



# The KLARION

Newsletter of the Keuka Lake Amateur Radio Association  
Spring 2017

## Profiles in Amateur Radio The Taylor Brothers

Joseph H. Taylor (Joe) and Harold E. Taylor (Hal) were brothers, born in Philadelphia, to a Quaker family.

As boys and young men they built many fully functional antennas which were mounted well above the roof of the three story farm house where they grew up. They built their own radios from a mixture of war surplus material and junk TV sets.

Both men earned PhD's in Physics; Hal from University of Iowa and Joe from Harvard University.

Hal taught at the Richard Stockton College of New Jersey for nearly thirty years. He did research in and taught Astrophysics, Meteorology, Astronomy, Electronics, and general Physics. He was much loved on campus, where he facilitated the construction of the campus astronomy observatory.

Following his retirement, he moved back to the ancestral farm (remember those big rotating antennas?). He was a favorite interview of the local TV news folks, particularly during times of extreme weather.

Hal was also known as an All – American soccer star. He played right fullback and was named to the All – American squad during a time when the entire nationwide roster consisted of eleven men!

He was a dedicated amateur operator until his final illness. Hal passed away in 2001.

Joe is probably the better known brother.

As noted above, Joe is a graduate of Haverford College and Harvard University. Following the completion of his work at Harvard he became a full professor at the University of Massachusetts – Amherst, where he did research in and taught Astronomy. He also served as the Director of the Five College Radio Astronomy Observatory. In 1980 he moved on to Princeton University, where he was a distinguished Professor. He retired in 2006.

He is one of the 1993 Nobel Laureates in Physics for his discovery, with Richard Hulse, of a new type of pulsar, a discovery that has opened up new possibilities for the study of gravitation.

Joe has also maintained a very active interest in amateur radio. He is very well known in the field of “weak signal” work.

His current call sign is K1JT. He has written several software packages and communications protocols, including WSJT (Weak Signal / Joe Taylor). WSJT is useful for passing short messages via non-traditional radio communications methods, such as moonbounce and meteor scatter and other low signal-to-noise ratio paths. It is also useful for extremely long-distance contacts using very low power transmissions on both VHF and HF bands.

Joe is also a fine public speaker. He delivered one of the keynote speeches at the ARRL 50<sup>th</sup> anniversary celebration ... to much acclaim.

Two Philadelphia Quakers and two first class minds ... profiles in amateur radio.

Joel (KC2VAW)



Joe Taylor at the 2014 ARRL Centennial Convention

## The Power Formula

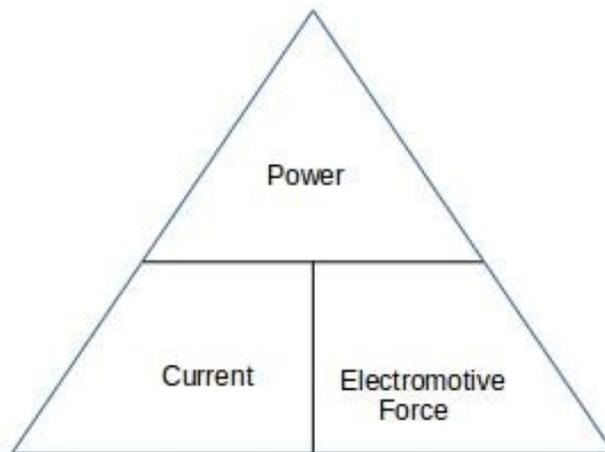
You will recall that last newsletter we discussed Ohm's law, covering resistance, current, and voltage. I promised then that I would write another column discussing the power formula ... and here you are!

The basic power formula is expressed as  $P$  (or power in watts) =  $I$  (in amps) x  $E$  (in volts);

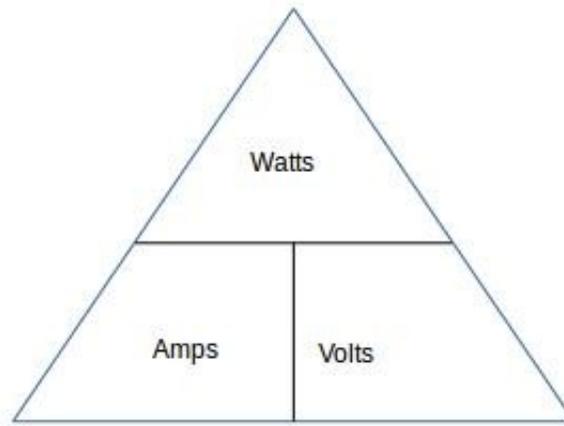
it then follows that  $\text{current } (I \text{ in amps}) = \text{power (power in watts)} / E$  (electromotive force in volts)

and  $E$  (electromotive force in volts) =  $P$  (power in watts) /  $I$  ( current in amps)

