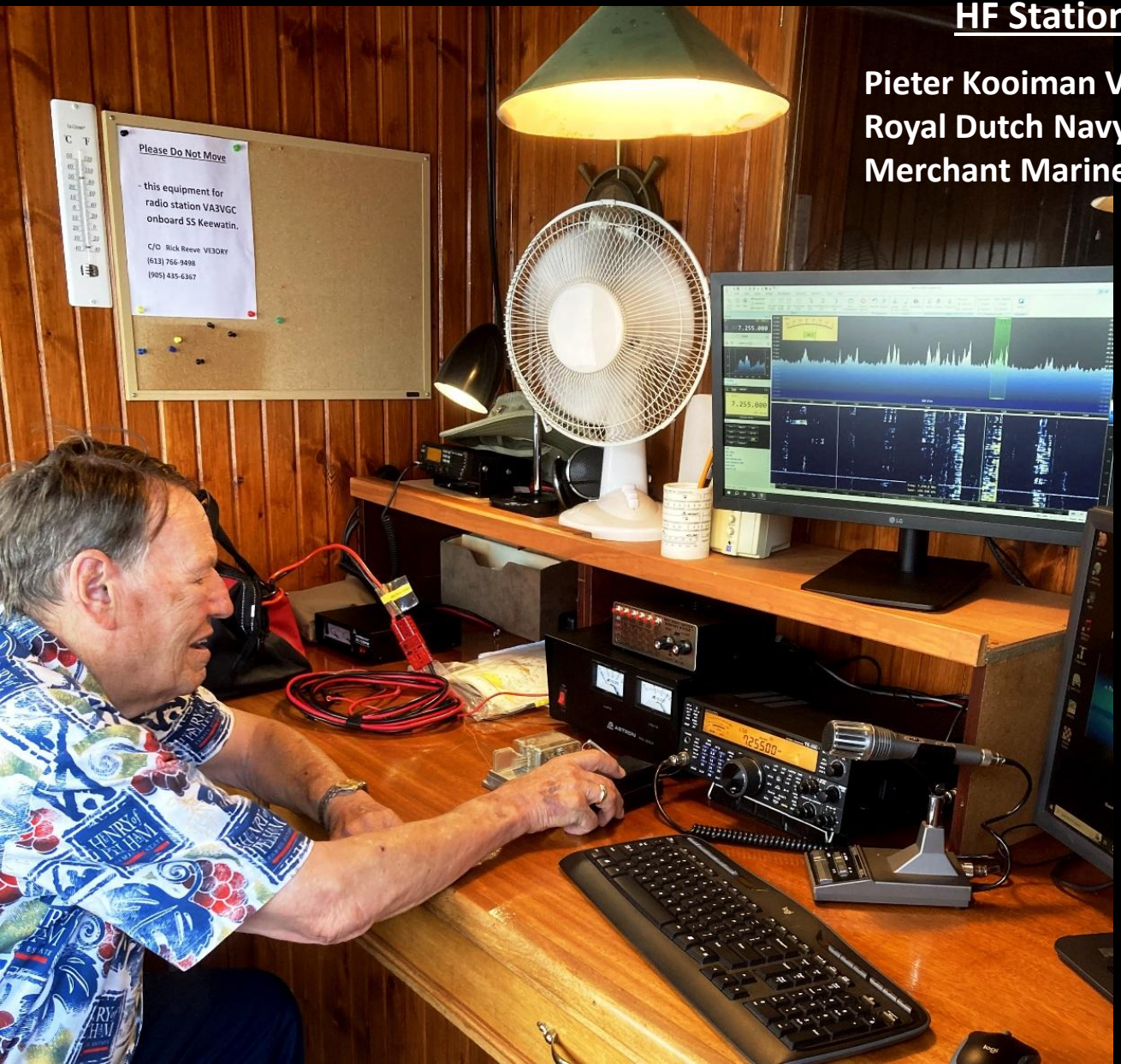
RICK REEVE

FROM WIRED TO WIRELESS

Milestones in Early Wireless Technology

October 26,2023

2024 Amateur Radio Station VA3VGC onboard SS Keewatin



HF Station donated by :

Pieter Kooiman VE3NXE,
Royal Dutch Navy –Submariner / Radio Officer
Merchant Marine Radio Operator

Station Operators :

Pieter Kooiman VE3NXE
Ron Walsh VE3GO
Tim Gregory VA3TIC
Greg Foster VE3PJ
Rick Reeve VE3ORY

Registered ISED License Holder / Sponsor :

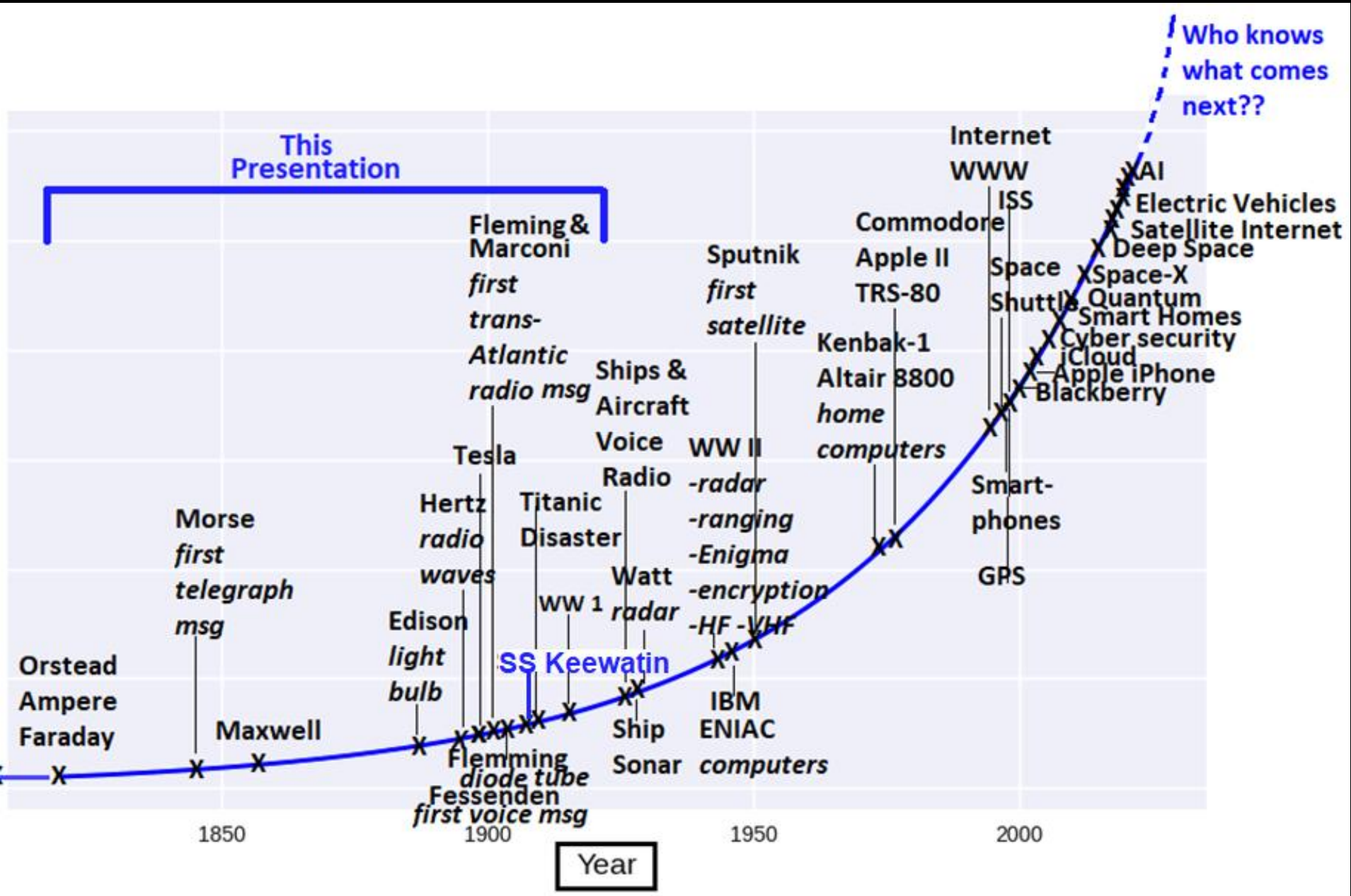
Rick Reeve VE3ORY

Early Marconi Radio Display onboard SS Keewatin at Great Lakes Museum - 2025

Radio's kindly gifted to GLM by the Toronto Maritime Museum archives - 2024

GREAT LAKES MUSEUM
Celebrating 50 Years 1975 2025

"Technology builds upon itself exponentially over time"



Technical Evolution

Just 120 Years

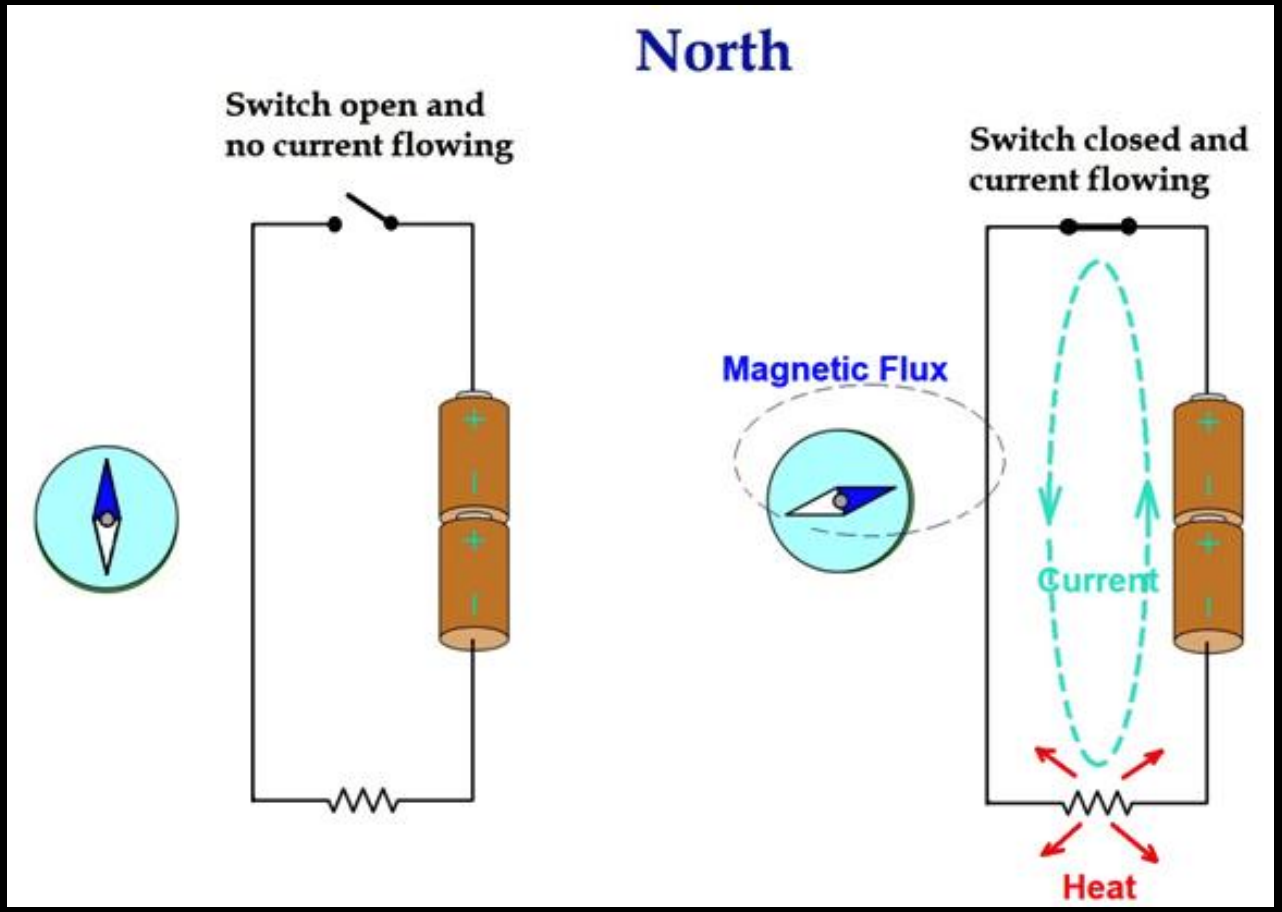
Microwave 2.6 GHz
Antenna Length 1.6 Inches
Weight 7 oz

Low Frequency 800 KHz
Antenna Length 585 Feet
Weight 700 lbs

Early Fundamental Discoveries

1820 Hans Christian Orstead (Danish physicist)

Electric current flowing in a conductor creates a magnetic field



1820 Andre-Marie Ampere (France)

A changing magnetic field about a conductor, induces an electric current

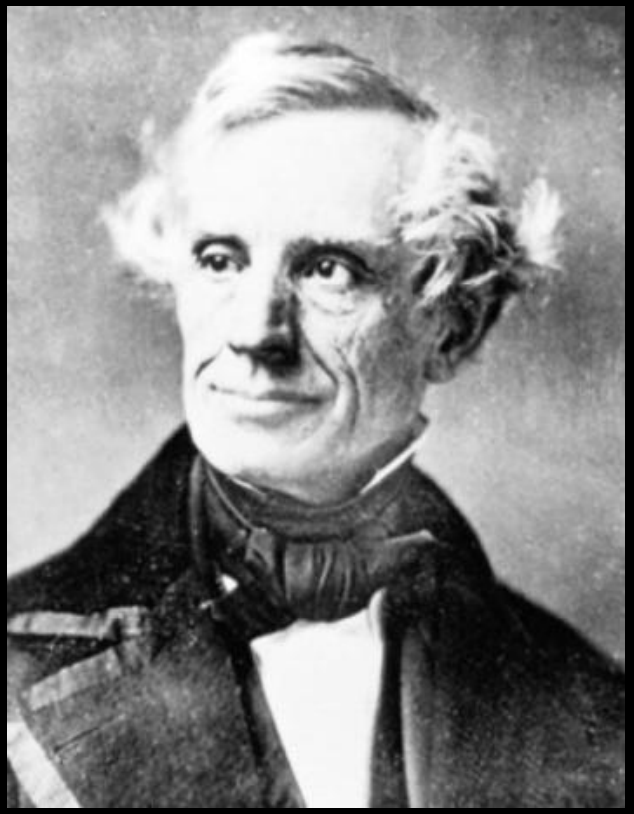
May 24, 1844

"What hath God wrought"

Samuel F.B. Morse

- Inventor of **Single-Wire Telegraph**

- Creator of the **Morse code**



Born April 27, 1791 in Boston MA
Died April 2, 1872

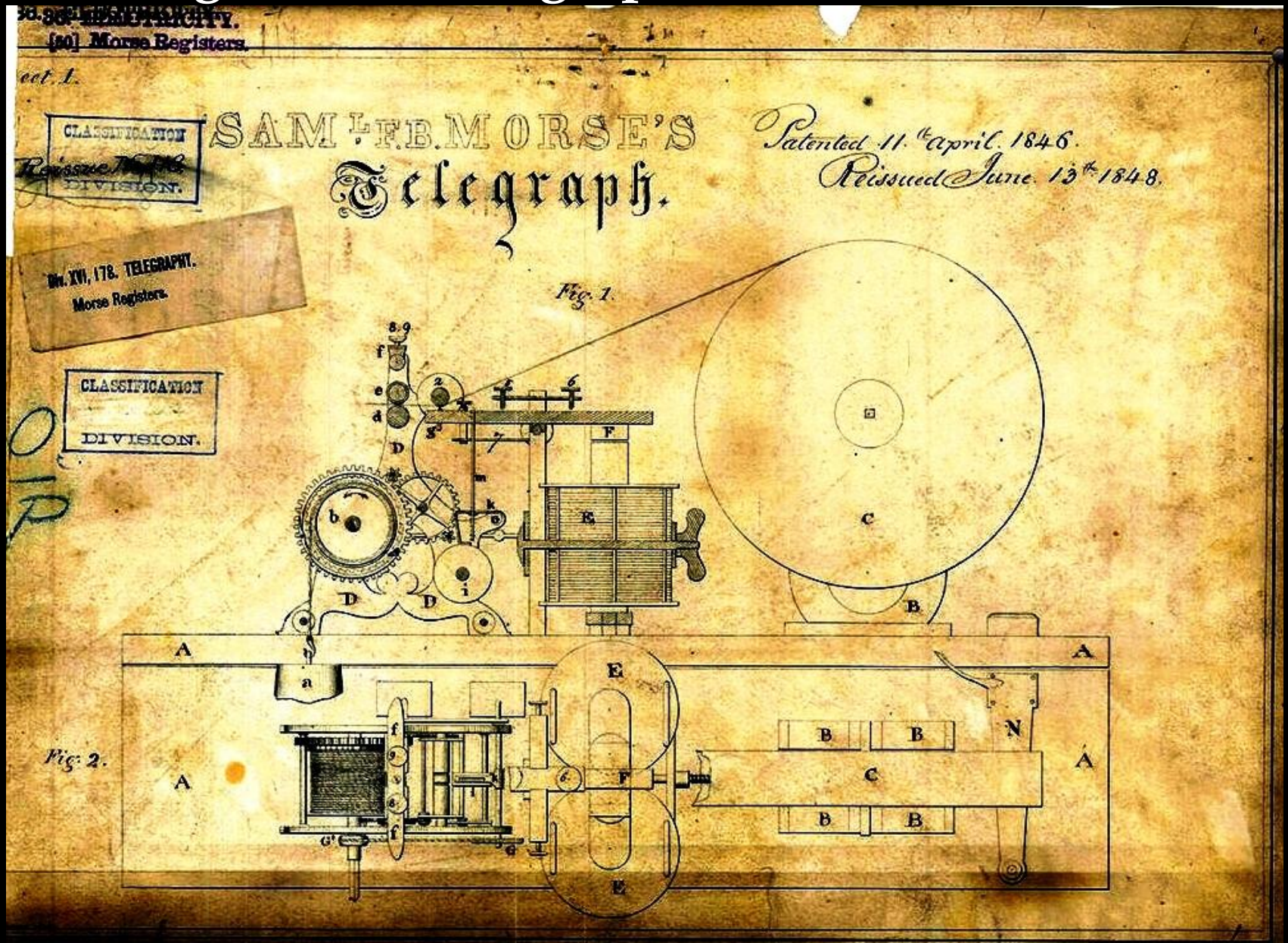
24 May, 1844
First telegraph message from
Baltimore MD to Washington DC

‘What hath God wrought’

“ the very first text message” -ed

1846

Samuel F.B. Morse
'Single Wire Telegraph' U.S Patent No. 4453

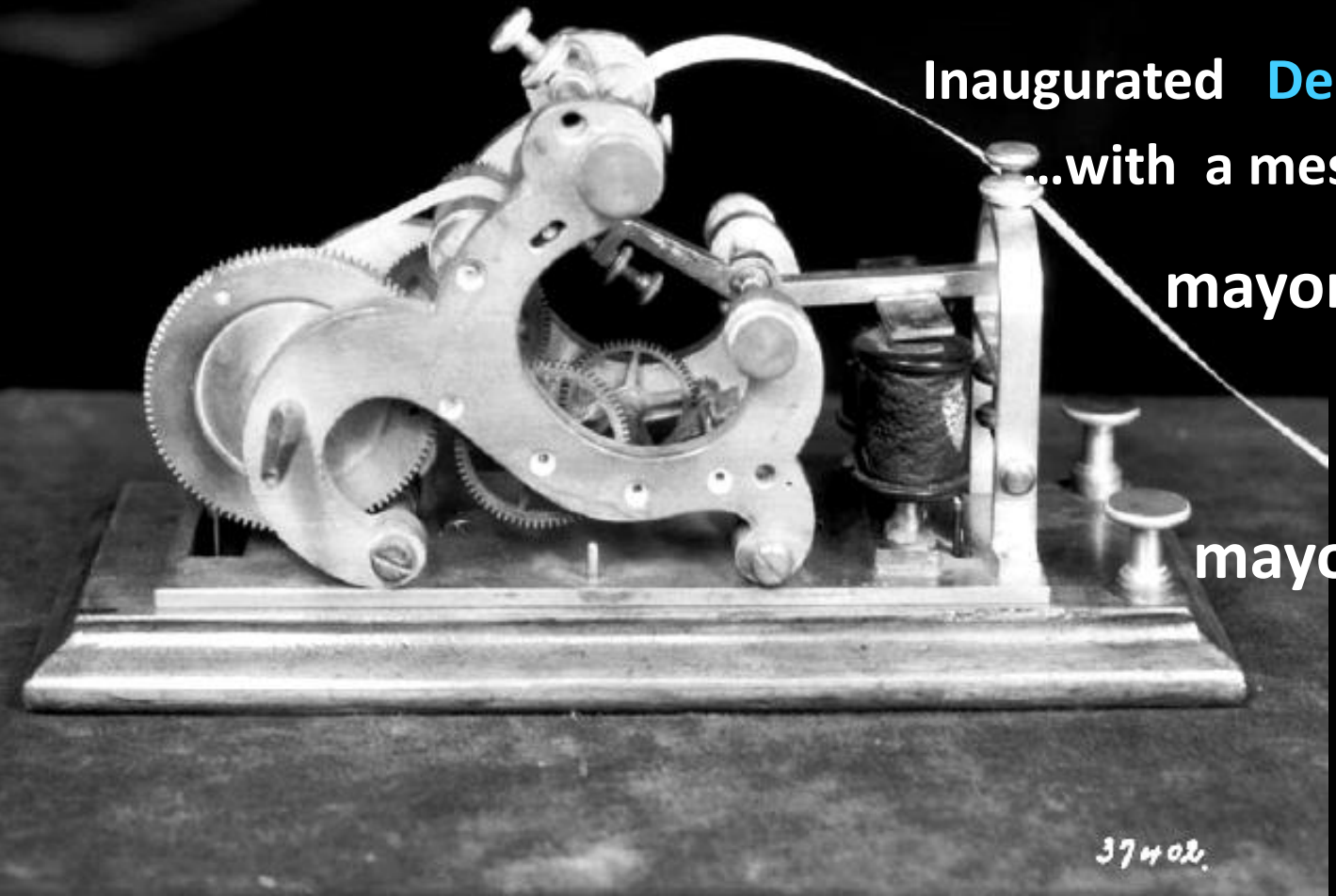


1846 Canada's First Wired Telegraph Line

Linking Toronto to Queenston (Niagara)

Constructed by:

'Toronto, Hamilton and Niagara Electro- Magnetic Telegraph Company'



Inaugurated December 16,1846

...with a message sent from

mayor of Toronto

to the

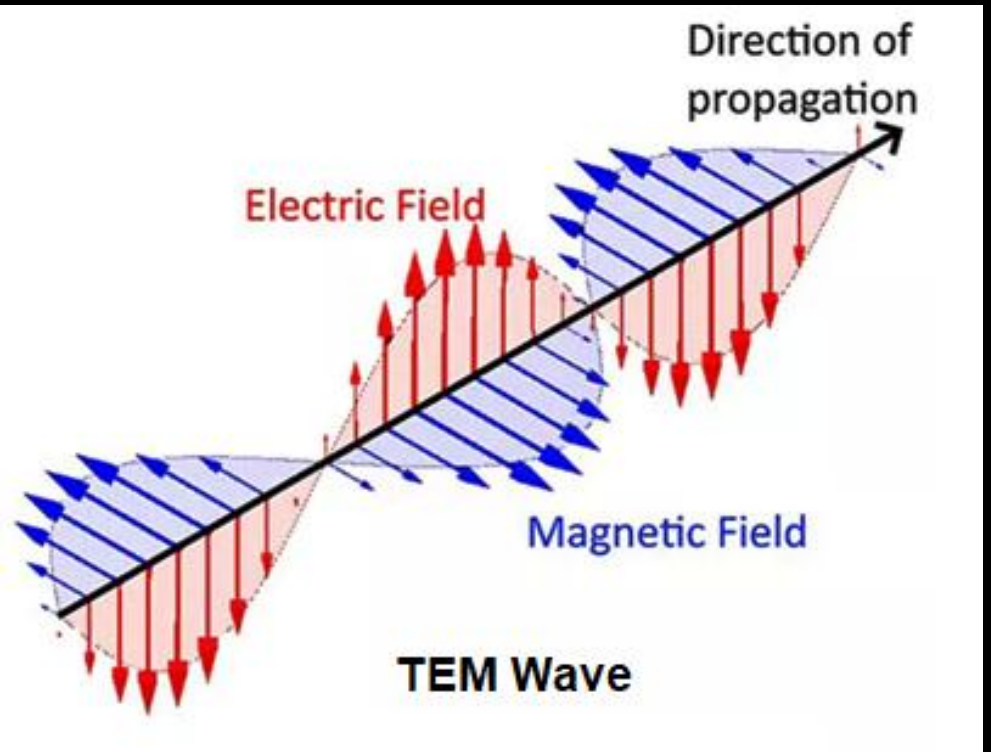
mayor of Hamilton

1862

James Clerk Maxwell (Scotland)

42 years after Orstead and Ampere discoveries James Maxwell combines laws of magnetism and current into his paper "A Dynamic Theory of the Electromagnetic Field".

Postulates that electro-magnetic fields could travel through space at the speed of light.



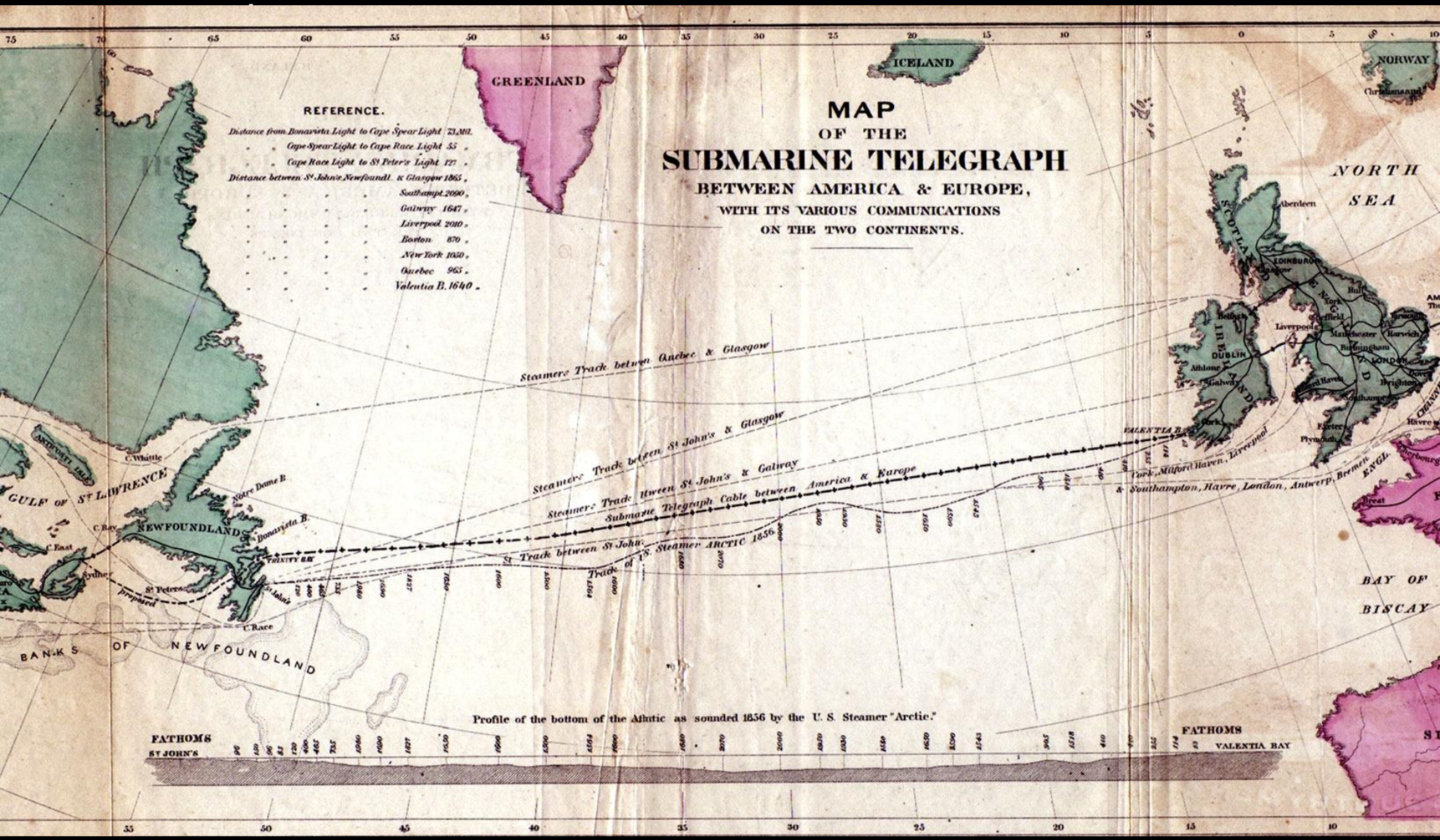
TEM

Transverse Electromagnetic Mode

Wave

Note: Still speculative in1862
…will not be proven until 1886

1866 Installation of the first permanent telegraph cable across the Atlantic Ocean (Valentia Island, Ireland to Trinity Bay, NFLD.)



