

WIRELESS HILL BEACON

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Meeting – March 13th 2013

The regular monthly meeting will be held at 7:30 PM on Wednesday, March 13th, at Our Lady of Good Counsel Church, on Upper Ferry Road at Wilburtha Road in West Trenton. The site is easy to reach from I-95 or NJ-29. Talk-in is available on the 146.67 (PL 131.8) and 442.65 repeaters. The directors meeting is 1 hour earlier at the club shack.

Meeting Minutes

Executive board meeting at the shack: First order of business was discussion of loss of members. To date only 25 members have paid. The club is operating at a negative cash flow. One suggestion is to send out dues notices including a self addressed envelope to return, most members may respond to this.

1. The club was offered a 100ft.tower,but it would cost \$1000 to move it.
- 2.motion made and seconded to deep six the land line, thus saving \$400.a year.
- 3.Disconnect refrigerator and have Hy check the exterior lighting to sav on electricity at the shack.
- 4.motion made and seconded to accept the treasurers report for 2012.
- 5.motion about signs at the shack at both entrances.

General meeting called to order at 7:49 all members introduced themselves.

- 1.Treasurer reported a balance of \$1195.\$100 dues collected at the meeting.
- 2.minutes will be posted in the newsletter.
- 3.Due to our negative cash flow it is important to remember that the Triathlon is our only fund raiser. For each member that shows up we are paid \$20 so we need as many members to show up as possible. This event is held on July 20th and 21st, Sat. & Sun. at Mercer Co. Park.
4. Don will hold exams at the library in Pennington on Sat. March 15th. starting at 1pm.
- 5.Loyd reports a successful Field day at the shack: Mike AB2IO had the most contacts.
- 6.Steve KC2VDL will hold a soldering class Sat. the 16th of Feb. at the shack starting at 10am.kits is available. Loyd and Dave donated material.
- 7.Our service projects are the March of Dimes at Mercer Co. Park on April 24th and the Tour de Cure on Sunday June 9th. First tour starts at 6:30 am, event finishes at 1pm, free lunch provided.
- 8.Skywarn coordinator presented an up date on Skywarn after the meeting.
- 9.Don AA2F is chairman of the audit committee and four members volunteered.
10. Webmaster reports that our website was hacked and had to be reinstalled.

Submitted by Cal Moon KC2CKI

BALANCED LINES 2013 Installment 3
by Bob Schroeder, N2HX
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PEnnsylvania 6-5-OH-OH-OH

When you think of behavioral science and human factors, you don't normally think of engineering, but that's what Bell Labs engineer Dr. John E. Karlin was doing. This year marks the 50th anniversary of the Touch Tone® telephone and Dr. Karlin, who died January 28, was the engineer who thought of it.



Karlin's claim to fame was his judicious use of the science called human factors, or as some would call it, ergonomic design. The evolution of the rotary telephone dial came to be known as the Western Electric 500 set. The letters of the alphabet were added to the dial as a mnemonic aid so that people could easily recall the typical seven-digit telephone number by making a word out of it. By creating a word or name at the beginning of the number, it was easier to remember. Growing up in the city of Trenton, we had such exchanges as EXport, OWen, and TUXedo. In 1940 while performing an engagement at the Hotel Pennsylvania in New York City, Glenn Miller came up with the lyrics for his famous tune, PEnnsylvania 6-5000.

As the old Bell System Number 5 Crossbar Office became obsolete in the early 1960s, the new Electronic Switching System (ESS) central office made it possible to dial more quickly using pairs of tones rather than dial pulses. Bell Labs developed the Touch Tone® system using pairs of pure tones the frequencies of which are primes of each other. Even the dial tone was changed from the old familiar "buzz" to the pair of tones consisting of 560 and 690 Hertz. John Karlin led the effort to develop a new push button "dial" (an oxymoron) to replace the staid old rotary dial.

I would now like to introduce the peculiar sounding term, *skeuomorphism*. In a nutshell, skeuomorphism is the technique of modernizing an old thing or application into a more modern one while still keeping some of the old familiar characteristics to make the new thing more user friendly. Examples of this can be found on some Apple products. On the iPhone notepad for example, the pages are made to look like the familiar yellow legal pad. Also familiar is the controversial animation that you see when you "turn the page" on their e-reader. When you swipe the screen, it looks like you're actually turning the page of a real book. It's certainly not necessary, but the app looks that way to give older people the feeling of reading a real book. To an adolescent who cut their teeth on computers, such an "old fashioned feel" is totally misspent.

