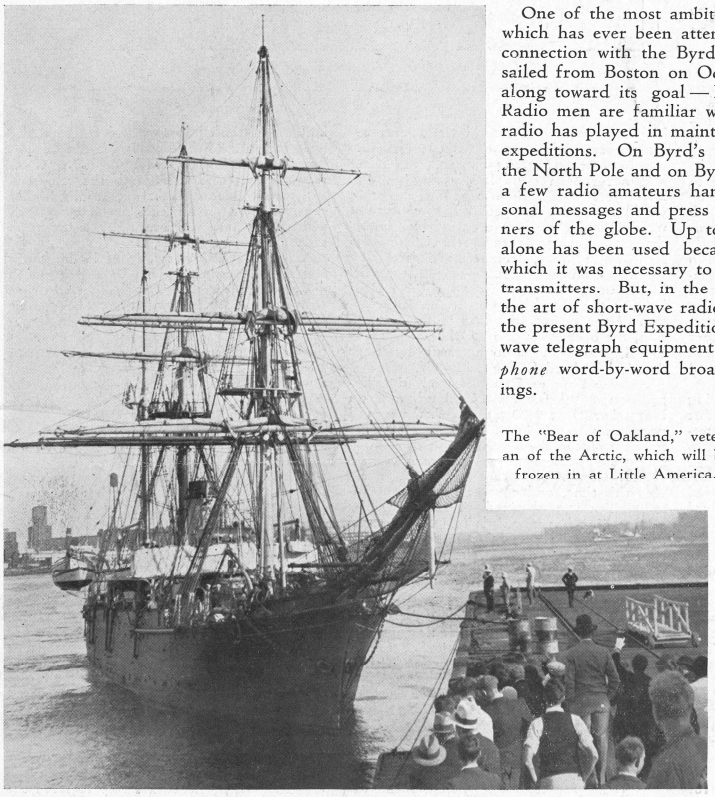
The Signal

OFFICIAL MAGAZINE OF THE COLLINS COLLECTORS ASSOCIATION * Q1 2013 Anniversary Issue *

THE BEGINNING 1933 to 1941

COLLINS SIGNAL
Published by
COLLINS RADIO COMPANY
Designers and Manufacturers of
Transmitters, Transformers and Speech Equipment
CEDAR RAPIDS IOWA, U. S. A.
JANUARY, 1934

The Byrd Antarctic Expedition II Sails With A Complete Collins Short Wave Broadcasting Station Aboard!



One of the most ambitious feats of radio communication which has ever been attempted is now being carried out in connection with the Byrd Antarctic Expedition II which sailed from Boston on October 11, 1933, and is now well along toward its goal — Little America in the Antarctic. Radio men are familiar with the important part short-wave radio has played in maintaining contact with previous polar expeditions. On Byrd's and McMillan's previous trips to the North Pole and on Byrd's last journey to the South Pole a few radio amateurs handled thousands of words of personal messages and press releases direct from these far corners of the globe. Up to now, short-wave radio telegraph alone has been used because of the tremendous distance which it was necessary to cover with relatively low-powered transmitters. But, in the last few years the advancement in the art of short-wave radio telephony has been so great that the present Byrd Expedition decided not only to carry short-wave telegraph equipment but also to transmit by *radio telephone* word-by-word broadcasts of their thrilling undertakings.

The "Bear of Oakland," veteran of the Arctic, which will be frozen in at Little America.

Rear Admiral Byrd shown on the Bridge of the Flagship, "Jacob Ruppert," as the Expedition sailed.

$5.75 USA $6.50 Canada 550円日本

Collins Collectors Association

FROM OUR FOUNDER

On this occasion of the 80th anniversary of the incorporation of Collins Radio, and coincidently almost 20 years of operation since the official founding of the CCA in 1994. It is appropriate to make some comments about the progress of our CCA organization since it was founded.

First I want to congratulate the folks at Rockwell Collins on the occasion of their 80th anniversary of incorporation. To all of you, Well done! . . . and we wish you another 80 years of success.

As the CCA approaches its 20th year of operation, we should remember that the "CCA" started as a loose net (the original 20 meter net started in 1993) of friends with common interests in Collins Radio. There was in existence at that time, another magazine called the Collins Collectors Magazine – which was published by our good friend and supporter, Jay Roman, KB0ATQ. This small start of the two separate entities soon blossomed into a formal club, the Collins Collectors Association which was formed in 1994. Over the years, and with the growth of the membership, magazine and the website the CCA became what you see today. Named after the original Collins Signal which was published by Collins from the 30's into the 70s – our CCA ***Signal Magazine*** grew from a 4 page newsletter style publication to the full sized professional grade 20+ page bound color magazine that you see today.

Never in my dreams did I envision what the Association would become. It gives great pleasure to see you all enjoying your hobby and participating in this exciting effort to preserve the history of Collins Radio and its equipment as well as to educate those that will make up the technologists and members of tomorrows generations.

It is obvious from the reflector membership, the website hit rate activity, and the CCA membership roster, that there are thousands of you out there enjoying this segment of our amateur radio hobby.

I hope that you all have a great year and I also hope to see many of you at our upcoming CCA events.

Yours Truly,

Bill Wheeler, K0DEW
President Emeritus and Founder, Collins Collectors Association

The Signal Magazine

OFFICIAL JOURNAL OF THE COLLINS COLLECTORSASSOCIATION

Issue Number Sixty Nine - First Quarter 2013

Join Us on the Air!

- Sunday 14.263 mHz at 2000Z
- Tuesday 3805 kHz at 8pm CST
- Thursday 3805 kHz at 8pm CST
- Friday (West Coast) 3895 kHz at 10pm CST
- Sunday 10m AM 29.050 mHz at Noon CST
- 1st Wednesday AM 3880 kHz at 8pm CST

Sunday for Technical, Buy, Sell & Swap
Tues., Thurs., Fri., & Sunday for Ragchew

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Editor Bill Carns, N7OTQ
Ass't Editor, Don Jackson, W5QN

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P.O. Box 1269
Wimberley, TX 78676-1269

Come Visit Our CCA Website

www.collinsradio.org

See our New Features & Members Area.

You can renew your membership or join the CCA on our website using the JOIN US link.

- A Dedication - To Collins Radio & The People of Rockwell Collins

1933 to 2013 - 80 years

In that 80 years,

You have survived a depression market place

You have prevailed when attacked by giants

You have survived the stress of war – and thrived

You have recovered from losing almost all your business after the war

You have survived being led to the brink by a leader that reached too far too fast

You have witnessed a divestiture and rebirth

You have survived in a time when there are very few 80 year old companies remaining....and,

During this entire time, you have continued to lead with your technology and quality

Congratulations – Many people made this happen – These are some of the finest people in the industry.

Carry On

- - - - CCA - - - - -

A Quick Look in This Issue

Issue No. 69
1st Quarter 2013 Signal Magazine

CONTENTS

ON THE COVER May 1934 Collins Signal Magazine featuring the Byrd expedition to the Antarctic and his use of Collins 150B and 20B transmitters.

FEATURES

Regulars

Collins Collectors Association

To our Members,

Last issue, I spoke of my excitement regarding our shared penchant for collecting, preserving and operating our Collins equipment. I guess it is fairly obvious that I like what I do here.

It gave me particular pleasure then when the election results came in and it turned out that I would be serving another term as your President. At the same time, Scott Kerr (KE1RR) was elected to a rotating board position and subsequently elected through a Board of Directors action as our new Vice President. This also gives me great pleasure because the board, and management staff, that we now have is dedicated to, not only making progress regarding our purpose of preservation and archiving, but also serving your needs as members. The end result will, I know, be continued improvement in services and information provided and in the quality and frequency of our social and service events.

This past quarter has also seen another big jump in the content of our website at **collinsradio.org**. In addition to more "open" content that fosters our general purpose of archiving, preservation and service, we opened the new Members Only area of the website – providing us a vehicle for giving you, not only some great current member tools and benefits, but also future expansion benefits. While it may not be obvious, this step to a Members Only area was a huge one and involved integrating our Membership Database into the website and updating all of our forms and PayPal code. This was a significant contribution of time and effort on the part of Scott Kerr and we all owe him another big vote of thanks. The result of these website changes and improvements is rather obvious. The hit rate on our website has increased now almost a factor of 10 since we started making the significant changes about 6 months ago. Clearly, you all are using the website more. If you have not checked out the new content and tools, you should try it.

One of our other focuses over the past year has been to increase the availability of social gathering and service events to our membership and other Collins aficionados. When your current management team took office, we had one event per year at the Dayton Hamvention in May, and an occasional social gathering out in California or a cruise or two. In 2011 we added the Dallas Ham Com event and dinner in June, and we followed last year with the AWA Partner Conference in August in New York. Now we are adding a significant CCA presence at the ARRL Midwestern Convention in November. The CCA will be one of the key sponsors of an Antique Radio "Beauty Contest" with some great prizes. We will also have a large booth and social area at the main convention hall and a social gathering one of the evenings. Bottom line, we are growing and having more fun, and you need to keep an eye on our new website Events Calendar so that you do not miss a chance to share some good eyeball QSO time with fellow members.

All of this could not have been done without a great team of board members - and many behind the scenes volunteers. We all owe them continued thanks…… Am I proud of what they have accomplished? You bet! Is there much more to come? Also…… You bet!

Finally, you all know by now that this year is the 80th anniversary of the incorporation of Collins Radio in September of 1933. This theme will run through all that we do this year. The *Signal Magazine* will be very special this year, and I hope that you enjoy it.

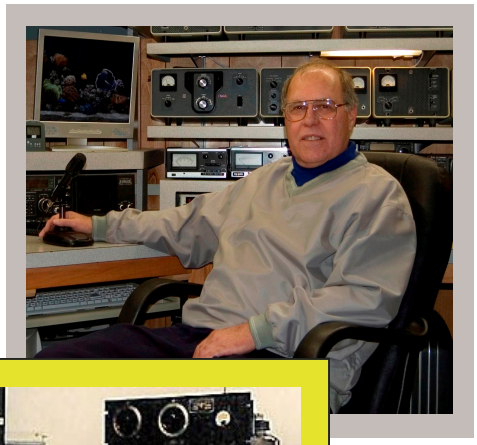
That's it for this quarter from here. Have a great quarter. Enjoy your hobby and the nets that we have and we will talk again next time. If you have any comments or just want to say Hi, drop in at one of the events or write me, one of the other board members, or the editors with your comments. We are always just an email or phone call away.

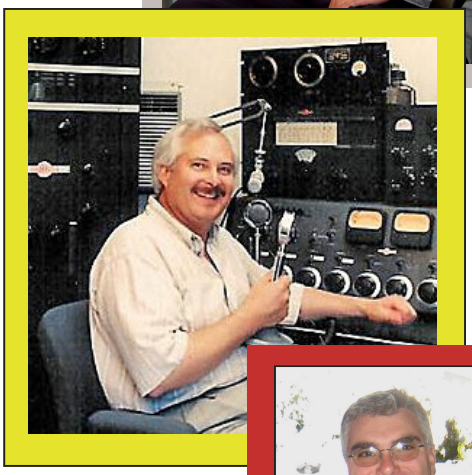
Best Regards and 73s,

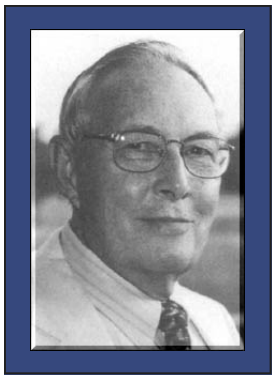
Bill Carns

President, Collins Collectors Association

OUR CONTRIBUTORS







BILL WHEELER, K0DEW

"A Letter from our Founder" *page 2*

Bill is the founder of the Collins Collectors Association and is responsible for leading the group through its first formative years back in the mid 90s. He also fostered the combination of the, then independent, Collins Collectors Magazine published by Jay Roman and his original CCA group into the entity that we have today. Bill went on to developed the relationship that we have with Rockwell Collins. He continues now as our President Emeritus and a board advisor.

GARY HALVERSON, K6GLH

"The Making of the Collins DNA" *page 8*

Gary has been a constant contributor to the CCA over the past 20 years. He is responsible for a large part of the content in the equipment archives of our website. In addition, he has contributed many articles about Collins equipment and history. He is a fastidious researcher and can be counted on always to have the facts. Recently he has also produced a wonderful series of "California Hammin" videos featuring significant collections and shacks around his home state of California. We are lucky to have Gary's unique perspective.

Steve Darvenzia, VK4VN

"Service Line, Tackling a 30FXB" *page 20*

Steve is currently an airline pilot in Australia where he lives with his wife and daughter. He is a passionate collector of Collins gear and collector of related historical information. He is a frequent contributor of technical help on our reflector, and now, tackles his first piece of prewar Collins

BILL CARNS, N7OTQ/K0CXX

"30S Photo Essay, *p 22* & Furious Growth, *p 28*

Currently the second term President of the CCA, Bill also edits and produces the *Signal Magazine*. He occasionally writes an article and loves to share in the pursuit of historical knowledge about Collins Radio, the people of the Collins Radio Company and Rockwell Collins.