As with Ohm's law, we can simplify these formulas to a triangle figure, as follows:



Again, if we reduce this further to units:



A few key points to remember:

- 1) Please understand the neither voltage nor current constitute power by themselves. Power is the combination of (or product of) the voltage and amperage in a circuit.
- 2) Also note that a circuit with high voltage and low current is capable of dissipating the same amount of power as a circuit with low voltage and high current.
- 3) Remember that it is not volts that kill, it's amps! Your body is capable of absorbing large voltage with minimum damage (minimum, **not none!**), but a small amount of amperage is lethal (it only takes 100 milliamps for a fatal dose).

*Joel (KC2VAW)*

## Some Conversation about Digital Modes

### What are all the abbreviations you guys are using?

During our discussion of the digital modes, at the February meeting, some of the abbreviations we were using sparked a lot of questions. Some of these came from the CW and telegraph world, some are unique to the digital modes, and in some cases, the signal is the same, but the meaning is different.

As with most language, things evolve over time!

Here are some of the most common abbreviations (*my comments are in italics*):

- CQ = Calling Any Station (*ubiquitous in all modes*)
- CUL = See You Later (*very seldom used ... I think this is more common with those who grew up with smart phones*)
- BTU = Back to You (*used a lot*)
- DX = Long Distance Contact (*Actually, an “overseas” contact. The 2,670 miles from my station to San Diego is a very long distance, in my book, but it isn't DX. All within the US ...*)
- FB = Fine Business (good) (*One of the most common ...*)
- FER = For (*Used to be common, but likely to be misinterpreted. Most operators now spell this out*)
- GM = Good Morning (*never seen this*)
- GD = Good Day (*have rarely seen this ... except for the Australian stations, who usually sign as Ga Day ... and if you use this be very careful, as in some cases these initials can be translated as a pretty potent set of curse words!*)
- GE = Good Evening (*never seen this*)

*The three abbreviations above are not used much due to differences in time zones. Your morning may be (probably is) their evening ... and may even be the next day!*

- HW = How do you copy (*usually spelled out*)
- HI = Humor Intended (*common in all modes ... particularly among those of us past a certain age. It helps when we know someone else is intending to be funny!*)
- K = Over (*ubiquitous in all modes*)
- KN = Over (*and only the station addressed should respond ... also have seen this translated as “key now”*)

- OM = Old Man (*used to refer to any male operator from 10 to 100 ... Rick Roderick, current President of ARRL, tells a story about calling King Juan Carlos of Spain “OM” on the air!*)
- PLS = Please (*used rarely*)
- PSE = Please (*much more common*)
  
- RCVR = Receiver
- RST = Signal Report (readability/strength/tones) (*actually more helpful for the digital modes to report the actual IMD and S/N values. e.g. IMD is -24 dB and S/N is 19. If IMD is larger than -20 (i.e. -19 to 0 or, God forbid, a positive value), check your station set up... your signal is probably distorted and / or splattering.*)
- RSQ = Signal Report (readability/strength/quality) (*see above*)
  
- SK = Silent Key (*used at the end of a QSO – means you’ve finished transmitting to the other station. I’ve also seen this one translated as “stop keying”. Many newer operators object to using the phrase “silent key” in this way due to its connection to the death of an amateur operator...)*)
  
- TNX = Thanks
- UR = You Are (*don't see this much on the digital modes*)
  
- W = Watts (*almost always spelled out*)
- WX = Weather
- XCVR = Transceiver
- XYL = Wife (*I've only used this once ... never again! In my household the YL's view this as rather rude. Besides, she'll never stop being “young” to me ...*)
- YL = Young Lady
  
- 73 = Best Regards
- 88 = Love & Kisses (*I've only had one phone contact where I used this one (and have never used it in digital modes) . I was, and still am, married to the reverse party! Otherwise, no guts!*)

### **How do I know I am making a “good” signal?**

It's a combination of power (see the piece above) and volume (remember, you are decoding sounds ...). Generally, 25 watts is plenty of power. Volume? Well, you can use the volume slider on your computer to set this. Watch the ALC meter on your rig. You would prefer that this does not move, but a small flutter between 0 and the first scale mark is nothing to be too concerned about.