Karlin's task was to conduct surveys to ascertain how the Touch Tone® keypad should look. Here are some of the things Karlin and his team had to decide. Should the buttons be round or square? How big should they be? Should they be laid out in a circle like the old dial, or should they be arranged in an arc or a rectangle? Should the buttons be arranged like that of an adding machine, or from 1 to 0, top to bottom as they are now? Should the letters still be used? A lot of thought went into the design of the rotary dial as well. For instance, the letters and numbers were placed outside of the finger holes so that you could still see them when you put your finger in the hole. While you probably never noticed, a white dot was placed inside the finger hole to help you "aim" your finger. All of these features were so subtle that most people took them for granted; however, every singly feature was created for a psychological human purpose.

As we all know, the current Touch Tone® dial carries the "pound" or octothorpe symbol (#) and the asterisk symbol (*) for electronic commerce. We no longer use mnemonics at the beginning of telephone numbers. This went out of style when new telephone exchanges had to be added that contained digits that don't spell anything. However, we still have letters on the keypad because modern marketing strategies have created telephone numbers that spell entire words like 1-800-COMCAST or 1-800-PLUMBER. The Touch Tone® telephone was introduced on November 18, 1963 in the cities of Carnegie and Greensburg Pennsylvania.

John E. Karlin was a very accomplished man. Born in Johannesburg, he earned bachelor's degrees in philosophy, psychology, and music. He earned an MS degree in psychology, and his PhD at the University of Chicago. He worked at Harvard and MIT in the fields of psychoacoustics and human factors. One of his projects involved the neurological effects of bomber engine noise and its effects on human concentration on task. In his spare time, he was a violinist for the Cape Town Symphony Orchestra.

So the next time that pre-recorded voice tells you "push 2 for Espanola", you can thank Dr. John Karlin for giving us the Touch Tone® dial. Karlin died at his home in Little Silver, NJ.

EASY AS FALLING OFF A LOG

Whether you enjoy math or not, it's impossible to escape it when you study for your Amateur Radio exam. Depending on your interests and aspirations, there are many principles of mathematics that you'll probably never use once you pass your VE exam. Often, this is because hams are intimidated by all the equations, formulas, and funny symbols. The most common reason for this phobia is because those math principles were never explained properly in the first place.

When I was in school, my nemesis was logarithms. Then one day the light bulb came on when I “got it”.

Every ham knows what an exponent is. The word derives from the Latin *exponere* which means “to put outside of”. And indeed, this is the number that’s placed above and to the right of a number (x) that gets multiplied by itself (y) times: x^y . Before we delve into logarithms, let’s review two important laws of exponents. First, any number raised to the power of 1 equals that number. Second, any number raised to the zero’th power is 1.

Example: $2^0=1$ $2^1=2$ $2^2=4$ $2^3=8$

When expressing powers of 10, the exponent conveniently reflects the number of zeros when the number is greater than one.

Example: $10^0=1$ $10^1=10$ $10^2=100$ $10^3=1000$

You may have observed that all the exponents you’ve ever seen consist of whole numbers (or counting numbers). Until now, you’ve never seen an exponent expressed as a decimal fraction like $10^{2.436}$. That’s going to change.

A logarithm is simply a number that is raised to a particular power in order to get another, smaller number. Logs, as they are colloquially called, were invented by John Napier in the early 17th century to make the process of manipulating large numbers easier. Napier’s system used the number ten as its base. These are often called common logarithms. Leonhard Euler (pronounced “*oiler*”) devised another log system in 1618 that uses the base 2.718, or the constant *e*. Euler’s system is often referred to as natural logs, Napierian logs, or hyperbolic logs. The natural log is written *ln*. The number 2.718 or *e* is a constant that crops up when you deal with the derivative of a hyperbolic function. Luckily, hams don’t need to worry about natural logs. Just know that Euler’s constant 2.718 is a number that is used in computing compound interest.

In reality, you can make up your own set of logarithms using any base you like. Binary logarithms use the number 2 as a base. I could invent a system of logarithms to the base Bob if I had a specific number in mind. For this essay, let’s concentrate on common, or base 10 logs. If you look at the second example above, the exponents or powers attached to the number 10 are whole numbers. As you can see, between the powers of 0 and 1 lies the entire range of numbers between 1 and 10. If you only use whole numbers to make the exponents, that’s all you get: 1 and 10. Now suppose you use a decimal fraction to make up the exponent, for example 0.9030. If you raise 10 to the power of 0.9030 you can intuitively see that the resulting number will be something between 1 and 10. And indeed, that number is 8. Writing this another way, $10^{.9030}=8$. Eureka! We just had a Napier moment and invented the base 10 logarithm. The decimal part of the log (the .9030) is called the mantissa. Let’s codify what we just said in words into a mathematical law.