Ben Stearns, Author: Radio Wizard

"A Glimpse of Merle H. Collins", *page 29*

Stearns enjoyed a successful journalism career in daily and weekly newspapers and then in industrial public relations. He worked for Collins Radio and the Collins Radio Group of Rockwell International from 1962-77. Much of that time he was Public Relations Manager in the Cedar Rapids Division of Rockwell Collins.

FROM THE EDITORS' DESKS

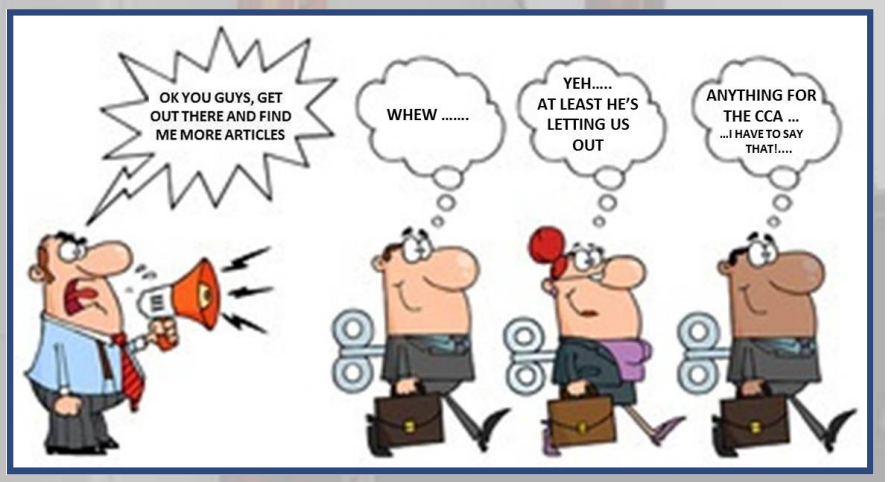
by Bill Carns, N7OTQ & Don Jackson, W5QN

From the Desk of N7OTQ . . . .

This issue has been both fun and very intimidating. After deciding to draw and quarter the history of Collins Radio, and now Rockwell Collins, into the four phases that you will see discussed here, we then decided to try and present a meaningful overview of these four phases of the Collins history in the four quarterly issues of the *Signal Magazine* in a way that would be meaningful and pay tribute to this fine company.

This quartering of the history of Collins seemed to naturally fall into these four periods when either looking at the subject from an Amateur Radio point of view, or also from a total company perspective. Thus, for this 80th anniversary year of Collins' incorporation, we have for our purposes here four issues coming in 2013 that deal with Q1 - The Prewar Years (Pre '33 to 1941), Q2 - The War Years (1941 though VJ Day in 1945), Q3 - What we like to think of as the "Golden Era" of the A-Line and S-Line Days (1945 though 1972) and then, Q4 - The Years of Change (1973 to date) as Collins struggled, morphed into - and back out of - Rockwell Collins… and Amateur Radio came to an end at Collins.

So much has been written about this history, that we did not want to "reinvent the wheel", but rather try and present a unique perspective on these very significant periods in the Collins Radio history. This was complicated – for this Q1 2013 Prewar Period issue - by the fact that the *Signal Magazine* recently carried a *Prewar Years* article that tried to present some perspective on the years between 1932 and 1939 when Collins was changing from an embryonic state to a company staged to be a major contributor to the supply chain of strategic WW2 materials. For those of you who missed the Q3 2010 *Signal Article* on the Prewar years, you can download and read it on our website. It focuses more on the facts, figures and equipment introduced during that time period.



For our four anniversary issues, the decision was made to carry a constant theme, or format, throughout the year where we try and present a picture of the environment surrounding Collins at the time of the selected period (and how they changed to grow during the period). We will show some really good, and usually not available, photography of the equipment that was key to the success for that time and we also will showcase some of the equipment in operation. Then there will be a feature article or two on key new perspectives for that era.

With this issue, we were very fortunate to have Gary Halverson write an article that has been germinating with him for some time. Gary is well known for his articles and videos relating to this time period. He has written for the *Signal Magazine* before. Actually, this article of his really tweaked my buttons, since the analysis of why, and how, this company rose to meet the challenges of its time is a topic of key interest to yours truly. Thus we have a wonderful perspective from Gary on "The DNA of Success with Collins Radio". Gary is uniquely qualified to write on this subject since he is one of the more enthusiastic restorers and writers related to the 30s period history at Collins. He also has an insatiable appetite for historical research and the supporting facts. As you will see in the issue, he is as well, one of the few people in the country that operate regularly with the very early Collins equipment. Best 73s - Bill, K0CXX/N7OTQ

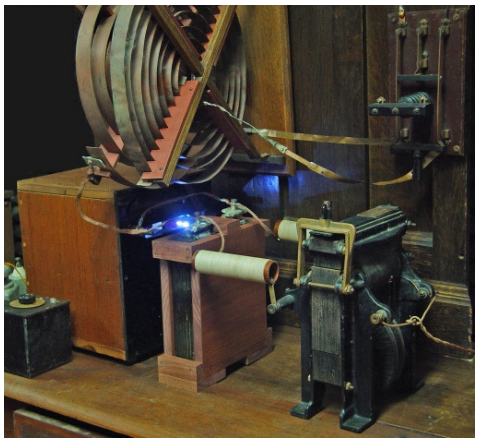
From the Desk of W5QN . . . .

I want to thank those of you that have contacted me regarding "In the Shack" presentations of their equipment. As many of you know, I am relatively new to the Collins collecting scene, so I need all of the help that I can get. I also appreciate the inputs received regarding future articles. There is one issue that I would like to comment on. Because of the four upcoming anniversary issues which will deal with the four time phases and eras of Collins' history and equipment, there are more limits on the subject matter that can be presented. Please understand that if you submit an article now, it may not run until the end of the year. This is not unusual for a larger magazine, and in case you have not noticed, we are getting larger. Be assured that you are not "lost" somewhere and we will be in touch regarding time of publication. If you have any questions regarding an article, please contact me or Bill and we will get them answered. We do need the material and we want to keep the content up where it is now. Best 73s, Don – W5QN

In the Beginning

The Making of the Collins DNA

by Gary Halverson, K6GLH



Arthur Andrew Collins was a world-famous ham, a genius, an inspiring leader, a pragmatist, a techno-guru, a visionary, and somewhat of an enigma. It is to him that we owe homage for our Collins Radio passion.

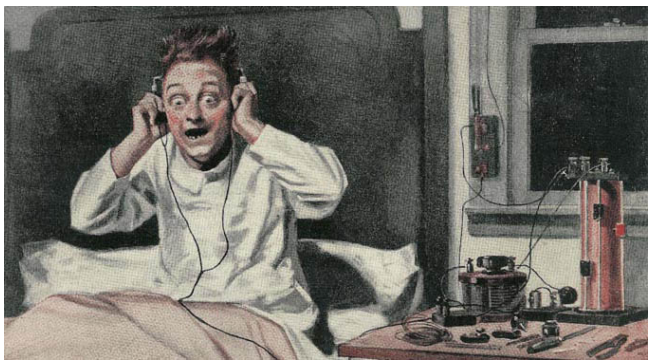
Art Collins was born on September 9, 1909 in Kingfisher Oklahoma, the year that Admiral Peary discovered the North Pole; William Howard Taft had become the 27th president; Indian Chief Geronimo died, and Halley 's Comet rediscovered. Around age 6 Arthur's father, M.H. Collins, then a banker, moved his family to Cedar Rapids Iowa to launch a commercial farming venture, The Collins Farms. This business was based on applying modern scientific agricultural methods to cooperative farming, a very innovative and successful idea at the time.

To gain an insight to the Collins legacy, we should take a brief survey of the landscape in which Art grew up - as it helped to shape the path on which Art began his journey. Homes across the country were just being electrified, newspapers were *the* mainstream media, and telephones were a recent addition to Midwestern homes. The Victrola was the only on-demand entertainment and the Lone Ranger on the parlor radio was still over two decades away. To further put things in proper perspective, the story begins 8 years before Art's birth . . .

Marconi's Wonderful New World

It was in December of 1901 that Marconi had crossed the ocean with his wireless. From that moment on radio development was fast and furious. Wireless was on everybody's mind.

Dozens of magazines sprang up to cater to experimenters and amateurs. Many manufactures sold parts to build wireless stations of all sizes from "junior" sized rigs with Ford spark coils and fixed spark gaps, to huge 5 kilowatt rock-crusher rotary spark gaps with condensers and oscillation transformers - all ready to go. Visions of loose couplers with crystal detectors, telegraph keys, aerial wire and insulators, Brandes mica headphones and hot-wire ammeters filled the thoughts of thousands of teen-aged boys throughout the country. Radio clubs sprang up all across the country. Wireless spread like wildfire in a windstorm!



The wavelength range of 300 to 1000 meters is where all ship, government and commercial traffic congregated. But it was also the electromagnetic land of opportunity for a new hobby to go viral.

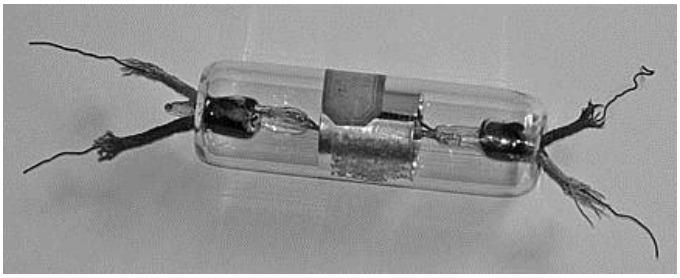
Along with this crazy growth came bedlam. The commercial stations often found it nearly impossible to pass traffic, while amateurs chattered away on their home-made rigs into the wee hours. To make matters worse, many of the commercial stations used outdated untuned receivers and transmitters. Everybody was on the same frequency, and the guy with the most power always won out. Courtesy between hams and commercials did not amount to much. The commercials would tell the amateur to "Shut up!" And the ham would come back, "Who the hell are you? I have as much right to the airwaves as you do."

The Radio Act of 1912

Sooner or later it had to happen. Often it takes a significant happening to stimulate change and the Titanic disaster was the trigger in this case. On August 17, President Taft signed the Radio Act of 1912 into law. This new law of the land put the amateurs into the "wasteland" from 1.5 megacycles and up, (200 meters and down) then considered worthless by the commercials and the government.

The new law also required all amateurs to be licensed by the Department of Commerce, and limited the power level to 1000 watts. Speculation was that the framers of this law reasoned it would be the doom of amateur radio, and that commercial and military wireless operations could then finally conduct business without amateur interference.

While many believed the new law was a major setback to amateurs, this was also a time of good ole Yankee pioneering. Amateurs installed basic tuning on their spark rigs to ensure they were transmitting at (or close to) 200 meters. Improvements in receiving sensitivity and transmitter efficiency kept coming and soon amateur activity was growing like gangbusters again. And one of the biggest improvements was the Armstrong regenerative circuit, which also created a big demand for the *deForest Audion*. These tubes were rare because everybody wanted a regenerative detector in their receiver.



The First Swap Net

A fortuitous juncture occurred around March/April of 1914 when inventor *Hiram Percy Maxim* learned of a fellow in neighboring Springfield Massachusetts offering a deForest Audion for sale. Maxim had been trying for some time to secure one for evaluation in an Armstrong circuit and figured he'd try to raise another amateur in Springfield to deliver a message to the seller. His 1-KW station had a range of about 100 miles, but the band conditions were so bad that it was impossible to raise anyone in Springfield, only 30 miles away.

As Maxim cogitated on the situation, he recalled meeting a young man at one of the early meetings of the Radio Club of Hartford. The lad was from Windsor Locks; a small town midway between Hartford and Springfield and he said that he had a transmitter on the air. Maxim called the lad and asked him to relay a message to Springfield.

By the following morning, as a result of the previous days experience, Maxim had struck on the idea of a series of relay stations that could be organized to pass messages to any desired destination. And along with this network of relay stations, he recognized the need for a national organization that represented the needs of the amateur radio community. Thus, the *American Radio Relay League* was conceived.

Using their own money, Maxim and fellow ham Clarence Tuska started publication of QST magazine in December 1915 to recruit stations that were willing to become relay affiliates, and to promote the ARRL. The membership grew and, by 1916, they had relay routes set up with amateur stations from coast to coast.

Operation on 200 Meters

Curious what band conditions and operating was like on a single band when Maxim formed the ARRL? Think of it like this: Every ham in the country is on the low end of 160 meters, and 160 is a seasonal band. Summer static conditions generally make communications pretty much a lost cause for half the year. So when the winter season arrives, and the band becomes useful again, the excitement in the air is electric and everybody's hankering for their crack at breaking last year's records.

A lost soul was the poor sap who didn't subscribe to QST magazine. Every month QST was *the* lifeline to what was happening in the world of amateur radio. Descriptions and diagrams of new circuits, improvements to old, questions and answers to common problems, buy and sell classified ads, pictures of the other guys' station, and news about the latest relay contests held ones attention from cover to cover - and the volume of information was growing; doubling in the first year.