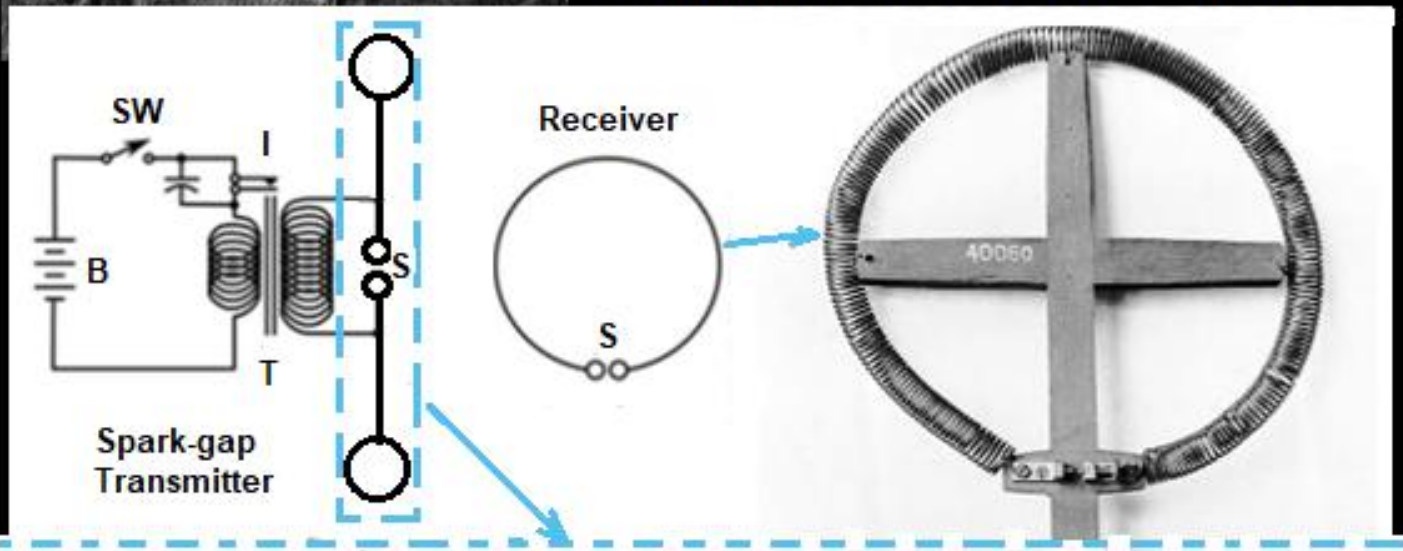
https://web.archive.org/web/20170713182226/https://open.lib.uhttps://open.lib.umn.edu/

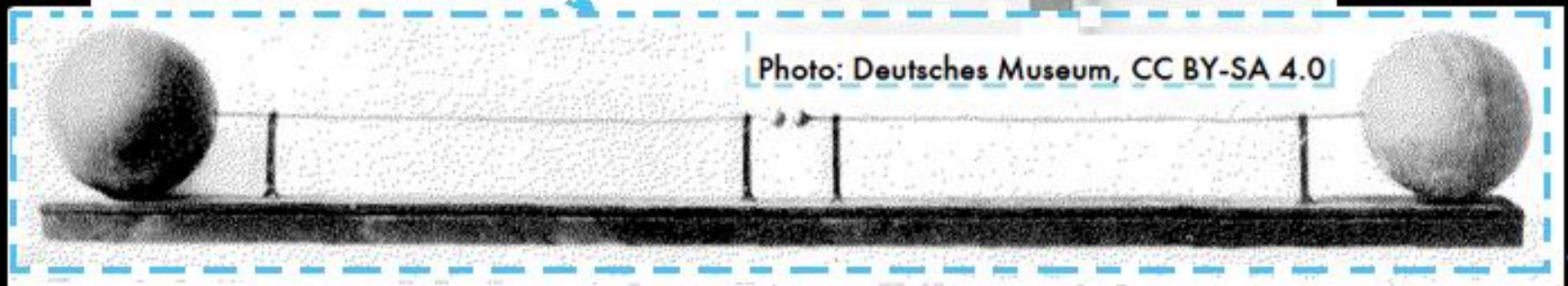
1886

Heinrich Rudolf Hertz

- Very first experimental **transmitter** and **receiver**

- **Determines wavelength & frequency** of the spark and calculates that speed of the electromagnetic wave produced **matches the speed of light** as predicted by Maxwell 24 years earlier





1894 *"By end of the 19th century* ***wired*** *telegraph communication is well established . However, there still remains* ***no available means of communication for ships in peril on the seas*****… other than signal flags , rocket flares, and ship's whistle "** *-ed.*

Guglielmo Marconi 1874 - 1937

Born 25 April 1874 in Bologna, Italy

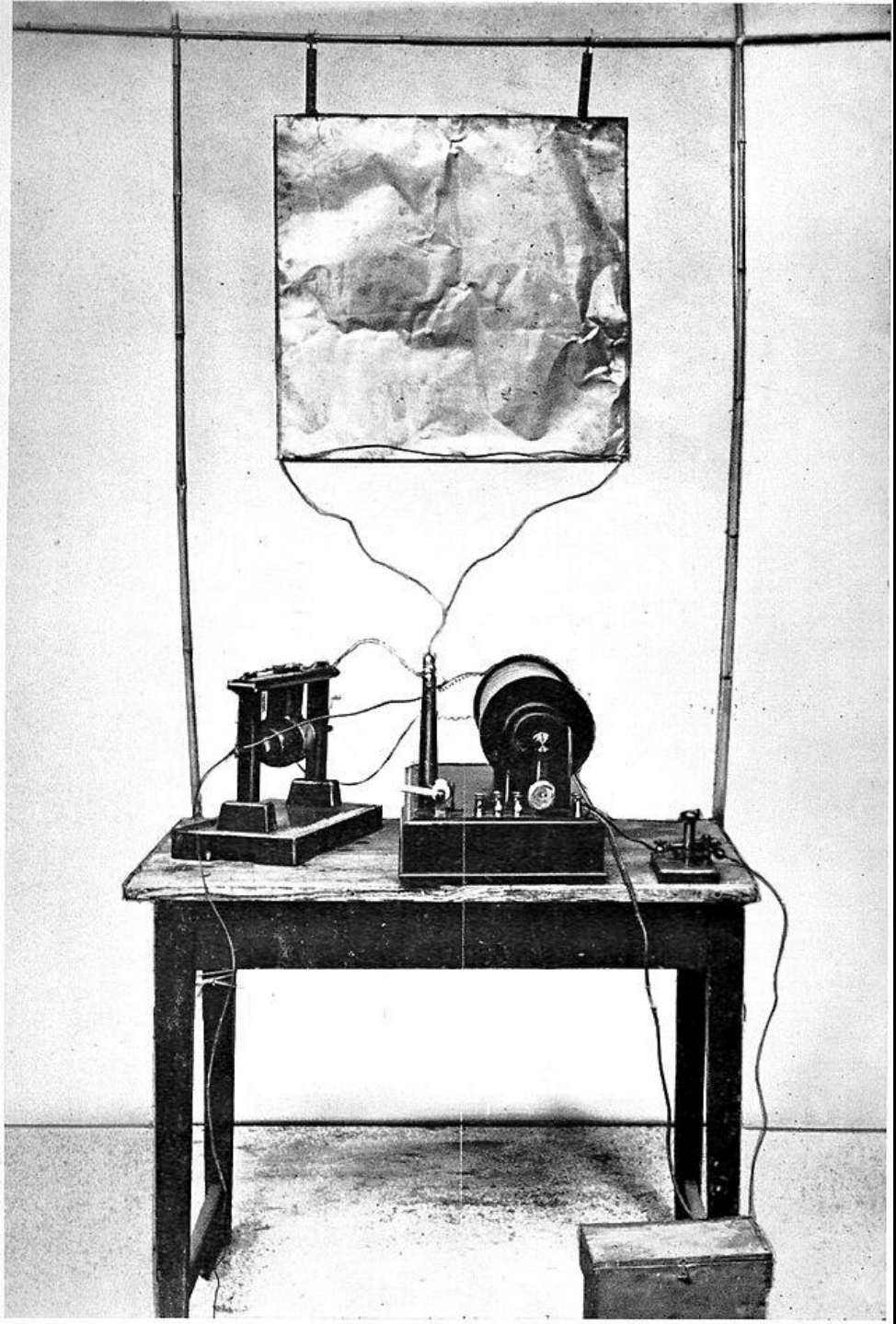
Villa Griffone

…the Marconi family's country estate at Pontecchio (near Bologna)

Marconi and his first wife Beatrice O'Brien (married 1905-1927)

In 1894 at the age of 20 Marconi begins his early experiments here

…elaborating on the earlier experiments of Heinrich Hertz



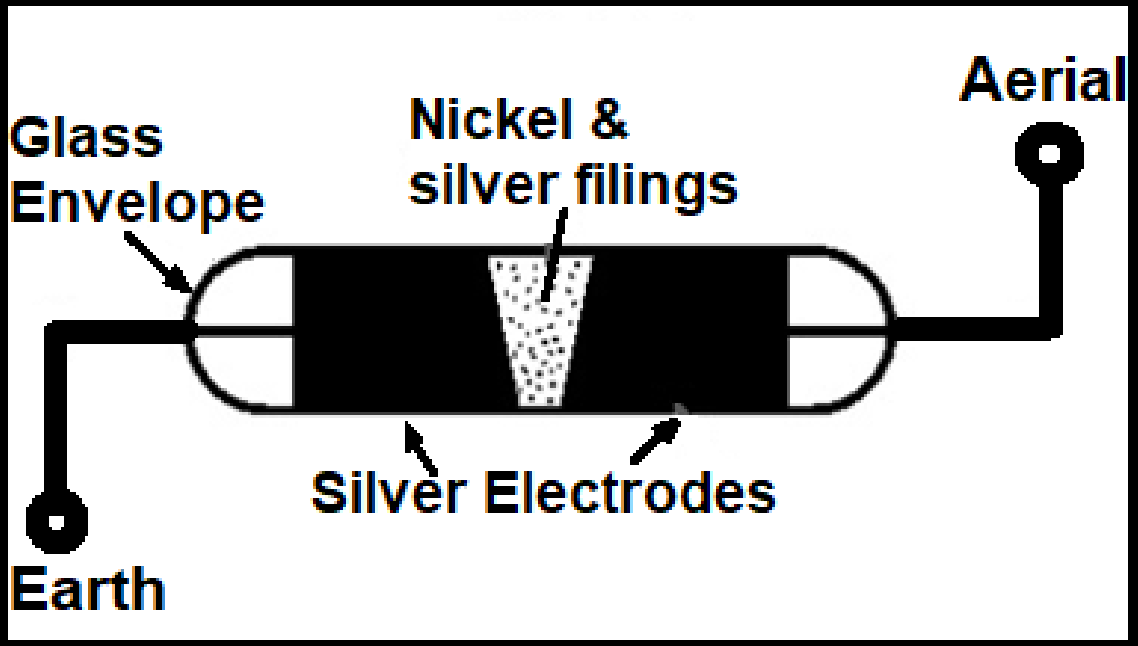
1894

Marconi' s early experiments conducted in the 'Silkworm Room' (the attic) at Villa Griffone.

Building on the early concepts electromagnetic wave propagation first demonstrated by Heinrich Hertz in 1886

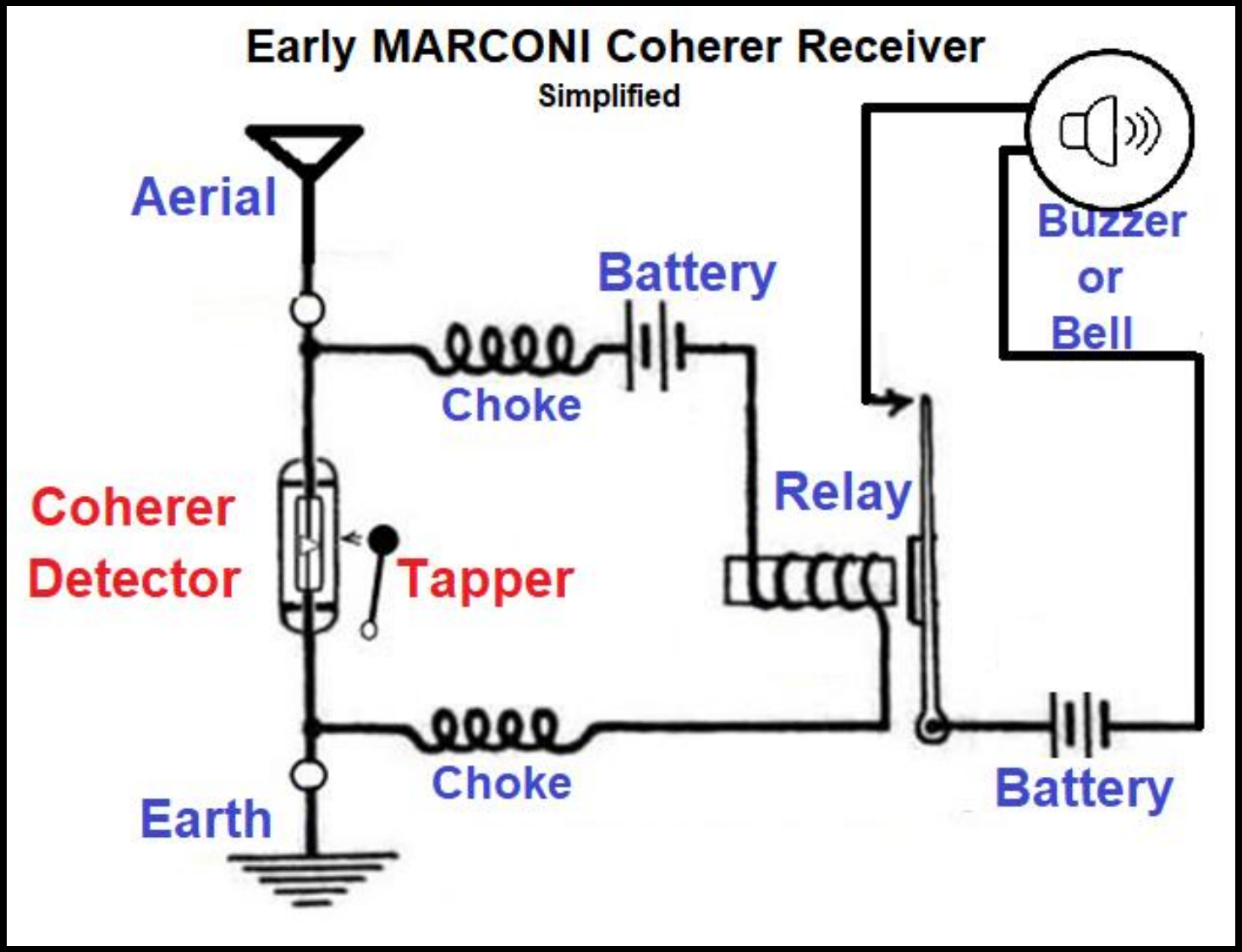
Exploring the science of induction coils and spark discharge controlled with a Morse telegraph key to generate electromagnetic waves.

1890 Edouard Branly invents the first electromagnetic ‘Coherer’ detector device



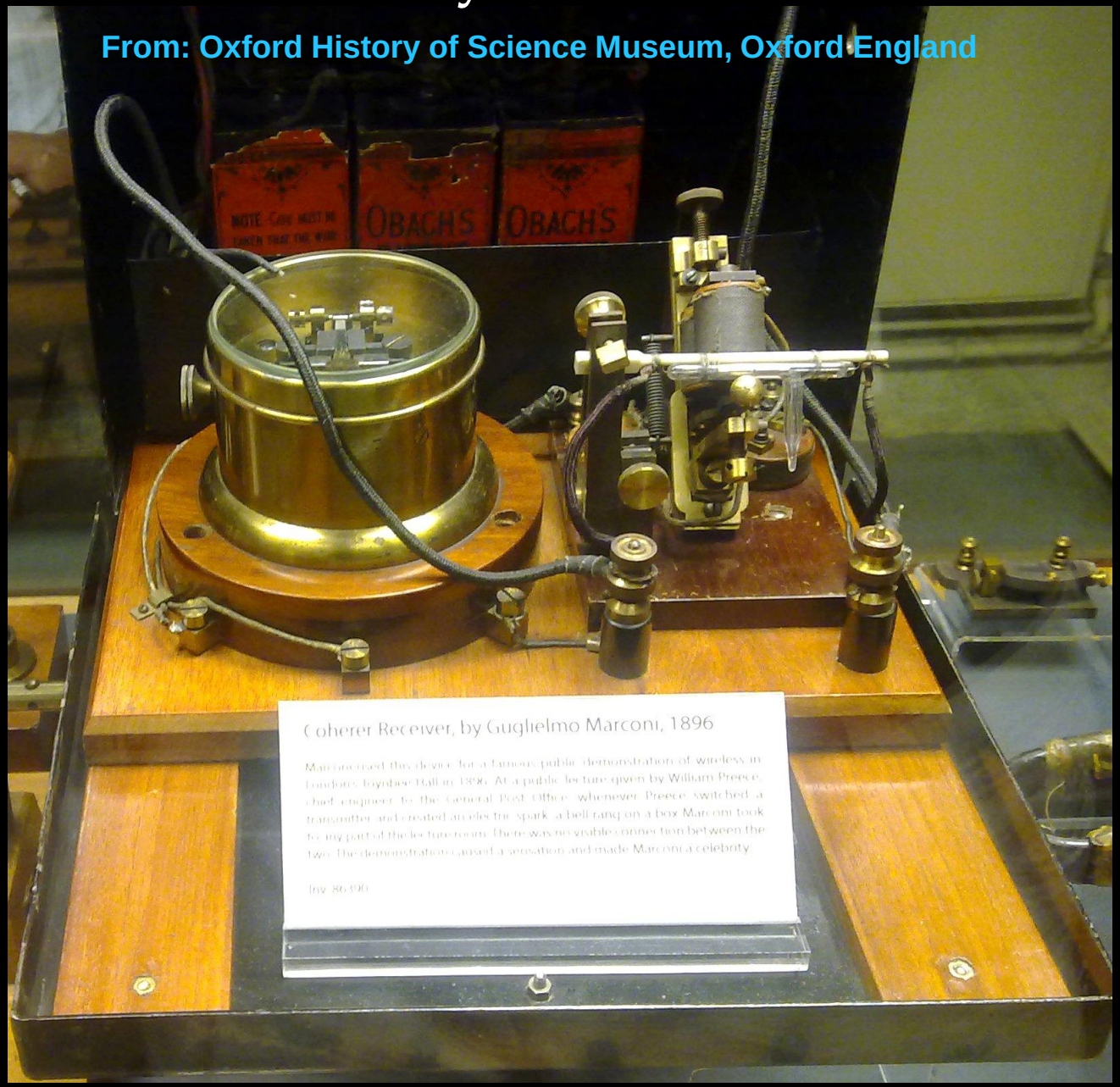
1895 Marconi's Early Coherer Receiver and Tapper Mechanism

Based on the Edouard Branly coheror and used as Marconi's early receiver until development of his 'Magnetic Detector' in 1903



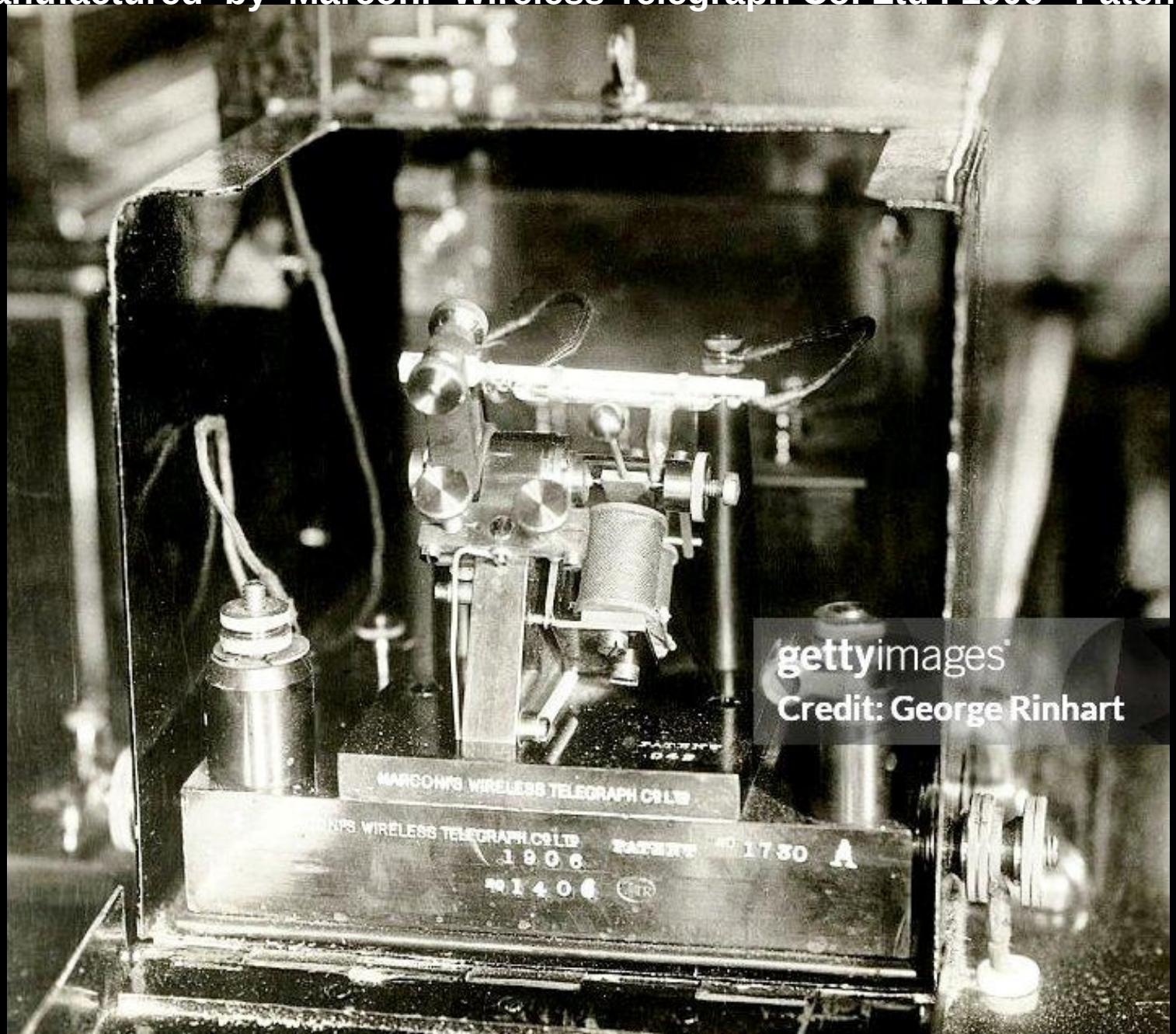
1896 An example of Marconi's first wireless receiver…based on the Branly Coherer Detector…

From: Oxford History of Science Museum, Oxford England

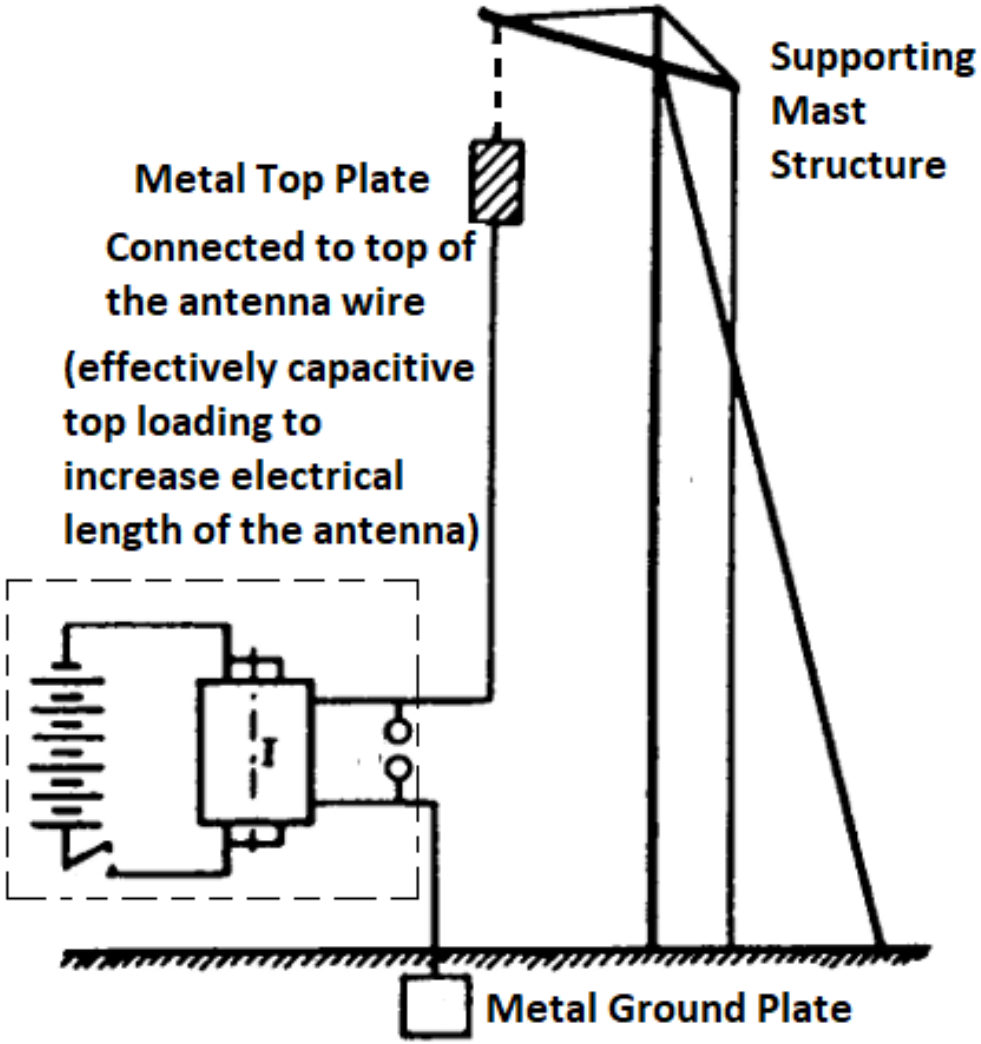


Publicly demonstrated by Marconi, at Toynbee Hall in London England December 1896

Receiving Detector onboard SS Carpathia, using the Branly Coheror detector and manufactured by Marconi Wireless Telegraph Co. Ltd . 1906 Patent No. 1730A



1895 Marconi's Early Antenna Experiments at Villa Griffon



Scheme of the transmitter used by Marconi at Villa Griffone (1895).

from: www.seas.columbia.edu/marconi/history.html

In the early summer of 1895 and despite an intervening hill, Marconi achieved signal transmission and reception over a **distance of about 2km.**

Successful reception of these signals was initially indicated by the waving of a handkerchief.

As distances increased this progressed to needing to fire a gun.

1896 Marconi moves to Britain, seeking support for further development of his experiments

Files Patent No. 12039 for 'Improvements in Transmitting Electrical Impulses and Signals' …

N° 12,039 **A.D. 1896**

Date of Application, 2nd June, 1896

Complete Specification Left, 2nd Mar., 1897—Accepted, 2nd July, 1897

PROVISIONAL SPECIFICATION.

Improvements in Transmitting Electrical Impulses and Signals, and in Apparatus therefor.

I, GUGLIELMO MARCONI, of 71 Hereford Road, Bayswater, in the County of Middlesex, do hereby declare the nature of this invention to be as follows:—

According to this invention electrical actions or manifestations are transmitted through the air, earth or water by means of electric oscillations of high frequency.

At the transmitting station I employ a Ruhmkorff coil having in its primary circuit a Morse key, or other appliance for starting or interrupting the current, and its pole appliances (such as insulated balls separated by small air spaces or high vacuum spaces, or compressed air or gas or insulating liquids kept in place by a suitable insulating material, or tubes separated by similar spaces, and carrying sliding discs) for producing the desired oscillations.

I find that a Ruhmkorff coil, or other similar apparatus, works much better if one of its vibrating contacts or brakes, on its primary circuit, is caused to revolve which

1897

Is it possible for electromagnetic waves to travel across open water (?)

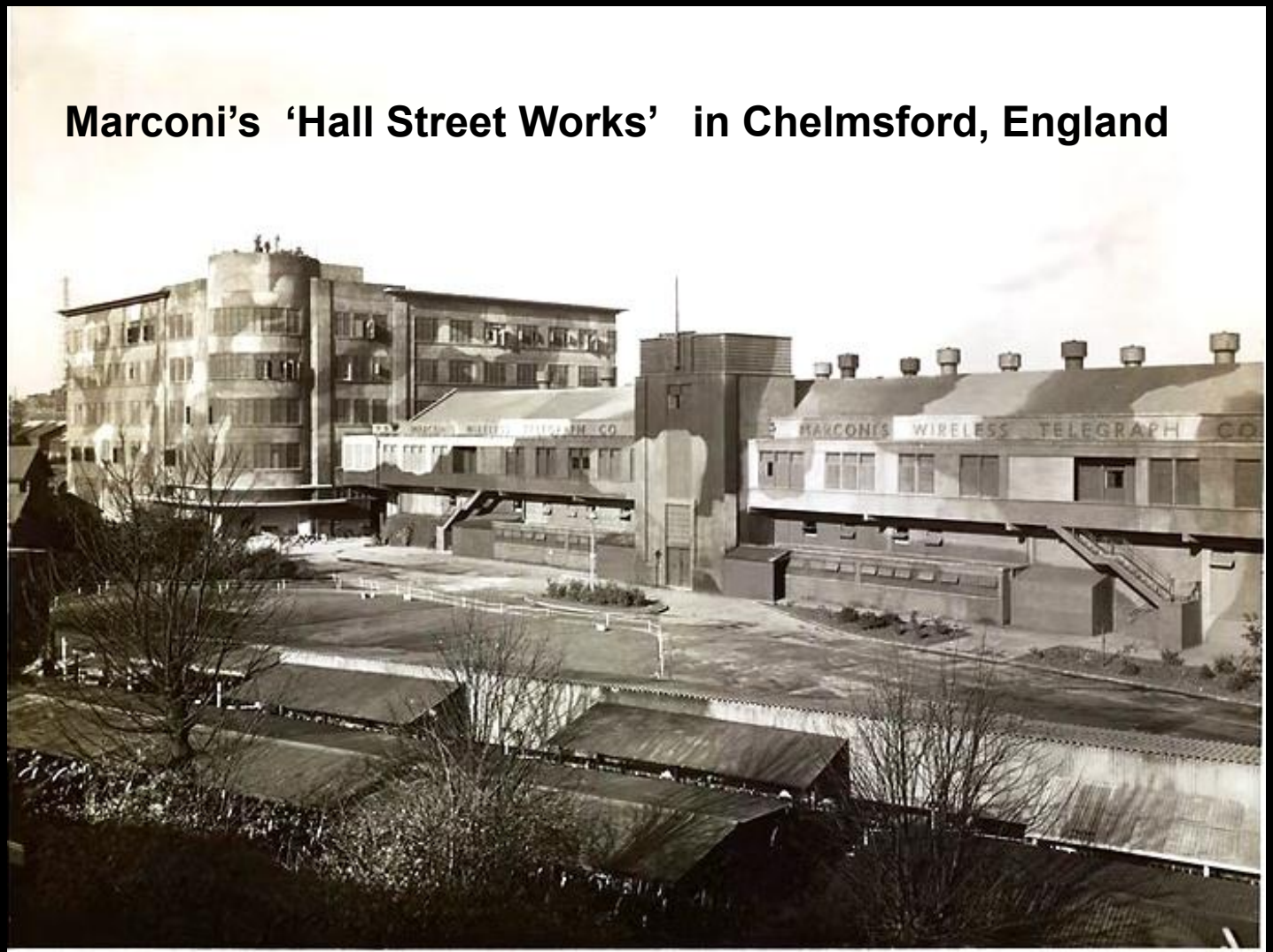
Marconi demonstrates that it is with a transmission across the Bristol Channel from Flat Holm Island to Lavernock Point , Wales (~ 5 km).

It is also largely believed at this time that radio waves must travel in straight lines (?), and therefore likely unable to be transmitted beyond the horizon (?). Marconi is determined to find answers to those questions.

British Post Office engineers inspect Marconi's radio equipment during a demonstration on Flat Holm Island – near the port of Bristol, England, 13 May 1897. [British Post Office licensed under CC BY 3.0]

1897 Marconi registers his **first company** in Britain as **The Wireless Telegraph and Signal Company**. The company would see multiple name changes over the following years (both in Britain and in North America)

1898 Marconi's first factory is established on Hall St. in **Chelmsford, England** under the name **'Marconi Wireless Telegraph Works'**.



1899 John Ambrose Fleming …Marconi's Chief Scientific Advisor'

Sir John Ambrose Fleming 1849 - 1945

'The Father of Modern Electronics'

Marconi hires Fleming under a formal agreement stipulating that Marconi would retain all ownership, rights, and recognition for any future developments under his employment.

