



PIONEER STATION KDKA'S CENTENNIAL: 100 YEARS OF ENTERTAINMENT BROADCASTING

Dave Rossetti

16 May 2021





KEY EVENTS LEADING UP TO BROADCASTING

- What lead to the beginning of Broadcasting?
- Who were the key persons responsible?



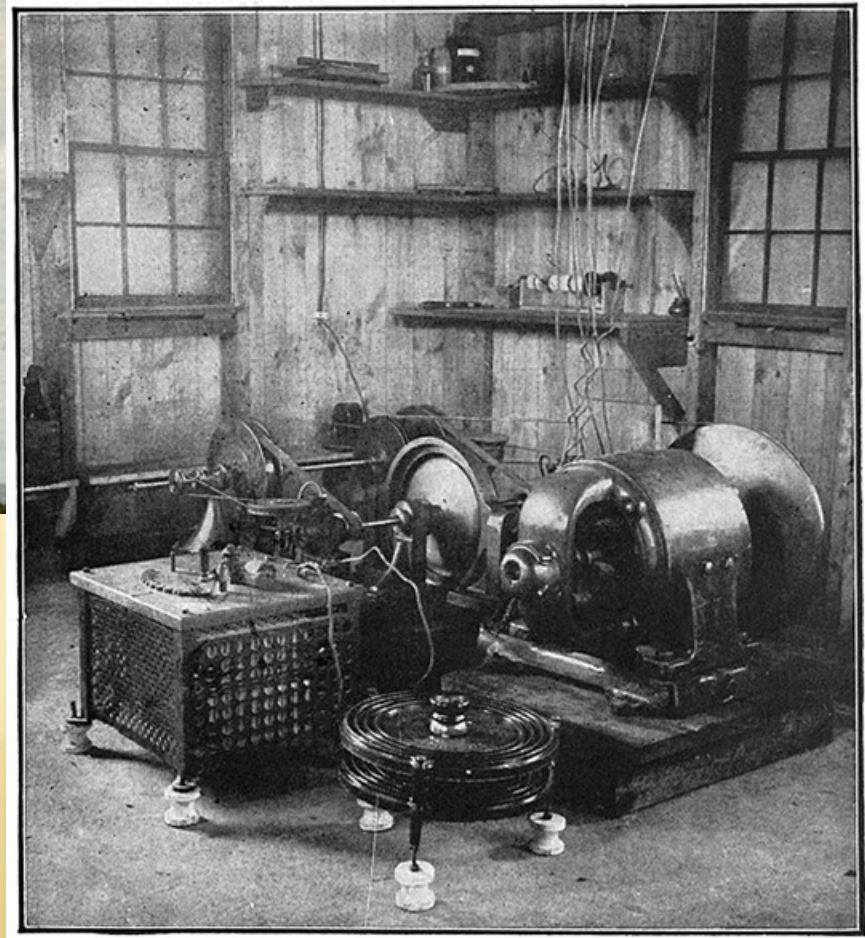
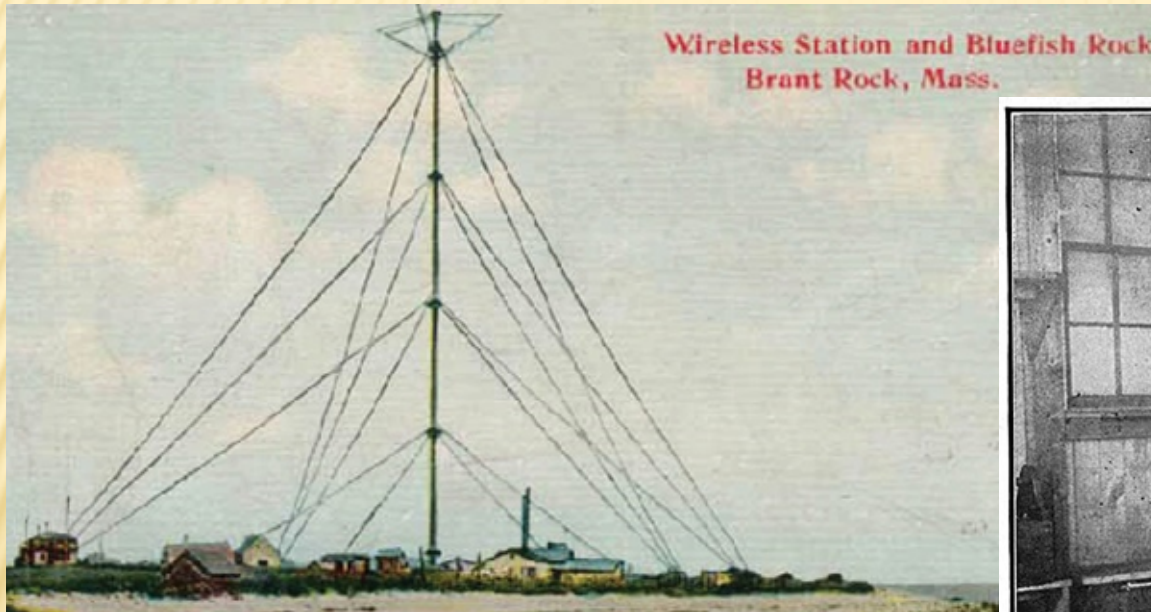
REGINALD FESSENDEN

- Groundbreaking work in audio radio transmission
- Early employment working for Edison, Westinghouse, the U.S. Weather Bureau, and the National Electric Signaling Company (NESCO)