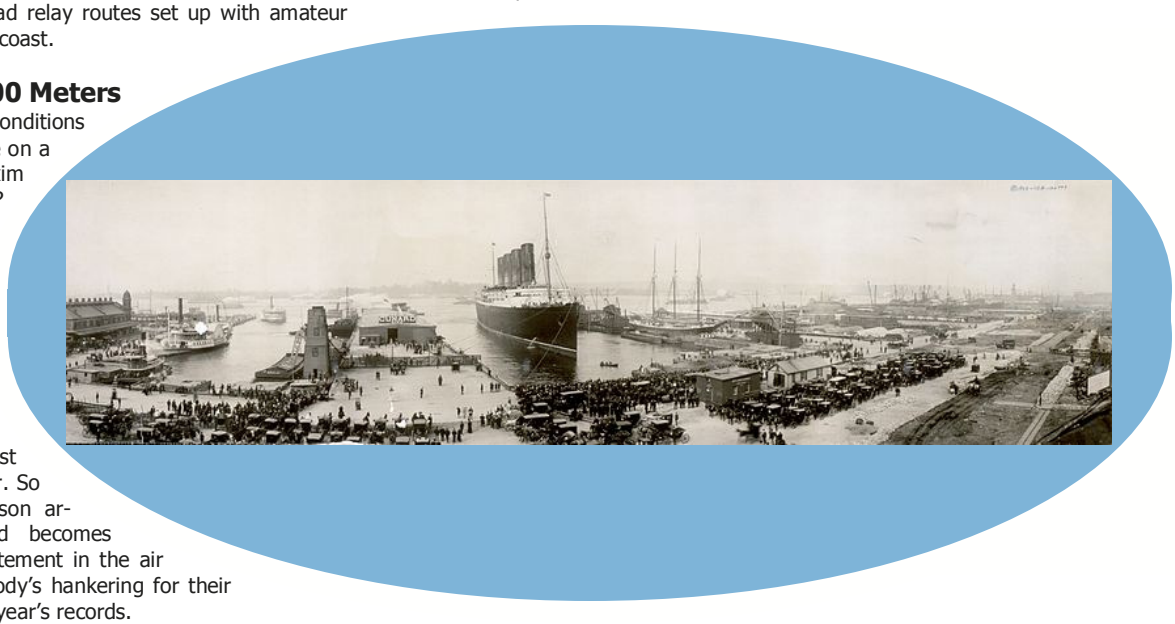
Maxim's Challenge

With the December 1916 issue of QST came the grand challenge from the Old Man himself. In his article, *The First Trans-continental Relay*, Maxim suggests that the circuits are basically in place to pass a round-trip message from coast-to-coast. All that's required to accomplish the feat is a little organization and discipline. He ended the article with a simple call to arms: *'Let us see what we can do and prepare to give all honor to those destined to be among the fortunate pioneers in handling the first Trans-continental radio relay message.'*
Hams all across the country got busy -- *real busy*. Many relay tries were made and with each attempt the results were more encouraging. Success came on January 27th 1917; The first private point-to-point message ever sent from coast -to-coast by amateur radio in the same day! There were three separate messages that all made it that night – two from Los Angeles to Maxim, and one from Bakersfield California to Tuska and then back to Hartford with Maxim. Then, on February 6th, another record; The round-trip was completed in an hour and 20 minutes.

Amateur radio was organized and growing like mad. But in April 1917, it all came to a screeching halt.

W A R !

On April 6, 1917, President Wilson had Congress declare war on Germany. The following month, the Navy shut down all amateur operation in the US. This ban involved the dismantling of receiving equipment, sealing of transmitting equipment, and the lowering of all antennas. With the Trans-continental Relay in the bag and all amateur radio activity banned, young hams across the country immediately responded to the pleas in QST to enlist into the Navy to meet the demand for wireless operators. Every able-bodied radio man in the country QSY'd to the Service. The Navy secured 500 new wireless operators in just ten days……But, there was also an espionage event involving radio that occurred a few years earlier still resonating with the US government, and this had a major influence on how things played out. Realizing that radio was strategic and critical, the War Department and Navy took charge of the patents owned by companies involved with radio manufacturing and created a Federal radio monopoly in order to devote all radio production to the war effort.



Flashback to 1915 . . .

"Get Lucy"

In August of 1914, the German Empire declared war on France and Belgium which rapidly escalated into World War 1. After the western Allies cut the German transatlantic submarine telegraph cables, radio traffic across the Atlantic increased sharply. A German Telefunken wireless transmitter had been constructed in Sayville New York (WSL, circa 1912) to broadcast commercial traffic to Germany -- one of the most powerful stations in the country at that time. In 1915, it was suspected that German spies were sending secret messages about Allied forces shipping activity (in violation of the Neutrality Act) to German submarines in the Atlantic using broadcasts through this station. This, however, could not be proven.

A New Jersey ham, Charles Apgar, was approached by the Secret Service to record the WSL transmissions in an attempt to discover the secret code. Apgar had adapted a headphone receiver as a cutting head attached to an Edison cylinder phonograph. He mostly recorded Morse code; however, he found some very strange code on three of the recordings of the Sayville Telefunken station. Eventually, he realized that these were actually high-speed coded messages similar to a data burst.

It is alleged that a message from the German embassy to "Get Lucy" was transmitted by this station, as the German spies believed the British ocean liner *RMS Lusitania* was covertly carrying war munitions back to England. In April of 1915, the Imperial German Embassy in Washington D.C. posted warning advertisements in 50 American newspapers cautioning travelers not to sail on the RMS Lusitania. Subsequently, on May 7, 1915, RMS Lusitania - en route back to Liverpool from New York- was torpedoed and sunk off the coast of Ireland by a German U-boat, killing 1,198 persons. This prompted the US government to send marines to the WSL Telefunken station to ensure that encrypted messages were not sent. When war was declared in April of 1917, President Wilson again sent marines to seize the station, making it the first hostile action taken by the United States against Germany in World War One.

The Grande Ave Telegraph System

It was around this time frame in 1916 that Arthur Collins (age 7) has his first exposure to a telegraph system. As he wrote in 1983: "When we moved to Cedar Rapids there was a grain dealer's office next to my father's office. When father took me to his office, I could hear the click-clack of the telegraph sounders carrying the Chicago Board of Trade quotations in the Wilder Grain Company office next door. This fascinated me especially when Mr. Wilder would visit patiently with me for several minutes and then stop briefly to write out in beautifully formed handwriting every quotation that had come over the wire while we had been talking. In response to my curiosity and, I fear impertinent questions, Mr. Milder gave me several telegraph keys, sounders and "gravity" battery electrodes and explained how it all worked. Soon there was a telegraph line connecting three boys and one girl on our block on Grande Ave. We never quite mastered Morse code but instead used the slower but easier to learn Continental Morse used by the Army Signal Corps. Mary Stewart was the fastest operator and soon could 'burn out' the rest of us." *Within a year, Arthur was experimenting with wireless, only to be frustrated by the war ban in 1917.*

War Over!

Fast-forward to November 1918……
After the War had ended, the young hams returned home. Everybody was anticipating the Navy lifting the ban on the amateurs and again the excitement built. And the commercials were also eager to get back on the air. However, the War and Navy Departments saw things differently. With the Telefunken Sayville and Lusitania memories still smarting, the government was resolved that control of strategic long-distance radio communications must reside in US hands.

The British-owned American Marconi company was the only surviving company in the US that could handle commercial transatlantic traffic. Eager to expand this service, Marconi was quick to resume negotiations with the General Electric Company to license the *Alexanderson alternator*, the most effective means available for long distance communications. When the government learned of these negotiations, it was unwilling to see this communications service expand under foreign control since the transatlantic cables were also in the hands of foreign, though friendly nations. In April of 1919 a letter to GE by Acting Secretary of the Navy, *Franklin D. Roosevelt*, suggested that negotiations be suspended. Navy brass then met with GE top management and asked them to cancel the Alexanderson alternator sale and proposed that GE consider setting up an *American-owned* radio company through which the Army and Navy would have a monopoly of long-range radio communications. They argued that this new American company could hit the ground running by acquiring the assets of the American Marconi Company.

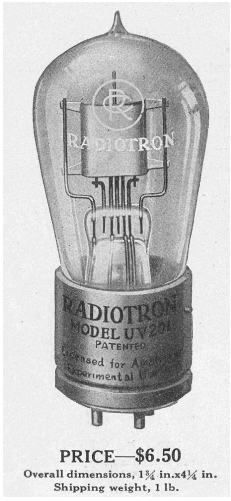
Back on the Air!

By September 1918, many of the old ARRL relay circuits were reorganized and ready for action waiting for the Navy to lift the ban on amateur transmitting. Then finally, on October First, the Navy officially lifted it's ban, but also told hams that their old tickets had all expired and that they needed to reapply to the Department of Commerce for new ones.

Art Collins was now nine years old, and he and two friends were building crystal sets to receive Navy time signals from NAY in Arlington VA. The boys had repurposed the old neighborhood telegraph line as aerials.

The Silver Spoon Monopoly

GE's Owen D. Young arranged the purchase of American Marconi. And thus on October 17, 1919, The *Radio Corporation of America* was incorporated as a radio patent monopoly. On November 20, 1919, the business of the Marconi Wireless Telegraphy Company of America was taken over. Young was RCA's first CEO and David Sarnoff (then the commercial manager of American Marconi) was made RCA's general manager. RCA's incorporation papers required that a majority of its stock be held by American citizens.



A cross-licensing arrangement was made with General Electric where RCA's newly obtained radio patents acquired from Marconi were exchanged with GE. In its first year of operation, RCA focused its attention almost exclusively on communications. Work was immediately started on new high power alternator stations in California, Hawaii and Massachusetts.

It was soon discovered that vacuum tube patents held by GE and the Western Electric Company infringed on each other. Once again, in January 1920, the Navy arbitrated a solution "For the good of the public" resulting in an arrangement where RCA was permitted use of all radio patents held by these companies.

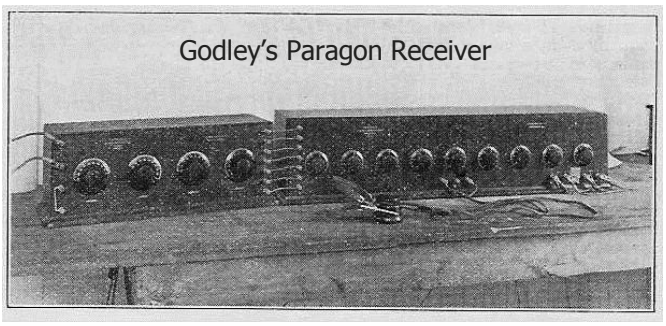
In the spring of 1921, using the vast manufacturing capacities of GE, RCA introduced an entirely new family of vacuum tubes and components for both receiving and transmitting. These components were featured extensively throughout popular radio publications and seeded a whole new generation of radio performance which was not only a major boon to amateur radio, but also facilitated the broadcast boom.

The Transatlantic Tests

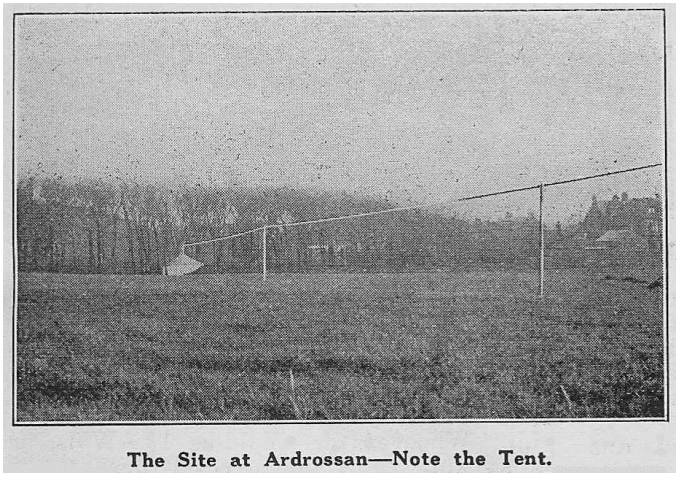
A major event that made history, and helped transition popular thinking away from spark into vacuum tubes, was the 1921 Transatlantic tests sponsored by the ARRL. Paul Godley, 2ZE was selected the most qualified person to conduct the tests as he had adapted the Armstrong regenerative circuits for use on the short-wave frequencies.


PAUL FORMAN GODLEY

In 1914, he invented the "Paragon", one of the best regenerative receivers on the market. A super-heterodyne receiver (more suitable for CW reception) also was designed and constructed for the test by Edwin Armstrong.



On November 15, 1921, "Paragon Paul" sailed aboard the "Aquitania" for Southampton. After landing, he traveled to London where arrangements had been made to place a receiving facility at his disposal. However, this site proved unsuitable (due to local QRM/QRN), and a hasty relocation to Scotland was necessary. Near the beach at Ardrossan, west of Glasgow, Godley set up his Adams-Morgan Paragon and superhet receivers in a tent and strung up a 1300-foot long Beverage antenna. Over a ten-day period amid gales and squalls, he and a British "checking operator" listened for both spark (dampened wave) and continuous wave (CW) signals from across the pond for six hours+ each night. (At this time, about 17% of all amateur traffic was CW, whereas, before the War, it was 100% spark).