If you really want to get into this, KK7UQ manufactures a kit for something called an IMD meter, which measures the IMD from your transmission, after it comes off the antenna, using a short whip antenna.

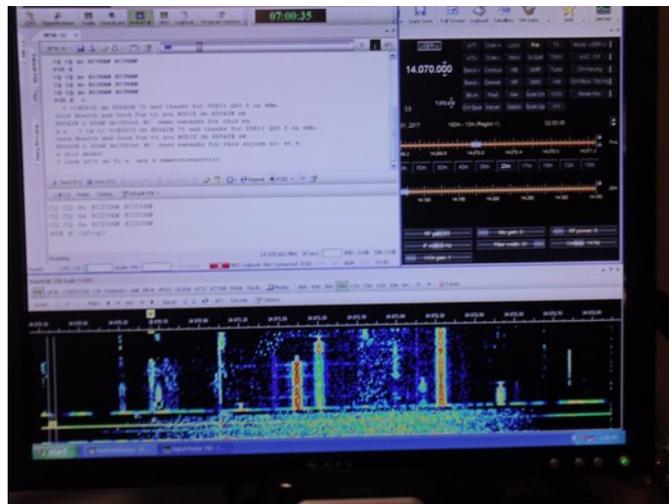
IMD is inter-modulation distortion. Not to get too far into this, but smaller numbers are better (less distorted). You should try for an IMD figure of less than -20. This is one of the reasons I link the SignalLink in preference to the computer sound card. The knobs which control the volume on both transmit and receive are right on the front panel.

There are also meters which can be inserted into the antenna line which do the same thing. I have, and built, a KK7UQ meter, and find it very useful.

A picture of the meter, in action, is below:



A screen full of signals!



## **Where do I find signals?**

Just getting started and looking for traffic? Try these “water holes” for PSK31 signals:

- 160 meters – 1.838 MHz (*I don't have the antenna for this one!*)
- 80 meters – 3.580 MHz
- 40 meters – 7.040 MHz (*and if you find nothing here, try 7.070 MHz*)
- 30 meters – 10.142 MHz (*I have never worked this band ... don't see a lot of traffic*)
- 20 meters – 14.070 MHz (*always some traffic here ... great place to start*)
- 17 meters – 18.100 MHz
- 15 meters – 21.070 MHz
- 12 meters – 24.920 MHz
- 10 meters – 28.120 MHz

Use Upper Side Band first when searching for traffic on these frequencies. If you find nothing, then try Lower Side Band, particularly on 40, 80, and 160. Note that some rigs will want you to specify, not only USB or LSB, but also if you are using a digital (sometimes called a data) mode.

There are different “water holes” for other modes. A quick Google search will show where to start, or if you prefer, just dial through the bands. After all, a real ham never reads the manual!

## **Finally, a few tips for new operators:**

1) **Listen first!** - spend an evening just decoding transmissions, so you can see how a QSO goes.

2) **Know the frequencies!** - see the list of “water holes”, above.

3) **Understand the terminology!** - see the list of abbreviations, above.

4) **Macros, Macros, Macros!** - There is a certain amount of repetition in a QSO. Therefore all digital software comes with macro functionality. This is a pre-set message you can send at the press of a button. As good as macros are, I like to type a certain amount of “free text” to make the QSO a bit more personal. Macros are also a god-send for the DX stations who are not native English speakers!

5) **Try answering a call before calling CQ!** - When just starting out, you will probably get better results answering someone else's call than calling CQ yourself. This is particularly useful if you are operating QRP power (5 watts or less). A lot of folks call this “hunt and pounce”. Note that it's better if you wait for their CQ call rather than giving in to the temptation to call a specific station at, what you think, is the end of the QSO!

