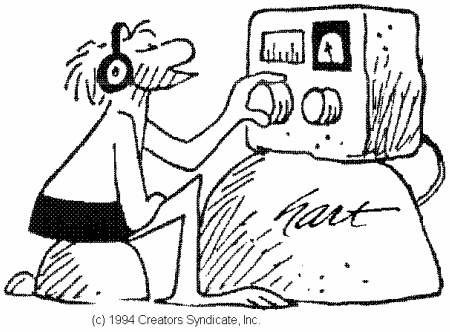

BARA Facts

Newsletter of the Binghamton Amateur Radio Association

June 2003

Website: http://www.wtsn.binghamton.edu/bara

From Here, Where?

The big topic of discussion at the June Board Meeting could be summarized as "where do we go from here?" Our Club seems to be idling right now and as a group we need to decide what the Binghamton Amateur Radio Association stands for and the direction we want to head in as a club.

There are several indicators that are a "wake up" call to collective action. First, although we continue to pick up new members, others drift away. Our club may not be fading, but there is no sustained growth and although this trend may mirror the overall trend within our Hobby, it is not a good sign. There are lots of Hams in our area who have never heard of BARA, there are also others who have no interest in BARA, and finally there are those who drop out because we don't appeal to their interests. ***Why?***

Second, participation. Coming out of the 2003 Hamfest we can say that there was some new help, but there were also lots of others who ***could have*** been there. There is also a regular cycle of the same crew through the Officer and Board slots. These are the members who keep Our Club alive and we would like to see new faces and hear new ideas, but ***too many are "too busy" or "not interested".***

At our June Board Meeting we opened the subject of the 2004 slate and we scanned the membership list for ideas. If you cut the list down to the members who come to meetings (how can you ask someone who you don't know) and if you trim off the members who are already serving in one way or another then there really aren't many names left and many of those have already sat as an Officer or Board Member.

Field Day is another indicator. Several times in these pages we have mentioned the need for a Chairman and the subject has been broached at Club Meetings. ***There has been no response.***

Attendance at our General Meetings is also "flat". True, there was bit of a spike for SkyWarn and the turnout for the EchoLink presentation was good, but it is hard to find members who are willing to present a program and discouraging when attendance is low.

There is no "magic bullet" to turn around Our Club, but there is a core group of us who feel that BARA is something that they want to be a part of and something that they will fight to keep going. Please consider this an invitation to join that group and to be part of ***Our*** Club's future and ***Our*** Club's success!

2003 Esther Valky Scholarship

At the June Board Meeting the Officers and Board evaluated two applications for the 2003 Esther Valky Scholarship. The choice was difficult because both candidates were talented and articulate in their essays, however only one could be awarded the prize. After discussion and deliberation, the determination was finally made in favor of John Skok, KC2IAW.

John will be presented with a check for $325.00 at the June General Meeting. It should be noted that $250.00 of this amount is the scholarship proper while an additional $75.00 had been donated anonymously prior to the Board Meeting with the stipulation that it be presented with the BARA portion of the award.

Congratulations, John, and success in your studies and all your endeavors.

Summer Boredom

The Long and Lazy days of Summer will soon be here. School will be out and as the first rush of freedom wears into boredom parents (and grandparents) will wonder "how to amuse the kids". Why not try something new? Why not push yourself a little and introduce a youngster to our wonderful hobby?

There's no need to shoot for the stars: Playing with batteries, bulbs, magnets, and wires can provide a

fun and instructive introduction for children as young as five. For older kids building a Crystal Set might make a bigger impression than you can imagine. To the uninitiated this stuff can be magic and you might be the inspiration for another Edison! Assembling a simple kit will develop an appreciation of the correct use of tools, build skills in reading plans and prints, and teach manual dexterity. Even better, as momentum builds your role switches from teacher to supporter and the activity becomes independent and self-directed as confidence builds.

Is a Ham Radio Ticket on the horizon? Maybe. If you build carefully and weave your web properly you may find that a summary of Rules & Regulations is enough to finish the job of preparation for the exam. You also may have laid the foundation for next year's Science Fair Project or even a career. Will it cost you anything? Perhaps a few dollars for parts and such and the gift of your time and interest, but that is a gift that we as adults sometimes undervalue.