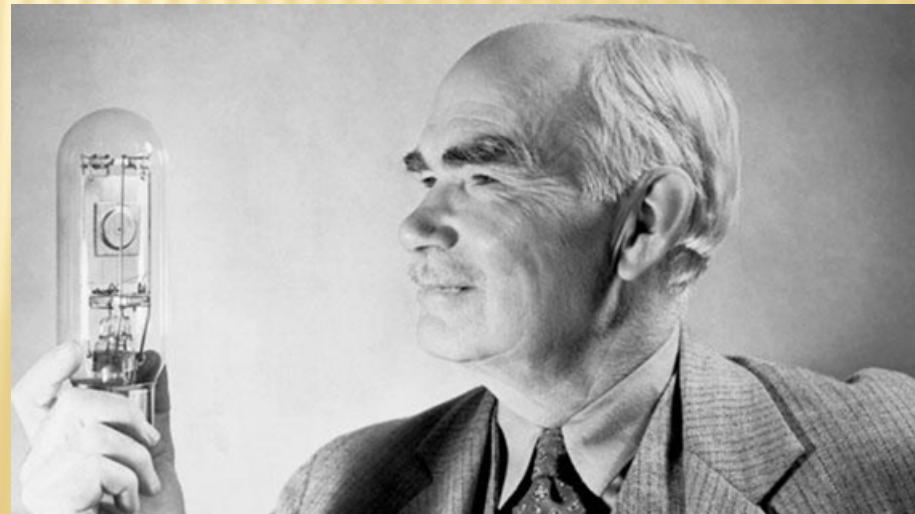
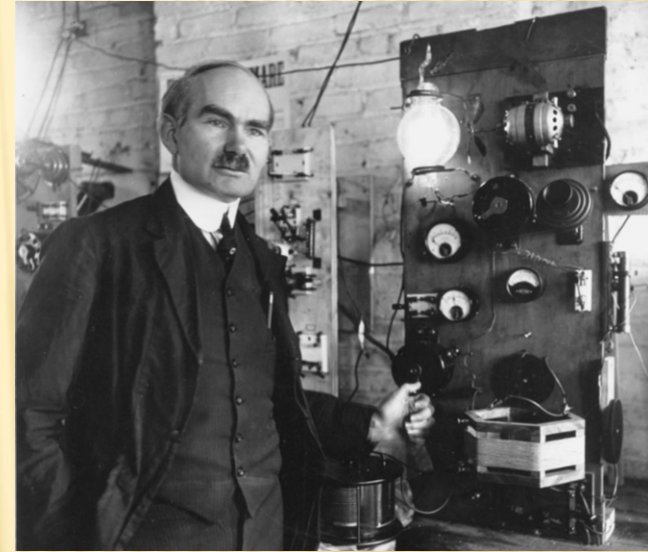
FIRST MODULATED COMMUNICATIONS

- DEC 21st, Christmas Eve, New Years Eve 1906



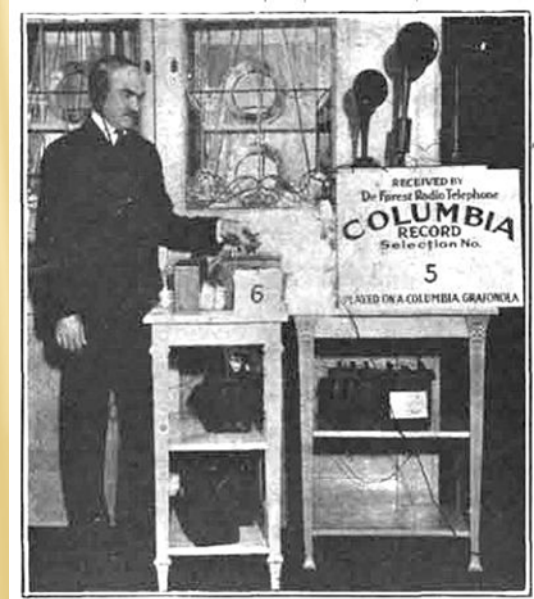
LEE dE FOREST

- American inventor and self-described "Father of Radio"
- Developed the grid Audion - the first device to amplify the strength of received radio signals, and built a working arc-transmitter (both in 1906)



