THE 100TH ANNIVERSARY OF THE FOUNDING OF RCA

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A Presentation for the Vintage Radio and Phonograph Society's 2019 Convention

Guglielmo Marconi

David Sarnoff

The “Founder” of RCA, Guglielmo Marconi! And the “Guiding Light” of RCA for almost 50 years, David Sarnoff.

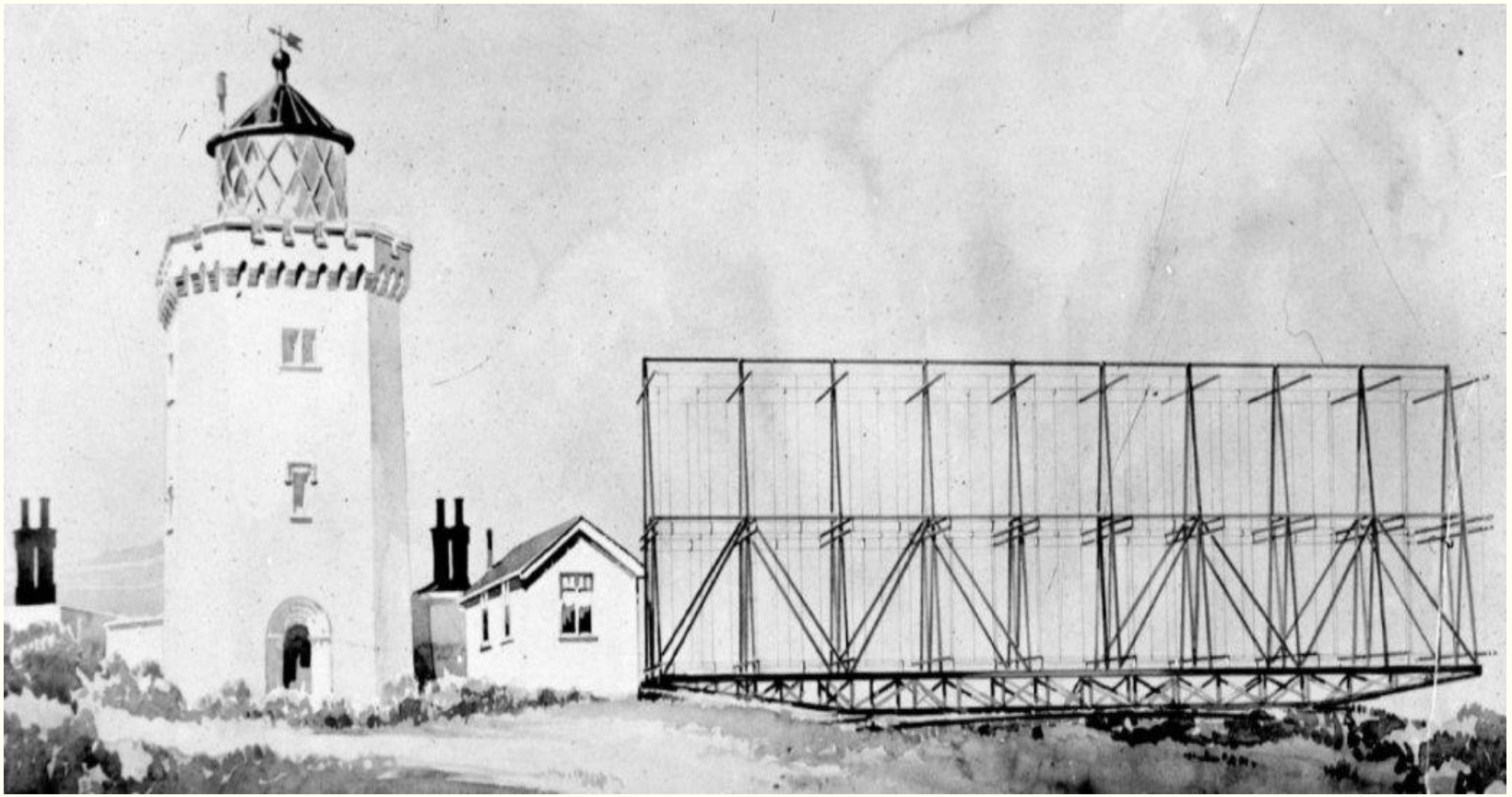
I. RCA: Created From the Ashes of American Marconi Wireless

- Guglielmo Marconi was born in Bologna, Italy 1874.
- His mother was Irish/Scot; He spent his early years in Britain.
- Attended some university lectures in Italy but never obtained a degree.
- Always had an interest in electricity.
- Around the age of 20, became aware of Hertz's work on electromagnetic radiation as well as research by Oliver Lodge.
- Marconi started researching a new concept in 1894 – building a radio telegraph system using "Hertzian radiation."
- Conducted experiments in the attic of his parents home from 1894-1896.
- Ultimately created a functional system using a simple oscillator or spark producing transmitter; an "antenna" wire, a coherer receiver; a telegraph key; and a telegraph register type

RCA: Beginnings with American Marconi… cont.

