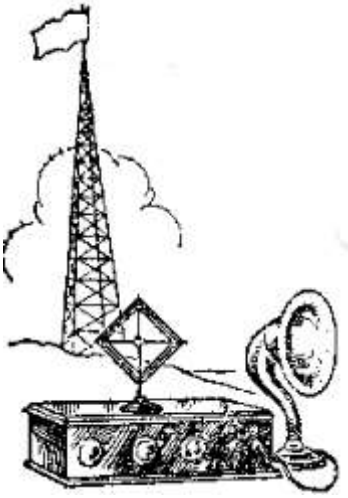

The Carolina Antenna

FALL 2008
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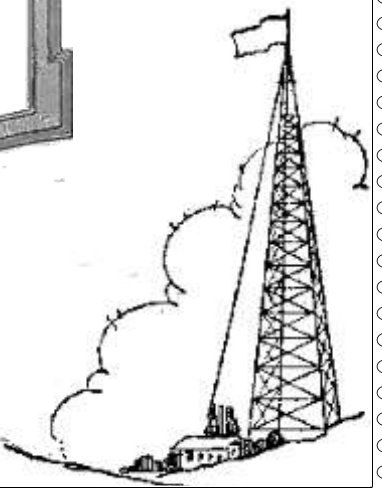
Carolinas Chapter
of the
Antique Wireless



The Carolina Antenna
The newsletter of the Carolinas Chapter of the Antique Wireless Association

ISSUE # 14 WINTER 2008 VOLUME 2

THE PREZ SAYS ...

By Ron Lawrence, KC4YOY
CC-AWA President

The 2008 CC-AWA Annual Conference in Charlotte was a tremendous success gain this year.

As we were getting ready for the show in January I was worried about how long we could continue to pay for the show with our current registration fees. The costs of everything seem to go up every year. One of the milestones we had worked hard to reach was to have enough money after each conference to be able to pay for the next years show in case we had a complete wash out. After much discussion with our group we decided that we would just have to bite the bullet next year and increase the registration fees.

For a number of years a couple of us have had a table at the Charlotte Ham Fest that takes place 2 weeks before our conference to hand out brochures and talk up the conference. On Friday evening before the Ham Fest I got an email from a friend telling me that a long time ham and we were to learn serious collector W4TIM had become a silent key about a month before and the guys that were helping the family planned to bring some of his estate to our conference. My friend had told them that I would be at the ham fest and that they should look me up. I had been to Tim's home a number of years ago and felt like there would a good bit of stuff there that would be of interest to our attendees.I met with the guys handling the estate items and encouraged them to bring as much a possible to show and put it in our auction. I had no idea just what we would be getting into. I told them that if they would send me digital photos of the collection I would put it on our web page and do everything I could to get the word out, I was worried that at this late date we had missed a lot of time to promote it properly. A couple of days later I started getting emails loaded with photos of the goodies.

And goodies they were. There was a DeForest 15 unit Panel set, a Clapp-Eastham spark transmitter, 5 Spherical Audions and LOTS and LOTS of other great items. At first I was disappointed when I learned that they were selling a lot of things from the collection before the show.

Now I know what a favor they did for us.

Thursday the first day of the conference was smooth and easy, the afternoon programs were well received, Robert Lozier did a digital slide show of photos shows the history of his collection and included a lot of early photos of radio meets in the Carolinas. John Allen W4GQT did a great talk on Super-Hets and Mark Oppat did a presentation on repairing speakers and controls.

Late in the afternoon the guys with the estate pulled in driving a U-haul truck.

We were shocked at the amount of stuff they had brought. There turned out to be over 300 items in the estate consigned to the auction and this was before anyone else at the show put anything in.

A lot of folks worked their collective butts off getting the estate logged into the clubs auction database.

Friday morning our flea market kicked off with our traditional "Le Mans Start".

The market was packed and I'm told there were a lot of sales. It's just my impression but it seemed that most of the sales were lower end sets and fixer uppers as opposed to high end sets, I think folks were saving their money for the auction and with the amount of auction sales I think I was right.

Total auction sales were over $72K, the DeForest 15 panel set brought $15.5K, the Clapp-Eastham spark transmitter sold for $4.5K. Most of the audions sold for around $1500. There were lots of vintage receivers, HROs and the like. There must have been more than a dozen National doghouse power supplies. There's a complete list of the auction items and their selling price on the CC-AWA web page.

With the amount of commission the club earned from the auction our money problems we were worried about in January not a problem any more. We intend to use the profit money from the auction to maintain our registration fees at their current level for as long as possible.

A lot of people worked really really hard to make this show the success it was, it couldn't have happened with them, Robert Lozier, Ernie Hite, Stephen Brown, R.L. & Linda Barnett, Geoff Bourne, Clare Owens, Kirk Cline, Louie Scribner, Barker & Judy Edwards, Mark & Debbie Cleary, Ralph & Jennifer Bartlett, Lee Gentry, and my wife Belinda.

A special thanks goes to our auctioneer Brad Jones. Brad has been running our auctions for more than 10 years and does a great job.

As I write this it's Wednesday December 3rd, the next event on the CC-AWA calendar is our Winter Swap meet in it's new location in Mebane NC at the Mebane Auction Gallery. This will be an ALL INDOOR event, and the doors open at 9AM, so there's no need to get there before daylight. Most of us can get up at a reasonable time and drive to the meet. Tables will be provided, vendor setup is only $5 and admission as always is FREE.

As always you can find details of this event and all CC-AWA events on our web page at, www.cc-awa.org.

2009 CC-AWA Annual Conference

"Spring Meet in the Carolinas"

Thursday, Friday & Saturday, March 26-28, 2009

The conference is held at the Sheraton Hotel, which is located at 3315 Scott Futrell Dr on I-85 at Exit 33, Charlotte, NC.

Hope to see you there!

2009

Winter Swap Meet
January 31, 2009

NEW LOCATION—Mebane NC Antique Auction Gallery. This is an ALL INDOOR EVENT. DOORS OPEN AT 9 AM Tables will be provided Many thanks to the Mebane Auction Gallery and to Kirk Cline for hosting this event.

Spring Swap Meet
To Be Announced

Location: North Carolina Transportation Museum at Spencer, NC. The "Spencer Shops" is located just a short distance north of Salisbury NC, and just off I-85 at exit 79.

Fall Swap Meet
To Be Announced

Location: City Lake Park in James town NC just on the edge of Greensboro NC. The park opens at 7 am. Meet Chair: Brad Jones.

Summer Swap Meet
To Be Announced

Location: Valdese SC. The meet will be in the parking lot of Burke Audio/Video on main street Valdese in the middle of all the traffic flow for the festival. Meet Chair: Ricard Owens.

Call for 2009 membership renewal!

Carolinas Chapter of the Antique Wireless Association, Inc.

Time marches on… Time for all of us to look forward to another year of learning about, collecting, preserving and restoring vintage communications equipment. Time to look forward to more opportunities to gather with fellow enthusiasts.

Before this year ends members of the CCAWA will host meets in Greensboro, Valdese, Columbia, Spencer and the big 32th Annual "Spring Meet in the Carolinas" at Charlotte. These events just don't happen, it takes volunteers and a source of revenue to provide the necessary infrastructure. None of these events would be possible without the support of enthusiasts just like you. Please show your continuing support of these activities by renewing your membership today!

2008 dues are $10.00. Make your check payable to: "CC-AWA" and mail to:

CC-AWA
c/o Clare Owens
101 Grassy Ridge Ct
Apex, NC 27502

Help us keep our membership records up-to-date.

Name: _____

Amateur Call: _____

Mailing Address: _____

City, State, Zip: _____

Home Phone: _____ Work Phone: _____

E-mail Address: _____ Fax: _____

If you have not renewed your membership in the Antique Wireless Association, take the time to do it today! A strong national organization for vintage communications enthusiasts is essential! AWA membership is $20 per year. Make checks payable to: "AWA" and mail to: Pat Muehlbauer (Secretary), P.O.Box 108, Stafford, NY 14143

MELCO SUPREME AMSCO PRODUCTS, INC. MID – 1923

By Robert Lozier

Lester L. Jones and the Melco

According to Allan Douglas, Lester Israel had worked at the Washington Navy Yard during WWI along with Priess, Horle and Hazeltine (as a consultant) where the group developed the SE143 receiver. By 1922, Lester Israel changed his name to Jones and had formed the Danziger-Jones Company to market his invention of a tunable RF transformer named the Telos Vario-Transformer. (Patent filed January, 1923)

His Patent #1,664,513 does not look like the coils seen in the radios I will describe to you. However, Ted Miller has found most of one that is identical to the patent and it is easy to understand why they were apparently quickly modified. The original coils were wound as a single layer flat 'D' shape and then coated with cement and laminated between sheets of card stock. To get these coils laminated correctly had to be a extremely tedious task.

Meanwhile, in July, 1922, the Mortimer Radio Company was incorporated and began advertising under the Melco name. By February, 1923, it introduced the Melco Supreme, using Telos Vario-Transformers. In May, 1923, Mortimer merged with Amsco (Advanced Metal Stamping Company) owned by the Price brothers, attorneys who had acted for Mortimer in its incorporation.

Jones, who had been working on neutralized TRF amplifiers at about the same time as Hazeltine, eventually lost most of his patent claims where the transformers were used between vacuum tube stages. He was, however, able to have some success with a circuit called the Technidyne. Here all the tuning was done in a multi-stage passive circuit followed by several cascade RF amplifiers. This was used most notably by the Sparks-Withington Co. (Sparton) but also by AC Dayton and in the, very rare, Atwater Kent Model 50.