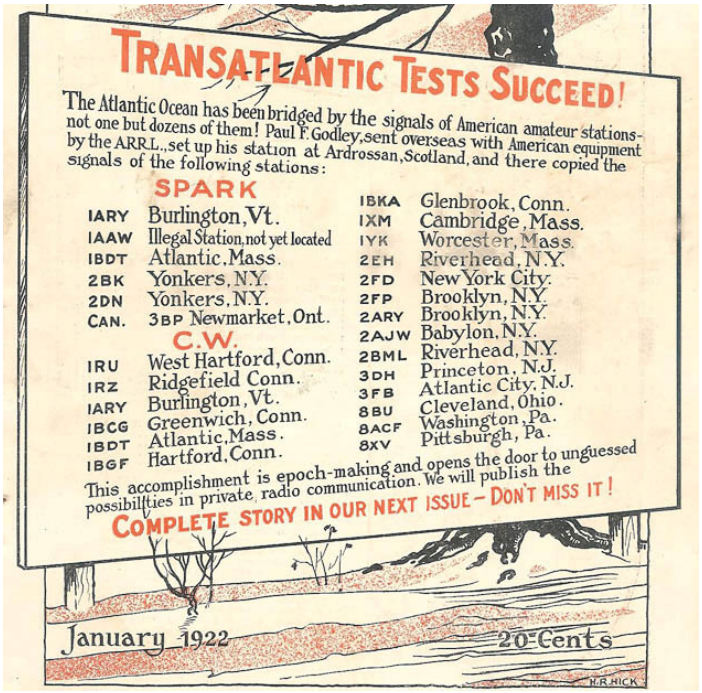
The Site at Ardrossan—Note the Tent.

This event proved as electrifying as Marconi's first transatlantic message 20 years earlier. After all, it wasn't just the first amateur message to cross the Atlantic Ocean; it was the first *shortwave* message to cross the Atlantic. And **the amateurs had done it** - most of whom were using CW. The superiority of the vacuum tube and CW was firmly established.

Art Collins was now eleven years old and had replaced his crystal with a brand new UX-201A tube for his detector.

Movin' On Up!

By this time broadcasting had taken root. Everybody wanted to get on the broadcasting bandwagon, and as they did, the amateurs were being elbowed out of the old 200-300 meter neighborhood.



Transatlantic Tests Run by ARRL Changed the Game

From the 6th Edition of the ARRL Handbook:

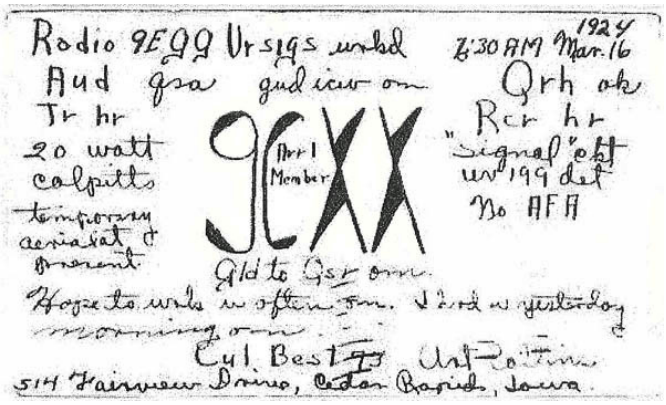
The needed jolt came on November 27, 1923. On this date, Schnell, 1MO, and Reinartz, 1QP worked for several hours with 8AB, Deloy, in France, for the first two-way communication across the Atlantic. It was a great accomplishment, but the significant thing was this: all three stations used a wavelength in the vicinity of 110 meters. . . When additional stations dropped down to 100 meters and found, to their astonishment, that they too could work two-way across the Atlantic. The exodus from the 200-meter region started.
In early 1924 the Hoover Radio Conference assigned amateurs bands at 20, 40, and 80 meters. It must be admitted that the move from 100 to 80 was made with misgivings by many. There was magic in 100! But maybe even more on 80! . . . And many other European countries were worked two-way.

When 20-meters was given a try-out, it immediately showed undreamt-of possibilities by enabling an east coast station (Reinartz, 1QP) to work a west coast station (Willis, 6TS) direct at high noon – daylight DX!

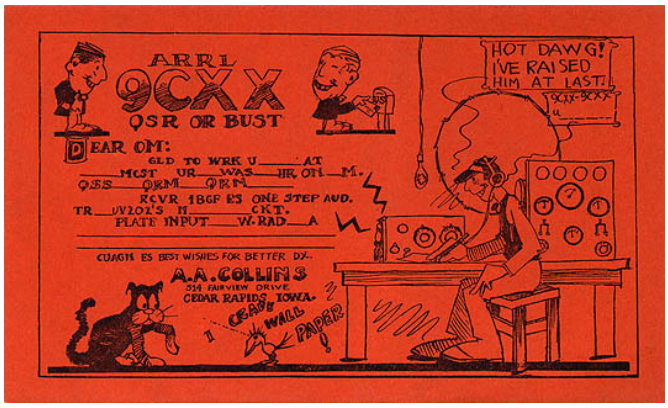
Enter the Radio Wonder Boy

Recapping the environment in which Arthur Collins grew up, his family owned a collection of farms and was successful in the agriculture business which afforded Art the resources to pursue his interests. Ham radio was a national craze that every red-blooded teen geek totally embraced. The ARRL provided a national vehicle for fostering operating and technical proficiency. Spy stories like the Telefunken Sayville story were emblazoned in the minds of radio kids across the country. The Atlantic had been spanned, and *individuals* could make history virtually instantly setting new DX records in this new "social media". This was the kind of excitement a new generation of teen-aged geeks craved.

By the time Arthur passed his amateur license examination in 1923 at age 14, he was quite familiar with state-of-the-art vacuum tube technology. As an unbiased newcomer to the amateur radio game, he recognized that the new shorter wavelength bands were prime real estate in which records were regularly being broken. His early home-made QSL cards indicated that he was using all vacuum tube equipment and that he was proud of his ARRL membership.



And so in the summer of 1925 at age 15, Arthur A. Collins became a national celebrity as the radio-wonder boy who was the only amateur able to maintain reliable communications with the Navy's MacMillan scientific expedition to the North Pole (via Greenland) sponsored by the National Geographic Society. *In 1908, MacMillan had accompanied explorer Robert Peary to the North Pole, however, had to turn back due to frozen heels. A year later -- the year Art Collins was born -- Peary claimed to reach the North Pole.*



For a three week period in August, 9CXX was MacMillan's only contact with the world on 20 meters. Art had become a bona-fide national hero. *Unlike David Sarnoff, who achieved fame a decade earlier as a radio operator for the American Marconi station in New York, by falsely advancing himself as the sole hero who stayed at his key for three days to copy reports on Titanic survivors*.

The radio operator for the MacMillan expedition was John Reinartz, 1QP of Hartford Connecticut. Art Collins was aware of Reinartz, (later K6KB) long before the MacMillan expedition: Reinartz had popularized his "Reinartz tuner" in 1921, made the first transatlantic contact with 8AB in France in 1923 on 110-meters, and developed a theory of how "skip" worked via Heaviside Layer reflection. Experimenting on 20-meters, Reinartz made the first daytime US coast-to-coast contact (with Willis, 6TS in Los Angeles) on January 21, 1925. The following day they repeated the contact, this time with Art, 9CXX in the middle. Since Reinartz's accomplishments had been published in several magazines, every ham in the country had now heard of Art, and it was through this reputation that (then LCDR) Richard Byrd asked him to handle communications for the North Pole expedition.

Prior to the MacMillan Expedition sailing, Art was able to talk his parents into re-arranging their spring vacation so he could meet with Reinartz in Wiscasset, Maine. Aboard the schooner Bowdin, Art and Reinartz worked out a plan of frequencies and schedules based on their 20-meter propagation experience. This would serve as backup for relaying the expedition's daily scientific reports to Washington.

Because atmospheric conditions made it impossible for the Navy station in Washington D.C. to copy the expedition's daily reports on the standard LF band, Art became the de facto relay station. Cutting classes at Washington High School to get back to his rig for these schedules, Art copied the daily reports from the expedition party, then got on his bike and took them to the Cedar Rapids Western Union office which forwarded them to Washington.

For his MacMillan work, Reinartz was commissioned a Lieutenant in the Naval Reserve in 1927. One can only imagine how empowered Art must have felt sharing history with a genuine radio pioneer friend.

With his fame as a Radio Wonder-Boy, *Radio Age* magazine asked 16 year-old Art to write a technical article, which appeared in the May 1926 issue. Art's article contained a statement revealing his "great radio ambitions", saying; "The real thrill in amateur work comes not from talking to stations in distant lands . . . but from knowing that by careful and painstaking work and by diligent and systematic study you have been able to accomplish some feat, or establish some fact that is a new step toward more perfect communication." The first published evidence of Art's inventor DNA was in print.

Art had always attracted the company of smart, talented, and creative people. In the summer of 1927, he and two radio friends, Paul Engle and Winfield Salisbury, secured funding (thanks to LCDR Richard Byrd) to conduct a series of short-wave propagation tests for the U.S. Naval Research Laboratory in Washington D.C. Together they outfitted a truck with a shortwave receiver and Collins-designed 10-watt transmitter. They then conducted tests while covering 7000 miles throughout the southwestern states.

Engle went on to become a famous professor at the University of Iowa establishing the *International Writing Program* and was a poet and novelist who made the NY Times Best-Seller list. Salisbury became a noted scientist/inventor and was Director of R&D at Collins Radio from 1945 to 1951 overseeing the development of the Collins-built Cyclotron at the Brookhaven and Argonne National Laboratories.

Art continued his studies after high school attending Coe College, the U of I at Iowa City, and later at Amherst College in Massachusetts taking physics, engineering and electronics courses. While he recognized the importance of academic study, Art preferred "hands on" experimentation. He later related: "I found out the hard way that I had to learn to study like everyone else. I have been fortunate since then in working with people who were brighter than me and who studied harder than I did."

The Radio Act of 1927

By 1926, broadcasting had grown into a major industry, and the Radio Act of 1912 was now irrelevant to manage and regulate the new electromagnetic landscape. Once again forced to take action and affect a solution to the exploding communications chaos, and to pave the way for the rapidly growing broadcast band, the government crafted the Radio Act of 1927. This new law created the *Federal Radio*

Commission whose job was to restore order to the chaos. The *Communications Act of 1934* replaced the FRC with the new Federal Communications Commission. This was also the first time that the amateur community had been specifically addressed. Following the lead of the previous Hoover Commission work, a whole new set of harmonically-related bands were allocated to the amateurs.

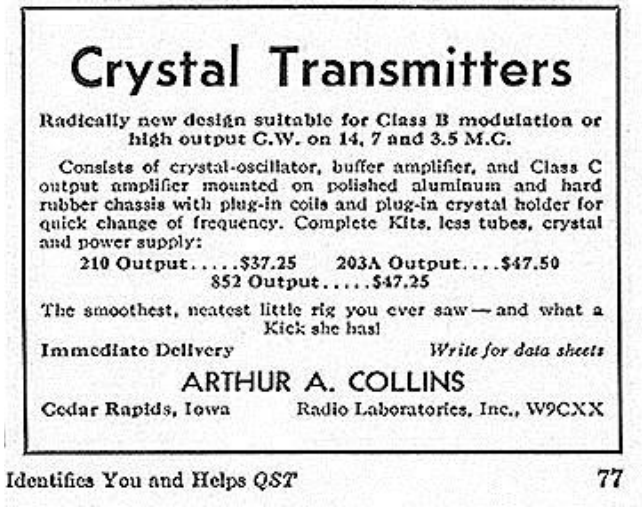
For many amateurs, migrating to these new frequencies was an enormous challenge. It meant new components and new learning curves. Most hams had to build their own equipment as, not only were there very few commercial shortwave transmitter products available, they were also very expensive.

As a result of his MacMillan experiences on the short waves (20-meters), Art had acquired the practical experience of transmitter design, construction, and packaging that resulted in the stability and reliability necessary for a successful product.

Enter Collins Radio Transmitters

By 1932, the Great Depression had forced the sale of the Collins family's agricultural business. Add to the mix Art Collins' recent marriage and the need to generate income. Clearly, the time had come for action. Having spent his formative years under the watchful eye of a father who was a successful businessman, Art had first-hand exposure to the attention-to-detail and discipline required in running a successful business. Combined with an ingrained down-to earth Midwestern work ethic, and his father's willingness to back him, Art's feet were firmly planted on the ground. The only direction to go was up.

As word of his expertise in transmitter design had spread, Art was building transmitters to order in the basement of his house. World records were being set on the new frequencies with the help of a new generation of screen-grid receiving tubes further fueling the demand for new transmitting equipment. By mid-1932, it was time to get serious about launching a company. With a number of prototypes already under his belt, the Collins Transmitter Company had produced a winning first product with more coming off the drawing board.



Crystal Transmitters

Radically new design suitable for Class B modulation or high output C.W. on 14, 7 and 3.5 M.C.

Consists of crystal-oscillator, buffer amplifier, and Class C output amplifier mounted on polished aluminum and hard rubber chassis with plug-in coils and plug-in crystal holder for quick change of frequency. Complete Kits, less tubes, crystal and power supply:

210 Output.....$37.25 203A Output....$47.50
852 Output.....$47.25

The smoothest, neatest little rig you ever saw—and what a Kick she has!

