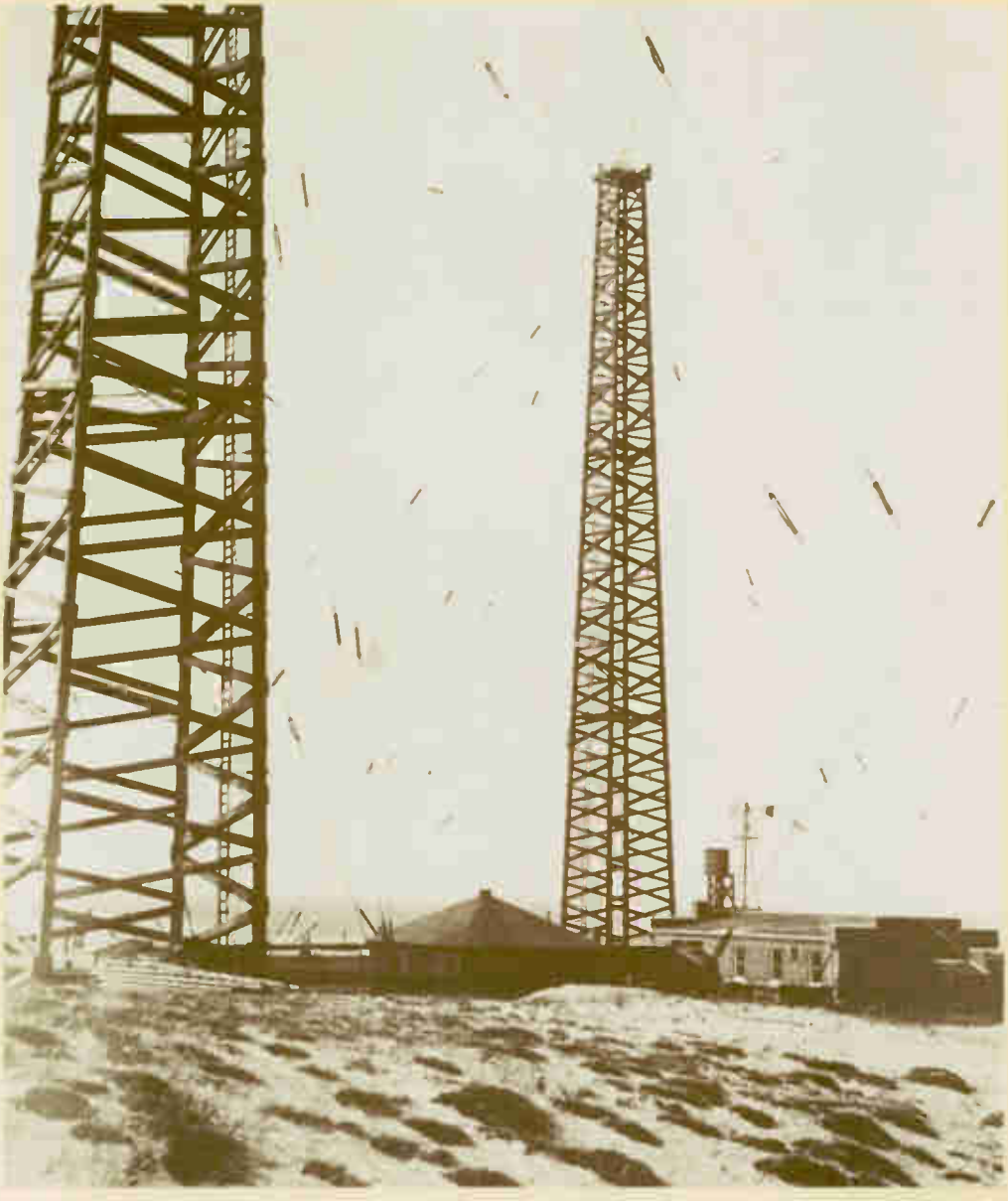
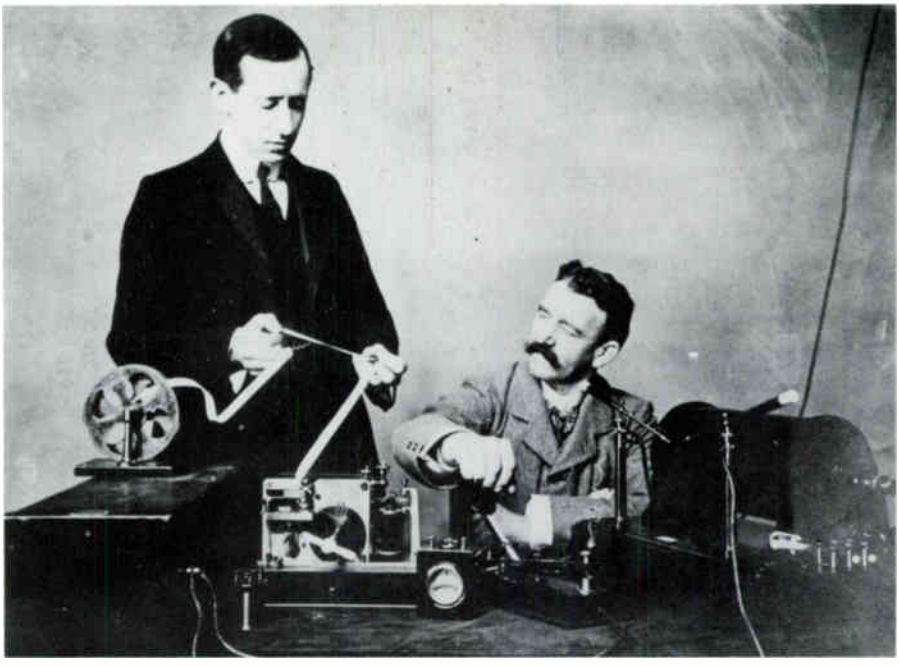
MARCONI
WIRELESS ON CAPE COD
South Wellfleet, Massachusetts 1901-1917



by Michael E. Whatley



Marconi and Kemp at transmitter equipment. Marconi Co. Photo.

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South Wellfleet, Massachusetts 1901-1917
by Michael E. Whatley
Park Historian, Cape Cod National Seashore

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Dedicated to St. Katheryn of Sienna, Italy

Front Cover

Marconi Company photo of the Cape Cod station as it overlooked the Atlantic Ocean in South Wellfleet in 1903.

IT WAS AN EVENING FULL OF EXCITEMENT. THE AIR WAS LITERALLY CHARGED WITH HIGH VOLTAGE WHICH UNDOUBTEDLY ADDED TO THE NERVOUS ENTHUSIASM OF ALL PRESENT. FINALLY, MARCONI WENT OVER TO THE WIRELESS TELEGRAPH KEY TO CARRY OFF THE "BIG THING"...THEN WITHIN SOMETHING LIKE FOUR MINUTES TIME IT WAS DONE...TRANS-ATLANTIC RADIO COMMUNICATION BETWEEN THE UNITED STATES AND EUROPE WAS NO LONGER AN EXPERIMENT, IT WAS A REALITY.

A LOT OF PREPARATION WENT INTO THAT NIGHT'S ACTIVITY, SOME SAY THREE YEARS, OTHERS SAY A LIFETIME. WHO WAS THIS YOUTHFUL WIZARD OF WIRELESS ANYWAY AND WHAT LEAD HIM TO SOUTH WELLFLEET ON THE NIGHT OF JANUARY 18TH, 1903?

MARCONI THE CURIOUS INNOVATOR

In his old age he foresaw the development of microwave transmission, envisioned methods that would electronically detect ships at sea, and even forecast the possibility of transmitting color images via "television." Was he ahead of his time, or was he of precisely the right time? His name was Guglielmo Marconi and one of the most eventful chapters in his life story occurred on Cape Cod, at the remote seacoast town of South Wellfleet, Massachusetts. But as with most stories, it has an intricate beginning.

Eventually to be known worldwide as the "Wizard of Wireless," young Guglielmo began his meteoric rise to fame from humble beginnings at home. Born on the outskirts of Bologna, Italy on April 25, 1874, Guglielmo was the youngest of three sons born to Giuseppe Marconi, a country bred, yet highly successful businessman. His mother, Annie Jameson Marconi, was an attractive and talented woman of Irish extract and was influential in Guglielmo's precise mastery of the English language, musicianship and academic drive.

Lugio, the eldest offspring, was actually a half brother. His natural mother had died in childbirth and Giuseppe raised him on his own until he married Annie Jameson. Alfonso, who was the next oldest, was Guglielmo's full brother. This "cosmopolitan" family of three lineages and dual national heritages would prove advantageous to young Guglielmo later in life.