Fleming agrees and remains true to this condition for the remainder of Marconi's life.

Marconi becomes known as *'The Father of Radio'* , but Fleming is sometimes referred to as *'The Father of Modern Electronics'* (he goes on to invent the first vacuum rectifier tube in 1904)

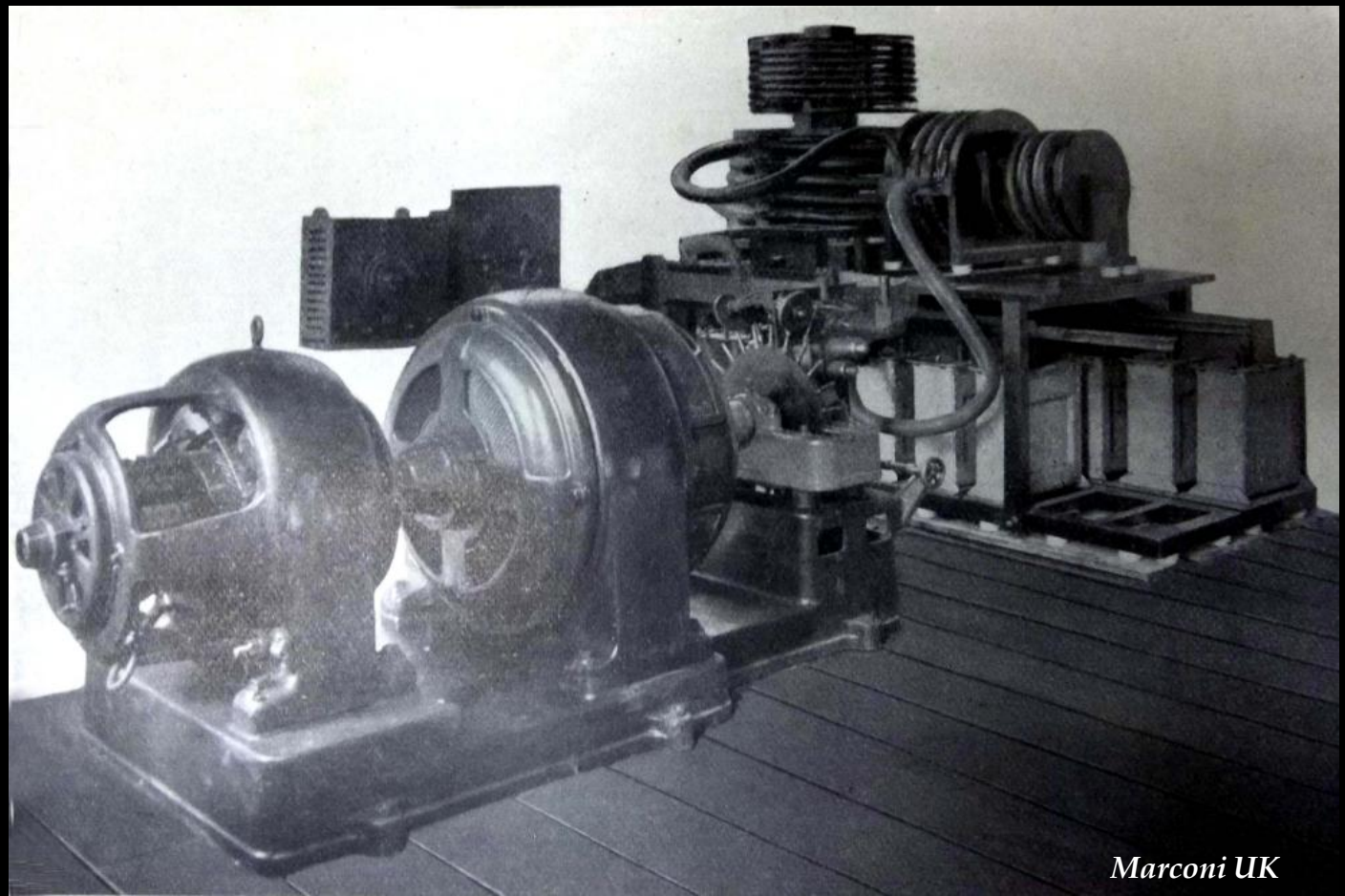
Using Marconi's fundamental principles, It is Fleming who actually designs and assembles the powerful Spark-gap transmitter for Marconi's trans-Atlantic experiment.

1901 Transmitter to be used at Poldhu, England (Cornwall)

-a 25 kW alternator and spark gap transmitter

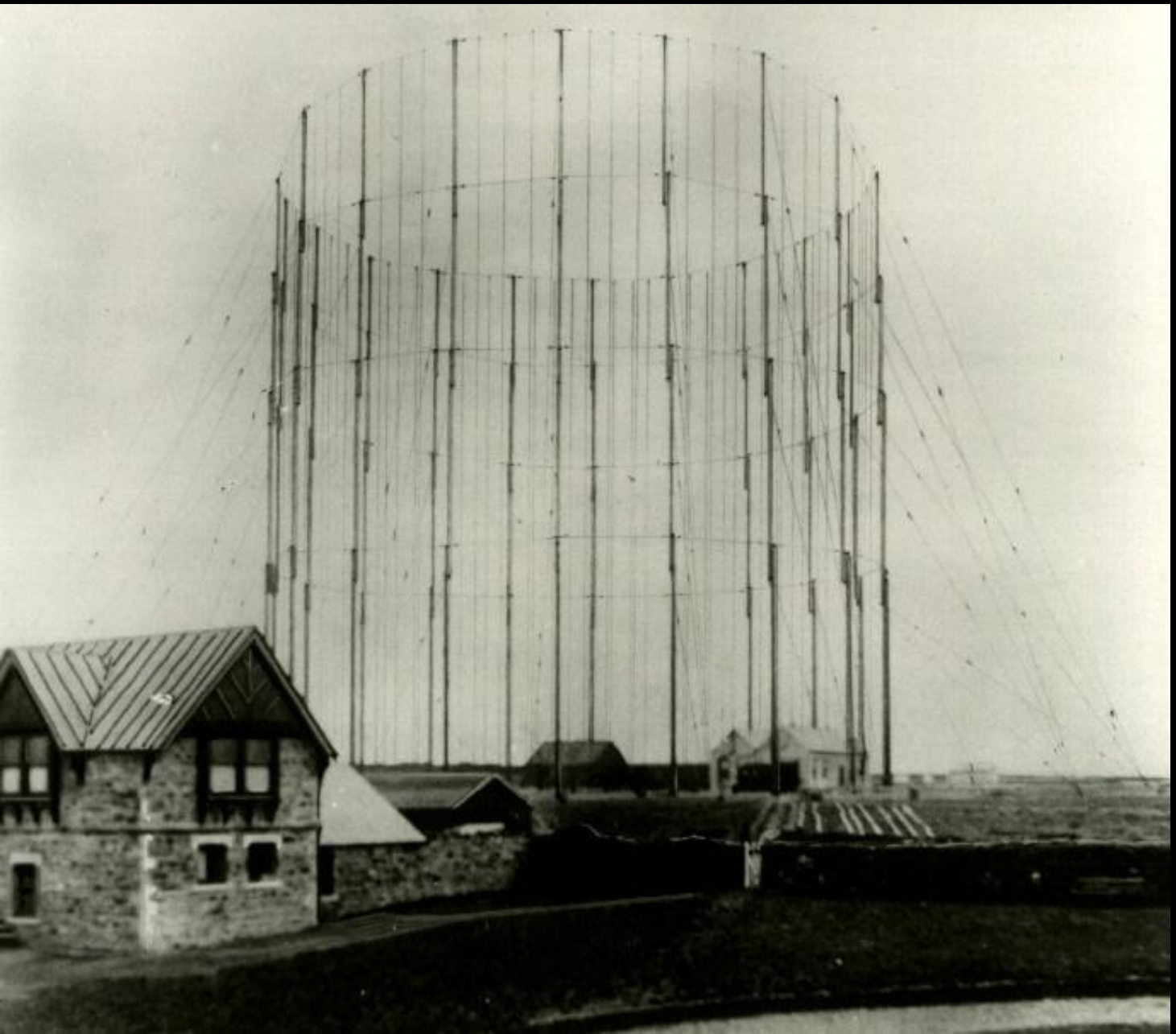
- estimated by Fleming at 10 – 12 kW RF output power

- and an estimated wavelength of 366m which corresponds to a frequency of 820 kHz



Marconi UK

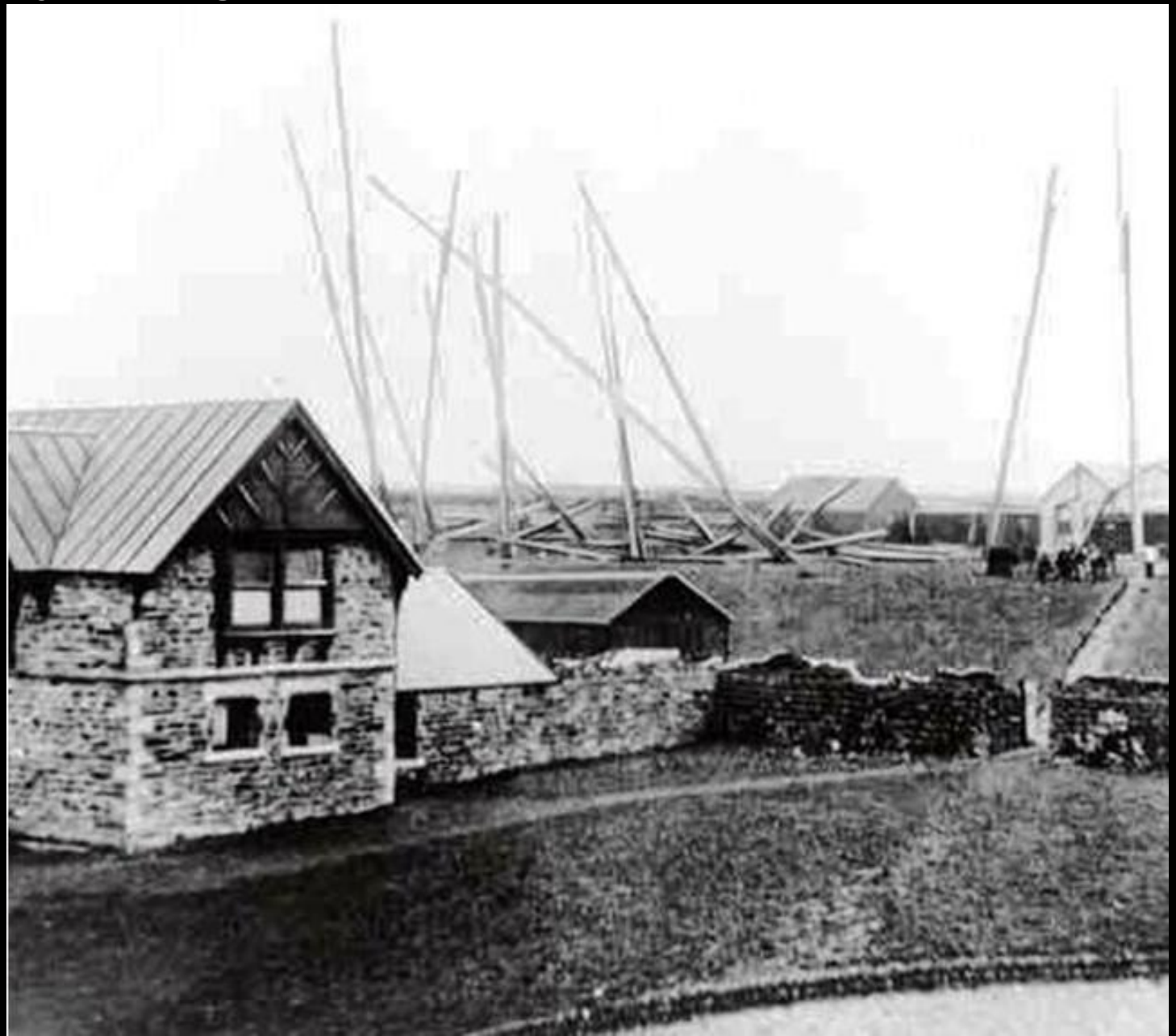
1901 Marconi's Intended Antenna Array at the Transmitter Site (Poldhu England)



Inverted Cone Antenna, erected for his planned first transmission

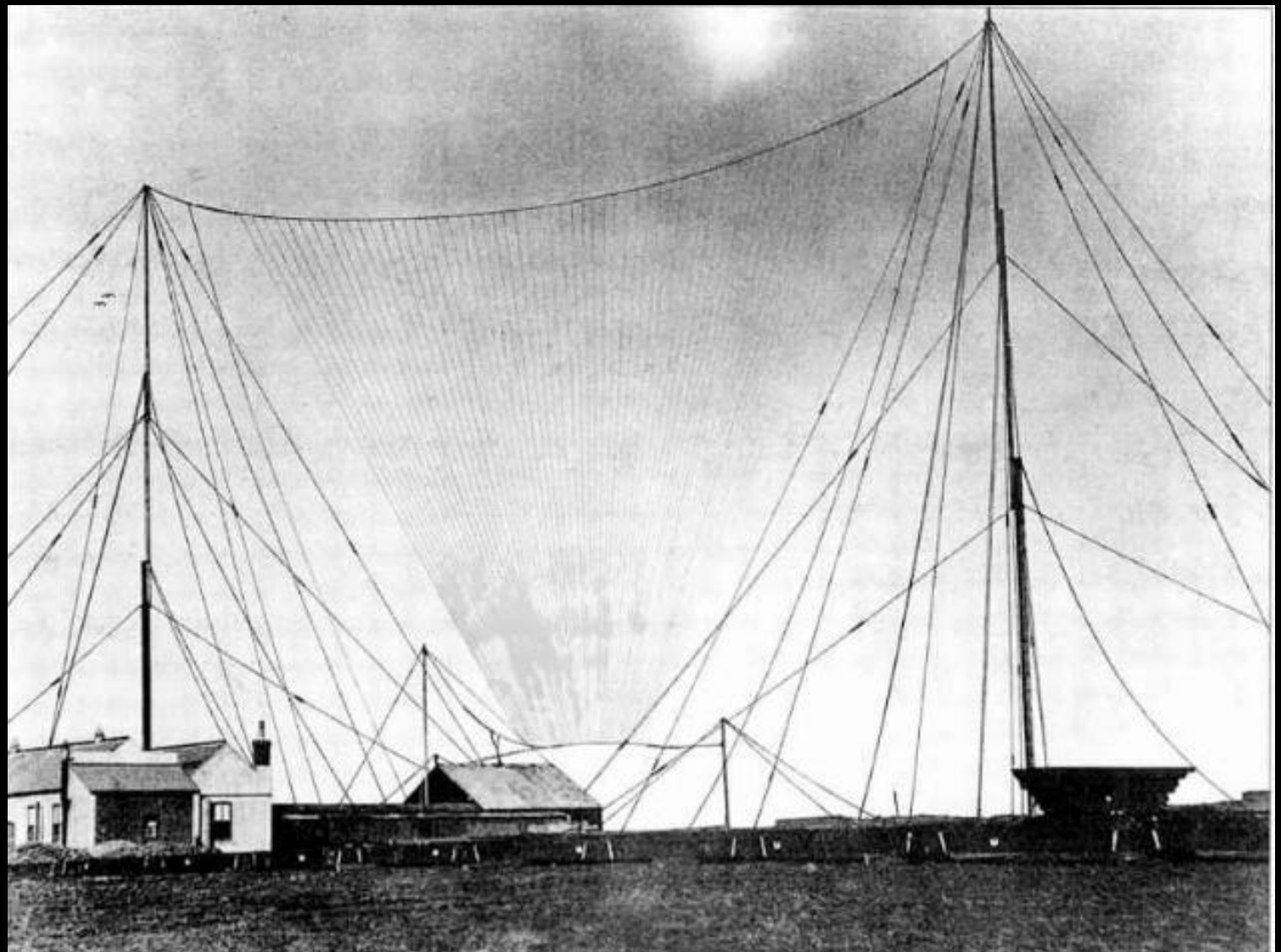
A ringed structure consisting of **20 wooden masts, each 160 feet tall**

September 17, 1901 **Marconi's intended transmitting antenna array at Poldhu is destroyed during a violent September wind storm…**



Marconi is forced to improvise a quickly erected **Fan- shaped antenna** to replace the antenna that was originally intended to be used…

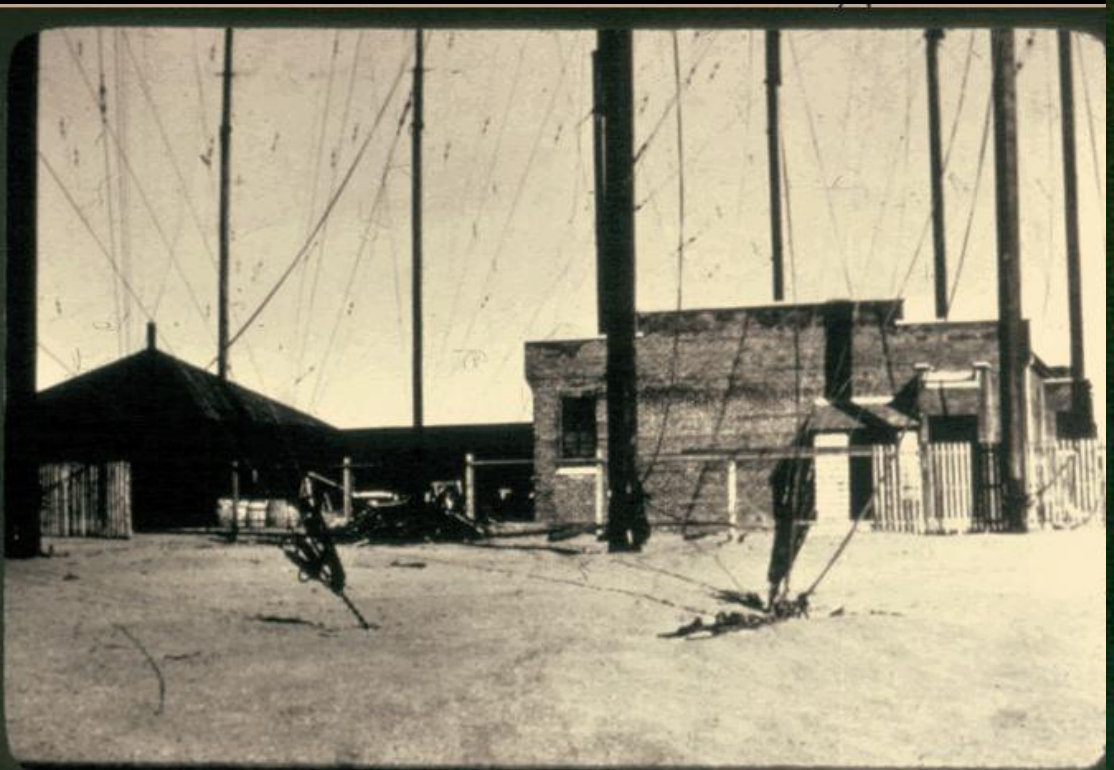
-**Two 200 foot masts** with fan shaped wire array – **extensive ground system of radial wires** to improve signal strength and to prevent ground losses.



1901 Cape Cod, MA - Marconi's originally chosen receiving station site for his first trans - Atlantic radio transmission

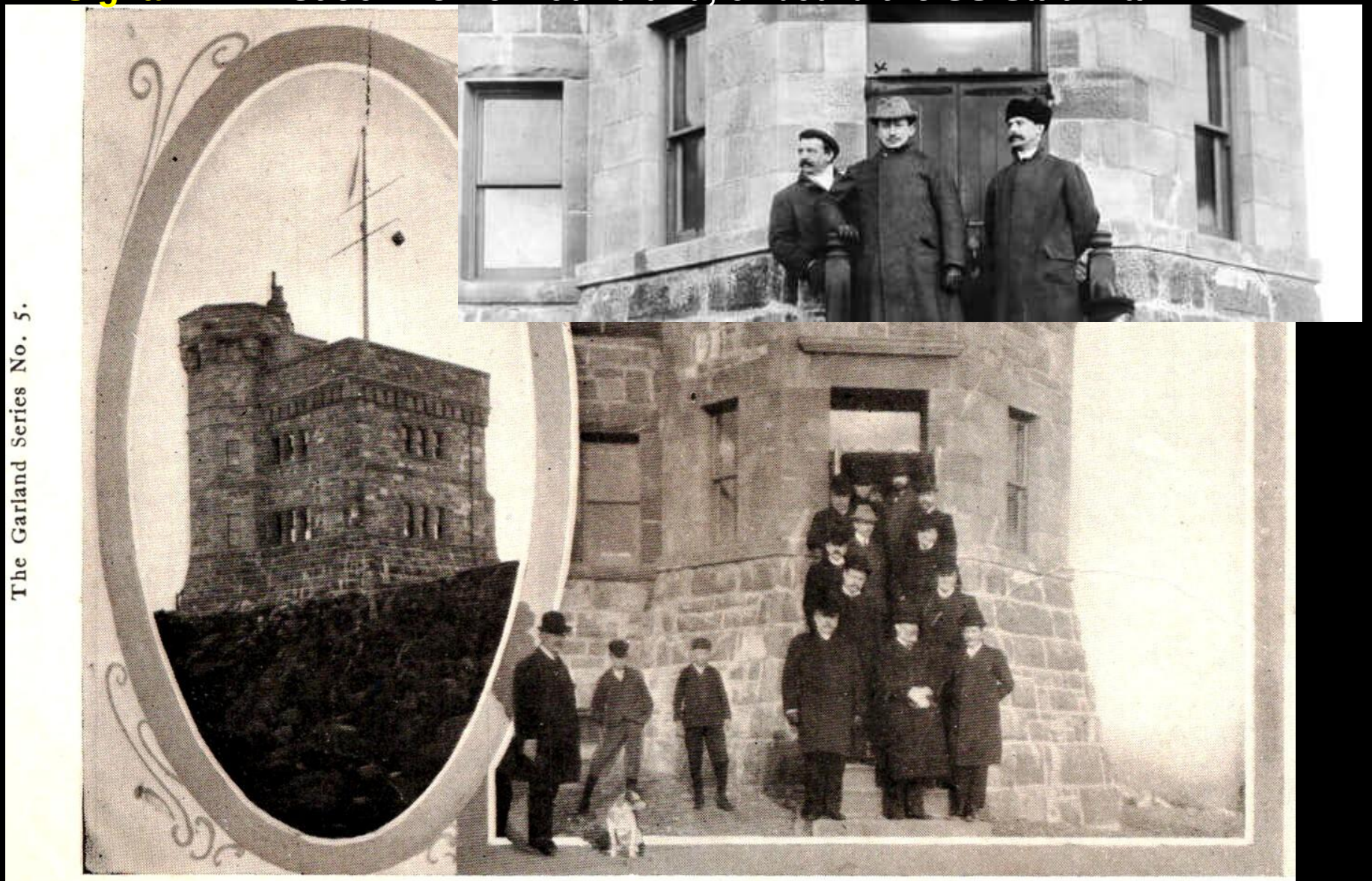
In November 1901 a violent wind storm at Cape Cod, MA destroys the antenna array here that was planned to be used as Marconi's receiving station.

With no time to rebuild, Marconi is forced to choose an alternate site…which will ultimately leading him to Signal Hill in Newfoundland.



December 6, 1901

Marconi and his assistants George Kemp and Percy Paget arrive at Signal Hill in St John's Newfoundland, onboard *the SS Sardinian*



The Garland Series No. 5.

Cabot Tower, Marconi and Members of the Executive on steps of Cabot Tower on Signal Hill, St. Johns, N. F.

Conflicting Historical Records – some history says that Marconi operated his receiving station in this abandoned government building lower down the hill below Cabot Tower.

However other historical records indicate that by 1901 this building was derelict, roofless, and completely unusable…

By permission of the Century Company, New York.

FIG. 16.—Government Building on Signal Hill, St. John's, Newfoundland, in which Mr. Marconi received the First Electric Wave Wireless Telegraphic Signals sent across the Atlantic from Poldhu Power Station in December, 1901.

So why would Marconi not simply locate his receiving equipment inside the Cabot Tower itself ??

1901 Anglo-American Telegraph Company (AATC)

In 1901, all telegraph communications in Newfoundland were controlled by the ‘Anglo-American Telegraph Company’, who feared that Marconi’s wireless system would threaten their business

Marconi was therefore legally forbidden use of the Cabot Tower premises for temporary setup up of his receiving station equipment

Marconi is forced to set up a temporary receiving hut on a small exposed plateau near the Cabot Tower

1901 Marconi's Receiving Antenna at Signal Hill

Initial attempts to raise the antenna at Signal Hill using a balloon (filled with coal gas from the local gas –works), due to the consistently high winds

Ultimately a 600 foot wire suspended from a large 'Levitor' kite designed by England's Lord Baden Powell was used as the receiving antenna for Marconi's

Marconi's kite-supported antenna essentially constitutes what is today known as a 1/2 wave vertical antenna worked against ground. At 600 feet in length, this antenna would have been resonant at ~ 800 kHz

1901 The wireless receiver used by Marconi at Signal Hill ??....

Few actual photos exist, showing the temporary receiving station equipment used at Signal Hill for Marconi's inaugural trans-Atlantic experiment.

It is widely historically accepted that Marconi used a similar receiver to this one based on Branly's Coherer detector.

Marconi's next evolution of a wireless receiver…the 'Magnetic Detector' was not patented until 1903

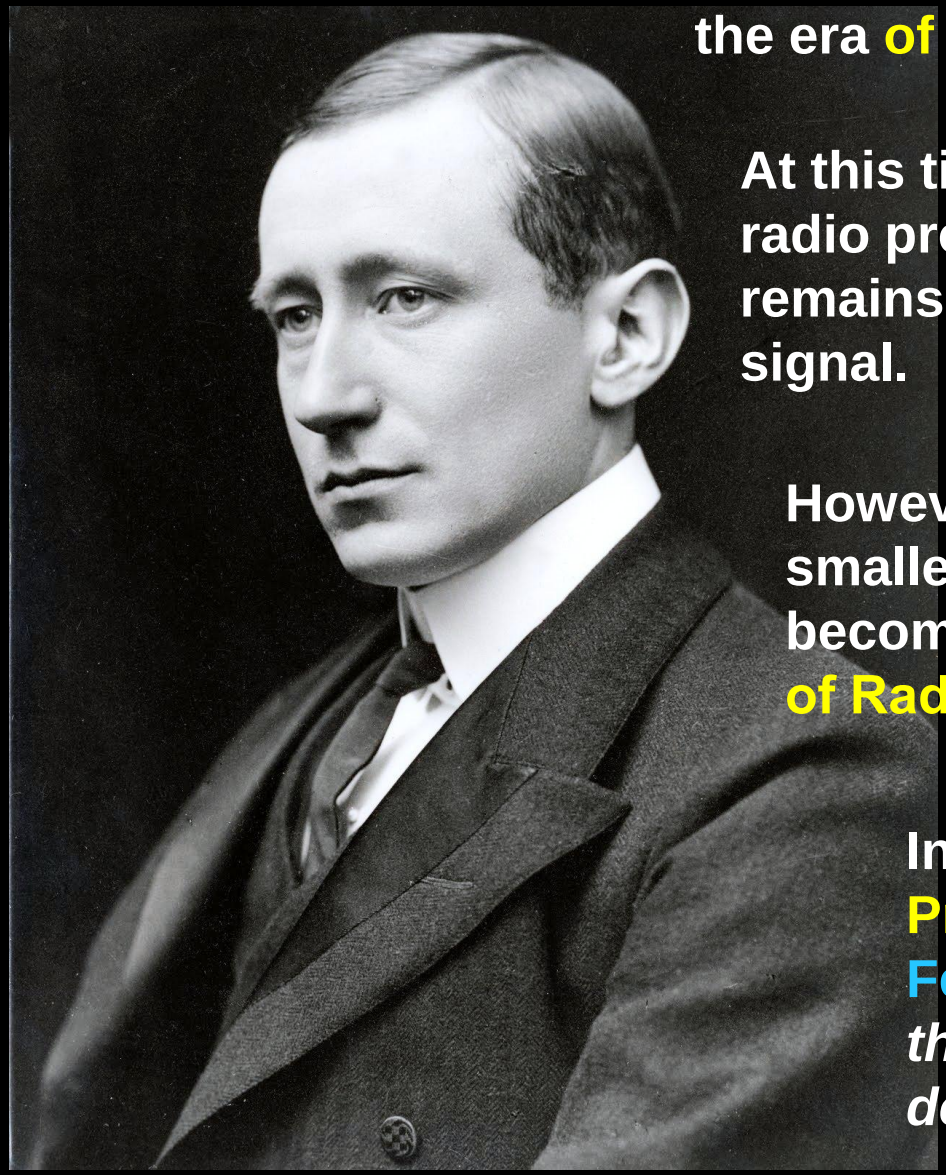
Notwithstanding the previous statement, this photo from the 'Marconi Wireless Telegraph Company' in Chelmsford England claims to show "Marconi at Signal Hill with the instruments used to receive his first transatlantic signals"

Guglielmo Marconi, December 1901

Marconi at Signal Hill with instruments used to receive the first transatlantic signals.

From Marconi Company, *Marconi Jubilee 1897-1947* (Chelmsford, England: Marconi's Wireless Telegraph Company Limited, 1947) 18.

December 12,1901



Never the less… On his receiver at Signal Hill, Marconi receives 3 tiny clicks from the transmitter in Poldhu, England … ushering in the era of long distance radio communication.

At this time, much was still unknown about radio propagation. Some speculation remains regarding frequency of the received signal.