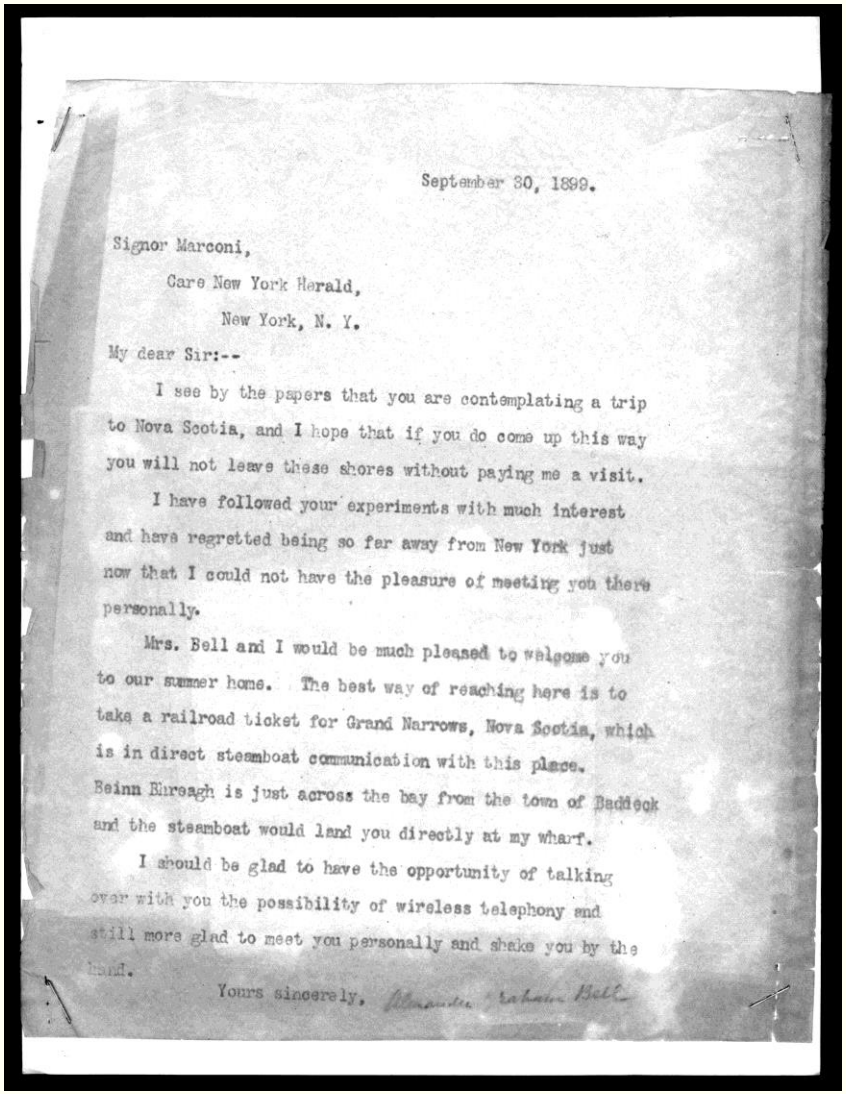
- In 1896-1899, he lived and worked in Great Britain, ultimately transmitting Morse code over land and in 1899, over the English Channel.
- In 1899 he used radio on a sea voyage to the US and back.
- The real break-through that drove Marconi was trans-Atlantic transmission by radio telegraph.
- Marconi Wireless was initially formed in Britain in 1897 and established short distance marine radio telegraph system in Britain and later in the US.
- In December, 1901, Marconi first reported hearing the faint signal of three Morse-code dots (the letter “S”) sent from Poldhu, Cornwall.

Marconi's Poldhu Antenna Array



Guglielmo Marconi… cont.

- The broadcast was on an estimated 350 meters (frequency = 850khz) during daylight hours.
- There was some scepticism for Marconi's claim to have heard the transmission but many major scientists of the era, including Alexander Graham Bell, believed him.
- Ultimately, the scepticism became irrelevant because by 1902, transmissions were regularly sent across the Atlantic.
- Marconi's company became the dominant international broadcaster until WWI. Its American subsidiary was formed in 1899 to establish radio sites here.
- A young David Sarnoff was hired by American Marconi in 1908 as a radio telegraph operator.



September 30, 1899.

Signor Marconi,

Care New York Herald,

New York, N. Y.

My dear Sir:--

I see by the papers that you are contemplating a trip to Nova Scotia, and I hope that if you do come up this way you will not leave these shores without paying me a visit.

I have followed your experiments with much interest and have regretted being so far away from New York just now that I could not have the pleasure of meeting you there personally.

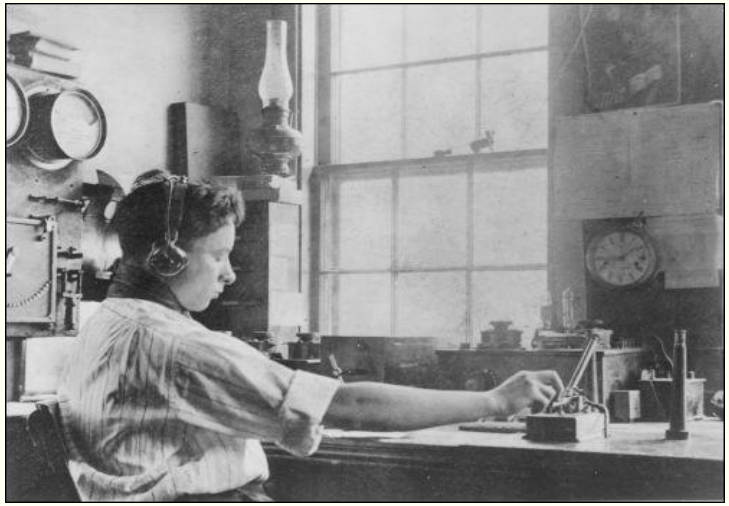
Mrs. Bell and I would be much pleased to welcome you to our summer home. The best way of reaching here is to take a railroad ticket for Grand Narrows, Nova Scotia, which is in direct steamboat communication with this place. Beinn Breagh is just across the bay from the town of Baddeck and the steamboat would land you directly at my wharf.

I should be glad to have the opportunity of talking over with you the possibility of wireless telephony and still more glad to meet you personally and shake you by the hand.

