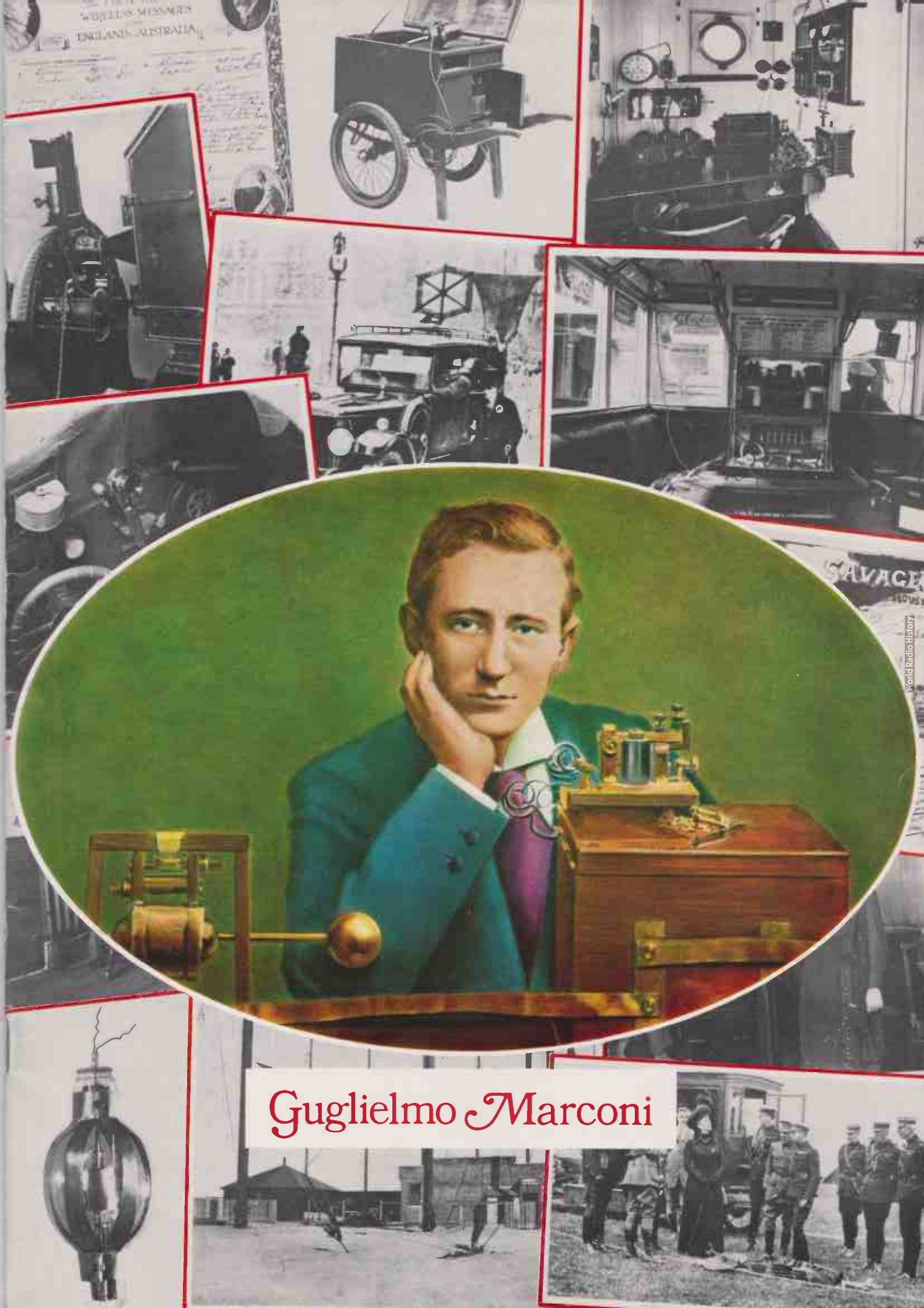
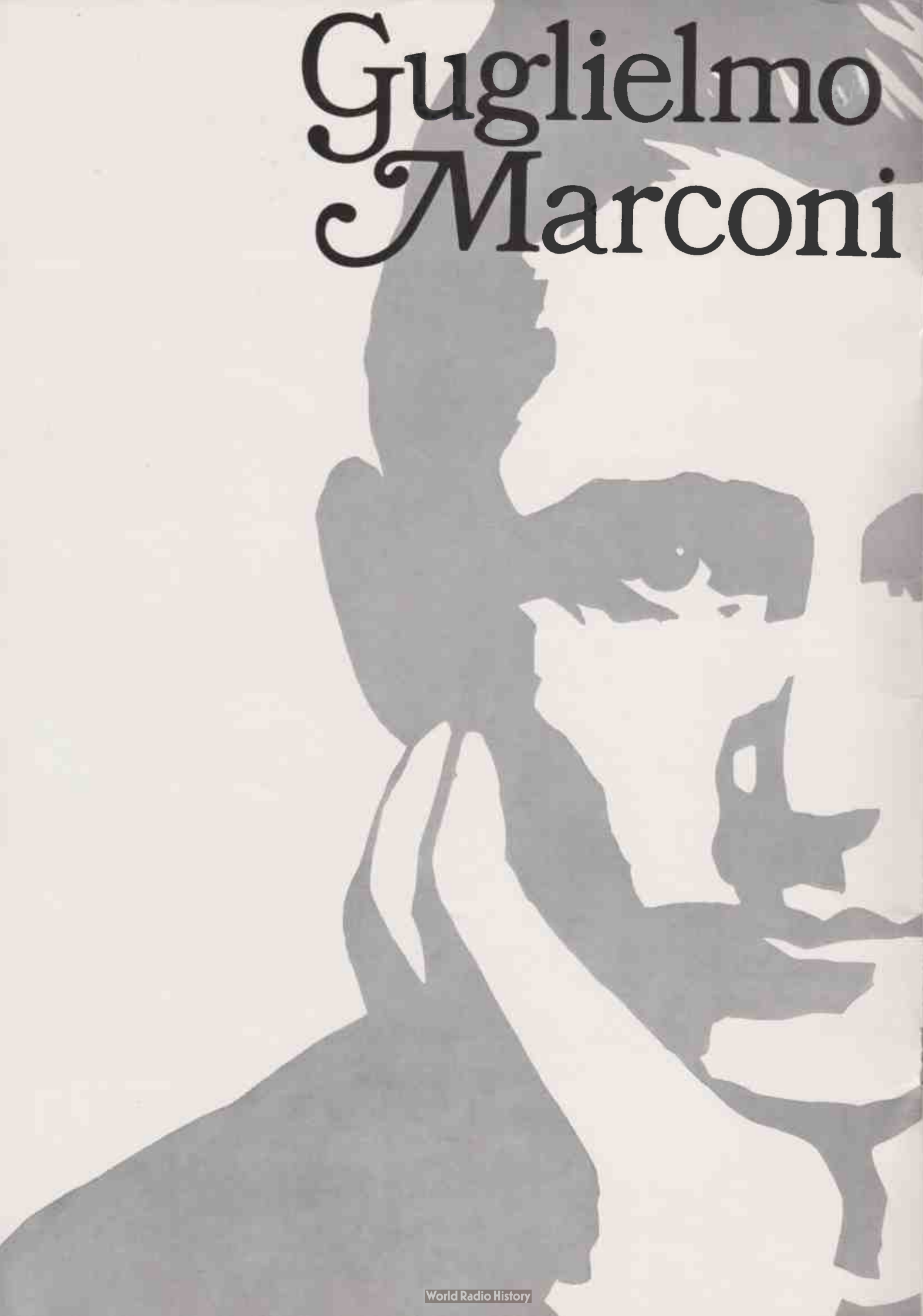
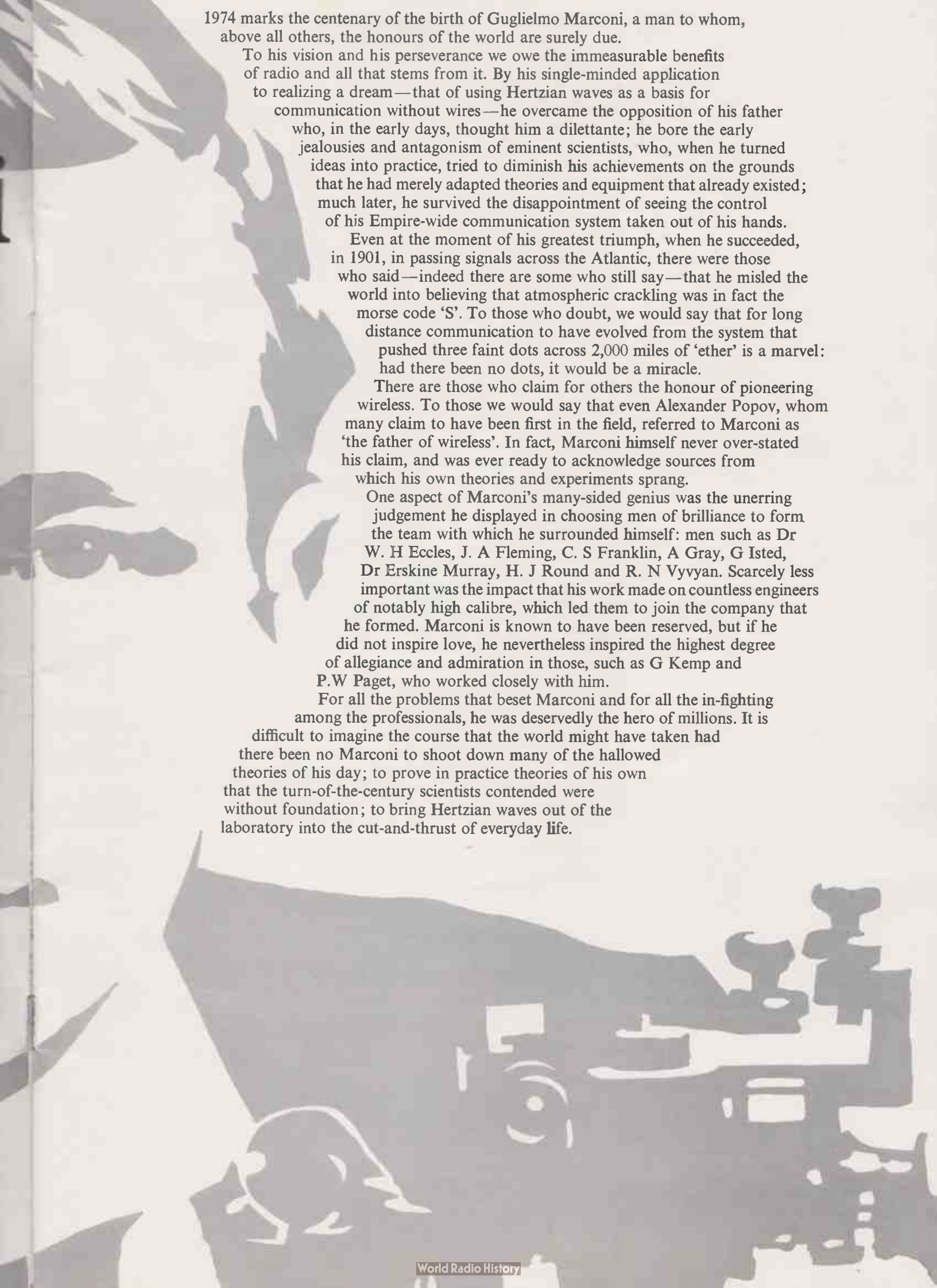

WIRELESS MESSAGES
ENGLAND-AUSTRALIA
SAVAGE
Guglielmo Marconi

Guglielmo Marconi





1974 marks the centenary of the birth of Guglielmo Marconi, a man to whom, above all others, the honours of the world are surely due.

To his vision and his perseverance we owe the immeasurable benefits of radio and all that stems from it. By his single-minded application to realizing a dream—that of using Hertzian waves as a basis for communication without wires—he overcame the opposition of his father who, in the early days, thought him a dilettante; he bore the early jealousies and antagonism of eminent scientists, who, when he turned ideas into practice, tried to diminish his achievements on the grounds that he had merely adapted theories and equipment that already existed; much later, he survived the disappointment of seeing the control of his Empire-wide communication system taken out of his hands.

Even at the moment of his greatest triumph, when he succeeded, in 1901, in passing signals across the Atlantic, there were those who said—indeed there are some who still say—that he misled the world into believing that atmospheric crackling was in fact the morse code 'S'. To those who doubt, we would say that for long distance communication to have evolved from the system that pushed three faint dots across 2,000 miles of 'ether' is a marvel: had there been no dots, it would be a miracle.

There are those who claim for others the honour of pioneering wireless. To those we would say that even Alexander Popov, whom many claim to have been first in the field, referred to Marconi as 'the father of wireless'. In fact, Marconi himself never over-stated his claim, and was ever ready to acknowledge sources from which his own theories and experiments sprang.