Immediate Delivery *Write for data sheets*

ARTHUR A. COLLINS

Cedar Rapids, Iowa Radio Laboratories, Inc., W9CXX

Identifies You and Helps *QST* 77

Arthur Collins' first ad in QST magazine appeared in January of 1932. The ad offered "a radically new design" crystal-controlled transmitter kit - less tubes, crystal and power supply. Considering that the average ham then was hay-wiring transmitters on breadboards from QST articles, a transmitter kit with a polished aluminum chassis and hard rubber (Formica) panel was indeed radical. Note the original name as Radio Laboratories Inc., W9CXX. The use of "Inc." is curious, as the company wasn't incorporated until the following year.

Arts' second QST ad appeared several months later in March of 1932. It too promoted Collins Crystal Transmitters (with carrier powers from 30 to 300 watts), but also mentioned "a complete line of power supplies, modulator and input equipment, relay racks, quartz crystals, etc." And the company name is now Collins Radio Transmitters.

COLLINS CRYSTAL TRANSMITTERS

are fast becoming the popular choice of both the old-timer who has learned to appreciate the value of trouble-free, efficient performance on all bands—and also the beginner who wants to start right. ● Write at once for full details and photographs. Units from $33.95 up with carrier powers of 30 to 300 watts. Also a complete line of power supplies, modulator and input equipment, relay racks, quartz crystals, etc.

COLLINS RADIO TRANSMITTERS
CEDAR RAPIDS, IOWA

(Arthur A. Collins, W9CXX)

84 Say You Saw It in *QST*—It

Collins' first product offering was a transmitter in kit form based on what was to become the 10A exciter. These kits were only advertised a few months, and no kits have ever since surfaced.

Collins Radio Transmitter ads continued through April, May, June, July, September, and October 1932. The ads quickly grew more sophisticated with the model 150B appearing as the first ad containing a photograph. In November of 1932, the first full-page ad appeared on page 73 of QST and featured Collins audio and power transformers. At the bottom of the page appears *Collins Radio Company* with an explanation "Collins Radio Transmitters is now known as Collins Radio Co., in order to include its widened field of activity."

Collins Radio was growing rapidly, and not only had designs in hand for a number of complete phone and CW transmitters, but also had established strategic relationships with key component suppliers.

Since labor was cheap in 1932, by assembling completed and tested units Collins could assure the quality of its products – not so with kits. The very first assembled and tested Collins transmitter offered to the general amateur community was the 30W, a combination of the 10A exciter and the 500AX power supply. The 30W's black Formica panels were crisp and clean with a layout emphasizing convenience. Controls were clearly identified with engraved captions and featured an impressive row of four Weston 301 surface-mounted meters.

In September of 1933, with 8 employees and $29,000 in capital ($512K in today's dollars), and no doubt some fatherly guidance, Collins Radio was incorporated under Delaware laws (Delaware had some of the most modern corporate laws at the time). Arthur Collins was the President and his dad, M. H. was Vice President.

Art's key ingredients for a successful product line included:

- **Leading edge design**. A 2-year product life expectancy was likely assumed given the fast pace of technology development in the '30s. Cutting edge technology isn't based on me -too design. That also meant hiring top-notch designers.
- **The use of high quality components throughout**. The reputation of a system builder obviously could only be built on the shoulders of its component suppliers.
- **Reliable performance**. No substitute for fulfilled expectations.
- **Clean packaging**. This included both safety aspects and aesthetics as styling became a criterion for bringing the ham station into the family living quarters.
- **Customer Support based on respect**. Long distance phone calls from Art to customers were not unusual.

COLLINS RADIO Hits it Big Again with BYRD EXPEDITION

Most hams at the time were confined to the attic or basement hay-wiring together their breadboards. The clean, neat, and elegant Collins transmitters were among the first preassembled ready to go products introduced to the ham market. As someone once commented: "Art Collins brought the ham up out of the basement and into the living room.

Byrd Expedition

Remember that Navy LCDR who asked John Reinartz to handle the communications for the MacMillan expedition in 1925? By this time, he was a Rear Admiral and was putting together his own scientific expedition to the South Pole. And he needed state-of-the-art communications facilities to do the job. Collins Radio was the obvious choice.

The January 1934 issue of the *Collins Signal* reported the headline:

The Byrd Antarctic Expedition II Sails with Complete Collins Short Wave Broadcasting Station Aboard!

This was a major PR event for Collins Radio (and of course Admiral Byrd). Billed as "One of the most ambitious feats of radio communication which has ever been attempted is now being carried out in connection with the Byrd Antarctic Expedition II which sailed from Boston on October 11, 1933, and is now well along toward its goal—Little America in the Antarctic." Adding to popularity of this event were weekly live broadcasts by the crew and Admiral Byrd himself of the expedition progress from the Flagship Jacob Ruppert on shortwave frequencies. Byrd made the first formal broadcast from Antarctica on February 3, 1934. These transmissions were not only heard by amateurs and SWLs around the world, but also by the vast broadcast audience over the nation-wide C.B.S. radio network.

For the expedition Collins designed a special Model 20B transmitter. The 20B was originally designed as a 1KW broadcast transmitter; however it was reworked with plug-in coils to cover the various HF frequencies. It was driven by a model 150B 100-watt exciter. The 150B and the 20B were installed on the Admiral's flagship *Jacob Ruppert* while a second 150B was flown to the Little America camp on a Curtiss Condor aircraft in order to maintain contact with Byrd.

The equipment produced for this expedition introduced some new concepts, such as multiple pretuned frequency generator bays and Class B modulation, both of which were quickly adopted throughout the industry.

Details of the Byrd Expedition and many more historic events involving Collins equipment can be found in the Collins Radio and CCA archives of early *Signals*.

The Byrd event gave Collins Radio world-wide visibility and credibility that no amount of advertising money could have purchased, and correspondingly, a huge spike in equipment orders. Some of the more unusual customers included:

The Maharajah of Mysore, who in 1935 ordered a custom "mobile" transmitter for tiger hunting in India, and four receivers - one for each of his wives so he could talk to them while on safari.

Father Hubbard (the glacier priest), who wanted his Collins gear (a 32G) adapted for dogsled use.

Firestone Tire and Rubber Co. who purchased a transmitter for use in Liberia Africa to replace a telegraph system that was being vandalized by natives stealing the copper lines. Because there was no port at the delivery site, the transmitter was sealed in a large horse-watering tank and floated ashore.

From these reports we not only see how customers were attracted to Collins, but we also get a glimpse of the lengths to which Art Collins, and Collins Radio would go to satisfy the customer. This is a characteristic that continues throughout the history of Collins Radio.

The Broadcast Market

With the success of the Byrd Expedition II behind them, Collins was eagerly sought out by the broadcast industry. Offering a complete product line from microphones to the antenna with everything between, Collins quickly captured this market, outselling all other broadcast transmitter manufactures combined according to Warren Bruene, W5OLY. (Bruene started at Collins radio on Nov. 6, 1939)

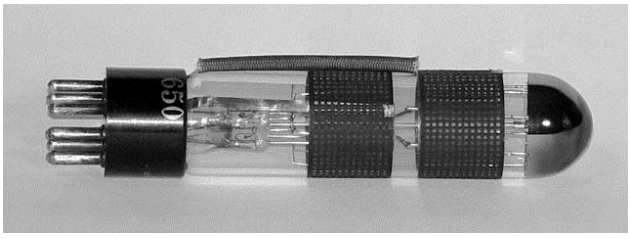
When Collins first entered the broadcast market, the Western Electric Company was already on the scene with over a dozen years of experience and a broad line of sophisticated transmitter designs and speech input products. Western Electric construction quality also had set the bar very high for competitors. This forced Collins to quickly develop an equally broad line of high-quality equipment to compete. However, the key difference between them was that WECo's business model was based on *leasing* versus selling equipment. For newcomers to the broadcast business, this sometimes meant not meeting WECo's qualification criterion, and for these guys, Collins was a logical choice.

By 1936, Collins' reputation had also attracted premium staff members, further strengthening the success factor. Such people included L. Morgan Craft, L. E. Bessemer, Robert Gates, and William Barkley to name a few. While Arthur Collins had always been comfortable surrounded by smart talented people, he was also a strong leader with a big-picture vision who kept things in focus. By the end of 1936, sales had more than doubled from the previous year to $391,000 (nearly $6.5 million in today's dollars).

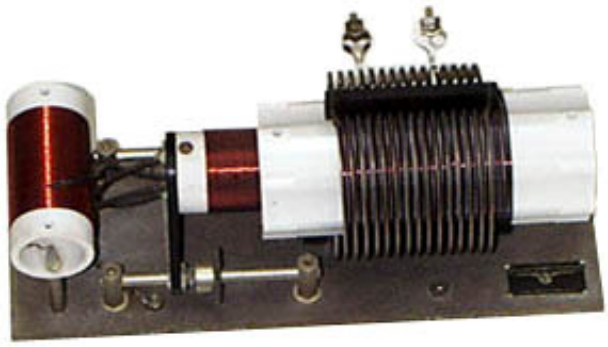
Legal Challenges

As Collins continued to grow its broadcast transmitter market (eventually outselling RCA), Sarnoff and AT&T refused to supply vacuum tubes, or to license Collins the use of some basic circuits owned by the "patent trust" - including the crystal oscillator and capacitive neutralization. In 1936, AT&T and RCA brought a lawsuit against Collins, forcing Art to explore alternatives or watch the company be strangled. Art's patent attorney discovered that Robert Goddard, the liquid fuel rocket pioneer had received a patent on an oscillator tube in 1915.

Art travelled to Roswell, New Mexico, to meet with Goddard. Art explained the lawsuit against Collins Radio and asked for Goddards' help. When RCA got wind of this meeting, they sent a representative to meet with Goddard to determine if the tube "actually worked." Goddard was insulted by the insinuation and as a result, vowed to help Collins any way in which he could.

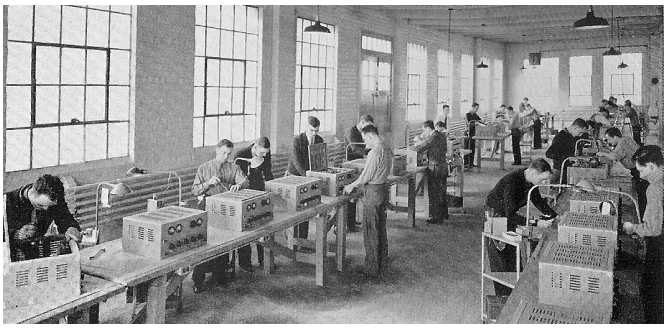


Art arranged to have Amperex manufacture Goddard's tube, which was designated the Collins C-100 series. Using it in a negative-resistance oscillator circuit, was the legal workaround that kept Collins in business while the lawsuit was pending. The work-around for the capacitive neutralization issue was inductive neutralization. Here, a dedicated inductor was inserted into the final tank plug-in coils to accomplish this function. Both inductive neutralization and the C-100A tube were used in the amateur transmitters which included the 30FXC and 45A, and the commercial transmitters manufactured in the 1936 time frame. The C-100A was also used in the 300E broadcast transmitter.



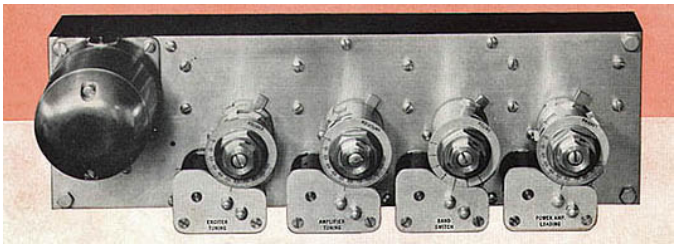
The lawsuit was finally dropped, and RCA and AT&T modified their licensing policies and did a cross-licensing arrangement with Collins. This was a legal triumph for Collins and other companies like Heintz and Kaufman; a transmitter manufacturer also named in the suite.

By 1937, the Collins transmitter designs had returned to using mainstream vacuum tubes and circuit designs. The Collins reputation for engineering expertise, product quality, and business stamina was also at an all-time high. On May 13, 1937, the company reorganized as an Iowa Corporation.



