

Hambone Goes to the Circus

A Hambone Story by Jaimie Charlton, ADØAB

“This sounds really cool! A circus about electrical surprises,” gushed Dude, Hambone’s younger, yet smarter, brother. The boys were walking to Hambone’s frat house when a poster on the outdoor bulletin board caught their attention. “I always wanted to see a real college seminar. But everybody told me I was too young or not a college student. But now, Professor Gavotte Bransle says everybody’s welcome to his Summer Seminar Circus of Electrical Surprises. That means me and best of all, it’s free! I already like that guy and I don’t even know him.”



“Yeah, yeah,” replied Hambone. “I’ve had him in class and he’s all right, quirky, but all right. He sometimes puts on these sorts of mini seminars. He says he’s trying to spur interest in electronics, but I think his seminars are boring. I already know everything about what he’s gonna talk about. There won’t be any surprises.”

“I don’t care, I still want to go,” replied Dude.

“Well, okay. It might be fun to ask hard questions and see how old Gavvy, that’s what we call him, squirms to answer.”

Later, at the seminar, we find Dude and Hambone occupying front row seats. A few of the other seats in the half-filled hall are occupied by an assortment of frat rats and lounge lizards looking for a cool place to spend a hot summer afternoon.

Professor Gavotte Bransle speaks, “Welcome to the Circus of Electrical Surprises. I hope that some of you will learn something new and eventually become engineers. I also hope that some of you who already ‘know’ what I am about to discuss will learn that what you think is true isn’t and you will be surprised and leave all the better for the experience.”

“Fat chance of that,” whispered Hambone.

“Finally, I think that some of you who may be considering a career in engineering will discover that you are better suited to becoming something less brain-taxing. “Like psychology. Since this seminar is a circus, let’s make our first act all about circuits. After all, circus means circuit, sort of.”

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AUGUST MEETINGS

Aug 13 – Troubleshooting Techniques – Tom Wheeler, NØGSG

Aug 27 – What I have learned using Radio Mobile software – Bill Gery, KA2FNK

The Johnson County Radio Amateurs Club normally meets on the 2nd and 4th Fridays of each month at 7:00 PM at the Overland Park Christian Church (north entrance), 7600 West 75th Street (75th and Conser), west of the Fire Station.

Much of the membership travels to the Pizza Shoppe at 8915 Santa Fe Drive for pizza buffet and an informal continuation/criticism/clarification of the topics raised at the meeting ... or anything else.

LEAVE THE CHURCH, TURN RIGHT (WEST) ON 75TH. TURN LEFT (SOUTH) ON ANTIOCH. TURN RIGHT (WEST) ON SANTA FE. PIZZA SHOPPE IS JUST PAST THE SONIC ON YOUR LEFT.

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-> FEEDBACK <-

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Johnson County Radio Amateur Club, Inc.*

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PRESIDENT'S CORNER

Since we have all become “Zoom Experts” and we are never certain which of the ever-changing



COVID-19 rules and requirements are going to apply on any particular day, we are going to hold-off on in-person meetings through

September. Ted continues to be in touch with the church as to the restrictions they have for large group meetings. We will see what the status is for October. The first meeting in October could be in person. The second October meeting, of course, will be held at the Ensor Farm.

Some good news is that Ensor will be opening for tours for September and October. Our club provides volunteers for October. Ted will be setting up a sign up. It only a few hours on a Saturday or Sunday.

More news is that this year's Ensor auction is on! Mark your calendars for Saturday, October 23. When you have that done, go through your shack and find those items you once believed you needed, but have not touched since you brought them home. They are perfect for the auction.

The club's raffle will also be getting underway. Once again, Vince, KEØCGR, has volunteered to head this up. We will have more details, soon.