The first Melco models used a 4 tube circuit but soon added an additional audio amplifier stage. The claim for the Telos coil is that it could enable high amplification at higher frequencies without oscillation. Under the Telos Radio brand, the Danziger-Jones Company offered kits to build your own outfit.

After Jones began to loose in court, apparently, to stay in business the kits became the only way to keep selling. Some of the kits have survived with engraved panels that say: "Sale if assembled prohibited." This seems to be similar to the strategy used by designers of superhetrodyne circuits to avoid infringement suits by RCA over the Armstrong superhet patents.

Radio Engineering for November

1924 has a complete write-up on how to assemble the five tube kit version.

The Telos coils are of a very unusual construction. The method of winding the coils results in minimal field leakage. The secondary coils are connected to a 'compensator' condenser. This device has two stators and one rotor. One side is used to neutralize the tube capacity at a given frequency, which would have the tendency to detune the circuit, so the other side adds enough capacity to keep the stage in tune.

It looks to me that, while the circuit would have worked pretty good compared to its contemporaries, there was a lot more labor involved in building these sets.

Alan Douglas has another radio using these Telos Coils. It is called the Flex-O-Dyne. One Charles G. Hall of New York advertised this set for about a year starting in December 1923.

A few years ago, Ted Miller acquired a chassis that appears to be identical to the front panel of the Flex-O-Dyne with the exception of having much larger Weston meters installed. However the engraving is completely different. The engraving proclaims "The Pantheon - Crystal Symphony" made by the KAYDEE Co. N.Y.C.

It is not known what the relationship between any of these companies might have been. However, you see the logo of the Melco Supreme change over three years. At times it

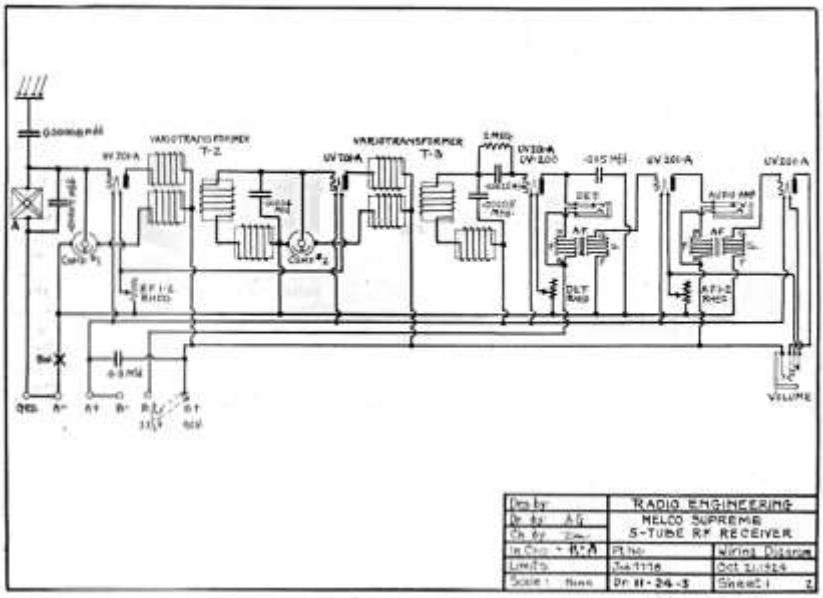


Fig. 2. Connections for the Melco set. Unit A is a variometer, while T-2 and T-3 are R. F. transformers in which the coupling and the secondary inductance are controlled simultaneously

has the word Acmedyne in smaller letters just above MELCO and sometimes the word Melco is bracketed with a smaller K & D... Like: <K MELCO D>.... Does that have anything to do with Kaydee Co.? --- Who knows at this point.

How clean is clean enough?

Late last year I realized that I had done nothing to my MELCO since I had purchased it from Ed Bell who, at the time, was selling some of Doc Muchow's collection.

Other than being dirty inside, missing a lot of white filling on the knob markings and having some cabinet glue joints that had broken loose; it was in pretty good shape.

So, how far to go in cleaning this up?

Since two cabinet joints had broken free, I decided to clean the joints out and re-glue them.

The cabinet was very dark and dull so I cleaned the surfaces with Go-Jo waterless hand cleaner. An amazing amount of coal soot came off and revealed an original finish that was not significantly damaged.

The way this set is built, it looks like it would be a real nightmare to take apart the chassis. However, it is only necessary to unsolder two connections. All the other connections are done with thumb nuts. Removing 20 or so nuts has the front panel components separated from the chassis. From there it was easy to remove each chassis part and clean it with Go-Jo.

I could have done more aggressive cleaning, but decided that only the thumb nuts could benefit by a quick zap in the ultrasonic cleaner.

Almost all the number lettering was gone on the three big tuning knobs but almost all other paint filling on the graduation marks and other knobs was OK. As it turns out, I had an old Elmers wood touch-up crayon of the exact color as the surviving filler lacquer. So I filled in the numbers. I elected not to fill the few missing graduation marks. This way, I think the set still looks more authentic.

P.S. If anyone has the Flex-O-Dyne or Crystal Symphony, Ted would like to have some detailed photos of the chassis and the cabinet. Any set called it the Pantheon (Temple of the Gods) Crystal Symphony deserves to be restored to its full glory.

(Continued on page 28)

OLD EQUIPMENT CONTEST 2008

At the CCAWA 'Spring Meet in the Carolinas'

by Robert Lozier

For the first time in years I was not able to participate in the judging for the contest because I was still working to clear buyers and sellers from the exceptional auction we had this year. Fortunately we always seem to have folks willing to help get things done just for the asking. This year Jeoff Bourne recorded the contest results for me and Barker Edwards, Louie Scribner, Don Patterson and Ernie Hite served as judges.

The number of contest entries seemed to be down this year. I was told that the auction prevented some folks from having enough time to bring in items for show. Hopefully that will not happen again. However, the overall quality of the items that were brought for exhibition remain very high. A true delight to the visitors.

This year we suggested a total of 24 categories for participants of which there were 6 categories with no entries. In some of these categories there was only one entry. Fortunately even these single entry categories had high quality items that would have fared well in contests with likely competition, so the judges frequently had no reservation in awarding a first or second place ribbon regardless of no 'on site' competition.

So I will now list the findings of the judges:

Categories:

1. Pre-1912 Electrical Devices, Non-Radio

No entries

2. Pre-1920 Receivers and Transmitters and Wire Line Telegraph Items.

1st—Don Patterson for his AMRAD SCR 74A Trench Spark Transmitter with extensive photographic documentation.

3. 1920's Era Broadcast Receivers

3a. Passive Detectors and 1 Tube Sets

1st- Merrill Bancroft for his AEREX crystal set with additional VT detector.

2nd— Merrill Bancroft for his A.W.Bowman one tube radio.

3b. 2-3 Tube Sets

1st—Merrill Bancroft for his TECLA receiver and two tube amplifier.

3c. 4-6 Tube Sets

1st—(tie) Bob Slagle for his Jones Symphony radio, and

1st— Gary Alley for his Elkay 5- S (Super-Selector)

2nd—tie to Merrill Bancroft for his FARAWAY radio, and

2nd-Robert Lozier for his MELCO Supreme

3rd-Barker Edwards for his Radiola Grand.

3d. Sets With 7 or More Tubes

No entries

4.1930's – 40's – 50's Era Broadcast Receivers

4a. Cathedrals & Tombstones

1st—Bob Slagle for his Revere 'dual level' tombstone set.

2nd-Tom Bourcy for his Crosley model 148

3rd—Fred Crews for his Philco 'Bing Crosby' (46-1201) radio/ phono

4b. Consoles

1st-Bob Slagle for his Crosley 'Johnny Smoker' mini-console.

1st-Louie Scribner for his SNR Excelsior 55 receiver.

4c. Catalin & Bakelite

2nd-Bob Slagle for his Trophy Baseball radio (with box!)

4d. Television Receivers

1st-Don Patterson with his Pilot 'Candid' 3" TV – working (with box also!)

5.Transistor Radios

5a. Large Multiband Portables

1st-Louie Scribner for his Sony CRF -320

2nd-Richard Owens for his Hallicrafters TW-1200

5b. Early Pocket Sets

No entries

5c. Novelties Sets

1st- First Place to Richard Crews for his Constellation globe radio.

6.Communications Equipment RX & TX

6a. Pre WW2

1st-John Dilks for his 1930 homebrew TX with power supply.

6b. Post WW2

1st-Herman Cone III for his SBE Model SB-36 transceiver

2nd—Richard Owens for his Hallicrafters S-41-W (yes white!)

7.Sound Reproducers, Cones & Horns

1st—Fred Crews for his Ambotone cone speaker

Special Recognition-Marty Reynolds for his Columbia 360 Stereo Phono with unique amplifier design.

8.Military Radio Equipment, Any Era

(In this case a transceiver used by the FBI's bureau of Alcohol & Tobacco Tax agency on raids of liquor stills, etc. (i.e. 'Revenooer's' radio.) Special thanks to Marty Reynolds thinking a little outside the box to bring this entry in for this category.

9.Test Equipment

No entries

10.Vacuum Tubes

1st- Robert Lozier for his 3 – 1920's vintage tubes that attempted to avoid basic triode patents.

2nd -Don Patterson for his Atwater Kent Type 607 cold cathode rectifier along with a vintage notice that the tube was to be

discontinued.

11.Radio Advertising and Radio Literature

1st -tie Imre Vanyi for his display of GE Radios, and

1st— Geoff Bourne for his collection of glass 'magic lantern' slides – all radio related.

2nd - Don Patterson for his extensive photo albums of radio pioneers and personalities.

