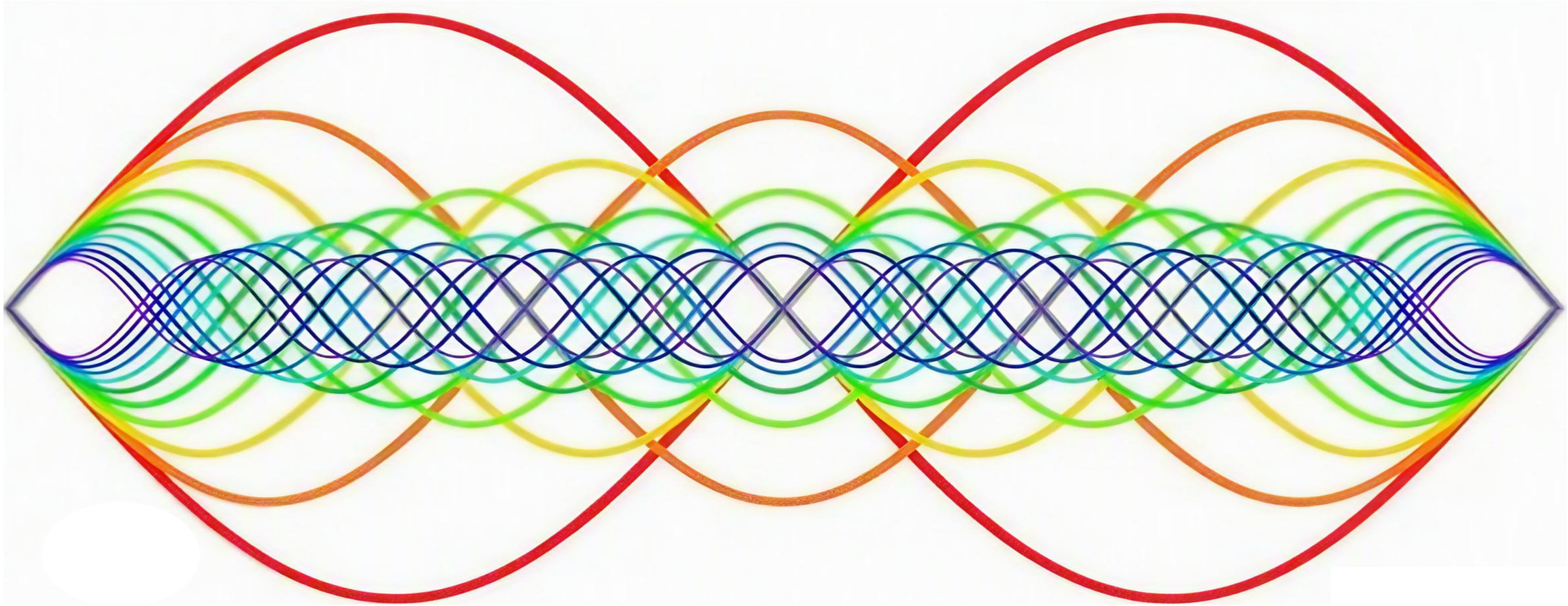


Harmonic Resonance:

Re-awakening Two Call Signs Across Four Generations

Will McCoy

Elle McCoy

Waves of Love: The Anniversary Promise

Will McCoy (W1CEI)

- University of Florida 2025 – Electrical Engineering and Computer Science
- Pursuing his Master’s/Ph.D.
- Great Grandson of a ham