Autotune

As Collins products found their way into the aviation industry, the need for rapid frequency change in aircraft transmitters was the next challenge for the company. As the aviation industry was rapidly expanding, the need for more frequencies was quickly apparent. Up to this point, Collins had made multi-frequency transmitters for operation on three or four frequencies by using separate RF sections with a common power supply and audio system. While flying back to Cedar Rapids from Dallas in 1935, Art envisioned an automatic tuning system which would be to radio communications what automatic dial switching was to telephone communications. He hit on the idea of mechanically linking all the transmitter tuning controls to a common



1933 - 1934
2920 First Avenue, NE

1931-1933
1620 Sixth Ave, SE

First Sale

Byrd
Production

MAIN PLANT -
Spring 1941 -

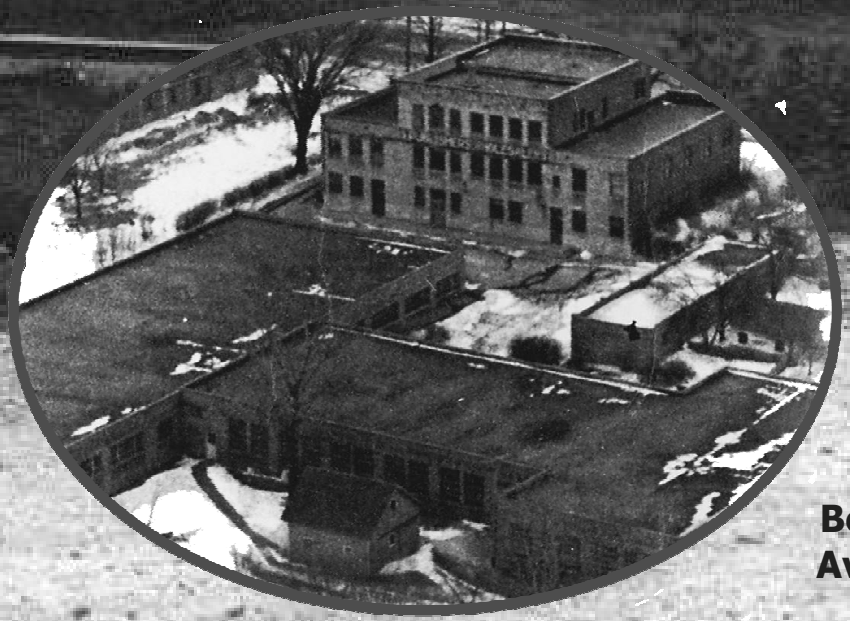
35th Street
First War Production

MAIN PLANT - 1943

FROM A
BEGIN

1934 - 1936
Modern Laundry Building
621 1st Avenue SE

HUMBLE
NNING



1937 - 1941
Behind the First
Avenue Building

mechanical positioning system that could be universally applicable to any kind of transmitter and be very reliable.

To kick off the Autotune project, the first thing Art had to do was update the machine shop and bring aboard some new talent knowledgeable in sophisticated machining techniques. Art hired an assistant professor of Mechanical Engineering whom he described as "the sort of fellow who could do a nice job of building gadgets." Art then sent the professor to Chicago to purchase a secondhand vertical milling machine, a lathe, tools, cutters, collets, etc., to amp up to the next level of mechanical challenge.

While Art had a reasonably concise idea of how the Autotune unit should be built, he gave his engineering team the lead on the development. Several approaches were tried, tested, and refined. The first production model used two lead screws, each driven by a motor. This system was eventually incorporated into the 17D ten-channel aircraft transmitter. Autotune gave Collins a major advantage in the aviation market as it allowed cockpit control of the aircrafts' radio. Braniff was the first commercial airline to adopt the Collins 17D 100-watt Autotune transmitter to its fleet of DC-3s.

According to Collins Radio Ads of the period, their Autotune offered the following outstanding advantages:

Drastic reduction of space and weight requirements

The same basic Autotune units can be used on transmitters of any power.

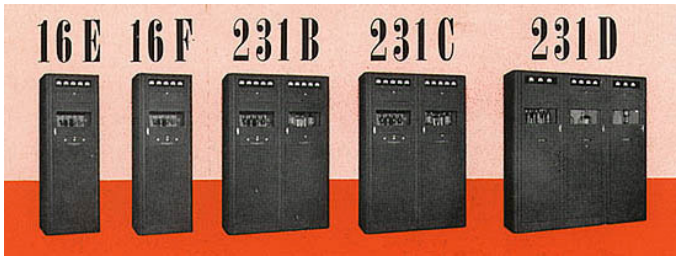
The Autotune system used as a common design basis greatly reduces the construction costs. No expensive time is wasted scheming up different custom-built frequency change gadgets for each application.

Autotune costs less than any other frequency change system because it is manufactured in quantity.

Autotune is the most highly developed and thoroughly engineered frequency shift arrangement. It has proven itself by flying millions of miles in transports and by working thousands of hours in ground stations of major airlines.

The first Autotune ad in QST appeared in May 1936. The ad introduced the 200 Series transmitters ranging in power from 300 to 2000 watts, and boasted: "The Autotune device automatically tunes the transmitter to any of ten desired frequencies within an interval of five seconds."

This Autotune was also migrated immediately to other transmitter products enabling remote control of transmitter facilities in other markets as well.

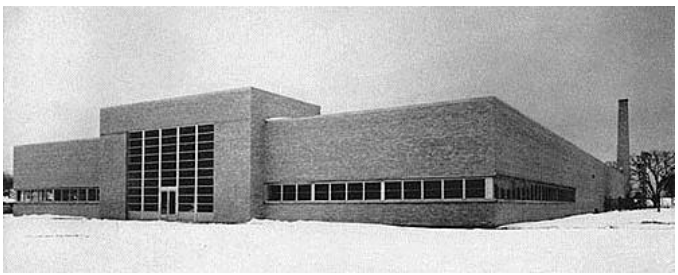


The War Challenge

In the spring of 1940, with the threat of war looming on the horizon, the Navy evaluated transmitters from three companies; Bendix, RCA, and Collins. The Collins ATC entry "won the competition overwhelmingly" and thus became the first remotely controlled transmitter in naval aviation. It was the Autotune adaptation, along with the Permeability Tuned Oscillator that led to the aircraft transmitter which ultimately became the ART-13.

By 1940, employment at Collins was approximately 150 people. The Collins war chest was rich with the sophisticated new technology the war demanded. Collins was in the right place at the right time, but with the new government contracts coming, a dramatic expansion was necessary.

In the fall of 1940, construction was started on a new 52,000-square foot state-of-the-art facility on a 26 acre parcel. By January of 1941, the move-in to the new plant was well underway. Six months later, additions to the plant, doubling the size, were announced with the US Government to pick up the tab. In addition the recruitment campaign for top young engineers was also paying off.



When Collins "Joined the Navy" in 1941, the company's net worth was $400,000 (~ $6.25 Million today). With the Collins DNA now permeating the company, when the call of duty came, Collins was not only at the top of their game, they were poised as the *game changers* that would prove vital to the war effort. Collins was about to become the largest war plant in Cedar Rapids.

Next Issue – The War Years

References
ARRL Handbook, 6th Edition; 200 Meters and Down by deSoto; Collins *Signal Magazine*; The First 50 Years;
Warren Bruene; Wikipedia; Collins to Roling letter

Editor Note: Gary Halverson, K6GLH, and a dedicated collector of early Collins equipment and historical knowledge, has written previously for the *Collins Collectors Association Signal Magazine*. He is also a significant contributor to our CCA website, both now - and in past years. Much of what you see on our website regarding the early years and the equipment of Collins during that period, originated with either Gary, or J. B. Jenkins. We are indebted to both of them, and very lucky to be able to share in this unique perspective on what the formative, and in some cases barrier laden, environment was as Arthur Collins headed for success.

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2012 - CCA Election Results


Scott Kerr, KE1RR

As I am sure most of you know, during the fourth quarter of last year, we opened nominations for the two CCA Board of Directors positions that were expiring.

Ron Freeman (K5MM), our Treasurer, had to resign to focus on other issues as he moved and built a new home and shack/shop building. In addition, the board position held by our President, Bill Carns (N7OTQ) was up for reelection. As reported on the website, and in the last Q4 *Signal Magazine*, there was only one nomination for each of the board positions so no voting election was required. Bill Carns and Scott Kerr were nominated for the two positions that were open, and were elected without contest.

Scott had previously been an appointed board member. But had resigned to run for the elected post.

In a subsequent board meeting, Scott Kerr was elected Vice President and Bill Carns reelected to his position as your President. Bill will also continue to edit and publish your *Signal Magazine*.

In a related action, the board also unanimously accepted Bill Wheeler's request to step down as an appointed member of the CCA Board of Directors and he then accepted a position as an advisor to our board. He will continue to hold the esteemed title as our President Emeritus of the Collins Collectors Association. As most of you know, Bill Wheeler founded the CCA in 1994, almost 20 years ago now.

All of the other board positions remain unchanged as do the areas of responsibility shown on the website and also elsewhere in the magazine. ----------CCA----------

CCA & Dayton 2013 - Come Join the Fun

Our Dayton Hamvention experience has always been great. I know that most of you look back on having attended at least one CCA Dayton Dinner, or on the camaraderie of the weekend at the booth and in the hospitality area, as a time not to be forgotten. Some of you have not had the chance to attend - for one reason or another. Regardless of whether you are a regular, or if you just "Have always wanted to come, but it hasn't happened yet." …… Now is the time.

2013 is the 80th anniversary of the incorporation of Collins Radio. We are in "Celebration" mode. This year's Dayton Hamvention CCA presence is going to be ratcheted up a notch or two….maybe even three. If you only make one Dayton Hamvention in your life, this is the one to come to. Just go to the new Events Calendar on our website, and click on the links for Tickets, Hotel, and Dinner reservations. It's all right there. Or, take the direct route and scan the QR here.

The Dinner Event will be a special presentation of 80 years of Collins Equipment hosted by Robert Hobday, the Deputy Director of the Antique Wireless Association. Equipment will be highlighted from the Prewar years, World War II, the Postwar A-Line and S-Line era, and then the Rockwell Collins period to date.

There will also be the usual selection of door prizes and drawings with a focus on Rockwell Collins. In addition there will be some wonderful displays at the dinner that you can browse through during the social hour before dinner or afterwards.

While you are at the swap, be sure and come by the new booth location that is in the adjacent room behind the one that we have always been in. This location is even better, and has allowed us to expand the booth size and add more displays and a hospitality sitting area where there will be refreshments for members. The new booth location is #508 and 509 along the North wall. See our CCA website for a map. This also allows us to be very close to Jim's HF-80 Shelter that he is bringing, and it allows us to get an antenna out the door from our booth. Yes, we are going to try and have an events station running. In addition, there will be videos running in the booth and there will be scheduled training videos along with live demos of a KWM-2A alignment - compliments of Hi Res Communication.

The Ramada Plaza hotel (We have our usual block of discounted rooms) will have a 24/7 hospitality suite in the Sky Box with refreshment. For those that like to hang out in the bar sometimes, the hotel has finally "Seen the Light" and they have renewed their liquor license – so the bar can provide you with whatever you need now.

Don't miss the training videos and live training sessions at the booth - as well as a super drawing for a prize there.

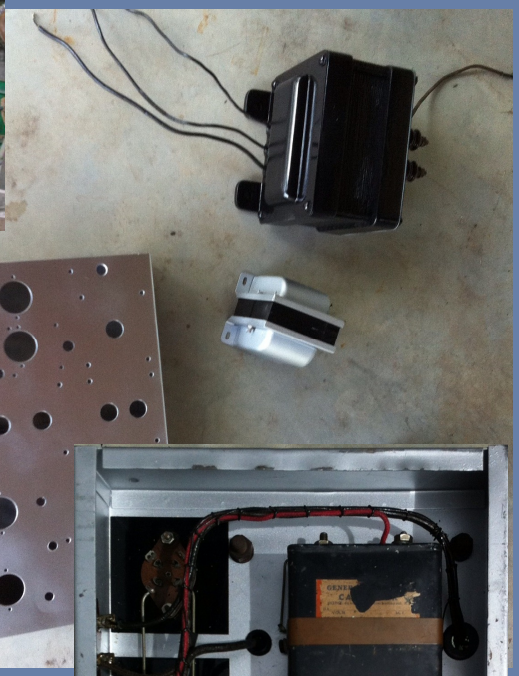
Did I say that this will be a Special Dayton Hamvention for the CCA? ….. Oh, I guess I did..

See ya there. Scan the QRs - or go to our Events Calendar on the website for more information. Also check out Dallas in June.

The Service Line

Tackling a 30FXB

By Steve Darveniza, VK4VN



They say a picture is worth a thousand words. This odyssey started about two years ago when I watched this very rough condition 30FXB sit on eBay at what I felt was a very high price. It did not sell, and as time passed, I opted to make an offer on it. To my surprise, it was accepted.