6) **Patience, Patience, Patience!** - Stay on frequency for a bit after calling CQ or answering someone else's CQ. This is not, necessarily, an instantaneous mode. It may take the other party a bit to respond (for a variety of reasons), so give them the time and space to do so, particularly if it's a DX station you really want in your log!

The digital modes are a fascinating part of our hobby. They were the primary motivation for me to get my General license. I hope you give them a try, and I sincerely hope you have as much enjoyment (and flat out **fun**) out of this as I have.

Oh, and by the way, for the Technicians reading this ... the digital modes work very well for local work using 2 meter or 70 cm **single side band** data modes (assuming your rig is capable of this ... and **please** don't try this on FM!) ... although without a schedule with another station, you may have trouble finding traffic.

As always, if you have questions or comments, feel free to drop me an e-mail or see me at the next meeting. If I have answers to your questions, you are welcome to them. If I don't have answers, we'll look for the answers together.

*Joel (KC2VAW)*

## **How the BBC scooped the world in the Falklands and used Amateur Radio to do it!**

As related by Laurie Margolis, BBC reporter, editor, senior editor, and amateur radio operator:

Back in 1982 I was a BBC journalist and also an amateur radio operator - I still am. That means I have a call-sign - G3UML - and some expertise in long-distance short-wave communications.

At the very end of March, 1982, I was working on the Golan Heights, hearing on the BBC World Service a bizarre story about Argentine scrap metal merchants taking over the British dependency of South Georgia.

### **Invasion claim**

I returned to London on the morning on 2 April, and went into Broadcasting House to work on a documentary. I was met by scenes of near panic in the radio newsroom.

The Argentines were claiming to have invaded and taken over the Falkland Islands, the 2,000-strong British colony off the south-eastern tip of South America.

The newsroom had Argentine claims, but nothing else apart from a laconic message from the Cable and Wireless station on the Falklands - "we have a lot of new friends".

In a very dreary BBC office block and, in a dusty, junk-filled attic room - number 701 - the BBC's own amateur radio club had a shortwave transceiver. With a big aerial on the roof, it worked pretty well.

My senior editors wondered if there was any way I could contact the Falklands through amateur radio. Nothing else was working. It seemed a possibility. The remote nature of the islands meant that radio was important, and for the small population there were (and are) a lot of radio amateurs down there.

### **'A true scoop'**

So I took up a vigil in room 701, listening carefully across the 14, 21 and 28 megahertz bands for anything from VP8 - the international call-sign prefix for the islands.

And about six hours later, I struck gold. On 21.205 megahertz at 1600 London time, that rather distinctive accent, a bit West Country - a Falkland Islander.

And what a story he had to tell - a true scoop, an exclusive of the greatest magnitude.

The voice was that of Bob McLeod, and he lived in the settlement of Goose Green on East Falkland. His call-sign, I realized, was VP8LP but he was anxious that it shouldn't be used. I have much of what he said that day recorded on an old-fashioned audio cassette.

"We have now been taken over. The British government still denies it but they have no contact I believe with the Falklands, and this is probably why they are still denying it.

"But we have been taken over. There is an aircraft carrier and I believe four other boats - I don't have the details on them - but they do have heavy armored vehicles in Stanley, details I don't know, and quite a number of personnel.

"They landed approx 0930 GMT this morning in landing craft and stormed the capital Port Stanley and have taken over the government office, they landed with heavy armored vehicles.

"We're now under their control. They are broadcasting that all local people will be treated as normal. Fairly peaceful in Stanley at present time."

### **Foreign Office call**

The Argentines had still to reach Goose Green and so Bob was able to transmit his bombshell.

He was getting information from local radio, which broadcast a commentary as the invasion developed early that morning, and then carried on, under Argentine control, transmitting messages of reassurance. The islands' amateur VHF radio network was also buzzing with the story as it developed.

By then my dusty attic was busy with BBC TV crews and newspaper people who'd been told it might be a good place to be.

I went onto the Radio 4 PM program at 1700 London time with an account of what I'd been told. A few minutes later I was rung by the Foreign Office, who understood I'd been in touch with the Falklands and wondered what they were saying. I gave them a bit more of Bob.

"Damage we don't know, shooting around a very rough guess approx two hours. Three deaths of Argentineans [sic] in the Falklands, one believed to be very senior.