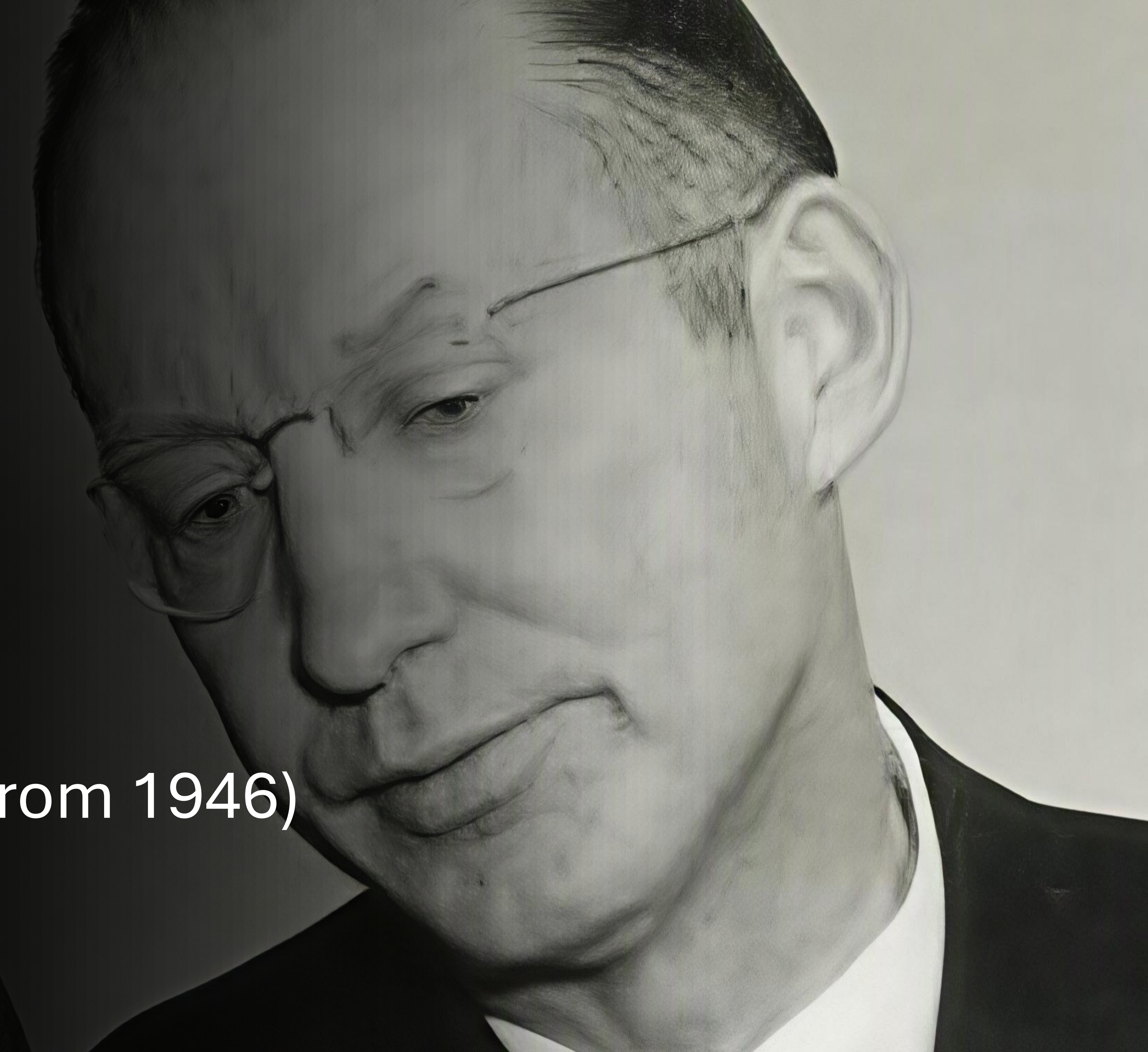
Elle McCoy (WB4SNL)

- University of Florida 2024 – Mechanical Engineer
- Design Engineer at a local company
- Great Granddaughter of a ham

JAMES J. LAMB

W1CEI (later W1AL from 1946)

1900 - 1986



The Lambs of Michigan City, North Dakota *(Nelson County)*

- **Maritime Roots to the Prairie:** Edwin A. Lamb, leveraging capital from maritime and shipping ventures, moved his family from Port Huron, Michigan, to North Dakota at the height of the 1880s homesteading boom.
- **The Pioneer Route:** The roughly 880-mile journey followed the newly constructed rail lines, leading to his founding of Michigan City in Nelson County in 1882.
- **Settlement Style:** Breaking from the norm of western North Dakota's sod houses, early settlers in eastern North Dakota initially constructed humble wood-framed homes.
- **Irish Lineage:** The family line—deeply tied to the Skehan and Lamb families—traces its origins back to County Wexford in the province of Leinster, Ireland.

Photograph of a home from around1890 in Pembina County – just north of Nelson County in the Red River Valley

A Legacy in the Making

Within a few years, Edwin A. Lamb would have commissioned an ambitious, statement-making urban Victorian to reflect his status as a town founder and prominent businessman