$x=b^y$ where y is the logarithm of x using the base b .

In the example above, $8=10^{.9030}$ or using our new terminology, $\log 8= 0.9030$

Using the laws of exponents, here is where the beauty of Napier's base 10 or common logarithms comes into play with large cumbersome numbers. Referring again to the example above, exponents bearing the whole numbers 2, 3, 4... signify the number of zeros in the original number. That said, let's look at how we can play with the number 8 just by incrementing the whole number within the exponent.

$$8=10^{.9030} \quad 80=10^{1.9030} \quad 800=10^{2.9030} \quad 8000=10^{3.9030} \quad 80000=10^{4.9030}$$

Expressing this in our new system of logs, we can write:

$$\text{Log } 8=0.9030 \quad \log 80= 1.9030 \quad \log 800= 2.9030 \quad \log 8000= 3.9080, \text{ etc.}$$

The laws of exponents state that when you multiply two or more numbers expressed in this manner, the exponents simply add. When you divide two or more numbers, you subtract the exponents. Try multiplying these two large numbers the long way. $4689 \times 6111 = 28,654,479$

Performing the same calculation using logs, we would do this.

$\log 4689= 3.6710$, $\log 6111= 3.7861$. Adding the logs as per the exponent laws,

$3.6710 + 3.7861 = 7.457$. Taking the antilog (that is, $10^{7.457}$) of $7.457 = 28,654,479$. Voila!

The beauty of handling large numbers as logarithms is that you can tell by the whole number in front of the mantissa how many decimal places you're dealing with. In our example, the numbers 4689 and 6111 are in the thousand or 10^3 range. When you add the two logs together the whole number becomes 7 so you would logically expect your final answer to be a number followed by 7 digits. And so it is: 2 followed by 8654479. Thus, you can visually confirm that your answer is at least in the right range.

You may well ask, What do you do when the number is less than one, such as 0.8? Good question! The logarithm (i.e. the exponent) develops a minus sign, but the clue to the number of zeroes remains the same. Check out this example.

$$\log 0.8= -0.09691 \quad \log 0.08= -1.09691 \quad \log 0.008= -2.09691$$

There you have it. Logarithms are nothing mysterious. It's merely a system to make an exponent out of a big number. Once you've done the arithmetic that you wish to do, you take the anti-logarithm of your answer to yield the big number answer. Before the scientific calculator came along one had to look up logs on a slide rule or in a reference such as the famous book of *Standard Mathematical Tables* published by CRC Press. I still have my CRC book (21st edition) from when I was in engineering school. The problem with doing things like logarithms on a calculator or computer is that you lose the beauty of what you are doing because you can no longer see the process. To most students, doing logs means nothing more than pushing a button and hoping for the right answer.

All for now.

Comments invited.

Bob Schroeder, N2HX

Past President, DVRA

DVRA Nets

2-meter & 70-cm nets on the club repeaters 146.670 pl 131.8, 442.650 pl 131.8

2-Meter Nets:

The Pepper Net 10:00 PM Daily

Mercer Co. Emergency Net 7:30 PM Tuesdays KB2EGL, coordinator.

Training & Upgrade Classes

Don Wright, AA2F, periodically holds Technician and General classes.

Classes are held at various locations. Call Don at 609-737-1723 to register.

Logbook of The World

Mike AB2IO reports that the current W2ZQ LOTW stats

As of: 2/23/2013

of QSOs 16,555

of LOTW QSLs 5,121

Latest QSL matches 2/23/2013

PY1VOY	2008-03-02 20:24:46	15M	SSB	21.28000	BRAZIL
VE2LX	2008-02-17 15:39:31	20M	CW	14.02049	CANADA
VE2LX	2007-01-07 05:16:43	80M	RTTY	3.59500	CANADA
PD9FER	2009-03-08 14:16:22	20M	SSB	14.18660	NETHERLANDS

Fame and Fortune Await

Want to become rich & famous – write an article for the DVRA Beacon. Fame among local hams almost guaranteed – fortune is up to you (and your luck in Powerball). Deadline for submission is one week before the monthly meeting (that would make the deadline the first Wednesday of the month). For details contact Alex / AB2RC – ab2rc@ab2rc.net