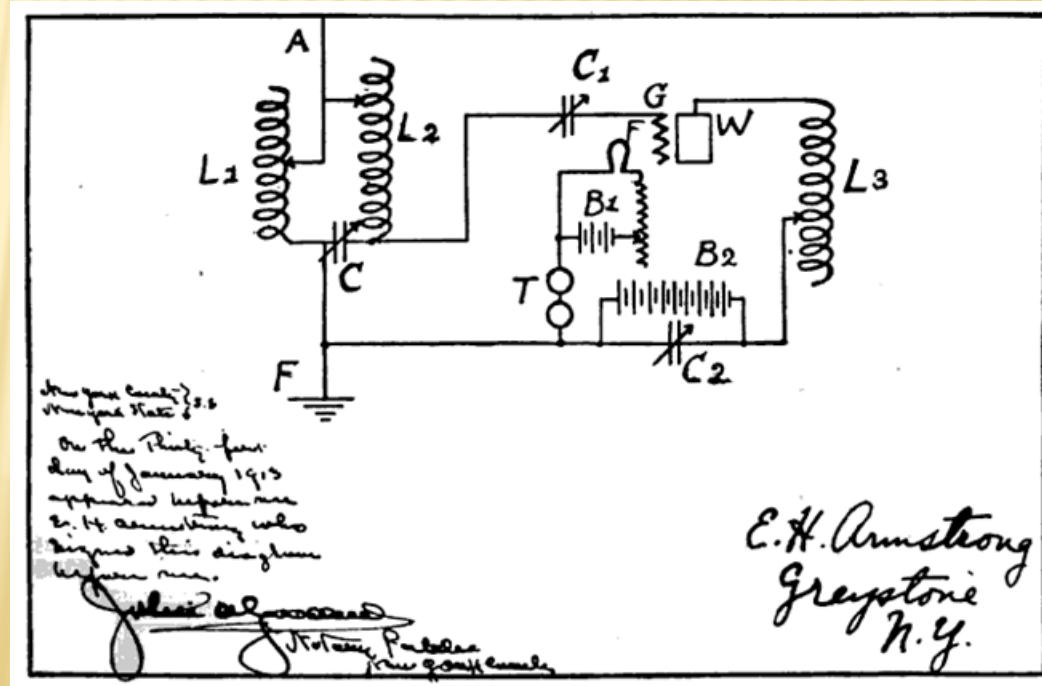
de FOREST AND BROADCASTING

- Using his arc-transmitter conducted experimental entertainment radio broadcasts (1907-1910)
- Navy operators used de Forest built arc-transmitters on Great White Fleet ships to transmit voice and music
- Using vacuum tube based transmitters, and an experimental license, de Forest resumed entertainment broadcasts (1916-1917 and 1919-1920)



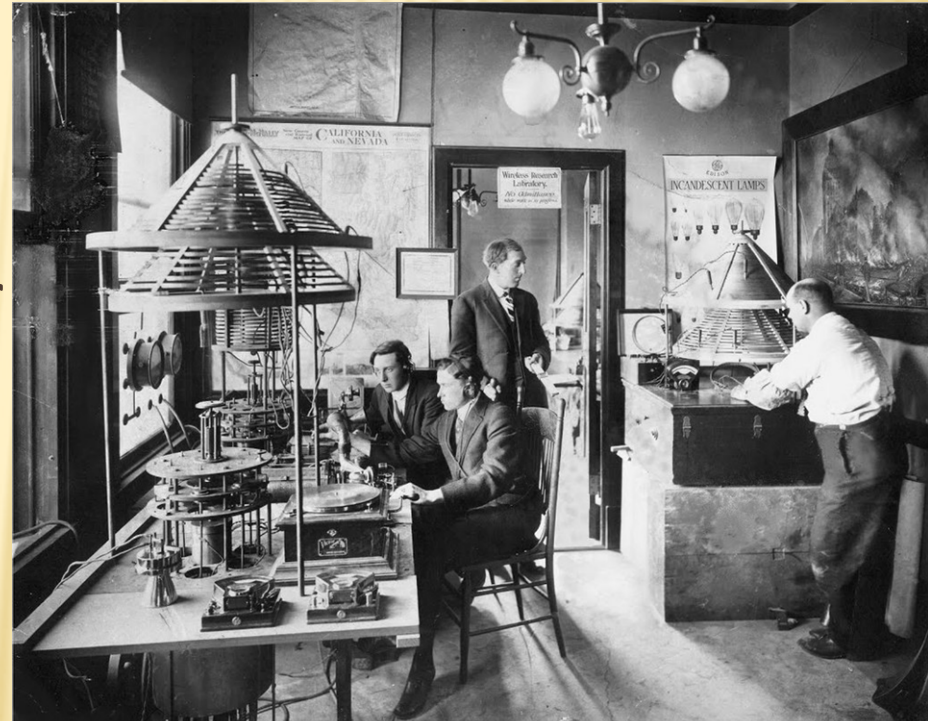
EDWIN HOWARD ARMSTRONG

- American electrical engineer and inventor - developed FM (frequency modulation) radio and the superheterodyne receiver system
- The true discoverer of positive feedback ("regeneration") and oscillation, leading to tube based transmitters



OTHER EARLY BROADCASTS

- Charles Herrold –1912
Weekly broadcasts from
his San Jose School
- Young & McCombs co-
operative store, Rock
Island, IL - 9BY September
1, 1920 Weekly concerts
(WOC)
- Dr. William Reynolds –
Colorado Springs -nightly
concerts - 9JE – October
1920 (KLZ)



OTHER EARLY BROADCASTS

- Charles Herrold –1912
Weekly broadcasts from
his San Jose School
- Young & McCombs co-
operative store, Rock
Island, IL - 9BY September
1, 1920 Weekly concerts
(WOC)
- Dr. William Reynolds –
Colorado Springs -nightly
concerts - 9JE – October
1920 (KLZ)