Living a somewhat secluded life as a child, Guglielmo achieved his place in science without the aid of a formal "university" education. But quite to the contrary, he was far from uneducated. Young Marconi received his initial elementary education from tutors at the family home of Villa Grifone in Pontecchio, near Bologna. By the age of 10, he had already shown interest in electricity and was a renown

Marconi as a child with his mother.

fan of Benjamin Franklin. At the age of 12, Guglielmo formally entered grammar school in Florence. He was uninspired by school, but fortunately his mother recognized this. Although she had taught him well in music and other disciplines, Annie Jameson Marconi also knew that her son would need more scholarly help for academic advancement.

A short while later, Guglielmo received a more sophisticated education at the Technical Institute in Leghorn near the sea. Here his mother arranged private lessons from Professor Vincenzo Rosa, and suddenly the boy's academic interests began to grow, but to no one's surprise in a limited direction—electronics. It was also here that Marconi learned Morse code from ageing telegraph operator Nello Marchetti. Little did he know at the time how useful that skill would be to him later in life!

Thus well before he had reached his teens, the family had recognized Guglielmo's talents and did what it could to foster them. Eventually his father procured additional tutorial services from nearby Professor Augusto Righi, a famous Italian physicist at the University of Bologna. All this was done to satisfy the boy's craving to learn more about electronics. Then at the age of 16, Guglielmo contrived a method of sending and receiving Morse code messages without wires in his parent's vegetable garden by utilizing two tin plates and other homemade electronic devices. As he continued to tinker with his practical application of this still "theoretical" science, Marconi became both bolder and more imaginative with his experiments. Little by little he found ways of transmitting and receiving messages from greater and greater distances.

A number of years of private study and experimentation ensued. Then in 1894 while young Marconi was vacationing in the Italian Alps with his family, he read an article in an Italian Electrical Journal by Professor Righi about the famous German scientist Henrich Rudolph Hertz. Hertz had died the previous January but the article was provocative enough to inspire Marconi to intensify his relentless quest to unlock, for once and for all, the secret forces of Hertz's "electromagnetic waves" and give them a practical application.

BUILDING ON THE FOUNDATION OF OTHERS

The theory proposing the possibility of transmitting telegraphic messages without the aid of wires had been around for some time, and young Marconi was aware of this. Earlier in the 19th Century the experiments of Heinrich Hertz, the great German physicist, uncovered the phenomenon known as "hertzian waves." This accomplishment verified the existence of electromagnetic waves, and many enthusiasts had thought up ways to utilize this process to transmit messages. But no one, up until Marconi's time, had actually devised a means of developing this concept into an economically functional, or (perhaps even more importantly), a truly "marketable" product.

In actuality, the process of determining the significance of electromagnetic phenomenon goes back to at least 1831. It was then that English inventor Michael Faraday first determined the existence of electromagnetic waves and developed a dynamo to generate them. In 1842 Joseph Henry further developed this concept by working with the phenomenon of oscillatory discharge. William Thompson, who later became known as Lord Kelvin, began experimenting in earnest in this relatively new world of electromagnetism in 1853. Thompson, who lived until 1907, would become one of the giants of

Lord Kelvin

electronic communications and, as is revealed later, had a great influence on the young Marconi. Then in 1864 Scottish inventor James Clerk Maxwell first conceived the theory of "electromagnetic waves." A number of years later the great physicist Hertz would confirm Maxwell's concept by building mechanisms which would demonstrate these principles and further enhance the theory that these "waves" traveled at the speed of light. In 1866 (at the same time the specially modified steamship Great Eastern was laying a new trans-Atlantic telegraph cable), an American by the name of Mahlon Loomis was experimenting with the utilization of electromagnetic waves to transmit messages through the air. Loomis, who was a dentist, had devised a method of transmitting messages at a distance of up to 14 miles between two high peaks in the Blue Ridge mountains of Virginia. For his efforts he was granted a patent on July 30, 1872 and in 1873 the Loomis Aerial Telegraphy Company was incorporated by an act of Congress.

Dr. Mahlon Loomis

However, while Loomis and other such individuals had developed techniques to detect Hertzian waves between one remote location and another, they could not obtain enough support or recognition to enable their products to grow either scientifically or commercially. Even the great genius of Thomas Edison failed to fully develop the practicality of this concept. Although Edison had identified an "etheric force" while testing his light bulbs in 1883 (which was later dubbed the "Edison Effect") he did not link the concept with its communications potential until much later. In 1885 Edison received patent number 465,971 for a system of "inductive telegraphy" also to be known as the "Grasshopper Telegraph." And although he actually put the system into operation, which worked by detecting impulses

from telegraph lines strung overhead of moving railroad cars, it never expanded full scale. In 1890 wireless experimenters benefitted from the development of the "Coherer Detector" by French scientist Edouard Branley, which utilized metal filings in an evacuated glass tube to detect electromagnetic waves. Rival contemporary Nikola Tesla was also hot on the trail of developing a means of transmitting messages by electronic principles and after conceiving the "Tesla Coil" and "Tesla Transformer" had predicted in 1891 that long range intercommunication without wires was not only feasible but highly practicable. However, Tesla's final developments of such technology and full entry into the market did not come into fruition until some six years later. Other successful experimenters such as American farmer and inventor Nathan Stubblefield followed, but once again initial accomplishments did not lead to permanent results. It was therefore left up to Marconi to be the first to unlock the secrets which would allow for this technology to grow into what would later become "commercial radio." And it was from the studio that Marconi set up as a youth in the top floor of his family home that this dramatic venture began.

Youthful inventor Marconi poses with his apparatus for "telegraphy without wires" shortly after his arrival in England in 1896. Marconi Co. photo.

DISCOVERY AND DEVELOPMENT

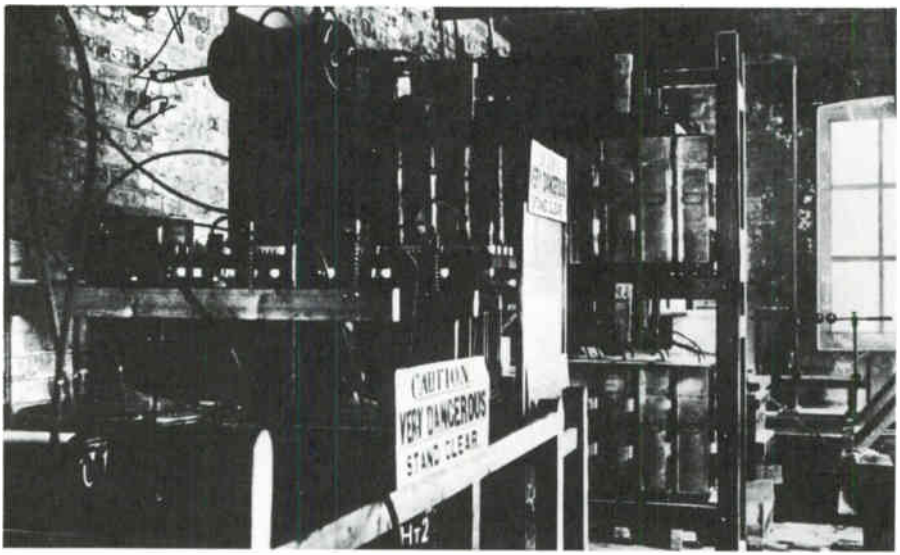
In 1894 after being inspired by the Hertz article, at the age of 20, the still youthful but intellectually mature self-made scientist initiated his greatest breakthrough. Within a year's time he would identify the missing element which would allow his apparatus to transmit from only a few dozen meters to several kilometers. This breakthrough came via his discovery of "grounding" the transmitting and receiving elements. According to family tradition Marconi's inspiration for this development came from a comment during his contact with Professor Righi who told the boy "sensa presa terra" or roughly translated "never lose sight of the ground." Marconi's first attempts resulted in demonstrating to his parents the ability to transmit to a distance of some 30 feet. Through a challenge, backed by an offer of a loan amounting to some $1,000 from his father, Guglielmo demonstrated a transmission of approximately 100 feet. Then during the summer of 1895 young Marconi successfully transmitted the letter "S" in Morse code to his brother Alfonso at a receiver located on the other side of a hill (out of sight) well over one mile away. Alfonso dignified the reception by firing a gun into the air to let the family know the message had been received! Using the grounding technique and building upon concepts and products developed by others such as Sir Oliver Lodge and Edouard Branley, Marconi had unlocked the limiting factors that separated short range transmission from long range transmission. And within another year, the young Marconi became an international celebrity, as word of his achievement spread at a soon-to-be-outmoded pace.

Marconi's English-speaking heritage came into play in the next chapter of his life. Unable to convince the Italian authorities of his product's worth, Marconi headed off to England with his mother to seek recognition. Here he forged a working alliance with William Preece, a high ranking official with the British Post Office, and George Kemp, an electrical engineer. A short time after his arrival he also obtained his first British patent for his apparatus, Number 12039. By 1897 the British authorities were more than astounded by Marconi's progressive advancements.

