

THE NEWSLETTER OF THE KINGS COUNTY RADIO CLUB

KCRC



January 2020

“NULLUM BENEFICIUM IMPUNITUM”

Volume 7, Issue 1^A

Minutes of the January 8th 2020 KCRC Meeting

Our January “Pre-Meeting Question and Answer Session” was loud and boisterous with many discussions taking place between the many members who came to this month’s meeting.

The monthly meeting was called to order at 8 PM, by our President, Joseph AC2AE. Also present at tonight’s meeting were Vice President Mitch N2RGA, , Treasurer Frank KD2QPU, General Secretary Roy AC2GS, Executive Board Member-At-Large Jason KD2LRX and Berlotte KD2HYF, Howard N2GOT, Bob KD2NVB, Andre W2ART, Jacobo KK6RKA, Simon K2FH, Richard KA2KDQ, William AC2ZV, Max AC2ZW, David KD2BNT, Dexter KD2LOM, Ed, our new member (he joined that night) Elvis KD2TDH, and a new guest Christian KD2TFJ.

The vote to accept the minutes of the December meeting was passed unanimously.

Treasurer Report—Richard KA2KDQ, reported, during this transition period during which the bank accounts will be linked to our new Treasurer Frank KD2QPU’s name, that our Treasury currently has \$1,555.54 in our bank account as well as \$124.53 in our PayPal account for a total of \$1,680.07 in assets.

Repeater status was discussed by Joseph AC2AE and Mitch N2RGA - The voice announcements still need to be optimized for the controller’s speech synthesis circuits—this is planned for the next routine maintenance visit to the repeater site. Work progresses on expanding our repeater link options while also streamlining necessary hardware and costs.

2 Meter Net Report—Joseph AC2AE reported that activity is increasing since the holiday season, with more than 16 check-ins during the Net.

10 Meter Report—Roy AC2GS reported that general 10M propagation conditions continue to be poor during our present sunspot minimum period, but that local activity is steady and the Net often goes over 2 hours most Sundays.

KCRC TechNet—Roy AC2GS reported that participation in the Technical Net remains a problem. Do to the holidays and scheduling priorities, the Technet has been on hiatus, but will return soon. We still need people to join in with either questions, topics, or their own observations. As mentioned previously this isn’t a podcast, or a radio show—it is a technical Net, and requires participation in order to thrive.

Fusion Net Report—Joseph AC2AE informed us that the Fusion Net is receiving a lot of national and international attention, with check-ins as far as the Philippines!

Old Business: Our next VE exam will be Sunday, January 19th, at 1 PM at Room 6B of The Wesley House 501 Sixth Street, between 7th and 8th Avenue. For ANY individuals interested in joining our VE Team, please contact any Executive Member of the Club or the return email address for these emails of our Club Meeting's minutes. People took time out of their busy lives to help get you licensed – pass on the favor!

Our Club presently has 87 members, our new member for December Katherine. 49 members have paid their 2020 dues (a 56% compliance rate). For comparison of our Club's continuing growth, last December 2018 we had a total Club membership of 75 members!

We are still selling Club patches at \$5 a piece and \$1 shipping and handling. You can save the shipping and handling fee by buying them at our monthly meetings.

Plans for the upcoming Winter Field Day 2020 were discussed.

Plans for regular practical Club sessions where technical subjects and techniques would be demonstrated and discussed. The Executive Board could use some help from other members that would be interested in such kinds of activities to plan something that might be well attended by our members.

Plans for small, informal social get-togethers was discussed by Joe AC2AE—anyone interested in arranging a semi-regular calendar for these informal meetups, please email Joe AC2AE.

New Business: The purchase of 500+ custom pencils to advertise our Club was discussed, regarding preferable color and text. Mitch N2RGA will be handling the order for these pencils.

At 9:25 PM the meeting was concluded.

[See you February 5th for our next meeting!](#)

Disclaimer: The views and opinions expressed in this publication are those of the author and do not necessarily reflect the official policies or positions of the Kings County Radio Club, its Executive Board, nor its General Membership.

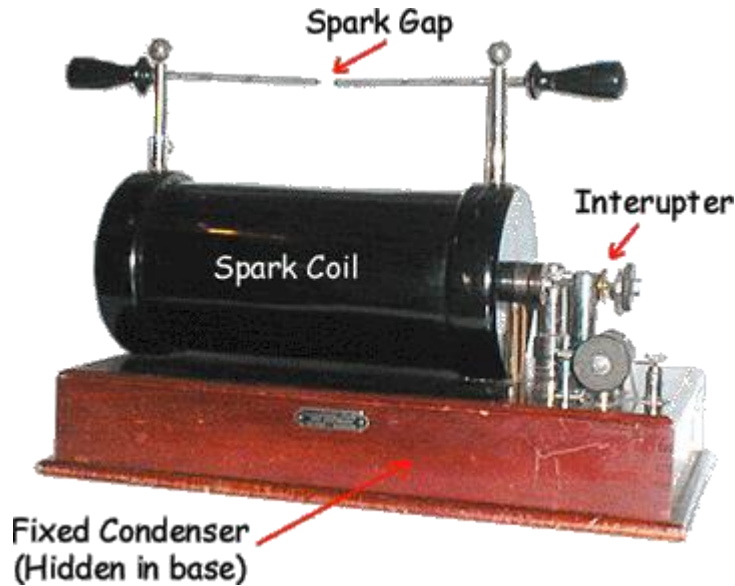
These minutes were respectfully recorded and submitted by Roy AC2GS on this day, January 8th, in the two thousandth and twentieth year of our Lord of Propagation...