- Bill Gery - KA2FNK



The Ensor Farm and Museum (and Ham Shack)
18995 W 183rd Street, Olathe, Kansas
Photo by Charlie Van Way, NØCVW

Johnson County Radio Amateurs Club - July 9, 2021

Meeting Date: Friday July 9, 2021. The meeting Started at 7:00 PM.

Attendance: Due to COVID-19 restrictions, this Meeting took place online using Zoom Video Conferencing. 30 were present.

There were No Minutes from the June 25, 2021 as this was the meeting before Field Day.

The Treasurer's report was Not Available.

Old Business:

- We welcomed all 1st time visitors to the meeting.
- Repeater Update – Bill Brinker, WA0CBW, reported that all 5 Repeaters are doing well.
- The Church is allowing outside groups to start meeting in-person again. The church is requiring for all of us to wear masks while in the church and to keep the air moving via open doors and fans. We will take this under advisement and decide when the Club will start meeting back in person. More details to follow.
- We would like to continue the Zoom feature when we return to in-person meetings. We will need someone to be responsible for this. Let us know if you are interested.
- New Member Committee proposal has been submitted to the Board will be reviewed soon.

New Business:

- Al Rawitch, K0IMP report that the Silent Key plague is currently at the engravers being updated.

Reports:

- 6 m – NR.
- 10 m SSB Roundtable – 6 participated on July 8.
- 40m SSB Roundtable – NR.
- Fusion Digital 440 net – 14 Check-ins on July 7 and 10 for Check-ins on June 30.
- 2m Wheat Shocker net – 14 Check-ins on July 8 and 12 Check-ins on July 1.
- HF Activity – 13 Colonies Special Event, Brazil 80m Antenna 4' off the ground on FT-8.

Announcements:

- Shawnee Mission Triathlon July 11. See Bill Gery, KA2FNK for more information.
- Lenexa Moonlight Bike Ride July 17. See Steve Rainey, WD0DPB for more information.
- Hawk 100 September 11-12. See Bill Gery, KA2FNK for more information.
- Bike MS September 25-26.
- Buffalo Bill Century Ride September 18. See Ray Erlichman, K0RSE for more information.
- Hamclass.org July 24 and 31 in Shawnee.
- See Larry's List for upcoming Events.

Business meeting adjourned at 7:43 PM.

Program:

The Program was a Field Day Recap with Statistics and Impressions from 1st time participants.

Johnson County Radio Amateurs Club - July 23, 2021

Meeting Date: Friday July 23, 2021. The meeting Started at 7:00 PM.

Attendance: Due to COVID-19 restrictions, this Meeting took place online using Zoom Video Conferencing. 32 were present.

The Minutes from the July 9, 2021 meeting were read and accepted unanimously.

The Treasurer's report was read and accepted unanimously.

Old Business:

- We welcomed all 1st time visitors to the meeting.
- Repeater Update – Bill Brinker, WA0CBW, reported that all 5 Repeaters are doing well.
- The Club has decided to continue Zoom Meetings through the End of September.
- New Member Committee proposal has been submitted to the Board will be reviewed soon.

New Business:

- The City of Olathe has decided to open the Ensor Museum to the public for Tours during the Months of September and October. Our Club will be responsible for providing volunteers during the month of October.
- The Club's Annual Ensor Auction and Activities will take place Friday October 22 and Saturday October 23. More details to follow.

Reports:

- 6 m – Ohio, Pennsylvania, 6m ARES Net.
- 10 m SSB Roundtable – 4 participated on July 22 and 5 participated on July 15.
- 40m SSB Roundtable – 2 participated on July 21 and 4 participated on July 14.
- Fusion Digital 440 net – 13 Check-ins on July 21 and 10 for Check-ins on July 14.
- 2m Wheat Shocker net – 16 Check-ins on July 22 and 14 Check-ins on July 15.
- HF Activity – Sweden, Finland, Denmark.