A major breakthrough came when Marconi was invited to

demonstrate his apparatus to Queen Victoria. Marconi was requested to report the proceedings of the Kingstown Yacht regatta. In order to do this the inventor installed wireless equipment at a lighthouse in Dover and on a lightship stationed offshore. His efforts were a smashing success and instantaneous reports of the outcome of the race made a great impression on the aristocracy of England, as well as the news media of the day. Marconi continued to make advancements and forge alliances in England over the next several years. On June 3rd, 1898 Lord Kelvin sent the first paid "Marconigram" when he offered Marconi a token sum of one shilling to send a message from the Isle of Wight to George Stokes and Sir William Preece.

On March 27th, in 1899, Marconi completed another European triumph by transmitting across the English Channel. Almost exactly a month later, on April 28th, Marconi equipment was involved in the first wireless "rescue" action. The East Goodwind Sands Lightship was in trouble and sent a "CQD" distress call. The crew was promptly rescued by lifeboats dispatched from shore. Three months later another rescue via wireless took place at the lightship again. Meanwhile, greater distances and additional advancements were taking place. By now Marconi was the rage of all Europe, but the Americas still lay before him.



Interior of the Poldhu station in 1901. Condensers appear on the left and the stationary spark gap to the right. Marconi Co. photo.

ANTICIPATING THE AMERICAN CONNECTION

In the fall of 1899 Marconi brought his wizardry to the New World. After being invited by the New York Herald, Marconi got an opportunity to replay his novel technique of reporting yacht races. This time it was for the America's Cup. The vessels in this race were the British Yacht Shamrock, backed by Sir Thomas Lipton, and the American Yacht Columbia II, sponsored by J.P. Morgan. This time Marconi followed the regatta in a hired vessel and was able to provide even more detail as the event progressed. Through a connection between wireless and telegraphic links, the Herald was able to receive instantaneous updates, as well as the final outcome of the race.

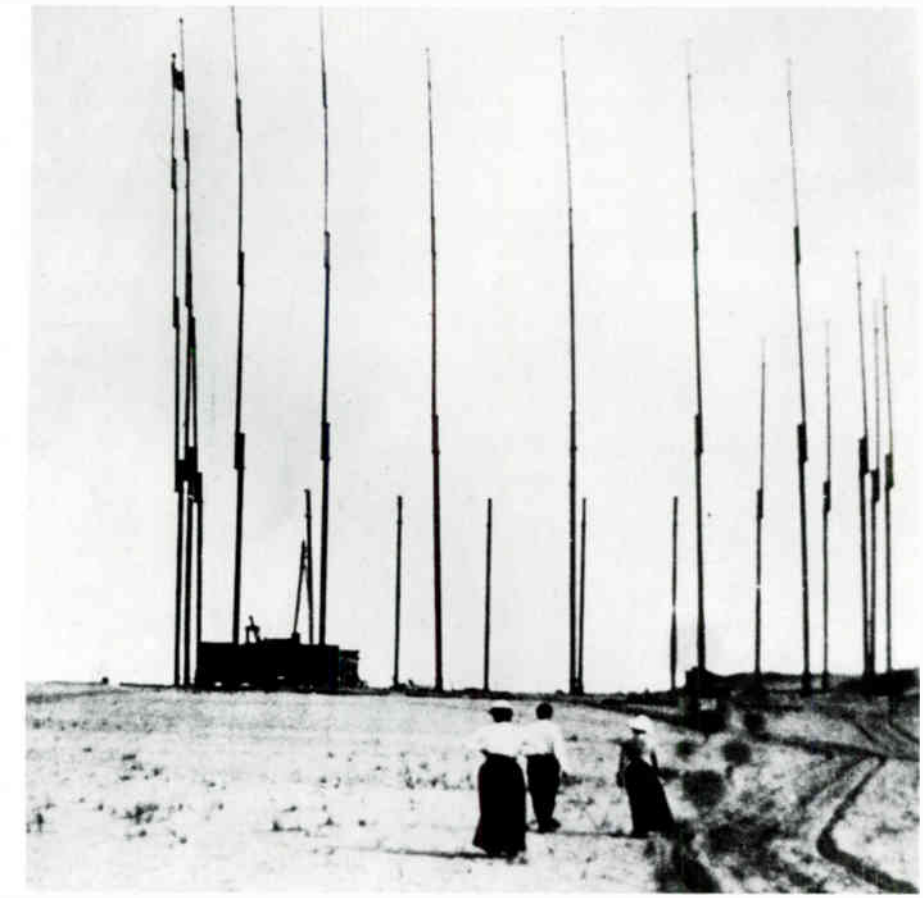
At the conclusion of the race it was Marconi and his apparatus that was proclaimed the real winner! He was invited to numerous receptions and speaking engagements. Newspapers billed the Marconi triumph alongside of featured reports. This well-versed, English-speaking Italian, hardly even in the prime of his life, had won the admiration of the American people. And perhaps even more significantly, he ignited their desire to partake in this revolutionary new form of electronic communication—lock, stock and barrel!

Marconi was invited to demonstrate his apparatus to the U.S. Navy, and wireless equipment was installed on the cruiser New York and the battleship Massachusetts. A successful test at sea displayed the ability of Marconi's apparatus to transmit to a distance of 36 miles between these two ships. And while in the United States, Marconi saw to the establishment of the American Marconi Company. Meanwhile, back in Europe the Marconi operation there continued to make great strides.

Upon displaying his ability to transmit significant distances over water, Marconi received the famous British patent No. 7777 on April 26, 1900, for the tuned aerial he developed. Armed with this and other legal safeguards, Marconi was now finally able to offer his product to the business world without fear of serious competition. And with business breeding in his blood, the young inventor quickly displayed that he was as apt at taking advantage of shrewd business

deals and public relations schemes as he was at developing new technology.

In the same year Marconi set up his first high-powered transmitting station at Poldhu on the English coast. This new station proved capable of transmitting to distances of up to 150 miles in early tests. During this time Marconi also forged a close working relationship with his two new assistants, G. S. Kemp and R. N. Vyvyan. The Marconi Company was doing well in Europe. Now it was time to turn again to the Americas, not just to set up more commercial land facilities but rather to attempt to span the ocean. Even Thomas Edison had determined that this was an impossible feat.



Onlookers flock to the site at South Wellfleet for a first hand look at the new station. Pictured are Mrs. Rollins and Mr. and Mrs. Amos B. Leighton. Photo by Charles F. Rollins.

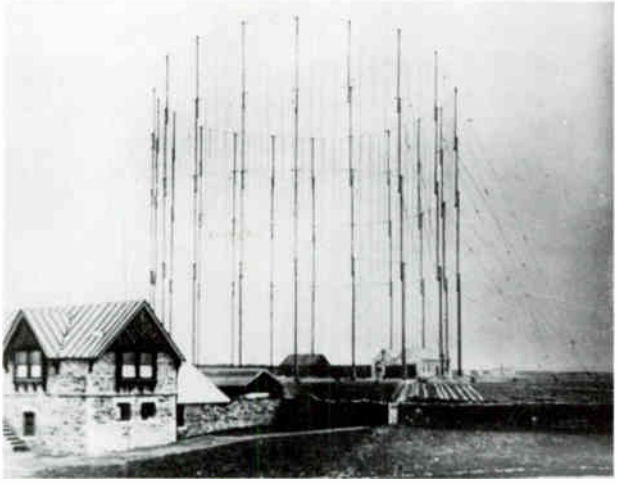
PREPARING TO JUMP THE "POND"

In 1901 the first order of business was to further increase the power of the Poldhu station. After various modifications the station was made to be some 100 times more powerful than it had been before. Now Marconi turned to his assistants to determine where and how an equivalent station could be constructed in North America.