3rd-tie Barker Edwards for his RCA & Victor advertising brochures, and

3rd Merrill Bancroft for his Cunningham Tubes cloth banner.

12.New construction from old parts or replicas.

No entries

13.'Survivor' Sets

1st-Robert Lozier for his PZT set from Poland via Australia.

2nd-Merrill Bancroft for his Campbell D and A2 radio outfit.

3rd-Ernie Hite for his Tungsram brand set made in England.

14. Special "Display Only"

Thanks to Bob Sands for bringing an exhibit that is part of the Gray Museum. The exhibit shows the Crosley Readio facsimile machine. A late 1930's attempt to deliver newspaper content to your home using facsimile signals sent out over AM stations after normal broadcast hours.

And to Barker Edwards for showing his DeForest F-5 receiver of 1925 vintage.

15.Superhetrodyne Radios

No entries

The judges award recognition for the following:

Best Restoration Award (with documentation of the work performed) to Tom Bourcy for his restoration of a Crosley model 148

Best Presentation Award to Imre Vanyi for his extensive display of GE Radio material in the lobby of the hotel. (Not only that but he also brought in a whole display of basic radio kits that you would have found in toy stores from the 1940's to 1960's. And, if that was not enough, he also had a collection of radio games, premiums, banks, etc. on exhibit.)

Personal note: One important thing that Imre was able to demonstrate in his exhibits, is that items do not have to be in pristine condition in order to put on a highly effective show. After all this is not an antiques and collectibles dealers show where items are treated primarily as commodities. One of our primary goals is to inform the public about the history of the artifacts we collect. Much of that is technical information, but Imre is especially good a showing the 'emotional/motivational' side of the industry. Well done!

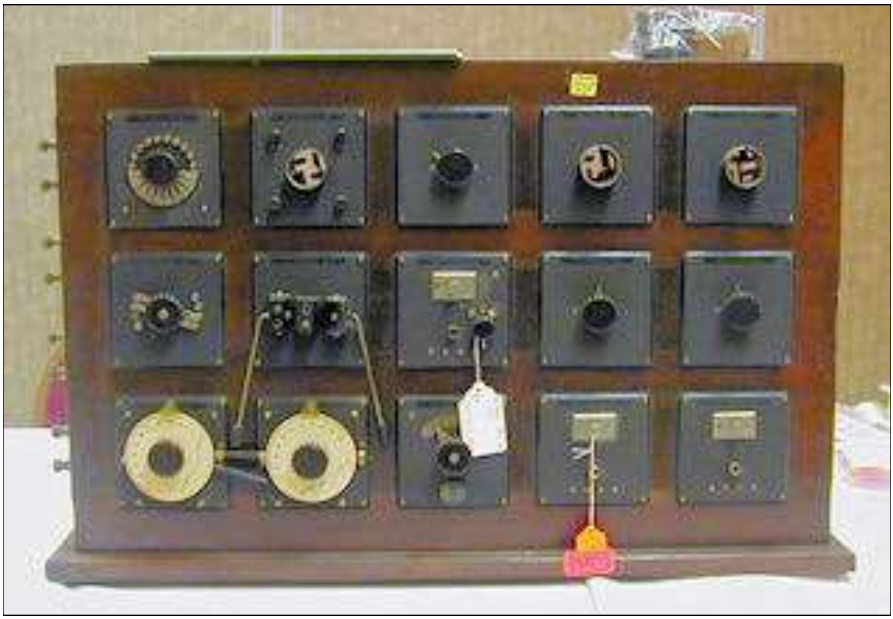
Peoples Choice–We had planned for conference attendees to have much more time to view the contest

entries but as most of you know, the auction ran far longer than normal. So there was no time to solicit a significant quantity of votes in order to award a Peoples Choice. Our plan is to resume this next year.

Best of Show Award by the judges went to a rather unusual exhibit this year. This was for Geoff Bourne's collection of some 200 vintage glass slides and vintage projector. The subject material of the slides range from 1920's vintage radio advertising slides shown in movie theaters, to slides to be used at radio manufacturer meetings and even to one of the oldest collections of antique wireless equipment assembled be Ed Raser in the 40's & 50's.

As always, I urge all of you to make available items you have collected by bringing it out to our vintage radio meets. Think about loaning your items out to local libraries and museums. Almost always you will have the opportunity to meet new people and spread the word that this sort of technological history is really worth preserving and knowing about for many generations to come.

DEFOREST 47-15 PANEL SET



This rare DeForest 47-15 panel set sold at the AWA Old Equipment auction for $15,500. It was one of nearly 400 items from the Tim Buehlmann estate that was sold Friday, March 21st.

FESSENDEN: WORLD'S FIRST BROADCASTER?

by James E. O'Neal

James E. O'Neal is the Technology Editor for TV Technology magazine and a Radio World contributor.

****

A Radio History Buff Finds That Evidence for the Famous Brant Rock Broadcast Is Lacking

Winter was just starting to make itself felt in New England. It was Dec. 24, a classic dark and stormy night along the Atlantic Seaboard. Radio room operators on ships were busy copying the endless, fuzzy dits and dahs of code from the big brute-force Marconi spark stations of the early 20th century.

Suddenly they heard something else under the code - faint, but definitely audible: a voice. Someone was talking! Listeners couldn't believe it. They hastily summoned relief operators to don headphones and called ship captains to the radio rooms to witness the event.

You may have read that 2006 marks the 100th anniversary of the first broadcast of speech and music. If we believe the Internet and history books, it happened something like the events described above.

But is the story true?

At Brant Rock, Professor Fessenden, a tall, 40-year-old man in business attire, pulled out his pocket watch and looked at it nervously. The appointed time was near. He stroked his beard.

Spread about him in the room were large machines of unusual construction, coils of wire, large condensers, a panel board, motors and a multitude of meters. Fessenden moved to a large knife switch dominating the control panel. He murmured a silent prayer and closed it.

The building lights dimmed as a large motor broke the silence and began to come up to speed. Fessenden looked intently at the motor and the assemblage of belts and pulleys attached to it.

The drive train concluded with a pulley on the shaft of a specially built alternator. The unusual machine connected to all of this picked up speed - 3,000, 5,000, 10,000 rpm. Fessenden felt the floor of the small building shake as the alternator climbed through its "critical" frequencies, smoothing out as it passed each. He assured himself the belts would hold and that the unit would make 20,000 rpm or more without flying apart.

Sometime during my high school or college years in the 1960s, I was told that inventor Reginald Aubrey Fessenden had, in 1906, assembled

a primitive AM radiotelephone transmitter and placed it on the air in the evening hours of Dec. 24 at his experimental communications station at Brant Rock, Mass. He transmitted music and speech on that occasion. Thus - the story went - he was the first ever to "broadcast."

Fessenden watched the array of meters and gauges, paying special attention to oil pressure and bearing temperature. This was a one-of-a-kind experimental machine; everything had to be monitored carefully. Finally the requisite speed was reached and everything seemed to be holding.

The professor looked at the indication on the large hot-wire RF ampmeter and double-checked the wavemeter.

It was time.

He stepped to the telephone-type carbon microphone, which was beginning to radiate heat from the amps of antenna current passing through it. He cleared his throat, leaning away from the mic. Then, in his best voice, he uttered a greeting to the world at large, informing anyone who could hear that he was Reginald Aubrey Fessenden and that this was to be a broadcast of speech and music.

He then started an Edison cylinder recording of Handel's "Largo." At the conclusion of the record, the professor opened a Bible and read scripture, describing the birth of Christ. There followed a moment of silence as he motioned his wife and a friend toward the microphone; but they backed away, suddenly frightened. Perhaps they felt the heat radiating from the mic; perhaps it was a case of nerves.

But the show had to go on. Fessenden pulled out his violin and played his next planned piece, "O Holy Night," while singing a chorus loudly enough to be heard over the violin. He then wished everyone a most happy Christmas and advised listeners that he would be transmitting again in one week, on New Year's Eve.

He moved slowly away from the microphone and pulled the knife switch, letting his machinery coast its way back to silence. The only sound that remained was of sleet pelting the building's windows. A faint smell of ozone mixed with hot machine oil filled the air.

Broadcasting had been born.

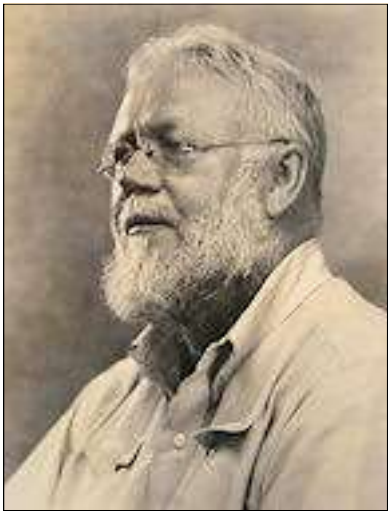
That's what the history books have proclaimed for decades. It is what I'd like to report as we near the 100th anniversary of that event, so dear to those of us in broadcasting.

Oh, if were it that simple.

Milestone

Earlier this year I was asked to prepare a story commemorating the anniversary. I started the project by reviewing written accounts of the historic event.

I immediately noticed the similarity of all such descriptions: the music



Reginald Aubrey Fessenden
Photo Credit: Archives Center, National Museum of American History, Smithsonian Institution

selected, the scripture reading, the first recorded case of "mic fright" and the invitation to listen for another such broadcast a week later. In some cases, the account was not attributed. Authors who did offer attribution cited a 1940 biography, "Fessenden: Builder of Tomorrows," penned by his widow Helen.

The events at Brant Rock, if they did occur, would have been a milestone in the history of mankind. In one evening, Fessenden apparently had staged the first radio broadcast and had become the first radio announcer, scriptwriter, disk jockey, program director, staff musician, studio engineer and chief engineer. It is a claim worth substantiating.