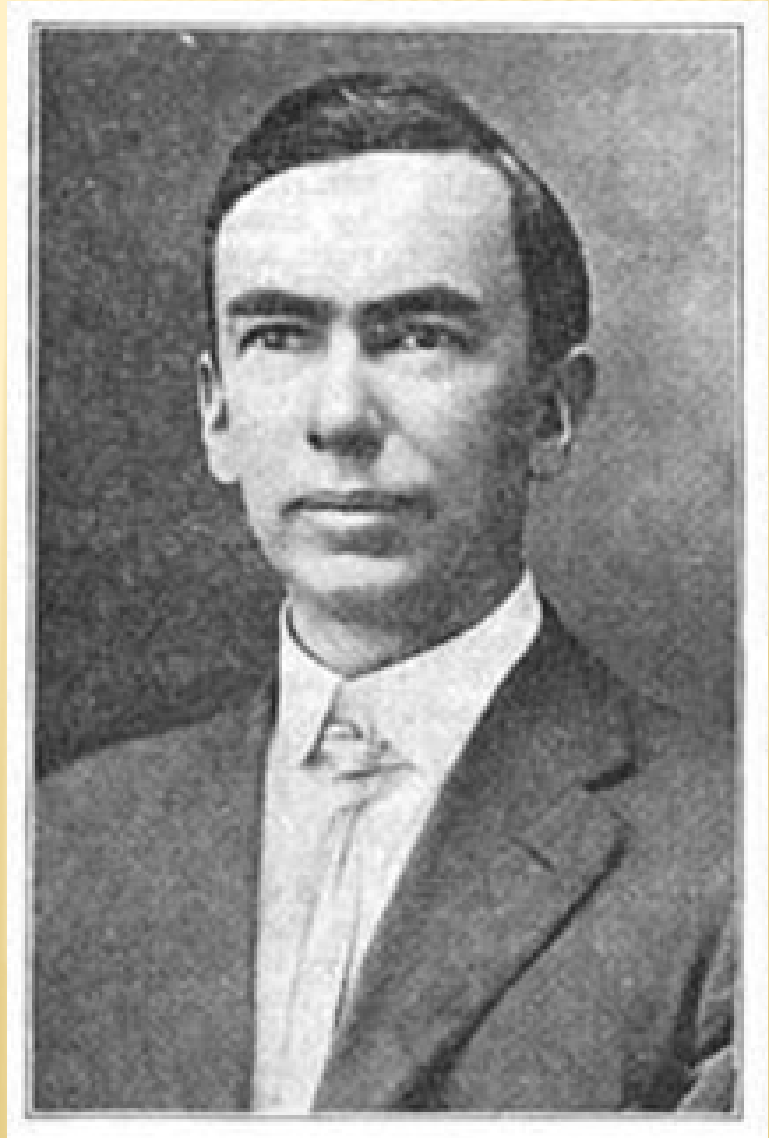
OTHER EARLY BROADCASTS

- Charles Herrold –1912
Weekly broadcasts from
his San Jose School
- Young & McCombs co-
operative store, Rock
Island, IL - 9BY September
1, 1920 Weekly concerts
(WOC)
- Dr. William Reynolds –
Colorado Springs -nightly
concerts - 9JE – October
1920 (KLZ)



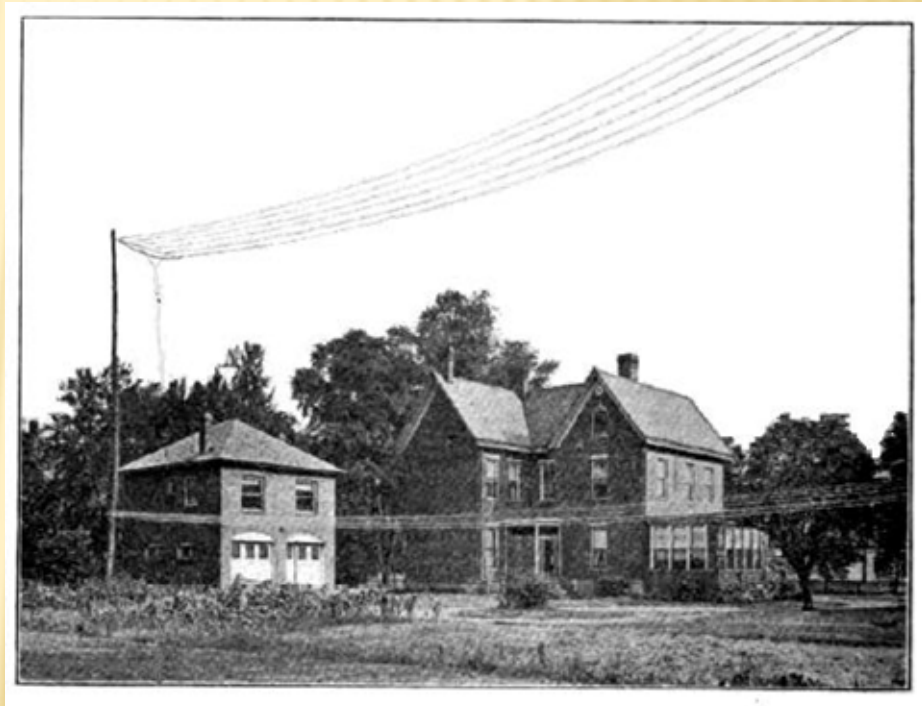
FRANK CONRAD

- American electrical engineer
- Started working for Westinghouse in 1890 at 16
- Became interested in radio in 1913
- Built an Amateur Spark Gap Transmitter and issued an experimental license (8XK) in the summer of 1916



FRANK CONRAD

- American electrical engineer
- Started working for Westinghouse in 1890 at 16
- Became interested in radio in 1913
- Built an Amateur Spark Gap Transmitter and issued an experimental license (8XK) in the summer of 1916



FRANK CONRAD IN WWI

- All amateur sites shut down
- Supported Westinghouse development of the tube-based SCR-69 aircraft transmitter and the SCR-70 aircraft receiver



