ANTIQUE RADIO COLLECTORS & HISTORIANS (ARCH) OF GREATER ST. LOUIS

ARCH CLUB NEWSLETTER

MARCH 2025

Special points of interest:

Join us for our next meeting:

April 11th, 2025 at 6:30 PM

Maryland Heights Community Center
300 McKelvey Road,
Maryland Heights, MO 63043

Meetings are temporally being held at in Maryland Heights Community Center while the Kirkwood Community Center is being re-finished.

Meeting Notes:

I, Anthony Rossetti ARCH secretary, was unable to attend the March meeting due to being out of the area. I am unable to provide a full report of what occurred at the meeting. Joe Tauser sent me pictures and a small summary of each presentation. I was also sent the PowerPoint slides Canio had used with his demonstration. These individuals have made this newsletter news worthy. I must state… being at the meeting is not close to simply reading this newsletter. Hope all members can make it to a future meeting. First hand attendance is great to experience.

Old & New Business

Antique Radio Club of Illinois holds virtual radio forums on Zoom. Join their mailing list, for free, to be invited to these radio forums. Forums occur March 22, May 17, Oct 11, Nov 15 starting at 10:00 AM. This is a great way to learn more about the antique radio collection hobby.

River Hills Hamfest

April 12th, 2025
Fraternal Order of Eagles Perryville
2746 W. St. Joseph St.
Perryville, MO 63775

Club dues for calendar year 2025 is again $20.00 dollars. Please support the club and become a paying member. Dues go toward the Christmas party, room rental, and club picnic events.

Show and Tell —March Meeting

Canio Vaccaro— 1928 Bosch Model 28

This was Bosch's first AC powered radio. Similar to an RCA Radiola's construction. An all wood "coffin" table top radio. A TRF receiver with single dial tunning consisting of four (4) ganged AM circuits.

The cabinet restored after restoration. There was water damage on the cabinet. The bottom was also warped and split. Flaking of the finish was dealt with via professional methods of restoration.

Canio went through and repaired all the point-to-point wiring. The insulation was falling off. Capacitor replacement was required along with the Bias resistors on both 'B' and 'C' power supplies. The wires and parts were done with keeping a period authentic appearance.

Notably, the unit had glass resistors! Glass resistors were used by a few radio manufactures. (Glass resistors, were simply a resistor mounted with in a glass tube.) The glass tube reduced leakage and while keeping humidity out.

As Acquired Cabinet Photos

Canio Vaccaro—1928 Bosh Model 28 (Continued)

As Acquired Receiver Chassis Photos

Notice corrosion on tunning capacitor.

Restored Radio Chassis Top View

Carl Kleinsorge — 1938 Crosley C648-B

Carl restored this Crosley AC/DC radio. This radio employes five tubes along with a ballast tube. Shown here working with the original tubes. This is remarkable as the ballast tube is known not to last as long as other tubes. NOTE: Ballast tubes are tubes that either reduce or limit voltages at other parts of the radio. The ballast tube, are simply large resistors within a glass or metal enclosure. The use of ballast tubes can be used to replace resistive AC line cords in some radios.

Note: Four buttons on top, above the gold vertical dial, are station presets.

Joe Tauser — 1972 Brother VX-33 "Aquatron"

This radio is also known as "The Egg". A solid state AM/FM radio with an internal 8 track player. The early 1970s consisted of many space-age designs. This was RCA's space age radio for the time. Joe was required to replace all the electrolytics within the amplifier and tuner stages. After this occurred, the radio started working great!

New belt on the 8-track player was needed due to deterioration. Joe demonstrated the playing of an 8-track tape to club members. (The first time an 8 track was demonstrated within the editor's memory.)

The front cover removed illustrates it's component layout.

Steve Groppe — 1937 Grunow 508

This is a 6 tube super-het radio offering 3 separate bands of reception. This is a stunning radio due to its wooden cube case. Grunow's "All Wave" tunning consisted of reception between 550-kHz thru 18,000-kHz. Cabinet had major damage when obtained. Steve repaired, stripped, and refinished the cabinet.

This was one of the last models Grunow sold. Notably, the circuit is a copy of a Zenith circuit. The radio was manufactured by General Household Utilities Company in Chiago, Illinois for Grunow.

Front and Rear of radio. Note metal tube covers. Metal tube covers, grounded to the chassis, were to reduce/prevent unwanted noise and interference. Speaker is on the top of the cabinet.

