

Pioneers

9. Guglielmo Marconi (1874-1937): father of radio

W.A. ATHERTON

For two minutes on July 21, 1937 the radio waves fell silent. In that unique way was commemorated the death on the previous day of Guglielmo Marconi, the international superstar of radio communication.

Marconi was born on April 25, 1874 at Bologna in Italy of a well-to-do Italian father and a Scots-Irish mother. He is said to have been a rather solitary child and much of his early education came from private tuition. He did not start school until he was twelve.

After a time at the Technical Institute of Leghorn (Livorno), he left full-time education without qualifying for a place at either the University of Bologna or the Italian Naval Academy, both of which were on his father's list of priorities for him. Father was not impressed.

By that time Marconi had developed an interest in physics which was not to be denied. At the University was Professor Augusto Righi. He was known to the family and he allowed Marconi access to his laboratories, lectures and books.

Righi is not very well known now. But he was a master scientist and, like Oliver Lodge in Britain, he was one of the few who really understood what Heinrich Hertz had achieved when he demonstrated the generation, propagation and reception of what had become known as Hertzian waves – i.e. electromagnetic or radio waves. Perhaps Marconi gained more from entering the university by the back door than if he had gone in through the front.

Hertz died in 1894 and Righi's obituary of him is said to have convinced Marconi that Hertzian waves could be used for communication. The basic requirements already

existed but they needed to be brought together and have life breathed into them.

Although others had superior scientific understanding and were in a better position from which to achieve radio communication, it was Marconi who had the vision.

From Righi he learned how to generate, radiate and detect the waves. The usual receiving detector then available was the coherer, made of metal filings packed into a glass tube. It was invented by Edouard Branly in France and it became the main detector for the first ten years or so of radio communication. In London, Lodge gave it prominence in a lecture in honour of the recently deceased Hertz. That, and a subsequent lecture, were published and became well known. Lodge, by the way, had come very close to beating Hertz to the discovery of electromagnetic waves.

Working in his father's attic, and with little encouragement from the man who was paying for his tinkering, Marconi dramatically improved the performance of the coherer. He also improved on Lodge's and Righi's spark-gap transmitters and rediscovered the principle of earthing one side of his transmitter whilst using an elevated metal object to act as an aerial. This had been previously known to Amos Dolbear in America who had come tantalisingly close to radiotelegraphy (and telephony) a dozen years before Marconi even began.

With these improvements Marconi moved from the attic to the garden, and from the garden to the fields. There he achieved transmission over one and then two kilometres in 1895. The earth connection and the elevated aerial had moved him from short waves of a metre or less to much longer

waves and greater distances.

It has often been said that Marconi excelled not so much at original inventions but at improving dramatically the inventions of others. That he most certainly did, but he coupled it with an ambition to achieve radio communication over ever increasing distances. It has been suggested that, in the early days, this drive may have been in part a desire to impress on his father that he could, in fact, do something other than fail to get into the university and the Naval Academy.

MARCONI IN BRITAIN

The Italian telegraph authorities rejected an offer to take up the new invention and so Marconi turned to marine communications as being the obvious use for radiotelegraphy. With his mother's encouragement he set out for Britain, then the greatest maritime power.

He arrived in February 1896, and though his equipment was damaged by a customs inspection, his entrepreneurial spirit was not. A meeting was arranged with W.H. Preece, the chief engineer of the Post Office which held the monopoly on telegraphy. Preece had long entertained an interest in 'wireless' communication using induction (not radio), but this had proved to be impossibly cumbersome. After several demonstrations, including one over several miles across Salisbury Plain, Preece gave Marconi his considerable support.

With Preece's help Marconi began to gain publicity. On the whole engineering comment was favourable but initially Oliver Lodge was resentful. "One of the students in Prof. A Righi's class at Bologna," Lodge thundered, "being gifted, doubtless, with a

sense of humour as well as with considerable energy and some spare time, proceeded to put a coherer into a sealed box and bring it to England as a new and secret plan adapted to electric signalling at a distance without wires."

Lodge was hardly being fair. Though the basic techniques were indeed well known, as Professor Slaby, one of the German pioneers pointed out, everyone else had got "just as far as 50 metres and no farther". Marconi had achieved miles and later Lodge was careful to give the Italian all credit due to him.

The British Post Office was slow in making an offer for the system and so, in July 1897, The Wireless Telegraph and Signal Company was founded. Marconi took £15 000 in cash, £60 000 in shares and a three-year contract at £500 per annum. It was not bad going for a man with a system but no customers.

The money had been provided by his mother's family and friends. It was no coincidence that in Britain lay his mother's extensive and wealthy family connections with the Haig, Ballantine and Jameson whisky empires.

At the start sales were non-existent. Some equipment was sold to the British Army in 1898 for use in the Boer War, but the expected market for ship-to-shore communications failed to materialize. Then in 1900 a contract with the Admiralty was signed to provide equipment and train operators. Maybe this was the key. After all, even Marconi could hardly expect to sell equipment to people who did not know how to use it.

A change of policy followed. Instead of selling equipment the company started to offer a radio communication service. Equipment would be leased, together with Marconi personnel who would operate and maintain it. This arrangement also overcame any possible infringement of the Post Office monopoly of wired telegraphy. A new company was formed, The Marconi International Marine Communications Co., and the original company changed its name to Marconi's Wireless Telegraph Company.