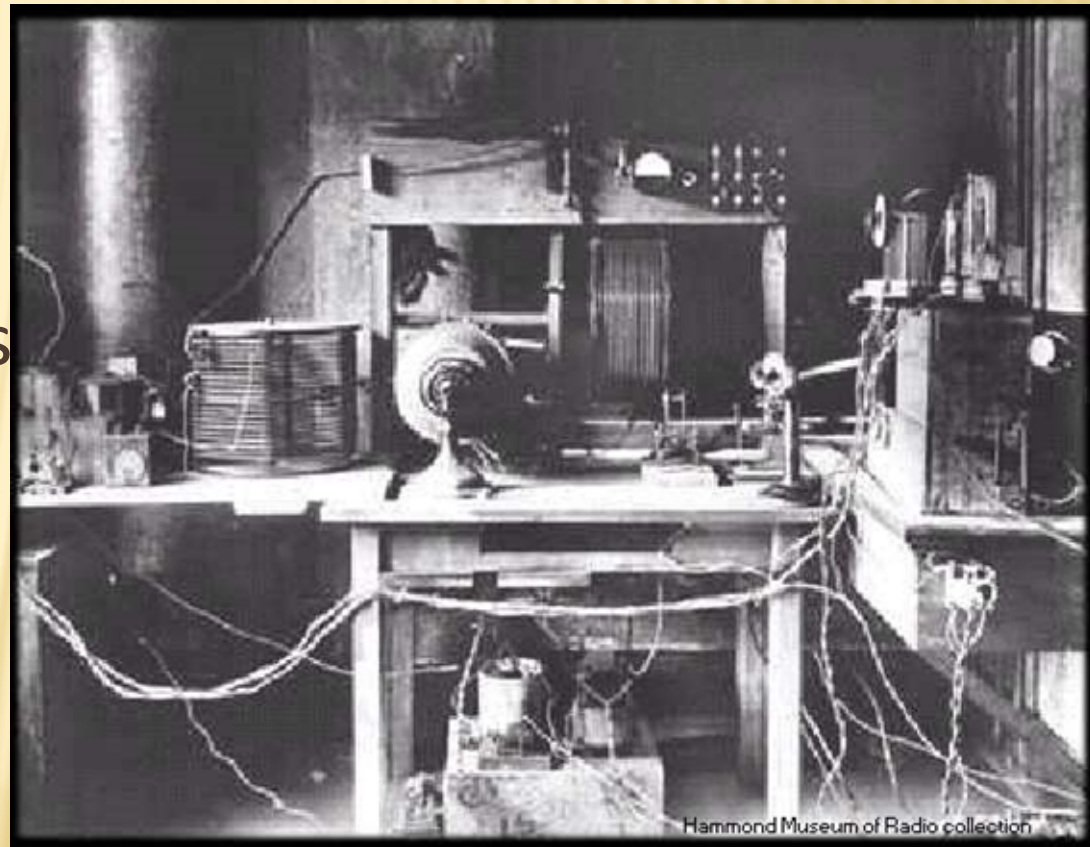
FRANK CONRAD IN WWI

- All amateur sites shut down
- Supported Westinghouse development of the tube-based SCR-69 aircraft transmitter and the SCR-70 aircraft receiver



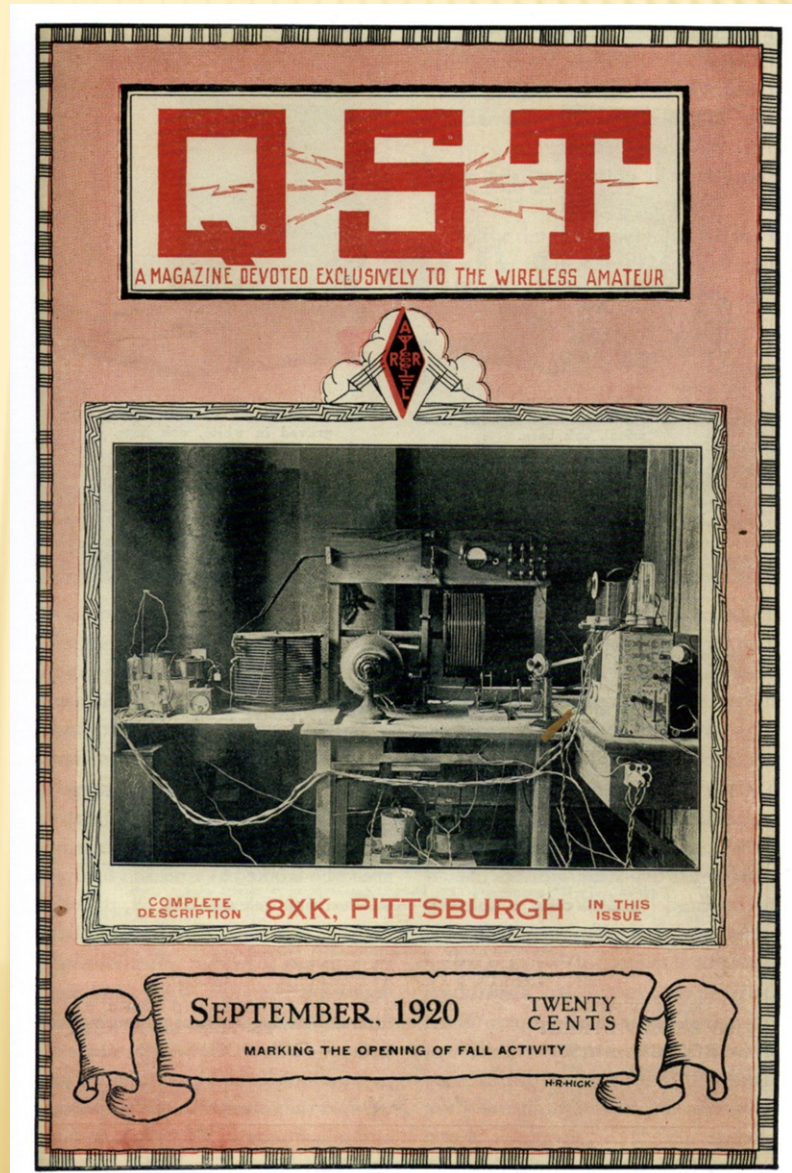
FRANK CONRAD AFTER WWI

- The amateur radio ban ended on October 1, 1919
- Conrad resumed operation of 8XK, broadcasting records for 2 hours Wednesday and Saturday Evenings
- His station appeared in the September 1920 QST



FRANK CONRAD AFTER WWI

- The amateur radio ban ended on October 1, 1919
- Conrad resumed operation of 8XK, broadcasting records for 2 hours Wednesday and Saturday Evenings
- His station appeared in the September 1920 QST



LISTENING ENJOYMENT GROWS

- The popularity of Conrad's broadcasts grew
- A Pittsburg Department store advertised his concerts and sold crystal sets
- Westinghouse Vice President Harry Davis took notice
- Had a transmitter built on the roof of the 8 floor K building