Bill Petti — Various Painted Bakelite radios. Belmont "Ladyfingers", Stromberg Carlson, and an unknown

Bill exhibited three radios he cosmetically restored. These working radios are visually appealing on any radio shelf!

Ladyfinger's radio is on the right. Named this due to the four preset buttons looking like a woman's long fingers.

Directional Antenna's Used with AM Broadcasting

In the early years of AM radio broadcasting, all stations utilized nondirectional antennas. Most all of these were wire antennas suspended between towers or buildings. Interference, especially at night, was severe. An interfering signal of 5% or less in signal strength was enough to disrupt reception of the desired station, and if the frequencies of the two stations were slightly separated, there would be a heterodyne beat note. As a result, only a few widely-spaced stations could operate on each of the AM broadcast channels in the entire country at night. This limited the number of stations that could coexist to about 500 nationwide, with many of them sharing time on a single frequency.

As antenna technologies were developed and improved in the early 1930s, a few progressive stations began experimenting with multi-element directional arrays. This approach offered two attractive benefits:

1) It could reduce radiation towards other stations on the same or adjacent frequencies, permitting more stations to share a frequency; and

2) A broadcaster could direct more signal towards the desired coverage area, and away from wasted areas such as open water in the case of coastal stations.

WFLA (Florida Station) vs WSUN (Minnesota)

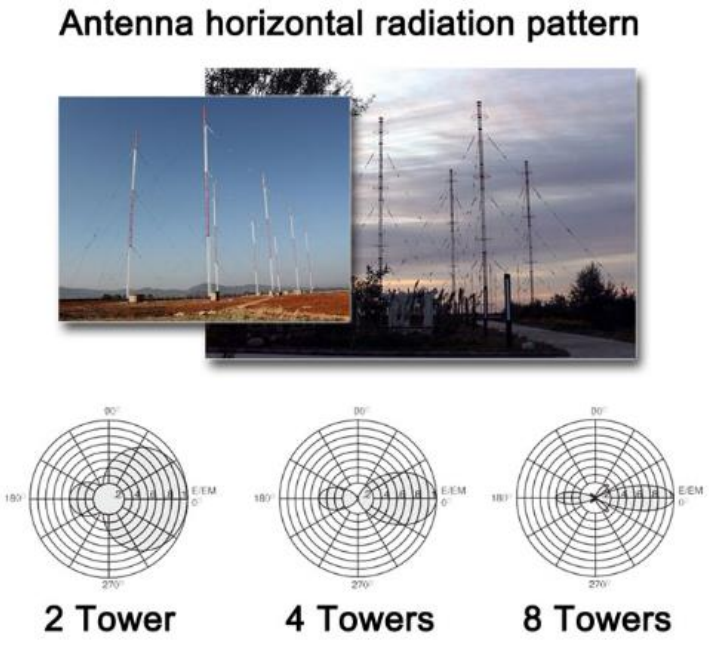
The first known use of a directional antenna was by a pair of stations in Tampa/St. Petersburg, Fla. In 1927, the Clearwater Chamber of Commerce acquired station WGHB and changed the call sign to WFLA. A companion station, WSUN, was operated by the St. Petersburg Chamber of Commerce. The two stations shared the frequency of 900 kHz, broadcasting on alternate evenings to promote tourism and business opportunities in their respective communities. In reality, they operated with two station licenses, but there was only one transmitter and one antenna.

In 1929, in a nationwide realignment of radio frequencies, the Federal Radio Commission moved WFLA-WSUN to 620 kHz with a power of 2 kW daytime and 1 kW nighttime. Immediately, WTMJ in Milwaukee, Wis., which also operated on 620 kHz, filed an objection with the radio commission, stating that its coverage was being impacted by interference from the Florida stations. The commission responded by reducing WFLA-WSUN's power to 500 watts daytime and 250 watts nighttime. This news was distressing to the two chambers of commerce — at those power levels, they would not have the nighttime coverage they needed to promote their communities to the rest of the country.