Announcements:

- Club member Harry R Wilson, KA0JLN passed away back in April. His name has been added to the Silent Key Plaque which hangs in Associated Radio.
- Kill Creek Events August 14 and 21. See Bill Gery, KA2FNK for more information.
- Hawk 100 September 11-12. See Bill Gery, KA2FNK for more information.
- Summer Breeze September 12. See Herb Fiddick, NZ0F for more information.
- Bike MS September 25-26. See Herb Fiddick, NZ0F for more information.
- Buffalo Bill Century Ride September 18. See Ray Erlichman, K0RSE for more information.
- Johnson County Fair Parade July 31. See Steve Rainey, WD0DPB for more information.
- Hamclass.org July 24 and 31 in Shawnee.
- See Larry's List for upcoming Events.

Business meeting adjourned at 7:38 PM.

Program:

The Program was a Field Day 2021 Video by Jaimie Charlton, AD0AB.

Submitted by Ted Knapp, N0TEK, Secretary.

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“Let’s consider this circuit. It is simply a battery, a switch and a lamp. Notice that when the switch is in position one, the battery is connected to the lamp. But in position two, the circuit is the same except there is no battery.”

A lady’s voice from the back of the room asks, “Can the battery light the lamp?”

“Yes, it can. Let’s say that the lamp is rated at twelve volts and twelve watts. Let’s also say the battery is a twelve-volt battery. Any other questions? Okay.

With the switch in position two, is the lamp in a complete circuit, anybody? Yes, lady in the back row again.”

“Yes, the lamp is in a complete circuit, but it doesn’t light.”

“That’s correct, but a deeper question is why doesn’t the lamp light?”

Unable to resist any longer Hambone shoots up his hand.

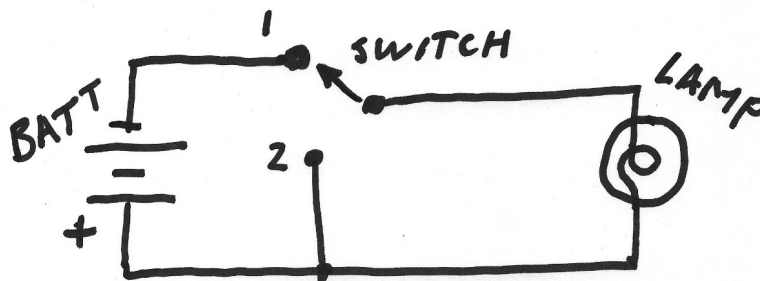
“Yes, gentleman right here in the front row. Please stand up. If I remember correctly, you were in my class last Spring. Your name is Hambone, isn’t it?”

“Go for it!” whispers Dude, loudly.

Surprised by his sudden loss of anonymity, Hambone rises and replies, “Yes, yes it is.”

“Well, Hambone, why do you think the lamp doesn’t light?”

“It doesn’t light because there are no electrons in the circuit. It takes electrons from the battery to make the lamp light. Everybody knows



that.” Hambone sits down satisfied with his answer. But the professor is not.

“Hambone,” he continues, “The lamp and the wires and everything else are all made out of atoms and molecules, are they not?”

“Yes,” answers Hambone, not sure where this is going.

“And atoms and molecules are made out of neutrons as well as positively charged protons and negatively charged electrons, aren’t they?”

“I guess so,” replies Hambone feeling like he is walking into a trap.

“All that said,” continued the professor returning his gaze to the general audience, “Would you expect to get a shock if you touched the lamp or the wires leading to it? Anybody.”

“What was that all about,” asked Dude in a low whisper.

“I sort of gave him a hard time when I was in his class. I think this is revenge. But don’t worry, I can handle him. I know his tricks.”

“We’ll see. So far, I don’t think he’s sweating.”

“Yes, Tim in the third row, would you expect to get a shock?”

“No, because the lamp and other parts are electrically neutral. The positive charge of the protons is exactly canceled out by the negative charge of the electrons.”

“So, Tim, how many electrons and protons would you say there are in the lamp and other parts?”