"The English marines and local defense forces - we have no information. Took over Government House, and then taken over all of Port Stanley. And I believe they shot up the Cable and Wireless transmitting station.

"Helicopters flying around Stanley. 500 personnel in Stanley, and aircraft carrier believed to be carrying 1,500. Flying Hercules aircraft, one has come in."

It clearly made an impression. Within an hour the Foreign Secretary, Lord Carrington, was on his feet in the House of Lords confirming a massive British humiliation.

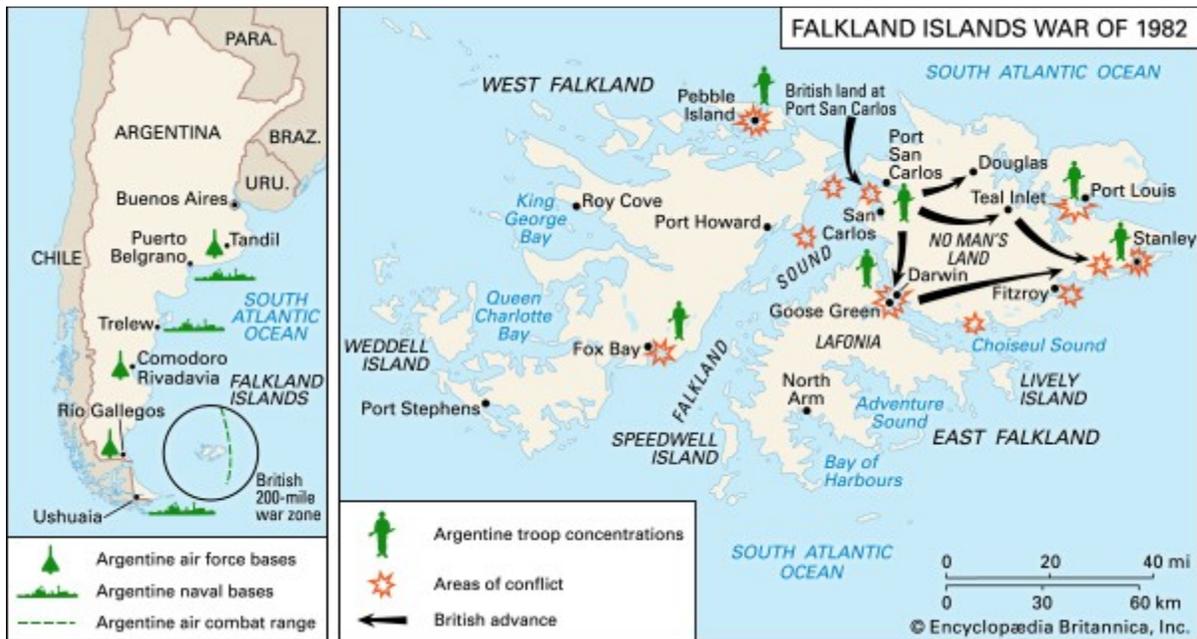
Both Laurie and Bob are still with us ... and still very active in Amateur Radio.

*Laurie Margolis (G3UML)* was inducted, in 2013, into the CQ Hall of Fame for his contributions to Amateur Radio. His mother, Sylvia, the former Public Affairs officer for the Radio Society of Great Britain, was inducted posthumously a year later. They are the only "mum and son" duo to ever have been so honored.

*Bob McLeod (VP8LP)* moved from Goose Green to Stanley several years ago. I am very happy to have both digital (PSK 31) and phone contacts with Bob in my log. Both are from back in 2011 when the bands were in much better shape. The McLeod's station is a "big gun" with a Step IR beam antenna and a large amplifier, Bob is a very active operator, and is "on" almost every evening! He works the pile ups like a pro and is an all around great guy.

His wife, Janet McLeod (VP8AIB), is active in the YLRL, as a “friend from around the world” and also a very active participant in the Islands on the Air program. The Falklands are “activated” for IOTA on a yearly basis by Janet and a crew of other YL's from “VP8” land!

Joel (KC2VAW) with a big thanks to the BBC!



## **Exciting News!** **New Bands!**

On March 29<sup>th</sup>, the FCC issued a Report and Order regarding rules for use of two new amateur radio bands. The rules will become final 30 days after their publication in the Federal Register.