(We set aside here the question of whether "broadcasting" can include wired transmission. Today we accept the term to include people sitting in a CATV studio reaching consumers in a wired fashion; if so, Fessenden, De Forest, et. al. are out of the running by at least a decade, because concerts, news and other content were "broadcast" to significant groups of telephone subscribers in the 1880s and 1890s, especially in Europe.)

In the register of historic wireless broadcast events, Christmas Eve 1906 was important. There must be sources or records to corroborate it.

Quiet Accomplishment?

So I started digging.

I researched Boston and New York newspapers published during and after the last week of 1906. They yielded nothing. Susan Douglas, writing in her comprehensive history of early radio, "Inventing American Broadcasting 1899-1922," similarly concluded, "There is no record of Fessenden notifying the press, and the demonstration received no newspaper or magazine coverage."

However, the inventor could have had a reason for not inviting press or issuing news releases. My next step was to conduct a study of Fessenden and his business activities.

The professor, we find, was a supremely self-assured and temperamental individual. He was physically large and had an ego to match. His personality could be described as bombastic, type A,

arrogant, insulting and demanding in the extreme. He is said to have told one of his more important employees, several times, "Don't try to think, you don't have the brains for it."

This man is not likely to have hidden his accomplishments under a bushel; nor did he do so with other achievements.

Regardless of how he conducted himself in front of workers and business associates, there's little doubt Fessenden was intelligent and gifted. In his lifetime (1866-1932), he was issued hundreds of patents and laid the foundation for many things we take for granted or attribute to others. An example is the principle of the heterodyning of two signals. Fessenden not only set forth the principle, he coined the term "heterodyne." He received a patent for it in 1902.

Fessenden was born in Quebec and migrated to Bermuda at the age of 18 to begin a schoolteacher's career. After a couple of years, he realized that this was not his calling and came to the United States, eventually finding employment with none other than Thomas Edison. He rapidly worked his way through the Menlo Park ranks to the position of chief chemist. Fessenden also held a position as engineering professor at Purdue University in Indiana and what is now the University of Pittsburgh.

For a time he was employed by the U.S. Department of Agriculture's Weather Bureau. It was here that he initiated early experiments in radiotelephony. That job ended in a dispute with his boss over patent rights.

Sometime thereafter he went into partnership with two Pittsburgh businessmen to form the National Electric Signalling Company, NESCO. It constructed several wireless stations, with its main operations at Brant Rock and Machrihanish, Scotland. One objective was to provide reliable transatlantic wireless communication and possibly take business away from undersea cable telegraph services. Brant Rock also served as an experimental laboratory for Fessenden.

It was during his association with NESCO that he achieved one of his goals.

Fessenden did not accept the conventional wisdom that radio waves could be propagated only by "shocking" the ether via a spark discharge across an antenna; he theorized that a continuous or sine wave would be much more efficient and would allow the transmission of speech and music.

There were no vacuum tubes with which to create a continuous oscillation. Fessenden thought creatively and had constructed by General Electric a special high-frequency alternator that could operate substantially above power line frequencies. His first successful machine could operate at 80 kHz and produce a few hundred watts. Amplitude modulation was achieved simply by inserting a

carbon microphone in series with the antenna lead.

Through most of his career, Fessenden also was an inveterate writer. He discovered Scientific American early and delighted in submitting manuscripts and letters documenting his work. His submissions for publication became more numerous as he went along. He was a frequent contributor not only to Scientific American but to The Electrician, Electrical Review, Electrical World, Radio News, Science, and Transactions of the American Institute of Electrical Engineers. There are approximately 200 published works penned by Fessenden; these span radio and electrical engineering but also chemistry, mathematics, economics and history. He even wrote articles for the Christian Science Monitor.

No Records

If Fessenden was such a prolific writer and enjoyed "blowing his own horn," where are the printed reports of the Christmas Eve and New Year's Eve broadcasts of 1906? Even lacking contemporary press reports, there must be some corroborating evidence to back his story.

According to later accounts, Fessenden a few days before the event had transmitted via radiotelegraph a general call to make sure he had an audience. He wrote 25 years later: "This broadcast was advertised and notified three days in advance of Christmas, the word being telegraphed to the ships of the U.S. Navy and the United Fruit Co., which were equipped with our apparatus that we intended broadcasting speech, music and singing on Christmas Eve and New Year's Eve."

This should be relatively simple to check in the National Archives; but in response to my inquiry the staff reported they have no U.S. naval radio logs from 1906.

Note Fessenden's comment about "stations equipped with our apparatus." In 1906, not all wireless stations were equipped to demodulate AM radiotelephone signals. Just a few years before, the Branley "coherer" had been state of the art for detecting radio signals. This was a small tube filled with a loose mixture of fine metal particles. In the presence of RF, the particles clumped or "cohered," and the resistance of the device drastically decreased. This principle typically was used to close a relay and at the same time activate a "striker" to tap the tube so that clumped particles automatically would be loosened and ready to clump again when the next burst of RF came through. In short, the coherer was a "digital" device and could not demodulate AM.

The coherer was part of the "standard" Marconi wireless installation at that time, thus ruling out reception of Fessenden's radiotelephony at Marconi installations.

(Another available Marconi detector could detect AM: the magnetic detector, or "Maggie." However, it

was notable for its lack of sensitivity, so much so that stations had to be practically in line of sight with one another for the "Maggie" to respond.)

The ships Fessenden mentions were using his electrolytic detector, the "baretter," or a pirated version of it. This device could demodulate AM. Other wireless stations had this technology; Lee De Forest created his own version, the "spade" detector. He used it in De Forest wireless stations and sold it outright, in violation of Fessenden's patent. (An injunction against De Forest's actions ultimately led to his development of the first triode vacuum tube, the "audion.")

Fessenden accused the U.S. Navy of not only using the baretter without paying him royalties but also of manufacturing knock-off devices.

So we know that on Christmas Eve 1906, U.S. Navy vessels and United Fruit stations were equipped for AM reception; we know too that De Forest stations also could have received Fessenden's transmissions. However my search for logs for such operations was unproductive.

The Hart Log

In digging for radio logs from that period, I did study a fascinating document at the Smithsonian Institution. This is a journal or logbook kept for nearly three years by a Francis Hart. It begins on Sept. 6, 1906; the last entry was made on Oct. 3, 1909. Though not a widely known source, it has been mentioned by Susan Douglas and other historians.

Little is known about Hart; but we can deduce that he was an early wireless enthusiast and had a lot of time on his hands to "listen in." He could read code and knew quite a bit about radio. There's no indication he owned a transmitter, so he can't really be called a radio amateur or "ham." Today he would probably be termed an SWL or shortwave listener; in 1906 no one was using shortwaves. It was all 500 kilocycles and below then. Perhaps the best term that can be applied to Hart is DXer.

Hart lived at Sayville, N.Y., about 160 miles from Brant Rock. His journal is a valuable resource, perhaps the only surviving log of wireless activity conducted around the time of Fessenden's radiotelephone work.

The logbook begins with several pages of listings for all known ship and shore wireless stations and gives their two-letter call identifiers; there was no FCC or FRC to issue call signs then. Included are U.S. Navy vessels, De Forest wireless stations, Marconi stations and those of other early adopters of wireless communications, the Standard Oil Company and United Fruit. NESCO's Brant Rock station - identifier "BO" - and the Machrihanish, Scotland station - "LK" - are entered.

Almost every day during the period, Hart started a new entry with a rubber stamp date on the book's sewn-in pages. Most entries are in

the form of the identifiers of the commercial stations he hears working each other. Occasionally the identifiers are interspersed with comments about static, radio propagation, the weather and anything timely or unusual that he hears.

It was a strange feeling, wearing the required white gloves and carefully turning through pages that Hart innocently constructed but which have become an interesting and important firsthand look at early radio history.

Nothing There

Hart was listening on Christmas Eve. There are two entries for Dec. 24, 1906. Both are made without commentary. Neither bears the BO identifier.

Ditto the Dec. 31, 1906 entry. He overheard more stations on that New Year's Eve, but they did not include Brant Rock.

As noted, Fessenden's later account of 1906 mentions that he had gone on the air with a "general call" radiotelegraph message three days before Christmas to advise radio operators to be sure to "tune in" BO on Christmas Eve for a program of music and speech. Hart's entries for Dec. 20-24 make no mention of this event either.

Hart could have been guilty of napping, having a meal or perhaps going to the bathroom when Fessenden sent his message. However, if Fessenden had made such a transmission, those who did hear it would, for some time thereafter, have been involved in a general discussion of the message and passing it on to other radio operators. In light of this, it's difficult to believe that Hart could have completely missed hearing not only about the broadcast but about Fessenden's promo.

It's reasonable to assume not everyone with a radio receiver heard the Christmas Eve broadcast. However, what a hot topic it would have been to those who did. It's inconceivable that listeners would remain silent about having been "ear witnesses" to such an event. Yet the Christmas Day entries in Hart's log do not document this. There's nothing out of the ordinary logged from Dec. 25 until well into 1907.

If Fessenden had transmitted special programs of music and speech on Christmas Eve or New Year's Eve, these events would have sparked a tremendously large "buzz" for days thereafter among the community of land and sea radio operators.

Bullet Points

But what is truly remarkable about the 1906 story is this: Not only is there no mention in the press at the time; there is also apparently no mention of it for the next 26 years.

Fessenden ended his career with NESCO in 1910 under conditions that were less than ideal. He continued to conduct research, write and invent until his death. In the 1920s we find several written accounts of a "first broadcast" from

Brant Rock. But none give the date as 1906; nor is Christmas Eve mentioned.