Yours sincerely, Alexander Graham Bell

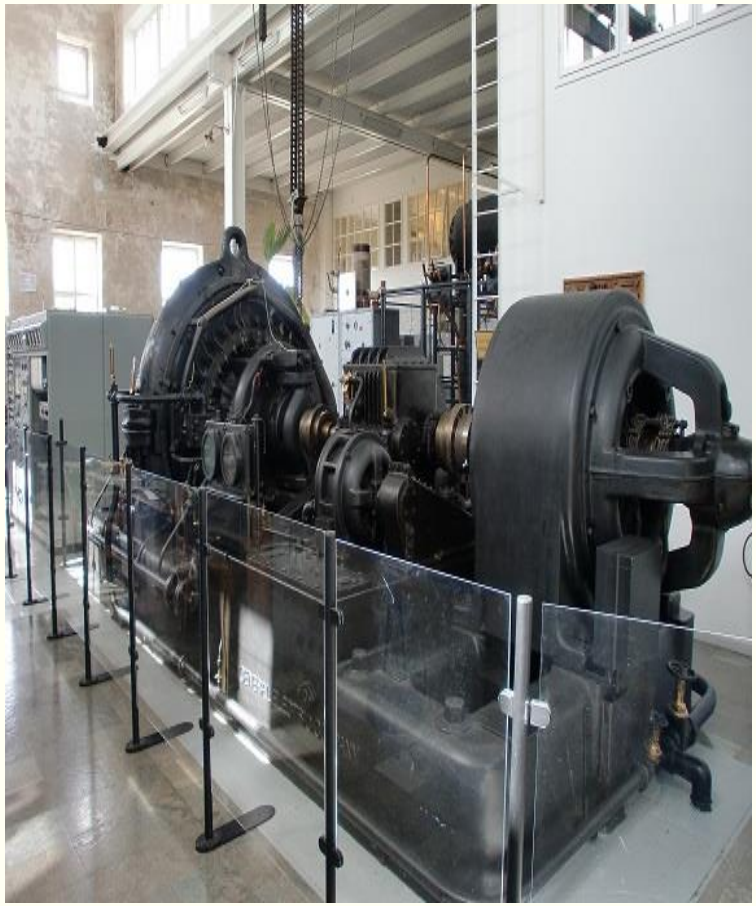
II. 1919-1922: The Early Years of Radio Corporation of America

- Marconi spent most of his career developing long-distance communications, ultimately to include short-waves in add ition to long and medium-waves.
- But after WWI, Marconi had a problem. It needed the high-powered Alexanderson alternator to generate the electricity needed for high-powered trans-oceanic point to point communication.
- General Electric owned the Alexanderson device. In 1919 the US Navy initially tried to convince the US govt. to allow it to control all radio broadcasting. Congress refused.
- The Navy then approached GE and its President, Owen Young, and asked it not to sell the Alexanderson to Marconi. Marconi was a foreign company and was also in talks to takeover the largest undersea cable transmission company which would have given a foreign company control over all trans-oceanic communication.



1919: British Marconi is Forced to Sell its US Subsidiary in order to acquire an alternator…

- GE told Marconi it could not sell the alternators, however, GE then proposed to buy all of Marconi's US subsidiary, Marconi Wireless Telegraph Co. of America. The British parent agreed to sell American Marconi's assets and patent rights and in addition to cash, obtained the right to buy the alternators for use outside the US.
- On October 17, 1919, Radio Corporation of America was incorporated and in November, GE transferred all of the assets and patent rights it acquired by GE into the new company.



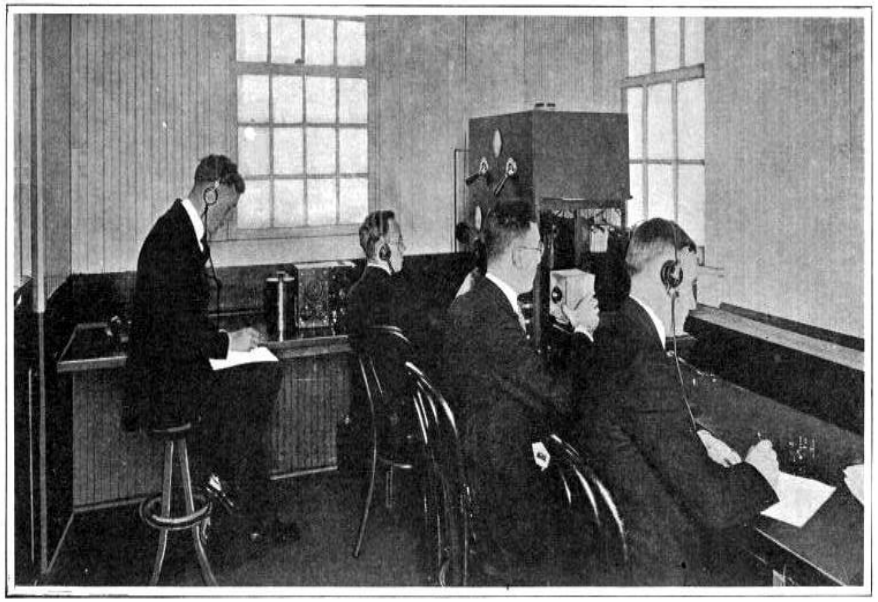
1919: RCA is formed from American Marconi—An Ironic Beginning

- There are many ironic points about this beginning. First, Alexanderson alternators were virtually worthless by 1922. Why, because Westinghouse's Frank Conrad established that better communication could be made on shotwaves and by 1922, with vacuum tube advancements, small radios could be heard across the oceans. British Marconi made a bad bet.
- Second, RCA became the dominant player in trans-oceanic communication in the 1920's in place of its former parent.
- Third, RCA kept all of the Marconi US employees including Sarnoff.

RCA's proposed Long Point, Long Island, antenna farm. Only some of this was completed.

III. RCA: 1920-1921: From Point to Point to the “Music Box”

- At its founding, RCA’s mission was to provide worldwide wireless telegraphy. See the first logo!! It had inherited Marconi’s large broadcasting center on Long Island where David Sarnoff started his career as a code operator.
- Ultimately, 10 Alexanderson alternators built by GE and powering 200+ kilowatt transmitters were located there for trans-oceanic messaging. This large array of new transmitters was partially completed in 1921.
- But something else happened on the way to the opera. In 1920, the first radio station, KDKA, formed by Westinghouse, broadcast live returns from the Presidential election. This was very popular and GE and RCA took notice. At left, the KDKA studio, 1921.
- Sarnoff, then general manager at RCA, sent (again) to GE President Owen Young what became his famous 1915 “music box” memo in which he predicted the future for radio was home entertainment.