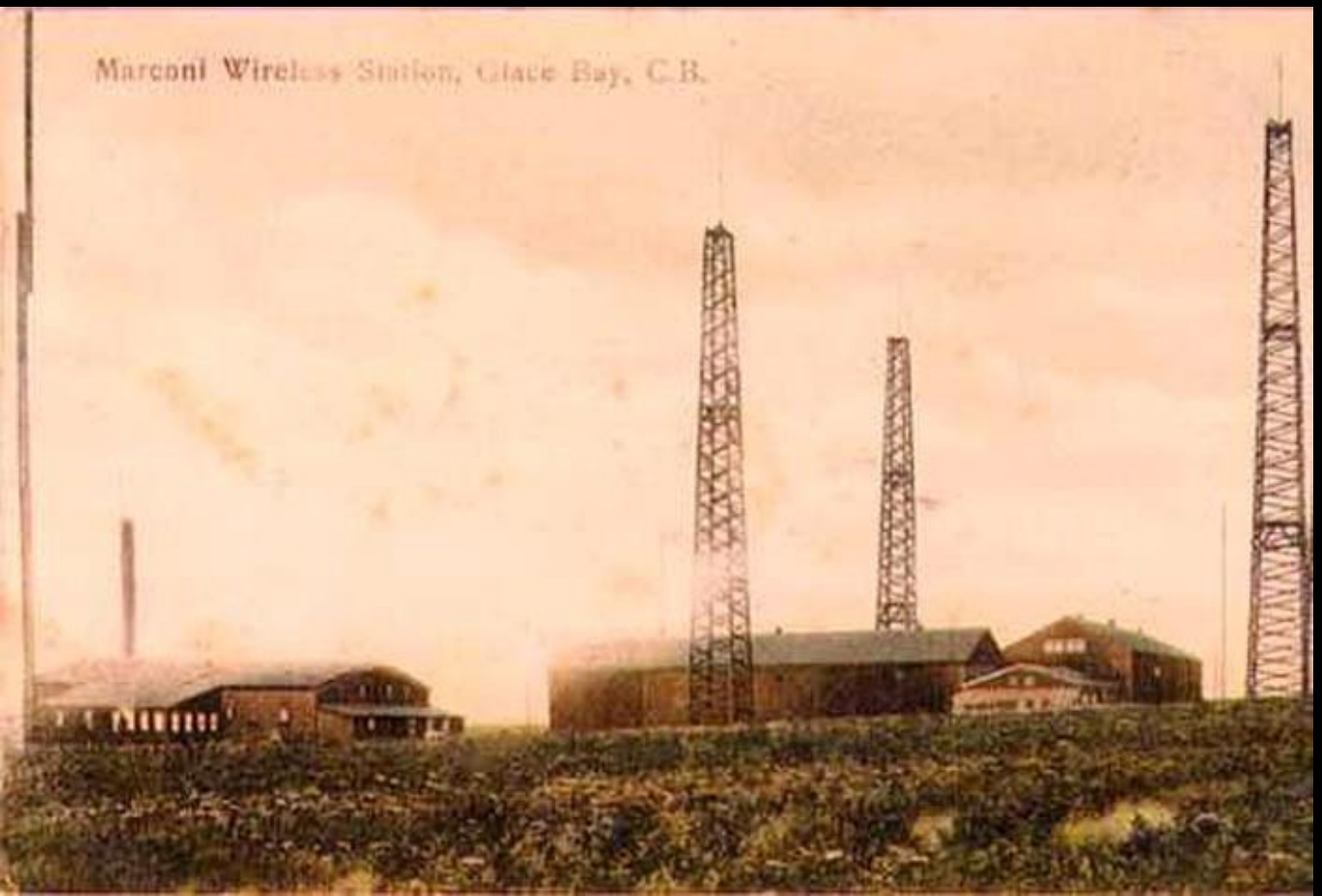
However, the world has just become a smaller place, and Guglielmo Marconi becomes widely regarded as 'The Father of Radio'

In 1909 Marconi is awarded the Nobel Prize in Physics, shared with Karl Ferdinand Braun *"in recognition of their contributions to the development of wireless telegraphy."*

December 15, 1902 Glace Bay, Nova Scotia

One year later, Marconi sends the first successful west to east wireless transmission from 'Table Head' in Glace Bay, NS to Poldhu, England

The antenna used for this transmission was in the shape of a large fanned umbrella supported by a 200 foot wooden mast.



1905

The original antenna installation is replaced with a structure supported by 4 steel lattice towers, erected a few km inland from where the original antenna had been located.

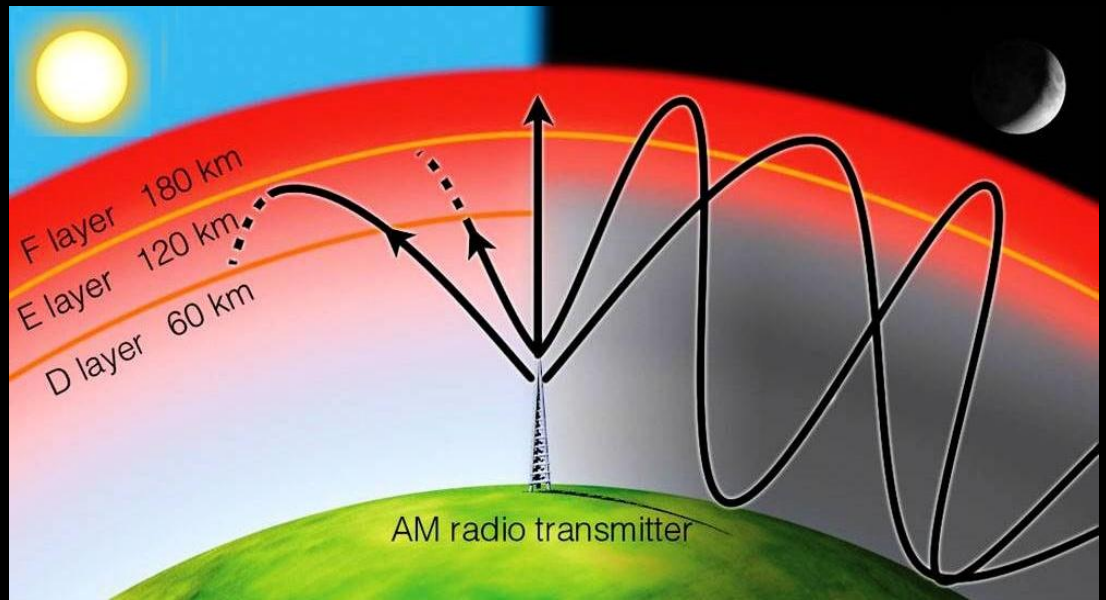
So where does it go from here? …

There is still no understanding as to how Marconi's low frequency radio waves were able to travel over such distances, and seemingly able to follow the curvature of earths surface

In 1902 , Oliver Heaviside postulates the existence of a conductive layer above the earth that could reflect Marconi's radio waves.

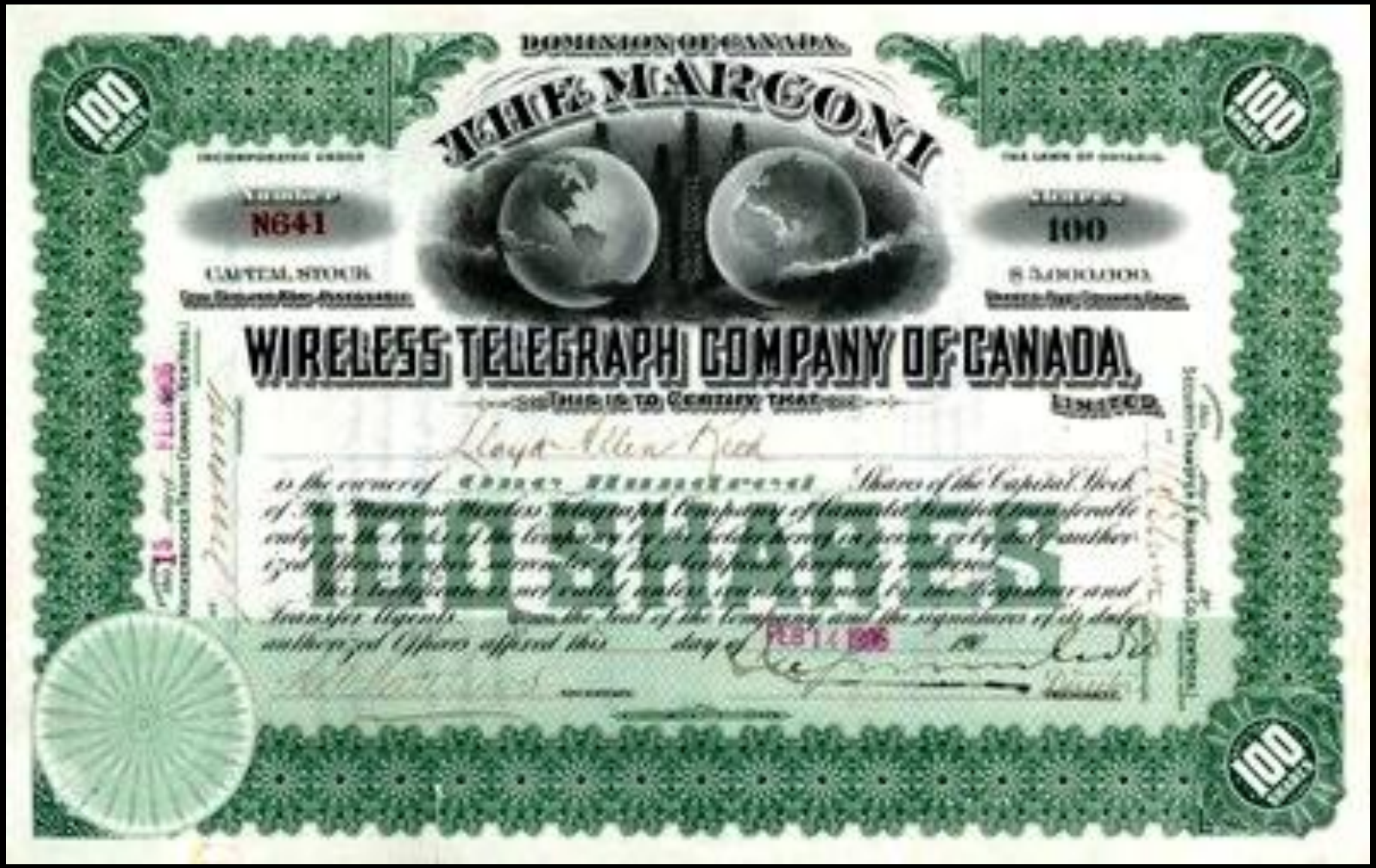
It is not until the 1920s that Edward Appleton conducts experiments proving the existence of such a layer , which was then referred to as the 'Appleton Layer'

1926 Robert Watson-Watt coins the term 'Ionosphere' as it is referred to today



1902 Marconi Wireless Telegraph Company of Canada, Inc

Founded in 1902 Incorporated in 1903



1904 Marconi's Glace Bay Agreement

The Canadian government issues 'Order in Council No. 1904-1460 authorizing contract negotiations the Marconi Company of Canada

The resulting 'Glace Bay Agreement' would grant the Marconi Company rights to the

- **design**
- **installation**
- **operation**

…of a maritime wireless network on Canada's Atlantic coast (including the St Lawrence River and the Great Lakes) for the purpose of linking remote maritime communities and improving the safety of ships at sea.

1905

Wireless Telegraph Act, 1905

- Canada's first **Act of Parliament** to provide regulations **specifically dealing with Wireless Telegraphy**

- assented into law July 20, 1905

- Assigned administrative responsibility to the **Minister of Marine and Fisheries**, because of the importance of communications to maritime activities.

1906 Reginald Aubrey Fessenden (1866 – 1932)

Born East Bolton (Quebec)

Education
Trinity College, Port Hope, On
Bishop's College, Sherbrooke, QC
Professor at Whitney Institute, Bermuda

Buried Smith's Parish, Bermuda

- First practical Continuous Wave (CW) transmissions, using the Alexanderson Alternator

- Advancements in radio detector circuits for receiving

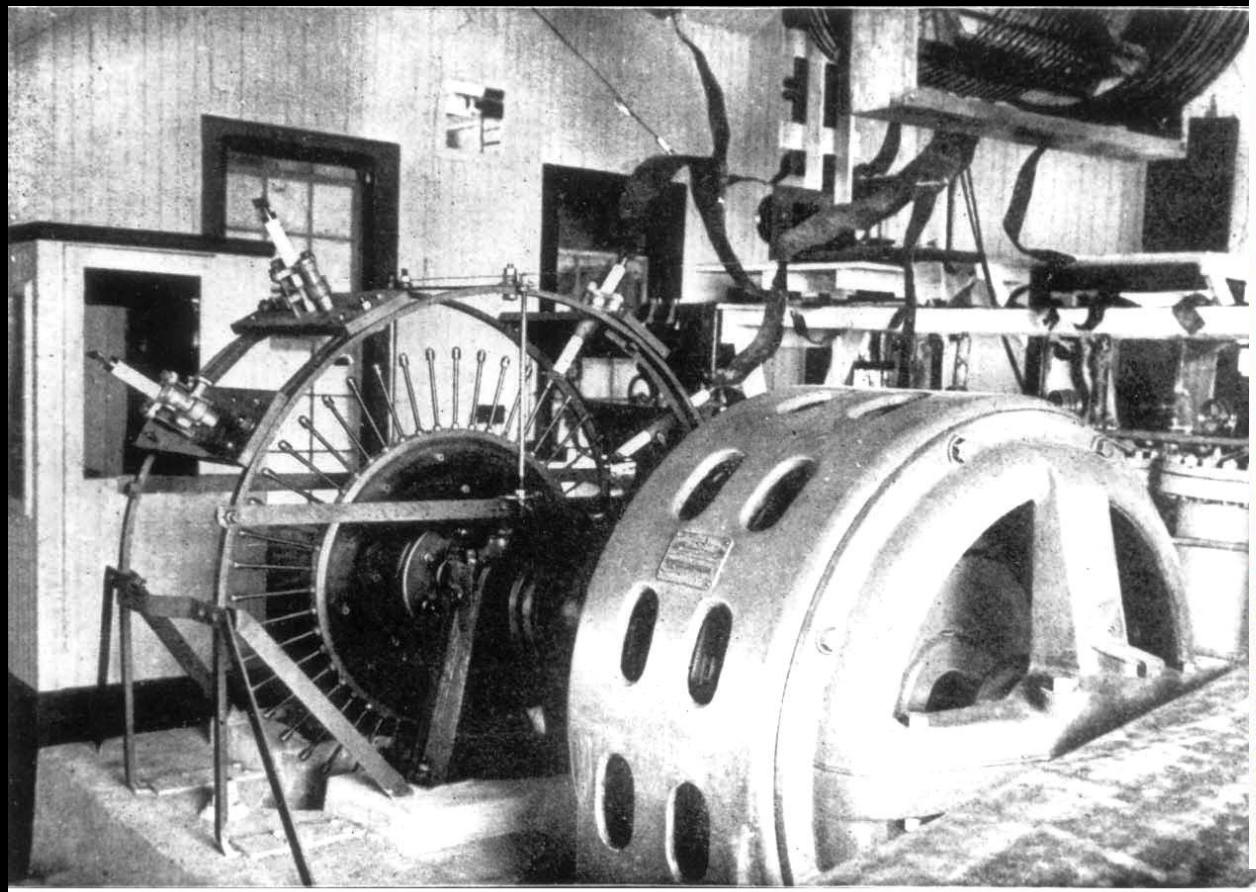
- Electronic mixer and heterodyne principles to produce Amplitude Modulation (AM) radio signals

Dec. 24, 1906 - First wireless broadcast of voice and music from Fessenden's station at Brant Rock, MA

- Invented first underwater acoustic oscillator and echo detector

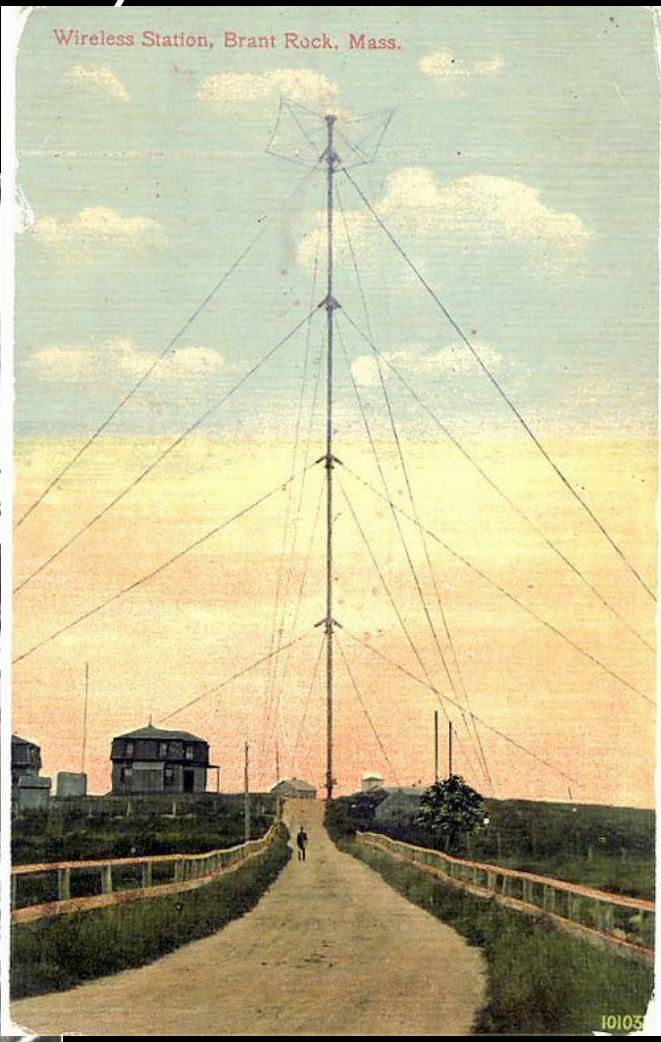
1906 Fessenden's Brant Rock , MA station (established by NESCO 1905)

Alexanderson Alternator system used for Fessenden's rotary spark-gap transmitter producing sparks at ~500 per second…more closely approaching a Continuous Wave (CW) oscillating current.



https://en.wikipedia.org/wiki/File:Fessenden_500_CPS_Transmitter.jpg

420 foot transmitting tower (destroyed by windstorm 1917)



1907

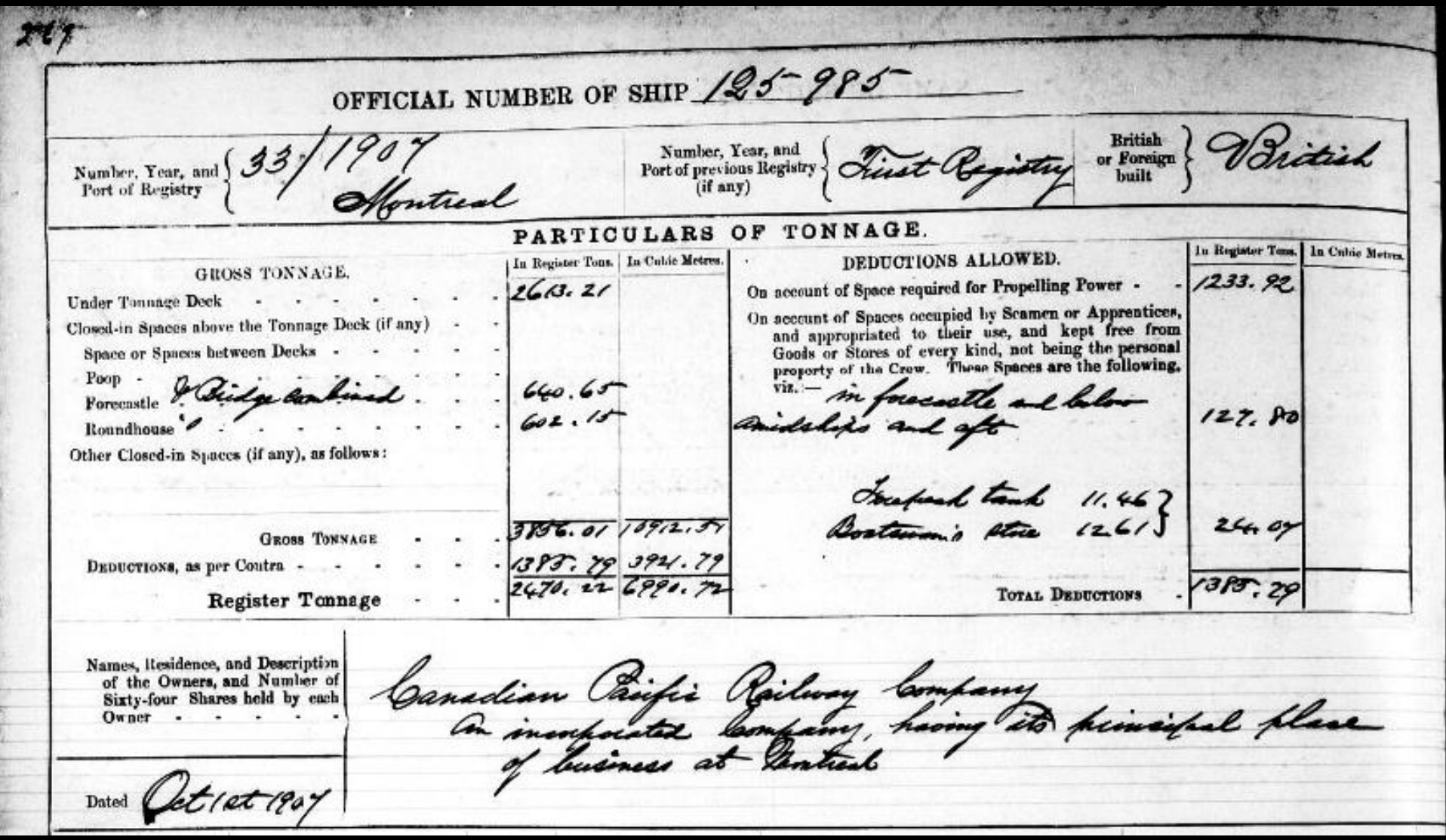
Canadian Pacific Steamship

SS Keewatin 1907

The Last Remaining Edwardian Era Steamship
- Still afloat 119 years later at Great Lakes Museum
Kingston ON, Canada

SS Keewatin

- Registered in Montreal on 1 Oct 1907



217

OFFICIAL NUMBER OF SHIP 125985

Number, Year, and Port of Registry	Number, Year, and Port of previous Registry (if any)	British or Foreign built
33/1907 Montreal	First Registry	British

PARTICULARS OF TONNAGE.

GROSS TONNAGE.	In Register Tons.	In Cubic Metres.
Under Tonnage Deck	2613.21	
Closed-in Spaces above the Tonnage Deck (if any)		
Space or Spaces between Decks		
Poop		
Forecastle & Bridge combined	640.65	
Roundhouse "	602.15	
Other Closed-in Spaces (if any), as follows:		
GROSS TONNAGE	3856.01	10912.51
DEDUCTIONS, as per Contra	1385.79	3921.79
Register Tonnage	2470.22	6990.72

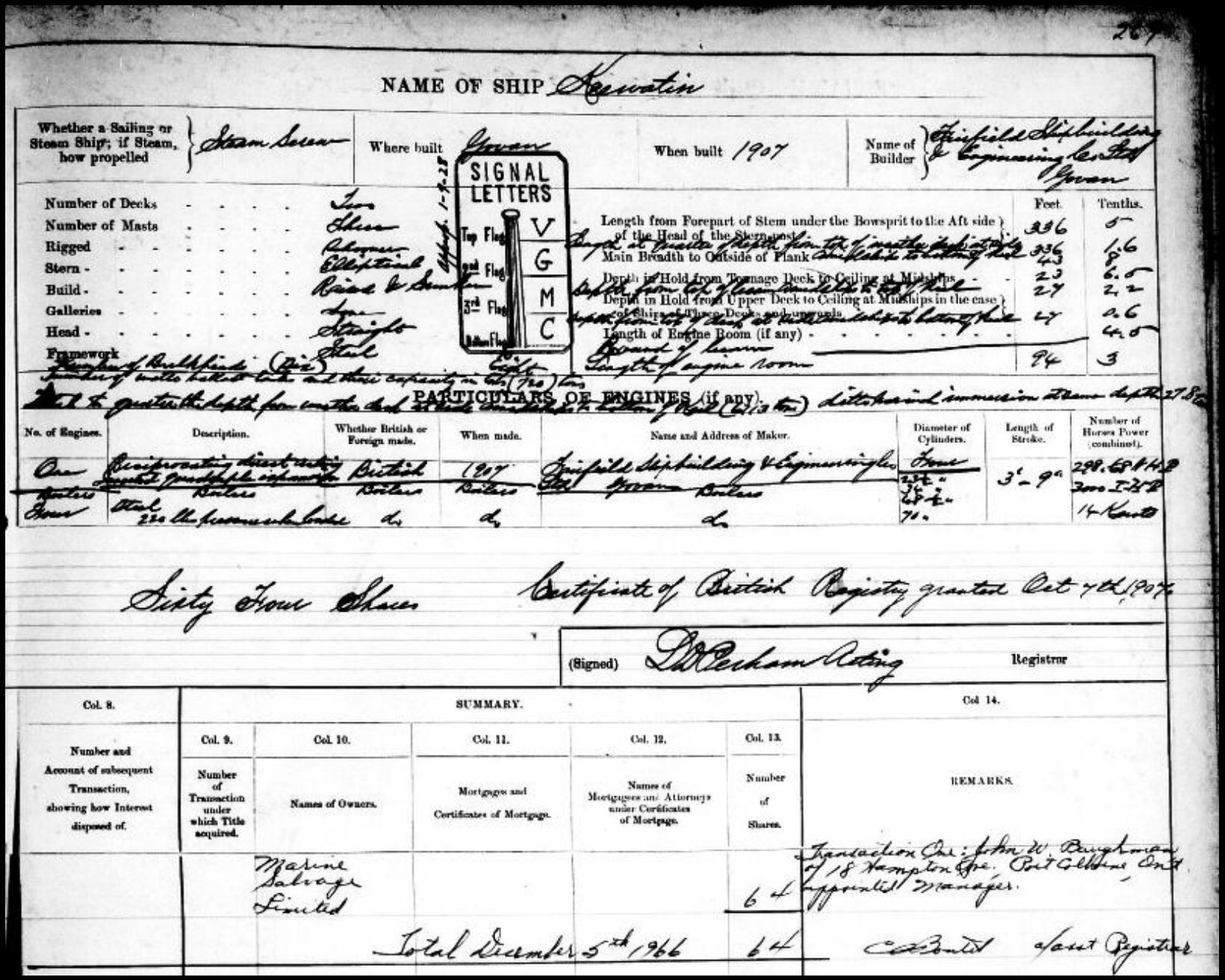
DEDUCTIONS ALLOWED.	In Register Tons.	In Cubic Metres.
On account of Space required for Propelling Power	1233.92	
On account of Spaces occupied by Seamen or Apprentices, and appropriated to their use, and kept free from Goods or Stores of every kind, not being the personal property of the Crew. These Spaces are the following, viz.:— in forecastle and below midships and aft	127.80	
Steering tank 11.46		
Boatswain's store 12.61	24.07	
TOTAL DEDUCTIONS	1385.79	

Names, Residence, and Description of the Owners, and Number of Sixty-four Shares held by each Owner

Canadian Pacific Railway Company
an incorporated Company, having its principal place of business at Montreal

Dated Oct 1st 1907

1907 *SS Keewatin* Registry - showing her ship's signal letters VGMC



NAME OF SHIP Keewatin

Whether a Sailing or Steam Ship; if Steam, how propelled: Steam Screw

Where built: Govan

When built: 1907

Name of Builder: Fairfield Shipbuilding & Engineering Co Ltd Govan

SIGNAL LETTERS
Top Flag V
2nd Flag G
3rd Flag M
Bottom Flag C

		Feet.	Tenths.
Number of Decks	Two		
Number of Masts	Three		
Rigged	Schooner		
Stern	Elliptical		
Build	Raised Quarter Deck		
Galleries	None		
Head	Straight		
Framework	Steel		
Length from Forepart of Stem under the Bowsprit to the Aft side of the Head of the Sternpost		336	0
Main Breadth to Outside of Plank		43	1.6
Depth in Hold from Tonnage Deck to Ceiling at Midships		23	8
Depth in Hold from Upper Deck to Ceiling at Midships in the case of Ships of Three Decks and upwards		27	6.5
Length of Engine Room (if any)		47	2.2
Length of engine room		94	4.6
			3

PARTICULARS OF ENGINES (if any).