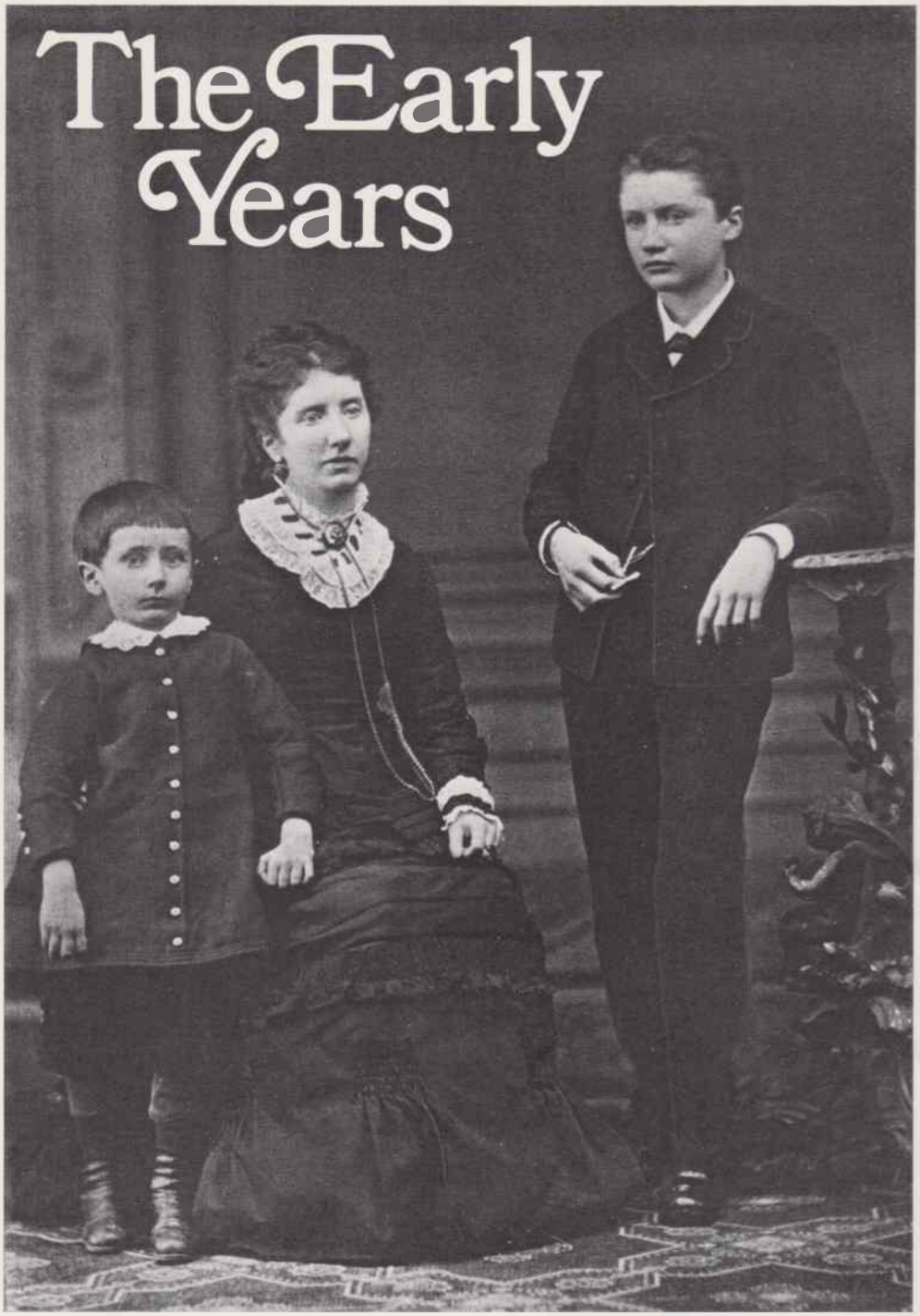
One aspect of Marconi's many-sided genius was the unerring judgement he displayed in choosing men of brilliance to form the team with which he surrounded himself: men such as Dr W. H Eccles, J. A Fleming, C. S Franklin, A Gray, G Isted, Dr Erskine Murray, H. J Round and R. N Vyvyan. Scarcely less important was the impact that his work made on countless engineers of notably high calibre, which led them to join the company that he formed. Marconi is known to have been reserved, but if he did not inspire love, he nevertheless inspired the highest degree of allegiance and admiration in those, such as G Kemp and P.W Paget, who worked closely with him.

For all the problems that beset Marconi and for all the in-fighting among the professionals, he was deservedly the hero of millions. It is difficult to imagine the course that the world might have taken had there been no Marconi to shoot down many of the hallowed theories of his day; to prove in practice theories of his own that the turn-of-the-century scientists contended were without foundation; to bring Hertzian waves out of the laboratory into the cut-and-thrust of everyday life.

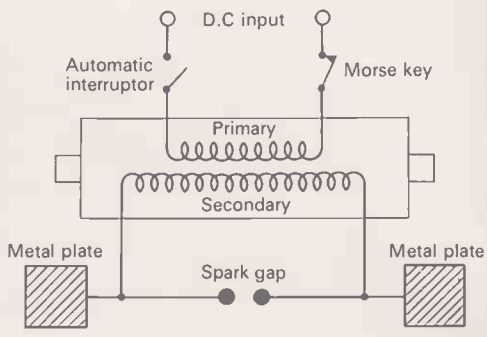
The Early Years

1 On 25 April 1874 Guglielmo Marconi was born at the family's town house in Bologna. Much of his early childhood was spent travelling with his elder brother, Alfonso, and his Irish-born mother, Annie, while his father, Guiseppe, played out his cherished role of squire at his country seat, the Villa Grifone, shown here.

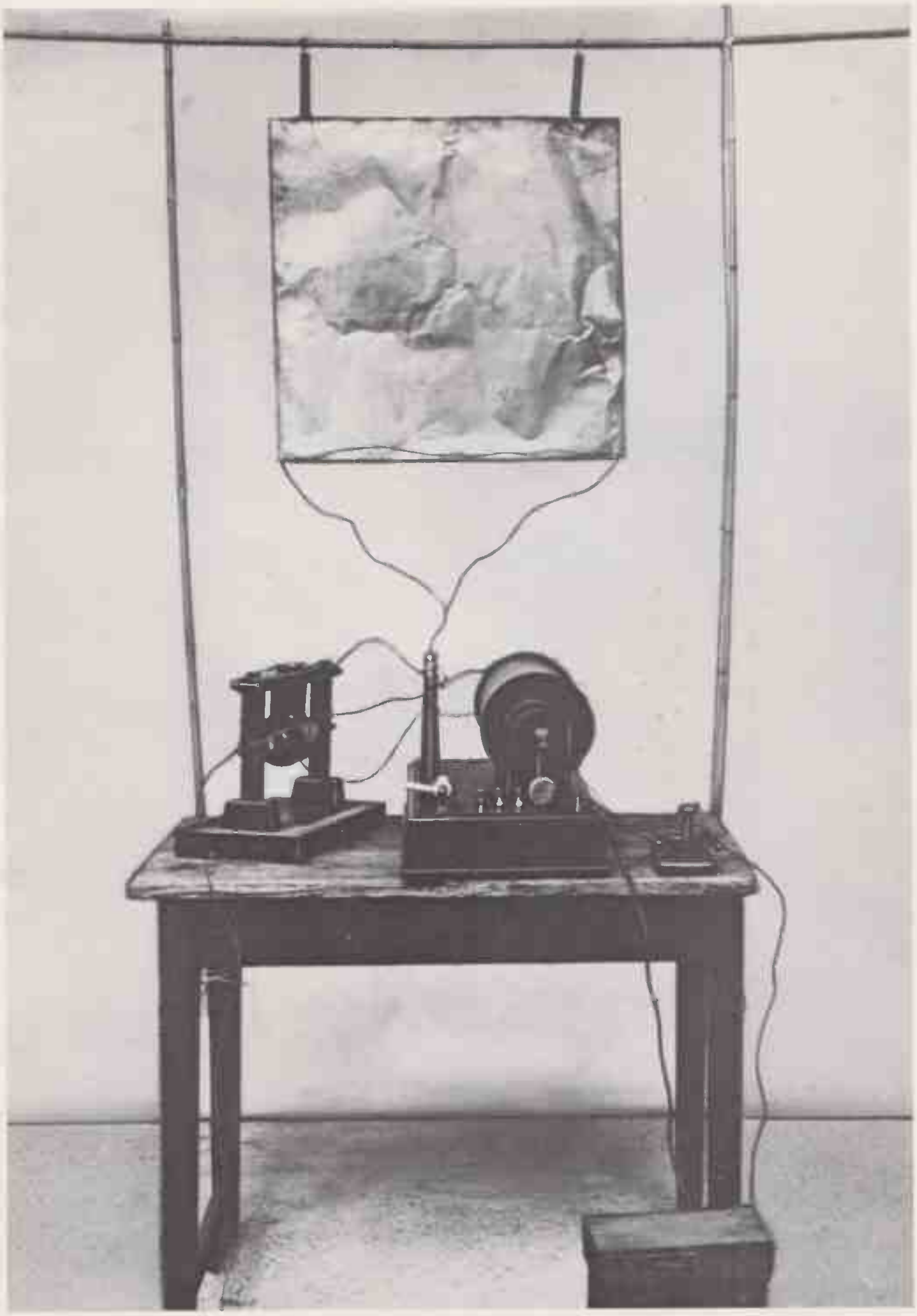
2 The child Marconi was not an unqualified success, either academically or socially. From an early age he was more interested in devising scientific toys than in school work. A widening rift between his parents, coupled with years of 'living in a suitcase', deprived him of a sense of security and resulted in a reserve that set him apart from other boys of his age. He is seen here with his mother and elder brother.



3 Having failed the qualifying examination for the Naval Academy, Marconi, encouraged by his mother and brother but opposed by his father, concentrated on his scientific interests. In his attic laboratory at the Villa Grifone, he pursued his dream of using Hertzian waves as a basis for communicating without wires.

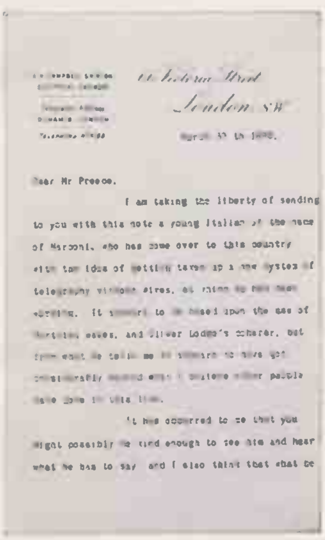


4 By the early summer of 1895, he had succeeded in transmitting signals over a few yards of space by means of two insulated plates separated by a spark gap consisting of two small spheres connected across the secondary of an inductance coil, the primary of which included a battery and a morse key. The receiver was of the coherer type.



5 By August 1895, Marconi achieved transmission over a distance of $1\frac{3}{4}$ miles by using an earth and an elevated aerial at both the transmitter and the receiver. And by using an improved type of coherer—a glass tube filled with metal filings—he was able to pass morse code, which could be recorded on tape.

6 The Italian Government, whom Marconi approached with his invention, evinced no real interest. So the young man set sail for England in 1896 and, under the guidance of his cousin, Henry Jameson Davis, filed the world's first patent application for a system of telegraphy using Hertzian waves. British Patent No 12039 was granted on 2 June 1896.



London SW

Dear Mr Preece.

I am taking the liberty of sending to you with this note a young Italian of the name of Marconi, who has come over to this country with the idea of getting taken up a new system of telegraphy without wires, at [illegible] been [illegible]. It [illegible] to be based upon the use of [illegible] waves, and Oliver Lodge's coherer, but from what he tells me he [illegible] to have got considerably [illegible] other people have done in this line.

It has occurred to me that you might possibly be kind enough to see him and hear what he has to say and I also think that what he

has done will very likely be of interest to you.

Hoping that I am not troubling you [illegible]

Believe me,

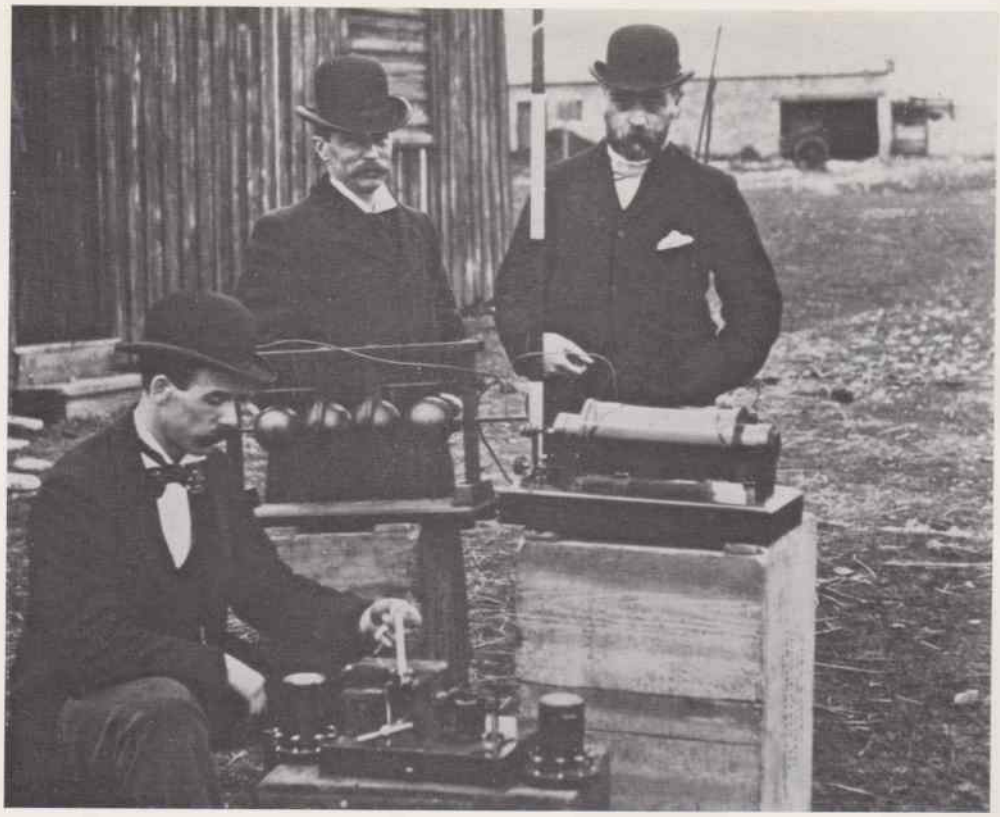
Yours very truly,

A. A. C. Swinton

7 Soon after his arrival, Marconi met A. A Campbell Swinton, a well-known electrical engineer, who gave him a letter of introduction to William Preece, Chief of the Engineering Department of the General Post Office. Preece swiftly arranged for a demonstration to be given of the transmission of telegraphic signals from the Post Office roof at St Martin's-le-Grand to that of a building on the Embankment.

