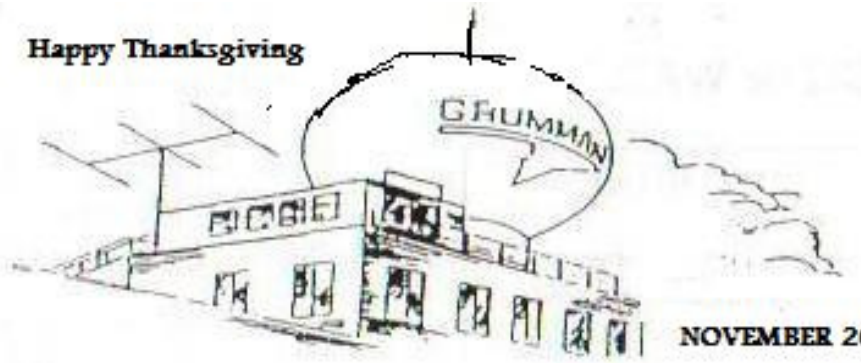

CQ de WA2LQO

NOVEMBER 2009 Vol. 82 No. 11

Who Invented Radio (continued from October CQ de WA2LQO)

By Bob Wexelbaum, W2ILP

The invention of the vacuum radio tube led to the development of many circuits which bear the names of their developers. Yep…There was a Ralph Hartley (1888-1975), a Edwin H. Colpitts (1872-1949), and a G.W.Pierce (1872-1956) who were responsible for the oscillator circuits that bear their names. Hams should at least recognize schematics of their oscillators. Not only did Pierce invent the most common quartz oscillator circuit, but he was the man who invented the word "modulation". After the triode tube came the tetrode (four element) and the pentode (five element) tubes. The grids were then the control grid, the screen grid, and the suppressor or beam forming element. The screen grid made possible "electron coupling" which provided some isolation between oscillators or amplifiers and their output loads. But I digress here because I must get back tracking the major radio inventions and who were the most important inventors.

Michael Idvorsky Pupin (1858-1935) was a Serbian who was born in Banat Province, a part of Austria that has also been a part of Yugoslavia. He studied physics at Pancevo and at the Prague University. He came to the U.S. in 1874, with no money. He worked at farm and factory jobs and taught himself English and because of his intelligence alone, he was able to enter Columbia College. At Columbia he earned a fellowship in physics. He returned to Europe and studied at Cambridge, England and then in Berlin. After earning a doctorate in mathematical physics he returned to the U.S. Among his many accomplishments was the development of the electrical resonator utilizing both theoretical physics and lab experimentation. He thus became the father of what we call tuned tank circuits which are used for radio transmitter and receiver tuning. Another of his accomplishments was the Pupin coil. This was not a spark coil. It was an inductive reactor that was needed to balance the capacitive reactance of long telegraph or telephone lines. It was hard for many to believe that long lines were capacitive rather than inductive, but Pupin's loading coil was used by the Bell Telephone Company in the U.S. and by Siemens and Haske in Germany. The British refused to believe that loading coils were needed, even though Oliver Heaviside, when he was a telegrapher working for the British post office, had suggested the same thing. Heaviside went on to develop his own complex notations for impedance matching. Without impedance matching there will be power loss as well as frequency distortion. This must be considered both for long transmission lines and for relatively shorter connections between radio circuits.

Now back to Edwin Howard Armstrong. I wrote about him before in relation to regenerative one tube radios, but as I said regeneration was only one of his many inventions. Armstrong was born in New York City, as were both of his parents, and they moved to Yonkers, NY. As a 14 year old amateur, Armstrong built a 125 foot antenna mast and worked with coherer detectors before he was able to obtain triode tubes. He graduated from Yonkers High School in 1910, knowing that he wanted to be an inventor. He then commuted to Columbia University by motorcycle to pursue a course in engineering. In 1912 he built both a one tube transmitter and a one tube regenerative receiver that performed better than any other of that time. Hugo Gerrnsback later published booklets that described his circuits. Armstrong received his engineering degree in 1913 and remained at Columbia as a assistant to none other than Michael I. Pupin!

It was long understood by musicians, that if two oscillations that were close in frequency were mixed in a non-linear manner, a beat frequency could be produced. This method is known as heterodyning. This is the method that is used when a beat frequency oscillator (BFO) is used in a radio receiver so that Morse Code carriers can be heard as audio tones. Armstrong developed the Supersonic Heterodyne, which he then shortened to Superhetrodyne or Superhet. It solved problems that were limiting the performance of tuned radio frequency receivers (TRFs) that were the first multi-tube radios. The TRFs required simultaneous tuning of both the detector and R.F. amplifier stages to the frequency of the station that you wanted to listen to.

