



The

# Broadcasters' Desktop Resource

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... edited by Barry Mishkind – the Eclectic Engineer

## High Powered History

[January 2011] For many years, high-powered broadcast transmitters often filled entire rooms or even several floors of a building. The stories about these massive transmitters - and the men who built and operated them - continue to fascinate readers to this day. High Powered History will look at these stories. And we start with some of the history of what truly was the first "Big One" in the world: WLW.

Powel Crosley, Jr. was a manufacturer who rarely did things on a small scale. He was a product of the early 1900's, a time when assembly line techniques were used to mass produce products, changed the lives of many people.

When mixed with the new technology of radio and Crosley's brilliance as a marketer, it became a real game changer.

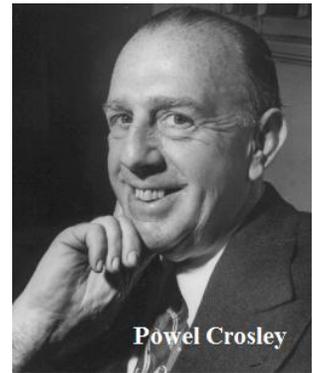
That he did this with the technology of the 1920s and 1930s only makes it more impressive.

### SMART MARKETING

At first, Crosley considered radio nothing more than a toy, his real interest was automotive. But one day he was shopping with his son and was stunned to find the minimum cost of a radio receiver in those days was \$100 - several month's wages for the average worker.

As Crosley was a practical man, he spent 25 cents for the book "The ABCs of Radio," then purchased parts and built his own receiver. Realizing many others would be interested in having a receiver, but probably could neither afford nor build their own, he decided to design and build cheaper receivers the masses could afford.

Crosley started making radio receivers in 1921 with the Harko Junior.



The original Harko

The sales of the Harko in the 1921 Christmas season were so successful that Crosley stopped building anything else but radio receivers.

## PROGRAM PROVIDER

Of course, in those days, selling a receiver required something we today take for granted: programming. Radio was new - and the number of stations was small. So Crosley applied to the government for his own station, and was granted a license for WLW on March 2, 1922. As with all of the "commercial" stations of the day, it was assigned to share 833 kHz.

Of course, the WLW of the early 1920s was nothing like what it would become. A little, curtained studio, made quite warm by the operation of the transmitter, would contain the whole operation. The microphone was essentially a huge, eight-foot horn-shaped affair, with an opening three feet across. The announcer would literally stick his head halfway down the microphone and speak up to be heard.

Records would be played by putting the output horn of the phonograph next to the microphone's input horn. Crosley liked to like to play "Song of India – and did so over and over, announcing the music was coming from "WLW - the broadcasting station for the Queen City of the West." (If you hear a station today repeating one record as a stunt to get attention, just remember that the concept is 90 years old!)

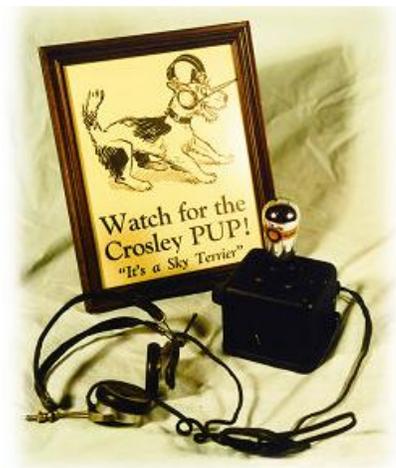
## MORE POWER

However, what made Powel Crosley and his station special was his combination of enthusiasm for the medium and his business sense as a manufacturer. WLW did not suffer from lack of reach. Unlike today, a hundred Watts would reach out quite well. A November 1922 contest garnered letters from 42 states indicating there was a large potential audience - as well as customers for Crosley radio receivers.

Yet, Crosley was far from done. His original thinking that there would be profit in making a receiver that could be afforded by the masses proved to be correct.

So Crosley continued to design cheaper radios, eventually making the Harko to sell for \$9. Another low-priced effort: the Crosley Pup. The key to making this plan work seemed to be in getting more and more transmitted power to the radios.

This need for power led Crosley and WLW to seek an increase to 500 Watts in 1923, then 1,000 Watts in 1924. It was the first US station to use a 5,000 Watt transmitter, in January 1925. Then an effort to reduce competition brought unexpected benefits.