8 Following the successful initial demonstration, a series of tests took place on Salisbury Plain and good results were obtained at a range of $1\frac{3}{4}$ miles. Preece, to whom Marconi always acknowledged his indebtedness, gave the young inventor every encouragement, and the support of the technical resources of his department. He also gave a historic public lecture on the subject of Marconi's invention at Toynbee Hall on 12 December 1896.

9 In 1897 Marconi established communication across the Bristol Channel, where Preece was experimenting with inductive methods. Comparison left no doubt about the superiority of Marconi's system, which set a new record of transmission across 8·7 miles. Post Office engineers are seen here checking Marconi's equipment.



10 The Isle of Wight was the scene of many early Marconi experiments. In 1897, he set up an aerial and installed his apparatus in the grounds of the Royal Needles Hotel, Alum Bay, and succeeded first in communicating with a hired ferry boat, the s.s *Mayflower*, and then with a station set up at Madeira House in Bournemouth. Marconi had spanned the Solent!

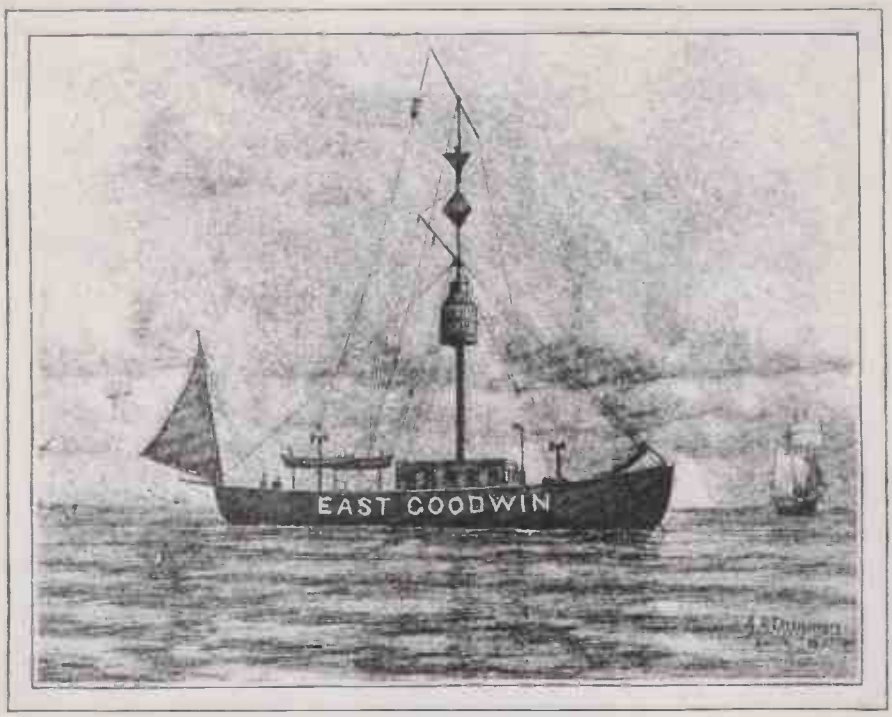
11 In July of the same year he went to Italy to demonstrate his equipment to the Government, and also to the King and Queen at the Quirinal. He is seen here with Italian officials at Spezia.

12 Meanwhile, in England, The Wireless Telegraph and Signal Company had been formed, with Marconi as the major shareholder, to develop his apparatus commercially. In 1899, premises were acquired in Hall Street, Chelmsford. In 1900 the Company's name was changed to Marconi's Wireless Telegraph Company, and in 1963, to The Marconi Company. The photo shows part of the Hall Street Works, the first radio factory in the world.


POST OFFICE TELEGRAPHS

TO

13 The Company's early years were crammed with activity. 1898 saw the adoption of Marconi wireless by the Italian Navy; the demonstration at Lloyd's request of a wireless link between Ballycastle and Rathlin Island; the first-ever use of wireless by the press; wireless communication between Queen Victoria at Osborne House and the Prince of Wales on board the Royal Yacht in the Solent; and the sending by Lord Kelvin of the first paid telegram to be transmitted by wireless.



THE EAST GOODWIN LIGHTSHIP.

The Marconi apparatus is seen suspended from the spar at the masthead.

14 From the beginning, Marconi was aware of the potential value of wireless to those at sea. At the invitation of Trinity House he set up a demonstration station on the Goodwin Lightship, using the South Foreland Lighthouse as the shore station. In 1899 the lightship, damaged by storm, sent out distress signals. The same year, the s.s *R. F Matthews* collided with the lightship and, following distress signals, the first sea rescue through wireless took place. Also in 1899, information for the first newspaper to be produced at sea was transmitted from the Isle of Wight to the US liner, *St Paul*.

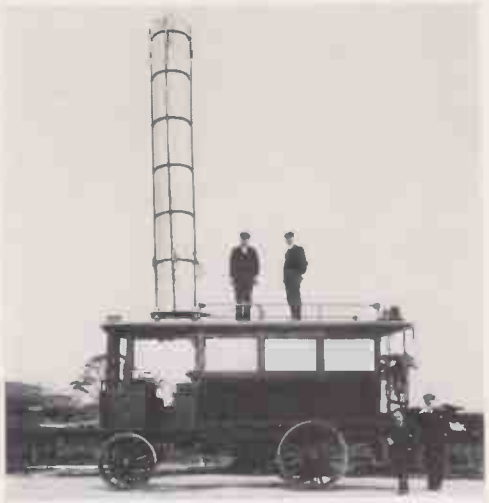
15 Marconi's next great achievement was to establish communication across the English Channel. With the agreement of the French Government, a station was erected near Boulogne at Wimereux, shown here, and in March 1899 the first official cross-channel message was received at South Foreland.

16 By now the significance of wireless was apparent to more than a handful of visionaries. In 1899, largely through the efforts of Captain Henry Jackson RN, seen here, it was installed and used to outstanding effect aboard three ships in Royal Naval manœuvres; it was brought into service in the South African War, and in this year Marconi crossed to the USA where his system was used to report the America's Cup Races and was demonstrated to the US Naval Department. November saw the registration of The Marconi Wireless Telegraph Company of America, which later became the mighty RCA.

17 While wireless was catching on in all quarters of the globe and for all manner of purposes—here it is seen in a 1900 fire station and on a 1901 mobile experiment—and while new stations were springing up and achieving greater and greater communication distances, Marconi was planning an attempt to span the Atlantic.

The introduction of, and the almost incredible advances in, the application of electro-magnetic waves that occurred in the last four years of the nineteenth century were inspired by one man, Guglielmo Marconi, who, at 22, helped

New Century – T

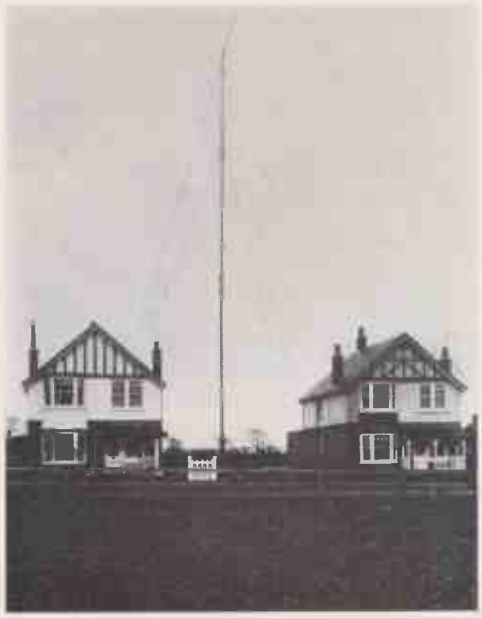


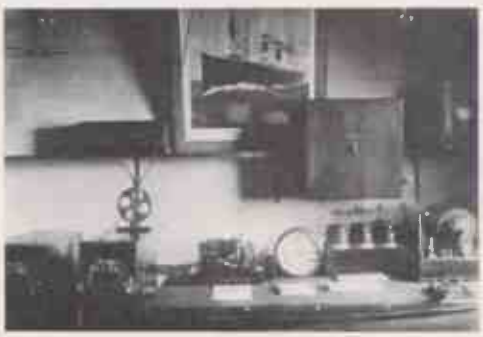
18 1900 saw the birth of The Marconi International Marine Communication Company Limited, whose purpose was to work an exclusive licence for all maritime purposes. More and more ships were being equipped, and the photograph shows a typical installation of the period. At this time, also, Marconi took out his famous Four Sevens Patent for tuned coupled circuits.

to lay the foundations of the space age. His achievements in the twentieth century until the time of his death are too numerous to detail, but here we record some of his more outstanding exploits.

New Conquests

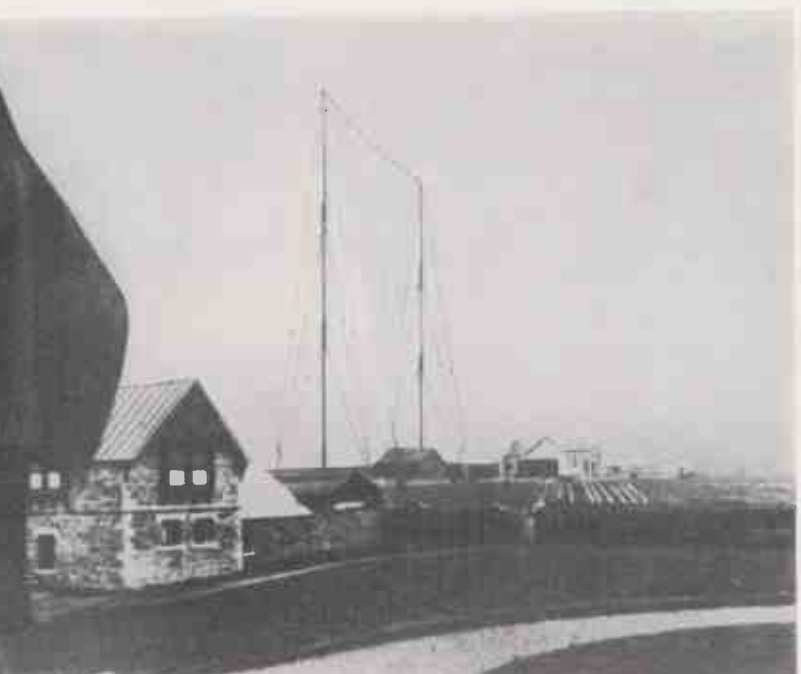
19 One of Marconi's problems at this time was that of staffing. No colleges or schools existed that covered the subject of wireless, so in 1901 the Company opened the world's first wireless school at Frinton to supplement the students' engineering knowledge with the principles and practice of Marconi wireless. The wireless school developed into the present-day Marconi College, which is situated in Chelmsford.



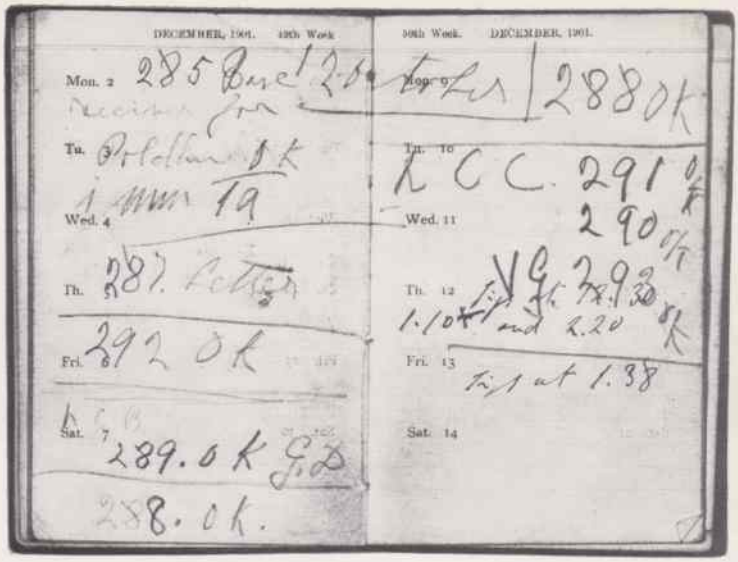


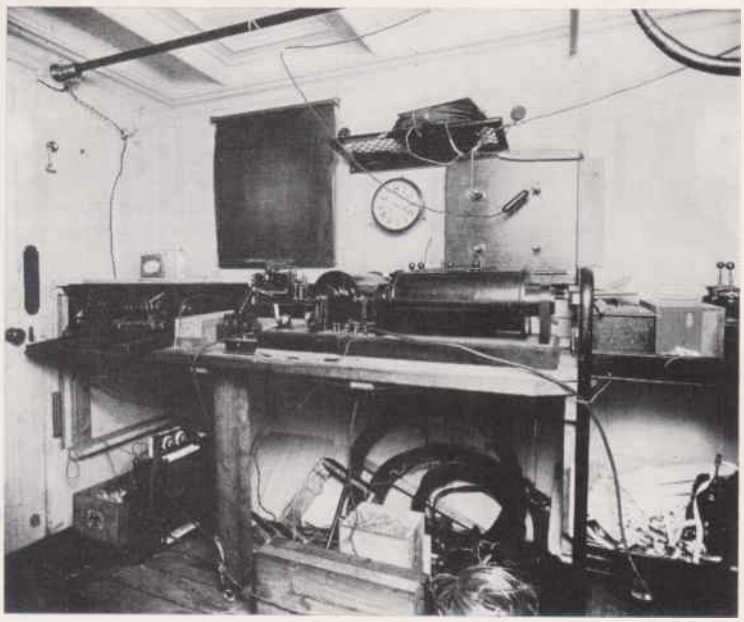
20 In 1901, Marconi achieved communication over 198 miles between the Isle of Wight and the Lizard—the interior of whose station is shown here—a fitting limbering-up exercise for his marathon transatlantic experiment, for which, at Poldhu in Cornwall, Vyvyan, Professor Fleming, Paget and Kemp started to build the eastern terminal station, while Marconi crossed to America and selected a site at Cape Cod for the western station

