



Who Invented Radio? (Continued from the September CQ de WA2LQO) **By Bob Wexelbaum, W2ILP**

Contrary to popular belief, Lee deForest (1875-1961) did not invent any tubes that could be used as amplifiers or oscillators in radio receivers or transmitters. DeForest graduated from the Sheffield School at Yale University in 1899, after nearly being expelled for a prank. He is given credit for inventing a three element triode, but he only made useless tubes that he called “audions”. That name itself meant that they were intended for audio usage and that they depended on ions. DeForest did not believe that electrons emitted by a filament could travel to a plate in a vacuum, thus all of his audions had to contain ionized gas. We now know that tubes containing mercury vapor can make good rectifiers and inert gas such as neon or argon can be used in tubes, such as thyratrons, for industrial switching...but for linear analog amplification (before transistors) only vacuum tubes are practical. Electrons can travel in a vacuum and the better the vacuum the better the radio tube. DeForest’s first attempted “audion” was actually a gassy Fleming valve which had its controlling element wrapped outside of its envelope! A later attempt that he tried had two butterfly plates inside the tube and then finally he placed a grid like structure within the tube that had evolved to be called a control grid, by other inventors, notably Irving Langmuir (1881-1957) of GE. Langmuir was able to explain exactly how a triode worked. DeForest had stated, during a patent trial, that he could not explain how the “audion” worked, but it worked. The audio part of the name “aud-ion” tells us that he expected that it would be used for audio amplification, which was needed not only for radios, but for phonographs and telephones. DeForest never spoke of any radio frequency (RF) amplification applications for his triode.

The coherer Morse detector radios could only drive clickers. Crystal sets could only drive earphones. Phonograph needles could only mechanically drive diaphragms... but with vacuum tube amplification radios and phonographs could electrically drive loud speakers.

The next significant advancement in radio technology was the discovery of regeneration. Regeneration due to controlled positive feed back can enable a vacuum tube (or transistor) circuit to have a greater amplification factor than it would without feed back. For a triode tube to regenerate, some of the signal at its plate would have to be fed back to its grid circuit. This was accomplished by what was called a tickler coil which coupled some RF from the plate back to the tuned grid circuit, until the detector could reach a point just below the threshold of oscillating. This was especially good for receiving CW signals since the feedback could be adjusted so that the triode detector would go into oscillation only during Morse dits and dahs and the oscillations could be heard as audio tones rather than clicks. A single tube regenerative radio receiver could be quite sensitive for AM as well as CW and its circuitry could actually provide a higher Q and thus greater selectivity than a conventional tube detector. The draw-back of a single tube regenerative radio was that when it went into oscillation it would act as a miniature radio transmitter and interfere with nearby radios tuned to the same frequency. The way to prevent this from happening was to isolate the detector from the antenna by adding an RF amplifier stage; thereby losing the advantage of using only one tube.

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In spite of this there were many instructions for building inexpensive one tube radio receivers in the popular magazines of the late 1920s and the early 1930s; even in the New York Times. The ARRL handbooks continued to show one tube regenerative receivers that could be easily built by novices until the '70s; usually with plug in coils to cover the entire HF spectrum.

The regenerative radio detector was clearly an invention of Edwin Howard Armstrong but it was only one of his minor inventions. We will talk about others later.

DeForest did not understand that a triode must have its grid negatively DC biased for it to work well as a Class A amplifier. Armstrong certainly did. DeForest never held a ham license or passed a ham exam. He based his credentials strictly on his academic diploma. He was a member of the AIEE. Armstrong was tinkering with radio circuits even before he graduated from Columbia University. He was a member of the IRE. Armstrong, in my opinion, was one of us. That may be why I must admit that I am biased in favor of Armstrong!

With the advent of motion pictures, a new media was brought before the public eyes. Thomas Edison, whose lab was working on perfecting motion picture projectors, had the opportunity to advertise himself by appearing in early newsreels. Lee DeForest also appeared in newsreels and it is from these that the general public formed impressions about who the wizards of the wonderful new world of radio were, while many unknown engineers and technicians toiled to make the new innovations work.

(to be continued next month)

<p style="text-align: center;">PRESIDENT'S NOTE by ED GELLENDER, WB2EAV October 2009</p>
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Not a lot is happening with the club right now, but I have two interesting things to report on.

