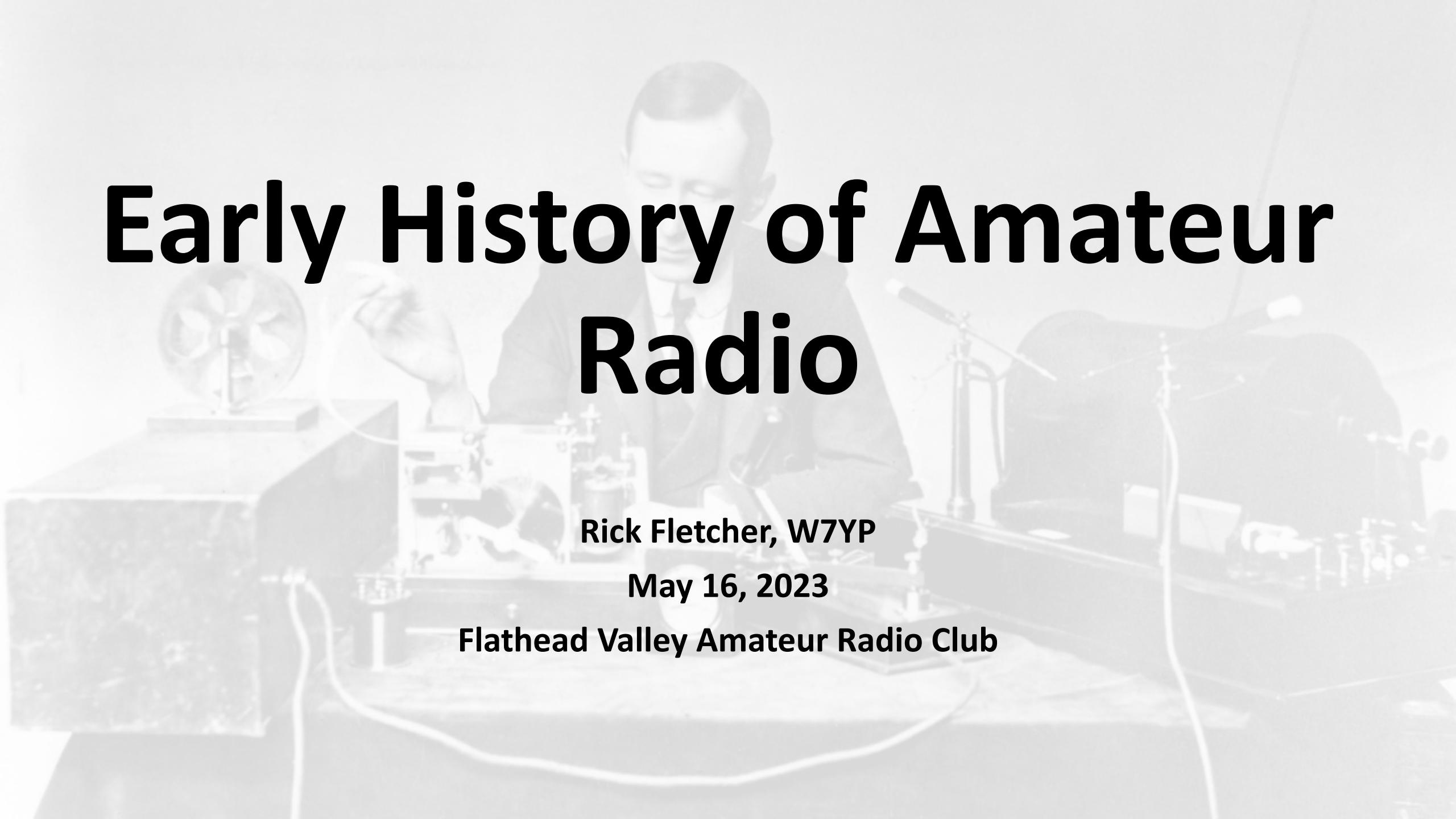


# **Early History of Amateur Radio**



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# Early 20<sup>th</sup> Century Amateur Radio:

Click to watch the Antique Wireless Museum's video on the early years of amateur radio:

<https://www.youtube.com/watch?v=2v9aLIm26p8&t=3s>

# How the Sinking of the Titanic Changed ‘Wireless’

- Dramatic rescue of over 700 survivors was made possible thanks to new wireless telegraphy equipment
- Irish-Italian wireless pioneer Guglielmo Marconi was one of the first to see the advantages and commercial possibilities of equipping ships with radio telegraph equipment
  - The technology was based on discoveries made in the latter half of the 19<sup>th</sup> century
    - James Maxwell proposed a theory of electromagnetic radiation in 1864
    - Heinrich Hertz confirmed Maxwell’s theories in 1887
    - In 1894, Oliver Lodge demonstrated the transmission and detection of electromagnetic radiation
      - His equipment could not transmit comprehensible messages
  - Marconi first heard about wireless telegraphy in 1895
    - Formed the “Wireless Telegraph and Signal Co, Ltd.” in 1897
      - Produced the first commercial equipment available
      - Sold his early systems to lighthouses and ships

# How Wireless Worked on Ships

- By the time the Titanic sailed, most passenger ships operating in the north Atlantic had Marconi installations staffed by Marconi Company operators
- Communication from ship to shore used Morse code, just like conventional telegraphy
- Using frequencies in today's AM radio band, the equipment could only send and receive messages for about 300 miles during the day; up to 900 miles at night
  - Due to the broad spectrum of RF from their spark-gap transmitters, stations often interfered with each other
- First Class passengers could send wireless telegrams when in range of a shore station, a great novelty at that time



# What Did Wireless Mean for the Titanic?

- The RMS Titanic had the best Marconi Wireless equipment available
- The limited spectrum supported by the equipment was open to everyone at the same time
  - Transmissions from different stations often interfered with each other
    - Stations were often kept busy with passenger communications
  - It is generally believed that several iceberg warnings were either missed or ignored
- Most ships had only one wireless operator who worked a long shift, then closed down for the night
  - Fortunately, as the Titanic collided with an iceberg on the night of April 14-15, 1912, at 12:30 AM, Harold Cottam, operator on nearby liner Carpathia, was still awake
    - He received the first distress call from the Titanic, sent by its senior operator Jack Phillips:
      - “CQD MGY 41.46 N 50.24 W” (“SOS” was not used by Marconi operators)
    - The Carpathia immediately set course for the Titanic, a 60-mile journey which took 4 hours
    - The Titanic sank 2 hours before the Carpathia arrived, claiming 1595 lives

# What Was the Impact for Radio Communications?

- The 1912 International Radiographic Conference passed new regulations for wireless communications onboard ships
  - First Class passenger ships had to set a round-the-clock radio watch
  - All ships were to use the same wavelength (600m – 500 kHz) which was reserved for their use only
  - Radio silence had to be maintained at regular intervals to listen for distress calls
  - Implemented by Congress as part of the 1912 Radio Ship Act