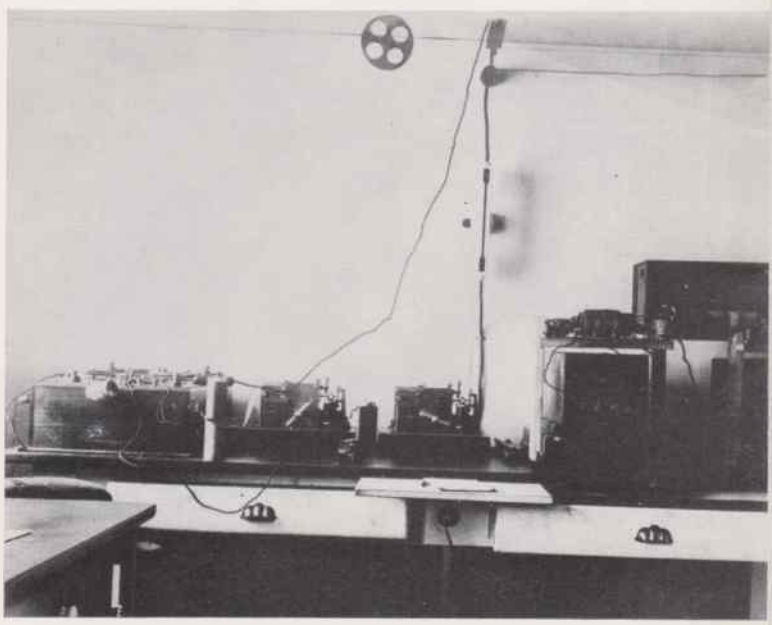
21 The weather proved an implacable enemy, destroying the aerials on both sides of the Atlantic. In England, the Poldhu aerial was rebuilt, a fan design, seen below, replacing the original circular structure, while Cape Cod was abandoned in favour of a temporary installation at Signal Hill, St John's, Newfoundland, where Marconi is seen in the photograph with Kemp, left, and Paget.



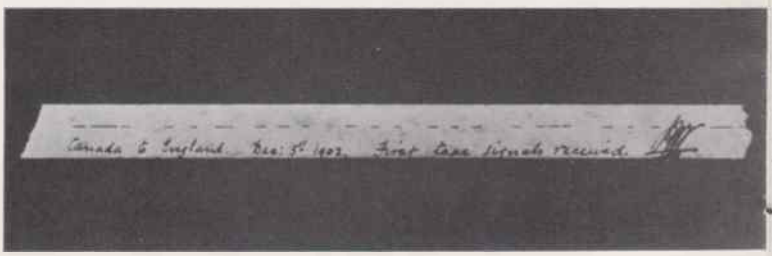
22 On 12 December 1901, a blustering gale at Signal Hill made it difficult for Marconi and his assistants to launch the aerial on its kite, but at 12.30, 1.10 and 2.20, as recorded in his diary, he plucked from the atmospherics the three dots of the morse code 'S' that was being transmitted from Poldhu. The age of long-distance communication was born.



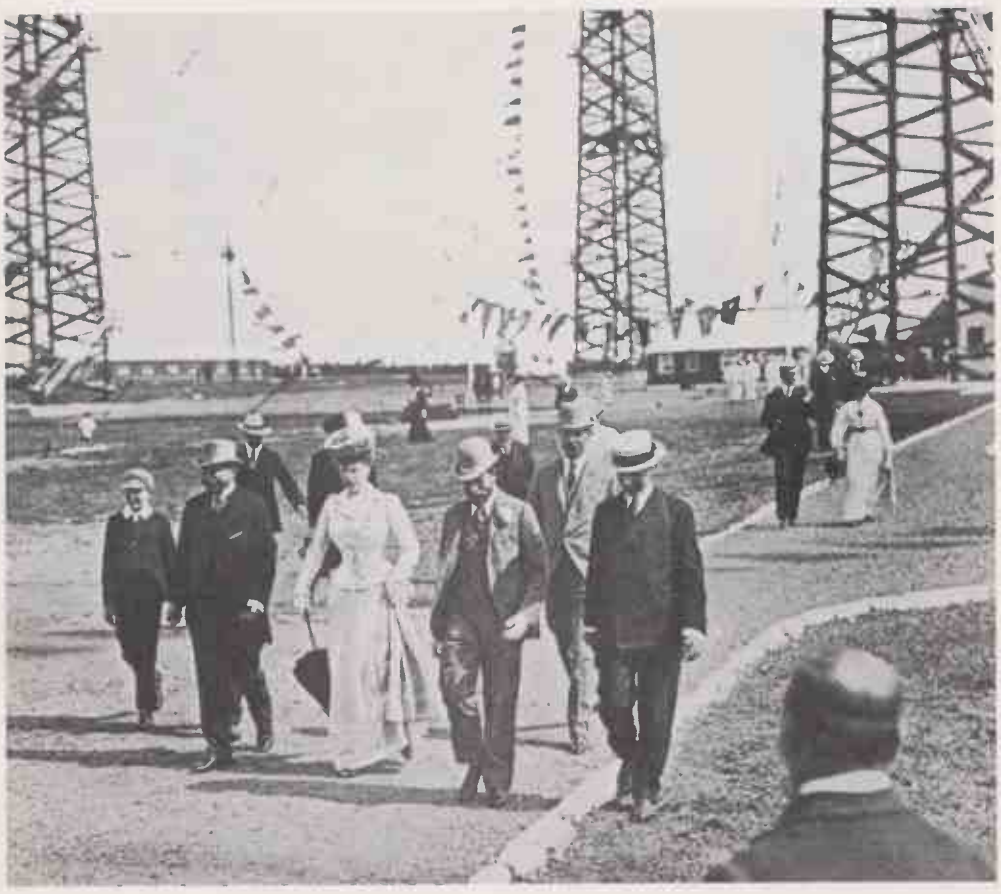




23 Marconi had chosen to use an ear-piece for detecting the transatlantic signals. In the absence of material proof, the news of his success was greeted in a variety of ways, but never with indifference. The caption to this picture, taken in 1902, was written by Kemp, and reads, 'Inside of the cabin on s.s *Philadelphia*, which I fitted for Mr Marconi's wonderful achievement, proving to the world that it was quite possible to receive on a ship greater distances than Newfoundland, which many of the Professors had doubted'. The range achieved was 2,099 miles.



24 On board the *Philadelphia*, Marconi silenced the sceptics by producing visible proof of his success. At night the simple 'S' signals received from Poldhu, 2,099 miles away, motivated the morse inker for all to see, and the first readable transatlantic messages, as distinct from signals, were recorded at a range of 1,551 miles. The Poldhu apparatus and tape are shown here.

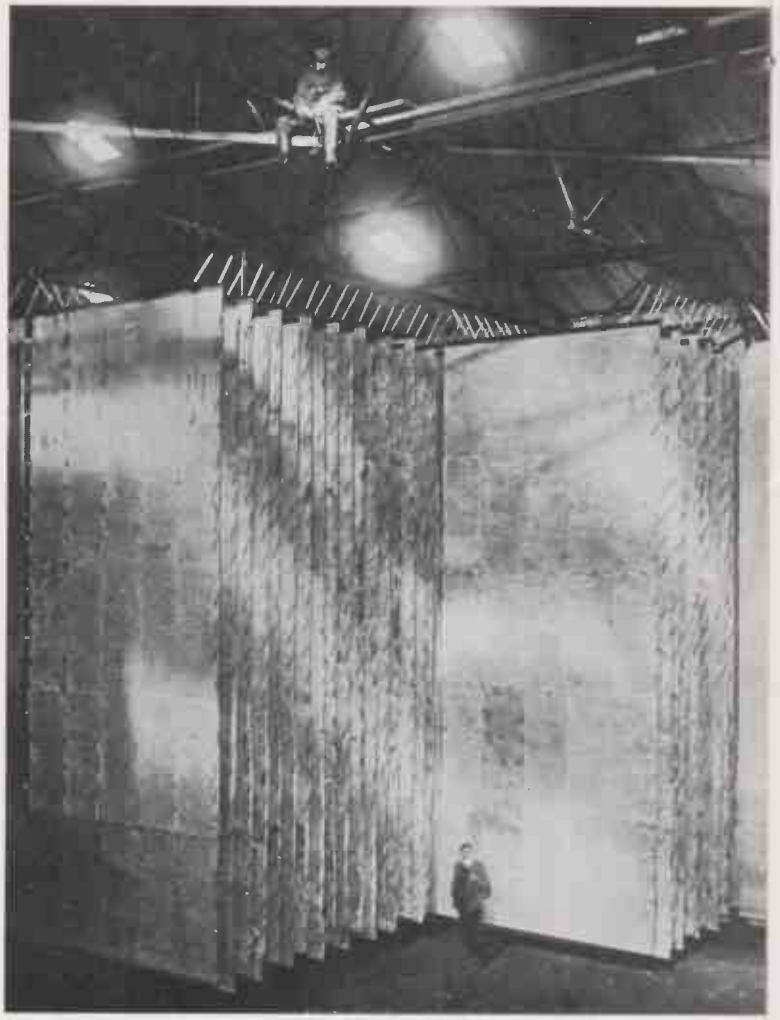


25 Tests having proved that intercontinental wireless communication was possible, an agreement was reached with the Canadian Government to build Poldhu's permanent opposite number at Glace Bay, Cape Breton Island. The station was inaugurated on 21 December 1902, and is the chilling backcloth against which Marconi and his staff are pictured.

27 In 1904, the Wireless Telegraphy Act made the licensing of all wireless transmission stations a requirement in the UK, thus clearing up a number of contentious points regarding transmission rights, and placing Marconi in a stronger position to meet foreign competition. This year also saw the original patent for radio valves, filed by Dr J. A Fleming, Scientific Adviser to the Marconi Company, one of whose early experimental diodes is shown here.

26 By 1903, when the Prince and Princess of Wales visited Poldhu, with its newly designed aerial supports, Marconi had increased the speed of reception by developing the magnetic detector, which remained the standard Marconi receiver for a number of years. Also in 1903, wireless received official recognition as a world force, and the first International Conference on Wireless Telegraphy was held in Berlin. The Admiralty entered into an agreement with the Marconi Company for the use of the Marconi system in the British Navy.

28 Marconi was continually uncovering mysteries that he turned to practical ends. Improvements to Glace Bay revealed the value of the directional aerial, for which, in 1905, he took out a patent—an early step in the development of the Beam System. As Poldhu was unsuitable for the erection of the new aerial, a station was built at Clifden in Ireland to take over the transatlantic service. The photos show, centre right, the Clifden condenser under construction, and, right, the railway used to link the isolated buildings with the road.



29 1905 was also the year of Marconi's marriage to the Hon. Beatrice O'Brien, daughter of Lord and Lady Inchiquin. In spite of a common devotion to their children, Degna (b. 1908), Giulio (b. 1910) and Gioia (b. 1918), and in spite of an amity which lasted until Marconi's death, the marriage ended in divorce in 1924.

30 In 1907, experiments were started that were to take wireless into a new environment —the air. Transmission was effected first from a captive balloon; in August 1910, J. D. A McCurdy, using a Marconi spark transmitter, sent the first message from an aeroplane to a ground station, and a month later Robert Loraine, seen here, also transmitted from the air to a receiver station a quarter of a mile away.

PURE INDIAN TEA
BRITAIN'S BEST BEVERAGE.

Weekly Dispatch
109TH YEAR
SUNDAY SPECIAL EDITION.

ESMOLIN NEURITIS

No. 5,677.] SUNDAY, JULY 31, 1910. [ONE PENNY.

CRIPPEN'S LIFE AT SEA DESCRIBED BY 'WIRELESS.'

DETECTIVE NO. DEW

MRS CRIPPEN — (MISS BELLE ELMORE.)

H.H. Crippen.

THE DOCTOR'S FIRST WIFE
MRS CHARLOTTE CRIPPEN

CAPT KENDALL

CRIPPEN'S LIFE AT SEA DAY BY DAY.

DESCRIBED BY CAPTAIN KENDALL OF THE MONTROSE.

FULL EXCLUSIVE "WIRELESS" TO "THE DAILY MAIL."

THE BOOKS CRIPPEN READS AND THE SONG HE LIKED.

WHY HE FAILED TO ANSWER THE NAME "ROBINSON."

MISS LE NEVE.

"ALL WALKED INTO THE SHIP."

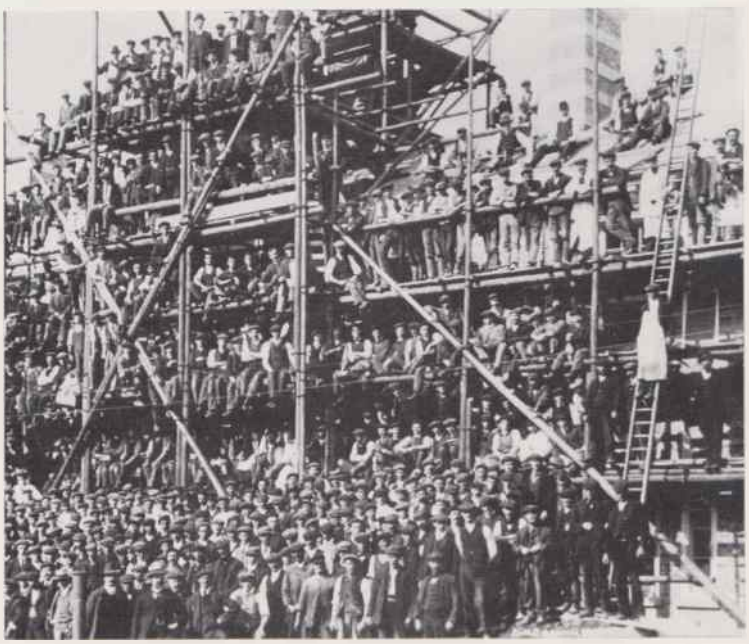
NOTICE.