No. of Engines.	Description.	Whether British or Foreign made.	When made.	Name and Address of Maker.	Diameter of Cylinders.	Length of Stroke.	Number of Horses Power (combined).
One	Direct acting Inverted Surface Condensing	British	1907	Fairfield Shipbuilding & Engineering Co Govan	34" 54" 70"	3'-9"	299 NHP 3000 IHP
Boilers	Boilers	Boilers	Boilers	Boilers			14
Steel	Steel 220 lbs pressure per Sq Inch	do	do	do			

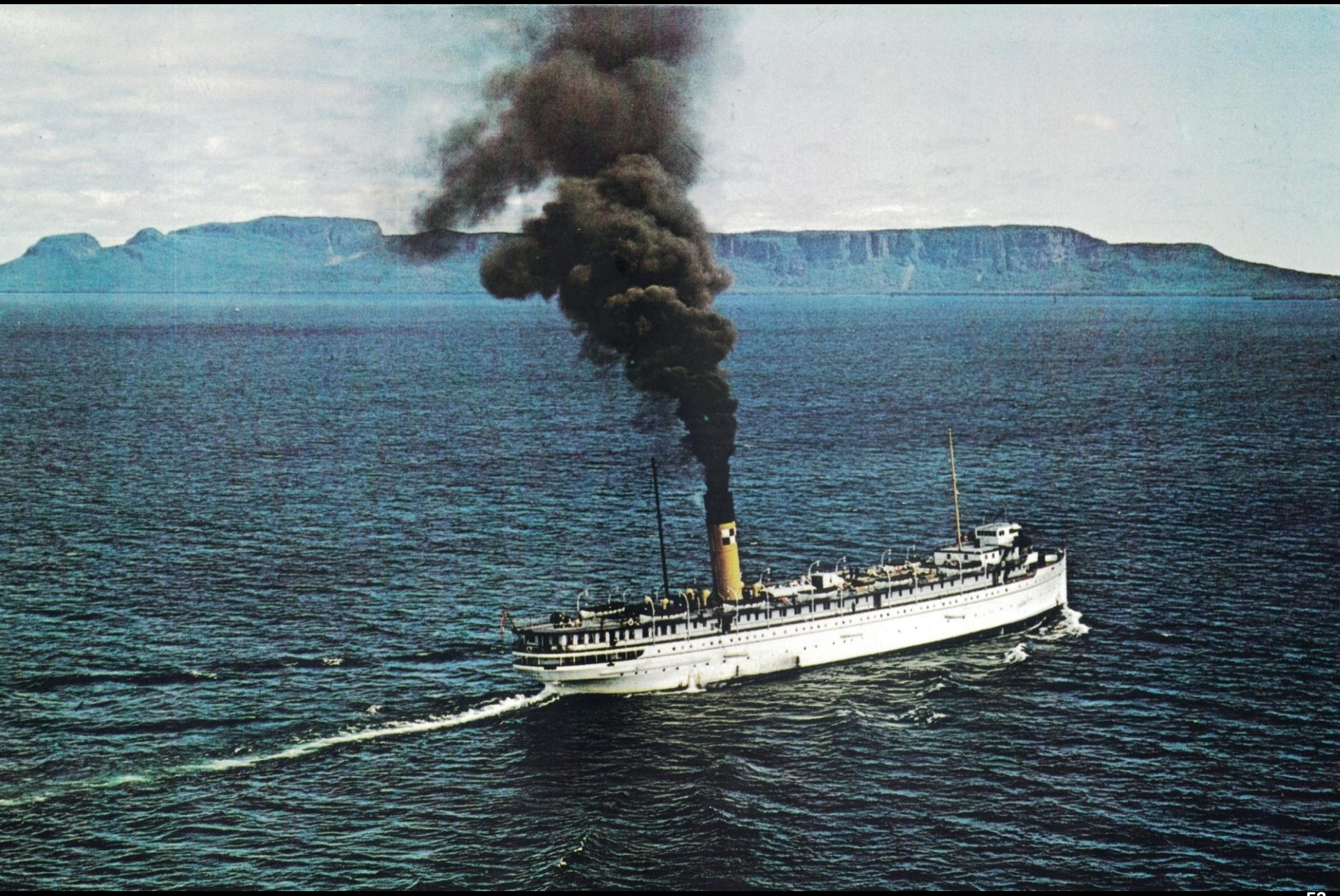
Sixty Four Shares

Certificate of British Registry granted Oct 7th 1907

(Signed) D. Wreham Acting Registrar

Col. 8. Number and Account of subsequent Transaction, showing how Interest disposed of.	SUMMARY. Col. 9. Number of Transaction under which Title acquired.	Col. 10. Names of Owners.	Col. 11. Mortgages and Certificates of Mortgage.	Col. 12. Names of Mortgagees and Attorneys under Certificates of Mortgage.	Col. 13. Number of Shares.	Col. 14. REMARKS.
		Marine Salvage Limited			64	Transaction Cert: John W. Burghman 4/18 Hampton Ave. Port Colborne Ont. Apprentice Manager.
		Total December 5th 1966			64	Certificate Issued 4/Asst Registrar

SS Keewatin inbound to Port Arthur (Thunder Bay)



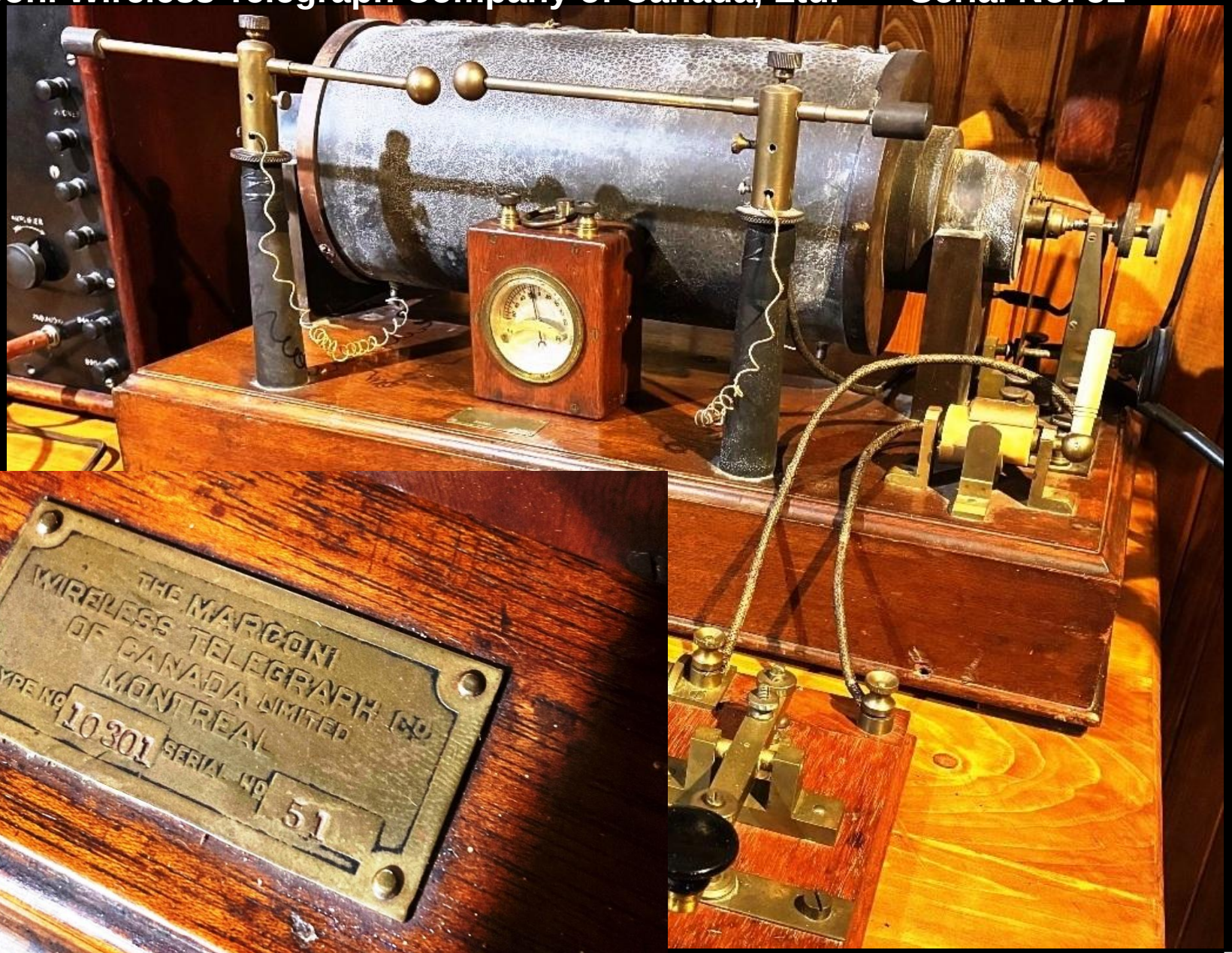

WATERFRONT PT. ARTHUR ONTARIO CANADA.

1909

Marconi establishes his first factory in Canada on William Street in Montreal

Circa 1905 Marconi Spark –gap Transmitter

Marconi Wireless Telegraph Company of Canada, Ltd. Serial No. 51



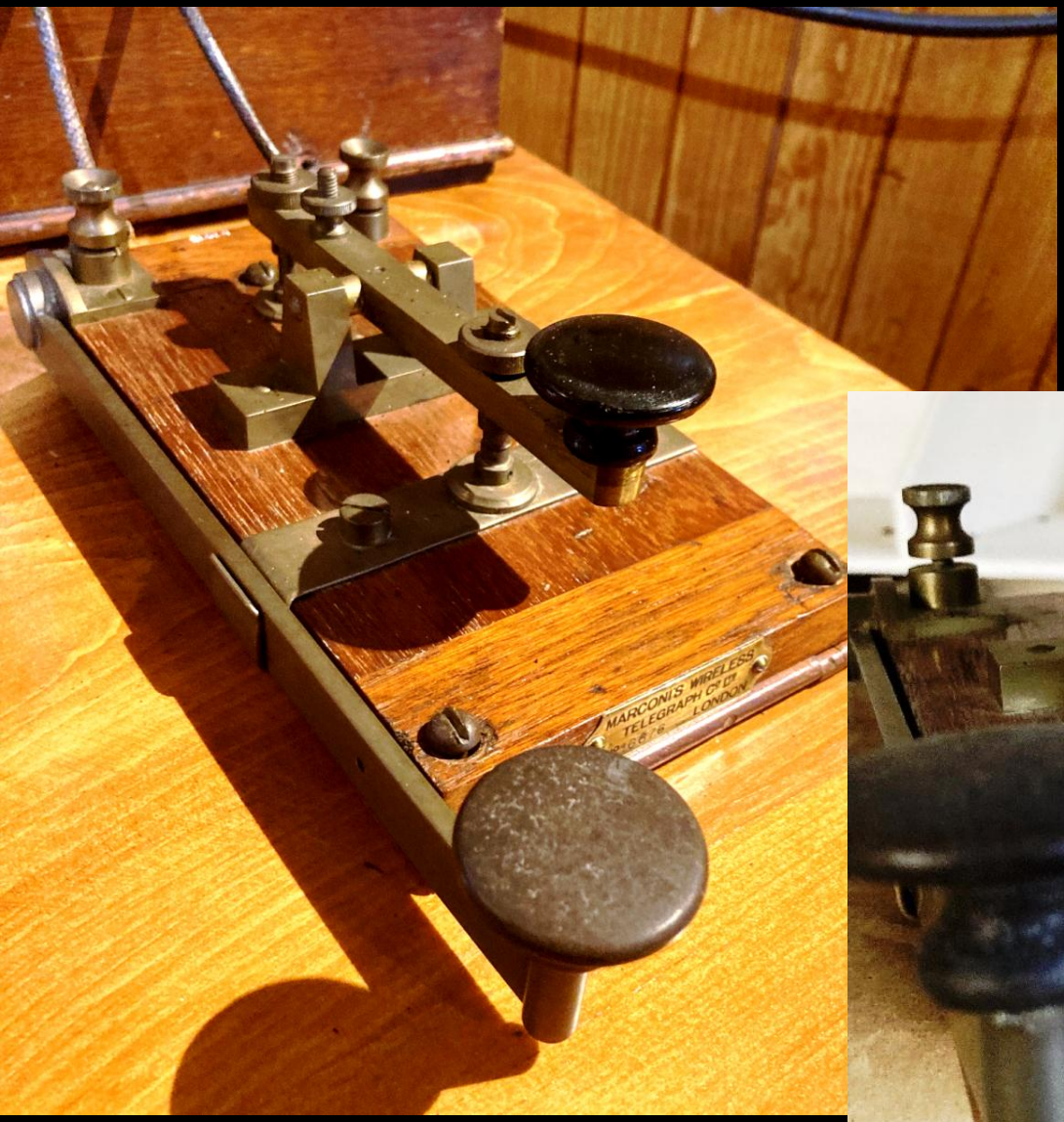
Circa 1903 Marconi Magnetic Detector Receiver

Manufactured by: The Marconi Wireless Telegraph Co of Canada Limited

Patent No. 85277

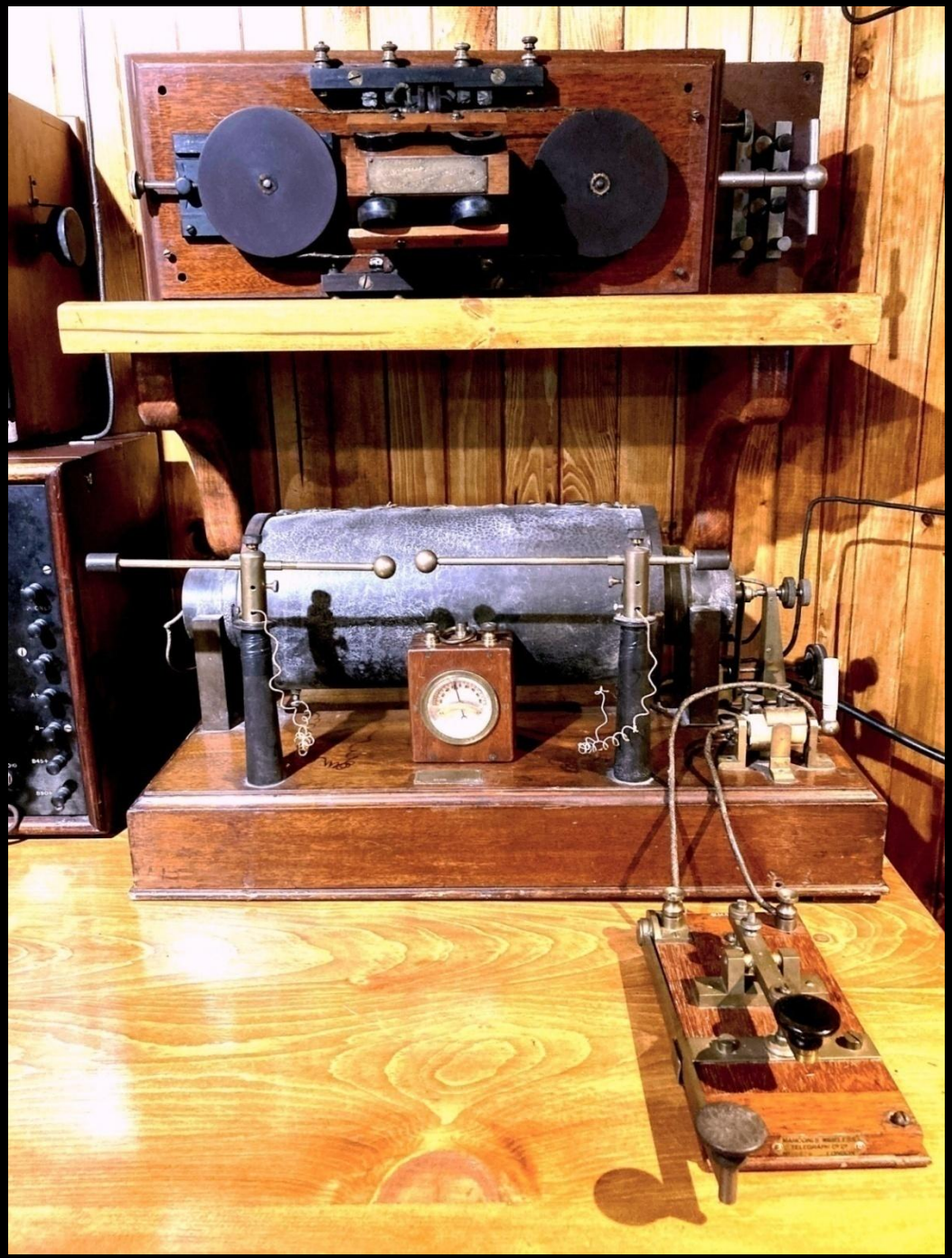
'Maggi'

Marconi Wireless Telegraph Key Serial No. 16676



Marconi's Wireless Telegraph Co Ltd

London, England



Popular early ship- board wireless station combination

Marconi
Magnetic Detector Receiver

Marconi
Spark –gap Transmitter

Marconi
Telegraph Key

Canada's First Atlantic Coastal Wireless Stations

-At the time, Eastern Canada's wireless station facilities were built by the government, but all of the station equipment was manufactured / installed / and operated by the **Marconi Company of Canada .**

- When first established, shore based stations used 2 letters call signs

- In **1908** Marconi assigns the **letter M prefix** to all of the call signs for his wireless stations

Station		Year Operational	Call Sign
Glace Bay	NS	1902	MGH
Cape Race	NL	1904	MCE

1910 First Great Lakes Marconi Marine Wireless Station

- First of the Marconi wireless stations installed at the head of the Great Lakes in Port Arthur, operational by the end of 1910 using the call sign ‘MUG’ then changed to ‘VBA’ after the ‘1912 London Radiotelegraph Convention’

VBA Port Arthur operating position ca. 1914-1918. Canadian Marconi Company / Library and Archives Canada / C-065134.

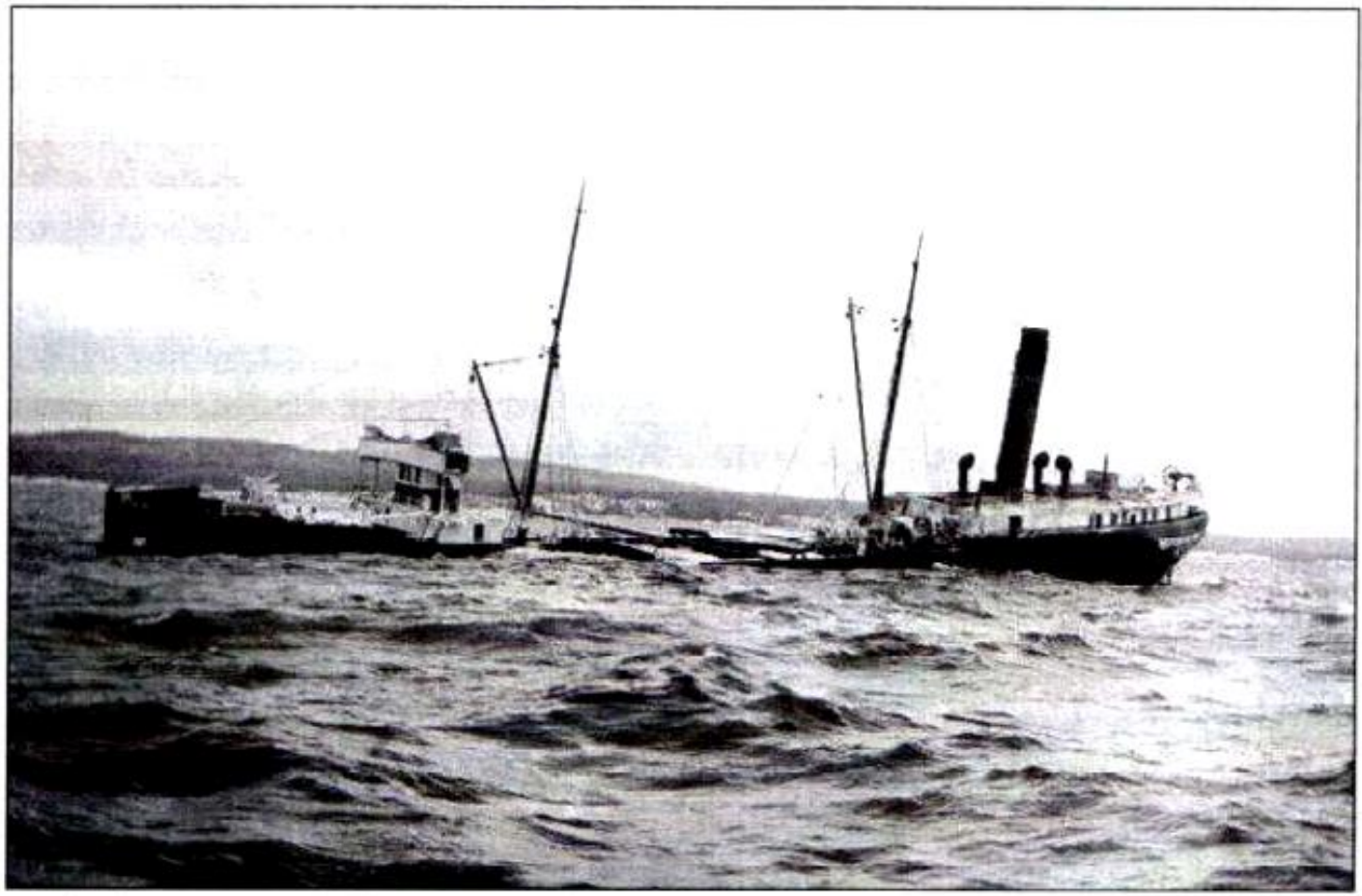
1910 First Wireless Distress Message and Rescue on Canadian Great Lakes

7 December 1910 – Steamship *'SS Dunelm'* outbound from Port Arthur and bound for Goderich, runs aground on 'Canoe Rocks' (northern tip of Isle Royale) in a blinding winter gale and with no wireless telegraph onboard.

Steamship *'SS F.B.Squire'* equipped with wireless telegraph , sights emergency flares from '*Dunelm'* and radios a distress message to MUG… the new Marconi station at Port Arthur

Tug *'James Whalen' also equipped with wireless* is dispatched from Port Arthur and ultimately rescues all of the *'Dunelm'* crew,

…becoming the first documented rescue on the Great Lakes attributed to wireless



Wreck of the DUNELM off Isle Royale. In the storm on 7 December, waves would have washed clear over her decks forcing the crew to abandon ship. TBHMS 975.85.30

GREAT LAKES.

A scheme has been drawn up for the establishment of a wireless telegraph system on the Great Lakes, which will include a chain of stations, approximately 180 miles apart, from Port Arthur to Kingston, with a station at Kingston of sufficient range to communicate with Montreal, thus linking up the proposed system with the east coast system and giving through communication between Belle Isle or Cape Race and Port Arthur. The scheme as draughted out will include stations at or in the neighbourhood of the following points:—

Kingston, Ont.
Toronto, Ont.
Port Colborne, Ont.
Port Stanley, Ont.
Sarnia, Ont.
Tobermory, Ont.
Midland, Ont.
Sault Ste. Marie, Ont.
Port Arthur, Ont.

A preliminary survey of the points has been made and sites have been secured at Port Arthur, Sault Ste. Marie, Tobermory, Midland and Point Edward (Sarnia).

CONSTRUCTION WORK.

A station was erected by the Marconi Wireless Telegraph Company of Canada at Port Arthur, Ontario, in November, 1910. The company erected this station at their own expense, but under an arrangement with this Department whereby the Department may take over the same should they wish to do so. The Port Arthur station proved its value immediately after being placed in commission. The steamer *Dunedin* of the Inland Lines ran ashore on Isle Royale on December 7, 1910.

She was not equipped with Radio-telegraph apparatus, but a freighter equipped with the same, sighted her distress rockets and reported the casualty to the Port Arthur Radio-telegraph station. The tug *James Whalen*, with a wrecking equipment was sent to the assistance of the stranded steamer. Constant communication was maintained between the wrecking outfit and Port Arthur, and the boats were warned of the approaching storms, enabling them to take shelter in neighbouring bays during operations. [The correct name is DUNELM not DUNEDIN. SS F.B. SQUIRES was the freighter that sent the distress message to MUG Port Arthur. RC Mazur 2011.]

Canada's **'Department Of The Naval Service'**

First Annual Report for the fiscal year ending 31 March 1911

Presented during first parliamentary session in 1912

Shows a list of Marconi wireless stations to be established on the Great Lakes

Also gives an account of the *SS Dunelm* incident and the demonstrated value of the VBA wireless station at Port Arthur (already in service as of the end of 1910)

Jack Phillips
1887 - 1912

Harold Bride
1890 - 1956

RMS Titanic	MGY
RMS Carpathia	MPA
SS Californian	MWL

CQD CQD MGY CQD

SOS SOS MGY SOS

WE HAVE STRUCK A BURG AND SINKING BY THE BOW

5 July 1912 'International Radiotelegraph Convention'

1913 'International Convention for the Safety of Life at Sea' (SOLAS)

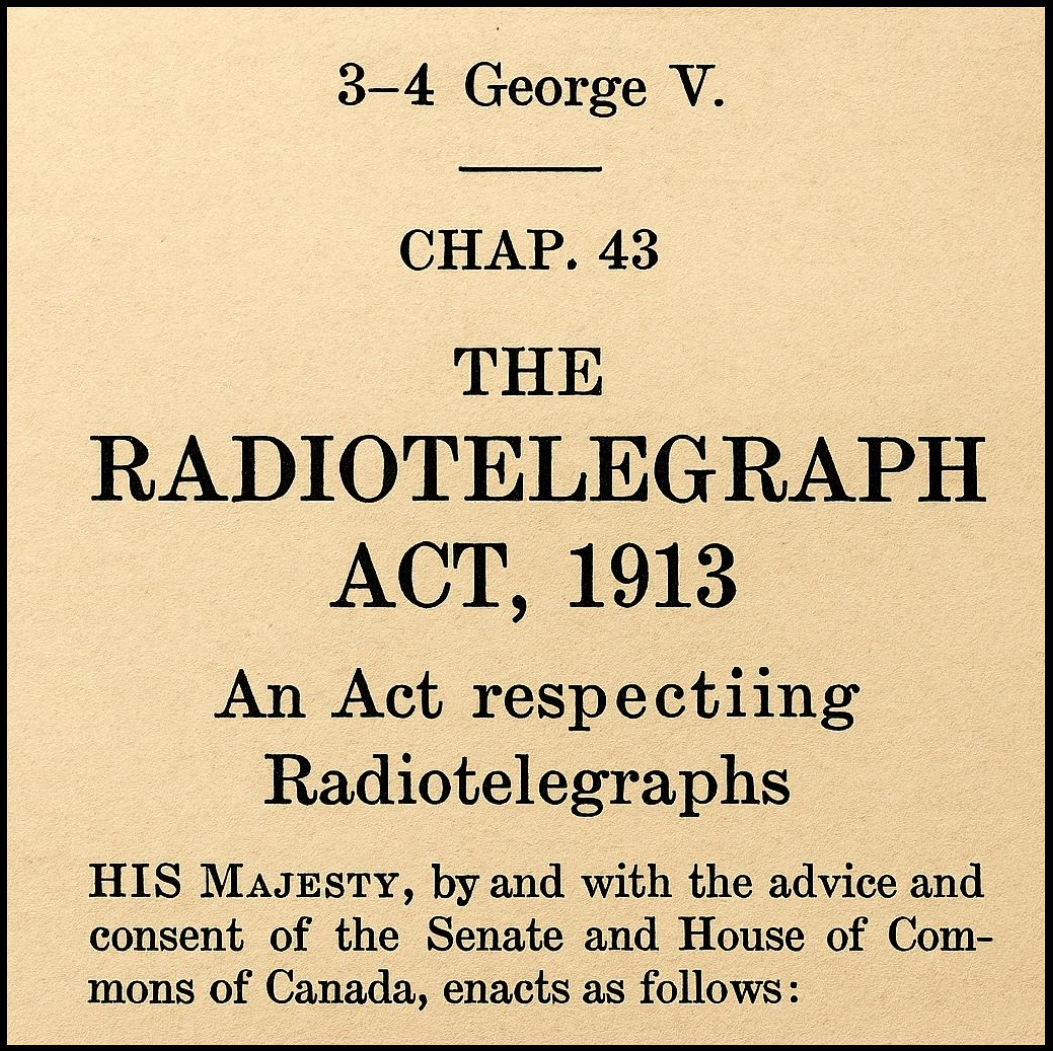
The International Radiotelegraph Convention London, England 5 July 1912

- Scheduled follow-up to the 1906 convention in Berlin
-Attended by 37 delegations

Established internationally accepted standards for maritime wireless communication, with particular emphasis for those carrying passengers;

- Wireless equipment requirements
- Operator training and qualification requirements
- Frequency allocations
- Operating practices and procedures
- Adoption of SOS as the internationally accepted emergency call
- Message handling requirements (implications for Marconi's policy)
- International allocation of blocks of call sign prefixes…Canada's being CF–CK, VA–VG, VO, VX–VY

1913 **Standards mandated by the International Radiotelegraph Convention of 1912 are signed into law in Canada on June 6, 1913 under 'The Radiotelegraph Act'**



3–4 George V.

CHAP. 43

THE RADIOTELEGRAPH ACT, 1913

An Act respectiing Radiotelegraphs

HIS MAJESTY, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

Administration of the Act is assigned to Canada's 'Minister of Naval Services'

Early Marconi Wireless Stations on the Great Lakes

Station	Operational	Call Signs (Post 1913 Act)
Port Arthur	1910	VBA
Midland	1912	VBC
Tobermory	1912	VBD
Sault Ste Marie	1912	VBB
Kingston	1914	VBH
Toronto	1914	VBG

Ships were assigned 4-letter call signs in keeping with ITU assigned prefixes, and corresponding to the call signals issued under the ship's registry …

SS Keewatin	VGMC
SS Assiniboia	VGKX

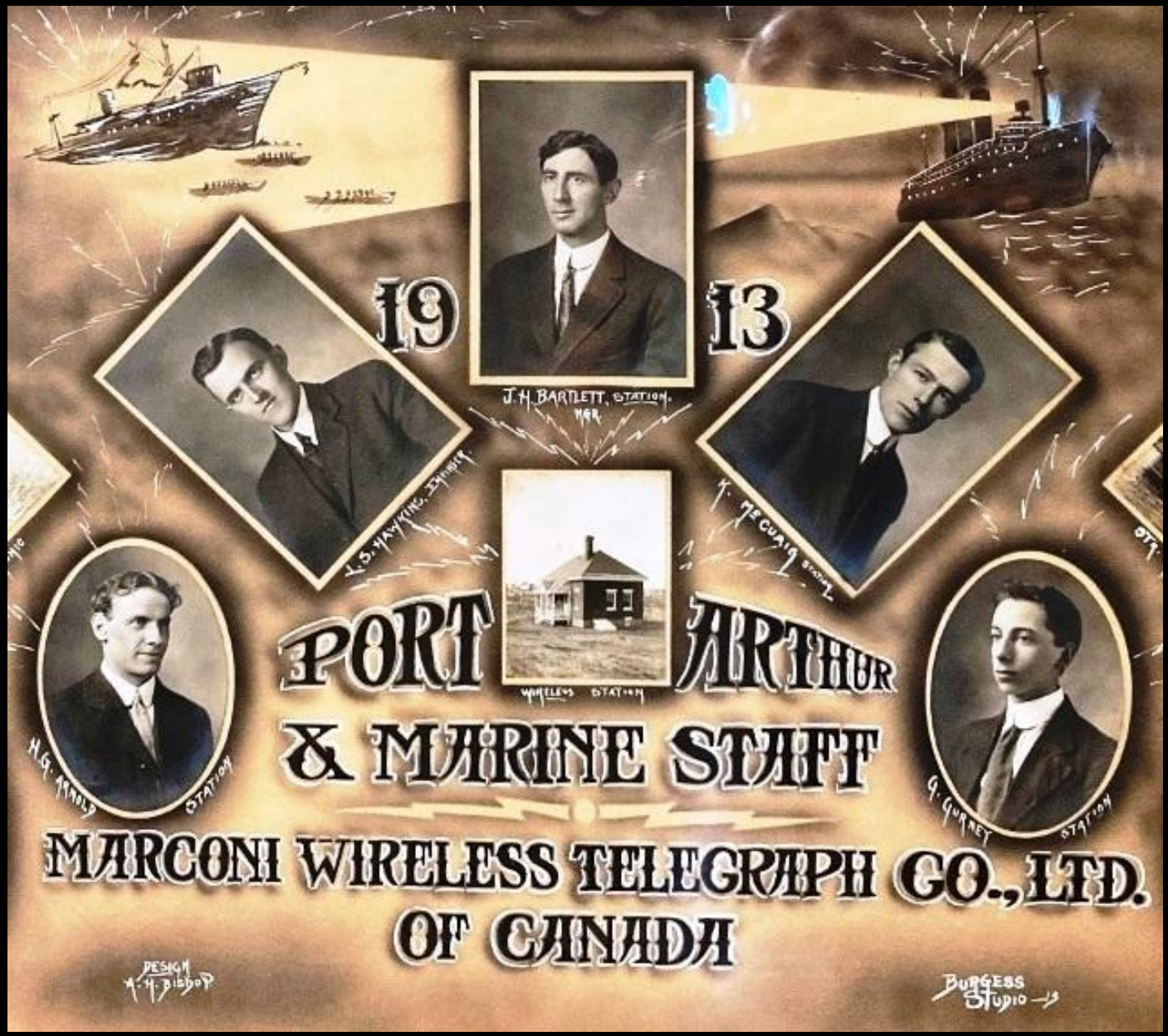
Burgess Studio

Composite Portrait

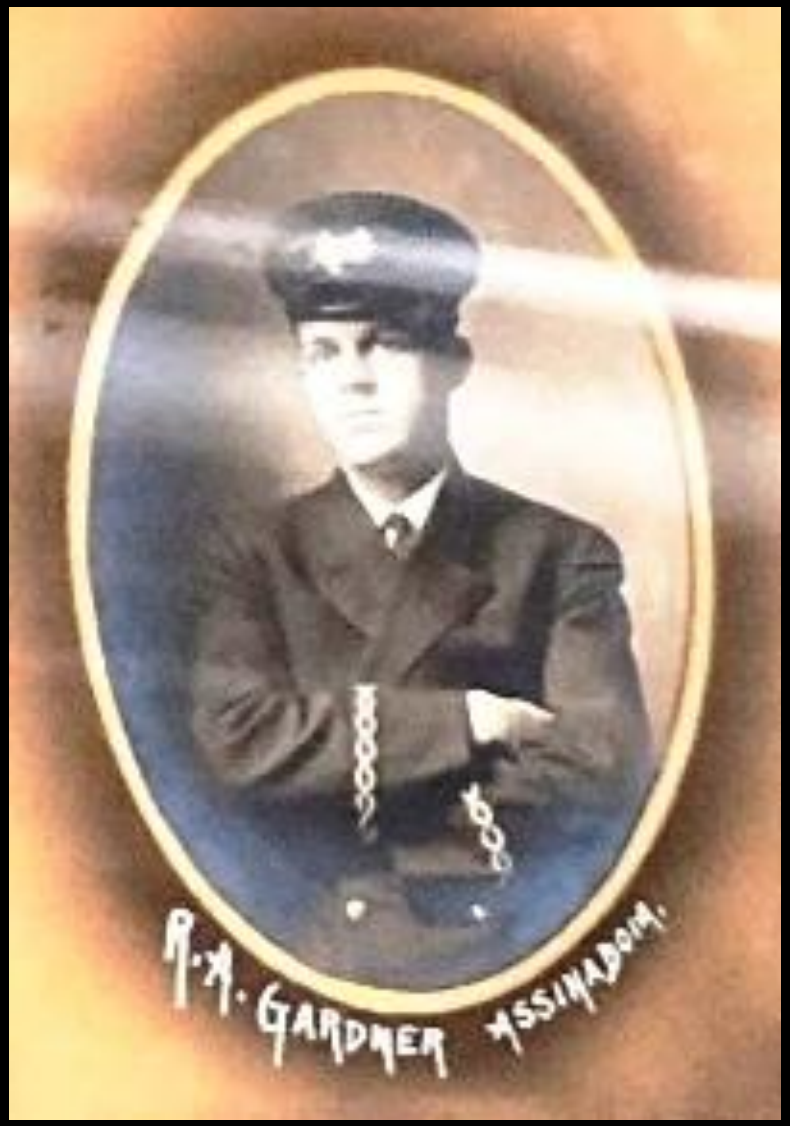
Design by A.H.Bishop

Gifted to Great Lakes Museum from Toronto Marine Museum Archives

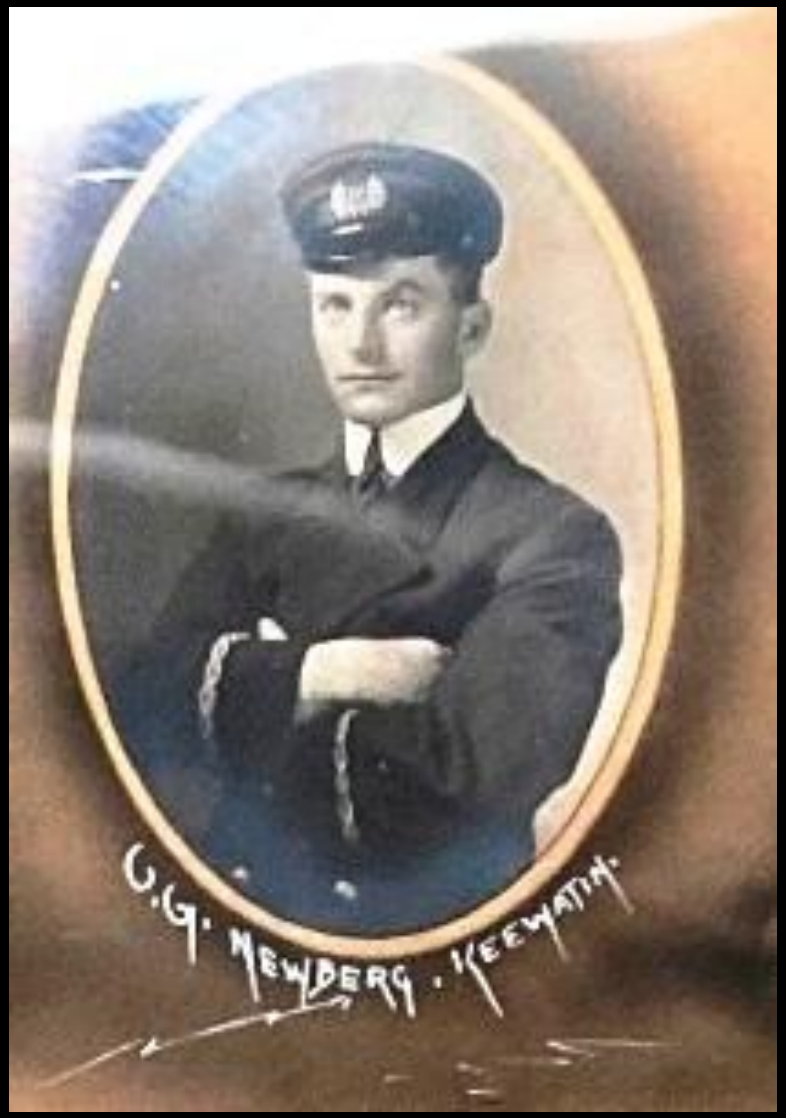
From the above composite portrait depicting the Marconi installation at Port Arthur in 1913