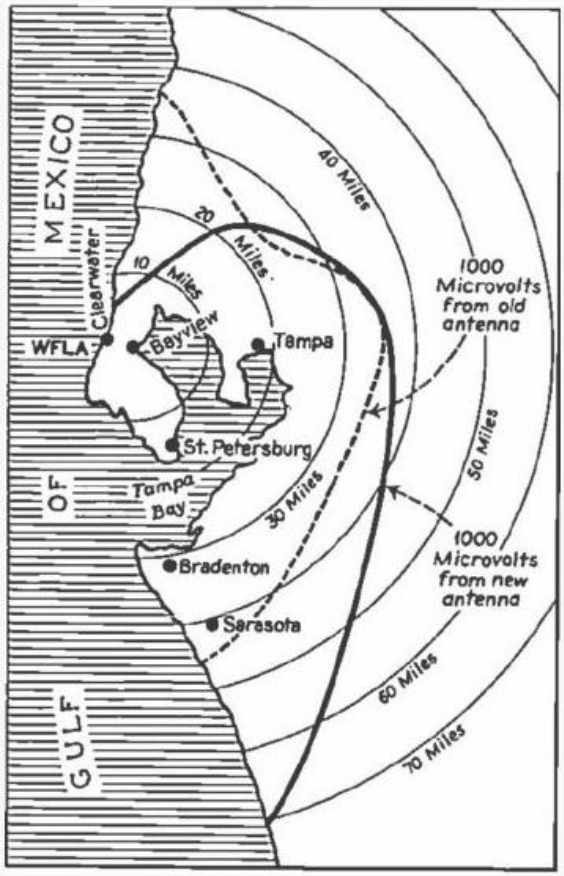
WFLA-WSUN contacted a Washington consulting engineer in desperation to try and find a solution. That consulting engineer was T.A.M. Craven, a former high-ranking naval communications officer who had resigned his commission in 1930 to go into private practice as a radio consulting engineer.

Craven, in turn, called on Dr. Raymond Wilmotte, a British radio engineer who had experimented with radio direction-finding technologies in Europe. Wilmotte immigrated to the USA in 1929 and was working for the Boonton Aircraft Corp. Craven encouraged Wilmotte to leave his job and open his own consulting practice. Together, Craven and Wilmotte proposed the erection of a directional antenna that would reduce WFLA-WSUN's radiation towards Milwaukee, allowing the stations to operate at a higher power level.

At first, the owners were skeptical of investing in an untried technology. Other equally-respected engineers believed that a working directional antenna was not possible — they thought the ionosphere would distort the signal's directional properties. But Wilmotte was certain it would do the job, and he proposed that he not be paid unless the project was a success. With such an assurance, WFLA-WSUN gave him the go-ahead.



Wilmotte had two base-isolated vertical towers constructed. Each was 200 feet high, separated by a quarter wavelength on a bearing towards Milwaukee. The towers were on opposite sides of what is now the Courtney-Campbell Causeway in Clearwater. The power from a new 5 kW Western Electric transmitter was divided at the transmitter building and sent to each tower via open-wire transmission lines suspended from poles. The system was configured so that the two towers could be operated in-phase during the day and 90 degrees out of phase at night, creating a cardioid pattern with a sharp null towards Milwaukee.



WFLA-WSUN in Clearwater, Fla., built the country's first AM broadcast directional antenna in 1932. This coverage map shows how the signal was reduced to the north of the transmitter to protect a Milwaukee station, while improving the signal to the east, west and south. The image is from Radio Engineering magazine, June, 1934.

The first tests were conducted in May 1932. There were lots of trial-and-error adjustments as they became educated in the unexpected complication of mutual impedances (the adjustment of one tower would change the tuning of the other tower). Finally, a precise adjustment was achieved and the system worked even better than expected — so much so that the government engineer in Atlanta who was assigned to measure the signal strength asked why the station was off the air — he could not hear the signal at all!

This feat of engineering immediately caught the fascination of the country's broadcasters, and it boosted the careers of both engineers. Broadcasting Magazine foresaw the significance of directional antenna technology when it wrote:

"The day when broadcasting stations will be enabled to predetermine their coverage and actually steer the course of their signals in given directions is envisioned … Interference troubles, through the use of this new directional radiating system, can be sharply curtailed, and at the same time make possible substantial increases in coverage in given directions, by putting the punch in the signals covering desired markets, and by cutting off propagation over useless areas."

WFLA-WSUN was allowed to increase its power, and operated successfully from the two-tower system for the next 18 years. (The stations separated in 1941 when WFLA moved to another frequency and both became full-time.)