Joseph Lamb
Son of Edwin A. Lamb

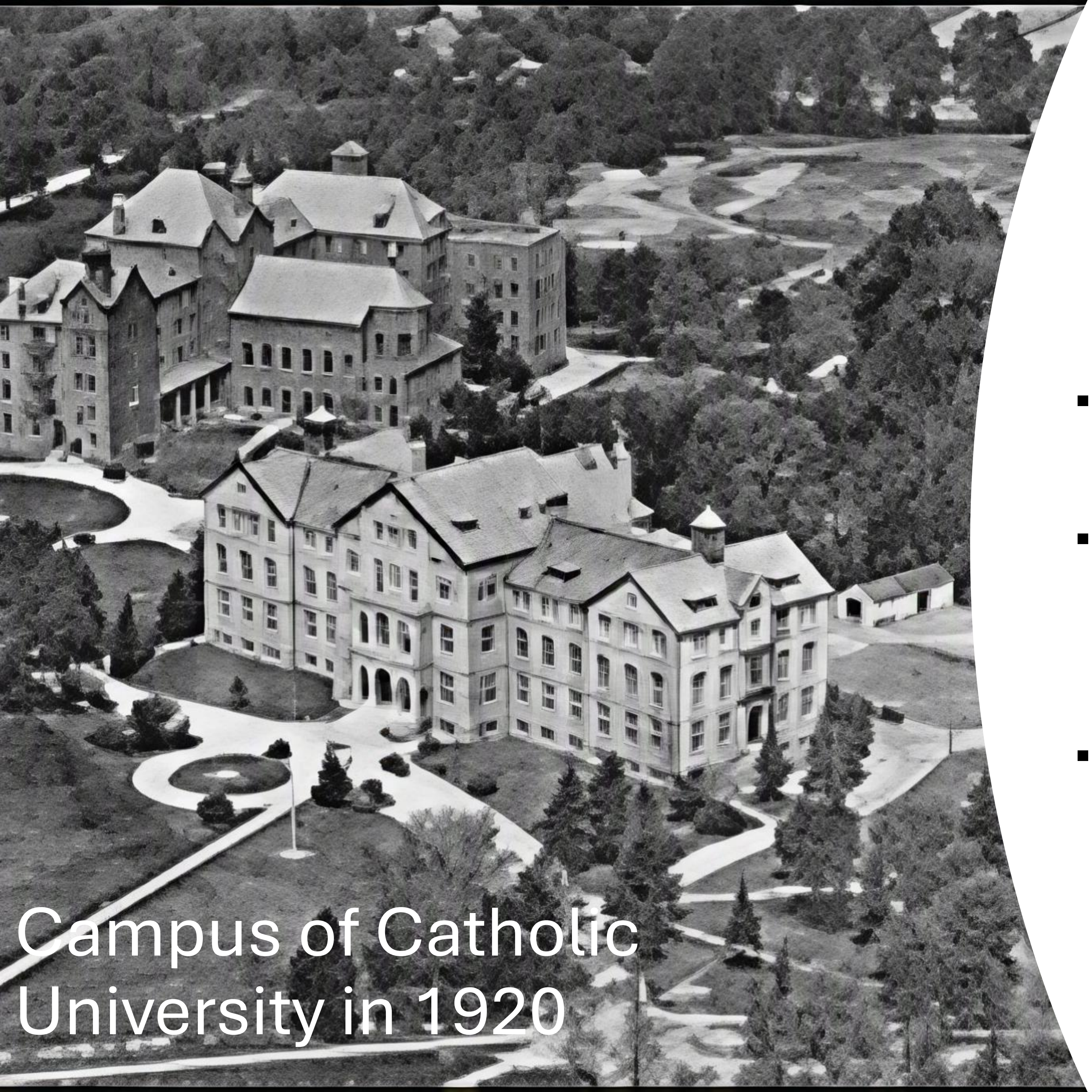
Joseph Lamb
Eldest, Banker

James J. Lamb
Engineer, Radio Pioneer
Born 1900

- As a young boy James started experimenting with wireless and radio, working with early spark equipment

- His nephew (Joseph S. Lamb (1934-2003) was appointed President of the Bank of North Dakota in 1986 by the governor.