LISTENING ENJOYMENT GROWS

- The popularity of Conrad's broadcasts grew
- A Pittsburg Department store advertised his concerts and sold crystal sets
- Westinghouse Vice President Harry Davis took notice
- Had a transmitter built on the roof of the 8 floor K building



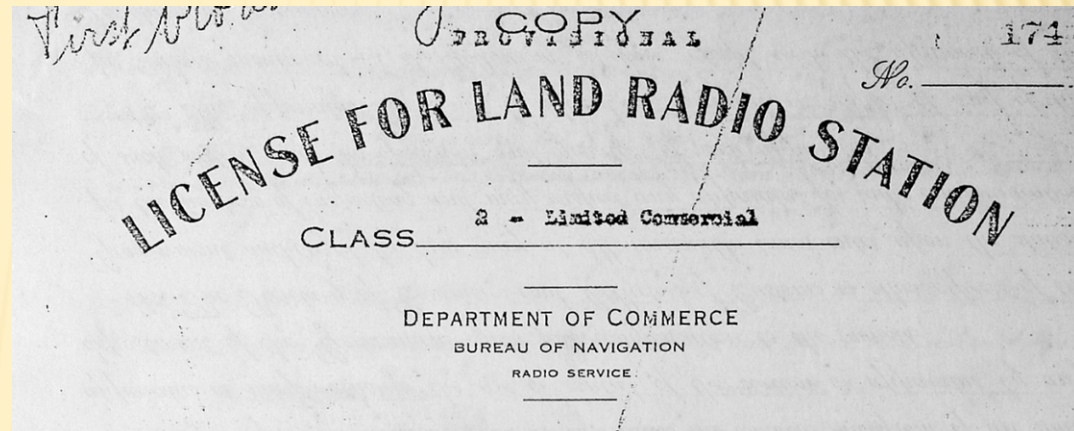
LISTENING ENJOYMENT GROWS

- The popularity of Conrad's broadcasts grew
- A Pittsburg Department store advertised his concerts and sold crystal sets
- Westinghouse Vice President Harry Davis took notice
- Had a transmitter built on the roof of the 8 floor K building



THE KDKA LICENSE

- Class 2 – Limited Commercial
- KDKA - Issued to Westinghouse
- 300 to 500 Meters (600 to 1,000 KHz – AM Band) at 200 Watts
- Issued on October 27th, 1920



THE KDKA LICENSE

- Class 2 – Limited Commercial
- KDKA - Issued to Westinghouse
- 300 to 500 Meters (600 to 1,000 KHz – AM Band) at 200 Watts
- Issued on October 27th, 1920

SCHEDULE OF STATION AND APPARATUS

Name of owner, Westinghouse Elec. & Mfg. Co.

Location: State, Pennsylvania; County, Allegheny,
City or town, East Pittsburgh; Street, - - - -; No. - - - -

Geographical location: Latitude, N. 40 24 " ; Longitude, W. 79 50 "

This station is licensed for communication only with the following land stations, ships, or lines of ships:

<u>Cleveland, Ohio</u>	<u>Newark, N. J.</u>
<u>Springfield, Mass.</u>	<u>Brooklyn, N. Y.</u>
<u>- - - - -</u>	<u>- - - - -</u>
<u>- - - - -</u>	<u>- - - - -</u>

Specific hours during which the station ^{must} be open to service (local standard time):
8:30 A.M. to 5:00 P.M.

Power: Transformer input, Tube 200 watts, H.F. Gen. 2 K.W. 1/2

Normal day range in nautical miles, H.F. Gen. 300

Time and method, if any, of sending time signals and hydrographic and meteorological radiograms:
- - - - -
- - - - -

Call letters, K D K A

THE KDKA LICENSE

- Class 2 – Limited Commercial
- KDKA - Issued to Westinghouse
- 300 to 500 Meters (600 to 1,000 KHz – AM Band) at 200 Watts
- Issued on October 27th, 1920

In view of special conditions the station is authorized to use for communication exclusively with stations licensed by the United States the following additional wave lengths under 600 or over 1,600 meters:

Meters, 500; Meters, 500; Meters, 3300; Meters, _____

The energy, if radiated by the transmitter in two or more wave lengths as indicated by a sensitive wave meter, shall not in any one of the lesser waves exceed 10 per cent of that in the greatest; and the logarithmic decrement per complete oscillation in the wave trains shall not exceed two-tenths, except when sending signals or messages relating to vessels in distress.

SENDING WAVE LENGTH	ANTENNA CURRENT (AMPERES)	LOGARITHMIC DECREMENT	READING OF WAVE METER INDICATING INSTRUMENT*	
			PRINCIPAL WAVE	WAVE NEXT IN ENERGY
300 meters . . .	Not ascertained.	300 and 600 meters to be used as required		
<u>600</u> meters . . .	"	in Regulations 42 and 44.		
<u>500</u> meters . . .	"	500 W		

THE KDKA LICENSE

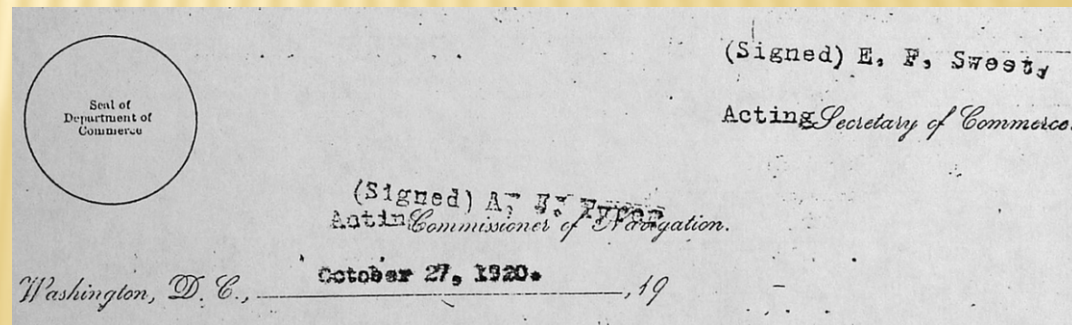
- Class 2 – Limited Commercial
- KDKA - Issued to Westinghouse
- 300 to 500 Meters (600 to 1,000 KHz – AM Band) at 200 Watts
- Issued on October 27th, 1920

Power: Transformer input, ~~Tube 200 watts, H.F. Gen. 2 K. V. 112~~
Normal day range in nautical miles, _____ H.F. Gen. 300
Time and method, if any, of sending time signals and hydrographic and meteorological radiograms.