A few years later, T.A.M. Craven would become the FCC's chief engineer, and then was appointed by Franklin Roosevelt as an FCC commissioner. He held the position from 1937 to 1944, and was the only engineer ever to serve as a commissioner. For his part, Dr. Wilmotte went on to patent an anti-fading two-section vertical AM antenna. He also helped create direction-finding systems for airports, was involved with the development of radar, and then joined RCA to help develop the first communications satellites. In the 1970s, the FCC tapped him to develop a high-performance UHF-TV tuner. He died on Jan. 27, 2000, at the age of 98.

In Conclusion….

By 1940, directional AM antennas were enough of a proven technology that dozens of stations were using them to obtain power increases or full-time operation. But in the years before computers, the current and phase parameters for each tower needed to be calculated by hand. This was mathematically complex and tedious process, and was understood by only a handful of expert radio engineers. The few who had early knowledge of these systems, such as T.A.M. Craven, were doing brisk business designing new antenna systems. By the start of World War II, there were 646 AM radio stations on the air in America, and 39 of them were using directional antennas.

In the early 1940s, Carl E. Smith (Cleveland Institute of Radio Electronics) built an elaborate electro-mechanical device that could calculate and draw antenna patterns. He published a 238-page book in 1936 that gave the parameters for over 15,000 possible two- and three-tower directional patterns. The publication of this reference work greatly simplified the design of directional arrays and made it easier for their design and construction.

When the wartime freeze on FCC applications was ended, hundreds of applications for new AM stations were submitted, with many specifying the use of directional antennas. Between 1940 and 1950, the number of AM stations in the USA tripled to 2,000, and then increased again to 4,000 by 1970. This was all made possible by the use of directional antenna technology. Today, the United States enjoys the greatest number of AM stations of any country in the world, and there are more directional antenna systems in the U.S. than all other countries combined.

Additional information related to this story can be read at:
The Development of the Directional AM Broadcast Antenna - Radio World

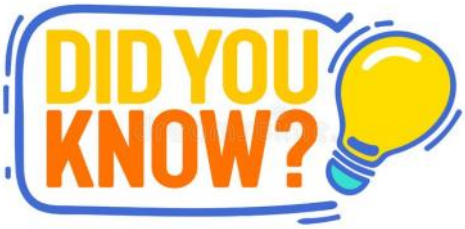
Novelty Radios

When transistors were invented, many radios were made smaller and cheaper! Radio manufacturing became so "cheap", radios were eventually made into novelty products. Here are three examples of novelty radios that some members may recall seeing long ago. Editor's Note: I will show some additional interesting novelty radios within future newsletters.

A 1950's gas pump. This was sold at Getty gas stations.

Radio disguised as a spray can of clothing starch/

AM radio made to look like an automotive oil filter. This radio was sold at Texaco stations in the 60s and 70s. Speaker is on the bottom facing downward.



In July 1956, National Bureau of Standards radio station KK2XEI in Boulder Colorado started test transmissions at 60-kHz with a power of 2,000 watts. The antenna's radiated power output was a tiny 2 watts, yet reception at Harvard University was reliable. In 1965 the addition of a binary-coded time code started occurring on this signal. This effort expanded over the next several decades. Today 70kW of radiated power, from a better antenna, permits North America atomic clocks to set themselves nightly. The station is known today as WWV, WWVH, and WWVB

Question: *What engineering advancement of AM station transmitters resulted and permitted the United States to have an explosion of AM stations between 1940 and 1950? Without this engineering advancement, the number of United States radio stations would have been limited to 2,000 or less.*

Answer: *Prior to 1940, there were only omni-directional AM antennas. It was discovered, around this time, vertical transmit antennas were better than horizontal antennas. (Vertical antennas provided a better sky wave propagation at night.) Due to omni-direction antennas, numerous station would interfere with each other at night. Reducing power levels was not the solution in many areas. With directional, multi towered antennas, concertation of the signal to a specific region permitted two stations to operate near each other at night without interference.*

Most directional antennas employee 2 or 3 towers spaced apart. At one time, there were 15 stations in the US that employed 8 or more towers to obtain the desired signal pattern.

Question for the April Newsletter:

Why are many films of the early days of motion picture film not preserved today? The film media was indeed unstable resulting in self-combustion causing multiple fires. However why did the film manufactures get rid of the film?

Radio Quote Of The Month:

Marlyn Monroe had an interesting quote with respect to a famous risqué calendar photograph taken of her. Marlyn was asked if it was true she had nothing on when she proposed for the calendar picture. Marylin's response was, "*It's not true that I had nothing on, I had the radio on.*" Marylin's response illustrated to others that she could handle the press well… and was a very clever person when many perceived she was not.

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