RCA Begins a Transformation, 1920-1921

- Owen Young did not know Marconi very well. He was not sure what to make of this upstart who kept sending him uninvited memos about home radio broadcasting and the music box concept.
- Early in 1920, Sarnoff and others helped convince Young to enter into some deals The first was with AT&T to cross license their respective radio patent portfolio, enhancing RCA's control on TRF related patents. AT&T received a significant amount of RCA shares in the deal. A second was with the United Fruit Co. which owned some of de Forest's audio patents!
- Sarnoff had also seen a demonstration of Edwin Armstrong's superheterodyne circuitry when he was with Marconi. Marconi refuse to buy it. Westinghouse ultimately acquired Armstrong's circuits and other patents. In 1921, GE entered into a very key deal to cross-license the Westinghouse patents in a number of areas. In return, Westinghouse gained a large number of RCA shares as well as the right to make 40% of RCA radios and radio products. GE would make the other 60%.
- More importantly, this deal allowed Armstrong continue working with Sarnoff and RCA's engineers to ultimately produce a simple less costly circuit design that was incorporated into RCA's Radiola radios beginning in early 1924. More on that later!!

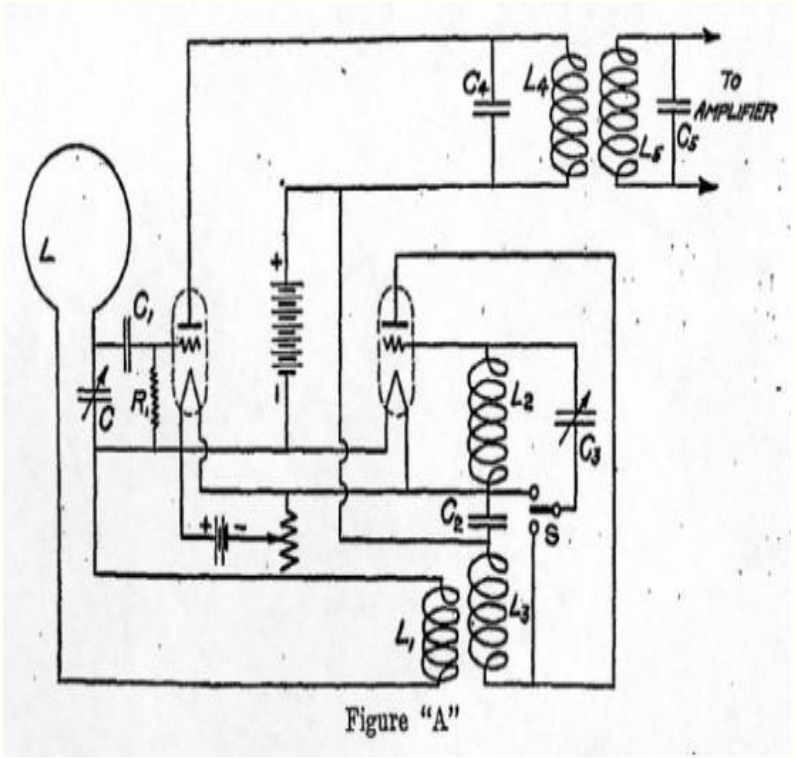


Figure "A"

A simple version of the circuit replicated in Armstrong's heterodyne patent.

RCA's Transformation 1920-1921

- At the end of 1921, RCA's ownership was held by GE (30%), Westinghouse (20%), AT&T (10%), United Fruit (4%) and the public (36%).
- But GE/RCA, like Westinghouse, realized that the future of radio would be home broadcasting, which in turn would generate demand for consumer radios, which in turn drove manufacturing of parts and radios.
- Broadcasting mostly to amateurs and experimenters in 1920, the situation would change by 1922.

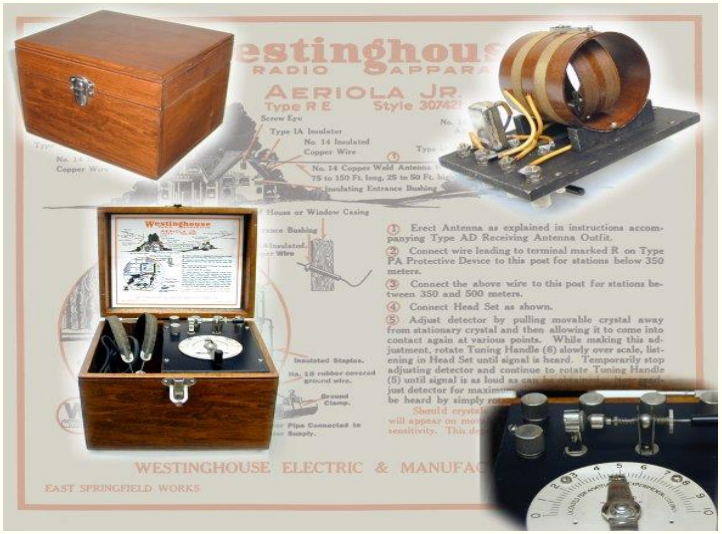
8MK broadcasting news in Detroit, 1920—later WWJ 950 AM. One of the first commercial broadcasters.

IV. RCA Begins to Market and Design Radios, and Leads Radio Innovation: 1922

- RCA inherited some good talent from American Marconi; combined initially with GE researchers, it was a formidable group.
- Pictured here at the former Marconi research lab and plant in Brunswick, NJ, are many scientists and businessmen who helped lead innovation in the 1920”s: Sarnoff, Armstrong, Steinmetz, Einstein and others.
- However RCA had to rely on Westinghouse and GE to make its radios. Later some radios were made by Graybar and Brunswick.

The Beginning of the Radiola Brand—”Aeriola”

- Initially, Westinghouse took the lead on radio design and manufacturing as it had already developed the “Aeriola” brand.
- At the time, Aeriola was a very popular radio offering crystal and TRF tube versions.
- GE could not catch up to Westinghouse’s manufacturing abilities until late in 1923. Westinghouse far exceeded its 40% quota for building radios under the cross-licensing agreement signed in 1921.
- RCA became the distributor and marketer for the Westinghouse Aeriola brand.
- Shown here is a 1921 Aeriola Jr. crystal set, and an Aeriola Sr. TRF with a WD-11 tube and the additional amplifier unit. Both Aeriolas were popular in 1921-1923.