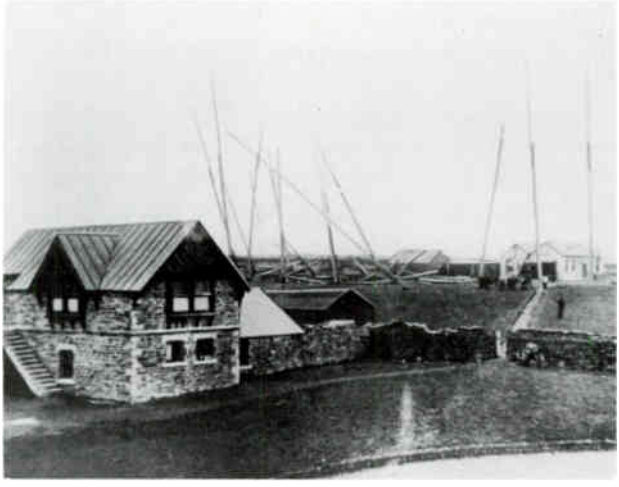
Marconi decided that his western-most station would be located on Cape Cod, as described by Thoreau, the "bare and extended arm of Massachusetts, where a man may stand and put all of America behind him." He arrived by boat from New York to Provincetown harbor where he met up with Ed Cook. Cook, who was approximately 60 at the time, was a local salvager and wrecker and knew the Cape like a book. First he took Marconi to Barnstable because it provided better railroad access and accommodations than other parts of the Cape. But Barnstable was too far inland. Marconi's second choice was land adjacent to Highland Light, and Cook even tried to negotiate with lighthouse officials to let Marconi conduct experiments directly at the lighthouse. But the request was denied. As word spread about Marconi's plans, suspicious natives refused to sell him land anywhere on the Outer Cape. Finally, Cook offered Marconi a parcel of his own land located on a high bluff in South Wellfleet, overlooking the beach. Marconi ended up paying Cook an equivalent of $250 for eight acres of otherwise worthless land. In time South Wellfleet would prove to be an excellent site as it offered a completely unobstructed vantage point between Cape Cod and Poldhu and allowed for goods and equipment to be off-loaded in nearby Wellfleet harbor (or to be transported via the railroad on the bay side).

Once the location was decided upon, the process of building the new station commenced quickly. Marconi set up his headquarters at the Holbrook House in Wellfleet, at that time the only boarding house in the area. But he did not stay long. Instead he left the construction of the South Wellfleet station to his Chief Engineer R.N. Vyvyan. The South Wellfleet station was to be modeled after the one in Poldhu. A circular series of twenty 200-foot ship's masts were planted in the sandy soil approximately 165 feet back from the cliff edge. The masts

and yards used to build this antenna were made by the H. Pigeon & Fraser Hollow Spar Company of East Boston. They were brought to South Wellfleet by train and then carried to the site by horse and wagon. A local man by the name of Atwood was hired to do the rigging. However, great numbers of nearby residents turned out on their own to become "sidewalk superintendents." They were fascinated by the project, but like true Cape Codders, were very skeptical of the outcome. Many predicted that the circular arrangement of masts would blow down in the next northeast storm, as one mast would pull down the next and so forth and so on. Eventually a barbed-wire fence had to be erected to keep bystanders at bay.



Original Poldhu circular aerial array before gale in September, 1901. Marconi Co. photo.

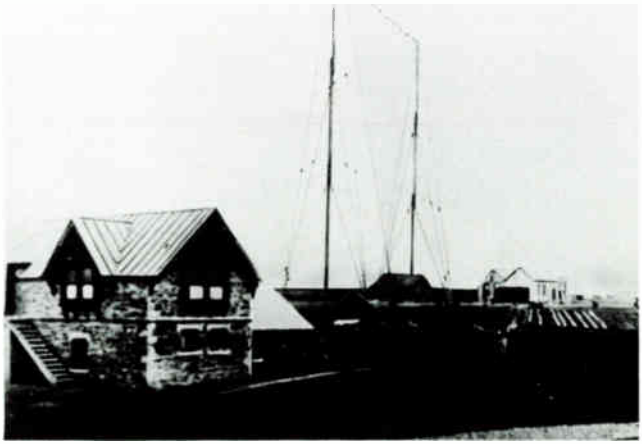


Collapse of the Poldhu aerial array in September 1901. Marconi Co. photo.

DISASTER DELAYS SUCCESS

True to form, the circular antenna arrangement proved to be a disaster. After work on the Cape Cod station had almost been completed, the Poldhu station towers blew down on September 17, 1901. Marconi, who was back in Europe at this time, hastily conferred with his engineers. It was agreed to replace the Poldhu towers with a makeshift "V"-shaped antenna suspended between two 150-foot masts salvaged from the downed timbers. The engineers back on Cape Cod were worried that the same fate would meet the Cape Cod towers before a transmission attempt could be made. For reasons unknown, Marconi decided to leave the Cape Cod towers as they were, but he had the foresight to anticipate the need for alternative plans. Hence when the South Wellfleet towers blew down on November 25th, Marconi was ready to shift plans immediately. In fact, he boarded a ship for the new world on that same day and at this point, it was decided to carry out the trans-Atlantic wireless experiment from St. John's, Newfoundland.

Back in England, the Poldhu station was proving to be extremely successful. By now it had demonstrated the capability of transmitting to a distance of some 225 miles to Crookhaven, Ireland. Even after the disaster, the new makeshift antenna was proving to be superior to the former design. Marconi was confident that a long-range message could be sent, but was not sure of how to receive it from another



The Poldhu towers with fan-shaped aerial which sent the first wireless signals across the Atlantic. Marconi Co. photo.

continent. Marconi, however, was a man of ingenuity, and together with his two assistants, Kemp and Paget, he set out for Signal Hill, Newfoundland, well equipped to carry out his biggest experiment so far. Upon arrival on December 5th, 1901, Marconi was greeted with assurances that he would receive "all possible assistance" from the Governor and Prime Minister of Newfoundland. Subsequently the vacant Barracks Hospital building which overlooked St. Johns harbor was selected as the staging area. This gave Marconi an uninterrupted vantage point, some 600 feet above sea level, to start from.

The Poldhu station had been given orders to begin transmitting the three-dot Morse code signal for the letter "S" continuously on a prearranged schedule, starting December 11th from 3 to 6 p.m. Greenwich Mean Time. The first means of elevating an aerial to receive this message was to launch a hydrogen balloon; but extremely strong winds ruined this attempt and put the balloon permanently out of commission. Then it was decided to launch a canvas kite with the aerial line attached to it. This proved to be successful, despite even stronger winds than had been present earlier and the kite was able to hoist the aerial to a height of some 600 feet above the Barracks. Another advantage of the Signal Hill location was that it was only 1,700 miles away from Poldhu (which was considerably closer than Cape Cod was to Europe).

On December 12th finally things seemed to be going right. The aerial was safely aloft and a self-restoring coherer attached in series to a telephone headset was all that should have been needed to detect the signal, if Marconi had calculated correctly. At 12:30 p.m. local time, Marconi thought he could detect three faint dots. Cautiously he turned the headset over to Kemp who also thought he could hear them. Then again at 1:10 and 2:20 p.m., the two men were reassured by the unmistakable pattern of three repetitive dots that it was the real thing. It had been done! A message had been sent across the Atlantic despite the incredible odds against it. Edison had said it was impossible. Radio waves were supposed to go straight and therefore veer off into space. But Marconi had proposed that radio waves would be reflected off the atmosphere and follow the curvature of the earth. It was a huge gamble, but it paid off.

Marconi wired news of his success by cable and was once again a worldwide celebrity. But on December 16th, he was surprised by something that had not been planned on. Local officials served Marconi with a cease and desist order on behalf of the Anglo American Cable Company which had exclusive communications rights on Newfoundland. A surprised Marconi packed up his bags and prepared to leave for England. But just before departing on December 22nd, Marconi received an offer from the neighboring Canadian government for use of land at Glace Bay, Nova Scotia, for a new station site. Marconi lost no time in sealing the deal; and now with a triangle of station sites strategically located, he could almost virtually assure successful wireless communications between the New World and Europe. But first some modifications had to be made. In addition to a new station being constructed at Nova Scotia, the Poldhu and Cape Cod stations would have to be rebuilt before actual two-way communications could be established.

1901 was a banner year and the triumph of determining that trans-Atlantic communications was possible was not the only Marconi success. Adjacent to Cape Cod, the Marconi Company had established a low-powered wireless station at Siasconset on Nantucket Island. The station was in direct communication with the Nantucket Lightship and was promoted by the New York Herald for the purpose of determining ship arrivals a day earlier than was previously possible.

Kemp, Marconi and Paget shortly after their arrival in Newfoundland in 1901. Behind them is the kite used to hoist the aerial. Marconi Co. photo.

David Sarnoff was a young operator there at the time and was involved in the first American wireless rescue effort when two ships collided off Nantucket Shoals. Many lives were saved by this action but this would not be the last time Sarnoff would be involved in witnessing a wireless rescue at sea. Several years later he would monitor the sinking of the Titanic while serving as a wireless operator in New York City. Then he would go on to become the President of RCA.

On January 13, 1902, Marconi was honored in New York City for his accomplishments by the American Institute of Electrical Engineers. He received numerous other compliments. Thomas Edison said of him "I would like to meet that young man who had the monumental audacity to attempt and to succeed in jumping an electrical wave across the Atlantic." Little time was spent on celebration, however. Construction and renovation work began on the trans-Atlantic stations at a feverish pace, and in February of 1902 Cape Cod came in line for receiving a new set of towers to support its aerial. The new towers would be virtually identical with those at Glace Bay and Poldhu. Carl Taylor, another important Marconi electrical engineer from England, was now on the scene at Cape Cod and was responsible for much of the technical work. It was decided that the new aerial arrangement would consist of four massive wooden towers which would stand some 210 feet above the horizon.