Call letters, K D K A

THE KDKA LICENSE

- Class 2 – Limited Commercial
- KDKA - Issued to Westinghouse
- 300 to 500 Meters (600 to 1,000 KHz – AM Band) at 200 Watts
- Issued on October 27th, 1920



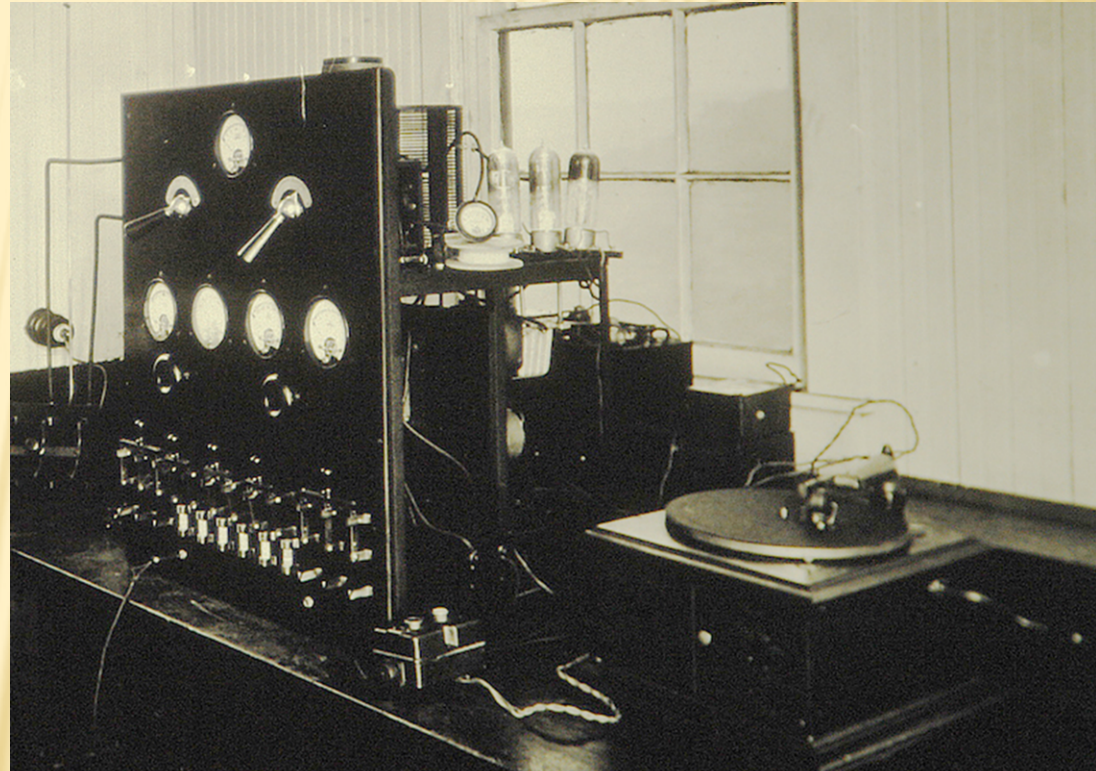
THE FIRST KDKA TRANSMITTER

- Built in a shack on the roof
- The antenna streamed between buildings
- The transmitter employed 4 – 50w output vacuum tubes and a telephone mic



THE FIRST KDKA TRANSMITTER

- Built in a shack on the roof
- The antenna streamed between buildings
- The transmitter employed 4 – 50w output vacuum tubes and a telephone mic



THE FIRST KDKA TRANSMITTER

- Built in a shack on the roof
- The antenna streamed between buildings
- The transmitter employed 4 – 50w output vacuum tubes and a telephone mic

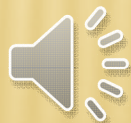
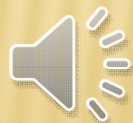
DESCRIPTION OF TRANSMITTER.

500 METER SET.

For 500 meter service - Vacuum tube set employing 4 vacuum tubes of 50 watts output each, is used, the power supply for tubes from a 1000 volt D.C. generator of .3 K.W. capacity - output connection of tubes made directly to inductance in antenna circuit signalling for continuous wave heterodyne reception, accomplished by opening grid circuit thus interrupting antenna current. No compensated wave used. Also provision for signalling by audible radiation by use of a buzzer or telephone microphone in grid circuit.