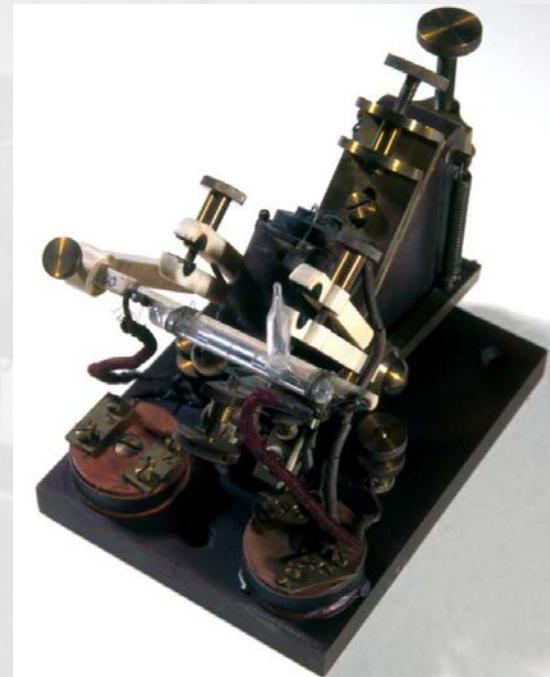
“

**Those who have been saved, have been saved through one man, Mr Marconi... and his marvellous invention.**

Herbert Samuel, Postmaster General (April 1912)

# Did Amateur Radio Help Sink the Titanic?

- It was claimed by some at the time that a few U.S. amateurs clogged the airwaves with false reports of the Titanic's sinking with all passengers saved
  - Could eastern seaboard based amateurs pick up the Titanic's transmissions?
    - Under the best conditions, a Marconi receiver at that time might pick up a signal up to 900 miles away
      - The Titanic sank at a distance of roughly 1300 miles from the nearest shore radio station
    - Some advanced amateurs were using the new "Fleming valve", also known as the "vacuum diode", or the de Forest Audion in their own receiver designs which were more sensitive and selective than the Marconi radio's "coherer"-based or crystal designs
      - Some amateurs were experimenting with regenerative receiver designs which could amplify the received signal
    - A Welsh amateur, Artie Moore, using a vacuum diode based receiver of his own design, picked up the Titanic's distress calls at nearly 3,000 miles distance
      - Local authorities did not believe him until the press confirmed the sinking two days later



# Did Amateur Radio Help Sink the Titanic? (cont.)

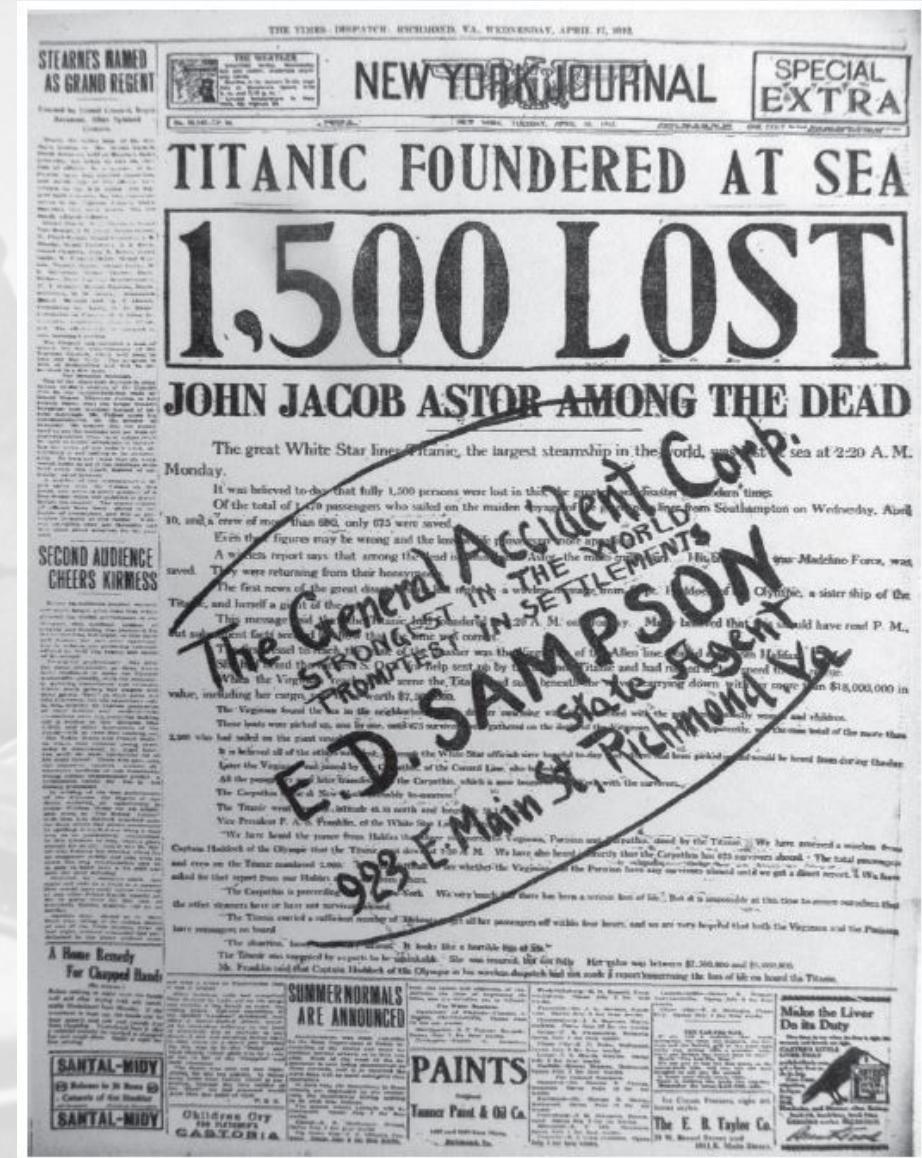
- Marconi, which had a near monopoly at the time, was in fierce competition with Telefunken
  - Since most operators were “company men”, they would often refuse to accept/relay traffic from a rival station
    - Some Telefunken operators did respond to Jack Phillips distress call but were told by him to “keep out” (his words as recorded by those Telefunken operators), as he refused to deal with them
- Commercial and Navy stations often reported fake distress calls and other messages from young amateurs
  - The government failed to deal with these complaints until after the Titanic sank
  - Shortly after the Titanic sank, a fake message was received by a shore station claiming “All Titanic passengers safe; towing to Halifax”, which was quickly printed by all major newspapers
    - Only late on the 15<sup>th</sup> was the truth learned and published