Marconi (on far left) observes as assistants raise the kite aerial used in detecting the first trans-Atlantic wireless signal on December 12, 1901. Marconi Co. photo.

TWO-WAY TRIUMPHS

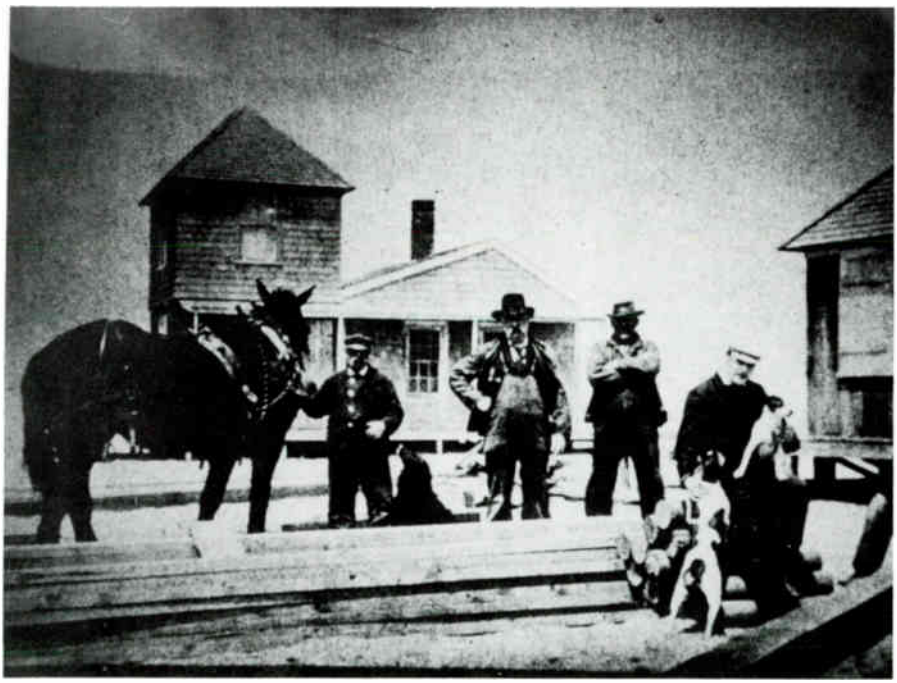
Wireless technology was primitive to say the least. The Poldhu station had experienced overheating problems which greatly reduced transmitting speed and amount of sending time that was possible. Since wood was the main insulating material in use at the time, fire was an imminent threat. High voltage was everywhere and a person could literally receive the "jolt of their life" if their clothing even brushed against the wrong piece of equipment. But it was the most advanced communications system of its time and was worlds apart from the more conventional wireless systems of the period. Progress on the new Nova Scotia station was going well and Marconi now knew that he would have a good chance of completing a two-way wireless transmission between that station and Poldhu before the year was out. And so it was. On December 17, 1902, the Glace Bay station proved its capacity to both transmit and receive trans-Atlantic messages—another Marconi triumph.

But the event that had just occurred in Canada had no effect on reducing the sense of urgency that prevailed in completing the South Wellfleet station. In fact, it became evident to many that something even bigger was in the offing. And so work went on at a furious pace. Marconi himself arrived at South Wellfleet early in January and took up residence adjacent to the station site. What would be revealed a short time later was that Marconi had secured the willingness of President Theodore Roosevelt to partake in the experiment by providing a message that could be sent via the South Wellfleet station to the King of England.

Finally it came down to the night of January 18th, 1903. Here they were, all assembled: Marconi, Vyvyan, Taylor, Kemp and a host of others. It was an evening full of excitement. The air was literally charged with high voltage which undoubtedly added to the nervous enthusiasm of all present. Finally, Marconi went over to the wireless telegraph key to carry off the "big thing." It is not known who actually tapped out the message, it may have been Kemp, Taylor or even via a prepunched tape and machine, but most accounts attribute the transmission that night to Marconi. Then, within four

minutes time it was done, the message had been tapped out and trans-Atlantic radio communication between the United States and Europe was no longer an experiment, it was a reality.

Marconi's original intent was merely to test the sending of this message and send the real thing out at a later time via relay through Glace Bay to Poldhu. Thus on the night of the 18th, sometime between 9:30 and 11:30 p.m. Eastern Standard Time, Marconi and his company made history once again, without even realizing it at first. While standing by to see if Glace Bay had received the preliminary signal, all involved were quite shocked when acknowledgement of reception of the message came direct from Poldhu rather than from Glace Bay. The apparatus had spanned the Atlantic by a distance of over 3,000 miles!



Ed Cook (in overalls) and his crew work on construction of the second set of towers for the South Wellfleet wireless station. Photo from Mrs. Chellise Cardinal.

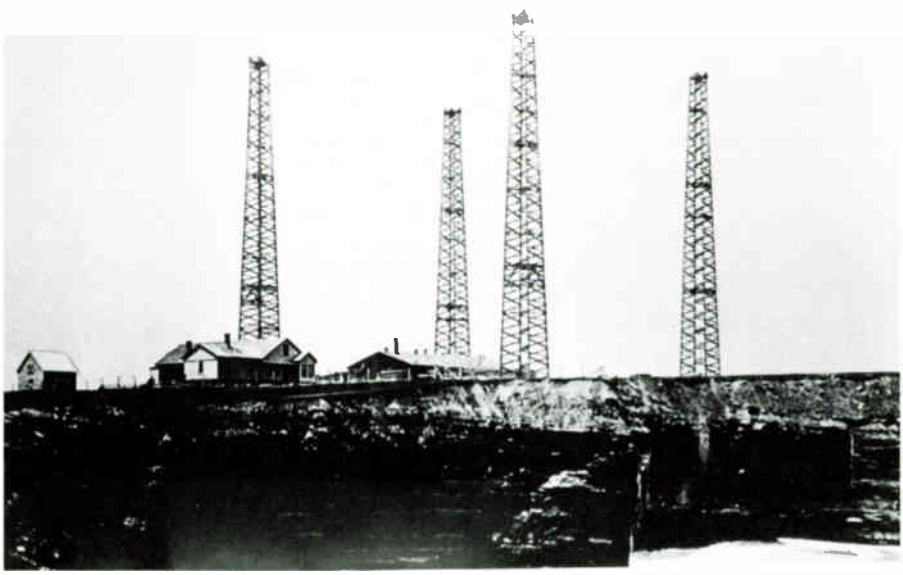
The message that was sent read like this:

His Majesty, Edward VII
London, Eng.

In taking advantage of the wonderful triumph of scientific research and ingenuity which has been achieved in perfecting a system of wireless telegraphy, I extend on behalf of the American people most cordial greetings and good wishes to you and all the people of the British Empire.

THEODORE ROOSEVELT

Wellfleet, Mass., Jan. 19, 1903



Four towers loom over the horizon in 1902 at the Glace Bay station on Table Head in Nova Scotia. Canadian Marconi Co. photo.

A lot of preparation went into that night's activity, some say three years, others say a lifetime. But no one can say that Marconi was caught off guard by his surprising success. To the contrary, he had anticipated the outcome and had ordered that local messenger Charlie Paine be standing by for relaying messages via his horse and wagon should something occur. Paine had been on call for the past six nights and was utilized to relay routine messages between the transmitter site and the telegraph station at the railroad station in Wellfleet some four miles away. But this night was different. In an account some years later, Paine put it this way:

Charlie Paine, in 1940, still recalled his famous ride. Photo by Robert E. Coe.

"Diamond and I had been waiting around for about six days. I never knew when Mr. Marconi was going to need me to rush to the telegraph office down here at the depot with the message he was praying for. When the great moment came, Mr. Marconi came dashing out of the station very excited carrying two messages in his hands. His orders were 'Drive like the wind and if you kill your horse I'll get you another one.' Well as soon as I'd driven out of sight, I slowed Diamond down to a walk. We made the depot in good time and the message went over the wires. Yes, I was pretty excited too, but still I wasn't going to kill my horse—not even for Marconi, the King of England or the President of the United States."

Jim Sweet, who was the telegraph operator that Charlie Paine met at Wellfleet Railroad Depot, was equally excited about that night's activity. The outbound message he handled was dated the 19th, presumably because it was already that date in England (even though it was still the night of the 18th back on the Cape) or possibly because it was not originally expected to be transmitted until the 19th anyway.

A reply from the King of England had also followed Marconi's initial transmission. It read as follows:

Sandringham, Jan. 19, 1903

The President,

White House, Washington, America

I thank you most sincerely for the kind message which I have just received from you, through Marconi's trans-Atlantic wireless telegraphy. I sincerely reciprocate in the name of the people of the British Empire the cordial greetings and friendly sentiment expressed by you on behalf of the American Nation, and I heartily wish you and your country every possible prosperity.