In 1924, Fessenden was asked by the editor of Radio News magazine, Hugo Gernsback, to write an autobiographical series of articles. The series was titled "The Inventions of Reginald A. Fessenden." It is not an easy read. It begins in January of 1925 with Fessenden discussing the philosophy of invention. With the article, the magazine published what we would call a box of bullet points. These numbered items list the inventions that Fessenden felt were his most important.

The fifth bullet is the entry "Wavechute" - what we know today as a counterpoise or ground plane - and "broadcasting of speech and music - 1907."

Nowhere in this article or in the series of articles is there any mention of Christmas Eve or New Year's Eve broadcasts. Fessenden gives the date as 1907; his "broadcasting" apparently was not done until then.

De Forest

Concurrent with the Fessenden articles, Gernsback also printed a series of biographical articles on Lee De Forest. In the June 1925 issue, the De Forest article states: "But the short transmission of music from the Telharmonium over four blocks to the towers of the Times building remains the first actual broadcasting incorporating the present connotation of the word ever successfully carried out." (Italics from the original manuscript.)

The Telharmonium was a sort of forerunner to the Hammond organ. It was a musical, mechanical invention by the Cahill brothers, constructed of a number of AC generators, operating at differing frequencies, with outputs selected by a piano-type keyboard. The Cahills had wanted to connect the device to the telephone system and broadcast concerts to subscribers. The phone company was much opposed to any sort of "alien" connection to company lines (no Carterphone Decision yet), and would not grant permission.

The brothers heard about De Forest's success in transmitting music and speech with an "arcphone" type of transmitter early in 1907 and solicited his helping in distributing their musical interludes around the New York City area.

De Forest, in his 1950 autobiography "Father of Radio," says that in late 1906 he designed his "first crude carbon arc transmitter."

"I recall that it was on the last day of that year that (John V.L.) Hogan picked up in the Audion and telephone receiver across the room the first words spoken into a microphone connected to my arc transmitter, then fed from a 220-volt direct-current source. All my radiotelephone work up to 1923 employed this transmitter."

De Forest states that in February of 1907, he was broadcasting with his new transmitter "for the benefit of any wireless operators who might hear it, asking such listeners to

telephone my laboratory in the Parker Building." He also set up a similar transmitter in the office of the Cahill Telharmonium Co. at Broadway and 45th Street and fed it from the musical instrument located there.

De Forest reported that he was getting reception reports from "sundry wireless men." One of these was George Davis, chief electrician at the Brooklyn Navy Yard. De Forest said Davis was called in by one of the wireless operators there to put on headphones and listen to the speech and music being received, because "the operator was of the opinion that he had had a little too much beer at the corner and wished to have himself reassured."

Davis heard the same thing and called De Forest's studio. He asked, "Am I drunk or crazy, or are you sending out some talk and music over that wireless of yours?" Davis later became a board member of the Radio Corporation of America.

De Forest proclaims in the 1925 Radio News article that he originated the world's first broadcast of speech and music.

Of course, inventors often dispute who was first. As the Fessenden and De Forest articles span multiple issues of Radio News, we may assume Fessenden would have seen the De Forest claim and taken it to task in the form of a letter to the editor. But Fessenden never rebuts De Forest's claim to priority in any of the subsequent issues.

The Navy Yard was not the only place where De Forest radiotelephone transmissions were being received. Francis Hart was hearing them too and made the following entry in his log on March 20, 1907.

"Music at 5:27 from de Forest's - good 3rd time."

This is the first indication in Hart's log of the reception of any speech or music. On May 9 of that year he wrote:

"De Forest's blooming telephony buzz raised the deuce with the L.W. & everything else."

LW was the identifier of the Navy ship the Washington.

Unlike Fessenden's purported broadcast, the De Forest radio broadcasts were noted in the press. The New York Tribune reported on May 15, 1907, "There is music in the air about the roof of the Hotel Normandy these days. A good deal of it is being collected by Lee de Forest's wireless telephone, ready for distribution to possible purchasers."

Hart doesn't report hearing Fessenden's radiotelephone transmissions until early in 1908. On Feb. 11 that year, he logged:

"Wireless phone at Jamaica & other must be at Brant Rock, Mass. - phone very clear except for a rasping noise that mingles with the voice & is hard to (?). I managed to get the following & could probably have obtained more, except for `q'

and etc.:

`How's that now'

`Open up a little more.'

`You came in louder than yesterday'

"Could hear music as plain as voice from weaker station but couldn't make out words from other station although they came in fair.

`Go ahead now for 5 mins.'

`We're all right if you will only, go ahead now.'"

The evidence presented by the Hart log indicates that while he could - and indeed did - hear Fessenden transmitting speech and music, he did not hear any such transmissions on Christmas Eve or New Year's Eve, 1906.

Newspaper Clippings

There is a voluminous collection of Fessenden material in the North Carolina State Archives: letters, memos, photographs and magazine and newspaper clippings. I sampled that collection. Three newspaper clippings that were part of the Fessenden estate bear special notice.

The first clipping is dated Aug. 7, 1924 and appeared in the Long Island Daily Press. It is in the form of a letter to editor. A David Hardenbrook in Jamaica, N.Y., wrote on Aug. 5 in response to an article published the previous day regarding the first radio broadcast.

He states that the credit is generally given "to Reginald A. Fessenden, the eminent scientist and inventor of more radio patents which are in use than any other inventor." He continues, "Also, Jamaica will go down in history for the first long distance broadcasting from Brant Rock, Mass. in 1907, by Dr. Fessenden."

Reader Hardenbrook says he found a book in the Jamaica library by a Dr. Goldsmith, "Radio Telephony," that states that "broadcasting was performed as far as Jamaica, where a mast of 180 feet high was used."

Hardenbrook went on to say he had learned that Fessenden lived in Boston and went to see him. The visitor apparently was treated cordially and noted that Fessenden was working on a new invention called the pherescope, Fessenden's term for a television. The visitor spent enough time with Fessenden to be fully briefed on Fessenden's life history and major accomplishments.

Hardenbrook concludes his letter with a mention of John V. L. Hogan, another early wireless pioneer, who had worked as a boy for De Forest. Hardenbrook wrote that in a book compiled by Ehrick Hausmann, Hogan gave Fessenden credit for broadcasting speech and music to Jamaica, N.Y., in 1907.

If a broadcast did take place in 1906, Fessenden apparently did not inform Hardenbrook during his visit. There is no follow-up to Hardenbrook's letter to set the matter straight.

Along with the Long Island Daily Press clipping is a front-page story clipping from the Fergus (Canada) News-Record of April 29, 1926, titled "Great Inventor Spent Boyhood In Fergus." This story about Fessenden is one of the "local boy makes good" genre and notes that Fessenden had made 300 inventions including the wireless telephone, the "heterodyne principal" (sic), relay wireless and "the first broadcasting in 1907."

The material in this article all appears to have been supplied by Fessenden. There is no follow-up "letter to the editor" in the files indicating a correction of the date by Fessenden.

A third clipping in the Fessenden collection is from the Nov. 6, 1927 Boston Sunday Globe. The story is the feature article in the radio section of the newspaper and puts Fessenden front and center, with a picture of him at his Chestnut Hills home near Boston. He is shown with one of his latest inventions, "the talking violin."

The article states that "Few people, however, realize that another man, also of Yankee descent, invented a wireless telephone and that his broadcasting station - first in the world - was at Brant Rock, near Marshfield." The article continues, "Twenty years have passed since the station was erected at Brant Rock." Give that article was published in 1927, that also would put Fessenden's radiotelephone work in 1907, not 1906.

Based on Fessenden's Radio News article and these newspaper clippings, a strong case is made for 1907 as the date for his first attempts at broadcasting. Neither Christmas Eve nor New Year's Eve are mentioned.

So when does 1906 enter the picture?

The 1932 Letter

It appears the legendary date stems from a letter written by Fessenden from his home in Bermuda in 1932, about five months before his death. The letter is dated Jan. 29, 1932 and is in the Smithsonian's Clark Collection.

It was addressed to S.M. Kintner, a former associate of his, then vice president of the Westinghouse Electric and Mfg. Co. In it, Fessenden discusses several of his inventions before going into detail his broadcasting activities. This is apparently in response to a question asked earlier by Kintner.

Fessenden first refers to a demonstration of the transmission of speech and music in a "program given to Dr. Kennelly, Prof. Elihu Thompson, the engineers of Western Electric and A.T. &T. and other companies, and the editors of several of the New York papers."

Although Fessenden does not mention a date, this is an obvious reference to a public demonstration of radiotelephony conducted on Dec. 21, 1906 between Brant Rock and another NESCO station in Plymouth, Mass.

Indeed, this could well qualify as the first broadcast of speech and music; however, it was intended only to demonstrate the capabilities of Fessenden's apparatus to an invited audience. Fessenden addresses this in his letter to Kintner by stating, "By broadcasting I suppose that you do not mean the transmission of speech, music and singing to other stations of the same firm which is sending but to receiving stations operated by other firms than the sending station, and also programs advertised or notified in advance." He makes the distinction between a technical demonstration and an actual attempt at reaching the "masses" via the airwaves. Fessenden continues: "If, however, you do not call this a broadcast, then the program sent out Christmas Eve and New Year's Eve, 1906 would be the first broadcast. This broadcast was advertised and notified three days in advance of Christmas, the word being telegraphed to the ships of the U.S. Navy and the United Fruit Co., which were equipped with our apparatus that we intended broadcasting speech, music and singing on Christmas Eve and New Year's Eve.

