100 YEARS OF WCCO

A module of the Pavek Museum's educational mission

COUNTERFACTUAL RADIO HISTORY

"WCCO CELEBRATES 100 YEARS OF SERVICE SEPTEMBER 4, 2022."

Promotion-susceptible radio fans have been told for 95-plus years that WCCO-830's Centenary is October 2, 2024. We will demonstrate that WCCO's story actually began at *9:00 am September 4, 1922, as WLAG*. We make the case in Linear Narrative form with printed news, oral and written history, conjecture, opinion, industry stories and confident conclusions (your author has 60 years' experience in broadcasting and is a WCCO alumnus).

This informal work strives to capture the mood, spirit, dreams and expectations of a group of men and women fascinated by the idea of "radiotelephony" in the early 1920s. We share what we learned about this era…and you might detect a yearning to have lived in their time for a while…

For factual information we credit the Pavek Museum as well as several trade publications identified within. You will also find stories and information courtesy of the *Minneapolis Star*, *Tribune*, *Journal* and the *St. Paul Pioneer Press*. Links to other related information are provided.

Pavek members have asked for *technical* information on WLAG; that's in an appendix. Finally, forgive the noisy look of photos clouded by the mists of time.

For orientation here are some buzzwords of the Radio 20s. Meet: *"radiophone"* (broadcasting), *"radiophans"* (avid listeners), *"Nite Owls"* (we now call them 'DX-ers'), *"radiosets"* (receivers) and *"kcs"* [*kilocycles*], (the term used for frequencies.)

The Radio World of 1922

Our counter-factual journey begins Labor Day 1922. There's plenty of parking at the Oak Grove Hotel, 230 Oak Grove Street near Loring Park in Minneapolis. In the posh 1920 lobby, early art deco signs invite guests to the hotel's 6th floor for a "radiophone adventure."

There behind a large glass window stands a fellow named Paul Johnson, a medical student with a fine voice. Johnson was pressed into appearing this morning as "announcer" by his MacPhail teacher Eleanor Poehler (who had been hired to oversee this undertaking). Next door, engineers are testing an array of batteries and coaxing a bank of motors to begin spinning. (These "motor-generators" will produce the new high power that will revolutionize Minneapolis broadcasting history.)

Mr. Johnson is fixated on his watch and is nervously clearing his throat. He and the staff around him have no notion they'll be setting in motion a 100-year legacy (they might otherwise have been terrified). A glance through the observation window reveals a group of radiophans gathered to see first-hand what they'd been hearing and reading about. "Big-time wireless" was about to arrive in Minneapolis.

The backstory

Historians note that the early 1900s were an era of "magic, dreams, adventure, vision and daring." Folks beheld the marvels of electricity and magnetism and the new wonders that unfolded almost daily. Scientific periodicals crammed the bookstores. Observers of the human scene conjured life in a new world in which strange unknown sounds from far away were appearing through the "aether."

Futurist-writer Hugo Gernsback was building a devoted audience with his excitement over "the wireless" and his view that this latest marvel might be accessible to *everyone*, no matter their technical proficiency.

In March 1922 the *New York Times* boldly declared, *"*In twelve months, radiophoning has become the most popular amusement in America." In 1922 sales of radiosets and do-it-yourself parts suddenly *quadrupled*. The dabblers and radiophans came to include hobbyists, hard-headed businessmen, newspaper publishers, managers, egotists, futurists, salesmen, musicians. They were driven by a desire to share the magic.

Within this populism, sociologists observed a stratification: "Radio" and "Wireless" were being considered the province of men of financial standing looking for new interests. And the province of *boys*. Middle-class boys, not "he-men," who dived into radio and electricity as a means of *belonging*.

Young men were mastering developments that seemed like magic to most. Because their technical absorption coincided with men's interests, boys could earn respect across the social stratum. A broadside of the day declared:

> "IT'S A BOY ERA:
> One of the most wonderful things about the radio is the way the boy takes to it. He can build almost any kind of a receiving set. 'It seems as if (they) have a better insight into the radio than a grown man' said an observer. 'They make short cuts and get along faster than the skilled electricians. At least they see the point quicker than the grownups…It's sure a boys' era."

In many respects these same social mechanisms play out *today*, at a million keyboards in moms' basements.

Adding voices to the "aether"

In the first two decades of the 20th Century men and boys spent thousands of dollars bringing the magic new sounds into the home. When they began their *own* transmissions they kick-started broadcasting. First it was wireless messaging sent to other experimenters. To sanction those activities these baby broadcasters secured federal licenses as "Radio Amateurs." At the time, Amateurs could "broadcast" at almost any frequency.

While Amateurs were using the telegraph key, their audience was limited to those who understood Morse Code. But then came the *radiophone* breakthrough as Amateurs adopted voice transmission. Now *aural* eavesdropping by radioset-equipped listeners was possible. Sometimes unintentionally, Amateur experimenters gained eavesdropper-followers and became "stars."

Dr. Frank Conrad in Pittsburgh was one such star. He was asked by Westinghouse to upgrade his popular Amateur station, for the purpose of sending messages urging the sale of radiosets. With little notice Conrad built that station, eventually licensed as "KDKA," in 1920. Others were walking the same path.

Around the world men, boys and lady Amateurs shared their technical aptitude while ignoring corporate strictures on professional secrets. "Stars" or not, their technical exchanges could be fascinating.

Amateur radio of the early 1900s was in fact the first Wiki.

With Amateurs attracting sizable listening audiences, the fire bells finally rang at businesses with an investment in the potential of mass broadcasting. They just hadn't been paying attention to the experimenters but now arose the righteous dudgeon of major corporations [read: RCA, AT&T, GE, Westinghouse etc.] The big companies wasted little time in seeking a governmental lid on the Amateurs' free-wheeling operations.

And so to 1922

That year Secretary of Commerce Herbert Hoover began a series of trade conferences in Washington so the industry could advise him as to how it wished to regulate itself. These conferences were repeated and updated as the new radiophone business exploded beyond anyone's expectations. It was time to *regain control*.

One of the first rule changes demanded by the major corporations was to reassign Amateur activity to higher radio frequencies not tunable by most listeners. In fairness, Hoover also allowed Amateurs and others to apply for legitimate 'popular-band' radiophone broadcasting licenses if they could prove their qualification to do so. In Minneapolis and elsewhere that concession opened the door for capable radio enthusiasts and, yes, Amateurs.

A risky venture

Joining the radiophone business meant entering an unproven industry with no revenue track record and a requirement for serious capital investment. The faint-hearted need not apply. Yet they did. Those with special foresight understood that few new business undertakings created such enormous consumer interest.

The challenge would be how to monetize that interest. Part of the radio pioneer/investor's collateral was a portfolio of dreams and imagined possibilities…and the wisdom to remain flexible in an industry that was seemingly reinventing itself on a daily basis.

Payback? In the Fall of 1922 an outfit in Britain went on the air as the British Broadcasting Company (BBC). Among observers of the BBC's "set-licensing" model there arose a debate as to who should pay for (and control) broadcasting opportunities. For the answer it would be necessary to play out this grand experiment. We'll witness that play in Minneapolis.

Meanwhile here's a set of markers. In March 1922 there were 30 valid licensed stations in the country. By the end of 1922 that number was over 500. In the Twin Cities, WLAG's would not be the *only* signal but it would be singular in its power and dedicated channel spot.

The birth of WLAG

Speculation capital for radiophoning ventures was apparently available in the Twin Cities. The opportunists needed someone to identify risks and point the way. Investors looked to the experimenters.

Among several interested and active radio groups were the Twin Cities Radio Club and the grandly labeled Executive Radio Council of the Twin Cities. These clubs and others sustained the swelling of enthusiasm and interest. Their members would be involved in several radiophone startups in the 1920s (many of which failed after their short time in the sunshine). Among them were station start-ups by the three local newspapers.

This assemblage of Amateurs and experimenters included two significant players who wanted to legitimize Twin Cities radiophone activities. The two operated in public view but moved behind the scenery as necessary.

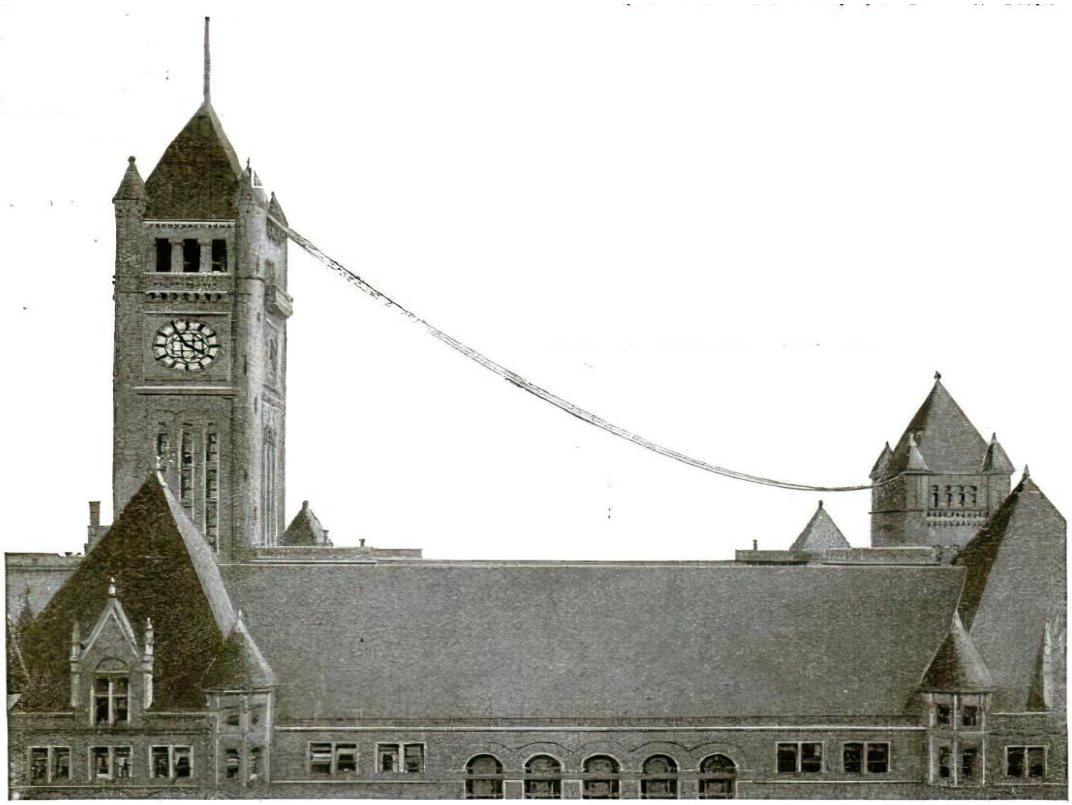
One was instrumental in crafting emerging government broadcasting regulations. The other operated from his own power base and had a direct impact on our station of interest, both when it was WLAG and later when its call-letters became WCCO.

Cyril Jansky made his bones at the University of Wisconsin and began teaching technology at the University of Minnesota (the "U") in 1920.

Jansky's qualifications and his reputation stood for a great deal in Washington in the crafting of federal regulations. His was a quiet insistence that fair play had to be exercised in the assignment of radiotelephone licenses. At home, as any experimenter would do, he spent hours at his workbench. At the "U" campus in the Twin Cities he built experimental station 9XI. In January 1922 9XI became WLB, now KUOM. Thus Jansky was the progenitor of the present-day University radio service that pre-dated WLAG.

Also hovering over Minneapolis radiophone activity was **Don Wallace**, a well-connected amateur radio operator. Wallace was considerably more visible than his compatriot. His detractors called him the "self-styled King of the Kilocycles." We'll fondly label him "Sheriff of the Airwaves."

At times he was a "Dennis the Menace" in radio experimentation. Perhaps his most visible early stamp was in the air above Minneapolis City Hall where his wireless club erected a "flat-top" antenna in 1915. ("Flat-top" or "T" antennas are described in detail in the appendix.)



Take a look at this City Hall antenna for Wallace's 50-watt experimental station and imagine how many municipal regulations that would have violated today!

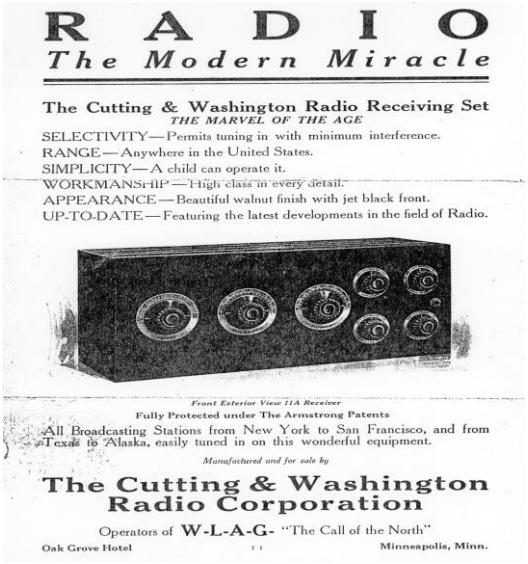
In 1923 Wallace received the "Hoover Cup" for operating "the best amateur code station in the country." Don was a rather serious chap and he certainly spared no effort in the pursuit of technically excellent transmissions. He shared his knowledge with listeners in a radio-guidance column in the Minneapolis Tribune. Wallace also spent a good deal of time chasing illegal Amateur operators (did he report them to the Feds)?

So Minneapolis had its active Amateur clubs and a cadre of well-to-do businessmen who saw a radiophone operation as a great hobby and perhaps a business. Several are mentioned in the many histories of early WCCO operation. One such, Mark Fraser, would pursue a license as a commercial venture after watching how Frank Conrad's KDKA operation successfully leveraged the sale of radiosets.

Mark Fraser was a recent graduate of World War One and he came home to Minneapolis in early 1922 with a manufacturing/marketing agreement under his arm. "Cutting and Washington" was an East Coast outfit designing high-performance radio receivers. Fraser found their products of interest and carried home their standard franchise language: He could build and sell Cutting and Washington sets in Minneapolis *if* he associated with "a radio outlet employing a 500-watt Western Electric transmitter."

That condition seems awfully specific until you know that 500 watts was often the Feds' power limit…and that Western Electric was making the only good broadcasting equipment at the time. If Cutting and Washington wanted to sell their sophisticated radio sets they'd want a demonstration station of the highest quality.