EDWARD R. and I.

The text of both heads of state's messages appeared on the front page in the papers in Boston as well as New York the next day. According to the subtitle in the New York Times' article, "England's Ruler Return(ed) the Compliment by Means of the Marconi System." Other sources also stipulate that the King's reply was received direct via Marconi equipment. Some speculate, however, that since the Poldhu station was experiencing overheating problems that the reply may have been sent via cable. Nonetheless, the triumph was Marconi's alone and the publicity astounding. Things were busy on Cape Cod the next day, too! Congratulatory messages were being received from all over the world as cablegrams and telegrams kept the Cape Cod operators in turmoil. A half-page telegraph message was sent to Marconi via traditional means from Victor Emmanuel, the reigning King of Italy. It, like a host of other messages, had to be relayed from telegraph station to telegraph station, eventually ending up at the small General Store in South Wellfleet where finally it was copied down by hand from the telephone. From there the congratulatory message still had to get to the station site by means of a horse and buggy!

PRESIDENT SENDS WIRELESS MESSAGE TO KING EDWARD.

England's Ruler Returns the Compliment by Means of the Marconi System.

SOUTH WELLFLEET, Mass., Jan. 19.—The following messages were transmitted today by the Marconi system of wireless telegraphy between Cape Cod and Cornwall, England, between President Roosevelt and King Edward: His Majesty, Edward VII.

London, Eng.

In taking advantage of the wonderful triumph of scientific research and ingenuity which has been achieved in perfecting a system of wireless telegraphy, I extend on behalf of the American people most cordial greetings and good wishes to you and to all the people of the British Empire.

THEODORE ROOSEVELT

Wellfleet, Mass., Jan. 19, 1903.

Sandringham, Jan. 19, 1903

The President,

White House, Washington, America

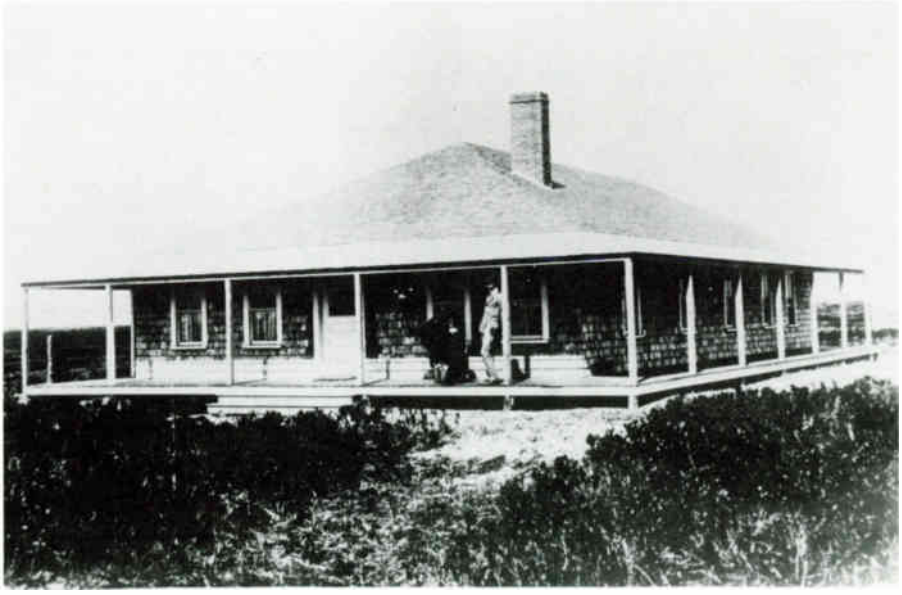
I thank you most sincerely for the kind message which I have just received from you, through Marconi's trans-Atlantic wireless telegraphy. I sincerely reciprocate in the name of the people of the British Empire the cordial greetings and friendly sentiment expressed by you on behalf of the American Nation and I heartily wish you and your country every possible prosperity.

EDWARD R. and I.

The New York Times carried news of Marconi's accomplishment on its front page, January 19, 1903.

FITTING INTO THE SCENE

Life at the Marconi Wireless Station was different from anything else on Cape Cod and not just because of Marconi's personal presence. For starters, the equipment alone was so massive and complicated that there was nothing like it anywhere else on the Cape, let alone the rest of the United States. Likewise, the high voltage that the station generated and utilized gave it an eerie and dangerous mystique. On the night of the famous trans-Atlantic transmission, eyewitness accounts from Life Saving Service personnel on patrol tell of the frightful sights and sounds of huge blue sparks, disjointedly arcing atop the antenna. From the onset there were frequent complaints from nearby residents about the noise the station made. No wonder, in later years Station Manager Irving Vermylia noticed one night that he could distinctly hear the sound of the transmitter five miles down wind! To make matters worse, it was soon discovered after its maiden run, that the station operated better at night (between the hours of 10:00 p.m. and 2:00 a.m.), when atmospheric conditions were more

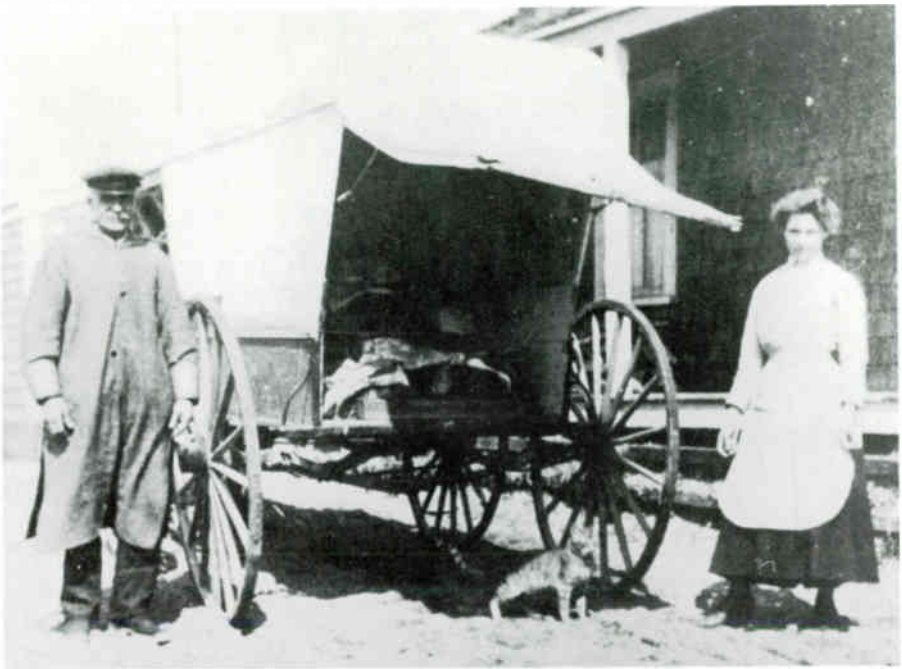


The Bungalow. Marconi Co. photo.

conducive to the transmission of radio waves. The station was unusual in other ways as well. For example, since Marconi was not especially pleased with all of the aspects of rural life on Cape Cod, he ordered food and wine to be sent to him via train from New York and Boston. But Marconi also made sure that certain otherwise-missing amenities were present for his staff too. One such feature was the construction of a rather impressive 20-by-60 foot bungalow for accommodating the station crew (which consisted of a manager, chief and assistant engineer and three operators). Very modern in its construction, this one story "hotel" as it was called, was equipped with pot-bellied stoves, generous furnishings, and even a piano for the staff's recreational enjoyment. Marconi, an accomplished musician, repudiatedly played the piano while he stayed there as well.

But in its own way, the Marconi Station was also very much a part of the Cape Cod scene. From the beginning, local people were involved in the project, starting with Ed Cook, who continued his involvement with the operation up until the station was finally dismantled. A good

A steward at the station prepares for a meal in the bungalow. Marconi Co. photo.



Mrs. Eva Higgins poses with the local butcher and "Castagna" the cat. Photos from Walter Campbell.

number of other local people were employed directly at the station. Several Cape men served as operators. Others worked on the rigging and construction of new buildings. Mrs. Eva Higgins of Wellfleet served as the station's cook. In addition to preparing meals for the staff she also did washing and cleaning, occasionally while her son Lorimer played on the grounds. Cape Cod also seemed to have an effect on those brought in from elsewhere. An Englishman by the name of Harrod, who

Little Lorimer Higgins poses against a giant turnbuckle.

Station crew, along with Sam Campbell's dogs Missy and Mike, pose for a photograph. Photo from Walter Campbell.

Lavishly appointed interior of the bungalow shows the station's piano, repudiatedly played by Marconi for entertainment. Photo from Walter Campbell.