A photograph of a home somewhere in North Dakota in late 19th Century

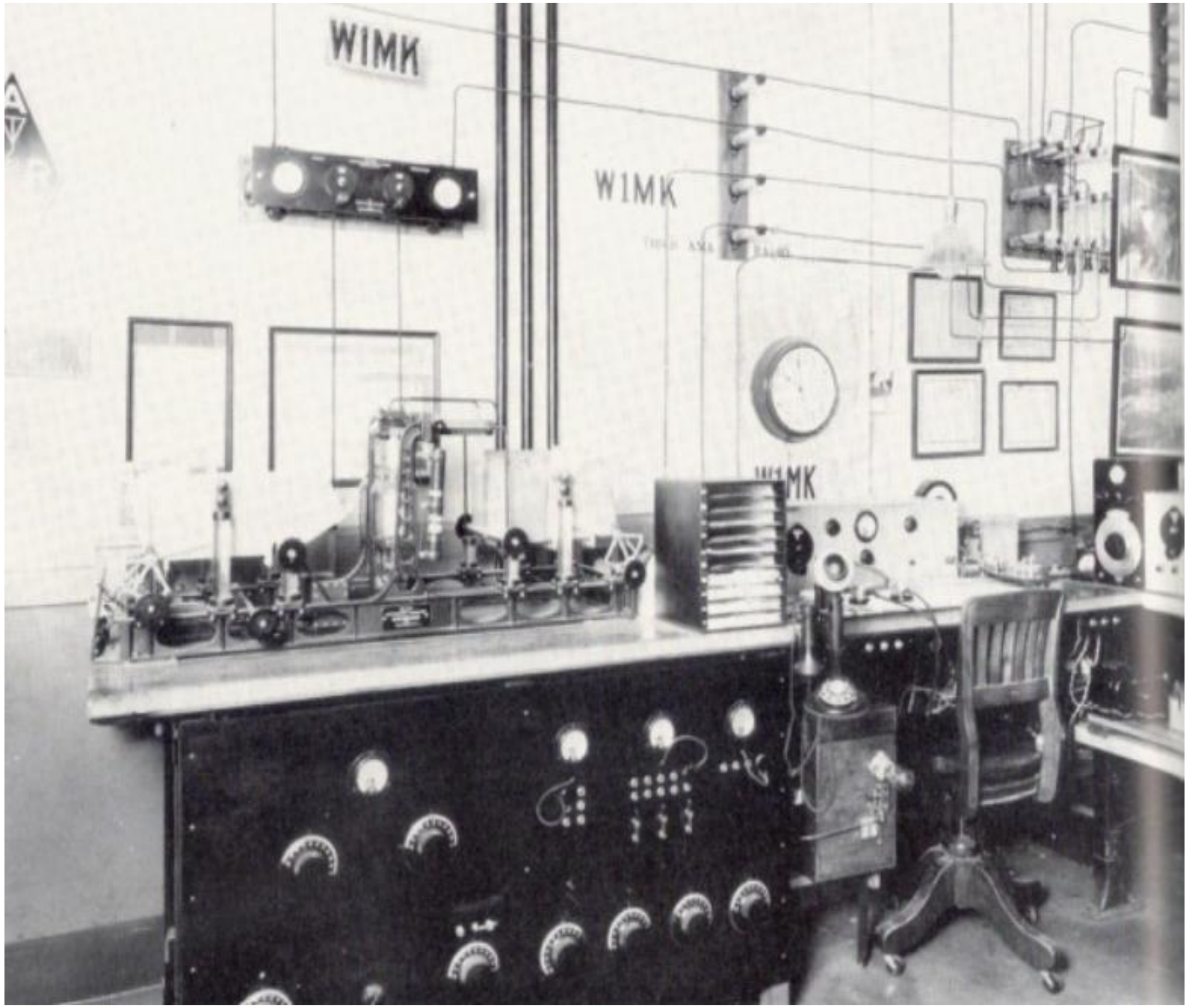


The Making of an Engineer: Education and Early Writing

- **Accelerated Early Education:** Completed high school by the age of sixteen, followed by a foundational year at the University of Minnesota.
- **Practical Engineering Roots:** Relocated to Washington, D.C., and attended Catholic University, focusing on practical mechanics like steam engines to piece together a hands-on foundation in electrical engineering.
- **Early Community Engagement:** Began cutting his teeth in technical communication by answering reader inquiries for ***QST*** magazine, authoring hundreds of published letters that established his early authority and set the stage for his future editorial leadership.

Tenure at the ARRL / QST

- **2nd Technical Editor of *QST* magazine** (1929 – 1939)
- Lamb wasn't just a contributor; he was the primary engineer running the ARRL laboratory and responsible for filling the technical pages of the magazine
- During his prolific career with *QST*, Lamb authored several landmark articles that revolutionized amateur radio engineering



ARRL Station W1MK at Brainerd Field before being destroyed by the 1936 floods

What's Wrong With Our C.W. Receivers?

Overhauling Our Ideas of How They Work—Double-Beat Response—R.F. Selectivity—Pointing The Way To "Single-Signal" Performance

By James J. Lamb, Technical Editor

C.W. SELECTIVITY, ancient problem that has been with us ever since there was QRM, has come to roost on our work bench again. It is with us, as a matter of fact, because the last selectivity-QRM struggle that embroiled *QST's* laboratory no longer than six months ago left us not entirely satisfied with the complete effectiveness of the audio-frequency methods treated at that time. This dissatisfaction was suggested in Ross Hull's article in January (1932) *QST;* its roots lay not in the audio-frequency filtering method but in the limitations imposed upon the a.f. side by the inadequacies of the radio-frequency section of the receiver. For, no matter how nearly perfect the audio-frequency filtering might be made, with every known method of beat-note reception each carrier brought forth two signals of identical audio frequency; there was always the "other side of zero beat," the "image." This meant that each signal occupied more space on the dial than it should — just twice as much, to be exact — no matter how good the signal and no matter how good the audio-frequency selectivity following the detector. There was, we realized acutely, a weak spot in all our systems of beat-note reception; the simple regenerative receiver with oscillating detector or with a separate oscillator-regenerator, superhets with oscillating second detector or separate oscillator beating with the intermediate frequency — all gave what actually amounted to two signals in the output for every signal received.