"The program on Christmas Eve was as follows," he went on. "First a short speech by me saying what we were going to do, then some phonograph music. You will find a photograph showing the phonograph used in the article in the Transactions of the American Institute above referenced to and also in the American Telephone Journal, the music on the phonograph being Handel's `Largo.' Then came a violin solo by me, being a composition by Gounod called `O, Holy Night,' and ending up with the words `Adore and be still' which I sang one verse of, in addition to playing the violin, though the singing, of course was not very good. Then came the Bible text, `Glory to God in the highest and on earth peace to men of good will,' and we finally wound up by wishing them a Merry Christmas and then saying that we proposed to broadcast again New Year's Eve."

Fessenden goes on to say that the New Year's Eve broadcast was similar to the Christmas Eve transmission, with different music and someone else singing. He concludes the letter with mention of reception of the Christmas Eve program from as far away as Norfolk, Va., and from "some places down in the West Indies" for the New Year's Eve broadcast. Fessenden invites Kintner to "check the logs of U.S. war vessels and United Fruit vessels."

The account and dates given in this letter are extracted by Helen Fessenden and appear, lightly edited, in Chapter 15 of her 1940 biography of her late husband.

It would appear that the Kintner letter is the origin of the 1906 Christmas Eve broadcast story. Nothing appears in the press or in Fessenden papers I've examined that mention this broadcast prior to January of 1932.

Fessenden's health had begun to fail by this time, which could cast doubt on the veracity of his statements.

(Interesting too is his comment on "a composition by Gounod called `O Holy Night.'" That work was not composed by Gounod. The music was by Adolphe C. Adam and the words supplied by Placide Cappeau; the translation to English was by John S. Dwight. Gounod is known for his "Ave Maria." Why this discrepancy has not been questioned by Fessenden biographers is unclear.)

Meanwhile, October of 1931 saw the launch of Broadcasting magazine, today's Broadcasting & Cable. December of that year would have been the 25th anniversary of the Fessenden broadcast; we'd expect a publication dedicated to broadcasting news to note the event. There were two issues published in December; neither contains mention of the 25th anniversary of broadcasting or of Fessenden. The second issue does contain a fairly long article about Marconi.

A search of other radio-related magazines from December 1931 fails to turn up any mention of a 25th anniversary commemoration.

Pioneer Debate

Is there anything that might strengthen Fessenden's "deathbed" claim?

In the Smithsonian's George H. Clark Collection is a memorandum written by Clark that captures opinions from John V. L. Hogan, H.E. Hallborg and Authur Van Dyck, all radio pioneers, as to what methodology was used and what year the Fessenden Christmas Eve and New Year's Eve broadcasts took place. The memo is dated Dec. 16, 1936.

Van Dyck thought Fessenden had used "multiple arc" and a water-cooled microphone. He adds that it was possible an alternator had been used. No date is given.

Hogan is certain that an alternator was used and "the date might have been 1906."

Hallborg expresses his certainty that an alternator was used along with a water-cooled microphone and that the date was 1906.

Clark sums up the issue by saying, "Thus it is well assured that it was an alternator; also that it was a water-cooled microphone that was used. The date 1906 is confirmed by my records, but must be finally checked" (my emphasis).

There is no indication that Clark managed to verify the date to satisfaction.

Dec. 21 Demonstration

There is another angle in this story that may shed some light.

NESCO was formed as a money-making organization with an eye toward establishing a transatlantic communication service. Fessenden served as its chief scientist and manager while two Pittsburgh businessmen bankrolled the operation.

Early in its existence, Fessenden erected two nearly identical radiotelegraph facilities, those at Brant Rock and Machrihanish. Each was equipped with spark wireless transmitters and each had an identical 420-foot vertical antenna - the first insulated-base, series-fed vertical radiators.

Construction was finished in 1906 and testing commenced. Things were looking good until a windstorm toppled the Machrihanish antenna on Dec. 6. This apparently was the result of failure to follow procedures in attaching guy lines.

The Machrihanish facility was never rebuilt.

The collapse of the antenna, occurring as it did in the first week of December, must have played heavily on Fessenden. The demise of the Scotland station changed the business model of NESCO and it was up to Fessenden to devise another plan to keep the company in business. (He earlier had made a case to his business partners to try to market equipment, but that proposal did not tempt them.)

Fessenden had been touting his radiotelephony as an adjunct to wired telephone service and on Dec. 11, he issued his invitation to engineering heads from Bell, Western Electric and others to attend a demonstration on Dec. 21 of his system of radiotelephony.

This demonstration did take place and was well documented by Fessenden, unlike the supposed Christmas Eve event. His first reporting appears in the Jan. 19, 1907 Scientific American. He mentions some of the dignitaries present, describes the equipment, references his past work in radiotelephony and describes the transmission of both speech and phonograph records.

The Christmas Eve event would have taken place just days after the demo. But Fessenden does not report it.

He writes again about his work in 1908 for the American Institute of Electrical Engineers. This report was published again that year in the Annual Report of the Board of Regents of The Smithsonian Institution. This is a comprehensive description of virtually everything Fessenden had accomplished along the lines of wireless telephony, includes many pictures and spans more than 30 pages of text.

There is not one word about the Christmas Eve and New Year's "broadcasts."

What Happened?

At this point, all surviving evidence points to the conclusion that Fessenden's 1906 Christmas Eve broadcast did not happen.

I really wanted to believe that Fessenden did what was claimed. Given the resources available to him in terms of an operational high-frequency alternator, methodology for AM modulation technology and an antenna system, he certainly could have done the broadcast. His

Dec. 21, 1906 demonstrations proved that he could transmit speech and music. However, all evidence points to the Christmas Eve event as being a contrived story.

Fessenden was no "shrinking violet." He was proud of his accomplishments, almost continuously writing about them for publication. He loved to blow his own horn.

Had he made these seminal and historical transmissions, he would have made sure the world knew about them in detail, at the time they happened. He would not have waited a quarter of a century, and only months before he died, to do so.

Now we enter into conjecture. Is it possible that in the last months of his life, Fessenden recalled the Dec. 21, 1906 demonstration of his system, unintentionally spread it into Christmas Eve and embellished it "just a bit?" This time Fessenden was not writing a letter to a magazine or newspaper editor. It was his assumption that only Kintner would read it. He could have had no idea that eight years later, his wife would reproduce a copy he retained and that this would be the basis for a wonderful tale about the first chapter in broadcasting. Or perhaps he wasn't concerned with the history books and what he revealed to Kintner was the product of a tired body and mind. Or our speculation may be wrong and some other explanation can be found for the utter lack of contemporary documentation to justify Fessenden's claim to history.

Conclusion

Let us summarize our reasons to doubt:

No press reports at the time, or for a quarter-century after. No mention for decades by an inventor who knew how to promote himself and wrote hundreds of articles about his work. No mention in a contemporary log and no known logs elsewhere, whether official naval logs or otherwise. No commemorations 25 years later. No challenge to De Forest's published competing claim. No followup to Clark's finding that the year needed to be verified; no consensus as to the date among the group cited by Clark. No mention of 1906 once the year 1907 began to be cited.

Any one of these objections can be explained away. Taken together, they form a powerful counterargument.

The question of the year also might be considered a minor discrepancy except that the evidence seems to point to De Forest being first with what we would consider broadcasts in the spring of 1907.

Fessenden was a great man. It is not my desire to discredit his many accomplishments. However, it appears his claim to this particular historic "first" hangs on a single letter penned late in his life, which laid out a story that has been parroted many times since. This should not guarantee automatic entrance into the "broadcasting hall of fame" and the title of world's first broadcaster.

Perhaps somewhere out there, locked in a trunk, is a diary kept by Fessenden or one of his associates. Perhaps the Brant Rock station log survives in a second-hand bookstore. I leave it to future historians to find such evidence and prove me wrong.

The author acknowledges the assistance of Elliot Sivowitch, Smithsonian Institution curator (retired); Hal Wallace, Smithsonian Institution curator; Jane Johnson, librarian, Charlotte (N.C.) Public Library; Jim Haynes, retired engineer and educator, and his wife Pamela O'Neal, who worked with him in plowing through Fessenden files and writings. He also thanks the staff members of the Smithsonian's Archives Center and the North Carolina State Archives.

This article was found on the web page of Radio World and is reprinted here with permission from the editor Paul McLane. Thank you Radio World for letting us reprint the story.

Mr. O'Neal has written a follow-up article to his original article *Fessenden: World's First Broadcaster?* which should appear in the next on-line issue of Radio World. Please visit the Radio World web site at—

http://www.rwonline.com/

to read this next installment of the story.

TINKERIN' TIPS

By Fred Crews

A Gimmick?

Many radio guys may not have heard of a device called the "gimmick". They were not often used in the old tube radios, but when used served a purpose. The gimmick was really something of a capacitor. They were used to give capacitive coupling in the RF circuits of some sets. An AC/DC superhetrodyne radio that I worked on had a very obvious one. It was used to couple the oscillator frequency of the radio to the incoming received signal and the output result was the intermediate frequency. The tuning capacitor was a 2 section one with the oscillator section physically smaller than the RF section. On top of the RF section was a wire going to the grid cap of the first tube. Closely wrapped around that wire was another insulated wire of 6 to 8 turns. One end was loose and the other was connected to the oscillator tuning capacitor.

Some designers actually wrapped a length of wire into a coil and they were not noticeable, but one end was soldered to another circuit, and the other end was open.

In other cases two wires had one end soldered to a circuit and these were then twisted together to provide a coupling capacitor of sorts. I found one radio that had one end of a wire connected to the antenna terminal and another wire

with one end connected to the antenna transformer. I have read that some designers have said these techniques tend to give more uniform gain over the radio's tuning range.