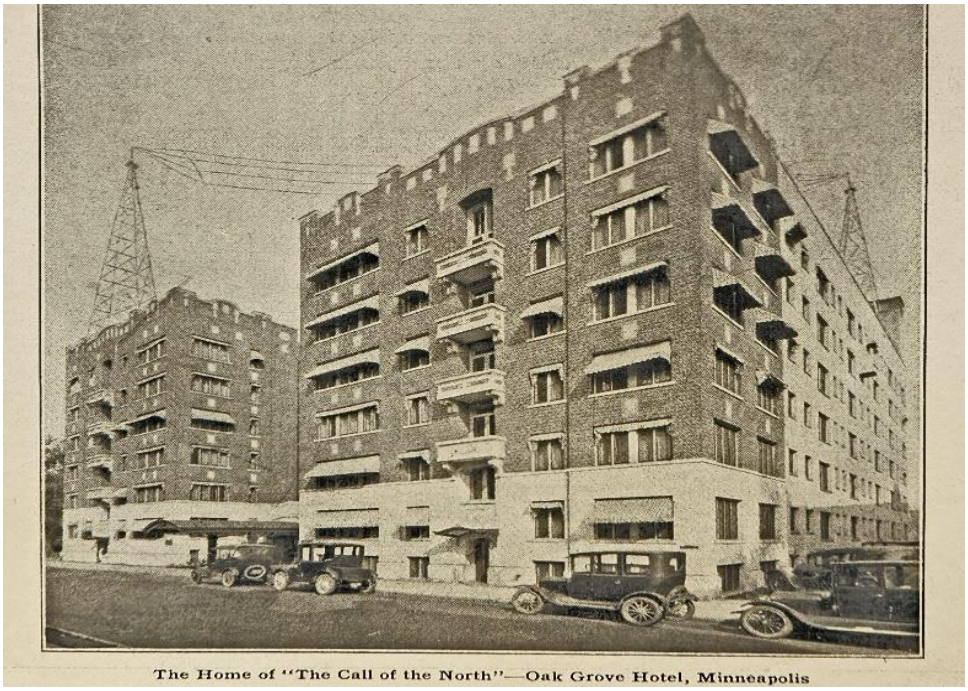
Fraser would build such a station. He knew he could obtain financing from his associate Walter Harris; himself an enthusiast seeking an entry into the radiophone profession. Other Twin Cities businessmen were canvassed and major retail and service companies came aboard. A first-year estimate of $35,000 was to support the purchase of the Western Electric transmitter, the flat-top antenna and the studio equipment. The investment would also underwrite a lease that included a conversion of three 6th-floor rooms at the Oak Grove Hotel. (That original estimate was exclusive of major program costs. The omission of this line-item cost would return to haunt the project.)



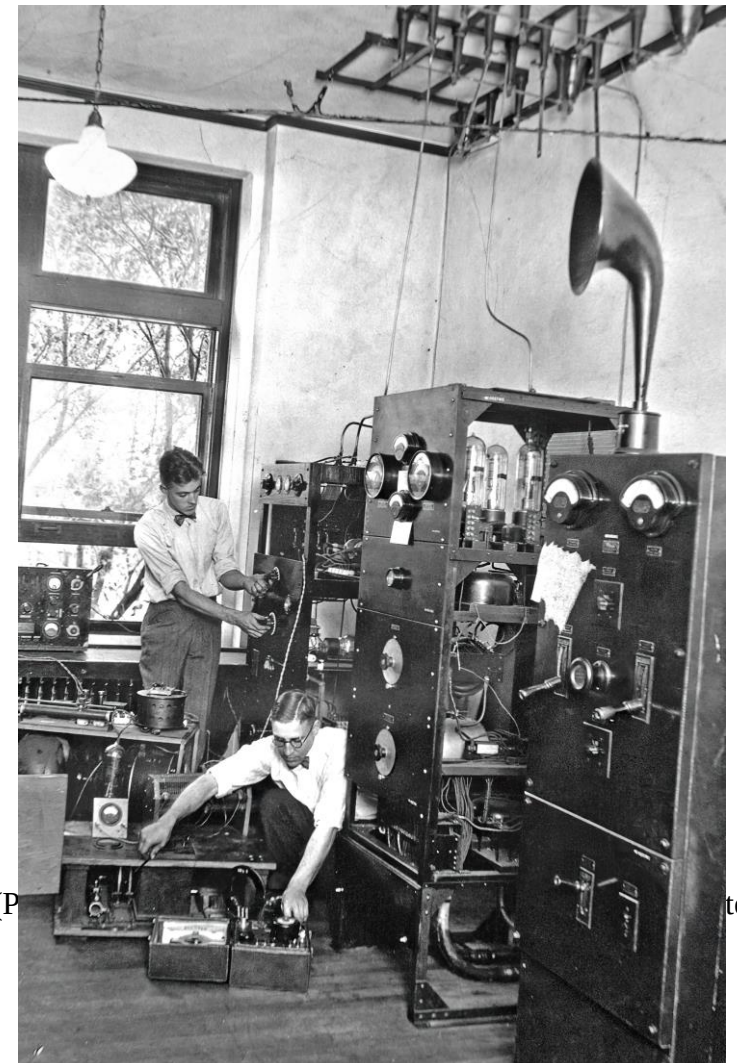
Fraser found what should have been reliable set-manufacturing companies in the Twin Cities. They were to build high-quality radiosets for the Cutting and Washington label. However, the development of this rather sophisticated device turned out to be beyond the capabilities of most manufacturers, and at the end of the day Fraser found himself without a reliable fabricator. Set sales were thus below expectations and the station found itself without that revenue. (That too would impact the station's financial future.)

In mid-1922 the authorization for station "W-L-A-G" was issued by the Commerce Department for 500 watts, on 416.4 meters (720 kcs). (In the beginning most station call letters were issued alphabetically; eventually applicants could request specific calls.)

The news of the new high-power station spread among local Amateur and radiophone devotees like fire in a wheat field. Volunteers flocked to the Oak Grove Hotel to pull wires or to simply gawk and get in the way, "helping" owner Bowden Washington and Chief Engineer Ray Sweet uncrate the steel panels and assemble them into working machinery. The transmitter was installed in a 6th-floor apartment at the Oak Grove Hotel, in a location providing connectivity to the antenna that would hover over the hotel, some 75 feet above the roof.



The Home of "The Call of the North"—Oak Grove Hotel, Minneapolis



Ray Sweet brought his extensive General Electric experience to the project. It became a labor of love for him and for his engineers (mostly ex-navy locals whose ships had been dismantled after the war). Sweet and his crew followed the Western Electric floor plans and they designed and built any technical apparatus they couldn't obtain elsewhere. The workshop had high priority. "We had to build it from scratch" was the response to an observer's inquiry about an unusual piece of equipment. Sweet would become known for his willingness to share his knowledge with the fledgling industry.

Down the hall, the Oak Grove Hotel engineer was coordinating with Northern States Power for the additional electrical service needed in the WLAG suite to power the transmitter.

(P technical details of the WLAG installation.)

As WLAG prepared to open its doors the three local newspapers were surrendering their own early licenses. Radiophone operation didn't match the newspapers' core competencies or business plans and it was *costly*. Many lower-power startups never did have much of a chance. They were assigned to the 360-meter wavelength (833 kcs) along with so many others and they had to time-share their operations. (Dayton's station WBAH would be temporary competition to WLAG but then it too would leave the air.) Among *successful* startups were stations whose call-signs would eventually become KUOM, WDGY, WCAL, WWTC and KSTP.

Anyway…remember the nervous Mr. Johnson?
The *Star-Tribune* of Sept 3, 1922 announced, "Hotel's Giant Radio to Open with Concert*"* and, "New Minneapolis Set is One of Six Largest in the World." No high expectations here!

Johnson knew the mike in front of him was connected to a transmitter that could carry his voice across the country. Nonetheless at 9AM on September 4, 1922 he straightened his shoulders and announced, "*WLAG, Your Call of the North Station.*" Mr. Johnson stepped back and thought, "*now what*?"

WLAG Station Opens With 12 Hour Program

Talks by Minneapolis Business Men Sent by New Radio Headquarters.

Music, State Fair Winners Broadcast—All States to Hear Signals.

Twelve full hours of broadcasting marked the opening yesterday of WLAG, Minneapolis' new radio station at the Oak Grove hotel. The station, one of the six largest in the world, formally began operations at 9 a. m., with a program of speeches by prominent Minneapolis men.

Our next section answers Johnson's "*now what*?" in providing detail on the internal operation of WLAG. In its efforts to establish and maintain a loyal audience and a modicum of revenue, the station would be working to develop what came to be known as "Full-Service."

We'll also learn how new owners would advance the WLAG spirit after its initial financial failure. New owners would re-capitalize the station and keep the pioneer radio service on its 100-year track. Then these new owners would also tire of the financial pressure.

Read on. They're out there: stories yet to be told!

WLAG "fledges"

Announcer Paul Johnson had been holding forth in one of the Oak Grove suites upgraded for broadcasting. Once he concluded his oratorical flourish WLAG began a more-or-less-regular program schedule.

The Bully on 720

When the license was first telegraphed to Minneapolis, WLAG was temporarily assigned to the inferior 360-meter band in a Commerce Department "whoops." By the end of 1922 the station was assigned to 416.4 meters (720 kc) where for a short while they shared time with WBAH. Once WBAH moved on the station had exclusive use of its "clear channel." Reception reports traveled to Oak Grove Street from North and Central America, Hawaii, ships at sea and occasionally Europe.

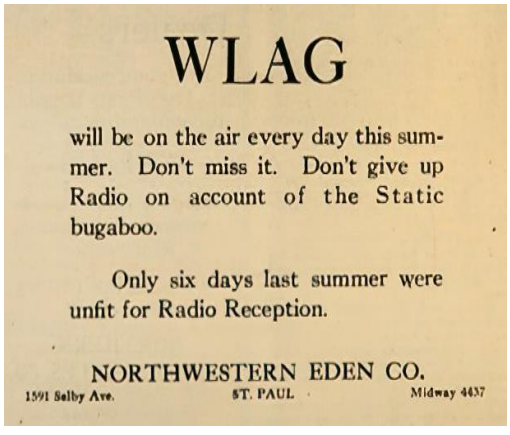
From its launch that huge signal coming from the Oak Grove Hotel generated listener reaction…good and bad.

Folks using the ubiquitous "crystal sets" of the early 20's had no problem with day or night reception of WLAG and other locals. However crystal sets were "deaf" to out-of-town signals. Late-evening listeners (the "Nite Owls") had to use vacuum tube sets to listen for "distance" and they had a choice of signals from New York to Atlanta to Los Angeles and many other cities.

In contrast to the crystal set, the better tube radios did a good job on *distant* signals, but some tube sets would go nuts in the presence of high-power *local* stations. So: WLAG's proximity and superior power were great for crystal sets but became a problem for some tube radios. Nite Owls crabbed about the station's interference to their favorite Nashville or New York stations.

This "receiver Catch-22" was not unique to Minneapolis and it was aggravated as cheaper tube sets entered the market. Across the country broadcasters collaborated on what became known as "*Silent Nights"* when all local stations would shut down for a time so folks could search for out-of-town signals. The barfing on cheaper tube sets came to be known as the "*local-power signal-overload problem*." It wasn't helpful when a receiver-trade organization meeting in Minneapolis asked attendees for their ideas on "traps" to block WLAG.

Other uncontrollable factors affected reception on all radios. Printed media and on-air blurbs encouraged fans to put up with temporary reception problems, including summer lightning.



Every station faced reception concerns in some form and to its credit the WLAG engineering crew did its best to help listeners, both by phone tips and by visiting homes with reception difficulties.

Nationally the print media was obsessed with the magic of hearing those distant voices (to be sure WLAG was in turn a target of similar interest to Nite Owls elsewhere). More than one radio magazine ran nationwide announcer-popularity contests. WLAG's Paul Johnson and an emerging local resident comic named Dody Reimer would score high in these countrywide matches, reflecting WLAG's reach.

The programming and the staff

WLAG staff members were new to this radiophoning venture. As they filed into the Oak Grove Hotel on workday mornings they carried hopes of successfully filling each broadcast day. That job got harder over time.

Broadcasting in the days prior to recording was a voracious consumer of time and talent. Much of the WLAG broadcast day included time, temperature, weather and "talks." In the studio, lectures and advice on all topics were offered. Practically anyone who had something to share was given a moment at the mike. Religion and radio were meant for each other; The Word could be spread among vast audiences that would overflow a church.

One unique program was "The Toothbrush Club" hosted by "Dr. Pepper." He saw radio as an opportunity for education on tooth care and his following grew into thousands of kids of all ages. They collaborated on the program, adding their own entertainment. It was TikTok with a constructive message but without the stupidity.

For music the horn of a talking machine was placed in front of the microphone when phonograph records were played---gnarly sound at best (records were borrowed from local department stores). The rest of the music was live from WLAG's "Concert Room" and eventually via remote broadcast from live music venues.

Paid staffers included Paul Johnson and Chief Engineer Ray Sweet. Other paid (and some unpaid) folks took turns in reporting to the microphone. Program Director Eleanor Poehler, as the first woman to manage a station, was likeably newsworthy. She came to WLAG from the finery of MacPhail music. That background influenced her programming tastes. Before too much time had passed the novelty of her "Chamber Music" diet wore thin. And she built in <u>long</u> periods of silence between music selections. This contributed to the reputation of the station as "a bit sleepy."

WEDNESDAY

March 14, 1923, 2:30 P. M.
Broadcast for Powers Mercantile Company

Miss O'Leary—Domestic Science.