A Special Edition of *The Weekly Dispatch* will be published this afternoon, giving an account of the arrest of Crippen and Miss Le Neve.

Special arrangements have been made for having the details rapidly cabled by our special correspondent from Father Point, where the liner Montrose will be boarded by the Canadian police officers and Inspector Dew, and one special edition will be published at the earliest moment after the receipt of the news.

31 The world was by now used to seeing Marconi's 'invention' hit the headlines. This it did yet again after the dramatic arrest of the notorious murderer, Dr Crippen, and his mistress, Ethel le Neve, following a wireless message from s.s *Montrose* to New Scotland Yard. In the following year, 1911, the Marconi Company itself went into print with *The Marconigraph*, which, after two years, it renamed *Wireless World*.

32 Over the years, the list of rescues at sea resulting from the use of wireless had grown significantly. When the *Titanic* struck an iceberg and sank in 1912, the loss of life was truly terrible, but those who survived owed their lives to the wireless distress calls. This must have gratified Marconi, whose first aim in perfecting communication without wires had been to break the isolation of those at sea.



33 From time to time, the Works at Hall Street were extended but were still inadequate for the needs of the growing Company. In 1912, therefore, a new building was designed and erected in New Street, Chelmsford. It was the first purpose-built radio factory in the world and ultimately became the Company headquarters. From conception to completion the project took only 17 weeks —thanks largely to the mighty team of builders seen here festooning the scaffolding.

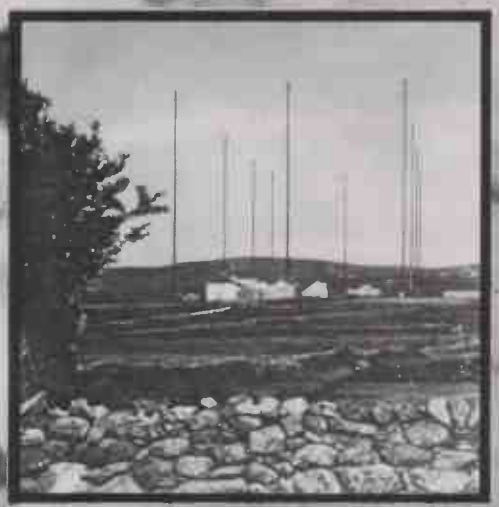
The Great War

At the outbreak of hostilities in 1914, the importance of wireless as an instrument of war was immediately recognized, and the Admiralty at once assumed control of the Marconi Works.

War is ever a stimulus to creativity, and even the remarkable pace of inventiveness that had always distinguished Marconi and his outstanding team of engineers was stepped up during this period.

Not only was hardware produced at Chelmsford by the ton and at an unprecedented rate but also Marconi's wireless telegraphists performed an invaluable service in all the armed forces and the merchant navy, both as operators and as training officers.

It is no more possible to record here the whole spectrum of war-time achievements than it is to record those of peace time, so selected references must suffice.



34 During 1914, Marconi completed the first longwave transatlantic wireless station for direct communication with the USA—the transmitter being at Caernarvon, shown here, and the receiver at Towyn. It was taken over by the Post Office and, later, by the Admiralty. Clifden was similarly used on Government service throughout the war, and Marconi's masts and equipment in Chelmsford and at Marconi House in London were requisitioned for wireless interception purposes.

35 One of the outstanding war-time advances was the perfecting of direction finding techniques, on which work had started in Chelmsford before the war. The Company established a chain of direction finding stations in Britain that were used to devastating effect in detecting enemy Zeppelins, submarines and surface ships—one of the most dramatic occasions being the detection of German warships that resulted in the Battle of Jutland. D/F networks were also established for the armies in France, which were already well equipped with wireless for field communications.

36 At the Royal Aircraft Factory, Brooklands, air-to-ground telegraphy, initiated by Marconi before the war, was perfected. In 1916, the apparently insuperable difficulty of receiving wireless telephony in noisy, interference-bedevilled aircraft was overcome by Major C. E Prince, Capt H. J Round and Lt J. M Furnival—all of them Marconi engineers. And in the late spring of 1917, from a newly established unit at Biggin Hill, the final aircraft communication gap was bridged when interplane telephony was achieved under Furnival's supervision.

37 The British Navy, faced with the possibility of action in any of the seven seas, set about creating its own world communication network for its scattered fleets, and the Marconi Company contracted to build a dozen stations on widely separated and sometimes isolated sites. The photo is of a mobile wireless set in use during the war.

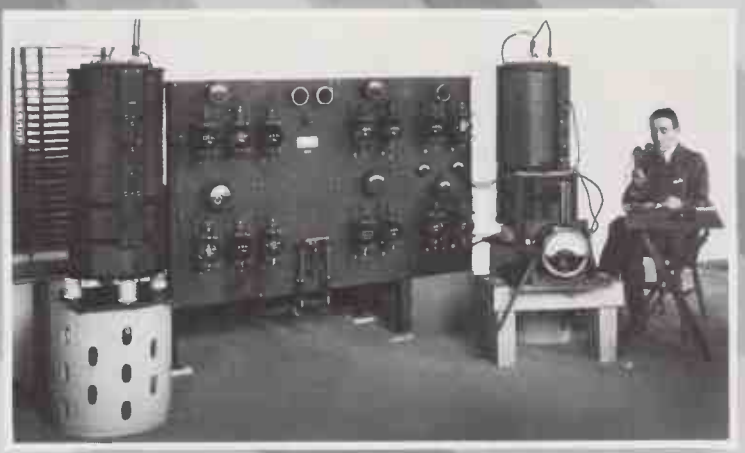
38 Marconi himself was commissioned in the Italian Army in 1915 and given a roving commission to inspect and recommend improvements to the mobile wireless stations behind the front. Later, he became heavily engaged in diplomatic and political work on Italy's behalf and after the war was appointed Plenipotentiary Delegate to the Paris Peace Conference.

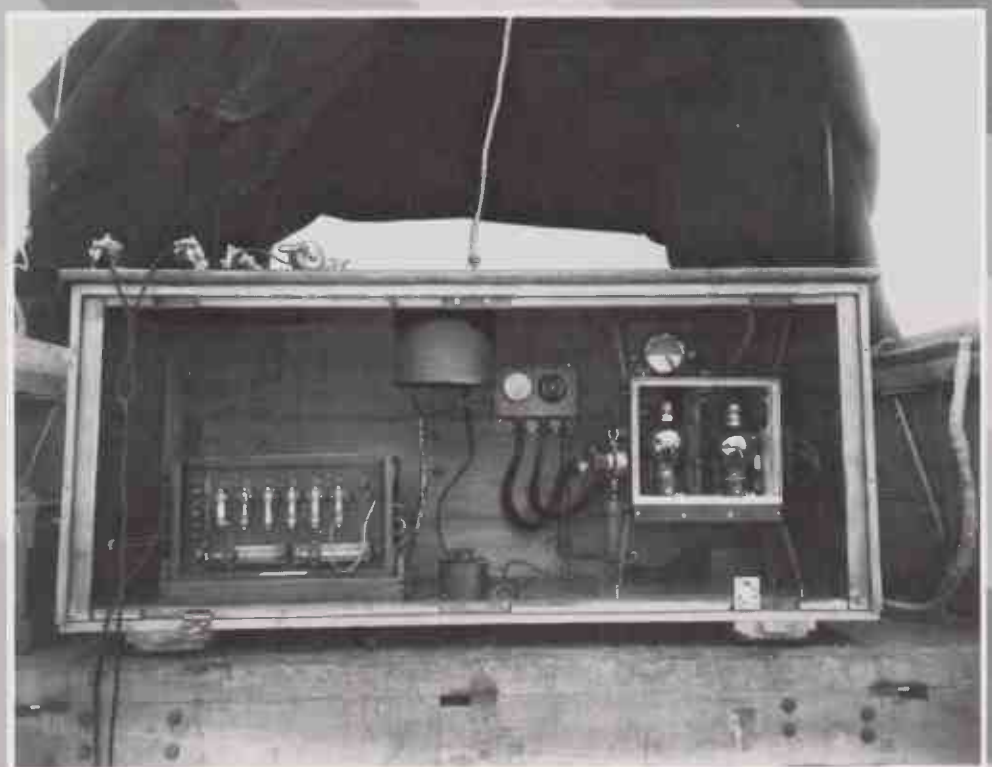
The Wider

When the war finished, Marconi and his team lost no time applying war-time innovations to peace-time purposes. Wireless telephony, on which so much work had been done for the Royal Flying Corps, was now an established technique, leading

39 In 1919, Marconi bought his yacht, *Elettra*, which he equipped as a floating laboratory. Although head of a world-famous commercial enterprise, his consuming interest lay in scientific experimentation and he was never happier than when, as shown here, he was at sea on his yacht, investigating new methods of communication and navigation by wireless.

41 The embryo of broadcasting as we know it today took shape at Chelmsford in 1919 in the form of a 6½ kW experimental transmitter, replaced in 1920 by one of 15 kW input, with which telephony range tests were carried out. Although entertainment was not the primary consideration, music was introduced as a variant to reading such items as railways timetables, and was greeted enthusiastically by wireless amateurs.

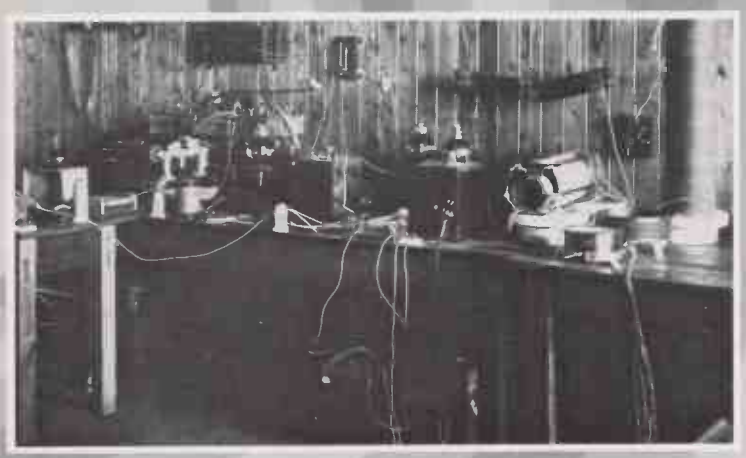




43 At this time, Marconi was fitting the first commercial air radio-telephone equipment—the AD1, photographed here on a lorry—to aircraft of companies operating the London–Paris route. Also in 1920, Croydon, shown here, supplanted Hounslow—the world's first civil airport—and was equipped by Marconi with the first ground–air transmitter station remotely controlled from a Marconi–Bellini Tosi receiving station.

eningNet

the way to vast new fields; wireless direction finding added a new dimension to civil aviation; and the mass of experience gained in long-distance communication opened up new vistas.



40 Also in 1919, the first east to west transatlantic transmission took place. The voice of Marconi Engineer W. T Ditcham was projected across the ocean to a receiving station in Louisberg, Nova Scotia, by a 2½ kW transmitter at Ballybunion, which used only three main valves as distinct from the 300 that had been needed in the west–east transmission in 1915.

42 On 15 June 1920, in Britain's first advertised public broadcast programme, Dame Nellie Melba broadcast a song recital from Marconi's Works in Chelmsford, where transmissions were made under a general licence allowing for experiments. Permission for entertainment demonstrations of this sort, however, was soon withdrawn on the grounds that they interfered with 'legitimate' services.

44 Meanwhile, there was much activity on the entertainment front. Under pressure from the wireless amateurs, who were aggrieved at being deprived of their concerts, the Post Master General granted the Company a licence allowing for regular, although very restricted, broadcasting. Transmission started in February 1922 from the Company's Writtle Laboratories, where the necessary equipment was hastily rigged up in an ex-army hut, shown here, and became famous as 2MT—Two Emma Toc. The tests were as notable for their entertainment as for their technical value.

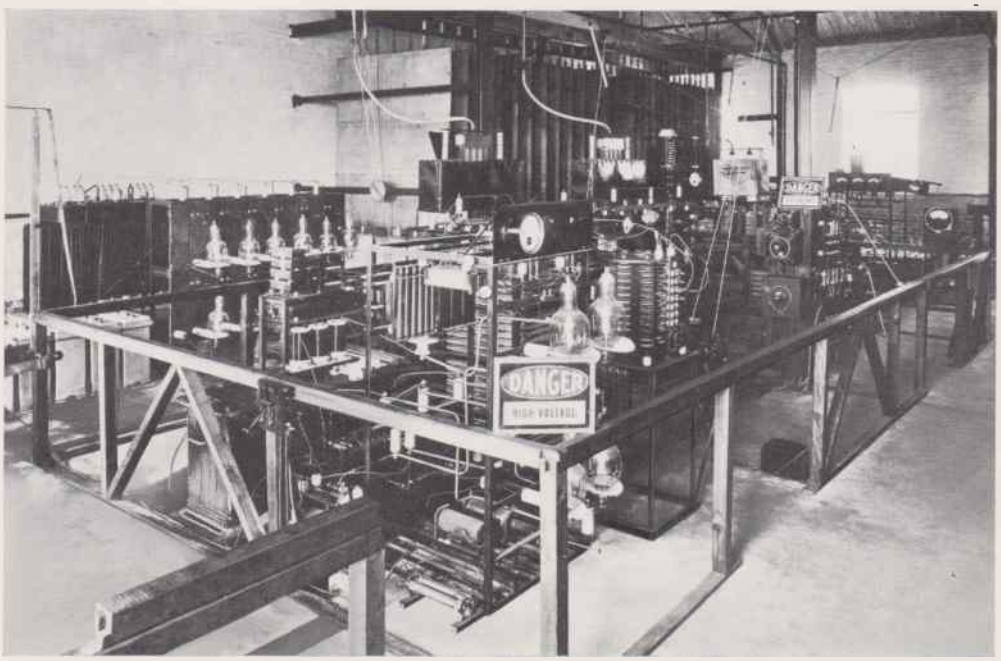
45 In May 1922, a further licence was granted, this time for the 2LO station in Marconi House in London. Enthusiasm for 'listening in' was growing apace, and the Government was concerned that the same sort of free-for-all broadcasting chaos as reigned in the USA might ensue. The Post Master General therefore called a conference of manufacturers at which it was decided that the six largest—Marconi among them of course—should form the British Broadcasting Company, which was superseded four years later in 1926 by the British Broadcasting Corporation.