First for the HF operators, the afternoon and evening of Saturday October 17 is the New York State QSO Party. It runs from 2 PM until 2AM Sunday morning. NY stations can work everyone they hear. Bands are 80, 40, 20, 15 and 10 with suggested CW frequencies 50 kHz above the bottom of the band and phone at 3.89, 7.23, 14.29, 21.35 and 28.4. The exchange involves signal report and location. For out of state stations, the location is a two letter state or province abbreviation. For us, it is a three letter abbreviation of county (most of us would be NAS or SUF, with maybe one or two in QUE). Note that the exchange does not include ARRL section.

Full details are available from the sponsoring group, the Rochester DX Association at www.RDXA.com. They also have a dedicated website www.NYQP.org. The event is scored, but only the top guns will get certificates.

The second item of interest involves an active member of the Grumman Amateur Radio Club, who found what Andy Warhol dubbed his 15 minutes of fame. The American Airpower Museum at Republic Airport (great resource by the way; pay them a visit) had a commemoration of 20 years since the cold war ended. Two older gentlemen who were military officers for the US and the USSR back in the '50s and '60s came in their full dress uniforms and made a presentation (How many of us have old uniforms in such good condition...and more importantly can still fit into them?). Much to his surprise, the US officer – club member Jack Hayne WB2BED, was featured in a photo of the event in last Sunday's Newsday. Jack is an active club member, but now I have a whole new respect for him...he looks quite impressive! Don't wanna mess with him.

**GRUMMAN AMATEUR RADIO CLUB
MINUTES OF GENERAL MEETING 9/16/09**

By Karen, W2ABK, secretary.

The meeting was called to order by Gordon at 5:30 PM.

TREASURERS REPORT – Ed, WB2EAV

Finances continue to be in good shape.

REPEATER REPORT - Gordon, KB2UB

Both repeaters are working fine.

VE REPORT – Bob, W2ILP

One applicant passed a Technician Exam.
VEs were W2ABK, W2QUV, WB2EAV,
WB2IKT, AB2ZW and W2ILP.

NET REPORT- Zack, WB2PUE

Thursday night net had few check-ins.

OLD BUSINESS

Discussing programs for our meetings.

NEW BUSINESS

Discussing the possibility of changing the meeting starting time to a later (after supper) time; also the possibility of changing meeting location. No official change has been made at this time.

PROGRAM

Ray, W2DKM brought in QSL cards that were received from stations that had contacted our Apollo 11 Special Event stations when asking for the commemorative certificate. There were over 200 cards from all over the U.S.

The meeting was adjoined at 7:15 PM

GARC NETS:

40 Meters: 7.255 MHz at 7:30 AM EST Sundays. *Note: Frequency has changed.*

2 Meters (via repeaters): 146.745 MHz (-.600 kHz) at 8:15 PM EST Thursdays.

145.330 MHz (-600 kHz) at 8:30 PM EST Thursdays

[Tone for both repeaters is 136.5 Hz] (ARES/RACES) Mondays

MEETINGS

General Meetings of the GARC are held on the third Wednesday of each month, starting at 5:30 PM. The meetings are usually held at the Ellsworth Allen Park in Farmingdale. Driving directions and maps can be obtained from <http://www.mapquest.com> It is suggested that the GARC Web Site be checked to be certain of meeting time and/or location, which may change after this newsletter is distributed. Board meetings are held eight days before the General Meeting.

GARC WEB SITE

The web site of the GARC can be found at <http://www.qsl.net/wa2lqo/> Webmaster is Pat Masterson, KE2LJ. Pictures of GARC activities, archives of newsletters, roster of members, and other information about the GARC may be found there.

INTERNET LINK OF THE MONTH FOR INTERNERDS

There are some members of the GARC that are just as interested in airplanes as they are in radios, and some who may be more interested in airplanes than radios. The history of military airplanes is just as interesting as the history of radio and it is especially important because much of it took place here on Long Island, at Grumman, Republic and their many suppliers. Congressman Steve Israel, Stop & Shop, and the History Channel have used the subject of the cold war commemoration to provide a video which was brought to my attention by the article in Newsday (see president's message). The URL of this month, which was suggested by Jack Hayne, WB2BED, is:-

<http://www.americanairpowermuseum.com/Website/index.aspx>

At the time of the Cuban missile crisis, I was working as a field engineer for Loral at Grumman Calverton on anti-submarine warfare (ASW) stuff that went into the S-2Fs. The guys in the shop listened to the radio while they worked. We heard all the news about the Cuban Soviet missile bases and also listened to President J. F. Kennedy's speeches. The Cuban missile crisis did seem threatening... but it never worried me very much. I could have been wrong...but somehow I knew that that the cold war was mostly political and economic, because the Russian people never hated the American people. We had been allies during WW2. After both sides threatened to start WW3, the missiles were eventually removed from Cuba, and the US promised not to attack Cuba... because neither the US nor the USSR really wanted to be the first to start a nuclear war.