3:00 P. M.
Broadcast for E. E. Atkinson & Company

ARTISTS

Mabel Alley, mezzo soprano
Eleanor Freemantel, accompanist
Rebecca Bakken, pianist

1. Piano Solo:
   Prelude ..... Rachmaninoff
   Rebecca Bakken
2. Mezzo-Soprano Solos:
   (a) Pleurey, Pleurey Mes Yeux (from Le Ced)..... Massenet
   (b) Chere Nuit..... Bachelet
   Mabel Alley
   Eleanor Freemantel
3. Piano Solo:
   Prelude ..... Stowjowski
   Rebecca Bakken
4. Three Desert Songs..... Gertrude Ross
   "Sunset," "Night," and "Dawn."
   Mabel Alley
5. Piano Solo:
   Norwegian Bridal Procession..... Grieg
   Rebecca Bakken
6. Mezzo-Soprano Solos:
   (a) Let Not Your Heart Be Troubled..... Speak
   (b) Take Joy Home..... Basset
   (c) Song of the Robin Woman (from Shanewis)..... Cadman
   Mabel Alley
7. Le Cavalier Fantastique..... B. Godard
   Rebecca Bakken

4:00 P. M.
Broadcast for Powers Mercantile Company

Mrs. Robbins Gilman: "The Work of the Woman's Cooperative Alliance."

6:00 to 6:30 P. M.
Children's Hour Broadcast for L. S. Donaldson Company

Radio Story Teller: Jack Rabbit Stories written for WLAG by David Corey, the Jack Rabbit Man of the New York Evening Mail; Japanese Story, "The Boy Who Drew Cats," by Lafcadio Hearn; Irish Fairy Stories by Yeats.

6:30 to 7:30 P. M.
Lecture Hour Broadcast for Northwest Farmstead

R. A. Lathrop: "Providing an Education for Your Children."
T. A. Oberlander: "How to Take Care of Tires."
Mrs. Constance Rittenhouse: "Observers of City Government."
W. H. Peters: "Possibilities in Community Livestock Breeding."

(Program subject to change.)

Typical afternoon programing on WLAG: music, kids' fare and farm advice

THE PERSONNEL OF W-L-A-G

Pictures of Other Members of the Staff Will Be Published in the Following Numbers.

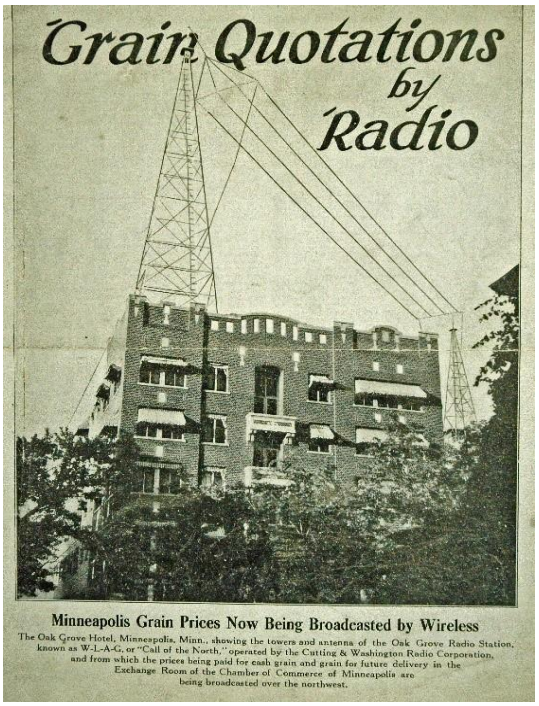
ELEANOR POEHLER
Program Director, Assistant Manager

H. PAUL JOHNSON
Announcer

RAY R. SWEET
Chief Engineer

Market reports were popular. Information was delivered by ticker tape from the market floors and aired through the day as the "Radio Market News Service."

Market reports were a primary product in the WCCO version of "full-service."



Lunch is no longer a gratuity

Once the bloom was off the radio rose, performers weren't interested in visiting Oak Grove-6 to contribute their talent unpaid, so WLAG began to look outside the studios for programing events. The "Radio Remote" was born (also at the time called "Outside Broadcasting" or "Remote-Control").

WLAG engineers began taking equipment on the road and connecting it to the studio via telephone lines. The targets were venues with some form of audience presence. Play-by-play was a natural; the legacy of Gopher sports broadcasts began at WLAG. Dick Long's Nankin Café Orchestra was a popular staple in the evening.

GO TO: *Ray Sweet explains "Remotes:" the process of getting 'hear' from there*.

WLAG's remote broadcast of grand opera from Mankato was probably the most ambitious of the station's early technological achievements. *Wireless Age* of July 1924 waxed ecstatic over this "first:"

> "Three microphones hung in the Mankato armory transmitted the sound waves over 106 miles of wire to the broadcasting station at Minneapolis, whence the music went out onto the air. Another complete telephone circuit kept the telephone technicians in constant touch with the Minneapolis station. Two men were busy at the armory switchboard all through the performance, amplifying here, diminishing there, so that the volume of sound broadcast might be constant throughout.
>
> "This is the most pretentious feat of remote-control-broadcasting that the Minneapolis station has attempted and Mrs. Poehler, the director, Mr. Sweet…and everyone else were anxious that it be a complete success. The volume and character of response received was sufficient testimonial to the signal success of broadcasting grand opera."

Milton Cross was 27 that year and seven years away from his first Metropolitan Opera broadcast.

Station promotion

In feeling its way WLAG invested in getting the station in view of its audience. Taking WLAG out of the studios was found to be the best way to promote the service. In turn these off-premise efforts by WLAG exposed the station's staff to the world beyond the Oak Grove.

This may have been Lesson One for WCCO. *If ever there was a radio station that defined the value of this form of promotion it was the WCCO operation of the mid-to-late 1900s*

Promotion in print


WLAG

LISTENIN' IN RADIO NEWS-PROGRAM

Price Five Cents APRIL 2, 1923 Minneapolis, Minn. Vol. I No. 6

THE CALL OF THE NORTH ORCHESTRA
ART LANDRY, Director

Six months after its inaugural 1922 broadcast WLAG participated in publishing a weekly program-schedule/newsletter. It was labeled "*Listenin' In.*" The title was a trope popularly describing how radiophans used their sets. This was an early form of listeners' newspaper and connected programs with sponsor tie-ins. And Ray Sweet was given space to advise listeners on how to improve reception.

"The Call of the North Orchestra" was a favorite of Ms. Poehler's…as long as they didn't stray too far into the "symphonic music" of the John Philip Sousa genre.

As for newspaper promotion, early radio was of such intense interest that in most markets the local papers devoted dozens of column inches to the program schedules and the news from their local stations.

These newspaper 'pre-TV Guide' postings were the best way for listeners to keep updated on program schedules and changes. Because of its wide-area coverage WLAG's information not only appeared in the Twin Cities print media but also in radiophan magazines of national coverage.

WLAG had one other promotion draw and that was station tours; these were highly encouraged.

Kudos

In my view as a radio veteran the WLAG staff, operating with little or no program budget and no models to follow, earned high marks for their ideas and activities on sponsor tie-ins and station promotion.

Besides the positive results, what else can be said about WLAG's early open-minded broadcasting efforts?

"*That they would throw anything at it, to see what would stick*!"

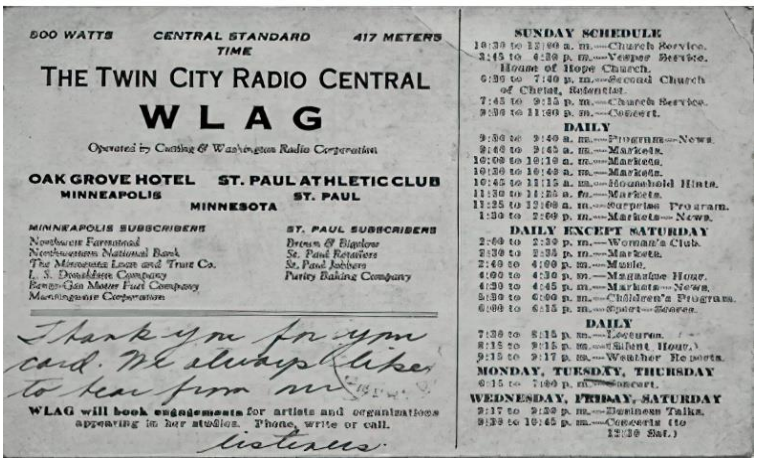
Twin Cities rivalries

From the beginning the concept and the business plan of the WLAG adventure were built on equitable service to both Minneapolis and St. Paul. In theory this might have been a formidable challenge given the metro rivalries; some claimed the station was favoring the larger city. Perception can become reality and there were likely some militants who actually kept track of comparative broadcast time. As fact however, the record shows that both cities had contracted to support the new service and that WLAG did its best to treat both towns fairly. (There survives an anecdotal tale about a reversible flip-card at the microphone to ensure station breaks alternately reversed the *order* of identification of the two cities.)

Meanwhile within the St. Paul business community there festered a growing "inequality" discord that wouldn't be formally addressed for several years. Some St. Paul dignitaries were accusing WLAG of not treating St. Paul with equal energy. Nevertheless St. Paul agreed to continued support of the station. WLAG in turn pledged to identify its signal as "from the Land of 10,000 Lakes." To address St. Paul concerns WLAG built a studio presence at the St. Paul Athletic Club in December 1923. *Radio Magazine* took note:

> "WLAG, TWIN CITY RADIO CENTRAL
> Programs are broadcast alternately from St. Paul and Minneapolis over WLAG, the Twin City Radio Central, operated by the Cutting and Washington Radio Corp in Minneapolis. The new St. Paul studio will be conducted under WLAG's community broadcasting plan with St. Paul commercial and civic associations and business concerns subscribing to programs"

1924 listener-acknowledgement card. The station's address now included the studios in both cities.



Sharp eyes will catch the pitch to performers at lower-left bottom. It appears WLAG would offer to help them get work if they appeared on the station. Very clever! (The words *"her" studios* suggest this language might have been 'bottom-of-the-page boilerplate' for some of Ms. Poehler's other communications). ☺

In the mid-1920s the National Bureau of Standards (NBS) sought to establish radio technical order. They selected the signals of WLAG (and KDKA Pittsburgh) as "Wavelength References" citing the reliability and stability of the two stations and the fact that both operated long broadcast days. WLAG became their "Western Calibrating Station," noted for its precision frequency-adherence.

So what went wrong with such a perfectly powerful station?
If WLAG was such a great service, why did it temporarily fold? We offer these theories:

First, t*he station's operating budget was likely unrealistic*. No one would have been able to accurately foretell WLAG's operating costs; particularly for programming. Jack Binns in the June 1924 *Popular Science Monthly* added that free broadcasting services obviously cannot go on forever: "While (some) costs may have been controllable, revenues fell far short of most pessimistic projections."

Radiophone broadcasters had not yet tumbled to the idea that income could be derived from direct advertising. Commercials had until now been limited to sponsor mentions. It would take WEAF's infamous "First Commercial" to give stations that advertising idea to imitate.

The second and related issue was *poor revenue performance*. To measure the station's value in selling messaging, some way had to be found to quantify audience impact. In the early 1920s there were no models to follow. There were no radio surveys and few other mechanisms to measure listener response other than cards and letters. But no one had found a way to monetize response.

While sponsors were given adequate commercial mention, advertisers who might be expecting some sort of instant reaction grew dissatisfied with the passive nature of radio's persuasion. "Commercials" were given no real production value beyond a dry reading of sponsor mentions until later at WCCO when the Wheaties Quartet would help revolutionize radio marketing for General Mills. But that tale is well told by others. And the station's music (described by one wag as "sexy elevator music") might have been a factor.

Third, *the radio world was changing dramatically*. Much more variety and novelty was found on the air.

Fourth, *new radioset owners were obsessed with the itch to 'reach out' as far as possible*. A Facebook entry of the time might have declared, "*I got Salt Lake City last night*!" Trade magazines regularly listed the stations heard by the Nite Owls.

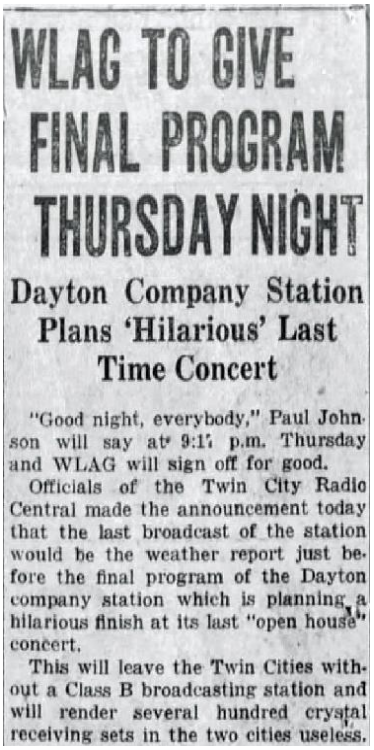
We know local interference could hinder reception of those stations. The signal-overload problem might have been resolved with time as crystal sets slowly disappeared. But the only enduring solution for WLAG would be a costly transmitter relocation that would have been impossible given the station's financial straits.

Fifth, *continued two-city commitment to operating support remained an unresolved concern.*

Finally, *station owner Cutting and Washington was itself in financial difficulty.* The business plan for WLAG included a commitment to build Cutting and Washington's receivers in Minneapolis. Construction technology for that radio was beyond the capabilities of most. An added complication was that the Minnesota area boasted more than 60 local radioset builders and some of them produced very competitive radios of their own.

Cutting and Washington, the Oak Grove Hotel's eviction notice in hand, would go into receivership and close its business. With the flip of a switch a signal that covered 48 states and several provinces would take a nap.

The local news community's reaction to the station's temporary closing (ignoring the sub-headline on the left).



WLAG TO GIVE FINAL PROGRAM THURSDAY NIGHT

Dayton Company Station Plans 'Hilarious' Last Time Concert

"Good night, everybody," Paul Johnson will say at 9:1[illegible] p.m. Thursday and WLAG will sign off for good.

Officials of the Twin City Radio Central made the announcement today that the last broadcast of the station would be the weather report just before the final program of the Dayton company station which is planning a hilarious finish at its last "open house" concert.

This will leave the Twin Cities without a Class B broadcasting station and will render several hundred crystal receiving sets in the two cities useless.