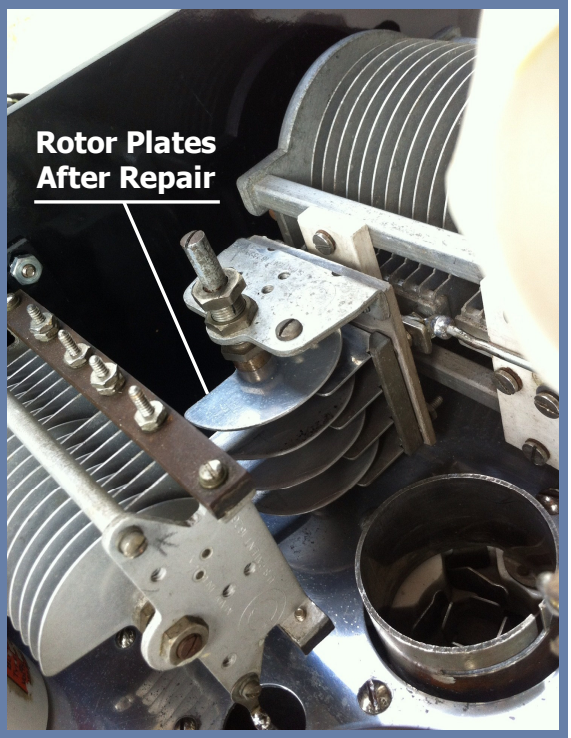
Above on Left, and just to Right, are three photos that tell the story of the 30FXB's hard life and condition as received

Rear RF Deck 10J - Before

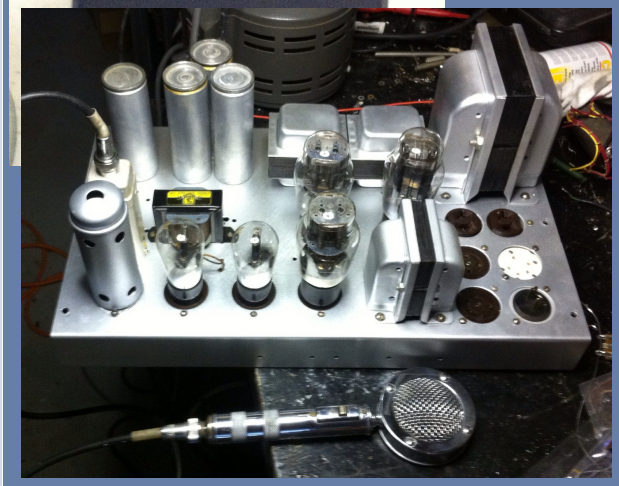
30FXB Odyssey Continued

Presented here will be an interim report on the progress to date. To be honest, when it arrived here down under, it was in worse condition than I thought. There were modification in abundance and everything was either rusty or dirty.

There will be a full article appearing in your magazine as soon as the task of restoration and making it operational is completed. I will not spoil that story with much detail here but here is an overview of what has happened so far.



There has been a lot of research and searching for information that would guide me while taking the transmitter back to stock condition – or as close as I could come. Some information has been forthcoming, but to date – no manual has been found. Frustrating indeed!



Completed 7CA Speech Amp in Test

The entire unit has been completely sand blasted and cleaned The steel chassis have been cleaned and rubbed down to the copper plate where all rust was removed. Following that, and some paint prep, the chassis were coated with the proper paint – a process which Collins used. This paint is conductive and has its origin with Collins in the silver paint used at that time in dirigibles to coat the fabric hull and make them conductive for static discharge bonding.

A local source was found for the correct cotton insulated wire and all wiring was pretty much replaced due to its sad state.

Thanks to support from this CCA group, the RF deck has been completed and that included building the reproduction RF tuning assembly from scratch and completely rebuilding the neutralization cap. This involved making three new plates based upon a pattern taken from the one good one

The journey continues..... More when I am finished and have it on the air.

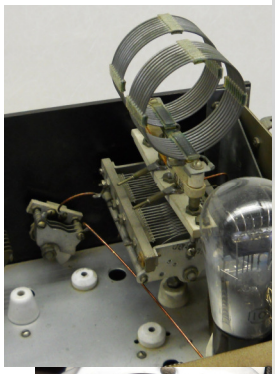
Cheereo, Steve (VK4VN)

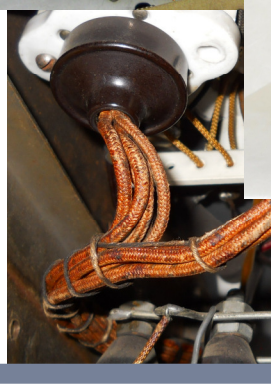
Completed 10J RF Deck

1932 to 1938 - - ARTHUR'S BABIES

The Model 30W - Rare and believed to be Art's Engineering Development Model

Rockwell Collins Museum, Cedar Rapids Iowa





The Model 4A

HE WAS A PROUD PAPA

The Very Rare Model 150C

The Rare 30J

Congratulations on 80 YEARS of TECHNOLOGY LEADERSHIP
- - Some Things Do Not Change - -

Collins Autotune* Sets Records

Braniff Airways, operating a fleet of Douglas and Lockheed transports throughout the great Southwest, uses the Collins 17D Autotune, 100 watt, 10 frequency Transmitter in all ships. Ten 17D's have been in constant service for two years and ten new 17D's have just been delivered to take care of increased operations.

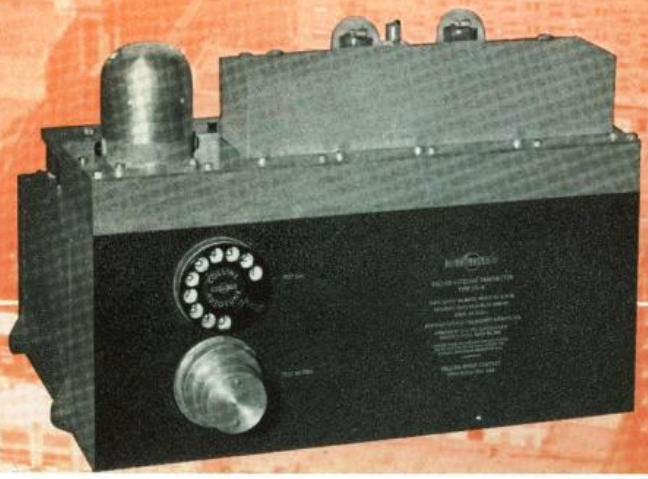
The 17D is

the first high powered transport transmitter.
the first 10 frequency aircraft transmitter.
the first 100 watt set to receive CAA approval.
the first modern aircraft transmitter to be proved out during millions of miles of flying.

*Autotune—The exclusive Collins device used on aircraft and ground transmitters to accomplish quick automatic frequency shift with absolute reliability.

COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA NEW YORK, N. Y. 11 WEST 42 ST.



The right information. Right now.

Your mission's success depends on getting the information you need, when and how you need it. Rockwell Collins provides smart new ways to deliver that information faster, easier and more reliably. Like intuitive, context-sensitive avionics for enhanced awareness. Head-up displays with synthetic vision for eyes-forward flying from takeoff to landing. And integrated flight and cabin information systems that keep you up-to-date and connected. All focused on providing you the right information, at the right time.

Avionics systems

Cabin systems

Flight information solutions

Simulation and training

Life-cycle service and support

rockwellcollins.com/rightinfo

Rockwell Collins

Building trust every day

IN THE COLLINS SHACKS OF THE THIRTIES

John Firey - W5ZG - Earns his WAS
Using only all Prewar Collins Equipment

John is one of those rare people who not only has managed to gather together an impressive array of Collins Radio prewar equipment, but also maintains and operates it regularly. This is a very solid accomplishment.

On the left is a period operating position consisting of his Collins 32G paired with a rare Hallicrafters S-22R Skyrider Marine from the same period.

Below we can see his beautiful 30J standing next to the early 150C on the right.

On the table sitting with John is a more current operating position with his 32V-2 and 51J-4, a great combination for AM.

John is mostly a CW operator, but also can be heard on AM. He is justifiably proud of earning his WAS award using only prewar Collins equipment.

150C Modulator Deck

J. B. Jenkins - W5EU

J. B. is a retired Collins Radio engineer from the Dallas area. He is a dedicated preservationist and provides the CCA with a great deal of support regarding the history of Collins and its equipment. His collection of early Collins rigs is beautifully displayed and he has several prewar operating positions to choose from when he wants to go back in time. J.B.s restoration journey

Right: J.B.s 30J paired with his very rare RME-9 receiver

- while bringing a "trashed" 30J back to life - is well worth reading about. You can find more on our website under the 30J heading. **Above you can see his 30W** operating desk....and, to the **Left is a very rare 30FX** with his National HRO receiver.

On the **Right is a great example of an early 32G**. Super Presentation J.B. Thanks!

Gary Halverson - now K6GLH - and - J.B. Jenkins - W5EU -

(W5EU Below Left)

make the first 30J to 30J QSO in 50 years

(Read the full story in the CCA 30J section of your website)

To the left here we see (Left to Right in the picture) a very rare 32F Collins 25 watt AM transmitter. Only 25 of theses sets were made during early 1935. For some reason this beautiful little transmitter never was advertised, and did not continue in production.

Here you see it paired with an equally rare "Pearl Button" HRO. Next to the operating desk is Gary's beautifully restored 30J (running I might add), and then (to the right again) his 30FXC operating position where the period receiver is a National NC-101X.

Right - Gary Halverson, right, gives the thumbs up to J.B. Jenkins (Inset) after their historic 30J to 30J contact following the completion of both of their restorations. Gary's outstanding collection of Prewar Collins transmitters is completely operational and he is often heard on this equipment on the California nets.

You should make a point to visit his QRZ.com pictures - as well as his website link there - to see the full extent of his collection. You should also not miss his great "Lost Decade" video on our website which features this equipment.

The last time that there was this kind of operating position was some time in the 30s. Left we see a 150B Reproduction that Gary carefully built. Next to that on the table is a mid-production 45A with partial reproduction 30W sitting on top. A home brew vintage 1945 speech amp sits on the right side of the desk and feeds audio to the Collins HF-200 prototype in the rack with a 4A exciter that drives the RF for the 200B. The receiver in the middle is another "Pearl Button" HRO.

If you get a chance, try and catch Gary some time on the air and you will hear this equipment in operation……A rare treat.

In addition to his Prewar Collins, Gary also has a great collection of other gear including a full-up FRT-24 AM transmitter….. Also among the rarest operating Collins gear around.

Collins - The Fast & Furious '30s by Bill Carns

The early life of any start-up company is difficult. Often, as is the case with young Arthur Collins' company, the capabilities of the small number of people involved center on whatever technology or product area is involved, and there is very little management and financial experience in the company to begin with.

Few people realize that less than 10% of these companies are successful, and more importantly, of the companies that do make it, almost 50% end up in a different business than their original business plan proposed.

In fact, most good venture capitalists, while certainly looking for a good business plan, a "great idea" and differentiating technology, also look for a nucleus of people who are passionately committed to "Making it Happen" and that are "All In" – they are looking for people that will "leap tall buildings" and overcome all obstacles.

In fact, one could argue that 1932-33 was a very wrong time to start a new company… The depression was on; the average ham had little expendable income and, indeed, most companies were busy going out of business or trying desperately to survive. In my family alone, there were two bankruptcies in the depression and my father's father lost the bank that he owned. We were lucky to save the farm, only because wise management had left it debt free.

Due to the depression, and to the dreaded bank examiners and subsequent lawsuits, the Collins family had lost their Farm Coop Company and most of their previously acquired wealth. Arthur Collins had just married, and was renting his deceased grandfather's home from his father. He was in dire need of income. His two year stint working for his father's farm business when he was younger had convinced him that farm management was a career path that he did not want to pursue. He was out of work and in need of money - and so was his father.. Now *that* is called "motivation" just by itself. Indeed, Art was "All In", as he had proven in the past was his style to begin with. Add to this that both Arthur and M.H. had demonstrated clearly that they were risk takers and "doers". The stage was set, and in 1932 they decided that Art's little "garage shop" effort at building a few transmitters in his basement should be turned into the income provider that they both needed.

M.H. had $10,000 left that, during earlier and more successful days, he had put in a trust for Arthur. Art (now of age) and his father decided to gamble this last $10,000 on the only area that truly interested young Art – and that was building transmitters.

In a time when most people were just trying to get by; In a time when there was little extra income in the country to spend on a "hobby"; but, driven by need and a passion for this exciting and magical new wireless technology, Art and M.H. reached for the stars, and the rest is history….. All of the "right stuff" was there; Commitment; passion; technical competence and leadership. The result is nothing short of amazing. It was a market waiting to explode. It was a time of excitement and intrigue. And the Collins family was ready.

The following time line will serve to put this in perspective. It is a blur of new model design, new employees.. and spiraling income. It was a time where the industry was in turmoil fighting for control of patents, and as Gary Halverson's article clearly shows, there were a number of hurdles to overcome legally and technically.

Following the incorporation of the Collins Radio Company on September 9, 1933, the first fiscal year of sales was reported as ending July, 1934 and was **$128,000**. This is equivalent to almost $5M in today's money. As might be anticipated, the company lost money in both 1932 and 1933. By FY 1935, the sales had risen from $128,000 to $293,000 and the company saw its first year of profitability. By 1941, just 6 years later, the sales were a whopping **$2.1M** (or about $33M today). That is a sustained Compound Growth Rate (CGR) of just shy of **50% per year** over that 7 year period.

During that 7 fiscal year period, the company went from having 8 employees at incorporation to almost 500 by the start of the war. That is a CGR in employment of **80% per year**.

During that same time period, Collins Radio had changed factory location 3 times – starting in the humble basement location and ending in Main Plant on 35th Street.

They had overcome a legal attack by two of the industry giants, GE and RCA, demonstrated the technology strength necessary to temporarily work around those roadblocks and taken their respectable positions in market penetration in Government, Commercial, Amateur Radio and Avionics. In fact, in several, they were number one.

Warren Bruene has stated that, after getting a late start against giants like Westinghouse and GE, the Collins Radio Company sales of Broadcast Equipment just prior to World War 2 totaled more than all their competitors combined.

