first gun fired at Manila was telegraphed from New York to Chicago, St. Louis, Philadelphia and Boston simultaneously over a single wire by the Herald.

And then, after this miracle, other pictures were flashed back by telegraph from those cities over the single circuit to New York.

It was no experiment, but the practical commencement of the Herald's new business enterprise of telegraphing pictures, drawings, autographs and designs of all kinds by wire as if by ordinary telegraphic message.

The machines had been tested and found to be in perfect order when 6 o'clock, the hour set for the long distance picture telegraphing feat, had arrived.

The correspondents of the far-away newspapers to receive the Herald's lightning art service were on hand to observe the practical working of the new system. The machines are a little larger than one of Edison's phonographs mounted on a cabinet stand.

F. Crane, the artist, produced the pictures to be sent. They were plainly sketched on sheets of tinfoil six by eight inches square.

The newspapers connected with the long distance circuit were: St. Louis Republic, Chicago Times-Herald, Philadelphia Inquirer, Boston Herald. The preliminary adjustments of the machines had been made.

"Click! click!" rattled a telegraph "sounder" beside the machines. Superintendent Flynn, in communication with the main telegraph office of the big downtown Postal building, said they had made up the circuit. That is, they had got all the offices of the five big cities connected on one wire running directly into the newspaper offices, east and west.

"Click, click!" went St. Louis. Then Chicago's "Click, click!" was followed by Philadelphia and Boston. The duplex wires had been "balanced"—the machines harmonized, "synchronized," and Mr. Crane, the telegraphic art superintendent, said the picture on the little cylinder, run by clockwork, was ready for sending. Again "Click, click!"

"All ready," answered St. Louis and Chicago, a thousand miles away, as Philadelphia and Boston tick-tacked back the same message.

Correspondents and editors hovered around the machine. A bombardment of an electrocution could have excited no more interest.

"We start in five seconds," click-clacked Superintendent Flynn at the telegraph key, with his racing watch in hand.

"One, two, three, four, five—Go!" The "switch" was "closed," the starting button pressed, and away went the picture of Dewey's Manila gun, over rivers, mountains and prairies instantly, in the twinkling of a pretty girl's eye, into the busy, roaring newspaper offices half across the continent.

God's lightning flashed back from Chicago and St. Louis, from Boston and Philadelphia, that "the picture is coming; it is perfect."

In each of these distant offices an exact duplicate machine of the one in the Herald office was receiving the sketch from the whispering wire.

Next came a picture in return from each of these offices. The St. Louis Republic sent a sketch of Senator Major, the reformer, known as Missouri's Lexow.

From the Chicago Times-Herald came a picture of McKinley and Kohlsaat, the editor.

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HOW THE MACHINE WORKS.

At last the miracle is accomplished. The Herald is successfully telegraphing pictures long distances by wire.

In storm and sunshine, over rivers and mountains, across big States and wide continents, your portrait or a copy of your \$10,000 oil painting—your lost Evangeline—may be shot through space in a lightning's dash.

It is a marvelous invention, but as simple as the typewriter.

After telegraphing by hand had been in practice for several years it was discovered that the "dots" and "dashes" inscribed in the slip of paper in Chicago could be reproduced by running the strip of paper under the key.

It is on this principle that the phonograph of to-day reproduces its records; the little invisible dots on the white cylinder when run under the bit of steel which originally made them will reproduce the song or speech at the other end of the wire.

This principle applied in telegraphing pictures works equally well. A drawing is made on a sheet of tinfoil wrapped around a cylinder in the machine similar to the wax cylinder of a phonograph.

In Chicago there is a win machine regulated to work in perfect harmony with the New York machine. In Chicago, instead of tinfoil, a sheet of carbon or manifold copying paper is placed between two blank sheets of paper. The New York current is turned on and the little needles or platinum point above the revolving cylinder in New York breaks the circuit when it touches the ink outlines of the picture.

The needle in the Chicago machine, which reproduces every pulsation made in New York, prints the same kind of a record on the carbon paper because the steel point beats hard on the cylinder, and thus the picture in New York is faithfully copied by electricity in Chicago. The simplicity of the system is its wonder.

Yet experts have been years in perfecting a machine that would be of practical commercial value. Mr. Ernest A. Hummel of St. Paul is the inventor. He set up his first machine in the New York Herald office in January, 1888, when a picture of Mayor Van Wyck was sent over a six-mile circuit without difficulty. Later, pictures were sent to the Herald from Camden, N. J., and Key West, Fla.

The success of the machine long ago passed beyond experiment.

Nothing is uncertain about the process. Whatever is drawn on the tinfoil here is absolutely reproduced at the other end of the wire, regardless of the distance. The extraordinary possibilities of this invention seem incredible, yet they have been demonstrated beyond doubt.