STATION WLAG ENDS LONG CAREER ON AIR

IN HANDS OF RECEIVER; TO BE PUT ON MARKET

No Offers to Take It Over Have Been Received at the Present Time

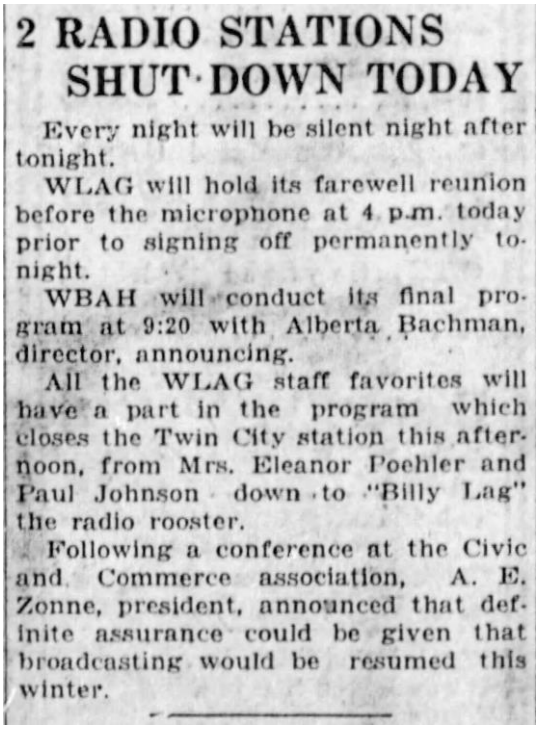
MINNEAPOLIS.—Station WLAG, located in this city, is no more. Due to financial troubles, this station known as the Twin Cities Radio central, was forced to suspend operations recently.

The station which is the property of the Cutting & Washington Radio corporation, now in receivership, will be placed on the market by the receiver. Efforts to have some syndicate take over the station and operate it by popular subscription have failed, thereby necessitating this course.

Whether the station will be taken over and opened later by a new organization, or whether it will be dismantled, has not been determined as yet.

WLAG was opened September 4, 1922, and supported by Minneapolis firms. Its slogan, "The Call of the North," became nationally known. Later a reorganization was effected by which it beeame a Twin Cities station, supported by people in both this city and St. Paul. It established a number of enviable long distance records, and was one of the best known and best liked stations in the United States.

Radiophans in this neighborhood regret the passing of the station, and are looking forward to it opening again some time soon.



2 RADIO STATIONS SHUT DOWN TODAY

Every night will be silent night after tonight.

WLAG will hold its farewell reunion before the microphone at 4 p.m. today prior to signing off permanently tonight.

WBAH will conduct its final program at 9:20 with Alberta Bachman, director, announcing.

All the WLAG staff favorites will have a part in the program which closes the Twin City station this afternoon, from Mrs. Eleanor Poehler and Paul Johnson down to "Billy Lag" the radio rooster.

Following a conference at the Civic and Commerce association, A. E. Zonne, president, announced that definite assurance could be given that broadcasting would be resumed this winter.

Oh: The "Toothbrush Club" found a home at another local station.

You had to hand it to them. Poehler, Sweet, Johnson, the engineers and the staff did their best to deliver useful radio and to help listeners get good reception. For the moment the financial gods were not smiling. But stay tuned. A young Betty Crocker was in the lobby waiting for the red light signal. WLAG would be back.

The scramble to protect a radio license

Now picture the action at the Department of Commerce. When the early rumors started flying about WLAG other Twin Cities radio stations wasted no time in bidding to occupy the clear channel 720 dial spot.

Such an open radio channel was a rare opportunity for an entrepreneur to reshape the Twin Cities radio scene. From his own station [the eventual WDGY] the flamboyant and flashy Dr. George Young announced he would "be taking over representation of Minneapolis" in the radio universe. The roar of silence following his announcement had to be discomforting.

Now come Cyril Jansky and other Minnesotans who had acolytes in D.C. regulatory offices. Jansky insisted the WLAG authorization remain valid at Commerce while the licensee's ownership was reorganized. This sort of "old boys" persuasion provided the breathing room to restore qualified service on the WLAG channel.

Meanwhile here's Don Wallace again. Speaking for the Northwest Radio Trade Association and the Twin Cities Radio Broadcasters he began promoting a solution that would solve the local-signal-overload problem. It was a plan he'd been working on since the initial reception difficulties. It would involve moving the transmitter and antenna to a site far enough removed from the metro area as to obviate the receiver overload issue.

Wallace put a proposal for a *high-power northern tower site* before local businessmen, the hobby clubs and the press. The reaction of the newspapers was typical:

BIG BROADCASTER FOR TWIN CITIES WILL BE PUSHED

Support of Northwest Radio Fans for Huge Unit to Be Sought

A gigantic super-broadcaster to make the Twin Cities constantly articulate to the entire United States with possibility of being heard in every part of the world was proposed late yesterday by the Northwest Radio Trade association meeting at the West hotel in Minneapolis.

A committee was appointed to go forward with the plan which was presented by H. H. Corey, secretary, and Don C. Wallace, radio expert.

This was all very fine but investors watching the financial disappointments of the original station were left to wonder whether even a 5,000-watt station could succeed. Some did agree Wallace's suburban tower plan could eliminate the signal-overload issue and perhaps resolve the "Minneapolis vs. St. Paul" parochial concerns.

The search for ownership

Our hero of this next moment is Harry Wilbern. Even before WLAG's signature broadcast he was tasked by the Northwest Radio Trade Association to begin knocking on investors' doors with a restructured business plan. After repeatedly having to close with, "well, thanks for your time" he entered the office of Donald D. Davis at the Washburn-Crosby Company. Davis got the updated business logic; he was attuned to the possibilities of promoting Gold Medal Flour in its nasty flour-fight with Pillsbury. He also knew the WEAF radio-commercial idea was being emulated and that for the first time a value might be placed on advertising revenue.

It wasn't a hard sell within Washburn-Crosby. A few days after WLAG went silent the company submitted a proposal to both cities to purchase and reactivate the station with their support.

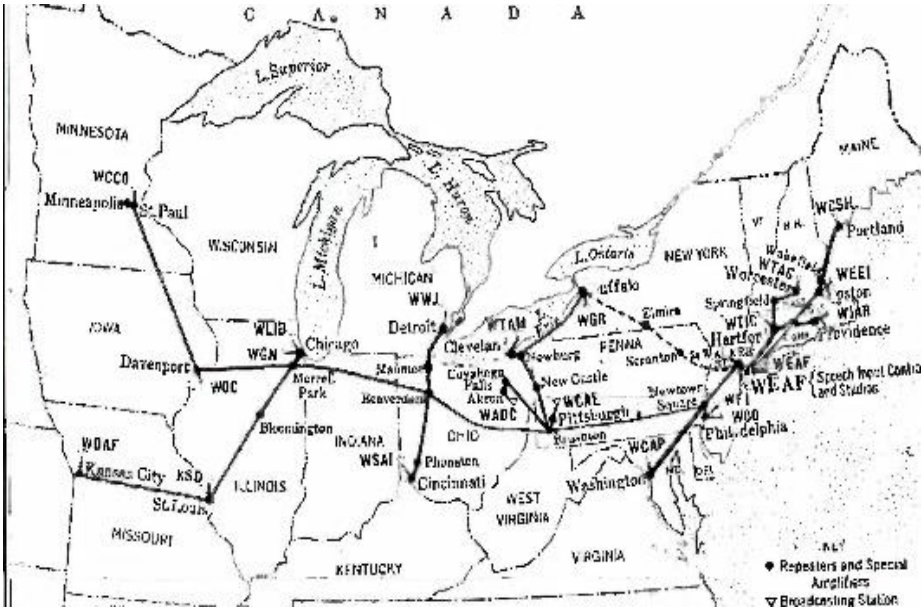
The proposal

Washburn-Crosby would at its sole cost invest in a high-power transmitter site at Coon Rapids MN and build new studios in both cities. Their "purchase-and-build" budget committed an initial $100,000. The WLAG receivership would be paid $7,500 for "assets and good will." Additionally, Washburn-Crosby would each year contribute 50% of a three-year $100,000/year operational budget.

The Minneapolis and St. Paul civic associations were asked to match Washburn-Crosby's 50% operational support in a respective 60/40 split. In an interesting incentive, *any commercial revenue would be deducted from the annual commitment of the two cities.*

The image of the repurposed radio outlet would be "The Gold Medal Station of Minneapolis and St. Paul." Until the rebuild projects were complete the station would continue operations from the Oak Grove Hotel with the original equipment and organization.

On August 13, two weeks after WLAG signed off, the deal was reported by the *Minneapolis Star*: "Gold Medal WLAG Accepted by Two Cities." Before the transfer could be formalized the signal was back on the air on September 12th to relay "National Defense Day," a big-deal broadcast fed on an ad-hoc AT&T network that tied together stations in the eastern half of the country. **GO TO:** *Here's the first part of that 1924 broadcast.*



The early AT&T network

This telephone circuitry was the core of AT&T's own "WEAF Network."

After AT&T's sale of its WEAF system to RCA, AT&T transmitted RCA's NBC "Red" Network.

Papers for Washburn-Crosby ownership were signed on September 17, 1924. That day WLAG resumed broadcasting market reports while Washburn-Crosby asked the Department of Commerce to assign the call letters "WCCO." Washburn re-leased the Oak Grove Hotel space to hold off the eviction; they also set up offices in the St. Paul Athletic Club. The 720 signal temporarily identified itself as "Twin City Radio Central."

Much of the WLAG staff returned to duty with their original responsibilities. Paul Johnson resumed clearing his throat. Engineering, with the impending addition of the irrepressible Hugh McCartney, would get busy building studios and the new transmitter site. Eleanor Poehler's role was in programing where she unsuccessfully attempted a cultural counter-balance to the more basic WCCO ideas about music.

The Gold goal

The Gold Medal Station declared two goals: "*To provide the best service to the region and to make the Twin Cities the center of good radio*." Reflecting on the service ideas for the new station, executive Earl Gammons would recall,

> "We didn't know any better. We thought: we were blessed with a frequency that gave us immense coverage and we felt it was our duty to serve that community. And after a while we went out there and broadcast and asked people what they needed and wanted from us. And we thought everybody else was doing the same thing."

OLD WLAG REOPENS; NEW LETTERS WCCO

MINNEAPOLIS, Minn. — WCCO, meaning "Washburn - Crosby company," is the new call assigned to former WLAG, Minneapolis-St. Paul, the Gold Medal station. Former admirers of WLAG, "In the Land of Ten Thousand Lakes," are asked to change their tuning log books to include the new call. The wave length, 417 meters, remains the same.

And so the big hubbub of October 1, 1924 when "WLAG" was retired and "WCCO" first aired. It was 99 weeks since the station had first signed on. Beginning October 2, 1924 the new owners would continue many of the traditions and program accomplishments of the first two years.

We don't wish to run out of ink and we're tramping awfully close to journalistic territory traveled by so many in their recounting of WCCO's history. Most of those scribes begin their detailing at Oct 2, 1924, adding a few backdrop paragraphs from the early information popularly available.

The purpose of *this* work was to report on additional research, illuminate the underreported startup years and make the case that the service we came to know as "WCCO" actually began two years earlier with WLAG. We've nearly completed this task. In closing we add a few post-it notes:

1. WCCO announces new studios

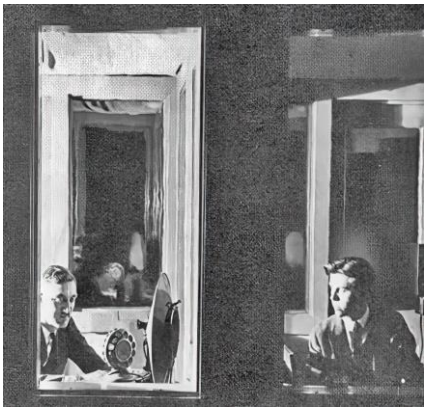
Washburn-Crosby's commitment to new broadcast locations began in late 1924. Most ambitious of the projects was WCCO's new home in the Nicollet Hotel. A faux 13th floor was added as well as offices, a tech center and new broadcast studios.

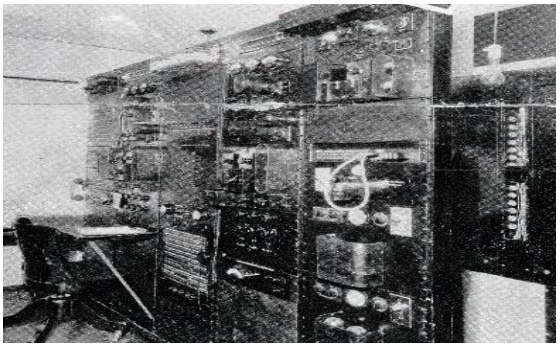
Here is the ground plan for the new Minneapolis studios of WCCO, now being built on the roof of the Nicollet hotel. St. Paul will have similar studios as soon as a location can be found.

The Nicollet operations opened to great fanfare on March 4/5, 1925.

Studio A above

Below Paul Johnson and engineer Ivan Anderson





Nicollet Master Control, with apologies for the 90-year-old picture quality

Next the station built a St. Paul presence at the Union Depot and opened it June 8, 1926.
Radio Age of April 1925 was enthused:

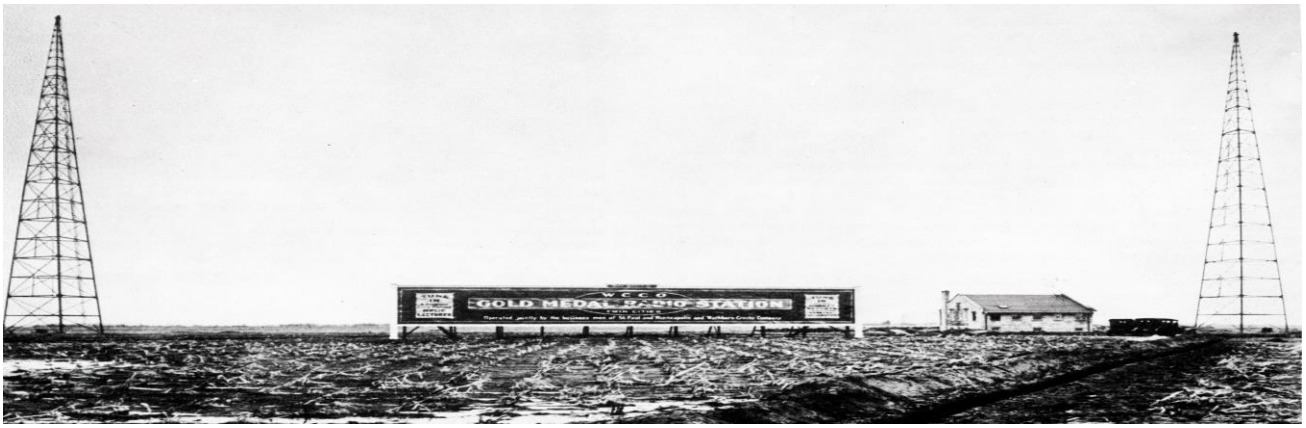
> "(This) "would probably be the most unique location of any studios in the world, for they will be in Saint Paul's handsome new Union Depot used by nine railroads."