Generations and Regenerations

When Dr. Lee DeForest added a third element — the Grid — between the Cathode and Plate (Anode) of John Ambrose Fleming's two-element Thermionic Diode he created the Triode Tube, but he did not quite understand its technical implications. He learned that a small voltage applied between the Cathode and Grid could be used to control the current flow between the Cathode and Plate and produce Gain, but the details of why the device worked and its larger technical implications remained unclear. DeForest went on to develop the device as an Audio Amplifier and the name he chose -- the Audion -- reflected his understanding of it in terms of Audio Amplification. He applied the Audion to amplification in Telephone Circuits as well as to Detection and Audio Amplification in a basic Radio Receiver, but in truth this application was a mixed blessing for Radio Technology for the device required a high-current, low-voltage battery to excite the Cathode while an additional high-voltage source was required to force current to flow from Cathode to Plate. The Audion was physically fragile and expensive and — in comparison to the proven Crystal Diode and the physically robust and technically simple Passive Crystal Receiver — the benefits of Audion Detection were far outweighed by its demerits.

Until Edwin Howard Armstrong taught the Audion to dance.

Armstrong, the inventor (or at least developer) of at least three of the fundamental circuits used in almost every RF Transmitter and Receiver today was an "amateur" who — like many men and women of his day — was enchanted with the idea of radio. Like DeForest he wanted to improve the crude detection systems in use and his insight, in 1912, was to place DeForest's Audion in a typical receiver circuit so that it detected (demodulated) the RF signal. At the same time he provided a path — a Feedback Loop — that returned a bit of the RF output to the circuit input. There it combined with the incoming RF and passed through the detector again, and again, and again. Each passage through the circuit increased the output. Each increase resulted in Gain and the RF was amplified many thousands of times.

Actually, there's a bit more to the story. In its rawest form the Feedback Loop would quickly fly out of control and the circuit would start to oscillate. This is exactly what happens when the output of a Public Address System gets back into the Microphone and a roaring howl develops into a squeal and damaging self-oscillation in the system. A throttle was needed to control the Feedback and Armstrong found it in the method used to couple the signal back into the input. His basic circuit used a small coil proximate to the Primary Inductance of the RF Tuned Circuit. The coupling between this Tickler and the Primary Inductance could be varied to control the overall Gain of the system. Because his circuit fed the output back into the input Armstrong called the process Regeneration and it became the first practical method of Radio Frequency (RF) Amplification. In one giant leap Armstrong had increased both the Sensitivity and the Gain of receivers a thousandfold. Weak signals could now be amplified before Detection and Loudspeaker Reception became a possibility.

In time, other methods of control were developed. A variable coupling between the Primary and the Tickler was effective, but not ideal because it tended to detune the Tuned Input Circuit and there was noticeable interaction between the Tuning and Regeneration controls. Less disruptive methods of control included the use of a fixed coupling between the Tickler and the Primary with a Potentiometer or a Throttle Capacitor to vary the amount of Regeneration, however the basic principal remained the same.

Interestingly, the seed for another innovation lay in the uncontrolled regeneration of the Armstrong Circuit. Armstrong noted that the Regeneration Control could be advanced to a certain critical point where maximum gain was attained. After that point no further gain was realized, but the circuit began to Oscillate just short of uncontrolled and destructive feedback..

This is significant. Radio Transmitter Technology was crude and used "Brute Force" to generate the RF Carrier. More often than not the Transmitter consisted of an Oscillating Spark that generated Damped Waves. Although Arc Transmitters were in use in the early 1900's and the Alexanderson and Goldschmidt Alternators improved the situation as the century moved through the 'teens, Spark Transmissions were the general rule and their output was inherently broad-banded — occupying vast amounts of spectrum by the standards of today. Radio transmissions were almost exclusively in Morse Code and Phone Transmissions were unknown outside of the experiments of a few pioneers. The distinguishing feature of a Spark Emission is that the Amplitude of the generated wave decays over time and the Frequency is not constant. By contrast, pushing Armstrong's Circuit just past the Critical Point resulted in a Stable Oscillation of Constant Frequency and Amplitude very much like that generated by the Alternator and the Arc. It was a Continuous Wave (CW) and it represented the death-knell of Spark and the leading edge of a revolution in Transmitter Design. In an interesting footnote to this discovery some operators (particularly shipboard operators in port) were known to push the regeneration control of their receivers into oscillation and key the antenna feedline thus creating a serviceable QRP transmitter for short range work. This tendency of the circuit to produce QRM if adjusted improperly led to the nickname "Blooper" and to the introduction of an RF Amplifier Stage to prevent the Detector from radiating interference.