1922—Initiation of the Radiola Radio Series

- In late 1922, RCA began to standardize parts and manufacturing as there were many variations of Aeriolas depending on parts availability.
- RCA also started to name all radios with the “Radiola” brand name and the designation of “RC” on all models. Even remaining Aeriolas were renamed “Radiolas”.
- Radiola was a trade and brand names used by many companies; there was even a radio company with Radiola in its name.
- RCA missed the usual late fall introduction of radios for Christmas 1922 and the initial Radiolas were not introduced until March 1923.
- Slowly, RCA began to introduce more Radiola versions with improvements and its large public marketing access helped the brand to grow significantly.
- Shown here is a Radiola IIC and the very popular Radiola IIIA. The IIC used two UV-199 tubes. The version of the IIIA shown here used four WD-11 tubes, two in the detector stage and two in amplification.

Radios For Every Home

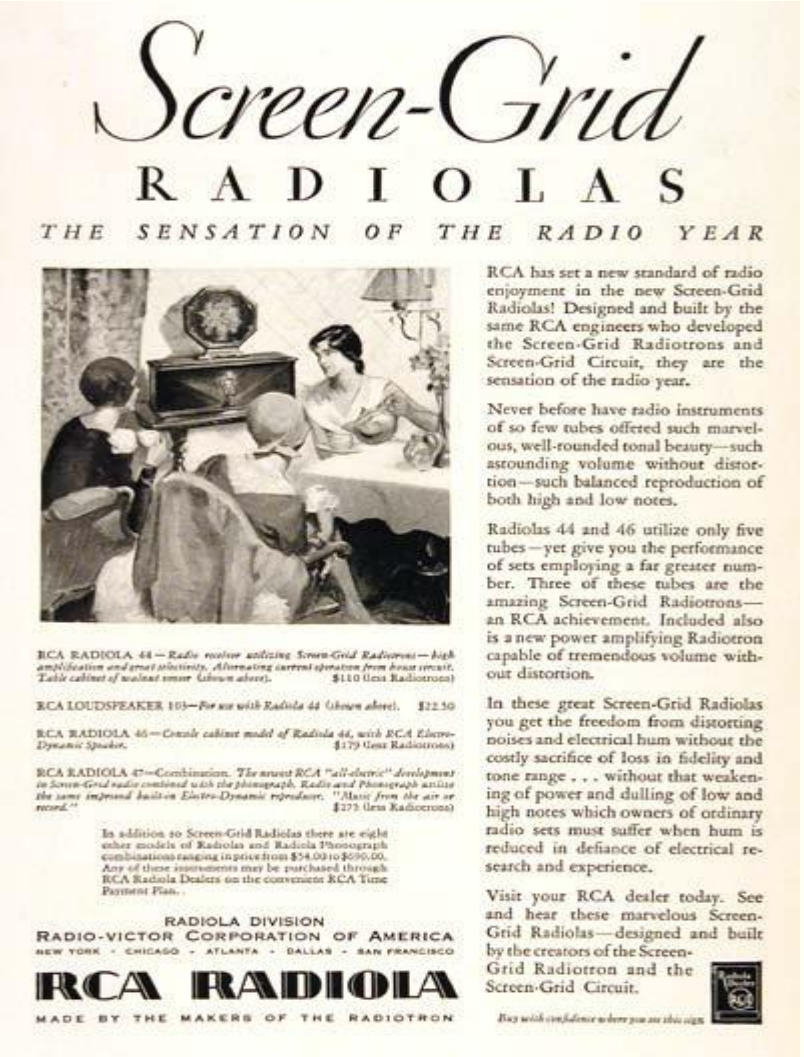
- Radios for Every Home became the marketing theme for RCA Radiolas beginning in 1923.
- GE began to catch up in the manufacturing game and produced many of the Radiola models beginning with the Radiola III, IV
- Shown here is the Radioa V advertisement, promoting the use of dry cell batteries to replace the difficult wet cells of the early 1920's. This was one of the radios introduced in 1923. It used three UV-200's or 201's for its TRF circuit.
- RCA was also busy funding research by Edwin Armstrong that was going to change the radio landscape dramatically in 1924.

RCA and Radiola Introduce the Super-het and other advancements.

- In 1924, RCA took a very drastic step. It stopped all orders for TRF radios that year and gambled that it could introduce the new super-het radio circuit that would change radios forever.
- Indeed, RCA's super-het advancement was one of radio's defining moments. Sarnoff was now the key leader of RCA's radio development and Owen Young came to rely on his judgment in all matters.
- Shown here is the 1924 Radiola Super VIII, an early super-het version that also introduced the console form of radio. It had a self-contained speaker and used six UV-199 tubes. Price: $425!
- RCA continued making TRF radios to hit a part of the market for lower priced radios, and as a "step up"radio for the consumer before the consumer could afford the nice super-het models.

1925-1931: Radiola Is Radio Powerhouse

- RCA continued to be in the forefront of radio development in the latter half of the 1920's.
- Some of its advancements were not necessarily "firsts" (putting aside the super-het development).
- However, RCA was a leader in the conversion from battery sets to AC, a leader in the development of new radio styles, and very significantly in radio tube development.
- RCA also protected all of its advancements with patents and of course, controlled many of the patents for key radio designs including TRF and now the superheterodyne radio.
- RCA also attracted the attention of government regulators as its hardball tactics drew many complaints and perhaps pushed many companies out of business.
- Shown here is an ad for a Radiola 44 from 1929 showing screen grid tubes that improved TRF reception. . This was RCA's last TRF model. Very popular with collectors due to its maple wood cases.



Screen-Grid
RADIOLAS
THE SENSATION OF THE RADIO YEAR

RCA RADIOLA 44—*Radio receiver utilizing Screen-Grid Radiotrons—high amplification and great selectivity. Alternating current operation from house circuit. Table cabinet of walnut veneer (shown above).* $110 (less Radiotrons)

RCA LOUDSPEAKER 103—*For use with Radiola 44 (shown above).* $22.50

RCA RADIOLA 46—*Console cabinet model of Radiola 44, with RCA Electro-Dynamic Speaker.* $179 (less Radiotrons)

RCA RADIOLA 47—Combination. *The newest RCA "all-electric" development in Screen-Grid radio combined with the phonograph. Radio and Phonograph utilize the same improved built-in Electro-Dynamic reproducer. "Music from the air or record."* $275 (less Radiotrons)

In addition to Screen-Grid Radiolas there are eight other models of Radiolas and Radiola Phonograph combinations ranging in price from $54.00 to $690.00. Any of these instruments may be purchased through RCA Radiola Dealers on the convenient RCA Time Payment Plan.