1913 *"First Documented Reference to Wireless installed Onboard SS Keewatin" -ed*

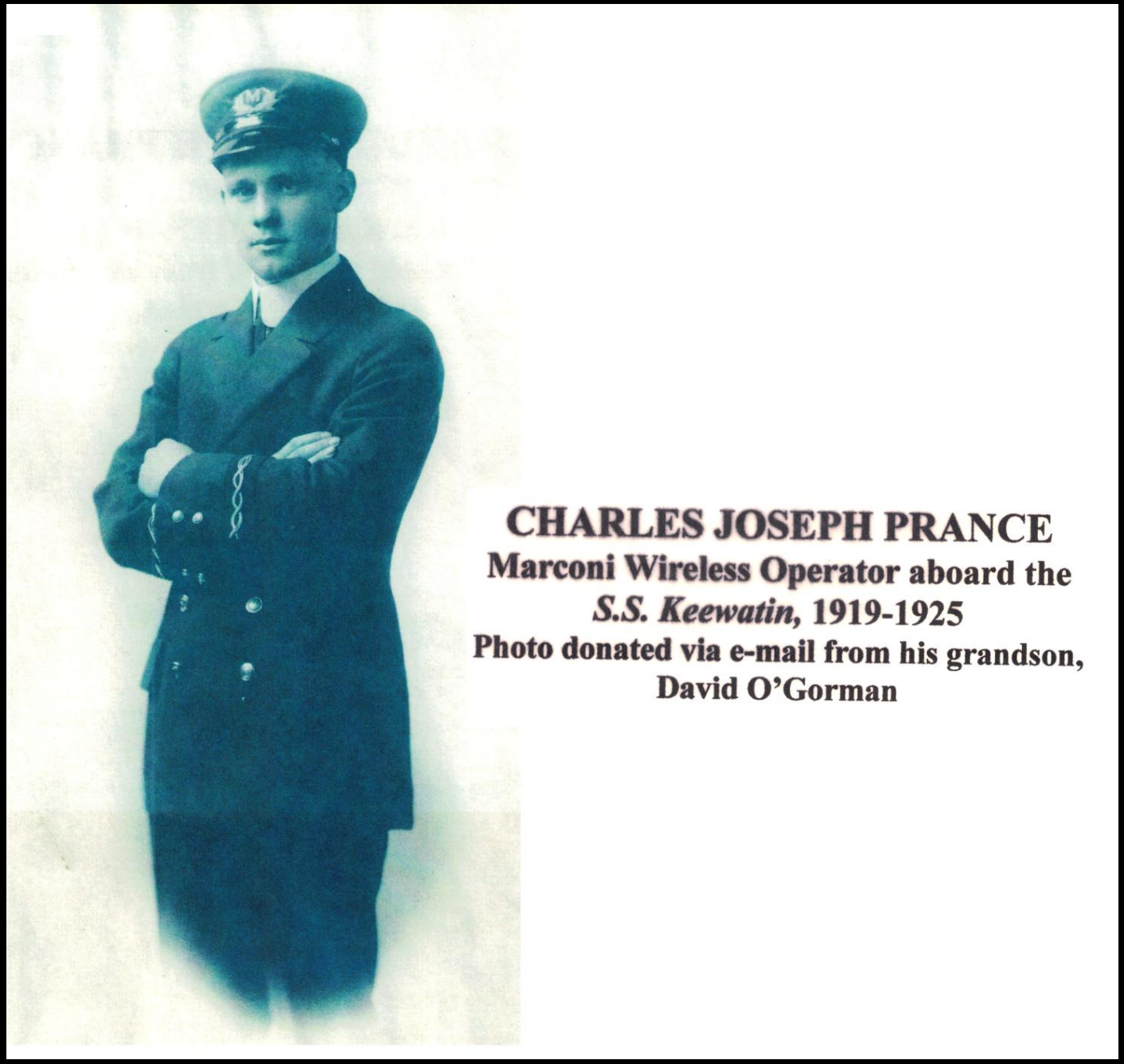


R.A.Gardner *SS Assiniboia*



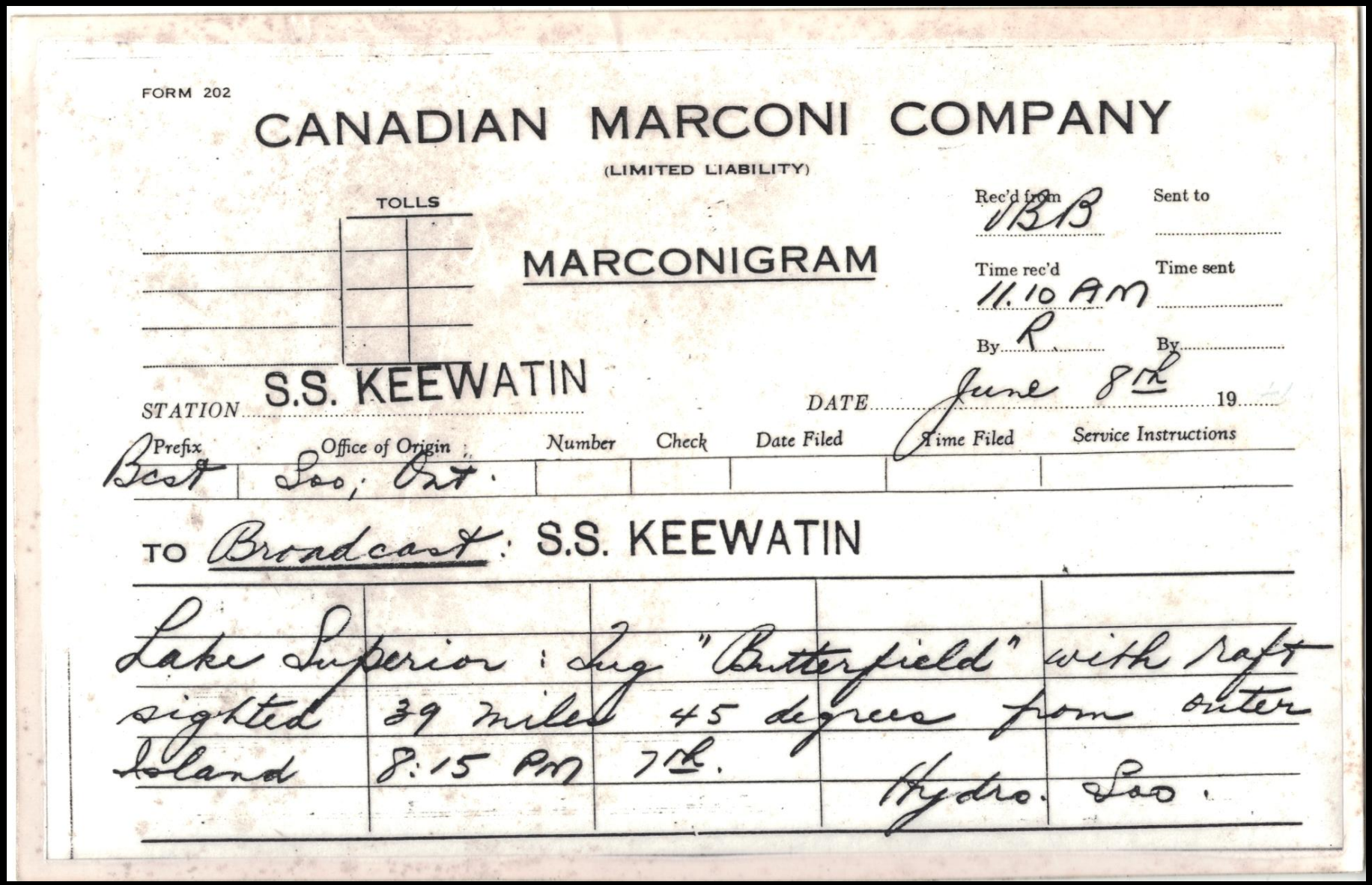
C.G.Newberg *SS Keewatin*

Found recently amongst SS Keewatin artifacts…



CHARLES JOSEPH PRANCE
Marconi Wireless Operator aboard the *S.S. Keewatin*, 1919-1925
Photo donated via e-mail from his grandson, David O'Gorman

‘MARCONIGRAM’…dated June 8th 1941



FORM 202

CANADIAN MARCONI COMPANY

(LIMITED LIABILITY)

TOLLS

MARCONIGRAM

Rec'd from JBB Sent to

Time rec'd 11.10 AM Time sent

By R By

STATION S.S. KEEWATIN DATE June 8th 19

Prefix	Office of Origin	Number	Check	Date Filed	Time Filed	Service Instructions
Boat	Soo, Ont.					

TO Broadcast: S.S. KEEWATIN

Lake Superior: Sug "Butterfield" with raft sighted 39 miles 45 degrees from outer Island 8:15 PM 7th.

Hydro. Soo.

1949 *'SS Noronic'* Canada Steamship Lines

Significant regulatory changes for passenger carrying vessels mandated by Canada's Ministry of Transport, following the *SS Noronic* disaster at Pier 9 in Toronto Harbor Sept 17, 1949 …118 fatalities

The Noronic on fire, September 17, 1949. (City of Toronto Archives/Fonds 1244, Item 1518)

5 Dec 1966 - ***SS Keewatin*** **is taken out of service and sold to 'Marine Salvage Limited' in Port Colborne ON.**

19 May 1967 - ***Keewatin's*** **Canadian registry is closed, when she is sold to "foreign U.S.A. Subjects"** ***Keewatin*** **is saved form being scrapped, when she purchased by R.J. Peterson, and towed to Douglas Michigan where she will spend the next 45 years as an historic attraction at Saugatuck, MI .**

Col. 1.	Col. 2.	Col. 3	Col. 4.	Col. 5.	Col. 6.	Col. 7.
Number of Transaction.	Letter denoting Mortgages, and Certificates of Mortgages.	Name of Person from whom Title is derived.	Number of Shares affected.	Date of Registry.	Nature and Date of Transaction.	Name, Residence, and Occupation of Transferee, Mortgagee, or other Person acquiring Title or Power.
1		Canadian Pacific Railway Company	64	December 5th 1966 1.45 P.M.	Bill of sale dated November 4th 1966	Marine Salvage Limited a body corporate having its principal place of business at 176 Welland St. Port Colborne, Ontario

Certificate cancelled and Registry closed this 19th day of May 1967.
Vessel sold to foreigners (U.S.A. Subjects).
Advice received from registered owners.

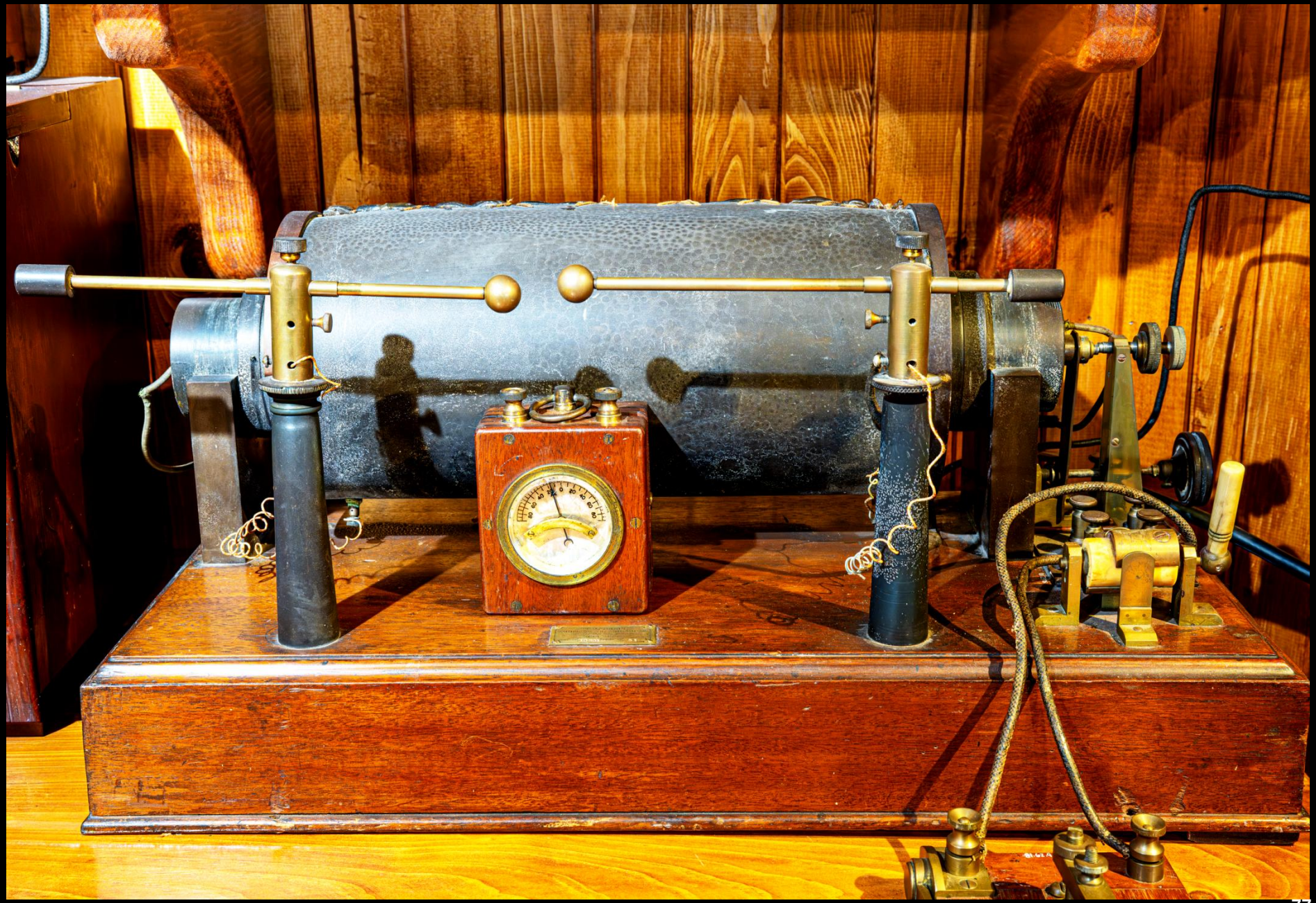
D. Dansereau
Asst. Registrar

Additional photos from our Marconi Display at Great Lakes Museum onboard *SS Keewatin*

Early Marconi Radio Display onboard SS Keewatin at Great Lakes Museum - 2025

Radio's kindly gifted to GLM by the Toronto Maritime Museum archives - 2024

Another look at our Marconi Spark-gap Transmitter Circa 1905 Type: 10301 Serial No. 51



Marconi's DC Power Panel, supplying DC power to the Spark-gap transmitter

Manufactured by:

Marconi Wireless Telegraph Co. Ltd.
London, England

Circa 1910 **Serial No. 21420**

Series Wire-wound Dropping Resistors for regulating DC Voltage

Switching to accommodate operating from or charging batteries.

Another look at the Marconi Magnetic Detector Receiver

The Marconi Wireless Telegraph Company of Canada Ltd. Montreal

Circa 1903

Patent No. 85277

Marconi Change-Over Switch

Canadian Marconi Company

1925-2001

Type: 24273 Serial No. 104

Marconi Crystal Detector Receiver Circa 1918

Marconi Wireless Telegraph Company of Canada Inc. Montreal

Type: 248
Serial No. 212

Galena (Lead Sulfide) crystal and a fine wire 'cats whisker' forming a rectifier junction

Marconi Tuner / Detector / Amplifier Receiver Circa 1920

Type MST-2 Tuner

Serial No. 143

Type MSA-5 Detector + Audio Amplifier

Serial No. 148

Marconi Wireless Telegraph Company of Canada Ltd.
Montreal

Marconi Type: MDF-1A Radio Direction Finder

Marconi Wireless Telegraph Company of Canada

Serial No. 38

Patents 1910, 1922, 1923

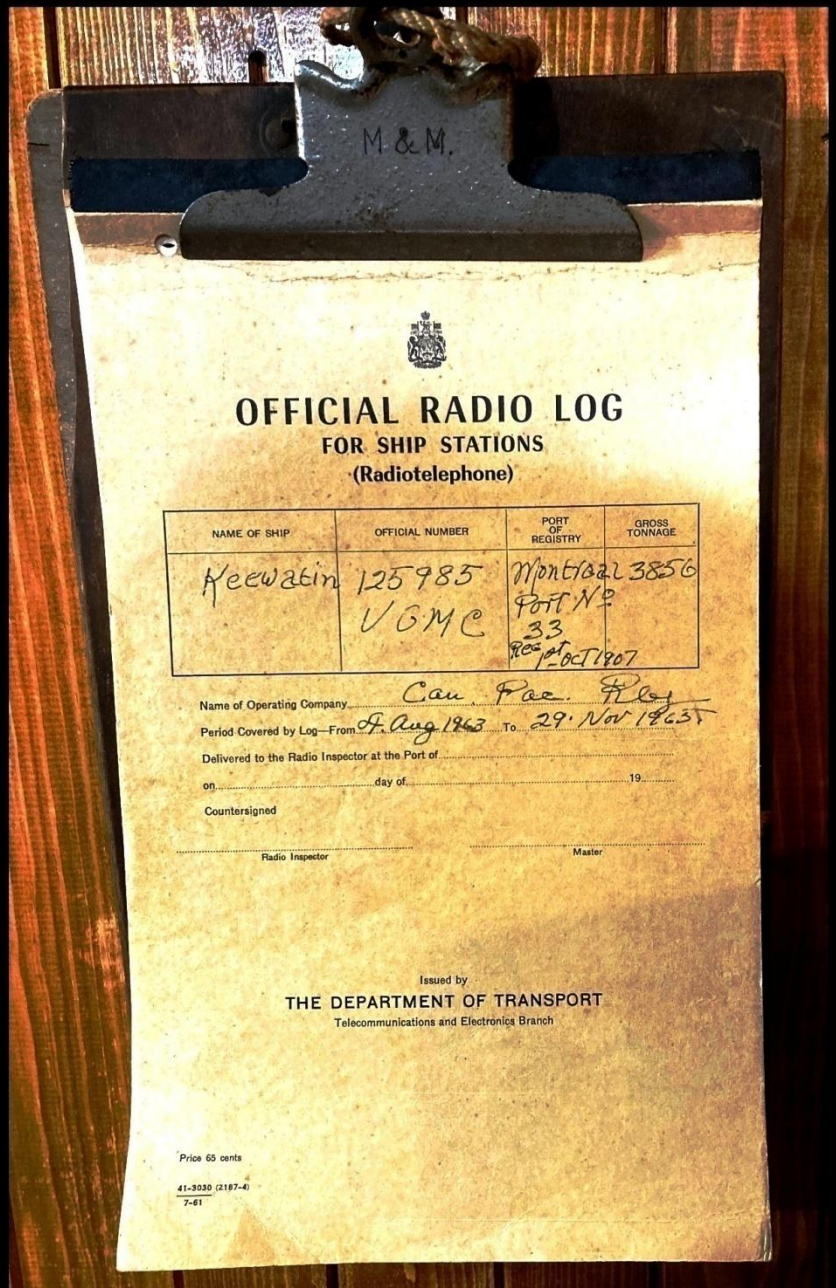
Marconi - Relative Bearing Calculator & Reporting

CANADIAN MARCONI COMPANY

SS Keewatin

VGMC - Official Radio Log

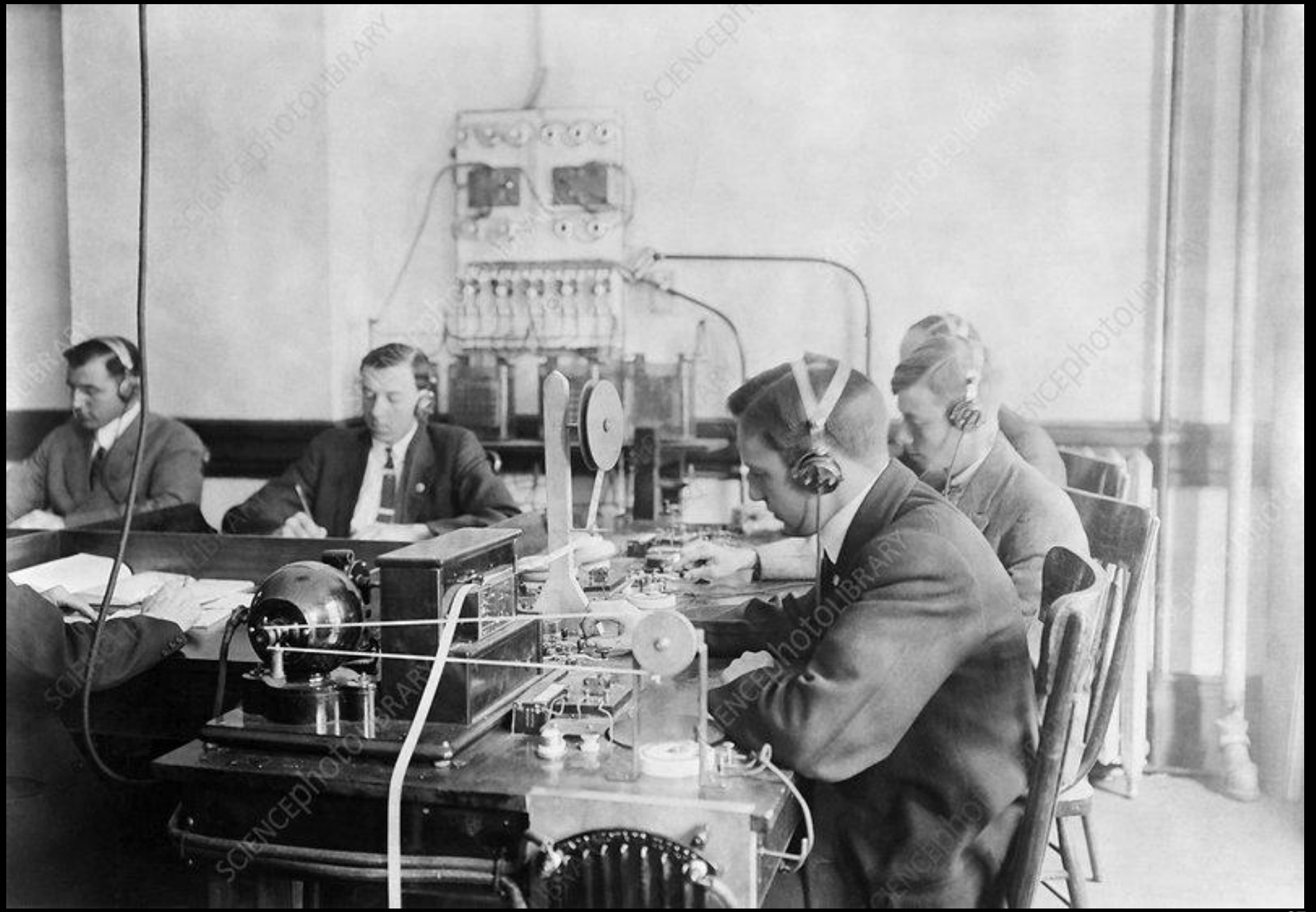
4 Aug 1963 to 29 Nov 1965



Additional Photos of

Marconi Company Installations

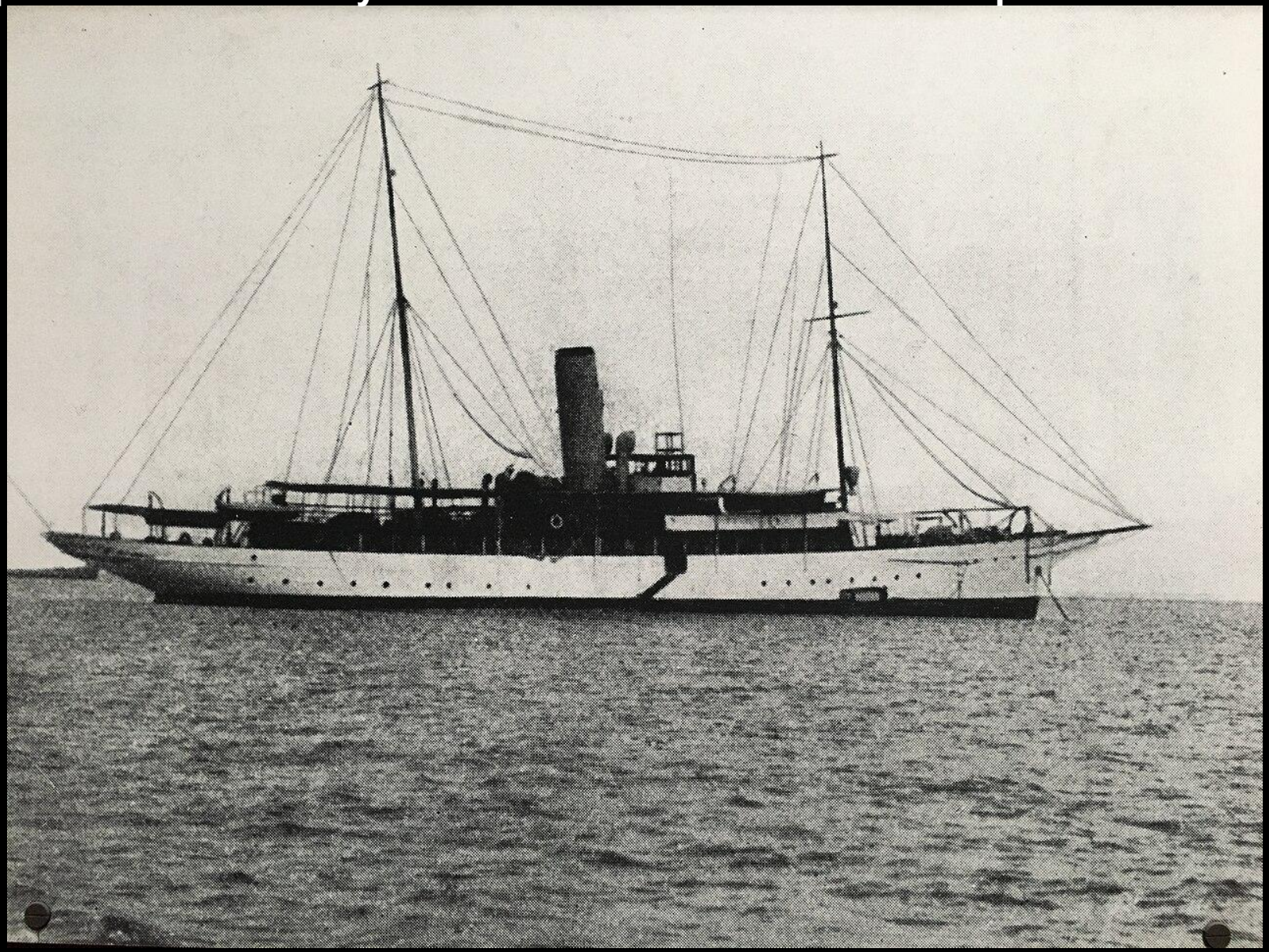
Marconi's Wireless Training School – New York 1912



Marconi's 'New Street Works' - Chelmsford England

Opened in 1912, and in continuous use by Marconi and successor companies until 2008

Marconi's yacht *'Elettra'* …formerly *'Rovenska'* purchased from the Archduchess Maria Teresa of Austria in 1919 and re-fitted to incorporate an experimental laboratory for continuation of his wireless experiments…



Marconi at his wireless station aboard *'Elettra'*

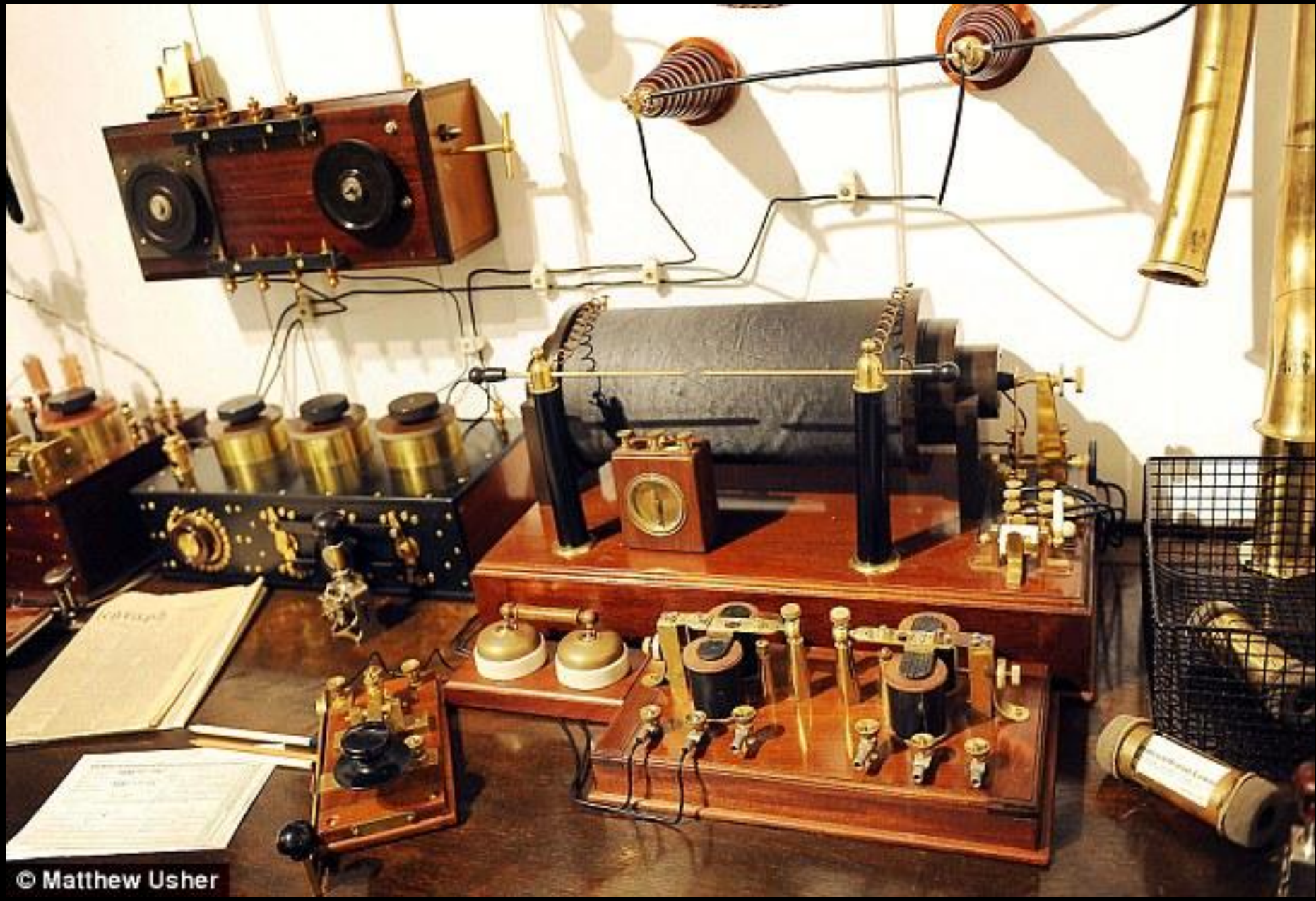
1937 Marconi moved back to Rome in 1935 where he remained until his passing on July 20, 1937 at the age of 63.