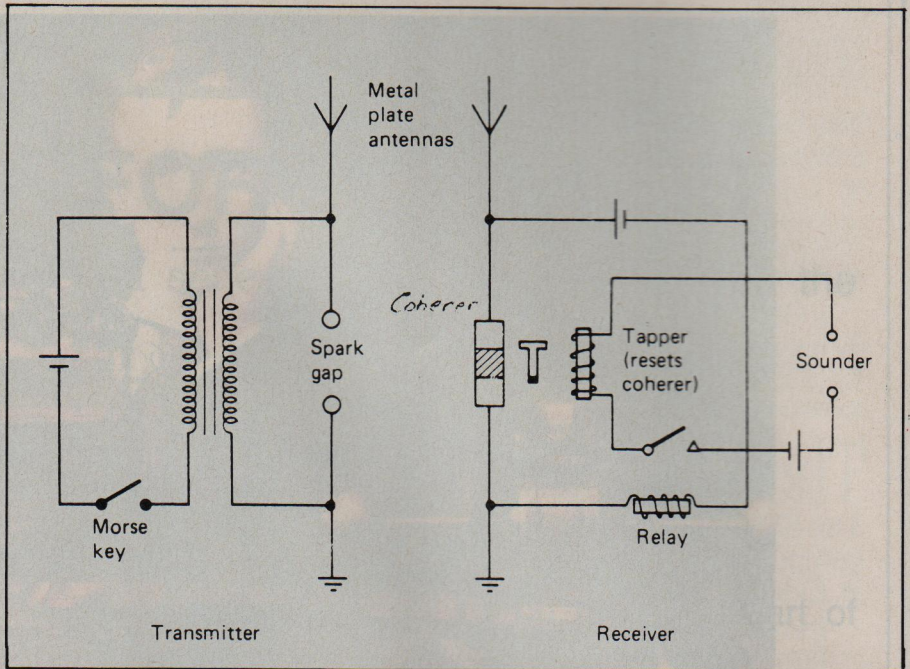
Shipowners now had access to a communications system that used standard equipment and techniques. Lloyd's of London gave that system its weighty approval with a contract in 1901. In practice this meant a virtual monopoly for Marconi's which lasted for seven years.

BRIDGING THE ATLANTIC

Marconi himself felt there was another market: competition with the thriving submarine cable companies.

The first permanent installation was on the Isle of Wight from where messages could be sent to the mainland at about 12 words per minute. It was from there that Kelvin sent the first paid radio telegram in 1898*. The following year a link was established across the English Channel, and after that the Atlantic became the target.

During more than a year of preparation, huge transmitting and receiving aerial



Marconi's untuned transmitter and receiver with ground and elevated aerial (1896).

arrays were constructed on both sides of the Atlantic – and destroyed by gales. At last the tests began, using a simplified aerial system at Poldhu in Cornwall and a receiving wire held aloft by a kite at St John's in Newfoundland.

The transmission consisted of a single Morse letter S sent at specific times during the day. On December 12, 1901, during a blustering gale, signals were received and Marconi recorded in his diary, "Pips at 12.30, 1.10 and 2.20".

Reception was erratic and automatic receivers proved impracticable. Sceptics suggested that Marconi and his men were suffering from self deception and that the radio waves would have been lost into space. The local telegraph company in Newfoundland reacted by threatening legal action if tests continued. It had a monopoly to protect.

A month later all doubts were dismissed when automatic recording equipment recorded reception on board ship as Marconi sailed back to Britain. The difference in distance achieved between day and night was also noted: 700 and 1653 miles respectively. The Atlantic shipping lanes now promised a new market.

At the age of 27, Guglielmo Marconi had become an international personality, an engineering superstar.

His private life was soon to change also. In 1905, after two broken engagements, he (like his father) married an Irish girl: Beatrice (Bea) O'Brien. They had four children, one of whom died in infancy.

By 1912 the marriage was in trouble but the couple averted disaster in more ways than one. As invited guests they were to sail on the maiden voyage of the *Titanic*. For business reasons, though, Marconi embarked on an earlier sailing. Bea avoided death by delaying her departure because their two-year old son was taken ill.

In an attempt to help their marriage they took a holiday in Italy. There was a head-on car smash and Marconi lost his right eye.

ITALY AT WAR

When Italy entered the First World War on the Allied side in 1915 Marconi became adviser on radio communications to the Italian armed services, and he represented his country on official visits, to London and America for example. He was also an Italian delegate at the 1919 Paris peace conference.

In 1923, after much conscience searching, he joined the Italian Fascist Party. Mussolini was only too pleased to have the support of the famous Italian. Much later he was given the hopeless task of defending Italy's invasion of Abyssinia. In this he suffered the ignominy of being denied by the BBC the opportunity to broadcast in defence of the Italian action. Privately by then he had grave misgivings about Mussolini.

A year later his marriage to Bea ended in divorce. Another three years and he remarried, this time to a beautiful Italian girl less than half his age, Maria Cristina Bezzi-Scali. Marconi's position as a divorcee had created obstacles because of church law, but they were overcome with the cooperation of Bea, with whom Marconi was still on good terms. Later Marconi himself became a Catholic and subsequently he personally supervised the installation of a short-wave transmitter in the Vatican.

From about 1934 he suffered several heart attacks. He was of course an international celebrity and had received many honours including the Nobel Prize (1909), honorary degrees, Knight of Italy (1902), Freeman of Rome (1903), and President of the Royal Italian Academy.

He died on the July 20, 1937 in Rome and received a state funeral. Following his own wish he was buried at Bologna, the scene of his childhood.

Dr Tony Atherton is on the staff of the IBA's Harman Engineering Training College at Seaton in Devon.

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