The station crew pose for a beach scene in around 1912. Photo from Walter Campbell.

came over to be the station's first Steward while Marconi was at the station, stayed on and eventually settled, married and raised a family in Wellfleet. Somewhat differently, Carl Taylor continued to travel around the world for Marconi installing and repairing equipment, but eventually he too found his way back to Cape Cod where he settled down and retired. When the Italian square-rigged barque Castagna was wrecked in a storm off the beach below the station in 1905, the rescued castaways were brought to the bungalow to recuperate. While the surviving crew members left after a short while, the ship's cat stayed on and was aptly named "Castagna," repudiatedly leaving a lineage in Wellfleet that goes on to this day.

TECHNOLOGICAL MARVEL

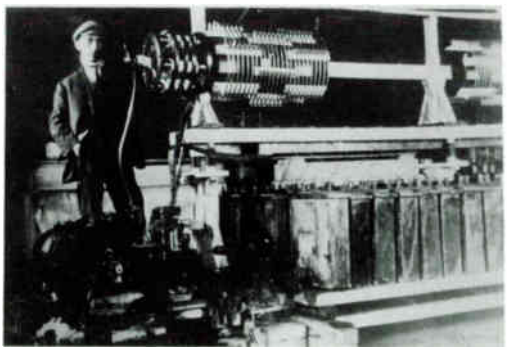
For those who actually worked inside the station it was both an exciting and dangerous existence. The renovated station in 1903 consisted of a complicated array of electrical machinery. The heart of the station consisted of the transmitter. Contained in its own separate structure the transmitter room housed the station's enormous oscillation transformer and transmitter coil, a bank of 33 condensers made from glass plates and metal sheets set in metal cans filled with oil and the rotary spark gap. The spark gap apparatus contained a huge 16-studded, three-foot-wide rotor, which revolved at 2,100 revolutions per minute, producing 35 kilowatts of RF (radio frequency) power. This was the first use of a rotary spark gap for commercial purposes. During transmission the whirring spark gap created ear splitting noise and blinding sparks. A jet of compressed air was forced across the gap to break the spark more clearly and to keep the electrodes cool.

The extreme heat that was generated limited transmission to a 45-minute cycle, followed by a 15-minute cooling off period. A door with a painted glass window eventually was installed and separated the narrow 8-by-10 foot operating room from the rotary spark gap apparatus. This would allow for the operator to observe the transmitter without the danger of entering the room. A long wooden pump handle extended from the transmitter room into the operating room, which was rather sparsely appointed with wooden benches containing the receivers, a paper tape printer, a paper tape transmitter and various switches. The operator sat on a wooden stool at this location and operated the pump handle, which in turn broke the high tension circuit directly inside the transmitter room. Transmission by this means was limited to around 15 to 17 words a minute, which was rather slow when compared to conventional telegraph's average of 30 words per minute at that time. Eventually telegraph lines were installed directly to the station site, making their juncture at the bungalow. From here the operators could work in relative comfort. In the bungalow a new Wheatstone Morse tape printer, adapted from telegraphy, improved reception; and a Profolover tape punching machine speeded up transmission. The paper tape recorded dots and dashes as it moved along in a seismograph-like up-and-down pattern

and could be "read" or transcribed later. Likewise, the prepunched tape, which had a pattern of "punched holes" for dots and dashes, could be prepared in advance and continuously fed through the sending machine, which in turn would mechanically tap out the message.

The red-brick power house produced the life blood of the station. It must be remembered that there was no electrical service on the Outer Cape in those days, so Marconi generated his own. The powerhouse was located just to the east of the transmitter room and was connected by a long narrow corridor to that facility and the operators room. Measuring 30 feet by 60 feet, the power house contained two kerosene engines. The smaller one drove a 110-volt DC generator for lighting and starting up the second engine which in turn powered a 2,200 volt AC generator that could be stepped up to 25,000 volts! It was told that on cold nights a can of kerosene was heated on the stove to start the small generator. If it could not be started, there was no transmission that night.

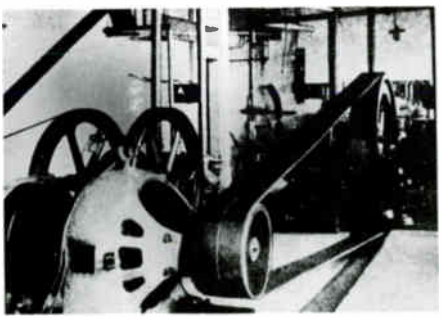
The four wooden towers that were erected after the original circular masts were blown down in 1901 proved to be an even more effective design than the original one. In 1903 they loomed some 210 feet above the landscape and were arranged in a 200-foot square pattern. Each tower was 24-feet square at the base and 8-feet square at the top. They were painted barn-red in color. The corner posts were made from 12-inch by 12-inch timbers and the criss-crossing lattice, which gave the towers support, was made from 3-inch by 12-inch planks. In order to give the towers stability they were guyed by 12 one-inch-

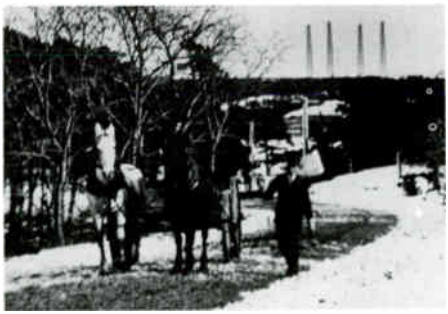


Joel Hudson stands by the South Wellfleet spark-gap transmitter. To the left is the rotary spark gap, to the right the bank of condensers and above the oscillation coil. No one could enter this room during operation. Cape Codders called the station the "thunder factory." Photo from Walter Campbell.

thick steel cables per tower which were anchored into 12-inch by 12-inch crossed timbers (or "dead men") buried some 10 feet in the sandy soil. The cables were tightened by giant turnbuckles, and to maintain insulation, Marconi's engineers devised a method of utilizing ship's deadeyes between rubber hoses and manila rope with melted sulphur connectors strategically located amid the guy wires. To insure stability further, a square four-foot-thick cement slab was prepared for each tower base to stand on. The rigging in the towers created a conical arrangement that consisted of approximately 200 wires which converged at the bottom and then fed into the transmitter house through a single lead-in wire.

Although certain safeguards were incorporated, the design was not completely fool-proof. Lightning was a major concern. Although the towers and station buildings were grounded with an elaborate system of underground lines it was mainly for the purpose of improving transmission and reception capability. So on occasion lightning strikes carried out a far greater threat to the station than one would suspect. Over the years lightning strikes and other perils while working at the station left more than one memorable story to be passed on. Irving Vermylia, the station's last manager, told of how a lightning bolt demolished a stool he had just been sitting on. Mrs. Higgins, the cook, used to complain that she would receive shocks when hanging up the wash to dry! Jim Wilson, one of the station's operators, told of how lightning knocked a man in the kitchen out of his shoes and welded a coal hod solidly to the stove. Sometimes the mishaps were even more serious but fortunately only on the rarest of occasions, fatal.





LEFT: The powerhouse housed two engines which operated an alternator to supply current for the transmitter and drove a smaller DC generator for lighting and other uses. Photo by Fred Parsons. RIGHT: A horse-drawn wagon transports supplies over "Wireless Road." Telegraph lines connecting the station with Wellfleet were installed around 1905. Photo from the Rosenthal collection.

PROVING ITS WORTH

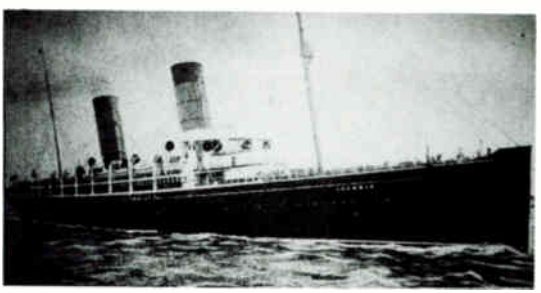
When the Cape Cod station was first constructed in 1901, it was intended that it would serve as the main link between the United States and England. But after the Glace Bay station came on line it became apparent that relaying messages via this northern location was far more practical. However, while the Cape Cod station did not take on its original role in transmitting wireless messages from continent to continent, it became equally important in a different way, when it took on the task of serving as Marconi's main North American "ship to shore" wireless station. It started out quickly and soon became the rage of the day.

Although Marconi had demonstrated wireless operations via ship to shore a number of years earlier, for the most part it was to demonstrate long-distance capabilities or military usefulness. So when the Cunard liner Lucania was outfitted with wireless equipment, a new era of "commercial" seafaring wireless operations had dawned. The South Wellfleet station became the luxury liner's direct link with North America while still at sea. Soon, a number of luxury liners were outfitted with printing presses and began producing their own daily shipboard newspaper. It was the Cape Cod station's duty to dispatch the "Nightly News" to these ships as well as to transmit and receive personal wireless messages or "Marconi-grams." Extremely popular, the going rate for sending a trans-Atlantic wireless message was around 50¢ a word. But commercial messages were not the only function that proved to be beneficial to the shipping industry.