Following state honors in Rome, Marconi was laid to rest in a mausoleum on the grounds of Villa Griffone.

from: www.seas.columbia.edu/marconi/history.html

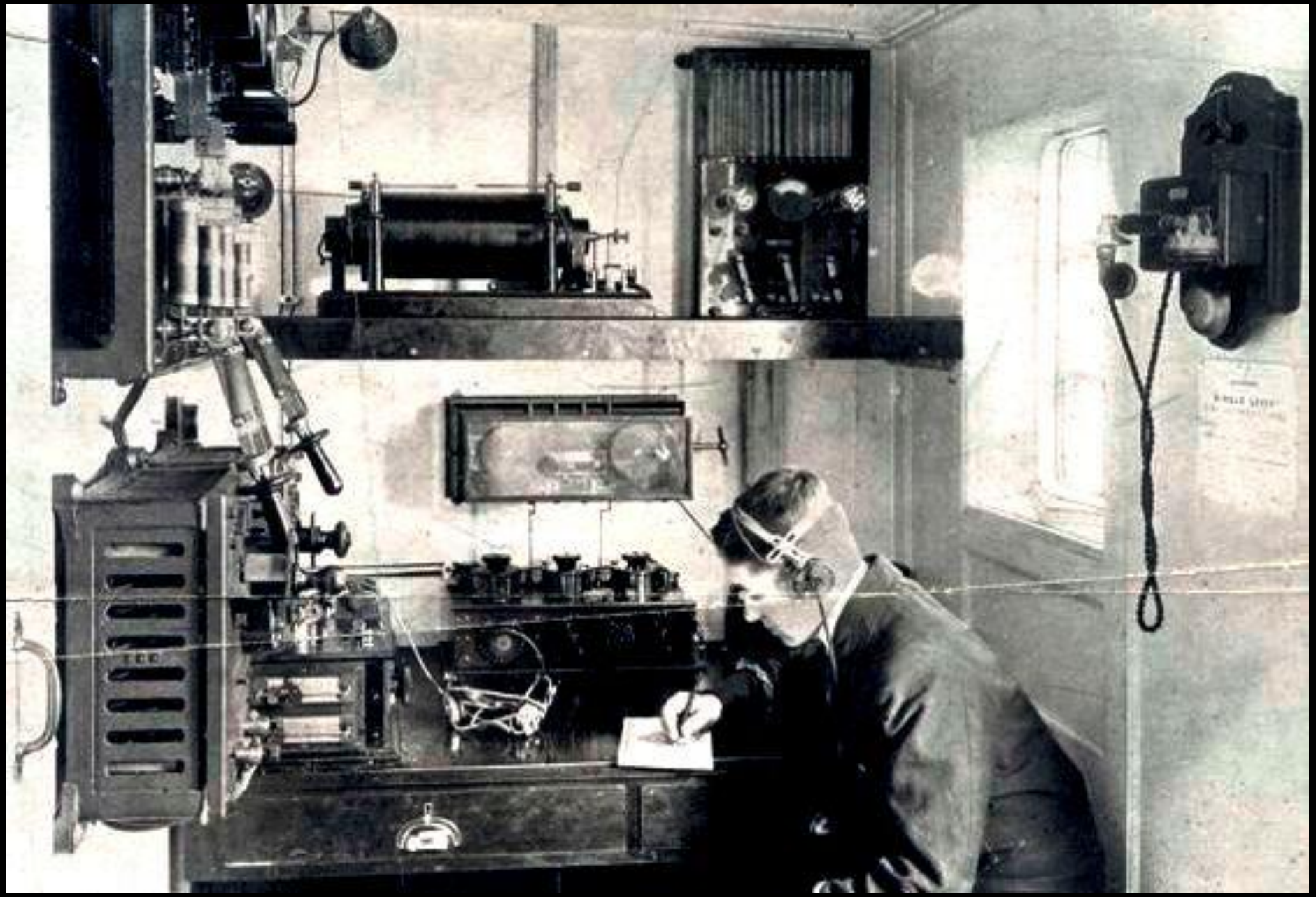
Examples of Other Marconi Displays

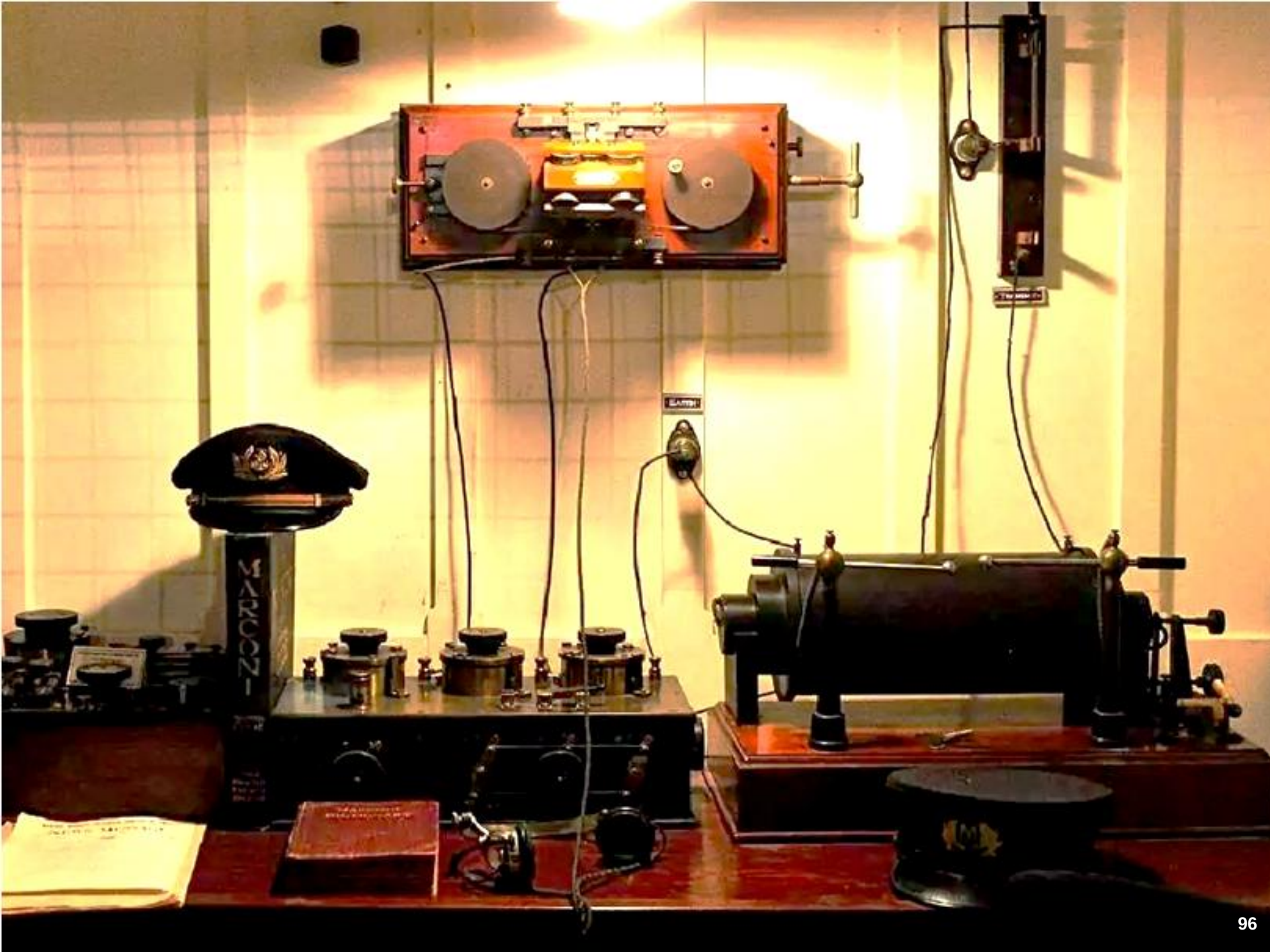
Watch for remarkable similarities to that of artifacts at our own Marconi display aboard *SS Keewatin*…

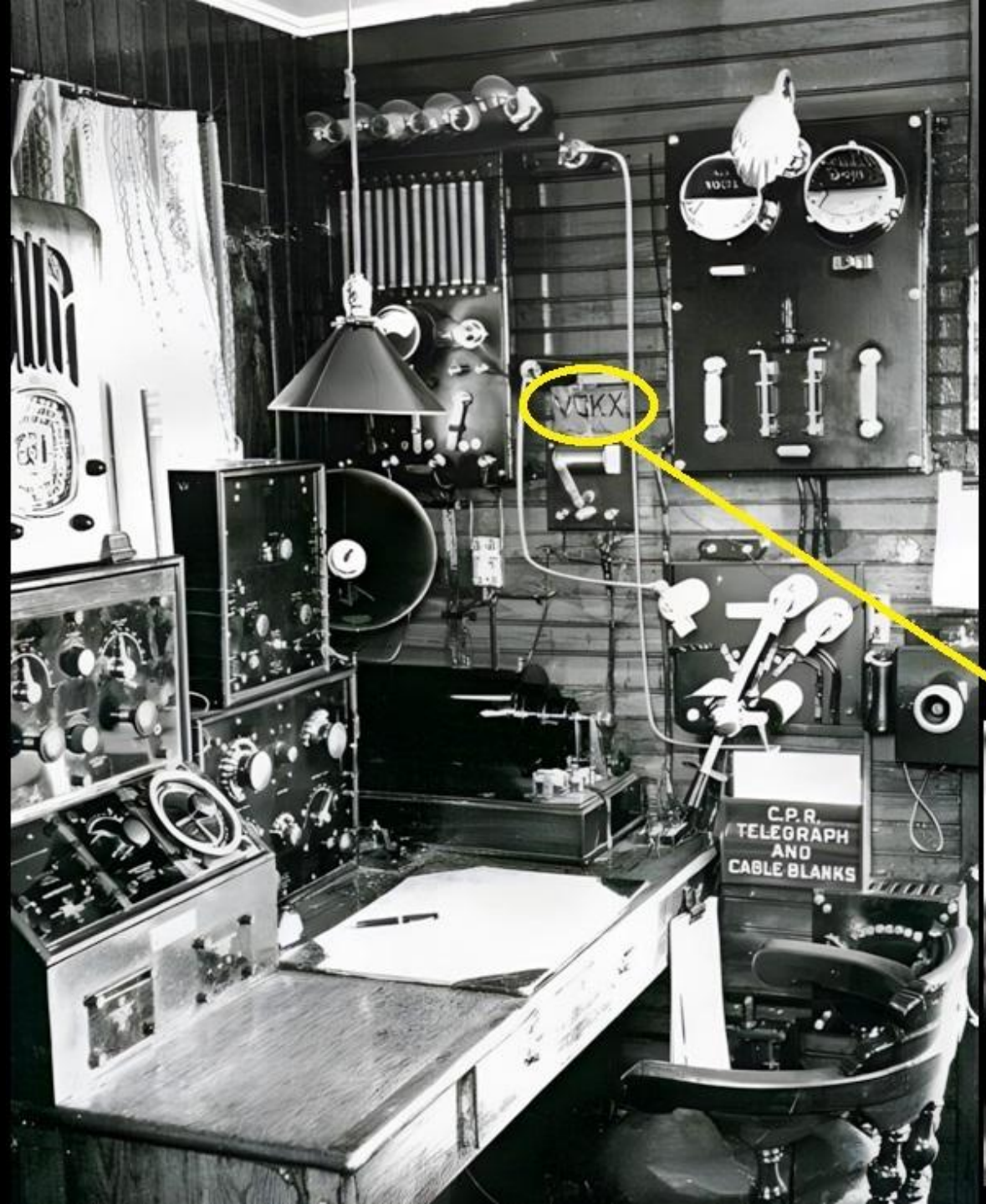

© Matthew Usher

Antenna Tuning Unit - recovered 8 months after the sinking of *SS FALARA* *(torpedoed March 28, 1915)*

MULTIPLE TUNER OF THE S.S. "FALARA" (TORPEDOED ON 28TH MARCH, 1915), AFTER IT HAD LAIN FOR EIGHT MONTHS AT THE BOTTOM OF THE SEA.




MARCONI



Origin of this photo is unknown…

VGKX = *'SS Assiniboia'*

Toronto Marine Museum ??

SS Keewatin 1907

Great Lakes Museum

Kingston ON, Canada

Thank you for joining us !

73, (Telegraph short form meaning 'Best Regards')

Rick Reeve, ***VE3ORY***


Photo by: Ron Walsh, VE3GO
October 26, 2023

Additional Information

SS Keewatin - Built 1907 at Fairfield Shipbuilding & Engineering Company

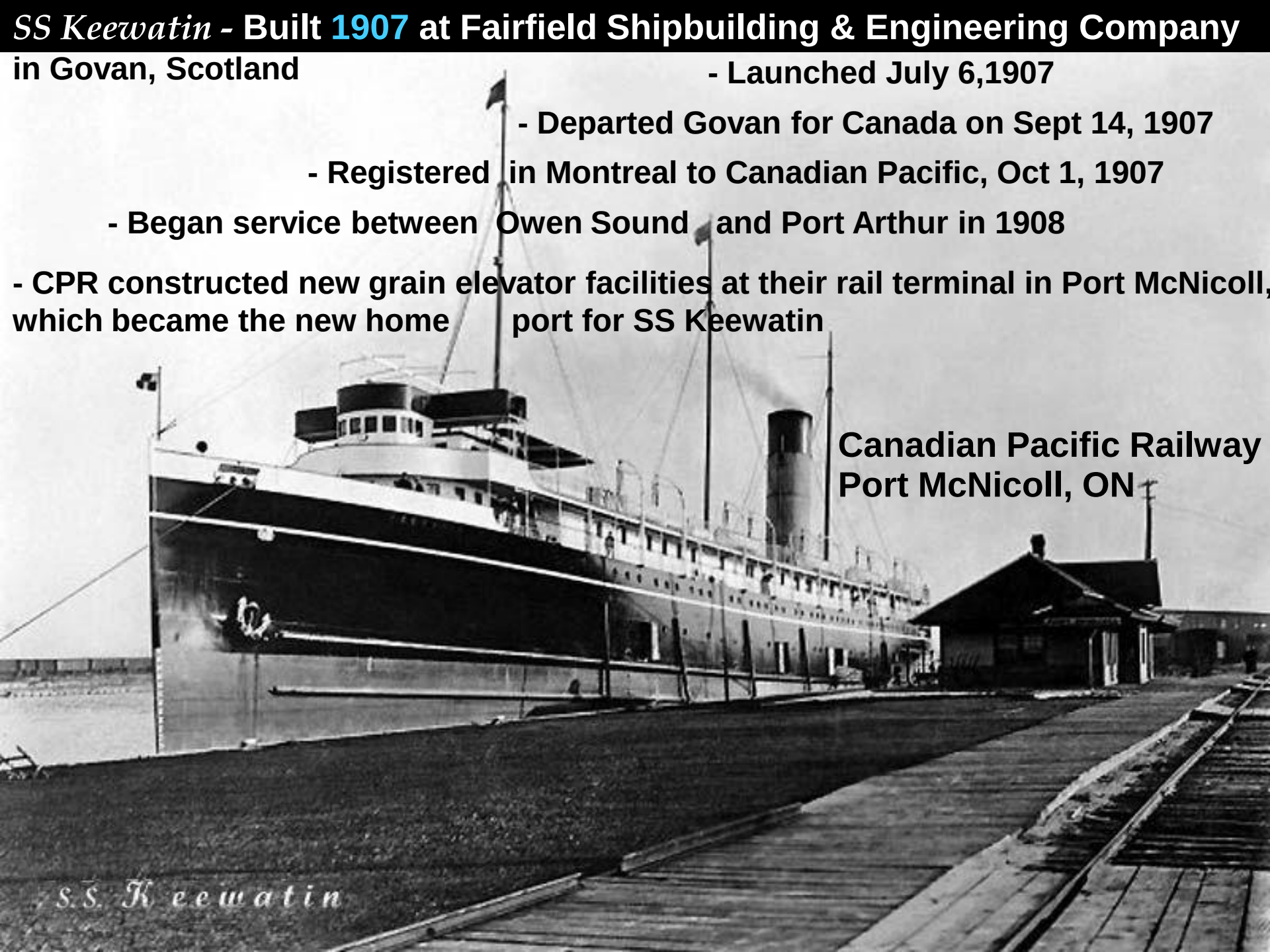
in Govan, Scotland - Launched July 6,1907

- Departed Govan for Canada on Sept 14, 1907

- Registered in Montreal to Canadian Pacific, Oct 1, 1907

- Began service between Owen Sound and Port Arthur in 1908

- CPR constructed new grain elevator facilities at their rail terminal in Port McNicoll, which became the new home port for SS Keewatin



Canadian Pacific Railway
Port McNicoll, ON

Marconi Spark-gap Transmitter

Type 10301

Circa 1905

Serial No. 51

Manufactured by:
‘Marconi’s Wireless Telegraph Company of Canada, Inc. Montreal’

Secondary ~ 15,000 V.
200 watts RF
Low Frequency ~600 KHz
Very broad banded signal

Banned except for emergency use in 1927

Manufactured by:
Marconi’s Wireless Telegraph Co Ltd London, England

No. 16676

From Thunder Bay Historical Museum Society 'Papers & Records' Volume XXXVIII (2010)

- Published by Robert Mazur (VA3ROM) a 35 year veteran Marine Communications & Traffic Services (MCTS), and Canadian Coast Guard Radio Station (CGRS) operator, at VBA (Great Lakes Coast Guard / marine radio station at Thunder Bay)

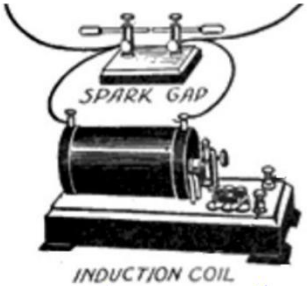
- The last Morse code transmission from VBA was sent by Robert on November 4, 1998

- Robert published this article documenting the 1910 sinking of 'SS DUNELM' and the role of the Port Arthur Marconi radio station (MUG) in the rescue of 'DUNELM' s crew

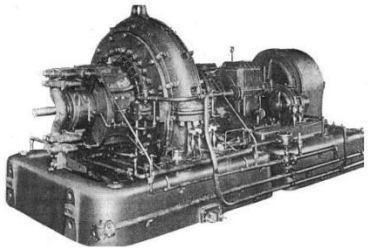
Continuous Wave vs. Diminishing Wave

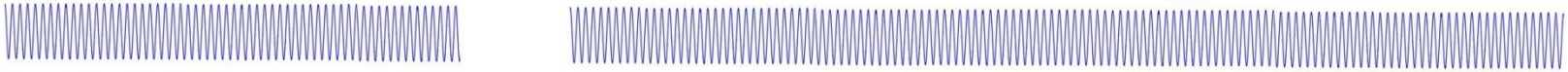
Morse Code - Letter 'A'

Marconi's Spark-gap - Diminishing Waveform

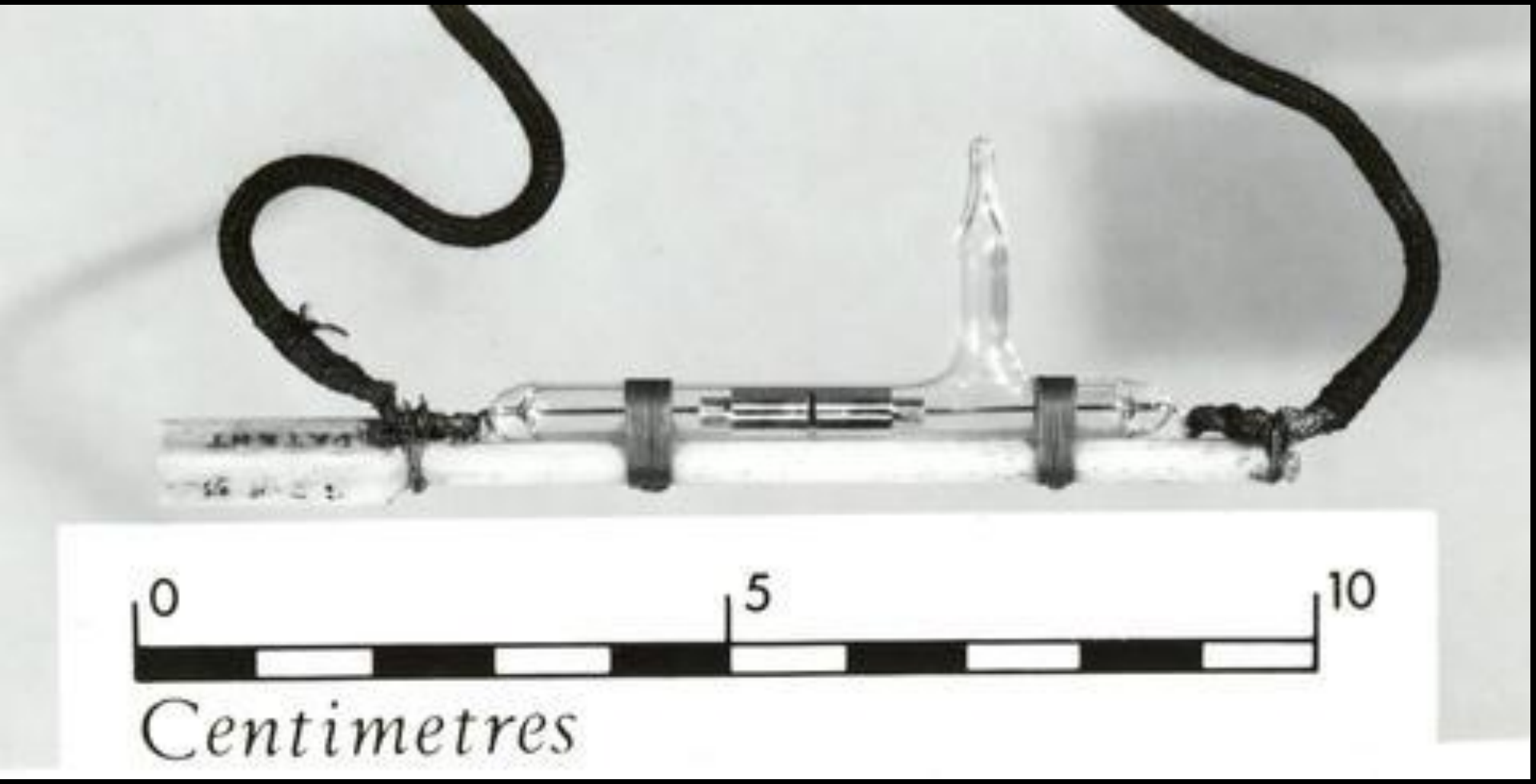


Fessenden's - Continuous Waveform (CW)





1895 The Branly coherer as refined by Marconi for use in his first wireless receivers



From: Dalhousie University Archives…

Marconi's company would go on from here to establish Marconi radio stations and training facilities in at least 15 countries by the beginning of WW I.