Telegraphing With the Typewriter

TELEGRAPHY with the typewriter as a sending and a receiving instrument has begun in Chicago, and the Morse alphabet, with its dots and dashes, will soon be abandoned.

From two independent sources has the art of telegraphy been advanced, and in the near future there is promise of conflict and litigation over patents. The two men who have perfected the great improvement in telegraphy reside in Chicago.

Simultaneously with the announcement that John S. Thompson has perfected his application of the typewriter to the electrical current of a single wire came the information that for almost a month the invention of another Chicago man has been in daily use in the workroom on the twelfth floor of its building in Chicago in the receipt and sending of messages. It is said to have passed the stage of experiment and established its utility under all the varying conditions to which a slender telegraph wire is subject by heat and cold, wind and rain, bad and good insulation.

The telegraphers' typewriting machine, as it is used in the Western Union office, sits on a desk partially boxed. Attached to the bars operating the types are a series of pinions engaging with a train of circular clutches, which in turn are operated by the current running through the telegraph wire. The striking of a key on the typewriter exerts a strength of current which at the other end of the wire, whether a yard or 1000 miles away, acts upon the particular clutch that pulls down the bar of the type corresponding to the key touched.

Just what device is used is kept a secret from prying eyes. In the Thompson invention the current is regulated by electro-magnets, whose armatures are wound with wire of different gauge in order to secure evenness in registering by actuating the current. To each type bar is attached the magnet which operates it through the spring armature. The different gauge of wire permits a quick response to the touch of the type at the other end of the wire.

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Instruments in the Operating Room for Receiving and Sending Dispatches by Wireless Telegraphy.

The sending of messages by the Marconi system does not require the use of the electric current in the sense that the ordinary telegraph or telephone does. The signals are flashed from one station to the other by means of Hertzian waves, as they are called. These waves, named after Professor Hertz of Karlsruhe, Germany, their discoverer, are magnetic waves having the same velocity as light, say 185,000 miles a second. Professor Hertz thinks they are identical with light except that the wave-lengths themselves are longer than the ordinary light waves. So much for the transmitting medium. Whenever an electric spark, as from an induction coil, is made to jump back and forth between two electrodes or poles these Hertzian waves are produced. They radiate from the producing point in all directions, and with a properly equipped receiver at a distant point we may intercept enough of them to make them serve as a signal, to convey intelligence, just as our own ear catches the radiation of sound waves when a voice calls from a distance. By starting and stopping the Hertzian waves, and thus causing corresponding starts and stops at the distant station, Marconi is able to transmit messages by the Morse telegraph code.

WIRELESS telegraphy has just demonstrated its practicability by aiding in the rescue of several people threatened with drowning at sea.

Not very long ago Signor Marconi showed the scientific world that he could send telegrams across the English Channel without the use of wires. Had the crew on the sinking lightship not been prepared to use wireless telegraphy in calling for help they must undoubtedly have perished.

The incident which forced this crucial test took place between one of the Goodwin apparatus was soon to be the means of saving their lives.

In the fog of April 28 last a passing vessel struck the lightship and continued on her way. After a time the crew of the lightship discovered that the blow was a serious one, and that their ship was sinking.

What was to be done? Make for the distant shore as fast as they could, with the risk of being carried out on the North Sea on the one hand, or being dashed to pieces on whatever part of the dangerous, rock-bound and reef-girl shore they might chance to reach? No time must be lost. Their lease of life on the lightship was getting shorter every minute, as she gradually settled in the water.

In the excitement of the moment not a thought is given to the vertical wire projecting from the "wireless telegraphy" masthead.

"Tell South Foreland that we're sinking," some one suggested in the desperate situation.

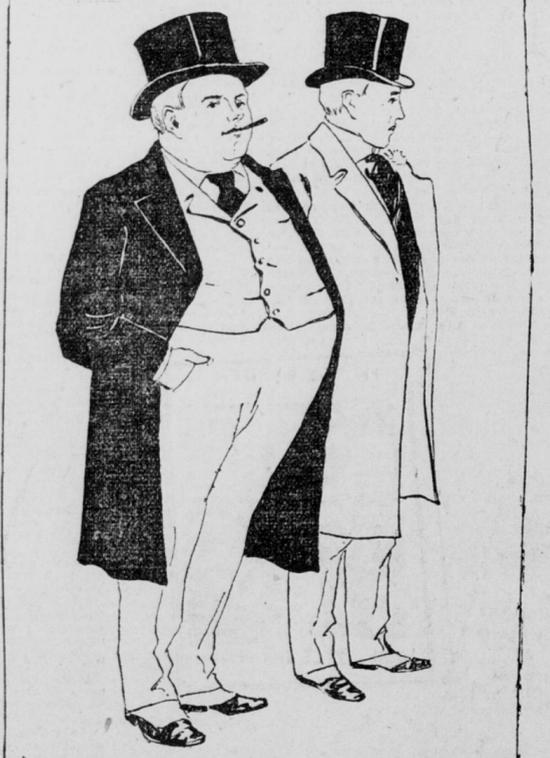
What! Tell South Foreland! How tell them anything, with ten miles of water between?