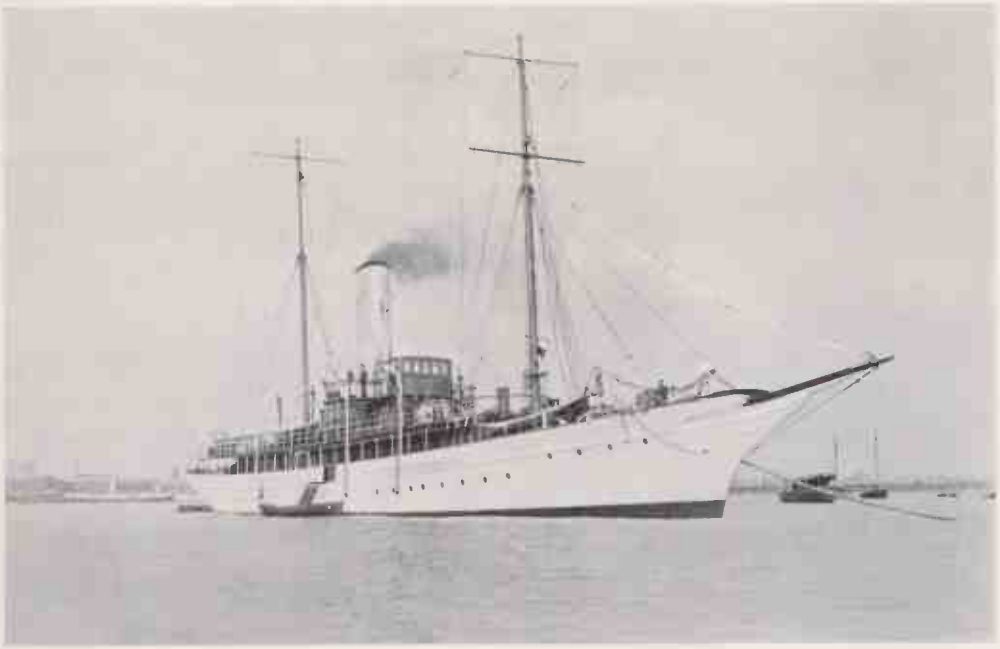
46 In 1922, the Marconiphone Company was formed to cater for those lacking the necessary skills to construct their own receivers. A message issued at the time, and reproduced here alongside an early, and by today's standards rather remarkable Art Decco, set, exemplifies Marconi's gift for anticipating trends and for using his inventive genius to satisfy them. The Marconiphone Company was sold to RCA in 1929, and was later merged with the Gramophone Company and the Columbia Graphophone Company to form EMI, of which Guglielmo Marconi became president.

It is both my belief and earnest hope that these Marconiphones, the latest popular development of the principles of my invention, may benefit the public at large by providing every home in the land with a new medium for education and entertainment

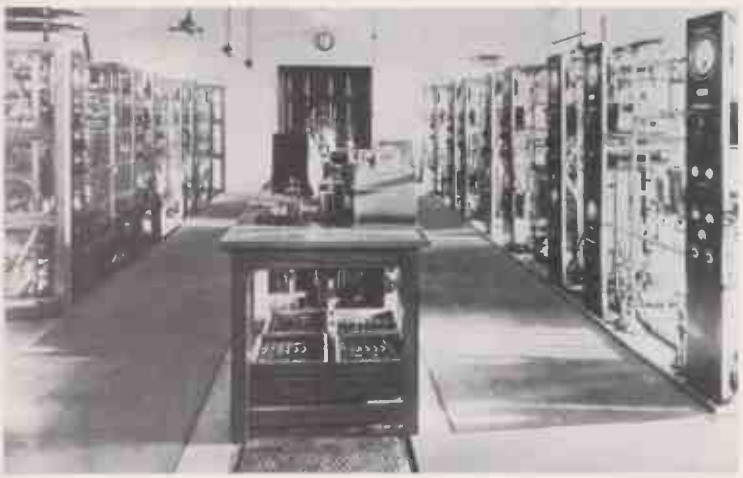
G Marconi

47 So overwhelming was the interest aroused by broadcasting that wider and wider coverage was needed. Therefore, in 1924, the 5XX high power longwave station, seen here, was inaugurated at Chelmsford for the BBC. It was so successful that in 1925 the Company supplied the equipment for an even more ambitious longwave station, which was built by the BBC at Daventry and which took over the 5XX call sign.





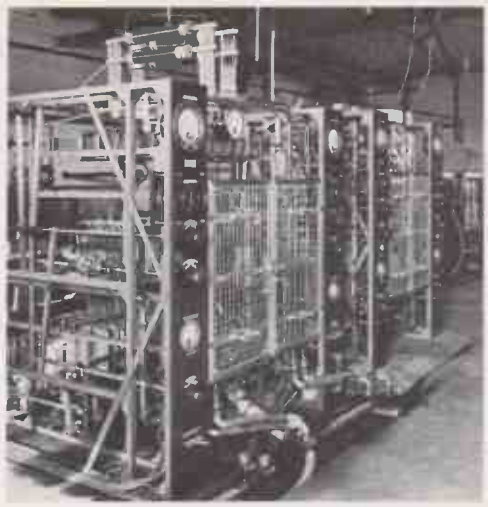
48 Meanwhile, running like a disruptive thread through the Marconi tapestry, was the controversial plan for linking the Empire by a network of wireless communication stations, first mooted in 1906. After seven years of political conflict, a Government contract to implement the scheme was placed with Marconi. The war and further political in-fighting delayed the project until 1924. But by then, Marconi, carrying out initial experiments on board *Elettra*, had developed shortwave directional transmission, which he considered potentially far superior to the longwave high power system originally specified.

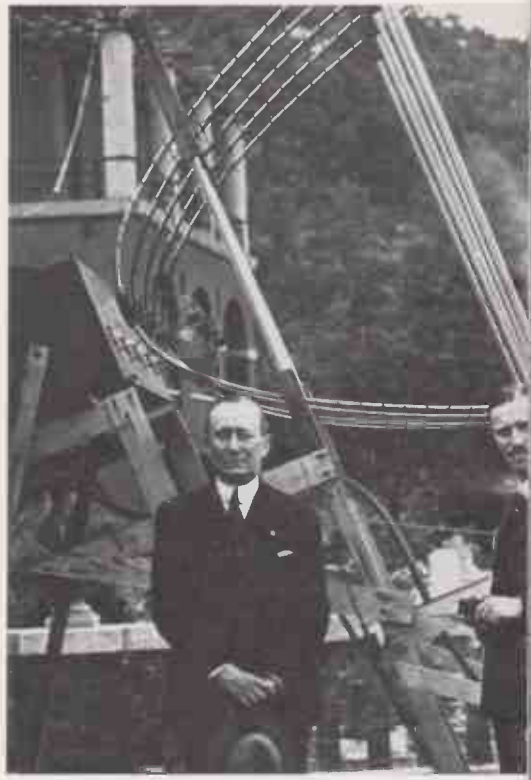


49 The announcement of his latest development threw the Government into disarray once again but Canada, Australia, South Africa, and India having decided in favour, it too agreed to adopt what was known as the Beam System. Thus, fifty years ago the foundations were laid for the Imperial Wireless Chain—a revolution in world-wide communication. In 1926, the Canadian Beam passed the preliminary tests with flying colours, followed in 1927 by the other three links. The photo shows the station at Grimsby, used for transmitting to India and Australia.

50 In June 1927, Marconi married Maria Cristina Bezzi-Scali, a beautiful Italian girl, less than half his age, whose father was a highly placed official in, and a nobleman of, the Vatican. Their daughter, Maria Elettra Elena Anna, was born in June 1930.

51 In addition to the Imperial Wireless Chain, established for the Post Office and the Dominion Governments, the Marconi Company built its own beam transmitting station at Dorchester and receiving station at Somerton for communicating with Argentina, Brazil, the USA, Egypt and Japan. These stations took their place in the extensive 'Via Marconi' network already operating.

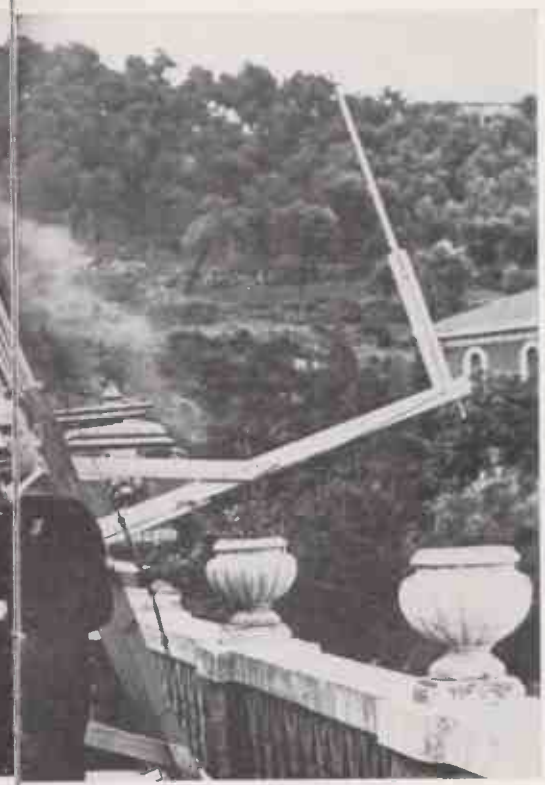




54 The realization of Marconi's life-long ambition to control an Imperial wireless network started at St John's in 1901, was fulfilled with the inauguration of the Beam System, and was shattered by the formation of Cable and Wireless. His research interests now turned to microwave experiments which he could conduct near his home in Italy, to which he was increasingly drawn. In 1932 he installed the first microwave telephone link, which connected Vatican City with the Pope's summer residence.

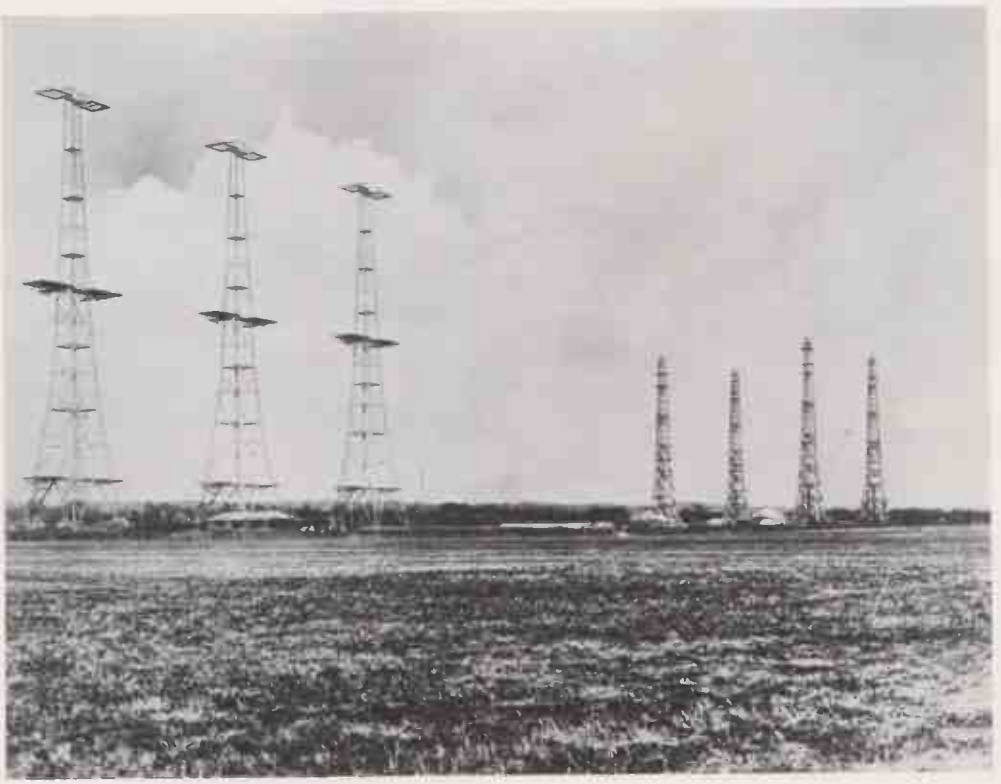
55 Marconi had come full cycle. The spark transmitter of his boyhood produced very short waves; his high power transatlantic system used a wavelength of several hundred metres; his Beam System wavelengths were measured in only tens of metres. Now he was investigating wavelengths of less than a metre. As early as 1916, he had noted that short waves were reflected by obstacles in their path to produce a hissing in the

52 Running parallel to shortwave communication activities were shortwave broadcasting activities. The appetite for the new entertainment medium was insatiable, and in 1927 the BBC decided to initiate shortwave broadcasting to the Empire, commissioning Marconi to build an experimental transmitter at the Chelmsford works, where it operated under the call sign G5SW. The photos show the G5SW transmitter, left, and studio, below.



receiver, and recorded his belief that this phenomenon could be the basis of detecting ships at sea. He now returned to the subject and in 1935 demonstrated principles of radar at Torre Chiarucci.