However Marconi's core manufacturing facilities were based primarily in
- United Kingdom / Canada / United States / Italy

Over the years Marconi Company would see many name changes both in Canada and in Britain…

Canada

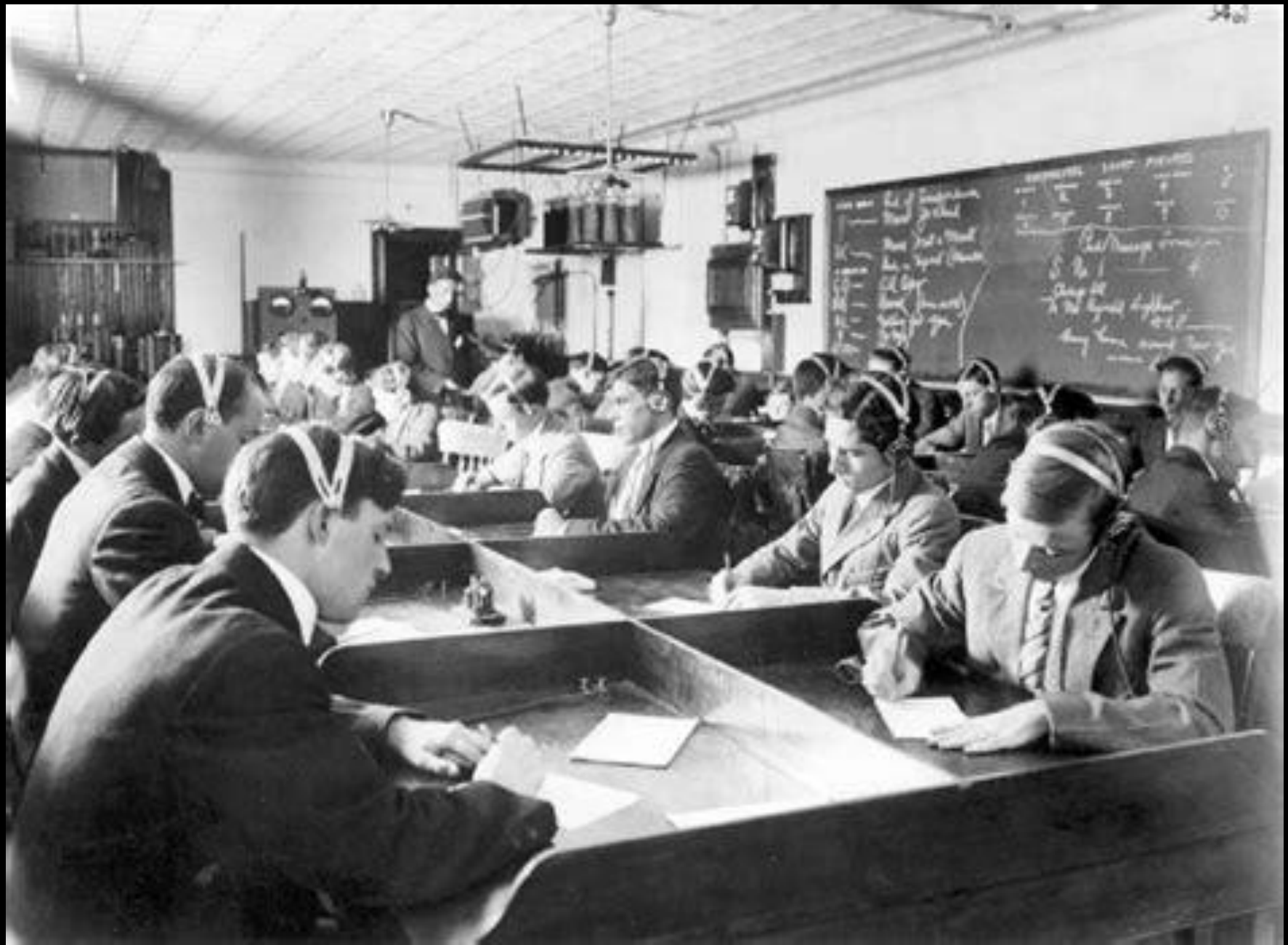
Years	Official Name	Notes
1903–1925	Marconi's Wireless Telegraph Company of Canada	Original incorporation
1925–2001	Canadian Marconi Company	Broadcasting & electronics era
2001–present	CMC Electronics	Modern avionics company

England

Years	Official Name	Notes
1897–1900	The Wireless Telegraph & Signal Company, Ltd.	Original incorporation
1900–1963	Marconi's Wireless Telegraph Company, Ltd.	Classic "Marconi's" era
1963–1987	Marconi Company Ltd.	Under English Electric & GEC
1987–1998	GEC-Marconi Ltd.	Defence & electronics integration
1998–1999	Marconi Electronic Systems (MES)	Defence arm sold to BAE
1999–2003	Marconi plc	Telecoms-focused GEC successor
2003–2006	Marconi Corporation plc	Final restructuring before Ericsson acquisition

Marconi Station in Turkey

Marconi ‘School of Wireless’



Marconi Wireless Facility

Canadian Marconi Company - Montreal

CANADA'S LARGEST RADIO PLANT

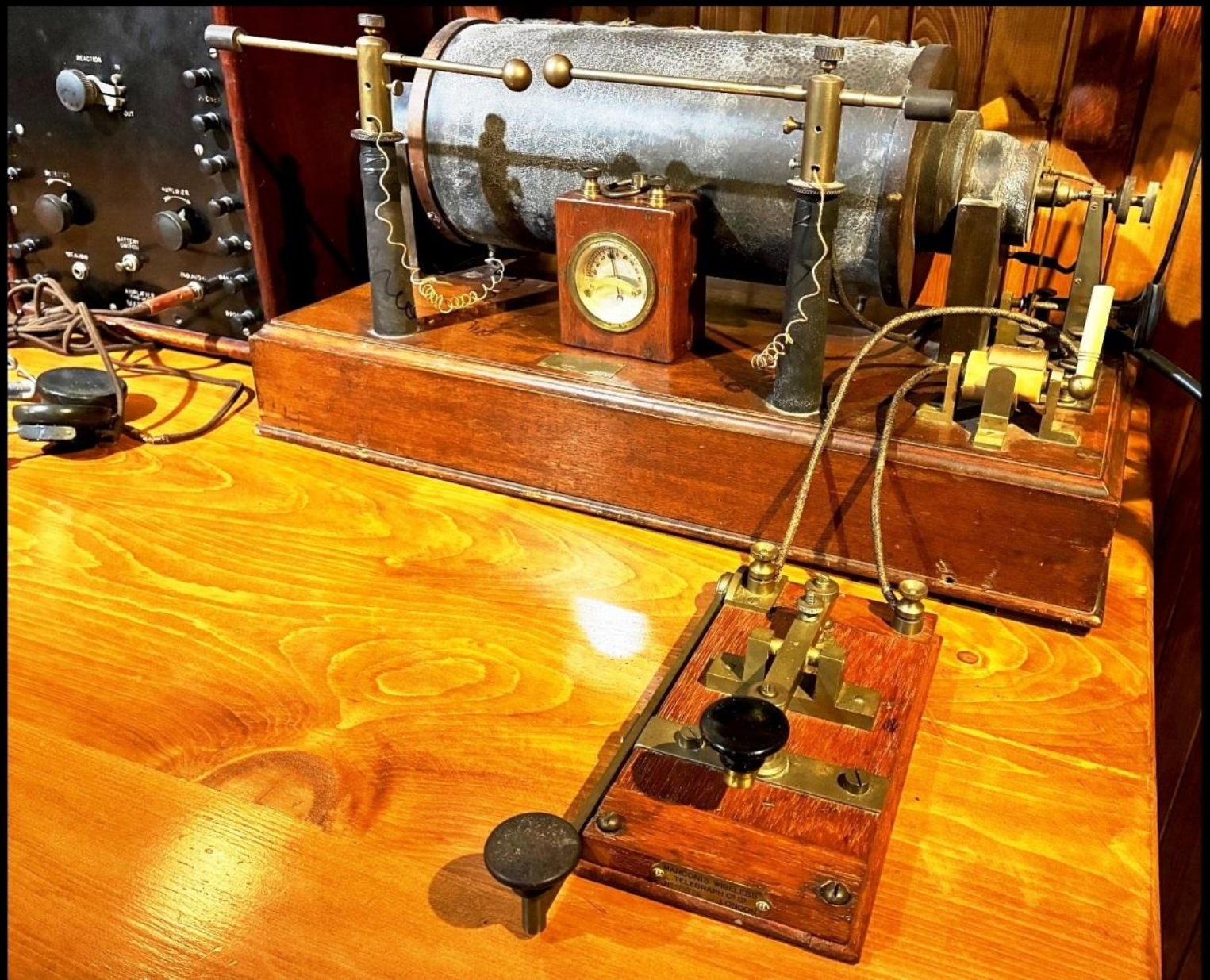
Above is shown the Canadian Marconi Company's factory at Montreal where extensive additions have recently been completed. Production facilities have been stepped up 100%, and the plant is now the largest in Canada devoted exclusively to the manufacture of all types of radio transmitting and receiving equipment.

Marconi Transmitting Laboratory

Marconi Spark-gap Transmitter

Marconi's Wireless Telegraph Company of Canada, Inc. Montreal

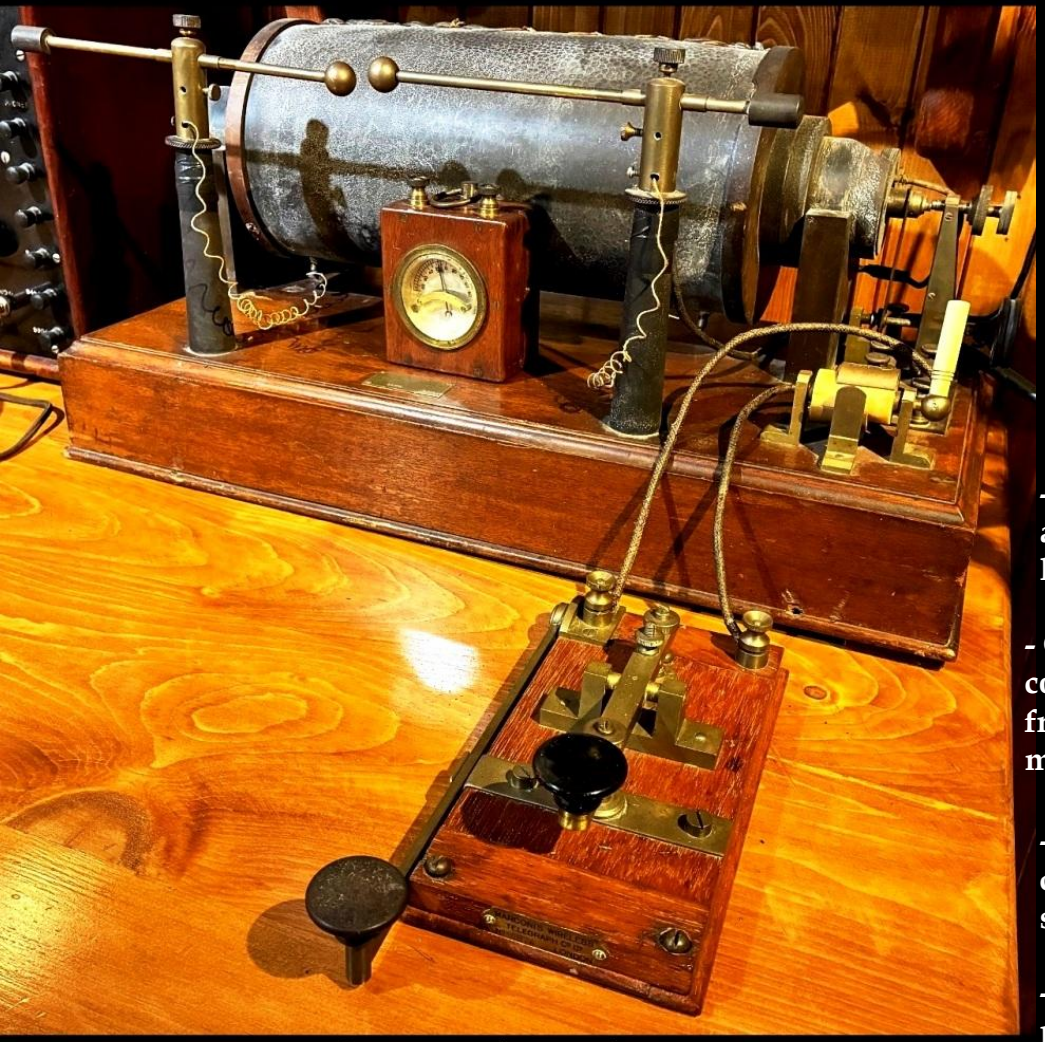
Type: 10301 Serial No. 51 Circa 1905



Marconi Spark-gap Transmitter

Marconi's Wireless Telegraph Company of Canada, Inc. Montreal

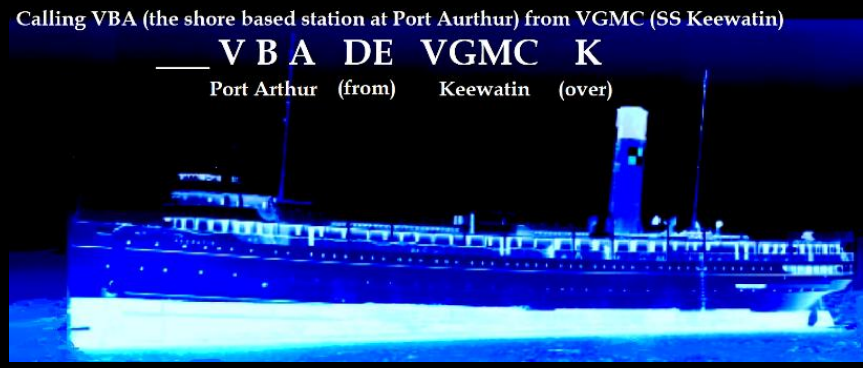
Type: 10301 Serial No. 51 Circa 1905



Sound of spark-gap radio signal

- Low / raspy 30-50 cps tone

- The vibrating solenoid interrupter device producing a series of rapidly decaying oscillations (dampened waves) while the key is closed



- Radio signals were very low frequency (~ 200 kHz) and very long wavelength (1500 meters). Required very large antennas

- Generated radio signals were very broad-banded covering a few hundred kHz of radio spectrum with no frequency filtering…resulting in interference when more than one station was transmitting at a time.

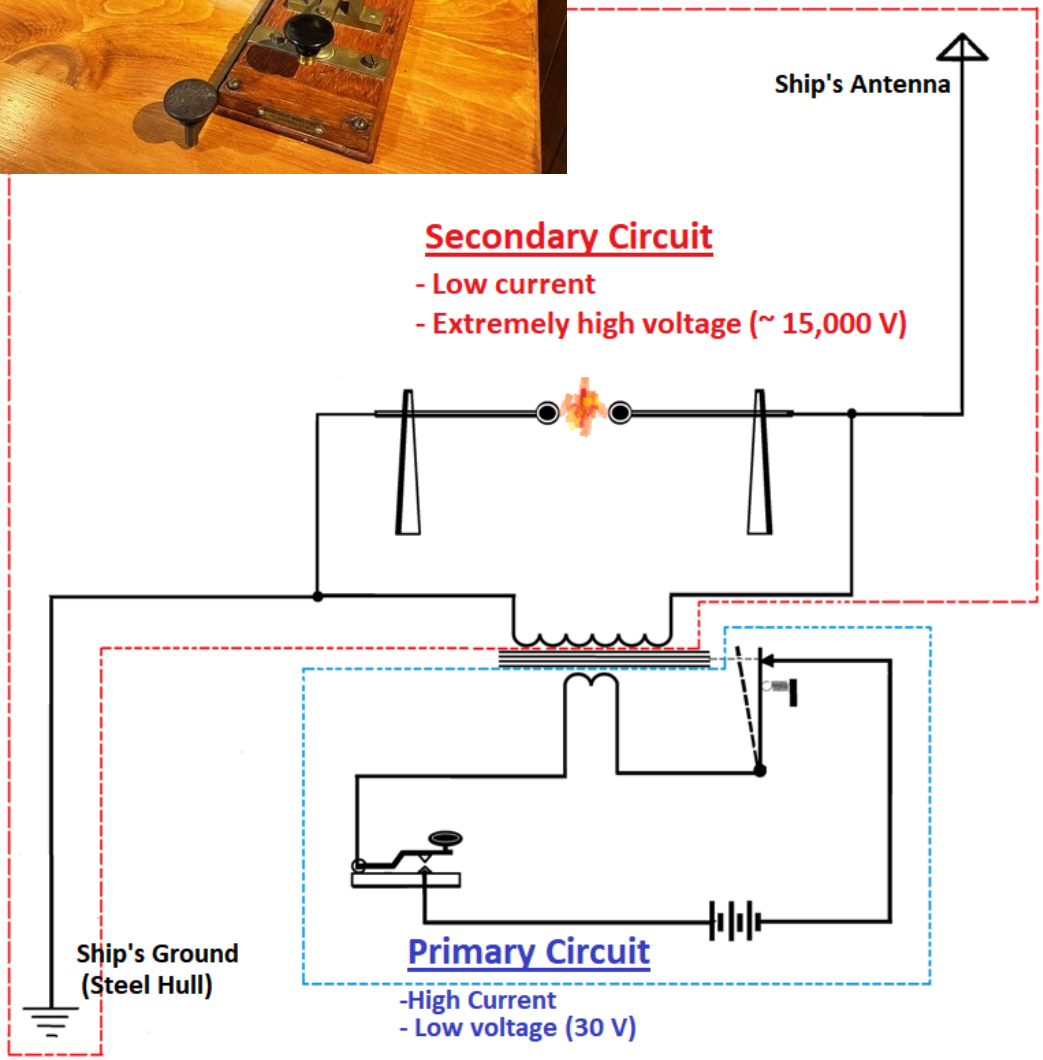
- Very inefficient. Very high voltages and low oscillating currents on the antenna. Much energy wasted with broad signals either side of the intended frequency

- 1934 International Radiotelegraph Convention prohibited use of these transmitters , except in emergencies (because of the broad-band interference that they produced)

Marconi's Spark-gap Transmitter

Marconi's Wireless Telegraph Company of Canada, Inc. Montreal

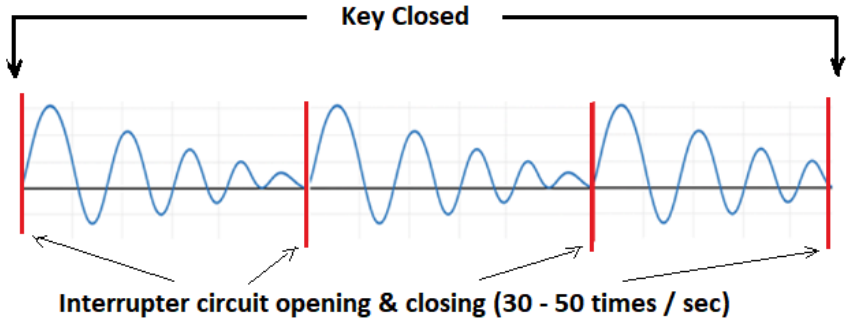
Type: 10301 Serial No. 51 Circa 1905



One side of Marconi's spark-gap transmitter is connected directly to the ship's antenna, the other side connected to ground (ship's hull).

While the key is closed, current oscillating in the ships antenna wire emitts electro-magnetic waves across a wide range of frequencies in the lower range of the radio spectrum (100 - 700 KHz) .

The sparc-gap signals are made up of a series of constantly repeating 'Diminishing Waves' ,unsuitable for audio (voice) modulation.



Tone of the received signals was a raspy low frequency sound and the radio signals were splattered across a wide portion of the radio spectrum, causing interference amongst nearby stations.

The International Radiotelegraph Conference (1927) banned the use of spark-gap transmitters for all but emergency use.

Robert Mazur VA3ROM

- 35 year career as a radio operator with Marine Communications and Traffic Services, formerly Canadian Coast Guard radio
- Much of Robert's time at VBA Thunder Bay (formally Port Arthur / call sign MUG) marine radio station.
-Technical papers for TCA and QST magazines
-Author of 'The Road to Radio'
- Articles published for the 'Thunder Bay Historical Museum Society'

I also challenged AI to defend the pretence that Marconi would likely have used the coherer type receiver for his Signal Hill experiment, and received this result…

Marconi's Coherer Was a Mature, Tested System

- By 1901, Marconi had spent five years refining Edouard Branly's coherer detector

- He improved the metal-filings mixture

- He optimized the vacuum and electrode spacing

- He developed a reliable **tapper** and **relay** system

- He had used coherers successfully in dozens of demonstrations and long-distance tests

From my own research, the above response from AI seems entirely justified, in that in 1901 the Coherer was only reliably established means of detecting electromagnetic waves.

Jagadish Bose had just discovered the galena crystal detector in 1901 but this was not yet developed.

And Marconi's Magnetic Detector receiver was not developed until 1903. Realistically in 1901 the coherer detector was the only means available .

So, I posed this same question to AI and this is the answer received…

Why No Photos Exist of the Actual 1901 Signal Hill Receiver

1. The experiment was secretive
Marconi was under intense scrutiny from competitors and skeptics. He kept the Newfoundland attempt deliberately low-profile, and no press or photographers were present on Signal Hill during the reception.

2. The receiving hut was temporary and crude
The setup consisted of:
a small, hastily built wooden hut
a kite-supported wire antenna
a simple coherer receiver on a table

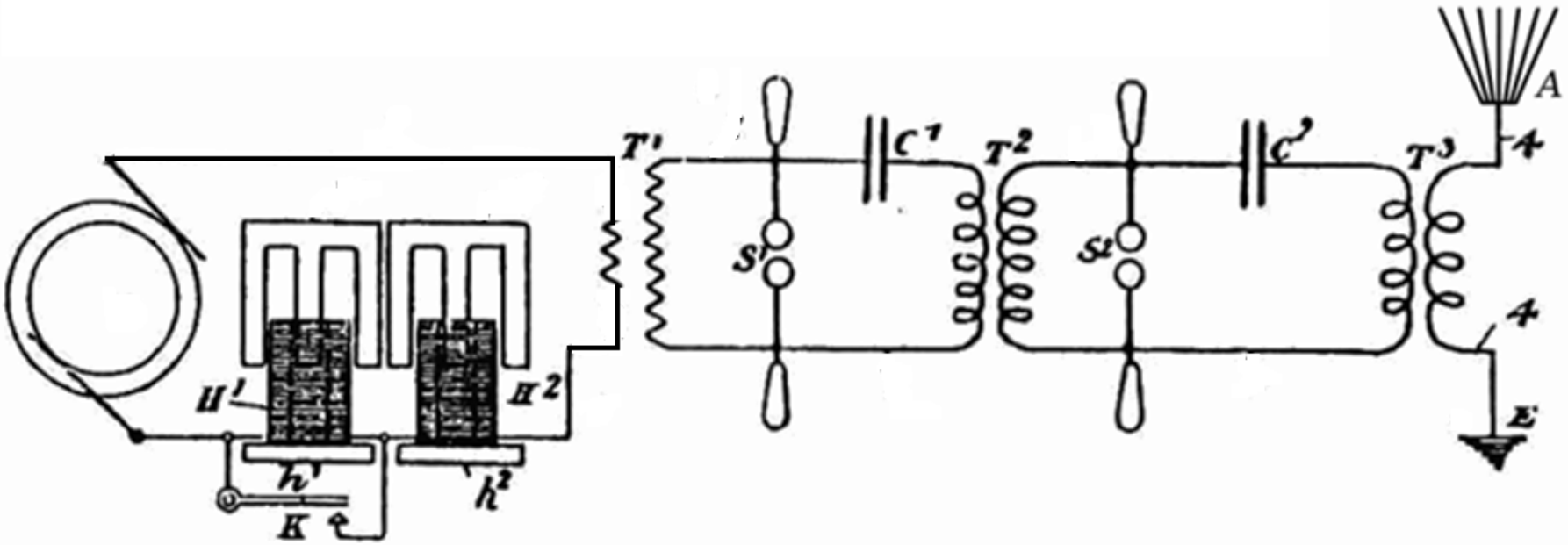
It was not a formal station, and Marconi dismantled it shortly afterward. No known photographs were taken inside the hut.

Marconi Building - Rue St-Sacrement, Montreal

The Poldhu Transmitter

As designed by John Ambrose Fleming

Professor John Ambrose Fleming's design for Marconi's first trans-Atlantic wireless telegraphy transmission



D 25 kW Alternator

H1 Iron core limiting

H2 current Inductors

Key

T1 Step-up Trans-former

S1 First Spark-gap

T2 Coupling Trans-former

S2 Second Spark-gap

T3 Output Coupling Trans-former

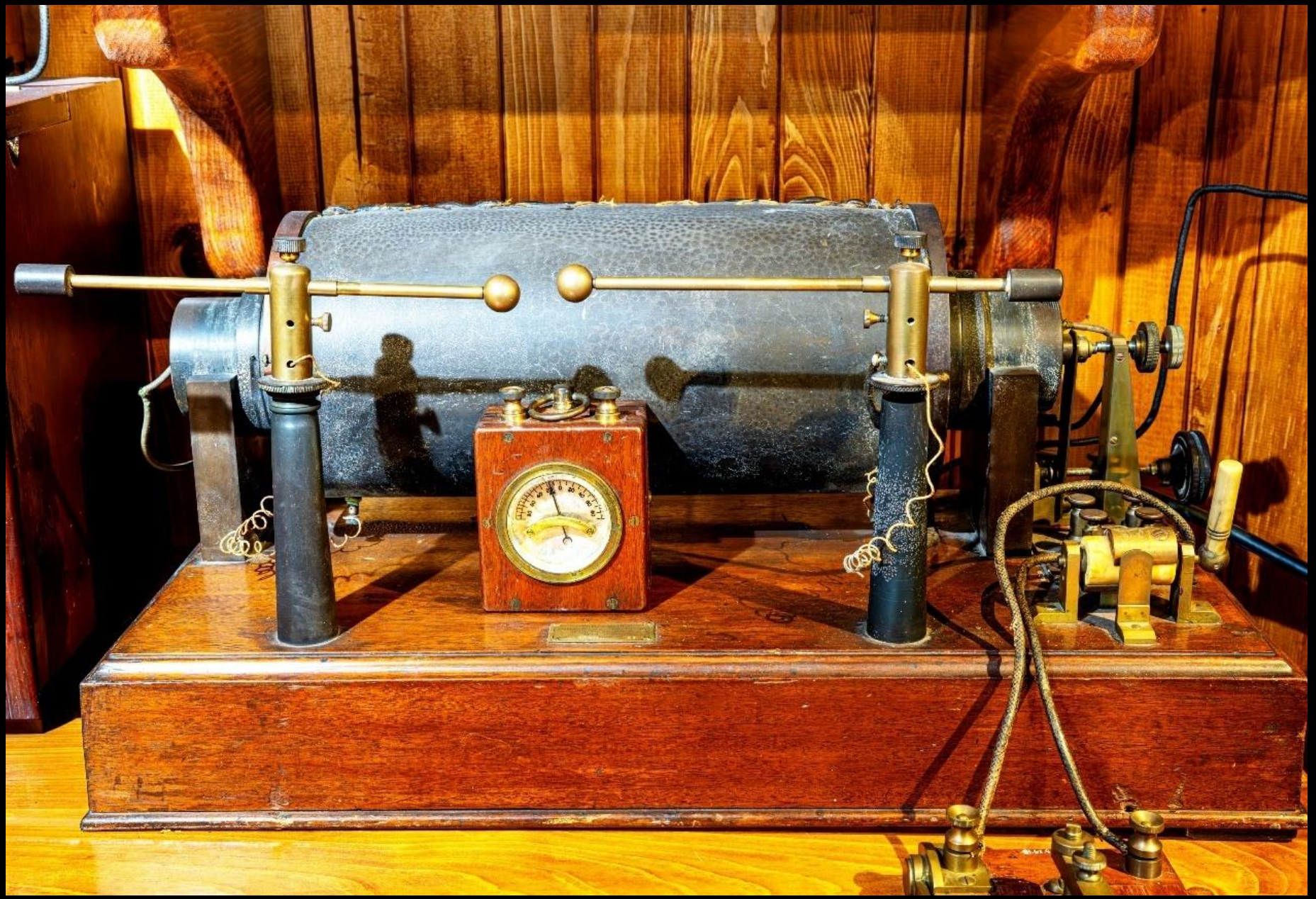
Marconi's Spark-gap Transmitter

Marconi's Wireless Telegraph Company of Canada, Inc. Montreal

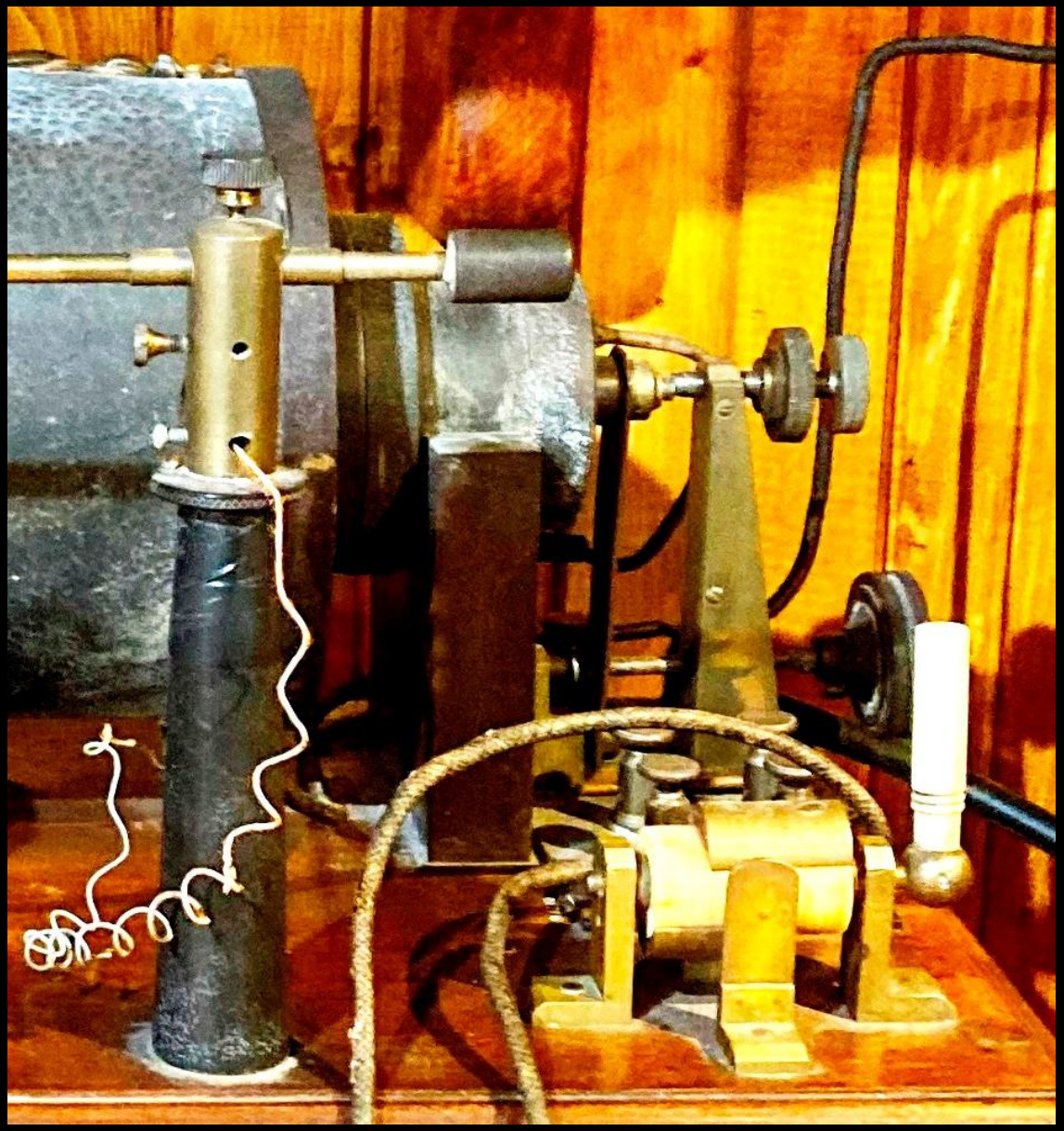
Type: 10301 Serial No: 51 Circa 1905

Great Lakes Museum
Kingston ON, Canada

Photography by Howard Mortfield VE3HBH



The Spark-gap ‘Interrupter’ …a crucial element in functioning of the Spark-gap transmitter



For speed and efficiency, numerous standard Abbreviations / Q-Signals / Prosigns contribute to making Morse Code a language unto itself.

e.g.

CQD **$\overline{\text{SOS}}$**

The first wireless telegraph operators in the 1900s were landline telegraphers who brought with them the same Morse code signals that were in use at that time.

One such commonly used signal was sending of the letters CQ…which translated to calling 'All Stations'
However, this signal was not formally adopted by the International Telecommunications Union (ITU) until 1912, and there was no formally established international distress call .

Marconi resolved this issue in 1904 by issuing 'Marconi Company circular no.57 ' to his radio operators, instructing them to add the letter D (Distress) in cases of emergency . So CQD became calling 'All Stations Distress'

At the same time Germany proposed using the distress signal SOS. Contrary to popular misbelief, it was not intended to signify 'save our souls' but rather was simply created because the characters were more easily recognizable and less prone to being misread during conditions of atmospheric noise and distortion.

Amateur radio operators today still use CQ as a general call to all stations, on both Morse code and on phone.
Canadian forces use "All Stations".

1905 Cape Bear, Prince Edward Island

Another of the first Marconi Wireless stations built under the newly signed contract with the Canadian Government.

Along with the Cape Race in Newfoundland, the station at Cape Bear station will become recognized as one of the first stations to receive distress messages from Titanic

-Marconi Company Office in Chelmsford England
- Multiple company name changes (in Britain) over the years

In 1897 Marconi registered his company as the Wireless Telegraph and Signal Company. Premises were needed for the new organization. Marconi decided upon a place that was a relatively short distance from London and accessible by rail; Chelmsford was an ideal location. In December 1898, the first wireless factory in the world was set up in an old silk factory in Hall Street. The building still stands today.

The Wireless Telegraph and Signal Company changed names several times to:
1900 Marconi's Wireless Telegraph Company
1963 Marconi Company Limited
1987 GEC-Marconi Limited
1998 Marconi Electronic Systems Limited
1999 Marconi plc
Marconi's Wireless Telegraph Company was taken over by English Electric in 1946. In 1968 English Electric merged with the General Electric Company (GEC). In 1999 GEC was renamed Marconi plc.

Marconi History from: www.seas.columbia.edu/marconi/history.html

F R (Rick) Reeve

VE3ORY

https://northwindradio.ca