“Oh, I don’t know, gazillions, maybe more.”

“Thank you, Tim.”

Returning his attention to Hambone, Bransle asks, “Hambone, you said that the lamp doesn’t light because there are no electrons in the circuit. But Tim says that this lamp and its circuit are full of electrons. So, why doesn’t the lamp light?”

“I, I don’t know,” murmured Hambone. “Maybe the battery adds more electrons?”

“Thank you! That’s exactly the wrong answer I’m looking for!” exclaimed Bransle.

“Now who’s sweating,” smirked Dude.

“It is commonly believed that a power source, in this case, the battery, provides electrons that flow like water through a pipe to a load such as a lamp. Surprise! That belief is wrong!

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“The battery doesn’t supply electrons, they are already present in the wires and everything else. The battery simply pushes them along.”

“What do you mean by pushes them along?” asked a voice from the back.

“Exactly what I said.

“Viewed from a distance, the battery is electrically neutral. It is only up close that we see that one end is more negatively charged than the other. This is because a chemical reaction inside the battery has caused a surplus of electrons to migrate to that end making it end negatively charged with respect to the other end.

“Since like charges repel and all electrons have the same negative charge, they really want to leave that battery. By setting the switch to position one, we provide a path and those electrons rush out of the battery.”

“Professor!” asked Hambone regaining a bit of his composure. “You first said that the number of electrons doesn’t change, but now you’re saying that electrons are rushing out of the battery. How can both statements be correct?”

“Good question. Both are true because for every electron that leaves the negative battery terminal, one returns to the positive terminal. The total number of electrons doesn’t change.

“When the chemical reaction inside the battery can no longer separate the electrons, the battery is considered dead.

“So, in summary, power supplies don’t actually add electrons to a circuit, they just push around the electrons that are already there.”

Turning to his brother, Dude whispered, “It’s a good thing we came. Both of us were surprised and learned something new.”

Hambone didn’t answer.

“The second question we want to discuss is, how fast do electrons move through the wires?”

“I know, I know!” shouted Hambone from the front row.

“Okay, Hambone, how fast?”

“Pretty darn fast, almost the speed of light.”

Returning his attention to the audience, Professor Bransle asks, “Who thinks Hambone is essentially correct when he says that the electrons travel at nearly the speed of light?”

Several of the braver students raised their hands slowly but hoped they would not be called on. The students who did not raise their hands looked away trying to avoid eye contact with the professor. Nevertheless, the Professor singled out a boy in the third row and called on him.

“Ken, I don’t mean to interrupt your browsing your Instagrams, but you didn’t put your hand up. That tells me that you don’t agree with Hambone’s assertion that electrons travel at almost the speed of light. How fast do you think they travel?”

With a red face and sweaty hands Ken stood and replied, “I don’t know, maybe the speed of sound?” Ignoring some giggles, Bransle

continued, “Thank you, Ken. While your guess is closer than Hambone’s. It’s still way too fast.”

Relieved, Ken collapsed back into his seat.

“Surprise! The electrons actually move at only about one-thousandth of an inch per second.”

“That can’t be right!” exclaimed Hambone. “If that were true, nothing would work because the electrons from the power company wouldn’t have gotten here, yet.”

“I said this was a circus of surprises and that’s surprise number two. The speed of electrons through the wires is called *drift velocity*. Drift velocity is the speed of electrons in a metal that is caused by applying an electric field. In this circuit, the battery supplies the electric field or voltage.”

A young lady in the back row raised her hand and asked, “In physics we learned that the electrons are bouncing around really fast, maybe thousands or millions of miles per hour. How is this different?”

“The velocity you’re thinking of is the Fermi velocity which is a quantum effect arising from the thermal and other energy carried by the electrons and atoms. Although it is very fast, it is totally random, so it does not result in any current. That’s why we don’t notice it.”