Thus the gimmick.

BUEHLMANN AUCTION RESULTS

1/4 KW buzzer spark set _____ 40
1/4 KW spark set _____ 175
1/4 KW Spark Transmitter Replica 100
101-F and 102-F _____ 80
135-Lot Number No Description ___ 40
150-patterson all wave rx_____ 160
156 - National 1-10 - no coils _____ 30
1848 Telegraph Book - fair cond __ 100
190-national 12" speaker _____ 10
199 to UX adaptors_____ 2
1ea C202,UV202 _____ 60
1ea UV200,UV210A BBTT _____ 30
1ea UV201A,UX200 _____ 10
2 ARC-5's w/ homebrew base_____ 20
2 VT2 tubes_____ 130
203 BBT _____ 20
203 no base_____ 5
203 Rainbow_____ 130
203 Rainbow_____ 75
203A _____ 60
203-A_____ 50
203-A_____ 30
203-A GF _____ 20
203-A QTY 2 _____ 70
203-A QTY 4 _____ 150
203-A SYL _____ 35
203-D _____ 25
204-A with Stand_____ 40
211 Tube_____ 90
211-E _____ 5
216A _____ 50
242-A WE Rainbow _____ 180
3 HRO coils .48-.96, 180-430kc, .5-1.0 _____ 35
3 HRO coils in box, 7.0-14.4,.9-2.05,1.7-4.0_____ 15
3 pcs wd/wx12 _____ 15
3 pin transmitting type _____ 70
3 sets headphones _____ 30
3pin transmitting types_____ 100
4 odd tube adaptors _____ 5
4 vt24 aka 864_____ 50
5 Watt Hartley TX - new construction 50
6 misc tube adaptors_____ 5
67- Slide Tuner _____ 30
8 HRO coils in box _____ 130
80-National SRR _____ 125
838 _____ 20
A P Morgan 1917 Lessons in Telegraphy _____ 10
A.P.Morgan 1922 Wireless Telegraphy 5
Adams-Morgan catalog 1916 _____ 20
Aerophone xtal set_____ 350
AK - Type "Y" poser supply _____ 55
AK 44 Model 3945_____ 500
AK Model 10 bb - Type 4600_ 1,000.00
AK model 246 - poor cabinet_____ 200
AK Radiodyne no tubes _____ 1,400.00
ARC-5 set_____ 300
ARRL 1926 handbook _____ 5
ARRL Handbook 1926 - rough_____ 30
ARRL Handbook 1930 _____ 25
ARRL Handbook 1931 _____ 30
ARRL handbook 1932 _____ 30
ARRL Handbook 1933 _____ 35
ARRL Handbook 1941 _____ 5
ARRL Handbook Special Edition ___15
ARRL Handbook Special Edition ___ 7
Arvin metal cabinet set_____ 30
Audion OF Bent Plate_____ 350
Audiotron OF _____ 70
Audiotron OF _____ 30
BBT 203-A _____ 20
BC-224 _____ 50
BC-312N receiver - no case _____ 30
BC-314-6 _____ 50
BC-342- N _____ 50
BC-342-N w/ tube kit_____ 70
BC-348 Type plugs (rare) _____ 30
BC-348-J _____160
BC-348Q _____ 70
BC-778 Mae West lifeboat TX _____ 50
Bladwin Type C headphones _____ 40
Book lot 4 books/magazines _____ 10
Box 5 HRO coils - gray box _____ 60
Box large knobs_____ 25
Breting 12 - missing 4 tubes _____150
Breting 12 - poor condition _____ 200
Breting 9 - looks good _____ 200
Bud Code oscillator _____ 5
Bud Codemaster Oscillator _____ 10
CG 1141 _____ 20
CG 1162 tube OF _____ 5
Clapp-Eastham 1/2 KW spark set_____ _____ 4,500.00
Cleartron CT-199 NIB _____ 50
Codemaster Type K _____ 5
coilset Type F 1.7-4.0,7.0-14.4,14-30,3.5-7.3 _____ 60
Collins 7M audio amp - fair _____ 70
Crosley model 51 _____ 110

CTX 120 _____ 15
Cunningham Audiotron GF _____ 70
Cunningham C0301A BBT_____ 60
Cunningham V-99 Qty 3 NIB_____ 30
Cunninghanm Audiotron Qty 2 ___ 70
DeForest & Airline 01A - DV-2's ___ 70
DeForest 47-15 panel set ___ 15,500.00
DeForest Audio Mount? _____ 110
DeForest coil set _____ 30
DeForest DL-14 in can _____ 80
DeForest DL-14 in can _____ 80
DeForest DL-15 GF _____ 80
DeForest DL-15 GF _____ 90
DeForest DL-3 & Audion tube OF__ 10
DeForest DV-3 & late Audion_____ 40
DeForest DV-3 can_____ 15
DeForest DV-3 in can GF _____ 60
DeForest late Audions OF Qty 3 ___ 20
DeForest Oscillion 250W _____ 70
DeForest Oscillion 250W _____ 300
DeForest Oscillion 250W _____ 200
DeForest Singer tube glass broken _ 80
DeForest spherical Audion GF 1,500.00
DeForest spherical Audion GF 1,500.00
DeForest spherical Audion GF 1,400.00
DeForest spherical Audion GF Inbox__ _____ 900
DeForest spherical Audion GF Inbox__ _____1,600.00
DeForest spherical Audion OF Plate Bent_____ 225
DeForest Type H _____ 175
Dorron Brothers Tuner_____ 400
Duovac VT-2_____ 35
Duovac VT-2_____ 50
Duovac VT-2_____ 60
Elcon B rectifier in can _____ 5
Electrad Diode OF _____ 30
Emerson AM set _____ 80
Emerson AM Set 1 knob missing __ 15
English 3 tube set_____ 400
Exp UV 202 BBT _____ 70
Experimental 202 GF _____ 70
FAA R27 & Coils _____ 30
Farnsworth BC-312-n _____ 30
Federal DX-58 w/ Fed. Catalog __ 700
Federal JR _____ 300
Ferrand Speaker _____ 30
Freq. Meter brand unknown _____ 15
GE AC/DC portable _____ 20
GE CG1162 _____ 25
GE GC 886 _____ 5
GE UV-203 GF _____ 80
GenRad Qty 4 NOS dials _____ 5
Gross 4-coils for TX_____ 20
Hallicrafters - HT-7 freq std. _____10
Hallicrafters Freq. Std._____10
Ham Call Book 1931_____ 45
Hammarlund coils bag of 20 _____ 40
Hammarlund Comet Pro w/coils __ 175
Hammarlund HQ-120 no bottom__ 50
Hammerlund Super Pro w/PS____100
HESSE - Full wave rectifier_____ 2
Homebrew regen - good _____ 25
Homebrew TX in desktop rack ___550
HomeBrew XMTRT PWR Supply__ 60
Homebrew? 1920 crystal set _____ 60
HRO & set of 3 ciols_____100
HRO & SKR _____ 70
IBM Radiotype missing innards ___ 2
Ideezet 221_____ 500
IRE Vol 1 Part 1 1913 _____ 30
j-51 key _____ 5
Jensen speaker _____10
jensen speaker _____15
Jensen speaker for communication RX _____ 20
JJ Duck catalog 1909_____ 80
JJ Duck catalog 1911 _____140
Kennedy 110 & 525 Amp. ___ 1,300.00
Kenotron UV 211_____150
Kenotron UV211 _____ 90
lab dpdt switch _____ 1
Leutz C-7 schematic set _____10
Loose coupler for xtal set _____ 70
Lot of Taylor Tubes _____ 30
Lot tubes _____ 30
Magnatron EV111 _____ 30
Mallory battery eliminator _____ 5
MARCO - Qty 4 dials _____10
Marconi WW-I code records _____ 20
Mazda carbon lamp _____ 1
McMurdo-Silver Model 5C _____275
Meissner Signal Booster_____ 30
Meissner Signal shifter_____ 40
Meissner Signal Spotter _____ 20
MESCO catalog 1912 _____ 50
MESCO key _____10
Millen grid dip meter - complete __ 30
Misc - T-17 & R-38 mics. _____15
Misc & RCA microphones box lot_ 350
Misc books _____ 25
Moorhead A OF _____10
Moorhead ER OF _____10
Moorhead ER OF _____10
Moorhead VT-32_____ 70