(continued on page 2)

(continued from front page)

This was not as easy as one might expect because slight differences in capacity or inductances would require trimming and even when trimmed there might not be good tracking from the low to the high end of a radio band. The Qs (figure of merit) of the tuned circuits would vary as one tuned across a band, and this would make the selectivity of the radio variable and unreliable. The design of Armstrong's superhet radio involved beating the RF signal from an antenna or RF amplifier stage with a local oscillator (LO) signal in a mixer tube and producing an intermediate frequency (I.F.). The LO and mixer would then be a frequency converter. The IF signal would then go to an IF amplifier, which would be fixed tuned to the IF frequency. In most U.S. broadcast band radios the IF was eventually standardized at 455 kHz. This could also work well for radios that tuned short wave bands up to about 10 MHz. Eventually there might be a noticeable image signal unless a well tuned RF amplifier was used because there would be two signals to be separated; one the difference and another at the sum of the RF and LO frequencies. The most important feature of the superhet is that the selectivity of the receiver may be controlled by the design of the IF transformers, and fixed frequency filtering (crystal, ceramic, mechanical or digital) may be utilized which will apply for all the radio frequencies that the radio can receive.

Static noise is the result of the same electrical discharge that results in lightning when the charge becomes very great. It produces amplitude spikes that interfere with radio reception. Armstrong realized that to eliminate amplitude spikes from static and other noise sources one must not use a radio system that uses amplitude modulation. He invented Frequency Modulation (FM), where the frequency of the RF carrier, rather than its amplitude is modulated.

The AM broadcast band is limited by the FCC to signals that may be no more than 10 kHz wide. This means that they may transmit audio that is limited to 5 kHz or less. [WQXR was given a special waiver for using a bandwidth of 15 kHz.] Armstrong's FM would use VHF rather than MF for broadcasting. There was more space available on VHF than MF and so Armstrong was able to transmit music up to about 15 kHz, by using wide band FM of 35 kHz.

(to be continued next month)

PRESIDENT'S NOTE by ED GELLENDER, WB2EAV
November 2009

Things are pretty quiet now. The repeaters seem to be doing OK. There are no major activities going on right now other than the ARRL sweepstakes, and that is really an individual rather than a group activity.

We are planning on having our annual Christmas party as the December meeting. It will be, as usual, on the third Wednesday of the month which is Dec 16 this year; Keep the date. We are planning on holding it at the same restaurant that worked out very well for the past two years. Bertucci's is on Route 110, just north of the Northern State Parkway.

Some of us may remember about 5 or 6 years ago when we operated during International Lighthouse Day from the Nantucket Lightship (LV-112) while it was undergoing restoration at the nautical center pier in Oyster Bay Harbor. It was quite an interesting experience. Not only is the ship fascinating, but we had the opportunity to operate from the original radio room. At first we used simple wire antennas strung over various parts of the ship. Eventually we figured out how to connect to the original beacon antenna strung between the tops of the masts and loaded it up on 40 Meters. We made a few nice contacts that way. A few months later we also helped out at a fund raiser for the restoration project. In the end, however, the organization doing the restoration backed away from the project and the lightship sat in Oyster Bay Harbor slowly deteriorating. It was impossible to see it forlornly sitting there, unloved, with dry eyes. Apparently, a few months ago, a group in Boston declared their interest in the lightship (and apparently they even have some money too).

Karen, W2ABK, heard that it was supposed to leave Oyster Bay this past weekend and took a few pictures before it left. I was hoping to be there for the departure (towed I guess) so I could wave bon voyage, but life interfered and it just didn't happen. I will always look at the pier in Oyster Bay with a twinge of what could have been.

GRUMMAN AMATEUR RADIO CLUB
MINUTES OF GENERAL MEETING 10/21/09
By Karen, W2ABK, secretary.

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

TREASURERS REPORT – Ed, WB2EAV
Finances continue to be in good shape.

REPEATER REPORT - Gordon, KB2UB
Repeaters are working fine.

VE REPORT – Bob, W2ILP
One applicant passed the amateur Technician and General exams. There were two commercial Applicants; one earned an MROP and the other Passed Element 8 (Ship Radar Endorsement.) VEs were AB2ZW, W2ABK, WB2EAV, WB2IQT, and W2ILP.