RADIOLA DIVISION
RADIO-VICTOR CORPORATION OF AMERICA
NEW YORK · CHICAGO · ATLANTA · DALLAS · SAN FRANCISCO

RCA RADIOLA
MADE BY THE MAKERS OF THE RADIOTRON

RCA has set a new standard of radio enjoyment in the new Screen-Grid Radiolas! Designed and built by the same RCA engineers who developed the Screen-Grid Radiotrons and Screen-Grid Circuit, they are the sensation of the radio year.

Never before have radio instruments of so few tubes offered such marvelous, well-rounded tonal beauty—such astounding volume without distortion—such balanced reproduction of both high and low notes.

Radiolas 44 and 46 utilize only five tubes—yet give you the performance of sets employing a far greater number. Three of these tubes are the amazing Screen-Grid Radiotrons—an RCA achievement. Included also is a new power amplifying Radiotron capable of tremendous volume without distortion.

In these great Screen-Grid Radiolas you get the freedom from distorting noises and electrical hum without the costly sacrifice of loss in fidelity and tone range . . . without that weakening of power and dulling of low and high notes which owners of ordinary radio sets must suffer when hum is reduced in defiance of electrical research and experience.

Visit your RCA dealer today. See and hear these marvelous Screen-Grid Radiolas—designed and built by the creators of the Screen-Grid Radiotron and the Screen-Grid Circuit.

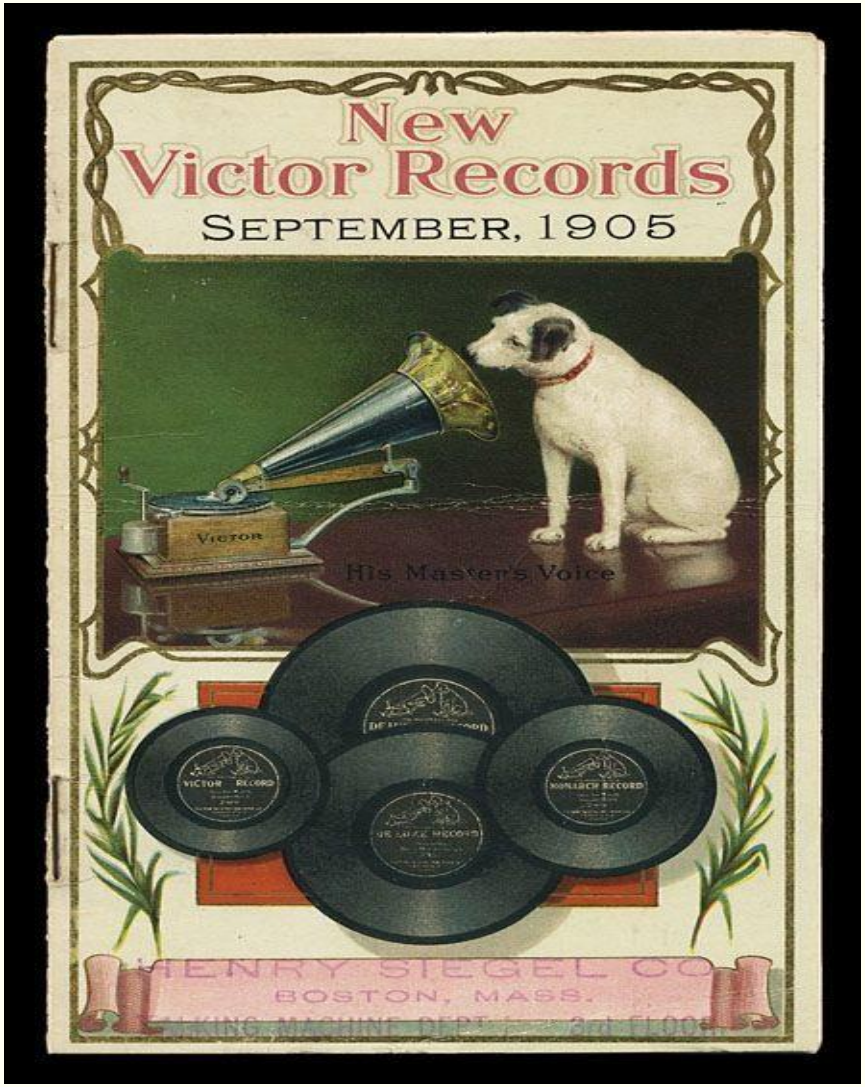
Buy with confidence wherever you see this sign

V. 1932: RCA Becomes Independent and Begins to Manufacture Radios

- By 1930, GE and Westinghouse, through RCA, effectively controlled a monopoly in many areas of radio development and production.
- Most radio manufacturers needed licenses from RCA and they did not like it.
- The US government initiated an antitrust case in 1930. The settlement required GE and Westinghouse to divest their interests in RCA and RCA was freed from the requirement that those companies build the radios.
- More importantly, RCA owned all of the patents so GE and Westinghouse had to enter into licensing agreements with RCA!
- And, to allow RCA a chance to get on its manufacturing feet, GE and Westinghouse could not build radios for 30 months beginning in late 1932.
- An ad for one of RCA'S early model cathedral radios, the R-28 "Superette" super-het model.