While WCCO'S Union Depot studios were being built the station temporarily occupied WLAG's studio in the St. Paul Athletic Club and held space in the St. Paul Chamber of Commerce offices. Later a major presence would be established in the Lowry Hotel and a "livestock" studio opened in South St. Paul.

2. WCCO upgrades transmitters and marginalizes crystal sets

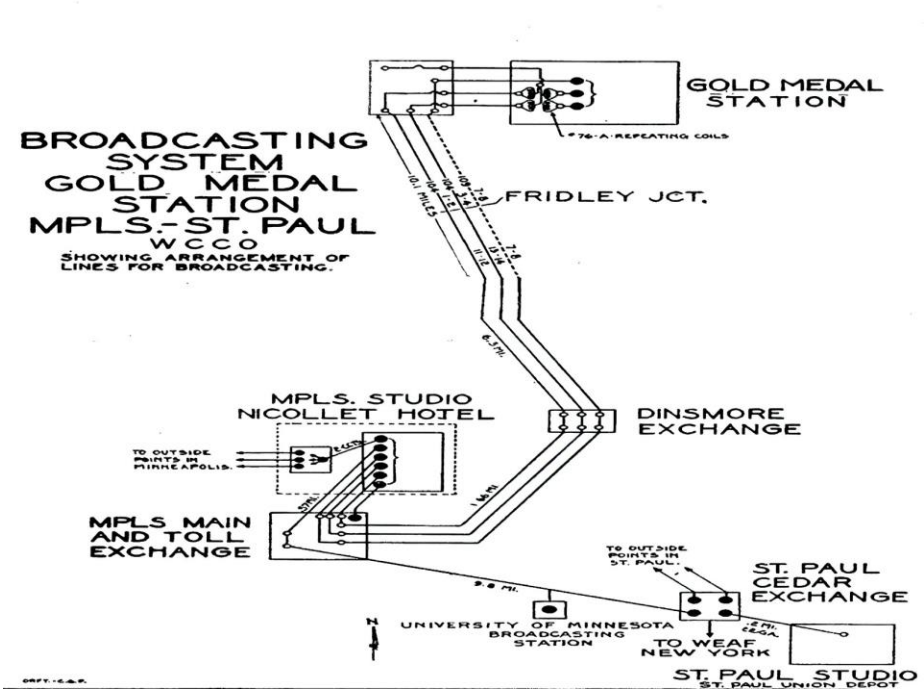
Technoid spoken here! But the pictures shouldn't harm any readers.
Washburn-Crosby agents secured enough land near Coon Rapids MN for new transmission equipment and with room for growth. Contractors leveled the land and built a transmitter building that's still standing today. In went a 5,000-watt Western Electric transmitter, living quarters and associated equipment.

This Western Electric 104-B transmitter was a behemoth. Its modern-day equivalent is 1/12th the size and consumes a small percentage of this monster's energy.



5,000-watt antenna; 200-foot towers. Flat-top not yet installed

The audio was transported via carefully adjusted telephone circuits; these were dedicated wire lines conditioned to pass music, not just voice. These paths became the permanent configuration of WCCO's program circuitry. Remote broadcasts were connected by telephone lines directly to the Nicollet Hotel. Note the channels for feeding the WEAF/NBC Network and the University of Minnesota.



With all in place the engineers reported to the Commerce Department that they were ready for a March 4, 1925 opening. Commerce had authorized the Coon Rapids operation to begin gently with 1500 watts' power (triple that of Oak Grove). Contrary to the grandiloquent expectations of opening day the new more-distant signal was a disappointment to thousands of crystal set owners in the metro Twin Cities area. They had succumbed to the publicity, tuning in high-power-opening night to hear President Coolidge's inauguration. And heard…noise.

Washburn-Crosby's promotions group exploded into overdrive to promote tube sets and the Commerce Department was quickly persuaded to sanction the full 5,000 watts authorized in the license. Meanwhile Don Wallace used his radio-advisor perch in the *Minneapolis Star* to blame the crystal set users. But…looking back, the Coon Rapids tower site *was* the right solution for radioset overload. The move opened the skies over Minneapolis for the Nite Owls. And all would now be fine on 720 kc. Mostly. But then came:

3. The great big network rumpus and WGMS

AT&T had extended its radio program network as far west as Minneapolis and Kansas City, in time for that Defense Day broadcast of September 12, 1924. With the early AT&T Network still in place, AT&T and WEAF used it to offer event coverage such as political conventions and inaugurations.

Most stations chosen for this early "chain" were recruited because they were using high-power transmitters from AT&T's subsidiary Western Electric. WLAG was thus a prime candidate for this network and when NBC bought the WEAF network, WCCO became a charter NBC affiliate, in November 1926.

The network wasn't aware it had affiliated with a maverick station. NBC was used to calling all the plays in demanding that stations air most if not all of their programs. But this was not a game the Minneapolis folks wanted to play. WCCO after all was in a seller's market as the most powerful station between Chicago and the Rockies.

It should be noted WCCO as a faithful affiliate contributed its successful programs to NBC (an example always mentioned was *The Wheaties Quartet).* In turn, WCCO broadcast those NBC programs it felt "*were of interest locally"* and farmed out the rest.

Sometimes this "farming out" meant WCCO had to lease time on another station for the conflict programming created by the two networks running side by side. But WCCO reserved the right to decide which network feed was heard on which station. And it wasn't always the main Red-network program heard on WCCO. To put it calmly, this irritated NBC.

Airing conflict programming and "WCCO 2"

For a moment we need to take a dog-leg in our reporting. The University of Minnesota's station WLB was producing educational shows that were fed by telephone line and aired over WCCO. It was a natural outcome of this collaboration that WCCO would donate its unneeded WLAG transmitter to the University. The only condition was that WCCO could use the transmitter when necessary.

In April, 1927 this gift transmitter was dual-licensed. It was identified as "WLB" when used by the school and "WGMS" ['**G**old **M**edal's **S**tation'] when WCCO sent the University the NBC conflicts. The U's radio center would switch the transmitter from its own WLB content to an NBC program if WCCO called for that air time. Listeners were mystified. Later in 1927 WCCO released the U's WGMS identity except for emergency backup duty. They contracted instead to send NBC's conflicts to WRHM [now WWTC] because of its superior coverage. Again NBC had little control over this situation.

Then in 1928 WCCO's Henry Bellows stirred the NBC pot by telling the new Federal Radio Commission that WCCO would not engage in exclusive program contracts with *any* network but would instead maintain the station's right to "pick and choose." That position spawned industry ire and added to NBC's annoyance. The skirmish came to a head when WCCO pre-empted the network's sponsored Chicago Symphony with its own sponsored broadcast of the Minneapolis Orchestra. That was enough for the Sarnoff Society. NBC prepared to move to the new KSTP. The *Minneapolis Star* of December 6, 1928 rhapsodized on the divorce:

> "WCCO'S DECLARATION OF INDEPENDENCE
> Radio station WCCO deserves now all the greater support and interest of radio listeners in the Northwest for its unprecedented refusal to take dictation from a radio monopoly. In declining to submit to the National Broadcasting Company's dictum that its chain programs be used exclusively, WCCO has taken a forward step that is being discussed and lauded in all parts of the country. The station acted on the sound principle that no radio concern has the right to tell radio listeners what they shall or shall not hear…Its action really amounts to what is a radio 'declaration of independence.'"

By the end of 1928 CBS was feeding its shows to WCCO, allowing the station to choose which programs would go to WRHM. Interestingly, it's possible CBS couldn't get an AT&T line to Minneapolis without some delay. If so it's likely that initially the station took the feed from the CBS shortwave station.

4. Ownership evolution

While the network situation was being resolved, the three-year 1924 WCCO/Twin Cities support agreement came up for renewal. Various documents and exhibits were tossed on the negotiating table in early 1927.

Washburn-Crosby wanted a three-year extension and modification of the 1924 agreement. Their proposal included a rather beguiling stock-purchase plan involving both cities. Washburn also committed to building a station in St. Paul and operating it from the Nicollet Hotel in Minneapolis. Upon approval the Minneapolis operation would be renamed "WCMP" and the St. Paul station "WSTP." Backstage, Washburn-Crosby President James Ford Bell was involved in designing "General Mills," a group of four milling companies including Washburn-Crosby. Ford would announce the new cluster as "General Mills" in 1928. In the meantime, it was in his financial interest to shed his broadcasting holdings. He had an unhappy tale to tell.

It turned out Washburn-Crosby's $100,000 commitment to 1924's capital investment plan had now ballooned to $187,000. The three-year $100,000 yearly maintenance fund had gone from $100,000 to $175,000 in 1925. Unplanned fees for programs and artists added an additional $50,000. It's little wonder therefore that Washburn-Crosby was ready to bail. They announced formation of an interim holdings enterprise named "Northwestern Broadcast Company" to eventually dispose of Washburn-Crosby's interests in WCCO.

Positioning

When they dropped their renewal proposal on the table Washburn-Crosby announced that if their new pitch wasn't accepted they'd put the station up for sale for $106,000. They offered First Purchase rights to the civic associations. St. Paul was apparently interested but Minneapolis wasn't. So Washburn-Crosby suggested selling to "a business nominated by the civic associations." No takers could be found.

The station then announced it would sell WCCO to the public in a cash transaction. If there was still no response they threatened to shut down September 1, 1927 at the expiration of the original agreement.

The Washburn-Crosby arguments:

1) The station anticipated a costly expansion of services to fully serve its vast coverage area (they were anticipating the 50,000-watt license).

2) In order to guarantee adequate services a form of "Unified Control" from Minneapolis would be required to oversee the added St. Paul station.

3) Nowhere in the country had a high-power station been successful without non-broadcast business or civic and organizational support.

From the outset the cities' civic associations pushed back on the stock suggestion, reporting their charters prohibited stock and securities ownership or trading.

Others were simply against a new St. Paul radio station operated by WCCO. And we do know certain buzzwords could jolt St Paul civic pride. The titles "Radio Central" and "Unified Control" did not sit well with St. Paulites when attached to an operation based in Minneapolis.

But history suggests a certain amount of this dissonance may have been generated by those with a financial interest in providing their *own* St. Paul radio station not associated with WCCO. Indeed, six weeks after renewal negotiations had begun there came news that the "St. Paul Broadcasting Company" had plans to file for a 5,000-watt station in that city. (Other plans were afoot as well.)

The newspapers then reported that two weeks before the threatened September 1, 1927 shutdown, Washburn-Crosby had agreed to keep going (details of continued support from the two cities were not mentioned). Following the failure of the two-city-two-station proposal, papers were carrying the news that "second-thinkers among the city authorities were now saying both cities could after all be serviced by one station."

To put one more dab of ironic icing on the carrot cake, the papers reported that St. Paul figureheads <u>wanted the dual-city ID removed from WCCO station breaks</u>. WCCO refused. It could only happen in America.

Ultimately a watered-down agreement with interim terms was concluded. Then in 1929 General Mills sold one-third of WCCO's interest to the Columbia Phonograph Broadcasting Company (CBS) for $150,000. Included with that sale was an option to purchase the remaining two-thirds of the station at a future date…*at the same price*. (This had to be one of Bill Paley's early financial triumphs.)

CBS exercised its buy option in 1931 and as full owner of WCCO began investing in a serious upgrade program including preparations for construction of a 50,000-watt transmitter at Coon Rapids.

5. March toward 8-3-0

In March 1925 WCCO had opened its new transmitter at Coon Rapids with 5,000 watts on 720 kc. In June 1927 the Feds told the station to move to 740 kc where they could operate 7,500 watts day and 5,000 watts at night. The company was privately reckoning on an eventual 50,000 watts and wisely decided the incremental 7,500 watts power wasn't worth the investment in a new interim transmitter. So they reported "delays" in the project. Letters of Extension were granted through November 1928 when their deferral was rewarded. Under the new Federal Radio Commission's General Order 40 the station was reassigned to 810, a fully-clear channel.

WCCO was now authorized 15,000 watts on 810. They made the frequency change but for the same financial reasons put off the power increase. A clerk with poor eyesight backslid their power authorization to 7500 watts; that wasn't built. The final corrected records show that authorization for the existing 5,000 watts was finally published June 24, 1931. That was just in time to be superseded by a permit for a full 50,000 watts, issued on November 17, 1931. Immediately engineers constructed a new building, added another flat-top with 300-foot towers and installed a Western Electric 50,000-watt transmitter, licensed in 1932.

And here we close our ten-year history 1922 to 1932. In 1939 the bigger flat-tops were replaced by a 654-foot tower. In 1941 under The North American Regional Broadcasting Agreement ("NARBA"), WCCO completed its march to 8-3-0. Look to the technical appendix for further information.

Personal reflections

In this work we've drawn from information widely available and added the results of a lot of serious additional research. Any inconsistencies or misinterpretation of fact are likely mine.

A social commentator recently reflected, "There is not much magic in the world these days." But the world of the early 1920s was bright and *full* of magic…and wonder and promise and anticipation and, yes, innocence. Our expectations 100 years later? Today we take the latest *app* for granted…in fact we expect it.

But in the 1920s radiotelephone pioneers built the world of broadcasting a step at a time at their own risk and they largely succeeded. To their benefit, as signal transmission was perfected, the novelty was no longer in the technology but had morphed into "fandom."

Radio created a shared national culture with a media that complemented and then overwhelmed print, with its great immediacy and ubiquity. Eventually the demand for more and more commercial revenue overwhelmed much of that greatness, and interactive online "broadcasting" is becoming the fact of life. And the further we get from 1922 the more important it is to remember and appreciate how it all began. To paraphrase W. B. Yeats:

"Man is curious
and loves to know what has vanished.
What more is there to say?"