Admittedly this aspect of beat-note c.w. reception is not one that has been universally thought of as undesirable. In fact, its very existence has been so long part and parcel of c.w. reception that we have come to take it for granted. The suggestion that it should be remedied or even that it is undesirable, we wager, is one likely to arouse little enthusiasm and, perhaps, considerable objection. But then again this may not be so — especially when the suggestion is expanded to *two.* Surely there could be no objection to that. If the suggestion is further expanded to include that in the process of eliminating the other side of zero beat there is made possible simultaneously an increase in selectivity that brings what not only diagrams like "single-signal" reception but also actually sounds like "single-signal" reception for steady signals separated by as little as 500 cycles — then perhaps there also will be some enthusiasm. At least there may be enough interest in the idea to carry the reader through the story of the development. He should not expect, however, to be startled out of his boots by the disclosure of any "revolutionary" new theory nor should he be disappointed if the sum total leaves him with the impression that it must have been thought of before. That, frankly, is our own impression. Probably it has been thought of before, as undoubtedly we shall be told by some several people within not more than three days after this issue is out. But a pretty thorough search and inquiry of people who ought to know have uncovered no previous disclosure of the combination of features that, coördinated, go to make up what we believe to constitute a new order of c.w. receiver performance. The essential features that make this possible are a high order of radio-frequency selectivity in combination with exceptional over-all stability and a system of introducing the r.f. modulation to give the audio beat-note that operates without injury to the sensitivity or selectivity of the receiver. The three are completely interdependent and each is of no less importance than the other two. That their achievement individually and operation in combination are entirely practicable has been thoroughly tested for several months in an experimental receiver whose performance has met with the unqualified approval of even such exacting brass-pounders as "RP" of W1MK. But back of this period of accomplishment lies another of groundwork development, of probing for fundamental deficiencies in existing methods of reception

FIG. 1 — RECEIVER SELECTIVITY IS JUST AN AID TO AURAL SELECTIVITY

This curve, taken from "Speech and Hearing," by Dr. Harvey Fletcher, suggests the ability of the average ear to distinguish between tones of different frequencies. Note that the minimum percentage difference region is the one containing usual beat-note frequencies.

Pioneering Receiver Engineering

- In 1932 Lamb introduced the **"Single-Signal" Superheterodyne receiver architecture**
- This innovation revolutionized high-frequency (HF) radio design, permanently transforming amateur and commercial receiver technology

Key Contribution of the 1932 Series

- **The Problem It Solved:** Early shortwave superheterodyne receivers suffered from severe selectivity issues—particularly "audio image" interference, where a single signal would produce dual beat notes, causing massive clutter on crowded bands
- **The "Single-Signal" Superhet Concept:** Lamb integrated a high-Q **quartz crystal filter** directly into the intermediate frequency (IF) amplifier stage of a superheterodyne receiver. By combining variable crystal filtering with precise IF tuning, his circuit rejected the unwanted audio image frequency entirely
- **Extreme Razor-Sharp Selectivity:** For the first time, operators could eliminate the "other side" of zero-beat tuning, effectively halving the bandwidth required per CW signal and allowing clear reception in heavily congested bands.

Historical Impact

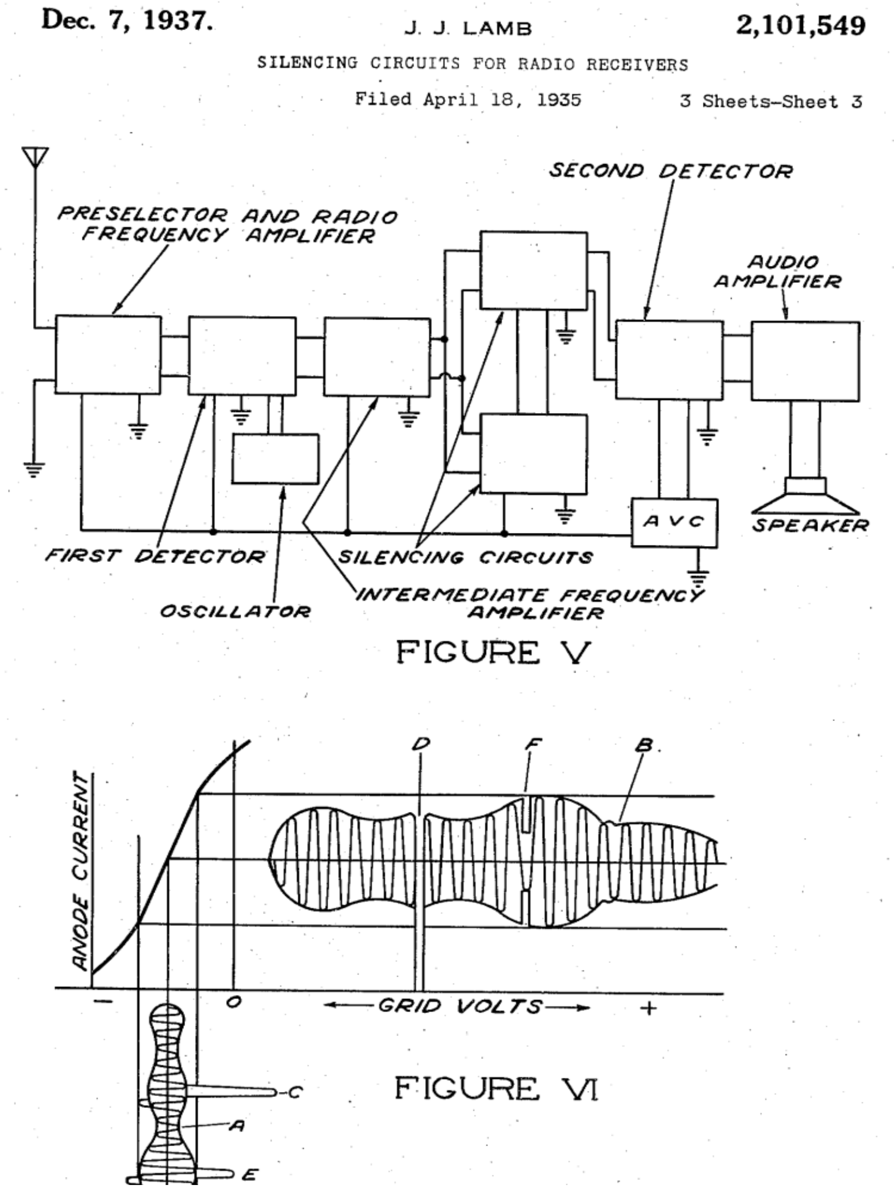
- **Commercial Receiver Revolution:** Lamb’s design immediately became the template for the premier receivers of the golden age of radio. Iconic commercial rigs like the **National HRO**, **Hammarlund Super-Pro**, and **Hallicrafters Super-Skyrider** directly incorporated Lamb’s single-signal filter architecture
- **Foundational Receiver Design:** The integration of crystal lattice/filter stages and razor-sharp IF selectivity remains a core principle of analog RF receiver engineering today
- Lamb later built on this legacy in 1936 with another landmark QST development—the noise silencer