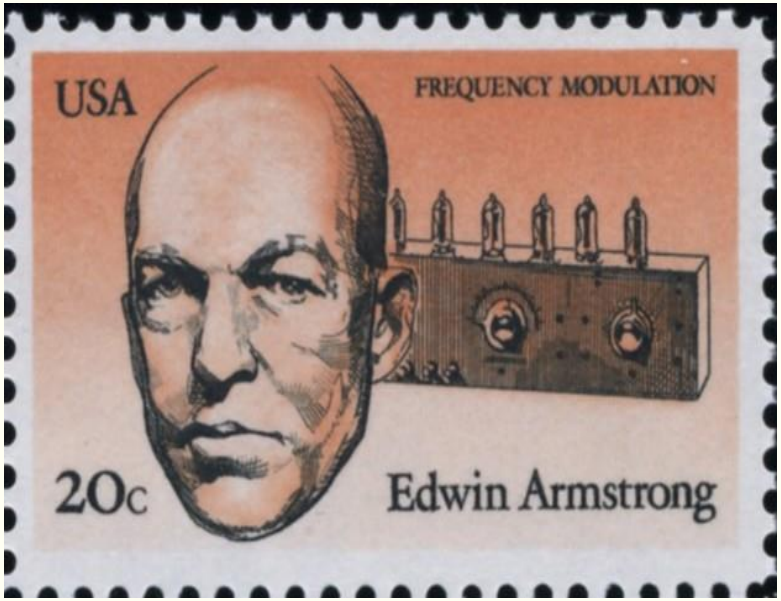
VI. RCA and Victor Talking Machines

- RCA was prohibited in the 1920's from making radios and radio parts. But David Sarnoff could see opportunity in a struggling company that was drastically affected by radios popularity: Victor Talking Machines
- The genius here was that Sarnoff entered into development agreements with Victor in the mid-1920's to combine radios with phonographs.
- Victor was the world's largest phonograph and record maker but it suffered from radio competition.
- In 1929, RCA acquired Victor and its manufacturing plants. These facilities were crucial in 1932 when RCA needed to make its own radios.



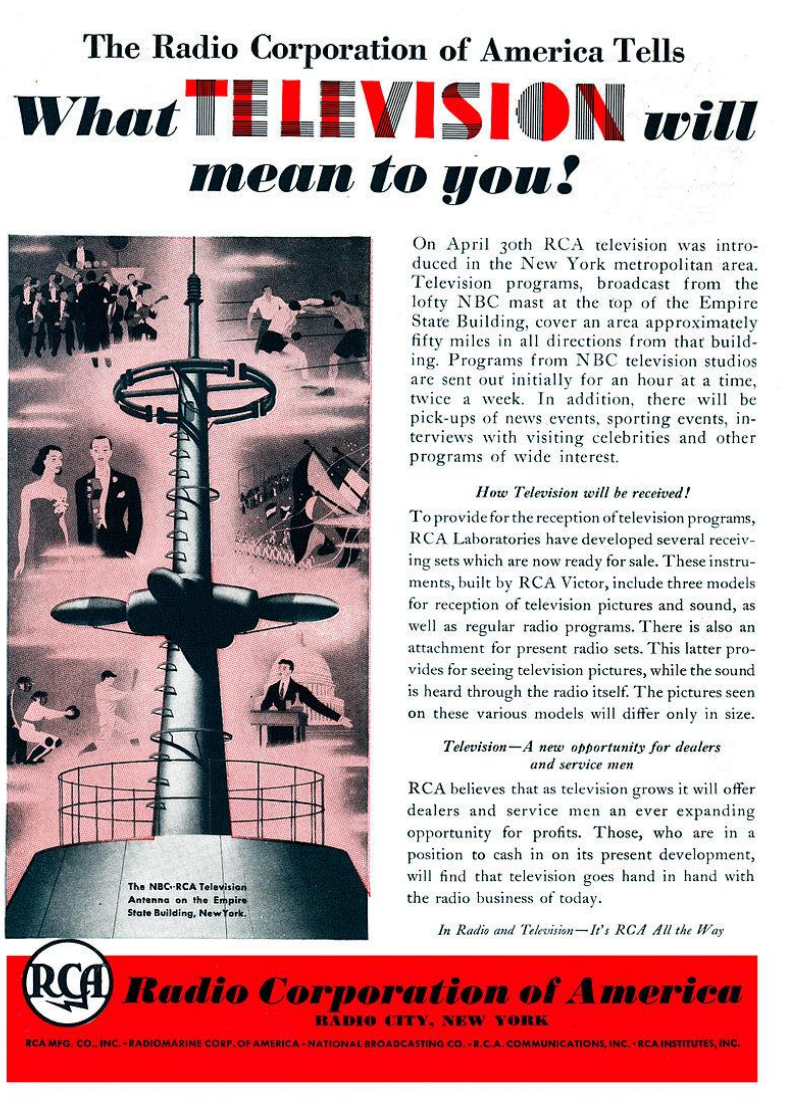
VII. RCA and FM Radio

- In 1928, Armstrong secretly began to research frequency modulation, an idea he started working on in WWI. The goal was to improve radio reception and listening for the consumer.
- Armstrong had an agreement to show RCA his research first. To his surprise, Sarnoff turned a cold shoulder to FM. Why? Because it would turnover radio manufacturing at a time when radio manufacturers were dealing with the depression.
- Additionally, Sarnoff had his own side project starting at this time: television.
- Armstrong developed very hard feelings for Sarnoff after this.



VIII. RCA and The Promise of Television

- During the 1930's, David Sarnoff employed physicist Vladimir Zwoykin to research and develop a working television system. Sarnoff saw television as the next "radio" for households.
- Television was not an idea exclusive to RCA. Others were doing research including Philo T. Farnsworth who worked in the San Francisco area on his television prototypes through out the1920's and 1930's.
- Sarnoff visited Farnsworth and arranged for Zwoykin to see his advancements.
- Farnsworth believed that Zwoykin stole some of his key ideas during that visit and he engaged in continual litigation with RCA well after WWII.



RCA and Television cont.