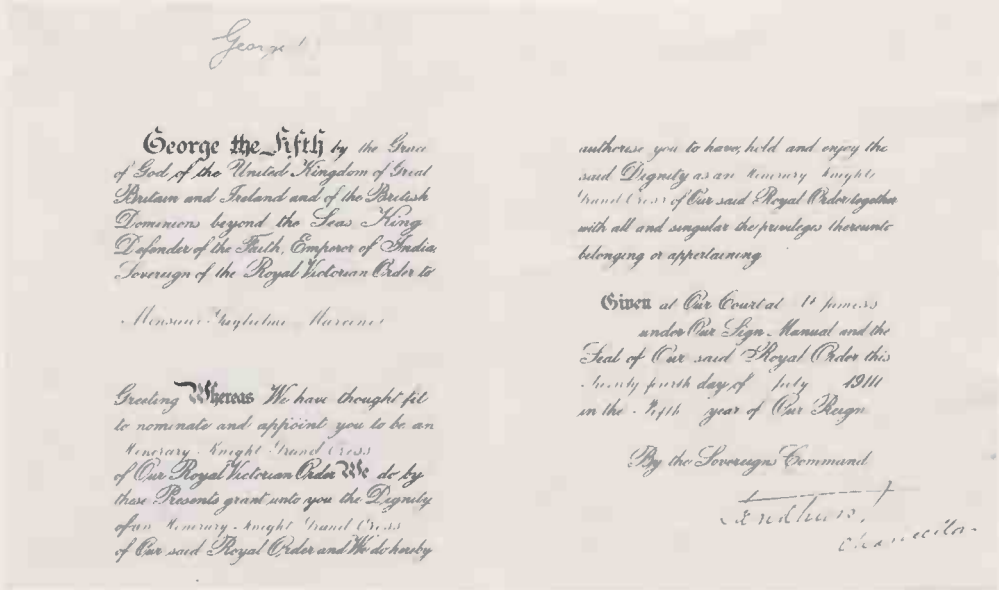
53 Ironically, the outstanding success of the Imperial Wireless Chain proved, for Marconi, to be a two-edged sword that was soon to be turned against him. So great was the threat of the Beam System to the Empire's cable interests that, in 1929, at the instigation of the British and Dominion Governments, Cable and Wireless Limited was formed to take over the investments, the patent and traffic rights, the licences and so on of Marconi's Wireless Telegraph Company and the cable companies. The portrait of Marconi at his desk was taken round about this period.



56 His own experiments were conducted in the same period as Sir Robert Watson-Watts'. At the same time, his Company in England was acquiring an expertise in the subject that enabled it to fulfil Government orders for transmitter aerial arrays, above, for the Chain, Home radar stations which, started in 1937, eventually ringed the United Kingdom. The Company later made significant contributions to the development and production of the radar and radar jamming equipment that helped to change the course of the Second World War.

57 Marconi was not greatly interested in television. His Company in England, however, was deeply involved in advancing the new medium. In 1934 its television interests were merged with those of EMI Ltd in a company called The Marconi–EMI Television Co Ltd (later dissolved) in which it was responsible for all aspect of transmission. The Marconi–EMI system was adopted in 1936 by the BBC for its public high definition television service—the first in the world. The photo is of the aerial at Alexandra Palace, designed by C. S Franklin.

58 International honours were heaped on Marconi throughout his life. Among the most notable were the joint award of the Nobel Prize for Physics, the Albert Medal of the Royal Society of Arts, the Kelvin Medal, and election to the presidency of the Italian Royal Academy and the Italian National Scientific Research Council. He was made a Citizen of Rome, Senatore, Marchese, Knight of the Order of St Anne and honorary Knight Grand Cross of the Royal Victorian Order.



George R.I.

George the Fifth by the Grace of God, of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas King Defender of the Faith, Emperor of India Sovereign of the Royal Victorian Order to

Monsieur Guglielmo Marconi

Greeting Whereas We have thought fit to nominate and appoint you to be an Honorary Knight Grand Cross of Our Royal Victorian Order We do by these Presents grant unto you the Dignity of an Honorary Knight Grand Cross of Our said Royal Order and We do hereby authorise you to have hold and enjoy the said Dignity as an Honorary Knight Grand Cross of Our said Royal Order together with all and singular the privileges thereunto belonging or appertaining

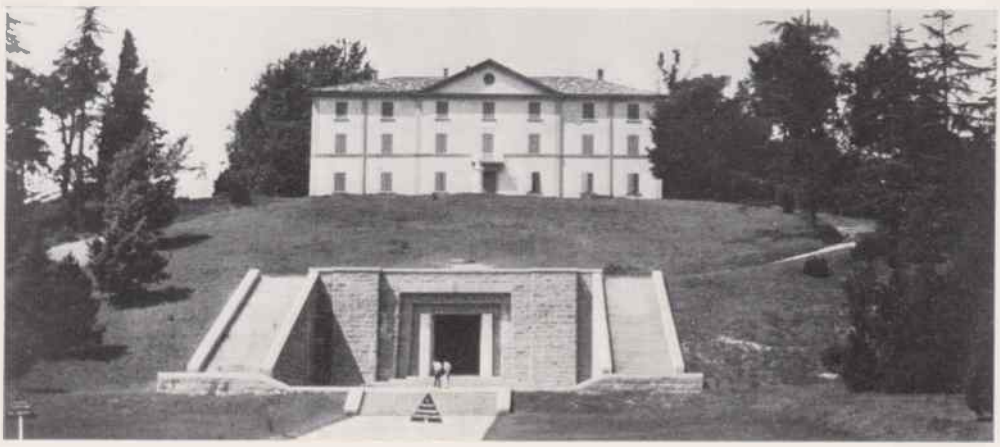
Given at Our Court at St James's under Our Sign Manual and the Seal of Our said Royal Order this twenty fourth day of July 1911 in the first year of Our Reign

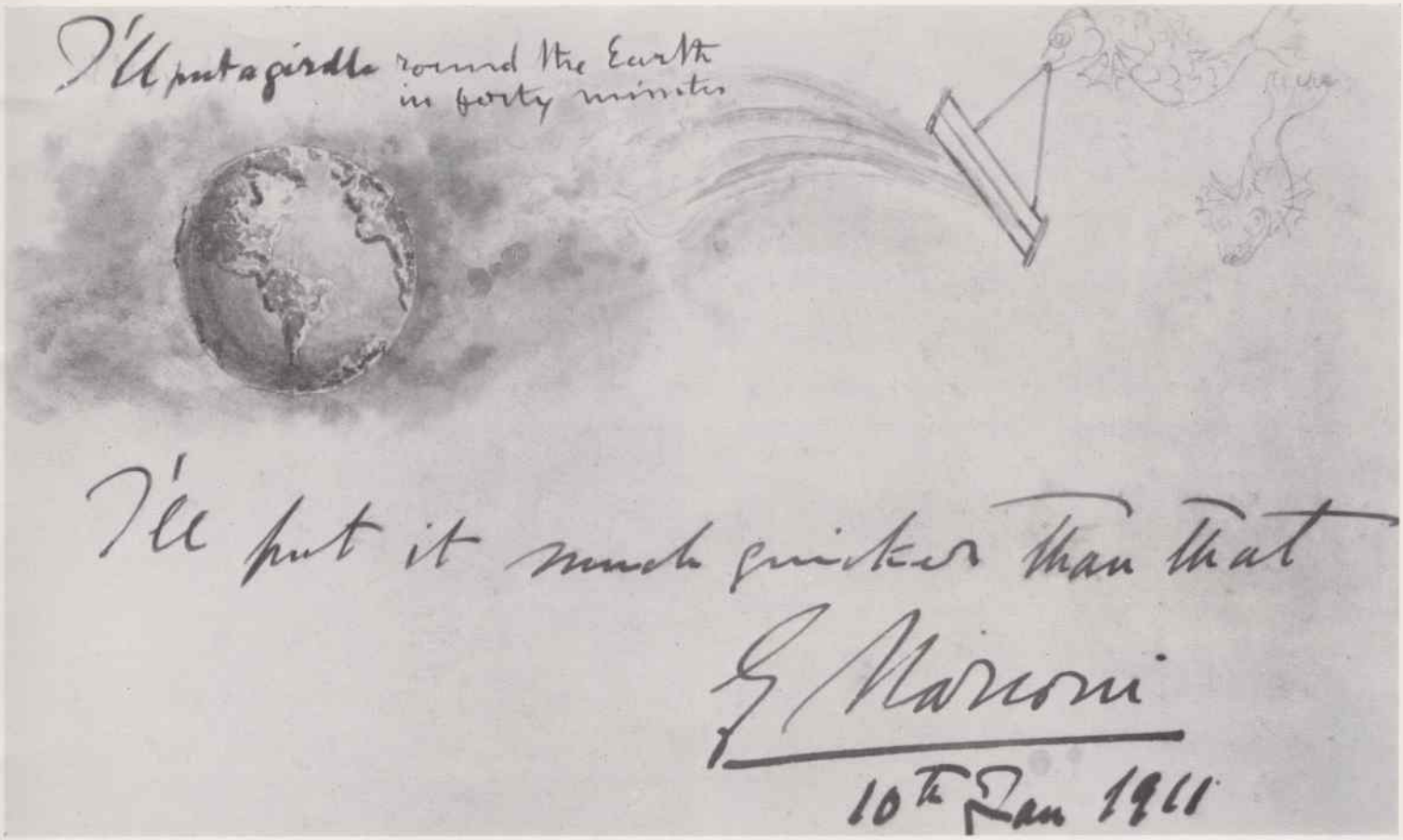
By the Sovereign's Command

Crewe
Chancellor

59 To recognition through honours and titles was added personal recognition by the most exalted personages of the day. Distinguished scientists, those in high office and many of the world's crowned heads formed part of the fabric of his social life. The photograph of Marconi and his wife Cristina was taken in Japan, where they visited the Emperor during a world tour in 1933–4.

60 Although the last years of Marconi's life were dogged by ill-health, he continued to travel extensively. But in December 1935 he returned to Rome, never to leave again. In spite of a succession of heart attacks, he still went to his office and even took part in microwave experiments. But at 5 o'clock on 19 July 1937, he was taken ill for the last time, dying in the small hours of the following day. His body was laid to rest in the mausoleum in the grounds of Villa Grifone.





News of Marconi's death was carried to all parts of the world by wireless. Of all the tributes that followed—and they were legion—the greatest and most impressive, the gesture that was unique, was the closing down for two minutes of wireless stations throughout the world. The 'ether' was as quiet as it had been before Marconi.

After Marconi

The years that followed Marconi's death saw far-reaching changes in the structure of the company that bore his name. After the Second World War it was bought by The English Electric Company from Cable and Wireless, whose operating interests were about to be nationalized. A number of Product Divisions were set up within the Marconi Company, each with specialist knowledge and experience in a specific branch of what is now known as electronics.

By 1968, these Divisions covered automation, avionics, broadcasting (both sound and television), communications (radio, line and space), computers, electro-optical systems, mercantile marine communications and navigation aids, microelectronics, radar, specialized components and research.

At the end of 1968, a merger took place between The English Electric Company and The General Electric Company, the combined organization ultimately adopting the latter's name.

In the restructuring that followed, The Marconi Company, through its newly created subsidiary, GEC-Marconi Electronics Limited, became responsible for the management of all GEC's major capital electronics interests.

Within the GEC-Marconi group, the electronic skills and expertise associated with such well-known names as Marconi, GEC, AEI and Elliott are concentrated in eight autonomous companies in the U.K and a world-wide network of subsidiary and associated companies. Together they employ 30,000 men and women; together they have a turnover in the region of £200 million; together they cover every aspect of capital electronics, with the exception of industrial automation. In the following pages a brief resumé is given of their activities and those of The Marconi Research Laboratories, which serve them.

GEC-Marconi Electronics Limited

A management company for
The Marconi Company and Elliott Brothers (London) Limited

Marconi Communication Systems Limited
CHELMSFORD
Billericay
Hackbridge
Birmingham

Marconi Radar Systems Limited
CHELMSFORD
Leicester
Gateshead
Watford

Marconi Space and Defence Systems Limited
STANMORE
Frimley
Portsmouth
Hillend

Marconi-Elliott Avionic Systems Limited
ROCHESTER
Basildon
Stanmore
Borehamwood

E-A Industrial Corporation
(Associated Company)
ATLANTA USA

The Marconi International Marine Company Limited
CHELMSFORD

Coastal Radio Limited
CHELMSFORD

Marconi Marine
(South Africa) (Pty) Limited
CAPE TOWN

Marconi Instruments Limited
ST ALBANS
Stevenage
Luton

Marconi Messtechnik GmbH
MUNICH

Marconi Instruments
Succursale de France
SAVIGNY-SUR-ORGE

EASAMS Limited
CAMBERLEY

ESAMS Limited
SYDNEY AUSTRALIA

EASAMS Systems
Engineering GmbH
MUNICH

ESAMS (Malaysia)
Sdn Berhad
KUALA LUMPUR

AEI Scientific Apparatus Limited
MANCHESTER

AEI Scientific
Apparatus Inc
NEW YORK

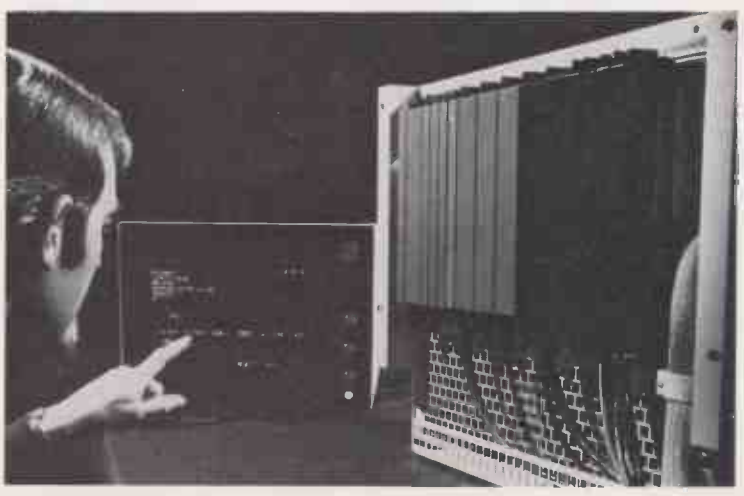
The Marconi Research Laboratories
CHELMSFORD

Marconi Middle East S.A.R.L.	Marconi (China) Limited	Norsk Marconikompani A/S	Marconi Electronics Inc	Canadian Marconi Company	Marconi Italiana S.p.A	Marconi South Africa Limited	Marconi de Venezuela C.A	Marconi Elektronik	Companhia Marconi Brasileira
BEIRUT	HONG KONG	OSLO	NEW YORK	MONTREAL	GENOA	JOHANNESBURG	CARACAS	FRANKFURT	RIO DE JANEIRO

Marconi Communication Systems Limited H.F and l.f point-to-point, microwave and tropospheric scatter communications; civil space communication earth stations, maritime and naval communications; automatic message switching; electronic telephone exchanges; digital and data transmission; error correction; sound and television broadcasting; mobile radio; professional receivers; specialized components; complete systems capability.