The Kings County Radio Club is at www.KC2RC.com or
www.KingsCountyRadioClub.com
KCRC is an ARRL affiliated club (see: www.ARRL.org)

How Does A Vacuum Tube Work?

In the dawn of Radio, there was no such thing as active amplification of a signal.

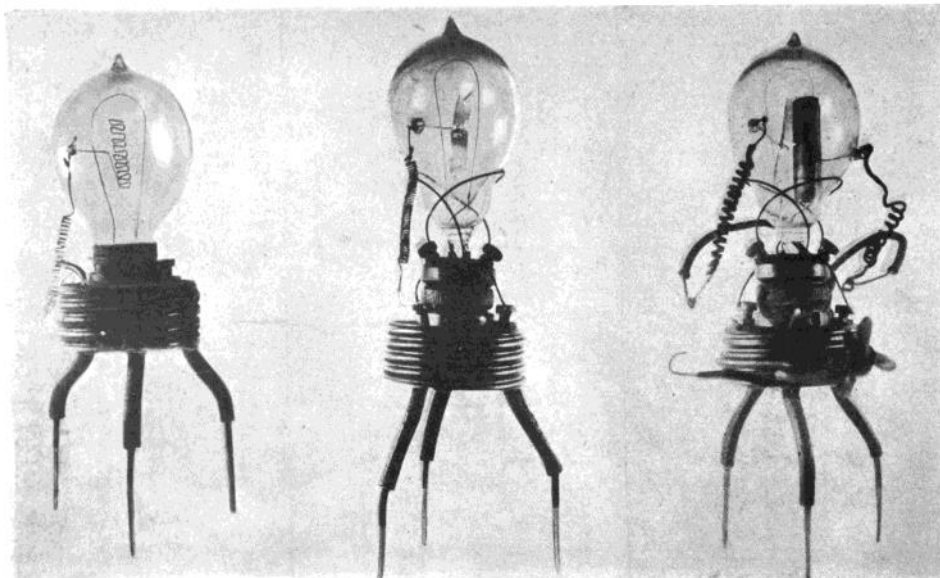
You had a Spark Gap Transmitter creating a harmonic rich ionized arc across two electrodes, and a Coherer, a vial of iron filings that would clump together if they "received" the radio waves from the spark gap transmitter.



Around the same time inventors were tinkering around with light bulbs, something that Thomas Alva Edison's company would not invent, but would improve and make into a viable product.

Experimentalists found that some materials "boiled off" free electrons when heated hot enough - thermionic emissions!

If you placed a positive electrode at the other end of a vacuum glass tube, an anode or a plate and a thermionic emitter at the other end, the cathode, you could make a device that will only run when the current was flowing in only one direction - a diode!



Early versions of Fleming Valves

By the way, thermionic emission was discovered by Frederick Guthrie in 1873, but that didn't deter Thomas Alva Edison from patenting the concept in 1884 (what can I tell ya – life ain't fair).

That was a very useful device, but it still didn't produce the electrical amplification that engineers needed for a more practical radio.

Enter Lee DeForest - tinkerer extraordinaire!



He realized that by adding another bit of wire between the cathode and the plate, a small positive voltage potential placed on that small bit of wire would cause an increase in the current going from the cathode to the plate!

Amplification! Eureka!



Lee DeForest's Audio Tube – The First Triode Vacuum Tube

Lee DeForest may not have been much of an engineer (he did not actually know why his 'Audion' three element triode amplifier actually worked - the earlier versions had the 'control grid' on the outside of the vacu-

um tube. DeForest just knew that it did, well, at least some of the time, to some degree work, but he was a great showman!

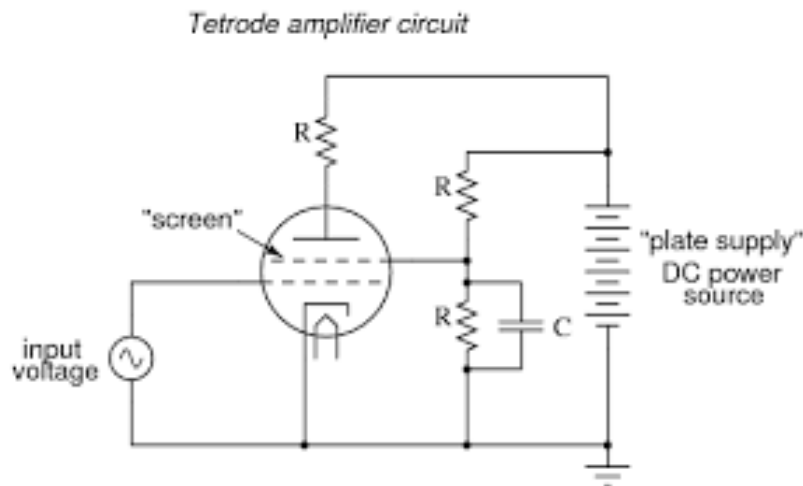
He promoted a new-fangled radio broadcast of opera on his new-fangled radio! But the 'Grid Audion' was erratic and only supplied a little actual amplification and the demonstrations was a failure.