In January 1923, Crosley purchased the Precision Instrument Company, and its station - WMH. The purchase included a spare antenna. And although the WMH antenna used an empty wine bottle for an insulator, it was a vertical antenna. This helped WLW provide better non-directional coverage.

## THE NATION'S STATION

The year 1928 brought WLW to 50,000 Watts. But Powel Crosley wanted yet more. Over the next decade, his quest for selling more radios at lower prices led to an achievement that has never yet been duplicated in the US: the operation of a 500 kW transmitter in 1934.

The coverage from this station was enormous, leading to the very apt slogan of WLW being "The Nation's Station." Requests came from daytime listeners in Hawaii and from Buckingham Palace.



For perspective, notice the man on the catwalk just to the right of the middle post.



The transmitter was a combined effort, led by RCA, and which included design by RCA design, RF sections from GE and control circuitry from Westinghouse.

It was, very obviously, Serial Number 1.

And it was *huge*. The statistics are almost impossible to believe in this day of transistorization. The transmitter was fifteen feet high and sixty feet wide.



Each modulation transformer (left) weighed 35,700 pounds, including 725 gallons of oil, and was about 10 feet tall.

The three parallel power amplifiers used 12 UV-862 PA tubes.

A three-phase substation was constructed to provide the two 33.5 kV power lines came to the transmitter building, 2300 Volts of AC entered the building.

A 70-foot-square pond held the water used to cool the transmitter, which needed something like 10,000 gallons of cool water a minute.



One of the UV-862 tubes, held by Powel Crosley.

Just getting the 72 Amperes of RF current to the tower required a feedline almost 10 inches in diameter.

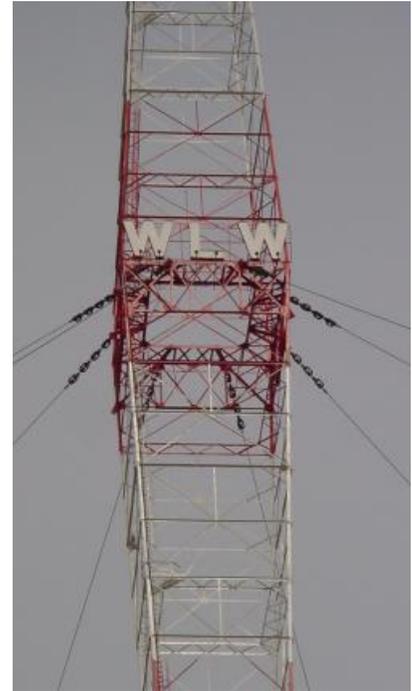
And the tower itself was a wonder of the times, an 872-foot Blaw-Knox construct in a diamond shaped form. Visible for miles, the tower came to well represent the enhanced reach of the station.



It was said that when WLW turned on the big rig the street lights in Mason, OH dimmed. In some homes, lights could not be turned off. And when the transmitter “coughed,” lights blinked all over town.

Operation required as many as 17 operators at a time - and a full engineering staff of 63 - to run it (not to mention an air staff of 190 full and part time performers).

Its reach was awesome. It was truly "The Nation's Station." There never has been another like it in the US.



Today, WLW is still a working radio station, although the 500 kW is but a memory. Those who are new to the industry may have only seen 50 kW transmitters that rival the size of a large refrigerator and, if they are fortunate enough to have been able to visit the WLW site in Mason, Ohio, invariably have been impressed with the site and the remains of the 500 kW transmitter, even though it has not been run in almost 70 years. Just imagining it in operation is a “trip.”

WLW no longer runs regular tours of the site, as they did in the 1930s and 1940s, and access depends upon the limited time and availability of the engineer. Yes, engineer. The staff of 63 now is one person. Of course, with the new solid state transmitters, operation is much simpler and more reliable – and a modern remote control system allows the site to be unmanned most of the time.

However, just down the road, there is what was used to be a sort of “sister site” where the VOA at Bethany Relay OH, transmitters lived. Today, the National Voice of America Museum of Broadcasting, featuring the Jack Gray History of Wireless Museum offers visitors a chance to see a large collection of everything that went into the WLW of old, from microphones to many of the Crosley receivers, as well as some of the large VOA transmitters that beamed programming around the world.

Located at 8070 Tylersville Road in West Chester, OH, the museum is expected to open shortly. For more information, visit: <http://www.westchesteroh.org/CSParksVOA.cfm>

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