Patents, Principles, and the Open-Source Spirit

Prolific Innovation: Secured 14 U.S. patents over the course of his career, with four specifically focused on advanced radio designs.

The "Open Source" Breakthrough: Rather than patenting his most famous creation—the single-signal superheterodyne receiver—Lamb published the complete schematics and engineering principles openly in ***QST*** for the amateur community.

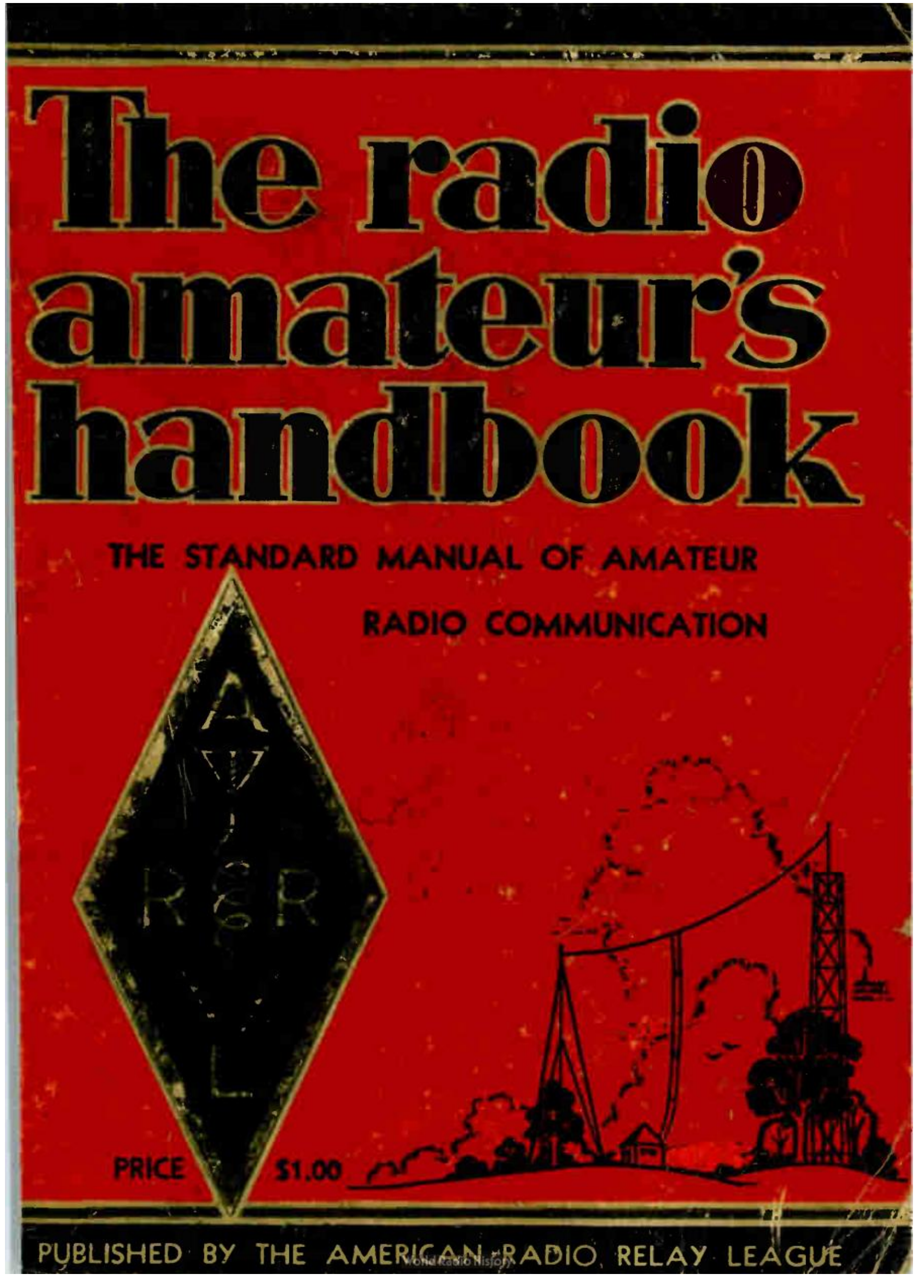
Corporate Exploitation: Major manufacturers immediately adopted the design, building commercial receivers based on his work and securing patents under their own corporate names.