Moorhead/Marconi/DeForest ____ 80
Moorhead/Marconi/DeForest OF__ 20
Morhead/Marconi/DeForest OF___ 10
National - 3 coils 1.4-3.0,3.5-7.3,3.5-7.3
_____ +15
National - 5 coils in black case ____ 70
National - Speaker GC_____ 60
National 1" scope _____ 80
National 12" Speaker _____ 70
National 3" oscilloscope _____ 20
national 58 _____ 50
National HRO & 3 coils _____ 80
National HRO & spkr _____ 125
National HRO & Spkr _____ 120
National HRO 5TA1 & 4 coils ____ 100
National HRO 7 w/ spkr & PS in Bud cab 100
National HRO early, converted octal tubes _____ 10
National HRO speaker _____ 50
National HRO-7 & coil set _____ 120
National NC-100 _____ 50
National NC-100 _____ 50
National NC-101 _____ 90
National power supply _____ 30
National Qty 2 dials _____ 10
National Qty 3 Velvet dials _____ 30
National Qty 7 matching dials ____ 20
National RAO-7 _____ 30
National RAS3 , coils & PS_____ 50
National receiver & 3 coils_____ 100
National SW-3 - Qty 12 coils _____ 40
National SW-3 w/ coil set _____ 225
National SW-5 _____ 150
National Tupe 5886 PS _____ 100
National Type 5836 PS _____ 80
National Type 5886 PS _____ 50
National Type 5897 PS _____ 60
National Type 5897 PS _____ 50
National Type 697 PS _____ 100
National Type 697 PS _____ 80
National Union 203A _____ 50
Nationl - RAS PS _____ 20
Natnl. Coil set 14-30, _____ 60
Natnl. Coils .9-2.0,.9-2.05,1.7-4.0 __ 10
NESCO like Navy SE 1420C_____ 800
new wd-11 tube bases qty 7 _____ 30
Omnigraph - fair _____ 30
Peak Pre-selector W-3 coils _____ 110
Peak SW receiver w/2 coil _____ 80
peanut tube to ux adaptor qty 3 ___ 10
Peerless Speaker _____ 25
Peerless Speaker - fair_____ 30
Philco-46-200 w/ history on bottom 20
Phono Book - Qty 2 _____15
Pilot 30's parts set - no spkr _____15
Pilotron PR 10 _____ 10
pliotron type P _____ 180
Pliotron UV 125_____ 40
PM speaker in Bud cabinet _____ 10
Power Supply _____ 5
Precision tube tester _____ 60
Precision tube tester - Good _____ 20
Precision Tube tester - nice _____ 40
Qty 2 01A NOS _____ 35
QTY 2 203-A _____ 70
QTY 2 Daven MU-20 _____ 10
Qty 2 UV 202 _____ 40
Qty 2 UV 202 BB_____110
QTY 2 UX-216B _____ 70
QTY 2 VT 2_____ 100
QTY 2 VT2 _____ 20
Qty 2 WD 11 NOS _____ 70
Qty 2 WD11 _____ 70
Qty 2 WD11 NOS_____ 60
qty 2-j-38 keys nib_____ 40
qty 3 199 to ux adaptors _____ 5
Qty 3 UV 199 _____ 30
Qty 3 VT-1 _____ 80
Qty 3 VT-1's GF _____ 100
QTY 3 VT2 _____275
Qty 4 Catalogs_____15
QTY 4 VT-14_____ 50
QTY 4 WD-11 tubes _____140
QTY 6 800/RK30 _____ 10
QTY 6 UV 200 BBTT _____ 70
QTY 2 UX 200-A _____ 20
Radio Products Midget Set extra tubes _____275
Radiotron 852 GF _____ 30
Radiotron 860 _____ 20
Radiotron 860 GF _____ 20
RAS Power Supply & 2 Coils _____ 40
raytheon 3 pcs type bh _____ 3
RCA 100A Speaker _____ 20
RCA Development tube GF _____ 20
RCA Faradon Cap _____ 30
RCA Radiola 18_____ 80
RCA Radiola 26 - no tubes _____150
RCA uv-199 bbt_____ 90
RCA UX-210 GF _____ 40
RCA Victor - metal cabinet _____ 10
RCA X-60 AM, SW set _____ 20
Regen receiver _____ 10
REL - 204A tube socket _____ 25
RME 45 w/preselector & speaker __150

RME DB-20 preselector _____ 40
RME LF90 _____ 40
RME preselector _____ 25
RME-9D_____ 250
Rvalve,Moorhead OF _____ 30
S-C Model 240 _____ 275
Schickerling S 8100 _____ 60
Sentinel, Model 309 in plastic cabinet _ _____ 20
Sig Corps LS-3 loudspeaker _____ 20
Signal Corp. 2 dynamotors _____ 40
Silver Marshal Round the World 4 250
Silver-Marshall coils - qty 14 _____ 10
Silvertone horn speaker _____ 70
Silvertone metal cabinet midget set_ 15
Singer Audion _____ 600
Sonora RA-1 GF_____ 30
Speaker for military set_____ 10
Speaker with volume control _____ 10
spy set key?_____ 10
Sterling "B" battery eliminator _____ 25
Stromberg-Carlson late 30's no speaker _____ 60
Taylor and RCA box lot_____ 60
Taylor tube lot_____ 35
Taylor/RCA 17 Tubes _____ 35
TB 115
TB-1 GF _____ 10
TBX-6 Navy xciever - 1 + 2 parts sets _ _____ 150
tube double ended _____ 40
tube lot _____ 5
tube tester adaptors qty 12_____ 2
Tube tester Model 9-10 GC _____ 30
Tuska Type 225 _____ 400
UnKnown open-fil _____ 2
UV 200 BB _____ 15
UV 200-A BBTT _____ 10
UV 202 _____ 40
UV 202 _____ 50
UV 202 _____ 60
UV199 BB Qty 3_____ 40
UV-203, UV 877 _____ 20
UV-99, WD-11 GF's _____ 50
V99 GF_____ 60
V99 GF_____ 60
various tubes_____ 10
VT 2_____ 20
VT 2 GF _____ 170
VT 2 NOS _____ 170
VT 25_____ 50
VT Amplifier GF _____ 10
VT-1_____ 100
VT-1 QTY 2 _____100
VT-1 QTY 3 _____ 125
vt-2 170
VT-2 _____140
VT-2 _____180
W.E. long drop wall phone _____ 125
W.E. SCR-59 w/ good VT-1's _ 1,200.00
W>E. - 50 Watt tube sockets - Qty 2240
Water Cooled Tube GF_____ 50
WCBA 41 Station MIC _____725
WD 11 _____ 85
WD 11 _____ 70
Wd 11 BB _____ 80
WD 11 BB OF _____15
WD 11 GF_____ 70
WD 11 NOS _____ 35
WD 11 NOS _____ 30
WD-11 to submini adapters_____ 3
WE 101-F GF _____130
WE 102-D _____100
WE 102-D GF _____ 90
WE 125A tube Socket Qty2 _____ 20
WE 205-D GF_____ 350
WE 205-D GF_____325
WE 211-E_____ 200
WE 212E GF_____550
WE 216A _____ 70
WE 221-D GF_____ 40
WE 221-D GF_____ 40
WE 221-D GF_____ 50
WE 221-D GF NIB_____ 35
WE 261-A _____ 20
WE 276-A _____130
WE 3-A photo cell _____15
WE 717-A Qty 3 NIB _____ 5
WE VT catalog _____15
WE VT-2 _____130
we vt-2 _____130
WE VT-2 QTY 1 _____160
WE VT-1 Early machined base ___ 90
we vt-5 215A 9 pcs _____75
Weagant Valve _____ 20
Weagant Valve _____ 60
Wegant Valve GF _____170
Welch peanut _____ 20
westclox key _____ 20
Wester Elec 37 Canlestick Phone __150
Western Elec 42 Sounder 4ohm___ 40
Westinghouse BC-98-B - 1928___ 200
wirco rf chokes qty 5 _____ 5
Xtal set w/ Radio News Lab approval tag 105
zenith 5-s-319_____120

in the ultrasonic cleaner.

Almost all the number lettering was gone on the three big tuning knobs but almost all other paint filling on the graduation marks and other knobs was OK. As it turns out, I had an old Elmers wood touch-up crayon of the exact color as the surviving filler lacquer. So I filled in the numbers. I elected not to fill the few missing graduation marks. This way, I think the set still looks more authentic.

P.S. If anyone has the Flex-O-Dyne or Crystal Symphony, Ted would like to have some detailed photos of the chassis and the cabinet. Any set called it the Pantheon (Temple of the Gods) Crystal Symphony deserves to be restored to its full glory

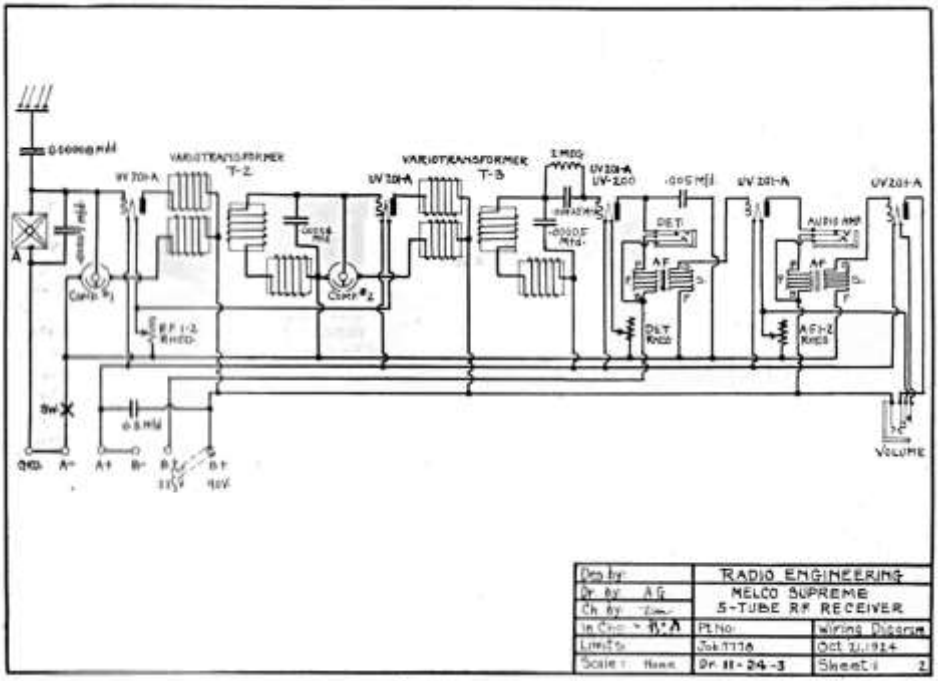


Fig. 2. Connections for the Melco set. Unit A is a variometer, while T-2 and T-3 are R. F. transformers in which the coupling and the secondary inductance are controlled simultaneously