David Sarnoff broadcasting from the New York World's Fair, 1939

RCA and post-WWII Television

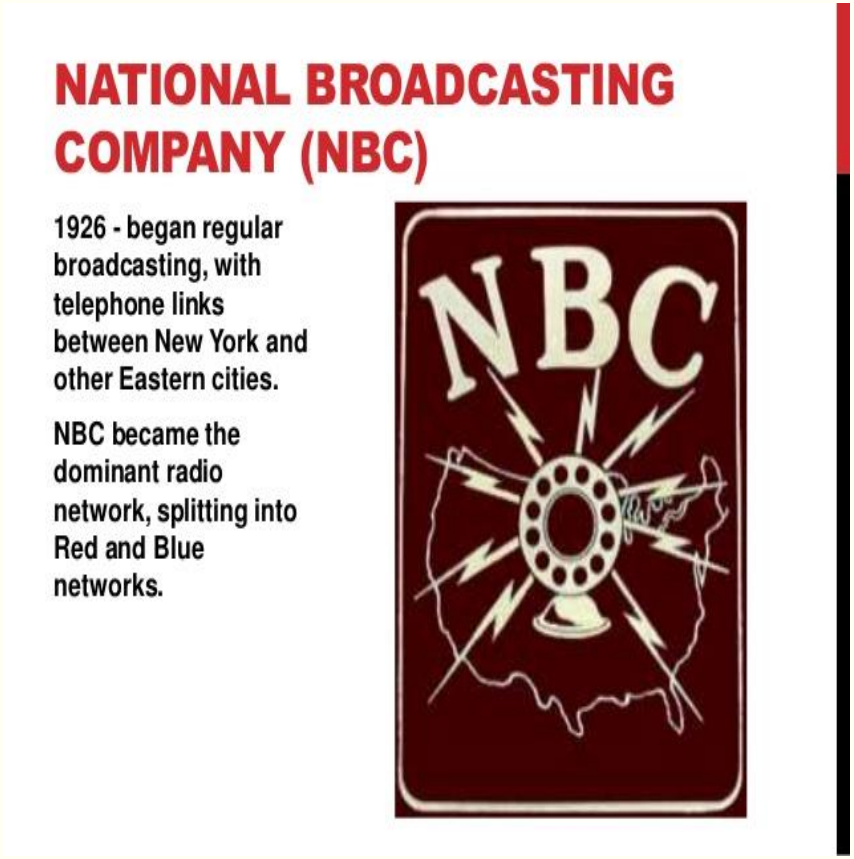
- After WWII, RCA was a major player in the research and development of television, television broadcasting, and color television introduction. Shown here at right is the first true consumer television introduced by RCA in 1946, the model 630 TS. At left, Time put David Sarnoff on its cover for the second time, here in 1949 celebrating RCA's advancements in color television.

IX. RCA and Broadcasting

- Sarnoff's "Music Box" vision led him to become a pioneer in radio broadcasting. Westinghouse actually preceded RCA in developing commercial broadcasting. However, AT&T created a network of commercial radio stations in the mid-1920's (starting with WEAF in New York, now WFAN AM 660.) More importantly, AT&T controlled both the key broadcasting patents and the telephone lines allowing radio stations to broadcast the same programming simultaneously.

- Sarnoff convinced Owen Young to start up a competing network that became the National Broadcasting System. However, the cost to develop programming was very high and the venture almost came to an end.

- But not quite. AT&T decided to sell its radio broadcasting unit outright to RCA in 1926. RCA gained access to AT&T's phone network. And with a monopoly on programming, RCA found broadcasting to be a very profitable business for many years to come.

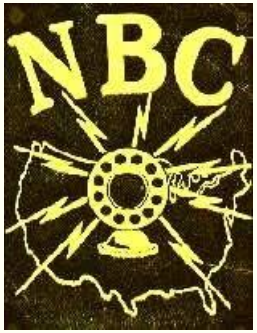


Sarnoff Promoting RFE, circa 1947

Marconi's Inventions and Developments Contributed to a Nobel Prize

Sarnoff at His Desk, Circa 1950's

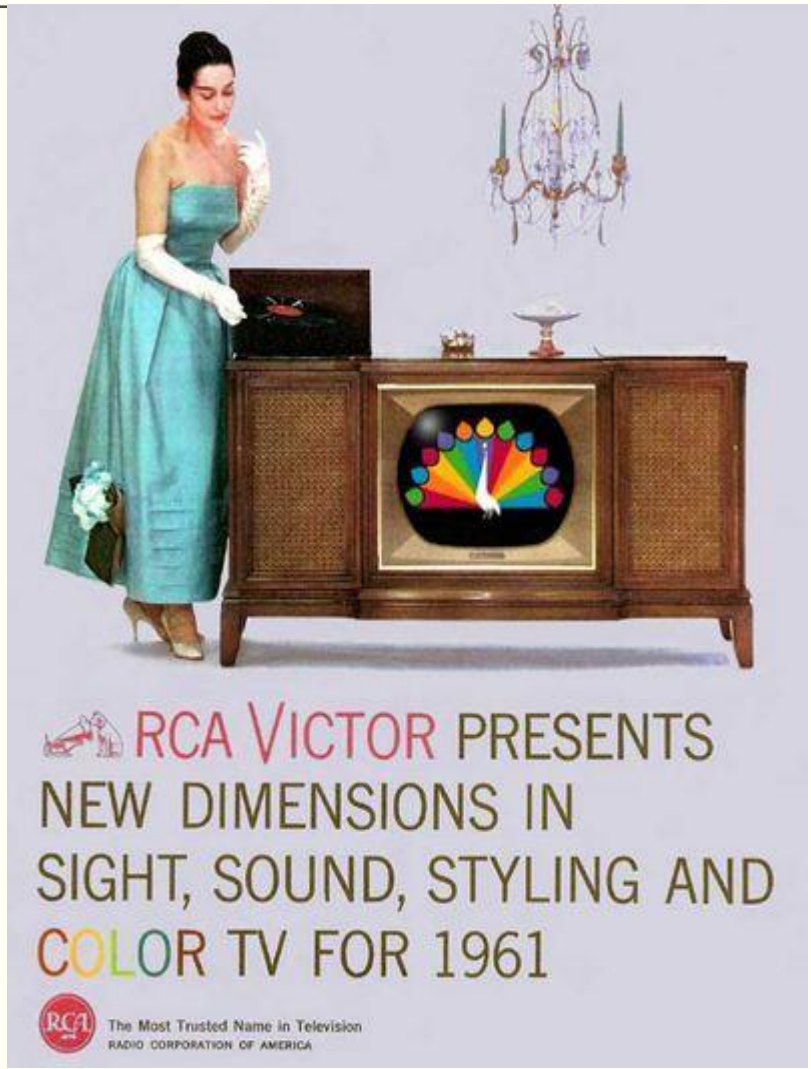
FDR Fireside Chat, 1934



RCA Advertising…

TAKE A LOOK

.....not sure what's being promoted here, although there is no brand name present, the TV is that of a 19" RCA from 1950. I beleive this was originally the top part of a calender. the "take a look" text appears in the original



Armstrong on Top of the RCA FM Antenna; on the Cover of Radio Craft