NET REPORT- Zack, WB2PUE
Thursday night net had a good turnout. Sunday morning net was quiet. See also note from Gene, W4JMX on Page 4.

OLD BUSINESS
We are waiting to get confirmation for a guest speaker for next month.

NEW BUSINESS
Next month is GARC election time. We may be changing our general meeting time and location in the future, but not until 2010. We will again make reservations for our December meeting holiday party at Bertuccis.

PROGRAM
Dave, AB2EF brought a video which showed a radio museum in Australia, and radio equipment that was used in WWII.

The meeting was adjoined at 6:30 PM

GARC NETS:
40 Meters: 7.255 MHz at 7:30 AM EST Sundays.
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 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.

NEWS OF THE SUNDAY MORNING 40 METER WAG NET ACTIVITY

Gene, W4JMX has reported that Tony WB2HFT, has moved to an assisted living location which does not permit antennas. Tony would like to stay in contact with GARC members. His address is:-
Tony Bacchi, 331 Alexian Way #N109, Signal Mountain, TN 37377
Phone Number: 431-866-0506
Gene also reported that the Sunday morning WAG net has been unforgiving. He was able to speak to N2MY, AB2EF, N2SFT and W2III, all on different weeks. Gene hopes that the 40 Meter band will be better as the cycle progresses. *The few recent times that I attempted to sign on to the net, I, W2ILP was not heard by anyone.*

INTERNET LINK OF THE MONTH FOR INTERNERDS

My son, Mark Wexelbaum lives in American Samoa. News reports told me about the tsunami which devastated the Samoan islands. I lost contact with Mark for about two weeks after the tsunami and I tried to find out how he had survived the disaster. I saw pictures and videos that showed ships and cars that had been tossed into buildings and I feared the worst. Mark's friends and I tried to contact people on Samoa who knew Mark but had little success at first. A ham on QRZ suggested that I contact a reporter who he knew, who worked for the American Samoa newspaper, and also for a Samoan radio broadcasting station. The newspaper allowed me to print a message in their free bulletin board and a message was also aired by radio, asking Mark to contact us. After two weeks we finally received an e-mail from Mark. He was OK! He lives on high ground in the western part of American Samoa. There was electrical power on the western part of the island, but the eastern part of the island was without power. Pago Pago (the natives call it "Pongo"), the capital was blacked out. Mark usually communicates with us by using a computer in a public library in Pongo, and that is why we didn't hear from him at first. Mark told us that he saw the largest airplane in the world land in Pongo. It brought new electrical power generators to replace ones that had been destroyed. This brought to my mind the Supper Guppy aircraft that I had seen at Calverton sometime in the 1980s. So I was curious about what the largest plane could be. The U.S. military has replaced the Guppy type propeller driven planes with the C-5A/B Galaxy jets, which are now the largest American military cargo planes. The largest airplane in the world is not the Galaxy. The plane that Mark saw on the Pongo landing field was the Antonov AN-225. It was built in the Ukraine by the USSR's Antonov Design Bureau in 1998, in order to carry space vehicles. When the communist administration changed to capitalism, the plane was no longer owned by the new Russian government. It is now owned by Antonov Airlines, a private entity. The AN-225's nick name is Mriya, which means 'inspired dream' in Russian, but it is also called "Cossack" by the British. For comparison, the Galaxy has a length of 247 ft and a wing span of 222 ft, while the Cossack is 275 ft long, with a wing span of 290 ft! For more details about the Cossack go to the website for this month: http://www.vincelewis.net/antonov.html Be sure to watch the video of an AN-225 landing. As it taxis across the landing field, all other aircrafts seem dwarfed.

PUZZLE Here is another Cryptogram: OU AFCSNQ BU RADDSDDBAU DSHGAI. ZSQOBUD

QTS DOIS NTOZI QTOQ BQ TIOG BU RPZDPBQ. --RHBUW QTS WAPUMSZ--

Solution to the October Cryptogram: THESE HEROS OF FINANCE ARE LIKE BEADS ON A STRING – WHEN ONE SLIPS OFF ALL THE REST FOLLOW. –HENRIK IBSEN--

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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.
Pat Masterson's e-mail address: Pat-Masterson@tampabay.rr.com
Ed Gellender's e-mail address: Edward.Gellender@ngc.com or wb2eav@yahoo.com