This is a schematic from his most famous patent – the Noise Silencer

Architect of the Handbook: Shaping the Amateur's Bible

- **Shaping the Definitive Guide:** Stepped in as co-author starting with the 4th edition in 1928—taking over from F. E. Handy's original operating manual—to completely overhaul and direct the technical content.
- **Core Technical Author:** Authored major, foundational chapters covering fundamental electrical principles, advanced radio circuits, receiver design and construction, and radiotelephony.
- **The "Bible" of Ham Radio:** Transformed the publication from a basic operating guide into the essential, gold-standard engineering reference for generations of radio amateurs.



Leave of Absence - 1939

- **Forced Hiatus:** Overworked and suffering from tuberculosis, Lamb took an indefinite leave of absence from the ARRL in 1939—just as his wife gave birth to their fourth daughter.
- **Community Support:** Demonstrating the profound respect and camaraderie of the amateur radio community, the ARRL staff voluntarily took pay cuts so Lamb could continue receiving a salary while he recuperated in a sanatorium.

Words written in a Staff Update in QST that show how much Lamb meant to the ARRL and the radio community at large:

"We very much regret to have to announce the retirement of James J. Lamb as our technical editor…

World-famous *as the developer of the single-signal superheterodyne, the noise silencer and the heterotone, his connection with our staff is by no means severed.*

We hope that he will soon be back with us and pulling ***new wonders out of the old hat****. Pending his return, he is listed on our staff as a consultant on leave of absence."*

From Radio’s to Computing Technologies

- Remington Rand established the **Laboratory of Advanced Research** in Connecticut in **1946**
- Leslie Groves **(Manhatten Project)** was hired to run the entire Advanced Research Division
- James J. Lamb was hired as their Chief Engineer
- Innovations included closed-circuit TV systems, and early computer memory components during the late 1940s and 1950s

Fort Huachuca, Arizona

Wartime Lessons: World War II proved the critical necessity of electronic devices in modern warfare, paving the way for advanced military testing infrastructure.

The Proving Ground: In 1954, the Department of Defense designated Fort Huachuca, Arizona, as the headquarters for the U.S. Army Electronic Proving Ground (USAEPG).

The Electromagnetic Sanctuary: The remote site was strategically chosen for its isolation from heavy industrial interference, offering an exceptionally quiet radio-frequency environment essential for precision testing.

Expert Leadership: James J. Lamb served as a senior civilian chief scientist for the installation, guiding its technical development.

Radio Propagation & Refractivity Research

Atmospheric Wave Propagation: Lamb co-authored studies on meso-scale radio refractivity, mapping how desert thermal gradients bend high-frequency signals

Terrain & Environmental Testing: Analyzed how extreme desert terrain impacts signal propagation for reliable long-range military communications

Supporting Early Unmanned Systems: Provided foundational data on signal propagation and electromagnetic compatibility for early drone testing programs

Pioneering Drone & Electronic Warfare Testing

Unmanned Systems Testing: Collaborated on early test programs for unmanned aerial drones at the U.S. Army Electronic Proving Ground