"By telegraph; the wireless telegraph."

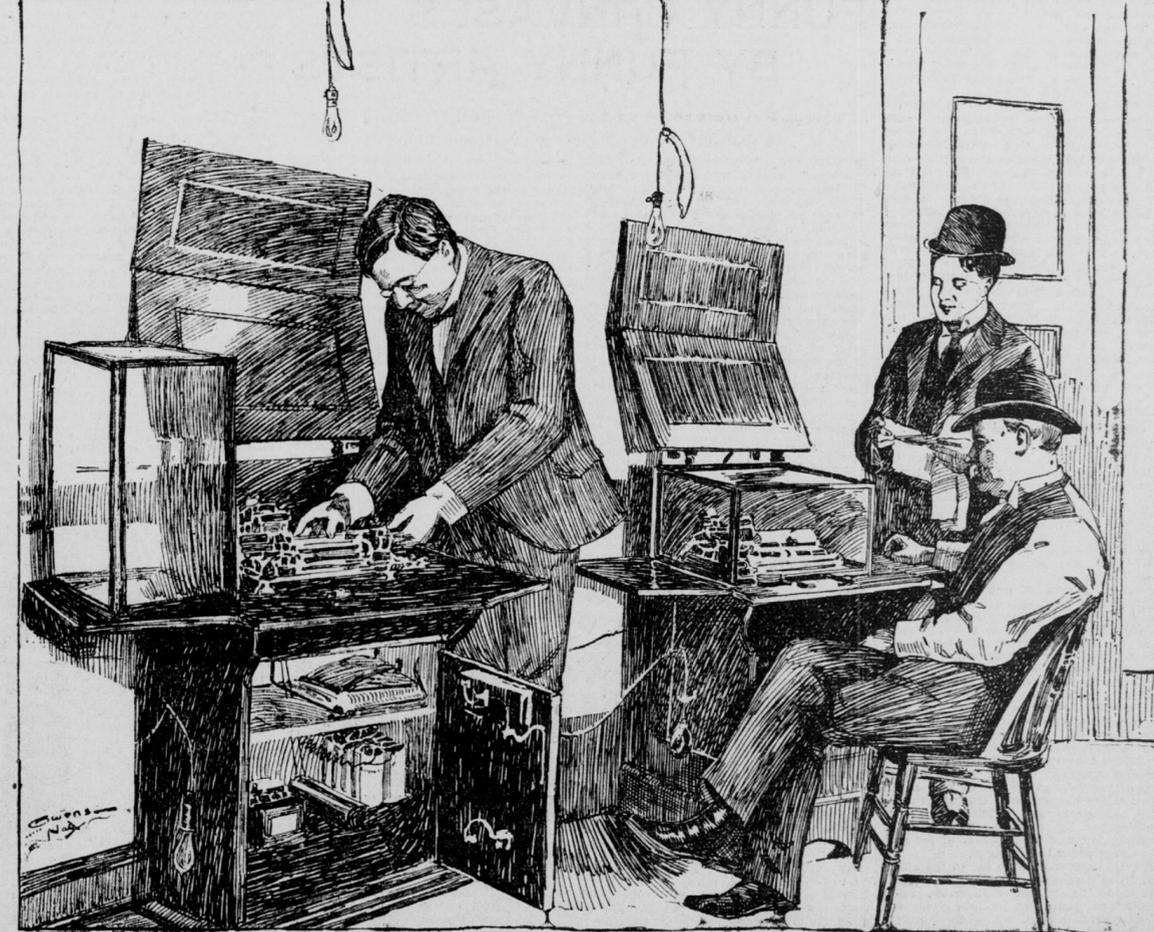
These Are Copies of Pictures That Were Telegraphed by the New Method Over 1000 Miles of Wire and Came Out Line for Line Just as They Were Sent.



H.H. KOHLMAAT FROM CHICAGO TIMES-HERALD.



FATTY BATES AND JOHN S. BRATTON-FROM THE BOSTON HERALD



Machines in the Main Office for Receiving and Transmitting the Picture

win Sands lightships off the southeast coast of England and the South Foreland lightship, several miles away.

These lightships and the South Foreland lightship were fortunately equipped with the necessary apparatus for the transmission of messages through the air, over the space of waters between them, when the time of need came. They, with Wimereux, near Boulogne, on the French coast opposite, formed the system of stations which had been established by Marconi and his co-workers a short time before the accident for their public tests. These tests were still going on between the two mainland stations, and at times with the lightship. In the absence of the scientists they were being conducted by members of the crew, who had become more or less proficient in transmitting and receiving messages. The crew little thought that the curious