EDITORIAL

I have attended a scheduled Webinaire discussion. I didn't know what a Webinare discussion was until it was explained to me to be an interactive Internet chat. The subject was: ATLANTIC DIVISION – COMMERCIALIZATION OF AMATEUR RADIO DISCUSSION. Although I was expected to have a microphone connected to my PC for some Q & A, the event ran out of time before anyone other than an ARRL rep and an FCC rep (both hams) could speak. The conflict between voluntary work and work for profit can result in gray areas. What happens when hams work for non-profit organizations and they are the only workers who are unpaid? Is it because they are good for nothing? Anyway the speakers agreed that hams have in the past been good enough to know how to obey the rules and regulations of Part 97 without help. The definition of the word 'pecuniary' was discussed. I know money when I see it. You can order a pizza on the air but you can't sell pizzas. It is as simple as that. Would it be advertising to quote the price of each pizza topping?
73, W2ILP (Interest Limits Pecuniary?)
P.S. Please excuse me. I have sore gums and teeth that must be extracted. I was supposed to have teeth extracted by a dental surgeon today, but my appointment was postponed. A water pipe has burst in the surgeon's office causing a flood.

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.

GRUMMAN AMATEUR RADIO CLUB OFFICERS FOR 2008

President	Ed Gellender	WA2EAV	X02-14	516-575-0013
Vice President	Gordon Sammis	KB2UB	Retiree	631-666-7463
Secretary	Karen Cefalo	W2ABK		631-754-0974
Treasurer	Ed Gellender	WB2EAV	X02-14	516-575-0013
2Yr Board Member	Zack Zilavy	WB2PUE	Retiree	631-667-4628
2YrBoard Member	Dave Ledo	AB2EF		
2Yr Board Member	Bob Christen	W2FPF		
1 Yr Board Member	Bob Wexelbaum	W2ILP	Retiree	631-499-2214
1 Yr Board Member	Jack Cottrell	WA2PYK	Retiree	516-249-0979
Trustee WA2LQO	Ray Schubnel	W2DKM	Retiree	

STANDING COMMITTEE CHAIRMEN

Contact VE:	Bob Wexelbaum	W2ILP	Retiree	631-499-2214
Webmaster	Pat Masterson	KE2LJ	Retiree	813-938-4614

GRUMMAN AMATEUR RADIO CLUB
Sixty Five Years 1944 -2009
P.O. Box 0644
Bethpage, NY 11714-0644

FIRST CLASS

DO NOT DELAY

FESSENDEN SIGN IN N.C.

You may not have known about Fessenden if you had not read about him in my "Who Invented Radio'" series in this newsletter. Dave, AB2EF gave me a picture of a sign that he saw in the town of Buxton, Hatteras Island, Outer Banks, NC. The sign is topped by the official seal of NC. The sign reads: **- RADIO MILESTONES – From near here in 1902 R.A. Fessenden sent the first musical notes ever relayed by radio waves. Received 48 miles north.**

I had seen a somewhat similar sign in Cape Cod, Massachusetts. It also marked the location of a RADIO MILESTONE**.** It was there that Marconi had unsuccessfully tried to receive Morse Code signals from England. He later succeeded in Newfoundland.

NANTUCKET LIGHTSHIP

The Nantucket Lightship, where the GARC had operated during Lightship Days, is moving from Oyster Bay to Boston. It had been retired from service in 1975 and designated a national landmark in 1989. It was docked at the Intrepid Sea Air and Space Museum in Manhattan and then it was acquired by the HMS Rose Foundation of Bridgeport, CT, which sold it to the National Lighthouse Museum in 2002 for $1. The Lighthouse Museum tried to bring it to a museum on Staten Island, but was unable to accommodate it. The Nantucket had been temporarily docked in Oyster Bay, where the town was unwilling to keep it, according to a decision made in 2001. Now the Nantucket has been sold to a Boston group for $1. This group claims to have collected $200,000 to move and restore it. The ship is 75 years old and has deteriorated somewhat while waiting for decisions at the free dock in Oyster Bay. There is something about old ships that makes them sort of romantic. We speak of ships using the female gender, as if they were alive. Nobody wants to destroy these old ladies. It was with this type of sensitivity that Oliver Wendell Holms wrote his famous poem "Old Ironsides" in 1830, as a plea to save the frigate U.S.S. Constitution from the scrap yard. Today Old Ironsides is still a US Navy ship of the line, a national treasure, floating in Boston Harbor. I was thinking of writing a similar poem for the Nantucket. I would have, if nobody had come up with the 200 grand to save it. – w2ilp