Above left: A Marconi Mk VIII automatic colour television camera at the opening of the Sydney Opera House.

Above right: A control console for RAF Strike Command's integrated communication system, MATELO.



Marconi Radar Systems Limited Air defence, air traffic control, weapon control and shipborne radar systems; airfield monitoring; battlefield surveillance; radar and optical sensors; training and simulation systems; advanced display and data handling systems; electronic counter-counter measures; complete software capability; total facility for turnkey operation and customer support services.

Above: Locus 16, a new low-cost data processing system employing the latest state-of-the-art technology.

Left: One of the S600 Series heightfinder radars. In all, forty-one Marconi heightfinders are operational in NATO countries.

Marconi Space and Defence Systems Limited Complete satellites; spacecraft control and guidance; spacecraft experimental packages; military communications, including space communication earth stations; military data systems; naval and ocean engineering; weapon guidance; fire control systems; electronic warfare systems; fuzing and arming; trainers and simulators; underwater weapons.

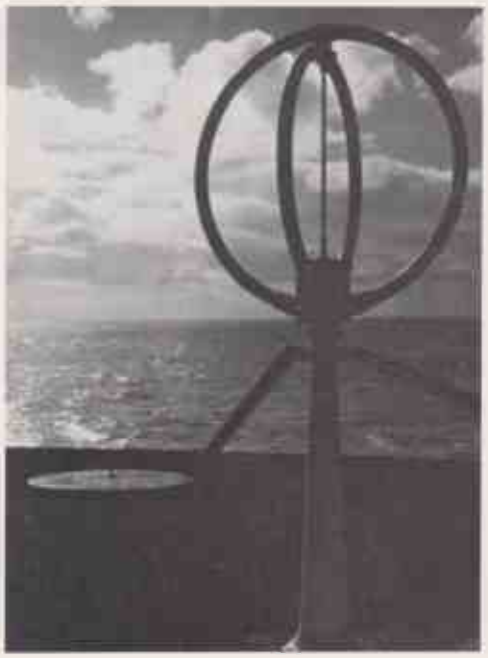
Above left: Royal Navy Mk 24 torpedo production.

Above right: Flight model of a Skynet II communications satellite.

Communication, navigation and automatic flight control systems for civil and military aircraft; aircraft aiming systems; intruder detection systems; laser, x-ray and neutron devices; airborne and other special-purpose radars; battlefield surveillance equipment; microwave systems; automatic test equipment and electro-optical systems for missile guidance and industrial and traffic control.

The Company's products are fitted to nearly every major civil and military aircraft type in the world.

Right: The RAF Jaguar is fitted with Marconi-Elliott Avionics' advanced navigation and weapon aiming system.

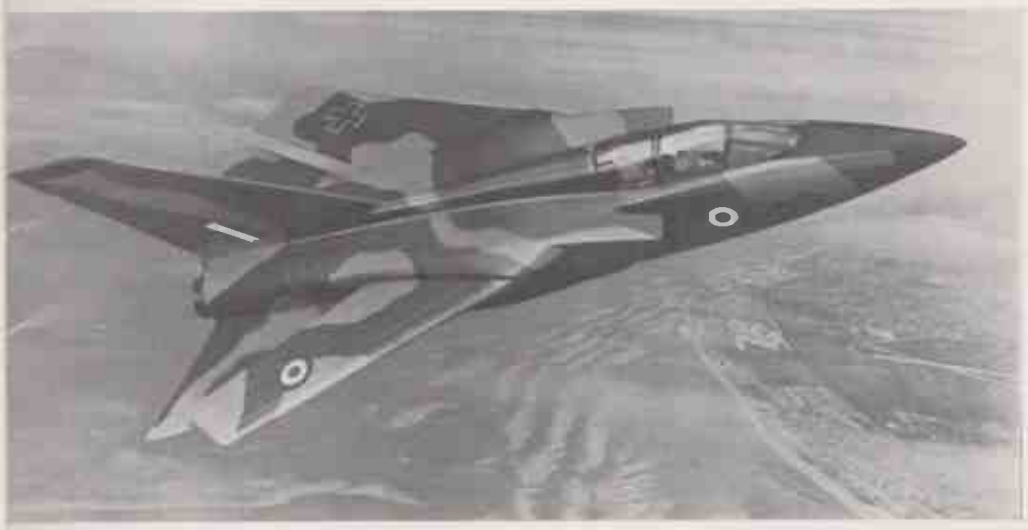


The Marconi International Marine Company Limited Marine navigation and communications equipment and systems; onboard communications and entertainment systems; provision of radio and electronics officers for merchant navies; traffic accounting service.

Left: Marine equipment perpetuates the realization of Marconi's first ambition—to help those at sea.

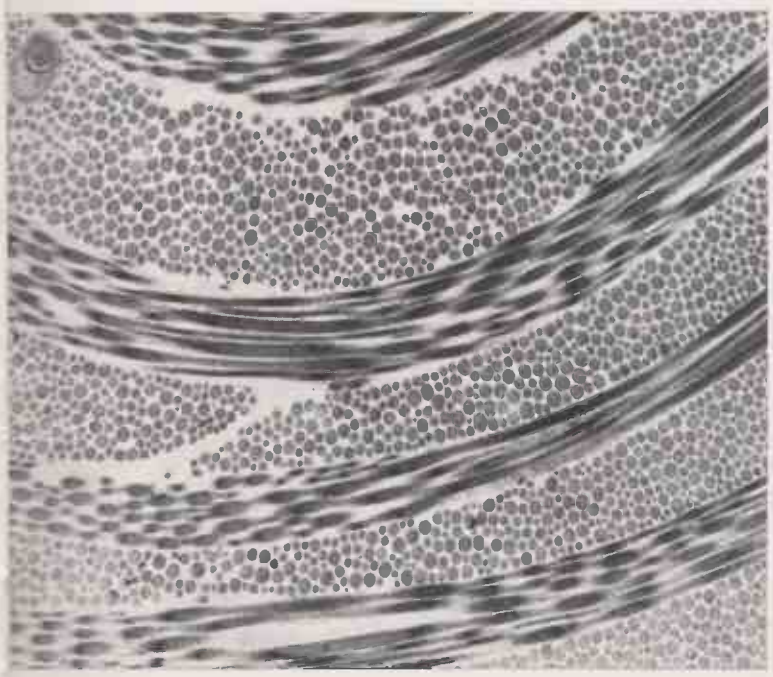
Marconi Instruments Limited Electronic measuring equipment from d.c to microwave frequencies; programmable automatic test systems; purpose-built equipments to meet special performance requirements.

Left: Final test on a new f.m/a.m modulation meter.



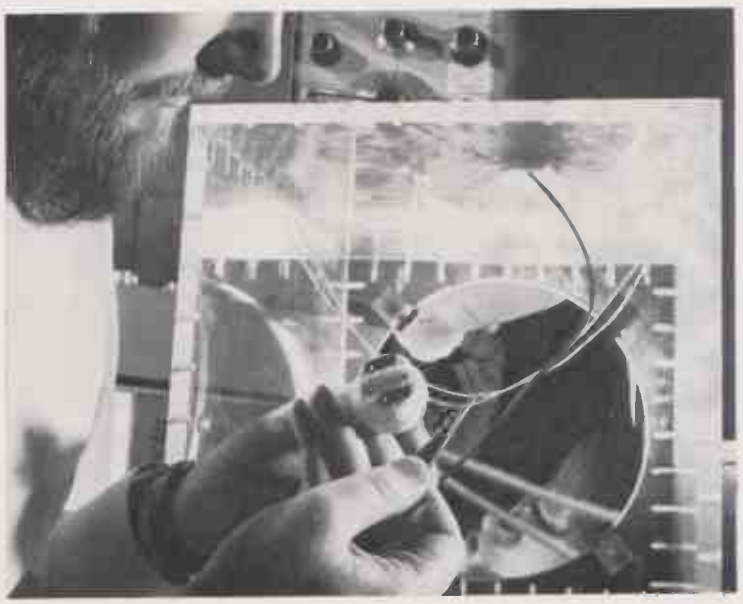
EASAMS Limited Civil and military operational research, system design, system implementation and project management.

Left: EASAMS is providing design, management, planning and integration services for the MRCA avionics system throughout the development of the aircraft.



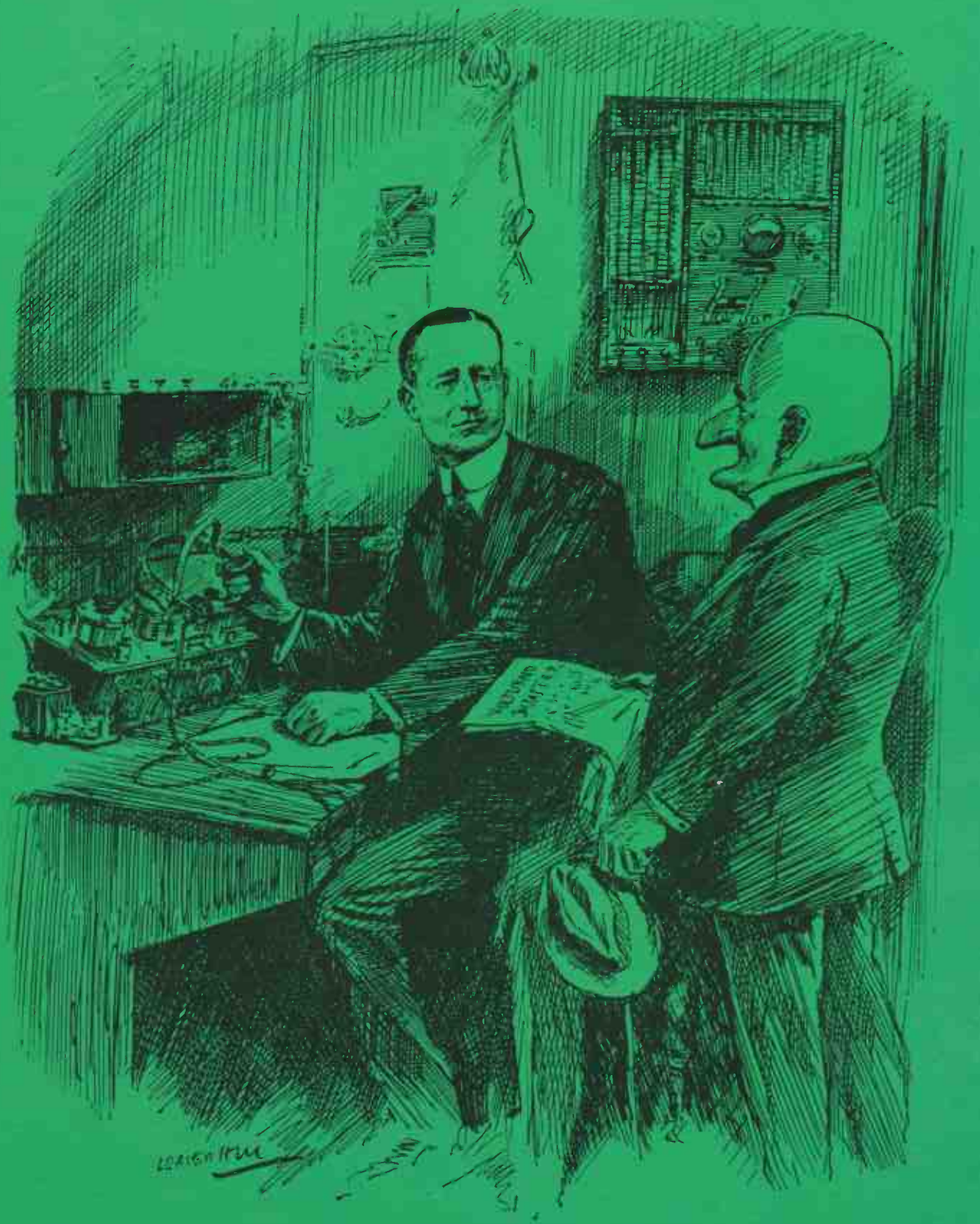
AEI Scientific Apparatus Limited Mass spectrometers, electron spectrometers and associated data systems; electron microscopes; x-ray analytical equipment; ultra high vacuum equipment.

Above: A section of chameleon skin at magnification of 27,000×, taken on the Corinth 275 electron microscope.



The Marconi Research Laboratories Specialization in antennas; acoustic delay lines; applied physics; communications; displays and data processing; materials application; mechanical engineering; microcircuit assembly and wiring; microwave engineering; plating and other specialized production processes; radar signal generation, amplification and processing; radio wave propagation; theoretical analysis and simulation and other related subjects.

Above: Attaching contacts to a pyro-electric film detector in one of the laboratories.



"S. O. S."

PUNCH (*to Mr. Marconi*). "MANY HEARTS BLESS YOU TO-DAY, SIR. THE WORLD'S DEBT TO YOU GROWS FAST."

Editor Pam Reynolds
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