# Did Amateur Radio Help Sink the Titanic? (cont.)

- Marconi Radio, capitalizing on the public outrage aimed at amateurs, insisted that amateurs had repeatedly made it impossible for Titanic's distress calls to be heard and acknowledged
  - These claims helped to hide his operators' own failures, as well as the fact that some amateurs had more advanced receivers than Marconi's best at that time
    - This did spur the rapid adoption of vacuum tube technology by Marconi Radio and the rapid replacement of spark-gap transmitters with tube-based oscillators
- Subsequent investigations by the U.S. and U.K. made these findings:
  - "Amateur interference" played a substantial role in the disastrous loss of life
  - Limitations in radio technology were a factor
  - Jack Phillips competitive operating technique was a contributing factor
  - There was a significant lack of a sufficient number of lifeboats
  - The vessel's captain showed poor leadership

# Did Amateur Radio Help Sink the Titanic? (cont.)

- Four months after the Titanic was lost, Congress passed the Radio Act of 1912
  - All operators were required to hold a valid federal license
  - Amateurs were restricted to frequencies below the 200m band
  - Operators violating these requirements were subject to a fine of up to \$2500 USD (nearly \$70,000 today) and up to five years in prison
- Very quickly there were far fewer amateur operators than had been the case before the sinking of the Titanic



# References

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- <https://www.sciencemuseum.org.uk/objects-and-stories/titanic-marconi-and-wireless-telegraph>
- <https://www.arcadiapublishing.com/Navigation/Community/Arcadia-and-THP-Blog/April-2018/How-Amateur-Radio-Sunk-the-Titanic>
- [https://en.wikipedia.org/wiki/Artie\\_Moore](https://en.wikipedia.org/wiki/Artie_Moore)
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A black and white photograph of a man in a suit sitting at a desk, surrounded by vintage scientific instruments. A large telescope is on the right, and a fan is on the left. In the foreground, there's a typewriter and other equipment. The scene is dimly lit.

**THE END**