It soon became evident to ship captains that they could use wireless to obtain weather information and perhaps even more significantly, to summon emergency help. It was one of Marconi's


THE
Atlantic Daily News
Hamburg-Amerika Linie
NOTICE

LEFT: A shipboard newspaper from the "S.S. Amerika" dated June 25, 1906, boasts of the latest wireless news. BELOW: Cunard liner "Lucania."



greatest triumphs when his equipment played the key role in the rescue efforts of the night of April 15, 1912, when the Titanic sank. It had been just an hour or so after the Cape Cod station had finished its nightly communicatons with the great ship when it hit the iceberg. Unfortunately the Cape Cod station had gone off the air when the Titanic sent out its first "SOS" and could not be of assistance, but fortunately other operators were still on duty, including the one on board the rescue ship Carpathia and David Sarnoff in New York who could monitor the events from the Marconi station there. Through Marconi equipment, not only were 712 lives saved, but the story was able to be posted on the front page of the major newspapers the next morning. Wireless had come of age!

Throughout the years the South Wellfleet station took on a number of call letters, first CC for Cape Cod, then MCC for Marconi Cape Cod. Finally it became WCC when an international convention assigned the "W" prefix to North American eastern seaboard stations. A low-powered localized wireless operation was also set up at the South Wellfleet station utilizing the code of WSW. It was started up after the gale of 1901 blew down the circular antenna arrangement by utilizing materials salvaged from that catastrophe. WCC was shut down in 1917, as were a number of other American commercial stations (excepting the French Cable Station in Orleans), because of security reasons in World War I. But a number of other reasons had also emerged which would signal the end of the South Wellfleet station's tenure. Within the rapidly growing industry, new technological improvements were constantly appearing. Dr. Lee De Forest's improvement of the vacuum tube called for wholesale abandonment of the spark gap method of transmission.

In addition, the erosion of the outer bank at the South Wellfleet site had threatened to undermine the eastern most tower bases as early as 1916, despite their 165-foot set back from the cliff a dozen years earlier. And so, following the war, the station was dismantled, scrapped and abandoned. Ed Cook who was there at the beginning, was there at the end. He and his crew were called on to tear down the towers and salvage the remaining worthwhile materials and by 1920 the station was nothing but an abandoned hulk. But this did not spell the end of WCC. Instead the operation moved on to Chatham, where it became a part of RCA Global Communications Inc.; and with constant upgrades of equipment and services, it went on to become the busiest worldwide ship-to-shore radio station on the eastern seaboard.

COMMEMORATION AND DISTINCTION

After Marconi departed the Cape on January 20, 1903, he went on to continue his work in advancing worldwide communications from other locations. He received numerous patents and likewise, had patents overturned when it was determined by the courts that some of his ideas had really belonged to others. Regardless of controversy, his personal image grew over the years, perhaps being climaxed by reception of the Nobel Prize in 1909 for "development of the wireless telegraph." But according to Marconi himself, he was not so much an inventor as an 'improver of inventions.' Likewise, it was not so much Marconi's presence on Cape Cod that proved to be so important but rather what he accomplished. When he died on July 20, 1937, he was honored the next day the world over by two minutes of radio silence. He was also remembered by many Cape Codders on that day, including Charlie Paine who reminisced about his wild ride on the bitter cold night of January 18, 1903.

In 1953 a bronze plaque commemorating the station and its role in worldwide communications was placed near the site by the Wellfleet Historical Society and a distinguished group of wireless enthusiasts, including retired Marconi Engineer, Carl Taylor. Then in 1963 after the Cape Cod National Seashore had taken over the administration of the area, and again in 1974, two more elaborate commemorations ensued. In order to dignify the story further, since virtually nothing remained from the station but a few fragments, the National Park Service built an exhibit shelter which would house a scale model of the South Wellfleet station and provide for the display of a bronze bust of Marconi and the commemorative plaque that had been dedicated earlier.

Bronze plaque first installed near the site in 1953.

Today, all is silent, with the exception of the sounds of wind and surf. The vast stretch of the open Atlantic still unfolds before the horizon. But the echoes of a bygone era still linger—and most probably will linger for a long, long time. For history was made here.

At the dedication on July 5, 1963, Carl Taylor (facing from the podium) returns to remark on the station's significance. Park Superintendent Gibbs (in uniform) stands to the right. The park's first historian, Edison P. Lohr (in uniform) is on the far left. Photo by Dr. Egon Kattwinkel.

SUGGESTED READINGS ON MARCONI & THE HISTORY OF WIRELESS

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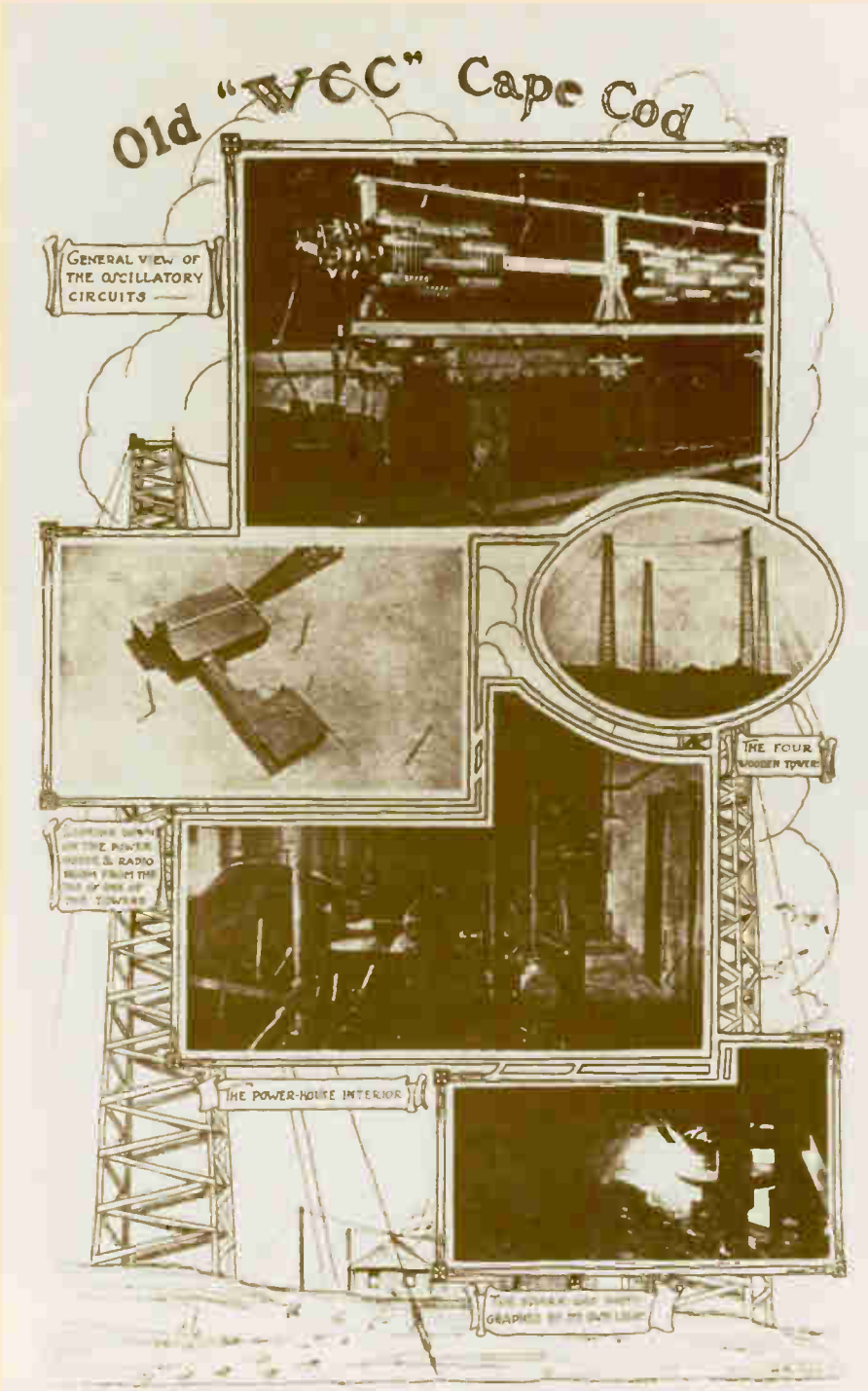

A commemorative poster, made up by H.R. Hick, was displayed in Q.S.T. magazine in 1920.

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