During this same time period, amidst a flurry of hiring, training, factory moves and reorganization, Collins managed a constant flow of ever changing and ever improving model introductions numbering more than 50 major types. This was a rolling process and we know that by 1938, he was focusing on 30 of these that were still in production.

They changed (updated their image) the company logo 4 times, went through at least 3 different styling periods, and trounced the competition.

When the war called a halt to commercial production in 1941, they were on a huge roll and had in fact demonstrated the aggressiveness and passion for success that is so often missing in new companies.

They now were looking at a 4 year hiatus in their commercial growth, and were again facing another huge wall to climb over in terms of needed factory growth and production methodology development. Collins Radio and the leadership was ready for the challenge and they would prove more than equal to the task.

This is a track record that any new company would be proud of and Collins Radio was positioned well for the next challenge that would come: War Expansion.

With the foresight of a strong leader, Collins Radio had already put a modern factory in place, and then doubled its size, knowing that this was soon to be needed. Of course, there was also the understanding that the opportunity to double factory capacity - based on a government grant - was a once in a lifetime opportunity.

In fact, not only were they now well positioned for this war challenge from a factory capacity viewpoint, but they had the technology in place (Autotune, Quality Control and their advanced tuning and network designs) to immediately put both airborne units (the ATC/ART-13) and higher power ground equipment (the TDH and the TDO) into immediate production. The TCS family (initially for the Navy PT Boat requirement) and the TCA/TCB/TCC 50 through 1000 watt Autotune ground transmitter would soon follow. But, that is another marvelous story of Collins performance under stress.

This story will continue in the next issue, where again, the words "Fast and Furious" continue to apply.

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Glimpses of the Movers and Shakers

Arthur A. Collins, President

Much has been written about Art Collins. Gary Halverson has looked into his motivations and the influence of the "wild west" early days of wireless on the world he grew up in. Numerous other books have captured other facts about what he did, and how he got where he did with his company.

Some facts are not so obvious though. He had an insatiable appetite for driving progress in almost any field that he was interested in - or exposed to.

There are stories of his participation in very early experiments in computing done at Iowa State College by John Atonasoff. This was in the mid 30s, long before computers were "invented". Art was interested in the application of those new HF tubes (make that potential high speed switching devices) that might be applied to the problem of building logic circuits.

During the years where we like to think of him focused on our beloved amateur radio equipment, he was looking ahead to instrument flying and applying his genius to the problems of instrumentation (The CDI and HSI we know today) or advancing Navigation. Art was the inventor of the most fundamental concepts of the VOR (VHF Omni -directional Radio Range) airway system and the resulting ILS approach guidance system.

He pioneered and led his company into many new areas and contributed to things now accepted as having advanced our airline travel system safely into the 21st century.

His innovative thinking, and patents, on the Autotune, not only positioned the company for success early in World War II, but brought a real strategic advantage to the allies during the early years of the war by giving our communications the capability of quickly, and strategically, changing frequency, while the enemy was stuck on one or two often compromised frequencies.

Yes - he was a genius, and yes, he was sometimes disruptive and caused projects to derail, or get delayed….. but he was also (more often than not) right on the money about the changes he asked for.

Bottom line, along with being a driven visionary, and a strong leader who often led by example (the best kind) – he was creative and passionate about contributing excellence to the solution of problems – no matter what they were. As important, he seemed to know where the next most important problem was, and reach out for the answer before others did.

It is generally acknowledged by his peers during that, during the first years of operation leading up to the war, Art focused on the engineering, design and technology aspects of the company, while his father, M. H. Collins provided the bulk of the business guidance and management. In addition, prior to the addition of Barkley to his sales position in New York, M.H. did quite a bit of the customer development, communications and sales.

Merle H. Collins, Vice President

By Ben Stearns

Merle Hunter Collins, the father of Arthur A. Collins, was born on Oct. 5, 1878 in Orion, IL - a small town near Moline. His parents were The Rev. Josephus and Jane Toinette King. She was Josephus' second wife. Josephus had come from Canada, one of seven children of a couple who migrated to Canada from England. It was said that because the parents liked Josephus' career choice, that of a Methodist pastor, he was given the largest share of the parents' will. Josephus was serving a church in Orion when Merle was born.

During Merle's boyhood, the family moved to Kansas where Josephus served other churches, one near the Oklahoma border. When Merle was about 17, he and his father went to Kingfisher, OK to take advantage of the Oklahoma land rush of that period. They bought lots and built houses there. About that time Josephus left the ministry and began working with a newly formed college there, which Merle attended at least one year. He next got into the buying and selling of land in the Kingfisher area. Reportedly he went from boom to bust and back in that period. In 1904 he married Faith Andrews, and their only child, Arthur Andrews Collins, was born Sept. 9, 1909 at Kingfisher.

In 1916, when Arthur was 7, the family moved to Cedar Rapids, IA where Merle established the Collins Mortgage Company, dealing in farm loans. Merle also soon started the Collins Farms Company, which bought up many small farms in eastern and northern Iowa, trying many advanced farming methods for that period. Both of Merle's ventures appeared to be doing well in those years of the Great Depression, but suddenly they went broke in 1931 and Merle was wiped out financially.

That was when son Arthur was starting his radio company. While occupied with the many legal problems of his farms companies, M.H. also did what he could to help Arthur. Eventually he went with the radio company full time.

M.H., as he preferred to be called, was a top rate business administrator, contributing in many ways to the early growth of Collins Radio Company. He was involved in many areas of management including sales. He personally negotiated the sale of radio equipment for the Iowa State Highway Patrol. Overseeing marketing of commercial radio broadcasting equipment was another main activity for M.H. In the 1930s broadcast transmitter and studio equipment sales in the U.SA. and abroad was the firm's bread and butter product line.

M.H. personally knew everyone in the offices and shop. He was highly thought of by all the employees.

M.H. died April 2, 1943 at the age of 64. The Cedar Rapids Gazette obituary described him as a friend of the man in the shop and a patron of the arts. The latter referred to when he was well off financially with his farms businesses and he contributed to a fund which supported two promising young Cedar Rapids artists, Grant Wood and Marvin Cone. - - - - - - - - CCA - - - - - - - -

Glimpses (Cont'd)

John Dayhoff - Manufacturing Manager

John (Better known as Slim) Dayhoff was there right from the beginning. Even as the company was being founded, he came and helped Art build his early transmitters in the basement of the home "factory" on Sixth Avenue. He was still on the payroll of the Collins Farms Company at that time. Art had worked with him on the farms during the days after he had graduated from High School. When Collins Radio was incorporated in 1933, Slim came on the Collins Radio payroll as Clock Number 3, and was—from that time on—a key player in the prototyping and manufacturing at Collins Radio clear through World War II and into the 70s. In later years he was in charge of all manufacturing in Cedar Rapids.

Slim and Art always shared a special friendship. It is acknowledged that Slim was a *no nonsense, get the job done*, manager, but it is also clear that he knew his workers well, and supported them when they were in need. In the Q2 issue of the *Signal Magazine*, there will be a longer feature on this intriguing man.

Wirkler—Short Intro - OK

Warren Bruene—Short Intro - OK

So, mid thirties on -
Art CEO & Chief Eng.
MH Admin
Gates - Finance
Barkley (NY) Sales

Did You Know?

This little vignette is of great interest as we look at the early history of the company. It is indicative of the vigor with which the entire team at Collins Radio pursued new business.

When Art Collins first went into business, he advertised his offering of a "High Output" transmitter kit with either one of three possible output tubes and power ratings. This ad ran in January of 1932. It is not known if he ever shipped any of these kits, as none have ever been observed and all related records have been lost.

He did build a number of assembled kits for local delivery with the help of two local hams, Leo Hruska and Roy Harrington. He very quickly concluded that adding the value of assembly to his offering brought him more return and by March of that year, his QST ad was offering completed transmitters from 30 to 300 watts. He also started advertising the sale of his components.

His first delivered sale came somewhat by accident. - - On a hot Sunday afternoon in the summer of 1932, an out-of-state visitor (Benton White) was driving with his wife through Cedar Rapids when they called a halt to rent a motel room and cool off. They decided to take a walk and, pausing at a news stand - quite by accident – Benton bought a copy of QST and saw the local Collins ad for transmitters. They decide to drive over and pay a visit. When they arrived, Peggy opened the door and greeted them. When the reason for the visit came out, she called to Art who quickly phoned Clair Miller - who came right over.

Although at first he had no intention of purchasing anything, when faced with the enthusiasm of Art and his compatriot Miller, Benton offered to buy the one transmitter that the two were building in the basement. In spite of being told that it was sold to another customer, Benton produce his money and convinced Art to sell him that unit. It drove away that afternoon in the car with the Bentons …. and Art's first sale was history.

Electric Radio Magazine

Serving the dedicated Collector

ELECTRIC RADIO

Electric Radio magazine is published monthly for those who appreciate vintage radio and the associated history.

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- ◊ Visit our website at: http://www.ermag.com/

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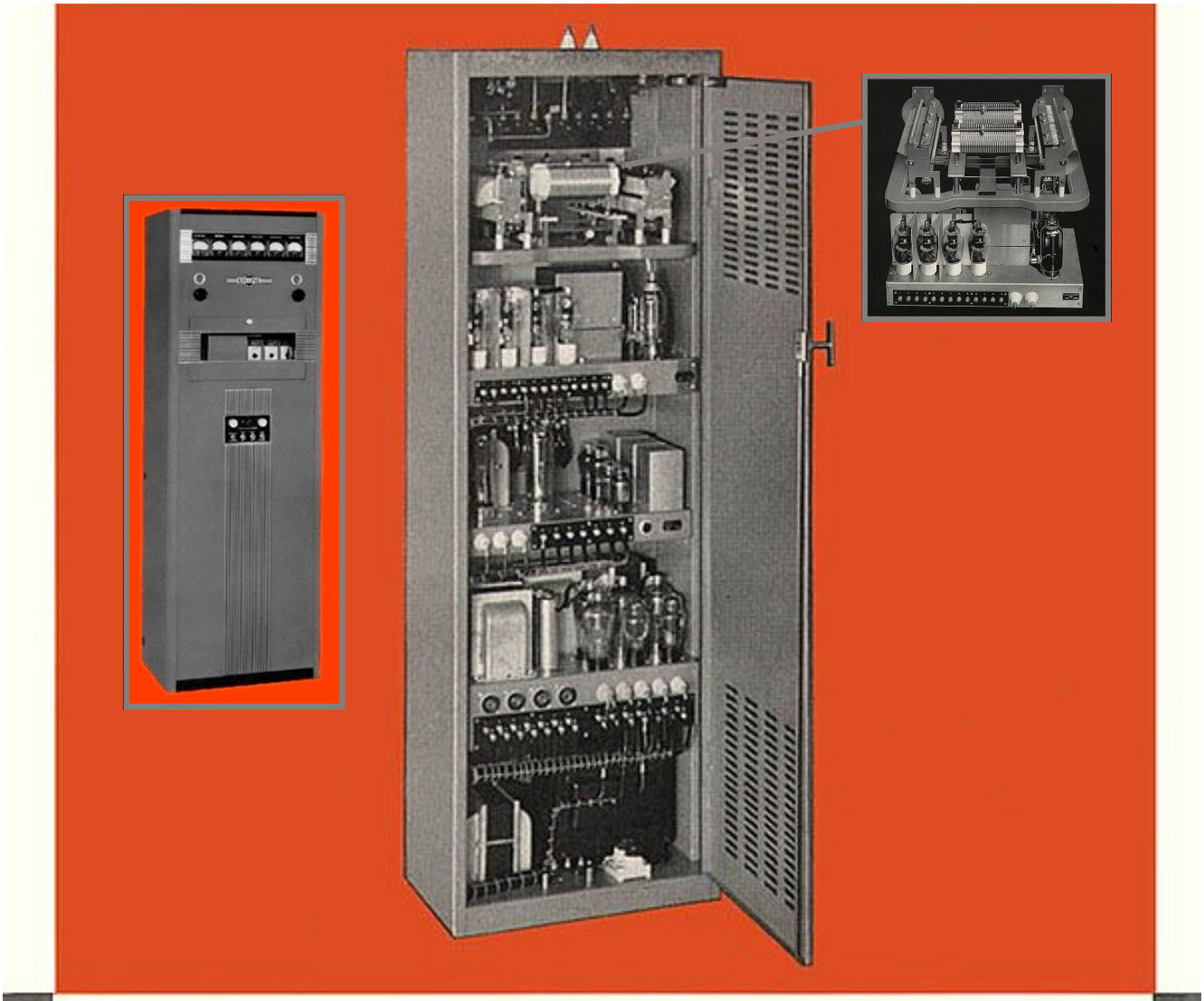

We Think We Have Done a Very Good Job With the 30J.

Mechanical details which we have had in mind have been perfected and many useful gadgets and niceties have taken form. For instance, the r-f output circuit is built as an integral assembly on a machined cast aluminum frame. Excitation tank circuits are "pre-tuned" units which are plugged in and adjusted through the front door. The cabinet with its inter-locked doors is a very neat job. Electrically, the 30J Transmitter has every refinement and desirable feature which our long experience has suggested. The output is 250 full sized watts, and the set works as smoothly at 60mc. as it does at 1.5mc.

COLLINS RADIO COMPANY

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