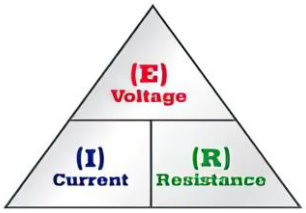
That's why doing the research for this report has been so rewarding. The reconstructed picture of those "seat of the pants" radiophone efforts reveals a lot of heroes who 'put it all out there' in offering their listeners better and better information and entertainment services.

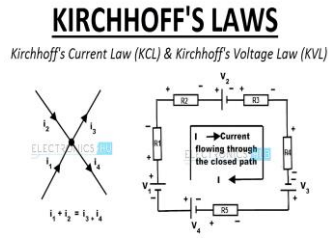
Whimsy: If WCCO were to change its call letters before October 2, 2024 the station still has 100 years in the bank this year…the credit demonstrated through this counterfactual history. Thanks for your time!

With this form of historical project, the Pavek Museum continues to fulfill its educational mission. For other historical facts visit www.durenberger.com

We welcome comments, questions, critiques at: Mark4@durenberger.com

TECHNICAL APPENDIX



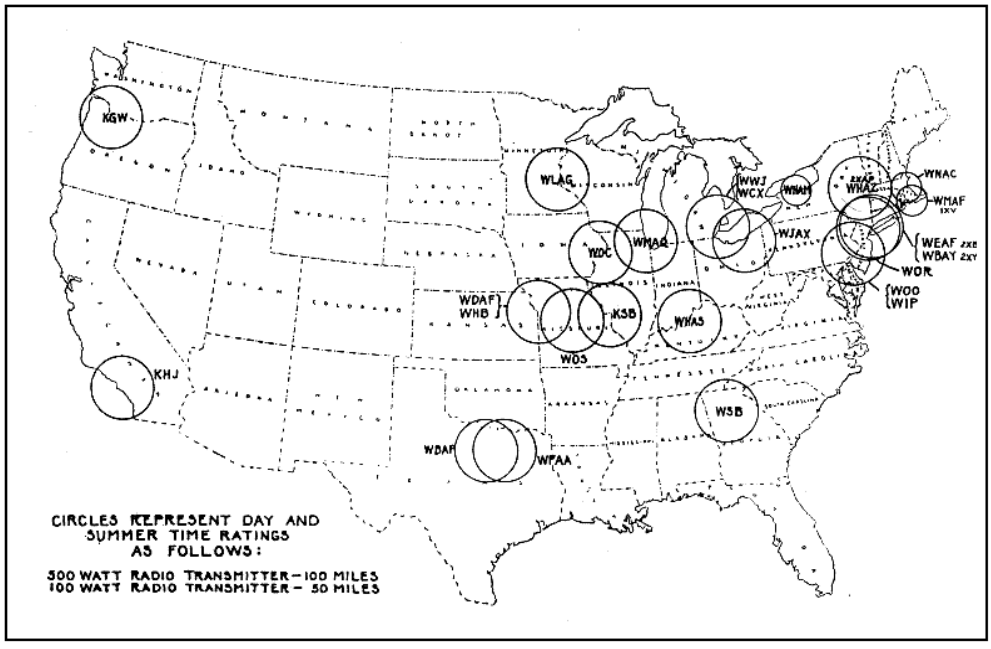


THE 1920s WLAG/WCCO TRANSMITTERS, ANTENNAS AND AUDIO EQUIPMENT

An unnamed observer reflected, "It's possible to discern the arrival of System Engineering in the period 1920 to 1929." We see that and also observe in the photos following that in early electro-mechanical design, components were large and laid out well-separated; presumably to aid in the diagnosis and repair of circuitry.

In the 1920s Western Electric ["WECO"] was the only legitimate provider of Medium-Wave transmitting equipment (the Commerce Department labeled other, home-brew outfits as "Composite Sets"). WECO's parent AT&T funded serious engineering and design research to create a recognized performance standard.

Moreover, the early almost-mandated use of Western Electric transmitters recognized AT&T's arguable exclusivity over land radiotelephony and the implied right of AT&T's subsidiary WECO to build *all* "wireless telephone transmitters." Included in those "rights" was a "Broadcasting Fee" payable to AT&T…unless the station purchased a Western Electric transmitter. Thus did they define the term "leverage."

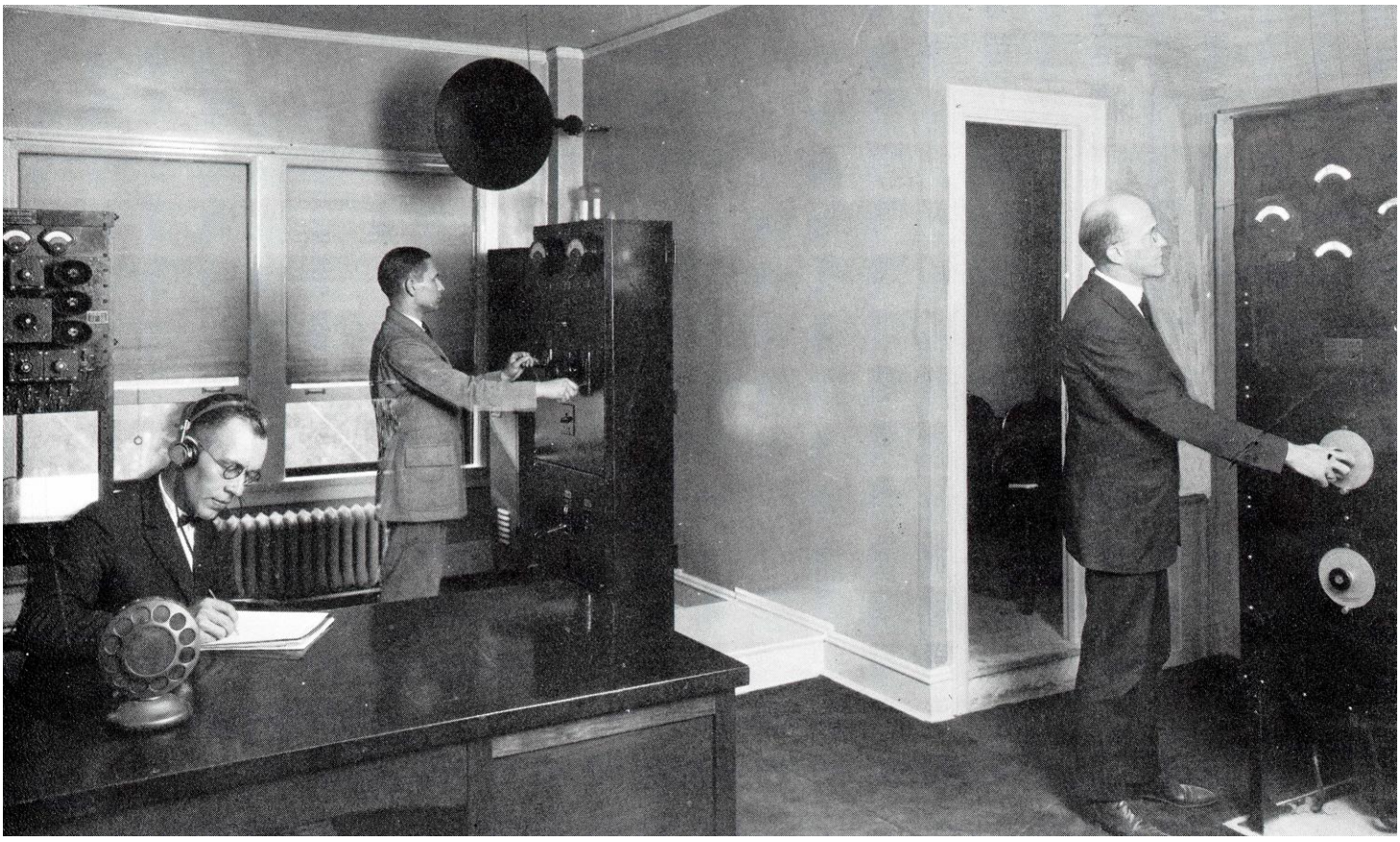


Early Western Electric stations (circa 1923)

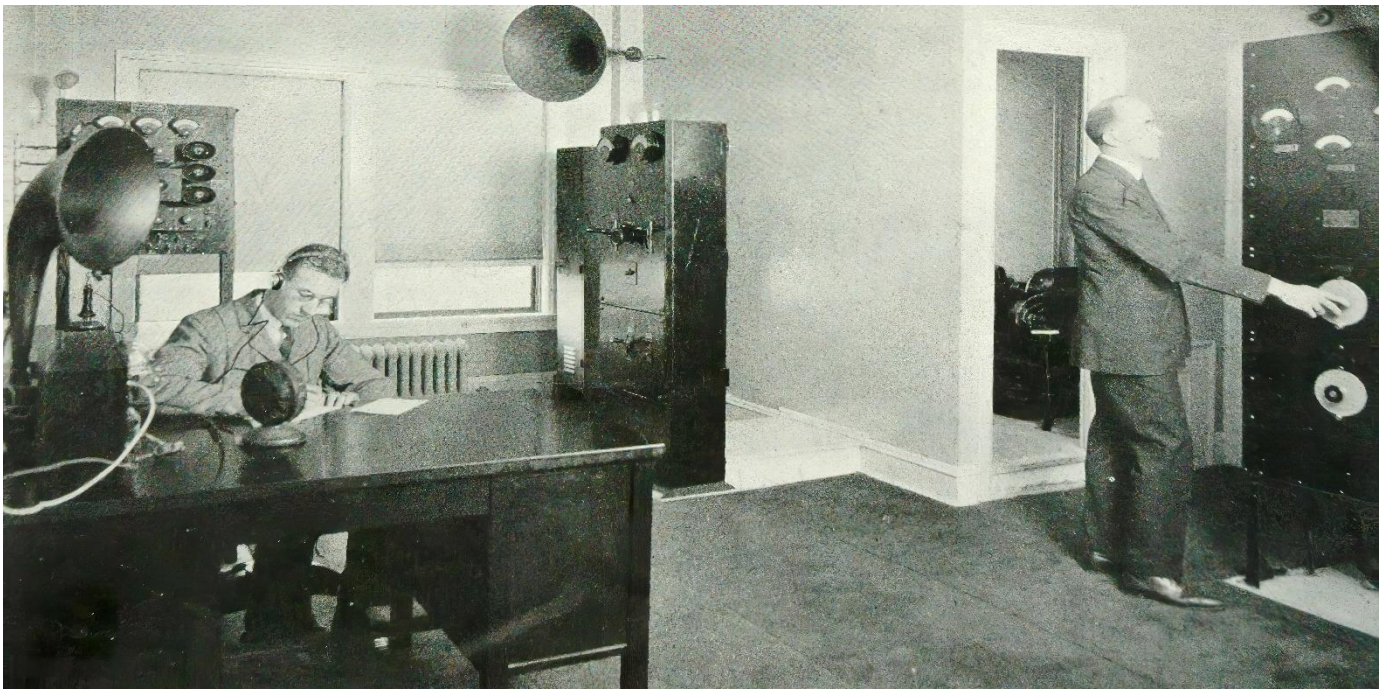
Note above that transmitter performance was labeled not in power as much as it was in predicted coverage. For their 500-watt model: "Day and summer coverage:100 miles" (sales brochures ignored co- and adjacent-channel interference). "Skywave" coverage was too unpredictable for sales-pukes to promise.

WLAG was licensed in 1922, as a 500-watt "Class B" station designed for wide-area coverage and with exclusive use of its frequency.

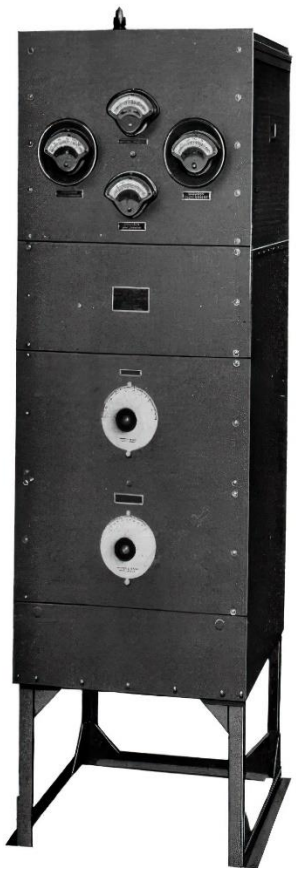
The WLAG operation

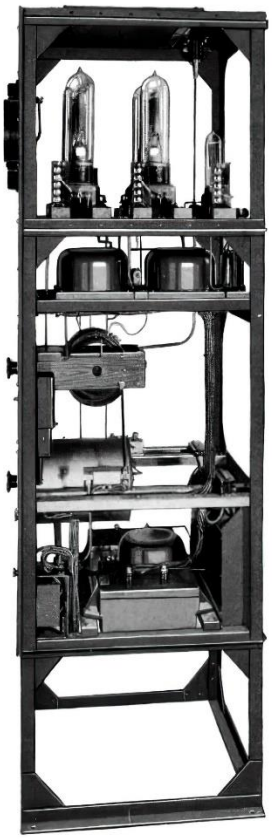


This is the most-publicized photo of the WLAG transmitter operation. On the left was a rack with audio-input equipment. Note the Western Electric mike. In the rear corner is the power switchboard. On the right, Chief Engineer Ray Sweet is adjusting the frequency. Behind him is a converted bathroom which held the motor-generator and the batteries (and hopefully a vent-fan).



Here's another view; Ray Sweet is still doing his best to keep on frequency. On the left you can now see the WECO 2-C receiver and speaker. The desk was also the announcer's work station.