Did you know the story of the Soviet submarine commander, who had refused to fire a nuclear headed torpedo during the heat of the Cuban crisis? Few people know about Commander Vasili Arkhipov. He died in 1999. I would have loved to see him visit us in his full dress uniform. I won't simply give you one website address to read and confirm the story. There are several good ones. Just Google up Vasili Arkhipov and you can read the rest of the story about the man who probably prevented the cold war from becoming a hot war or WW3.

PUZZLE

Here is another Cryptogram: This one is long enough to be easy.

GK RKC HVXTHG CZV YHJCJYF TF LIVFCJKRTQEV DTCHJKCF. PZTC PVHV

PTFZJRXCKR TRG WVUUVHFKR TRG TGTBF QIC DHKUKIRG YHJCJYF KU CZV

YKEKRJTE FCTCIF LIK?

--TGETJ FCVSVRFKR--

Solution to the September Cryptogram:

DOMESTIC POLICY CAN ONLY DEFEAT US; FOREIGN POLICY CAN KILL US.

--JOHN F. KENNEDY--

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CONTRIBUTING WRITERS

All the members of GARC (we hope!)

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ELECTRONIC SUBMISSIONS

For insertion to the WA2LQO website, information may be sent to Pat Masterson.

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Ed Gellender's e-mail address:

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EDITORIAL

Last month I included a picture on the back cover page of this newsletter. I didn't include a caption, so let me tell you now that that picture was taken by Karen, W2ABK at our August picnic meeting. I selected that picture because it showed the most members in one picture. I have received many pictures taken at the picnic and also at FD but I have trouble getting them into the MS Word format, where they use up many more bytes than they do when they are simply sent as e-mail attachments. I would like to include a picture in each newsletter now, but I can't promise to print all of the many good pictures that I have received.

If you read the news you will know that there was an undersea earthquake in the south Pacific that caused a tsunami in the Samoan Islands. It was the worst tsunami that had occurred there in recorded history. My son, Mark, resides in American Samoa. I have spent a good deal of time trying to contact him and find out if he is OK. Videos of the disaster showed massive destruction in the Leone village where he lives. He has no telephone and the library where he sent e-mails from was closed.

[10/7] Whew! I just received good news. My son Mark is OK!
73,

Bob w2ilp (I Like Pictures)

GARC VE EXAMS

We are continuing to proctor exams for all classes of ham licenses on the second Tuesday of each month, starting at 5:00 PM.

The present exams are:-

The Element 1 CW exam is no longer required.

Element 2: Technician

Element 3: General

Element 4: Amateur Extra Class

The fee for 2009 is \$14.00 for all exams taken in one sitting. The ARRL-VEC now charges \$15 but W5YI-VEC has decided not to change the required fee.

Applicants for upgrades should bring their present license and a photocopy of it and know their FRN number.

New, first time applicants should be aware that their Social Security number will be required on their application form, unless they register with the FCC for an FRN.

All applicants should bring picture ID such as driver's licenses.

Until further notice exams will be given at:-
Briarcliffe College
1055 Stewart Avenue
Room: Long Beach #5
Bethpage, NY
Briarcliffe, Bethpage is located in a building that was formerly part of the Grumman complex.

All applicants should contact W2ILP to register, so as to confirm location. If no applicants apply, the exam session will be cancelled.

For any information e-mail w2ilp@optonline.net or phone- (631) 499-2214

Study material is available at the web sites of the ARRL

<http://www.arrl.org>

or W5YI

<http://www.w5yi.org>

All VECs use the same Q & A pools.

Since the beginning of the VE program the GARC has provided opportunities to take the ham exams monthly, during all 12 months of every year.

Bob Wexelbaum, W2ILP and the GARC VE team.

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FIRST CLASS

DO NOT DELAY