Still, other's improved upon DeForest's design and the triode became a very useful vacuum tube. The cathode would emit a cloud of boiled off free electrons, the plate (or anode to some) would have a positive voltage potential placed upon it, and by varying the voltage potential of the control grid by a small degree, the cathode to plate current could be controlled like a 'valve' does in your water plumbing!

But even the improved triode had a lot of problems.

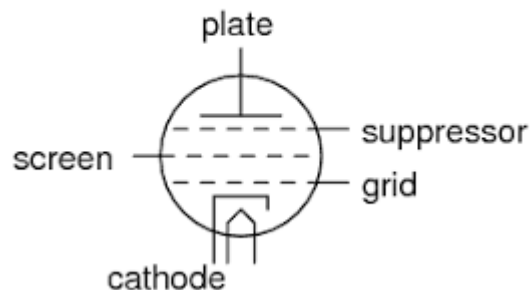
The control grid and the plate suffered from a degree of capacitive coupling, which would inevitably lead to feedback oscillations when the gain was set too high or the signal frequency was too high.

The solution was to build a four-element tetrode, with another 'screen' between the control grid and the plate, to offset the grid-plate capacitance.

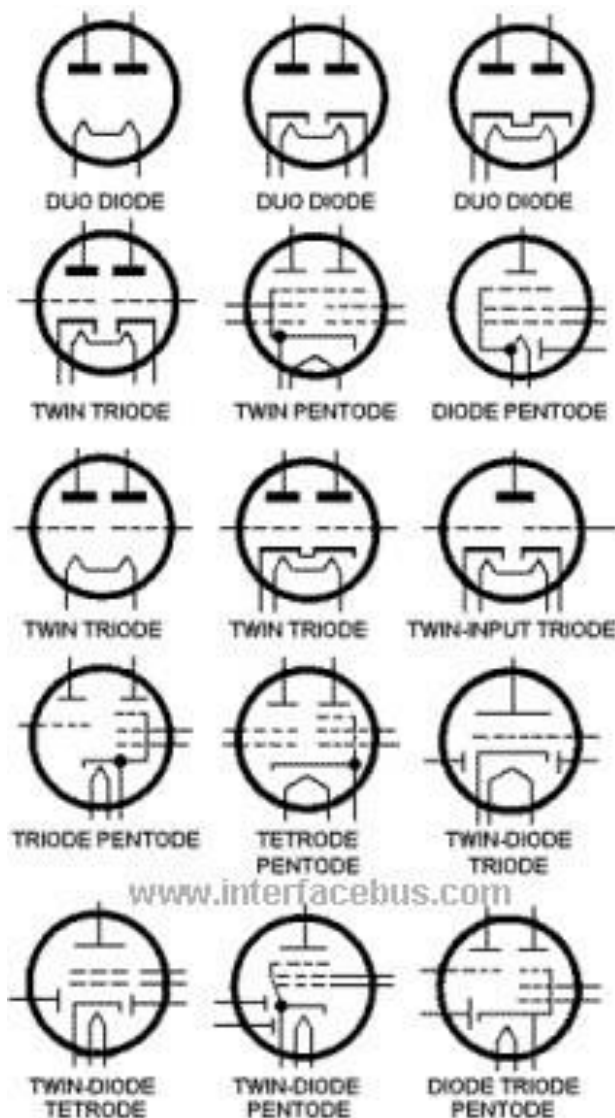


In some cases it was discovered that another screen element would work even better and the 5 element pentode was born. Over time engineers found other uses for these additional screens, and built multiple tubes encased in a single vacuum glass tube.

The pentode tube



Suffice to say, it started to get rather complicated:



The naming system that hams are most familiar with was the Radio Electronic Television Manufacturer's Association naming standard, that began in 1953 - the first numbers would be for the filament heater's voltage rating, the letters in the middle would be used as a manufacturing identifier, and the last numbers would be the number of active elements contained in the tube.

Some audio enthusiasts still favor the amplification characteristic of vacuum tubes, over solid-state transistors. There is still a place for high power vacuum tubes in the final stages of linear amplifiers,

73,

Roy AC2GS

(This article is based on a presentation that was made on a KCRC FusionNet/TechNet. If you are interested in science and technology (and why would you still be reading this if you aren't), check out my Technical Net on KC2RC 146.730, at 9 PM on the second and fourth Wednesdays of every month, or the KCRC Fusion Net, every Thursday at 9 PM – if you don't have a Yaesu Fusion radio for the latter Net, you can always use a YSF or XLX link from a Hotspot, or listen to the audio stream via <http://stream.KC2RC.com>)