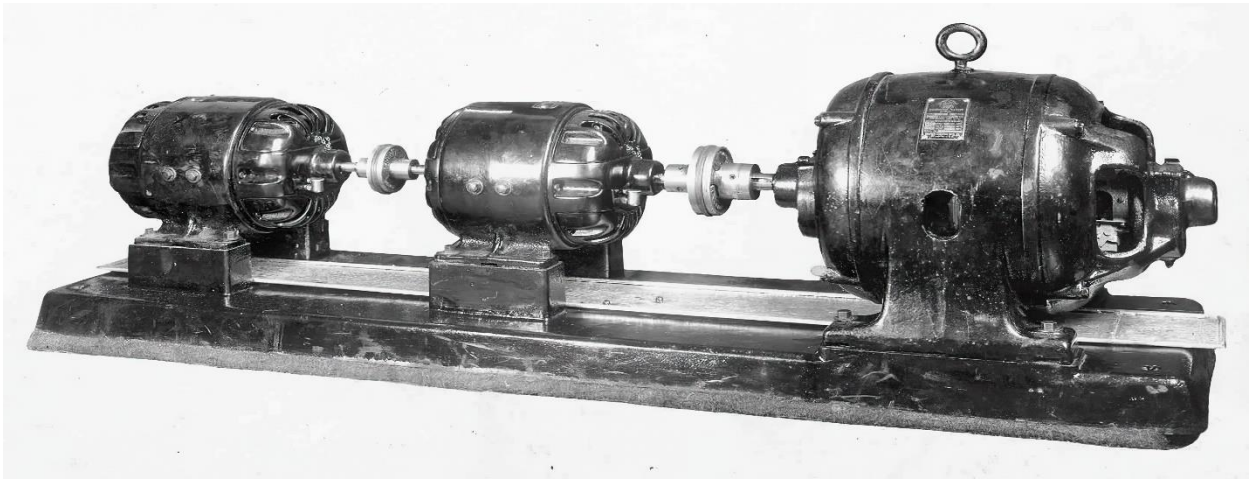
1-A 500-WATT TRANSMITTER

POWER SWITCHBOARD

WLAG received one of the first factory-built 500-watt broadcast transmitters released by Western Electric. It used a Heising design coupled to a free-running oscillator.

The transmitter had four # 212-A tubes (two "modulator," two "oscillator") and a # 211-A tube ("speech amp"). Shipped as a model 1-A, the transmitter's modulation drove the oscillator and the oscillator was part of a tuned circuit that included the antenna; collectively they determined the operating frequency. It was necessary to have a solid mounting for the flat-top antenna, since array-sway could cause a shift in frequency. That circuitry was later modified for better stability and the rig was labeled a "1-B."

The transmitter required 1600 plate volts @ 1.25 amps. Filaments needed 14 volts @ 28.4 amperes. This power was delivered by the motor-generators:



A 5-1/2 horsepower motor was needed to spin things up to 1750 rpm.

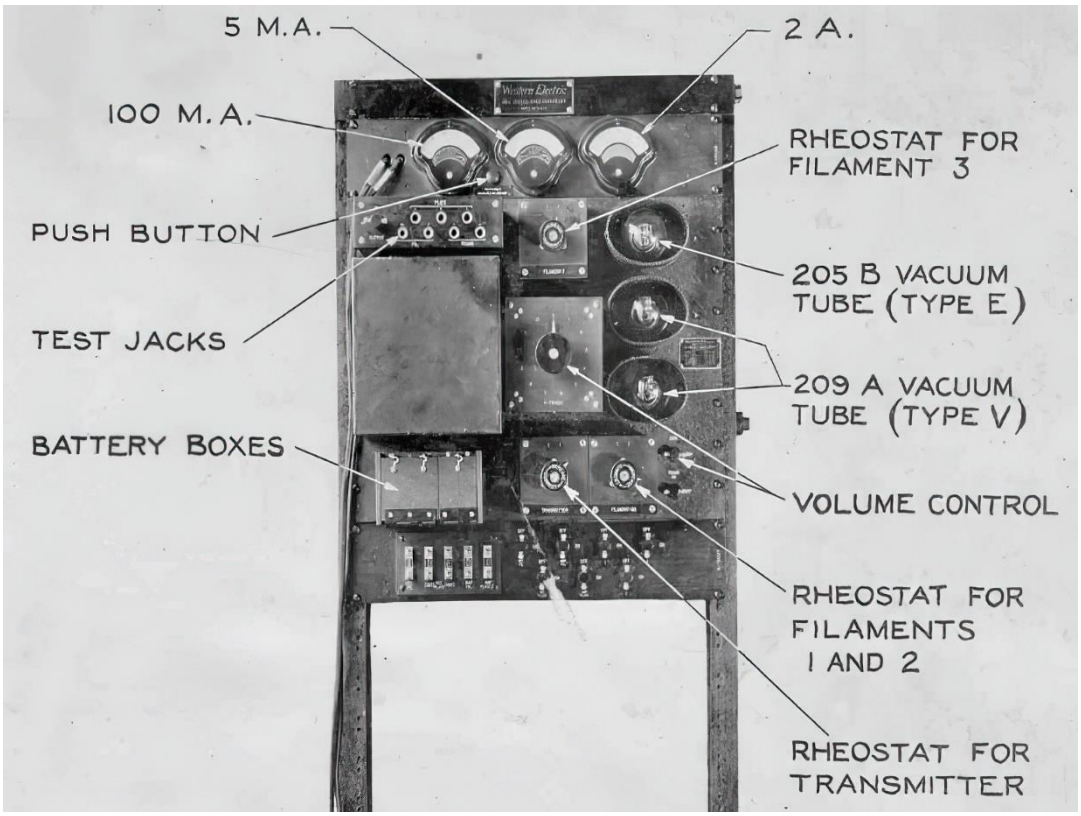
Power Switchboard (pictured above, rear corner)
This module controlled the starting and the regulating of the motor-generator and it monitored and controlled system voltages and transmitter power output.

Receiver

Figure 12
NO. 2-C RADIO RECEIVER

The 1-A transmitter system included a receiver to comply with existing requirements to "*listen before you radiate*" (for other stations or distress calls).

Audio amplifier (seen above, left)



Speech-input equipment (today it's an IC). "Rheostat for Transmitter" controls the mike.

The audio equipment depended on batteries for power (use of motor-generators would have induced noise into the low-level audio circuitry). The 18-volt audio-tube filament supply was provided by a rechargeable battery. The 130-volt plate voltage was delivered from a string of Type-6 (1.5 volt) dry cells in series. Do the math.

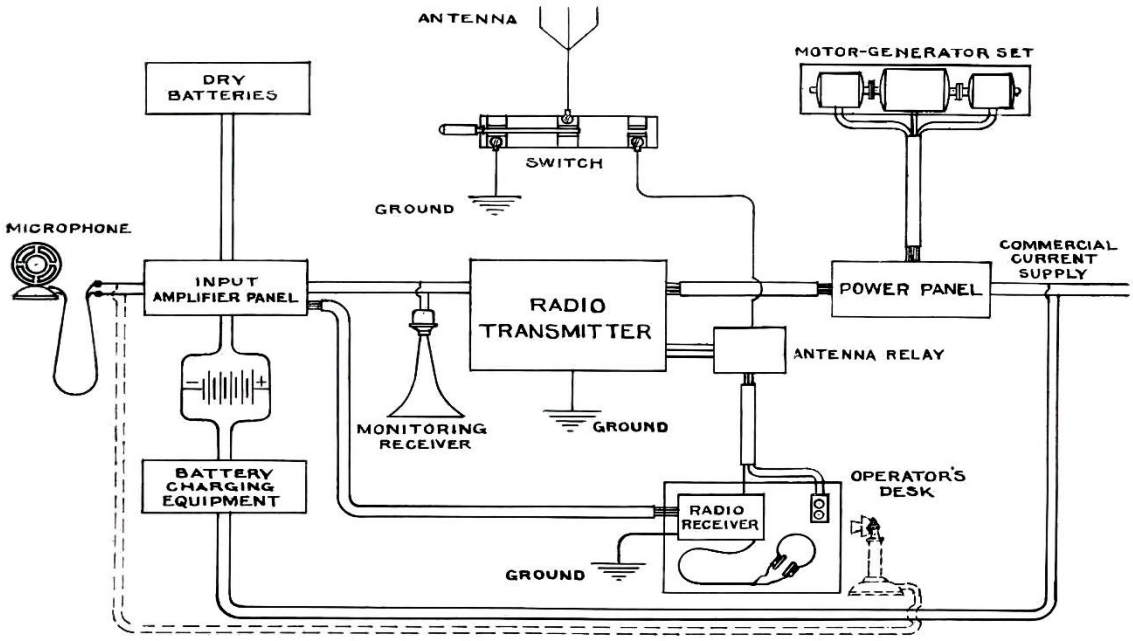
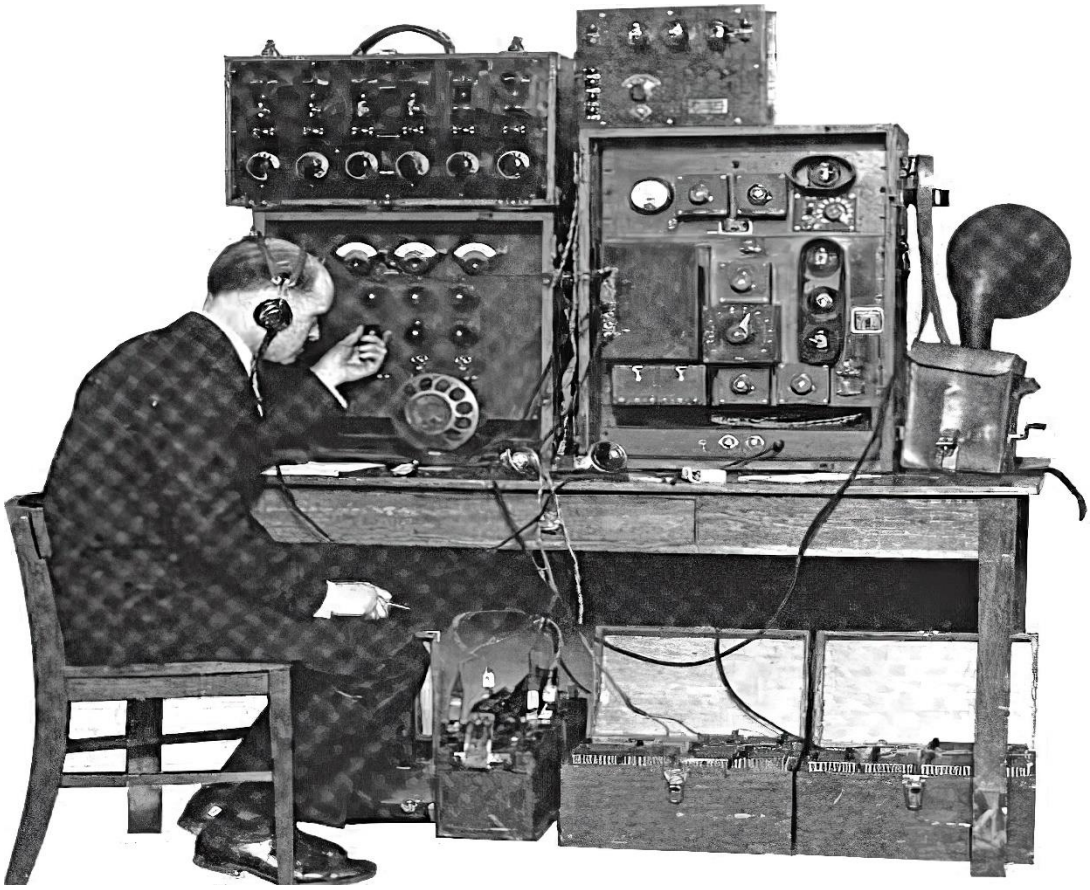


Figure 13
GENERAL PLAN OF CONNECTIONS

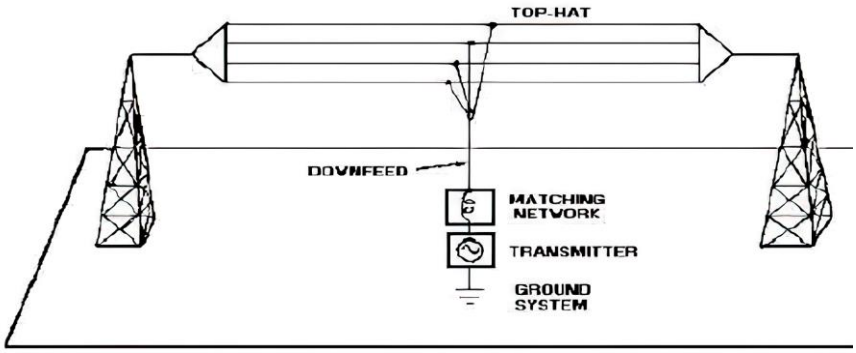
Late-20s audio equipment

Here's a look at a quasi-temporary remote operation with several inputs. This setup was likely for a multiple-mike pickup; perhaps the Minneapolis Orchestra.



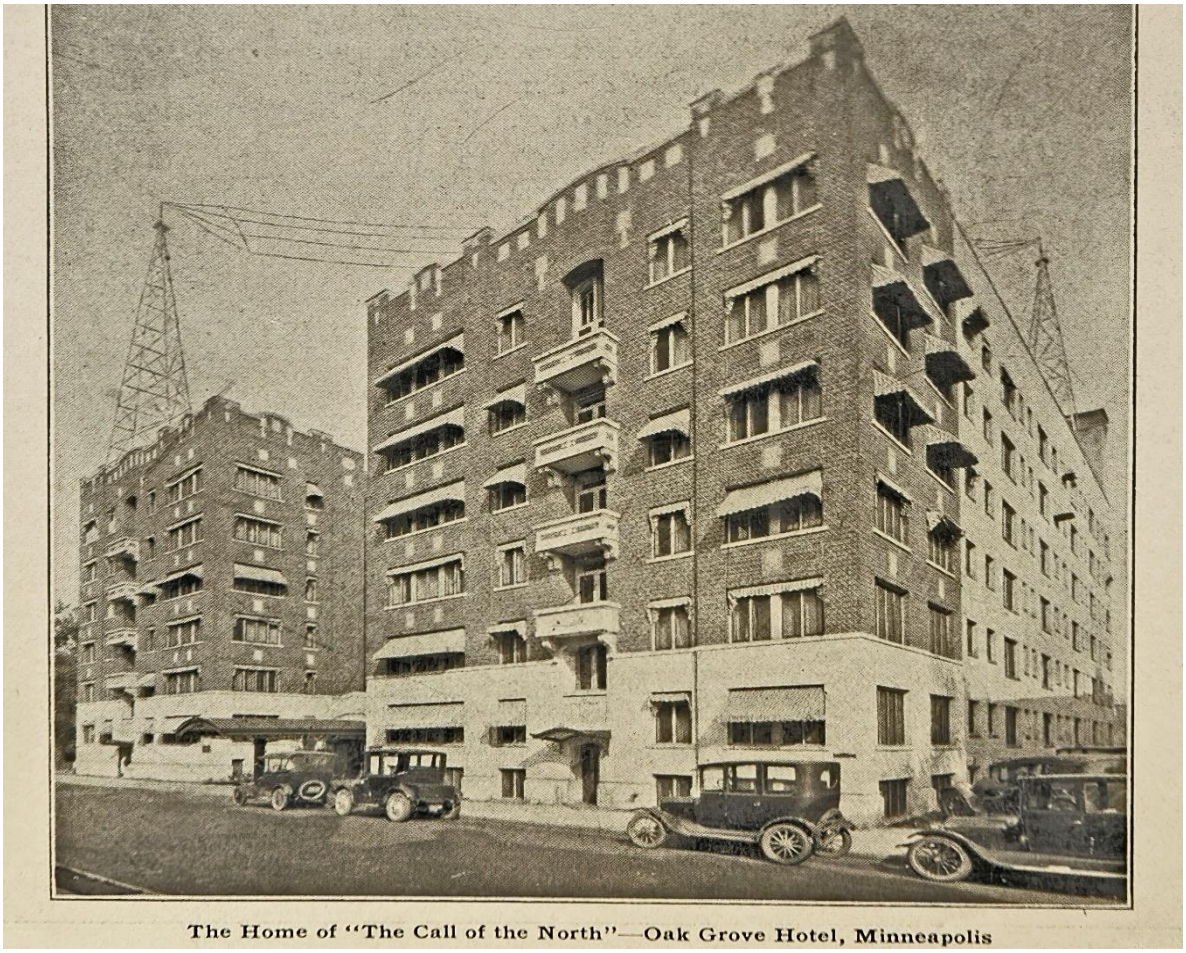
Top left is a mike-level mixer. Below that another 6-channel mixer and a WECO VU panel. On the top right you see a power amplifier for the shy loudspeaker and beneath that the famous 8-B speech-input amplifier/program amplifier. On the floor a cob-up of temporary batteries for filament and plate supply.