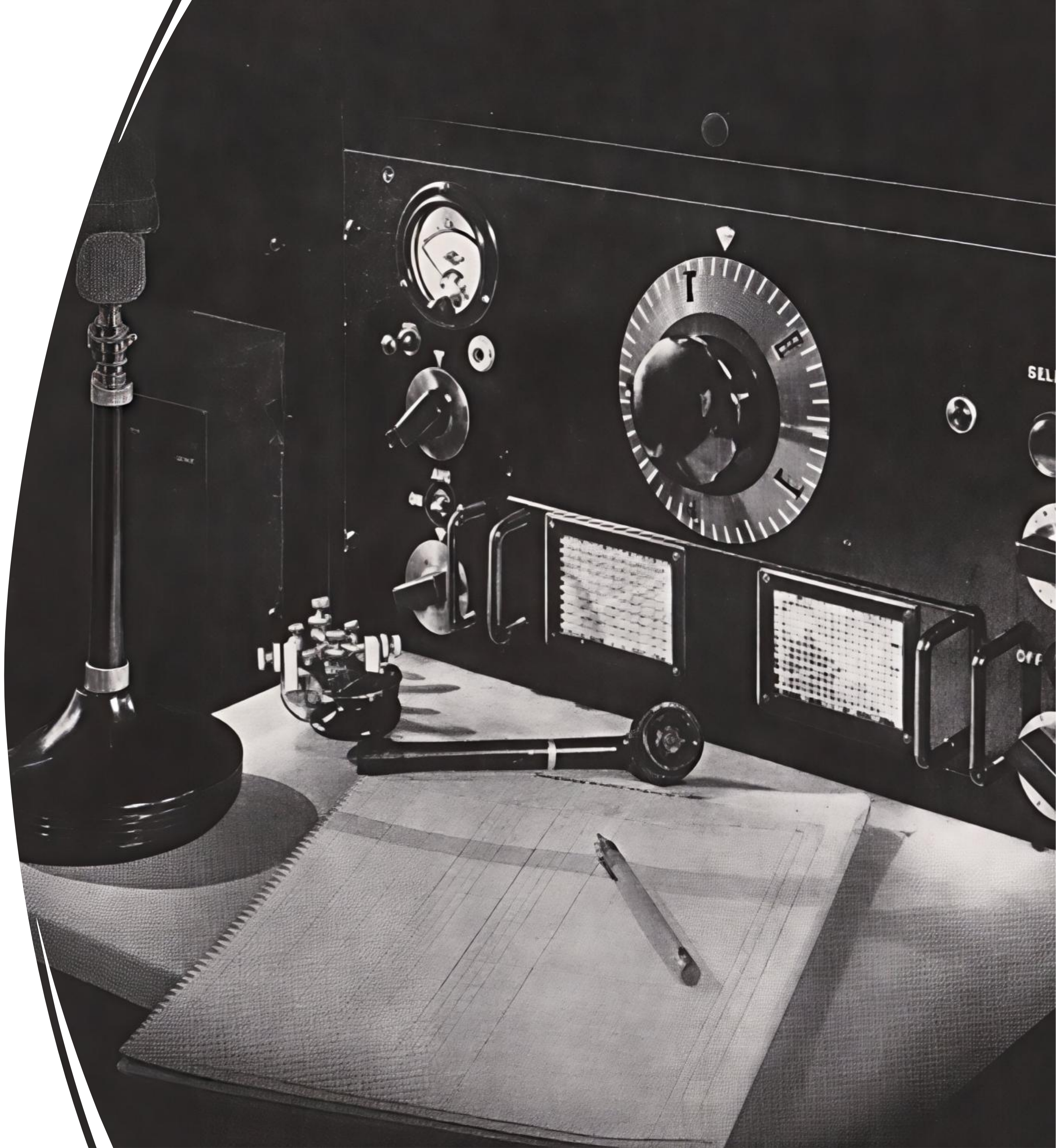
Desert Environment Analysis: Evaluated how radio-controlled aircraft operated in an electronically quiet desert environment

Interference & Compatibility: Targeted radio frequency interference, electromagnetic compatibility, and the reliability of early electronic warfare systems under flight conditions

A drone at Fort Huachuca around 1956. U.S. Army photo.

James J. Lamb
1900 - 1986

- Retired to California after a long and prestigious career
- QST published his obituary honoring his legacy as their technical editor and radio pioneer
- Lamb remained a recognized **Life Fellow of the IEEE** (Institute of Electrical and Electronics Engineers)—the highest honor grade awarded to engineers with extraordinary records of accomplishments



The Single-Signal Superheterodyne prototype is on display at the ARRL Headquarters in Newington, Connecticut

This is the exact equipment design that revolutionized amateur radio selectivity, turning a theoretical layout into the gold standard for high-frequency communications

Honoring a Legacy & Passing the Torch

- **Family Legacy:** Deepest thanks to the family of Will McCoy for joining us to honor the life and enduring impact of James J. Lamb—whom the amateur radio community is immensely proud to call one of its own.
- **Special Acknowledgement:** Heartfelt thanks to Glenn Lamb McCoy, James's youngest daughter, for providing the invaluable details that helped fill the gaps so the family may preserve this testament to his legacy.
- **Passing the Torch:** Warmest congratulations to Will and Elle McCoy on recently earning their amateur radio licenses!