Significantly, Controlled Oscillation in the receiver also solved another problem: the key to receiving Continuous Waves. The basic emission of Arc and Alternator Transmitters was a constant wave that could not be received using the simple receivers available. Continuous Waves broken up by the dots and dashes of Morse Code failed to produce an audible signal after Detection in the receiver. One solution was to impose an Audio Frequency on the Continuous Wave Train ***in the transmitter*** to produce Interrupted Continuous Waves (ICW) or Modulated CW (MCW) — the same method used today for Morse Code ID on many Repeaters. Another solution was to add Modulation in the receiver by injecting raw energy from a buzzer or another audio tone in the receiver Front End. An Oscillating Regenerative Circuit accomplished the same result before detection by injecting an oscillation at the same frequency as the CW Carrier. In other words, Armstrong's circuit acted as a Beat Frequency Oscillator (BFO).

There's more to the story, of course, both from the technical and the human side. Armstrong, for all his brilliance, was not fated to a happy life. His innovations were denied by the courts in torturous patent litigation with DeForest and he died a suicide, unaware that history (and the courts as well) would eventually vindicate him. DeForest gained honor (some rightful, some questionable), but never satisfaction. Radio, well radio would never be the same.

Review

Hello World, A Life in Ham Radio

Few conversations are without lasting effect and it may surprise us that one of our number — Jerry Powell, W2OJW — has reached into our century through his QSL Cards and affected the lives of two authors and their readers.

Jerry died in 2001 and a binder containing some of the QSL cards in his collection ended up in a New York City flea market where it caught the attention of two men who knew nothing about Amateur Radio. They were, however, intrigued by the designs on the cards and the cryptic notations they held.

To make a long story short, Danny Gregory and Paul Sahre (now KC2KGT and KC2KHN) were intrigued enough to research the cards, learn about Amateur Radio, write a book, and get their Tickets.

Although there are some minor errors in the text when the authors attempt to explain certain technical or contesting details, the book is generally accurate, but the real treat is in the design. The cards are reproduced in color and organized by date. The authors researched the history of many of the Hams involved in the QSOs and added these details as well as details of time and place with text that never intrudes on the cards which are — in reality — the real subject of the book. Browsing the text is a visual experience and the chronology is supported by an unobtrusive time-line that runs along the bottom of the pages.

Hello World has been reviewed in several Non-Ham publications (including ***Wired,*** the ***New Yorker,*** and the ***New York Times)*** and will doubtless remind many people that our fraternity is still online: tapping out code, chatting over phone, and filling the airwaves with our unique language. Priced reasonably (for a work so heavy in color graphics) at $24.95, ***Hello World*** (Princeton Architectural Press, ISBN 1-56898-281-X) is a pleasure to read and a delight to handle. It is also food for reflection on just how enduring and far-reaching our contacts and friendships can be.

Club Officers and Committees			
President	**Bob McCabe**	**KC2DSS**	**748-9808**
Vice President	**Jack Connors**	**WB2GHH**	**724-8822**
Secretary	**Ron Regan**	**N2RWK**	**722-6790**
Treasurer	**Paul Slocum**	**N2NCB**	**687-2057**
Directors	**Bob Handel**	**K2FU**	**693-4310**
	Steve Orzelek	**N2MSB**	**775-0281**
	Ed Plesnar	**KB2SCF**	**754-3810**
	Mel Snitchler	**WE2K**	**723-9612**
W2OW Trustee	**Frank Scoblick**	**N2HR**	**729-4249**
Newsletter	**Ed Plesnar**	**KB2SCF**	**754-3810**

BARA, The Binghamton Amateur Radio Association is an ARRL Affiliated Club

Next General Meeting

7:30 PM, Wednesday, June 18th Unitarian Universalist Church Riverside Drive, Binghamton, Next to Lourdes Hospital

Board Meeting

7:00 PM, Wednesday July 2nd
Broome Community College Campus, Office of Emergency Services (West Side of Campus)

Exam Session

7:00 PM Monday, June 30th
Vestal Public Library, Route 434 Vestal
1:30 PM, Saturday July 12th
Endicott Fire Station, Across from UE High School

BARA Dues

$18/year Single Member; $27/year Family

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First Class