“Okay,” came voice from the far corner of the hall, “If your drift velocity is so slow, how does electricity ever get anywhere?”

“Please, be still and learn.”

Bransle picks up a black erasable marker and began to draw on the white board.

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from HAMBONE on page 6

“This is a magnified view of a piece of the wire used in our little circuit. I haven’t included the other parts because you’ve already seen them.

“These little circles are electrons inside the wire. You see, the wire is full of electrons and all the electrons look the same and we can’t tell one from another. When no voltage is applied, that is, the switch is in position two, the electrons just bounce around randomly inside the wire, but don’t really go anywhere. But when we apply a voltage by putting the switch in position one, things change.

“Here the battery pushes electrons into its end of the wire. But since the wire is already full of electrons, the same number of electrons must be pushed out of the other end. In this case, into the lamp. It is analogous to a pipe full of marbles. You push a marble in one end and a different marble comes out the other. Although you push your marble in slowly, the far end marble come out right away. Because all the marbles look exactly alike, it looks like your marble traveled through the pipe very fast, but it didn’t.

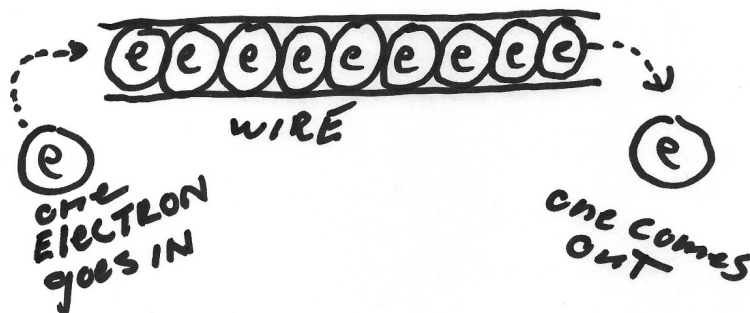
“It’s the same with electrons.

“Surprise! That’s your second surprise!”

“I didn’t know that, did you?” asked Dude.

“Shush,” said Hambone.

“For our third and greatest surprise, let’s talk about laws. Universal physical laws that we all accept. Name some laws you’re familiar with.”



From across the room students shouted out various names and Bransle listed them on the white board.

“That’s good, Newton’s law, and yes, Ohm’s Law, sure, Faraday’s law, Lenz’s Law, Ampere’s Law, great! That’s enough. This is quite an impressive list. But to quote the well-known philosopher, Big Bird, ‘One of these things is not like the others.’ Yes, one of these is not actually a law. Which one is it?”

No hands went up.

“Surprise! It’s Ohm’s Law!”

A collective gasp could be heard across the room.

“Yes, Ohm’s Law which we have all grown to love and hold sacred is not a real universal law.”

“But Professor,” shouted Hambone, “Even our textbooks and other classes always call it a law. Are they all wrong? Or are you?”

“Calm down, Hambone. Nobody’s wrong. We will always call your beloved formula, $I=E/R$, Ohm’s Law because that’s its popular name. But it is not actually a universal law.”

“I guess he told you, Hammy,” whispered Dude.

“Universal laws are derived from the fundamental constants like length,

mass and time or meters, kilograms and seconds. Ohm’s Law is not. It comes from the result of many, many measurements relating voltage, resistance and current together. None of these is a fundamental constant. For example, voltage is a type of force or energy, current is really the flow of charge and resistance is just the ratio between the first two.

“That doesn’t make it any less useful and we will continue to use it in solving many interesting and puzzling problems. But keep in mind that as you progress in your studies, you may find situations in which it doesn’t exactly apply. Don’t get upset. Just remember what it really is.

“Well, that’s it for today, thank you for coming and good luck in your Fall classes.”

As the professor left the stage and the students left the hall, Dude commented to his brother, “Hammy, that was fun. I really liked the way you asked hard questions and really made him squirm. Yeah, he really squirmed.”

“Dude, shut-up!”

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