The "Flat-Top or "T" antenna



Flat-top antennas were de rigueur for Amateur and licensed radio transmissions. They were arrays of like-minded wires supported by towers to form a "T" that supported the vertical wire (the actual radiator). The horizontal wires between the towers had two purposes. First they supported the vertical cable from the approximate middle. That cable ("DOWNFEED" above) typically dropped down to a coupling network where the signal from the transmitter was converted to the antenna's self-impedance; typically well below 50 ohms. The other purpose of the horizontal wires was to add capacity to the vertical cable to make it *electrically longer*, thus functioning as a "capacitive top-hat" which increased the current in the vertical section. Flat-top antennas could send a lot of power toward the birds, and the skywave signal they produced sometimes outplayed the desired horizontal reach. (We also know rooftop antennas were often too "short" for their operating frequency.)

The WLAG Oak Grove Hotel flat-top was supported on its ends by 75-foot towers placed 75 feet off the ground on the Oak Grove roof, for a total 150 feet above ground. (Probably too "short" for 720 kcs.)

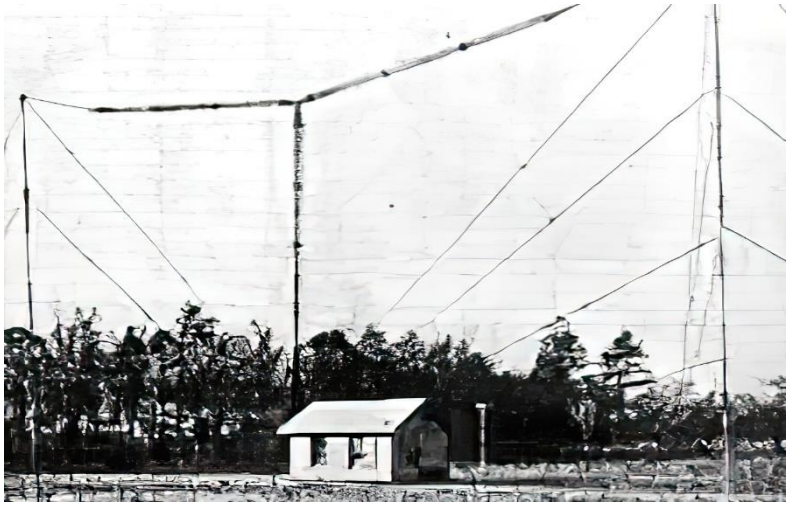


The Home of "The Call of the North"—Oak Grove Hotel, Minneapolis

At the Oak Grove the vertical radiator was connected to the center of the flat-top by a cable that dropped down and connected directly to the 6th-floor transmitter through a simple capacitive network. (Q???)

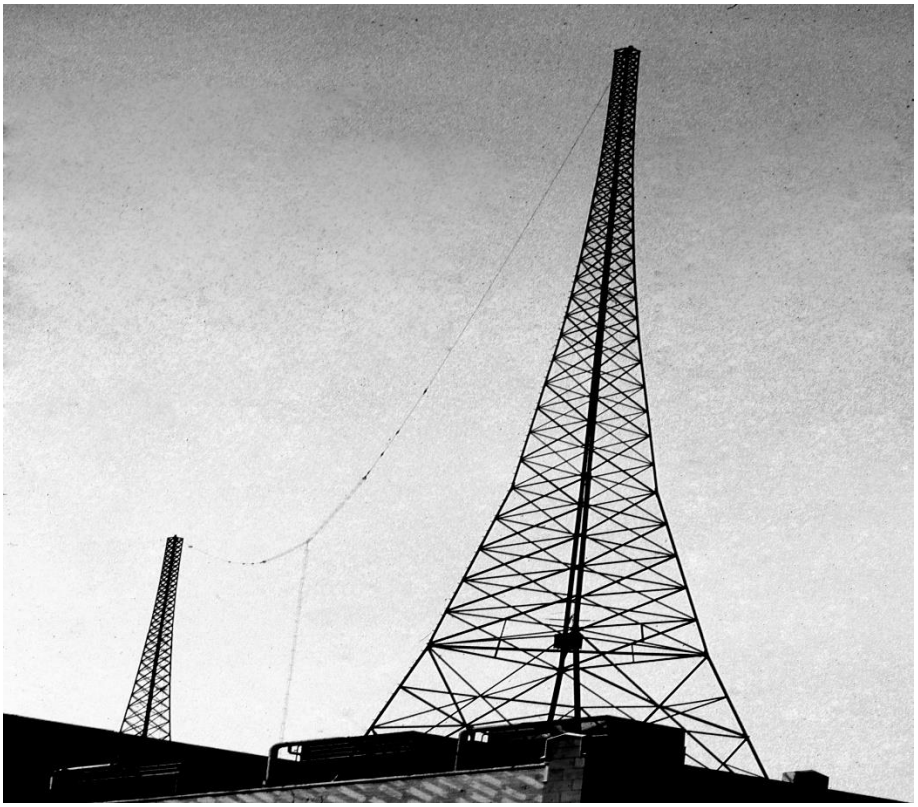
Early on, flat-tops were seen on the rooftops of a lot of buildings. The flat-top needed a "counterpoise" and roof-top placement usually meant connecting to the building's metal framing for that purpose. One can envision that, when all the stars aligned, the roof-top antenna could be seen as a "center-fed vertical dipole."

An extension of this arrangement (added to WLAG) was the "birdcage." A "cone" of wires would be fitted around the basic antenna wire structure. This had the effect of increasing the capacitance of the antenna and generally resulted in wider bandwidth and better audio.



Typical amateur "T" antenna with birdcages

Less-visible are the birdcages on station KXA in Washington (Ben Dawson):



Flap-tops were the best available low-frequency antenna until the mid-1930s when the vertical tower became the enduring state-of-the-art choice for high-power electromagnetic radiation at Long- and Medium-Wave.

WCCO 1925 Coon Rapids MN transmitter and antenna

Once the transmitter building was rain-proofed engineers assembled the components of the monster Western Electric Model 104-B 5000-watt water-cooled transmitter (they built much of this during the 1924/1925 winter).

To offer perspective here's the Western Electric concept of how this equipment might fit into a typical station:

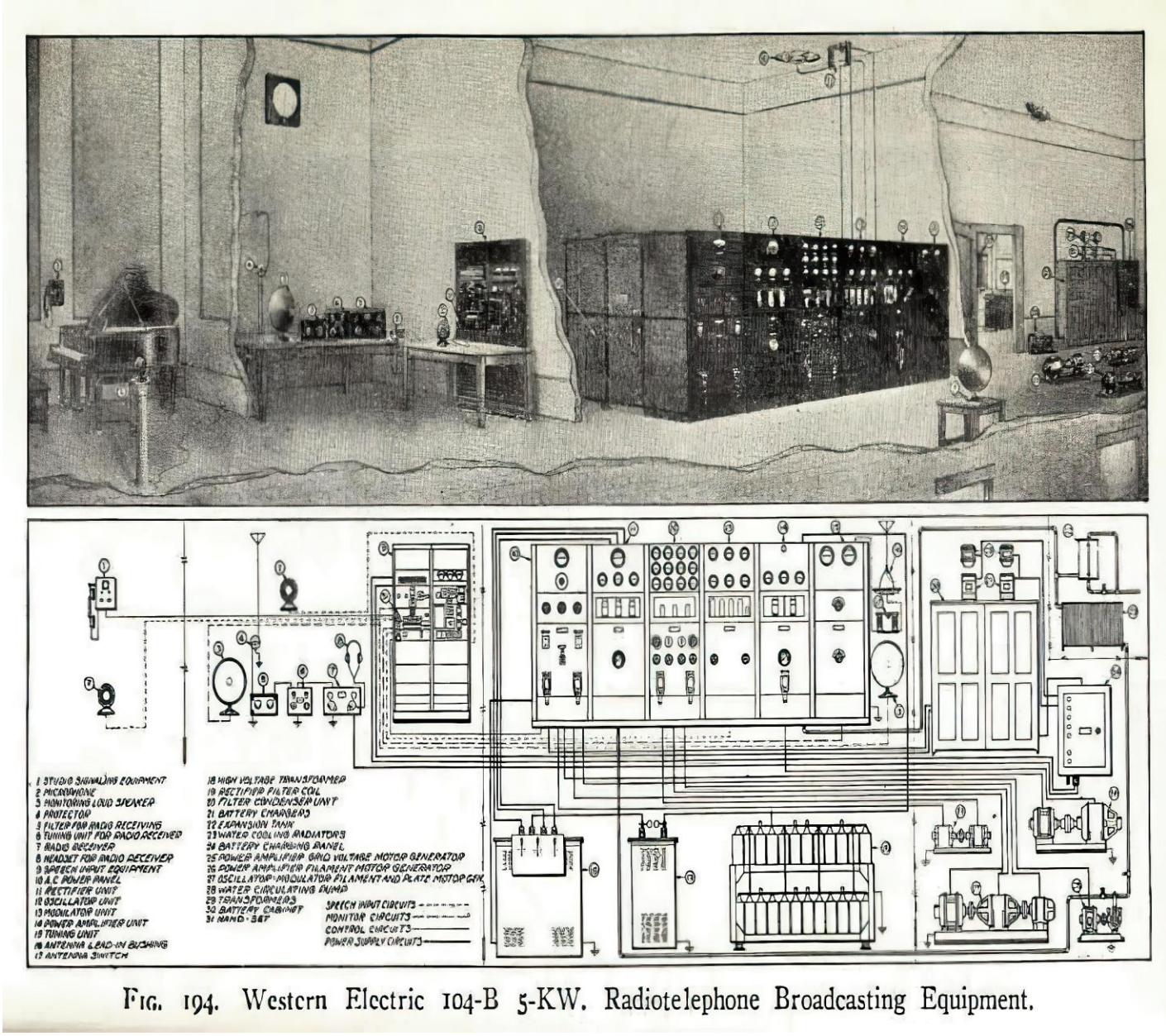


FIG. 194. Western Electric 104-B 5-KW. Radiotelephone Broadcasting Equipment.

Plate voltage on this mammoth machine was 17,000 volts (probably gas-tube rectifiers). Filament voltage was 24 volts DC at 41 amps. Necessary grid voltage was supplied by the motor-generator sets.

The transmitter's water-cooled system depended on an internal radiator for cooling, with an overflow roof-tank.

The transmitter as installed was the "Master Oscillator" type that had to be manually kept on frequency. In 1928 automatic frequency control replaced the manually-tuned oscillator; operators could now take longer breaks away from the controls.

The first Coon Rapids flat-top towers were 200 feet high and 400 feet apart and included birdcages. There's a picture above.

The ground system (counterpoise) was rather involved. Let's read the words of the WCCO engineers:

10/24/24 The ground system for the new Western Electric Co Type D-77964 transmitter was composed of a center ground bus extending 260 feet to the West, and 110 feet to the East from a point in the center of the transmitter building. The ground bus running around the building on the North & South sides to join the West bus with the East bus. From the West bus another bus was connected and extended into our 410 foot well. To this East-West bus was connected every two feet a ground wire on both sides of the bus, to fill an area 300 by 370 feet.
At each end of the East-West ground bus was a 200 foot triangle sided towers built as I recall it, by the Minneapolis Steel Machinery Company.
Supported between the towers was the antenna, flat tops and cages were used.
Also in connection with the ground system was installed a counter-poise approximately 10 feet above the ground and some where near the size of the West end ground system.

Modulation

Early on, the audio was transmitted "barefoot" (automatic-level controls weren't in use until the 1930s). Prior to their use station staff had to manually control volume level; manual gain-riding resulted in about 50-percent average modulation. And many systems couldn't tolerate continuous levels above that point without distortion.

More on early AM audio: http://durenberger.com/wp-content/uploads/2022/03/AMAUDIO20s.pdf

The next big thing(s) at Coon Rapids would be the addition of two more towers for a beefed-up flat-top:

The second (300-foot) flat-top was added following the 1931 grant for 50,000 watts. Engineers were on a learning curve as they dealt with the stupendous power being fed that flat-top; the biggest problem was the need to beef up the ground system. This flat-top was replaced by a 654-foot tower in 1939 (still standing).

With this appendix and the detail preceding, the Pavek Museum continues to fulfill its educational mission.

Find further technical information by the file-full at www.durenberger.com

COMMENTS/QUESTIONS: Mark4@durenberger.com