KDKA'S FIRST BROADCAST

- KDKA, Pittsburg – November 2nd, 1920
- Harding-Cox presidential election results as its inaugural show

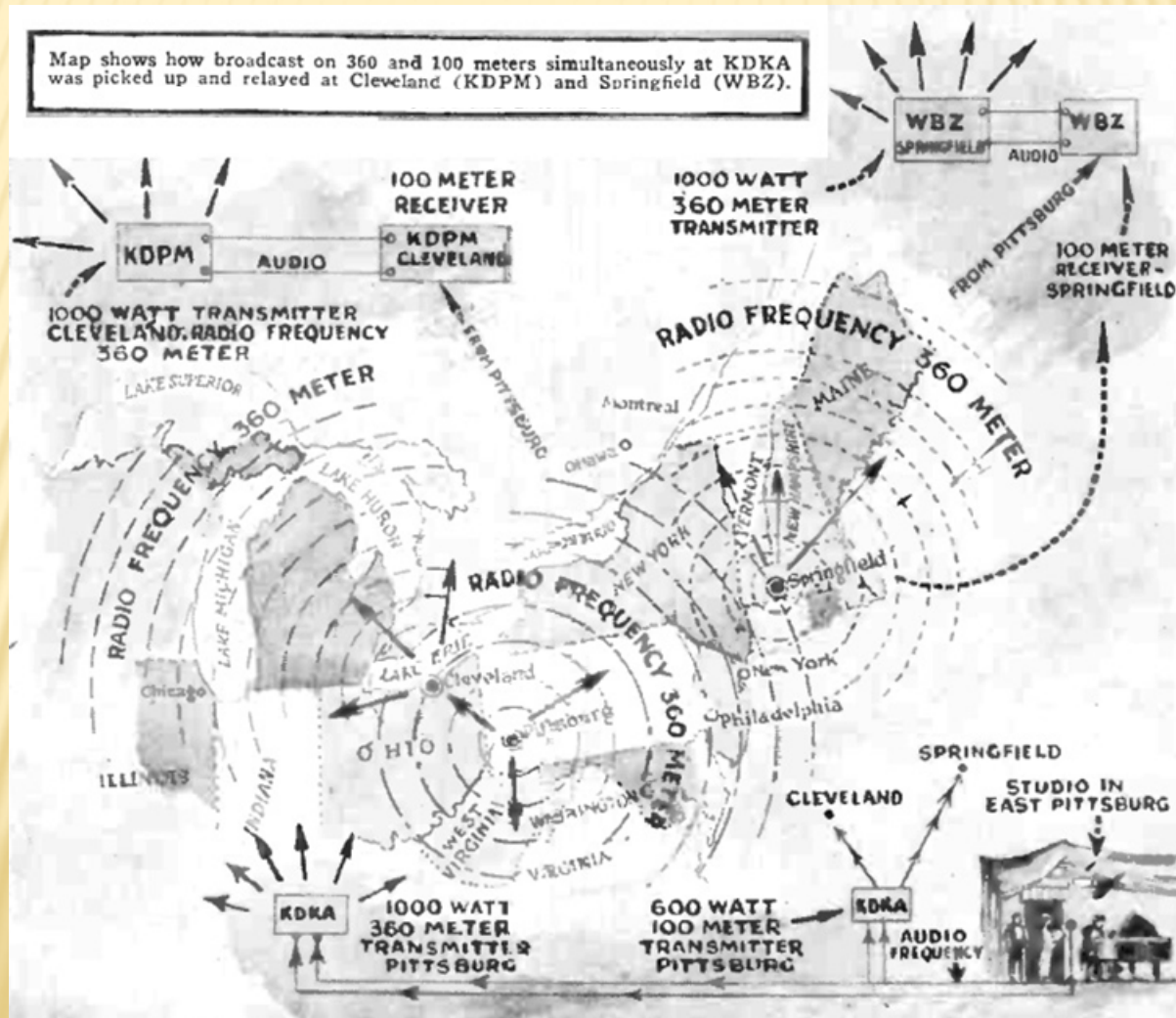


WHO WAS FIRST?

- The controversy over who had the first true radio broadcast will continue, but...
- KDKA was the first to be broadcasting using a Class 2 – Limited Commercial License, not an Experimental or Amateur license
- Frank Conrad, promoted to Assistant Chief Engineer responsible for all radio-related activities in 1921, continued development in improving high frequency (HF) transmission

BROADCASTING IN THE TRUE SENSE

- In 1923, KDKA began simultaneous broadcasting on 360 Meters (830 KHz – AM Band) and 100 Meters (3 MHz – HF)



KDKA TODAY

- KDKA-AM is today a Class A (clear channel) radio station broadcasting on 1020 KHz
- Beginning November 2, 2020, it is currently simulcast on FM translator station 100.1 MHz
- It features a news/talk format, operating with a transmitter power output of 50,000 watts
- Heard during daylight hours throughout central and western Pennsylvania, into nearby Ohio, West Virginia, New York, and Ontario.
- Its nighttime signal covers much of eastern North America.



REFERENCES

- *David and Julia Bart – Antique Wireless Review (AWR) - THE CENTENNIAL OF KDKA'S HISTORIC 1920 BROADCASTS*
- *Brian Belanger – Dials and Channels (NCRTV) – September 2020 – A CENTURY OF ENTERTAINMENT BROADCASTING: KDKA CELEBRATES ITS 100th BIRTHDAY*
- *Richard Brewster - Pittsburgh Antique Radio Club Presentation - THE BIRTH OF RADIO BROADCASTING*
- *Wikipedia - Reginald Fessenden, Lee de Forest, Edwin Howard Armstrong, Charles Herrold, 9BY/WOC, 9JE/KLZ, Frank Conrad*
- *<https://www.radio.com/kdkaradio/podcasts/kdka-100-years-podcasts>*
- *<http://www.thedepartmentstoremuseum.org/2010/05/joseph-horne-co-pittsburgh-pennsylvania.html>*
- *<https://radio.tcapsule.com/fbis/>*
- *<https://www.pabook.libraries.psu.edu/literary-cultural-heritage-map-pa/feature-articles/kdka-broadcastings-pioneer-station>*
- *<https://pittsburgh.cbslocal.com/2012/03/08/kdkas-historic-broadcast/>*