The new bands are:

**630 meters** – 472 to 479 kHz (note that this is kilohertz and not megahertz as our other bands). This band is limited to an equivalent isotropically radiated power of 5 watts, except for those portions of Alaska within 800 kilometers (about 479 miles) of Russia. The power levels in these areas is 1 watt EIRP. Antenna structures are limited to a maximum of 60 meters (about 197 feet) above the Earth's surface. Permissible modes are CW, RTTY, data, phone, and images.

**2200 meters** – 135.7 to 137.8 kHz (as above, note that this is kilohertz and not megahertz as our other bands). This band is limited to an equivalent isotropically radiated power of 1 watt. Antenna structures are limited to a maximum of 60 meters (about 197 feet) above the Earth's surface. Permissible modes are CW, RTTY, data, phone, and images.

Both bands will be available to General, Advanced, and Extra class licensees.

There are restrictions on the necessary separations from powerlines which carry PLC (Power Line Carrier) emissions. Power Line Carrier systems are data emissions carried over powerlines which provide “command and control” functions for the electric grid and other power systems.

If you wish to read the Report and Order, it can be found here:

[http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2017/db0329/FCC-17-33A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0329/FCC-17-33A1.pdf)

Note that antennas at these frequencies will be **very** large. A half-wave dipole for 475 kHz is about **985 feet** long! It is also impossible to mount this at a half – wavelength over ground, as there is a 60 meter height restriction.

I would expect that both of these bands will probably be worked via HWV (helically wound vertical) antennas, over very large (and very long) radial fields.

Fun, fun, fun. Now we need to build a transceiver which can operate in these ranges. Transverter, anyone?

*Joel (KC2VAW)*

## Nominal Pipe Size

### Know What You are Buying!

Amateur radio antenna builders love PVC pipe. It has a lot to recommend it. It is dimensionally stable and strong in all directions (although its strength in compression needs to be carefully assessed). The various sizes can be “nested” or telescoped, and it is inexpensive.

It is, however, important to know what you are buying. The discussion below applies to any pipe, either steel or plastic. Most of our uses can be met by plastic pipe (either PVC or CPVC).

Nominal Pipe Size (or NPS) is a North American set of standards for pipe size, originally set up in 1927. It originally referred to wrought iron or wrought steel pipe. Neither is used much in today's construction, but the standard remains.

“Nominal”, in this case, is a non – specific term and identifies the diameter of the **interior** bore. For example “2” nominal steel pipe refers to any steel pipe with an interior diameter of 2”. In order to fully specify the proper pipe size, a second number specifying wall thickness (or Schedule ) is used.

Thus, 2” Schedule 40 pipe is 2.375” in outside diameter with a wall thickness of 0.154”. If we need greater strength we can step up to Schedule 80 pipe, which has the same outside diameter and a wall thickness of 0.218”. Schedules 120 and 160 are also available, although much more costly and unlikely to be available at the local home improvement store (a plumbing supply house will have them or can get them for you).

Outside diameter and wall thickness are of interest to us as radio amateurs. Outside diameter allows us to compute the outer circumference (outer circumference =  $\pi$  times the outside diameter). For 2” Schedule 40 pipe the outer circumference is 7.4613 inches or approximately 7 ½ inches.

If we use PVC pipe as a coil form or to build an HWV antenna (see previous article), knowing the circumference of the pipe lets us calculate the number of turns of wire necessary for our purposes.

One final point to consider is UV resistance. Most PVC and CPVC pipe was **not** made to be used outside, in full sunlight. After a year of exposure to the levels of UV light in full sun, you will see some discoloration (often from white to brown). This is also referred to as “sun burn”. Industry publications indicate that sun burn causes no diminution of pipe stiffness (or external load capacity). The factor which is most compromised by UV exposure is impact resistance (the ability of the pipe to withstand rapid external force or violent contact).

One way to decrease the effects of UV light exposure is to paint the pipe. You may wish to paint for aesthetic reasons, as well. If you do this, be sure your paint is designed for plastics and carefully follow the directions!

A table showing critical dimensions for various sizes and schedules follows.

KC2VAW (Joel)

NPS	OD [in (mm)]	Wall thickness [in (mm)]							
		SCH 5s	SCH 10s/20	SCH 30	SCH 40s/40 /STD	SCH 80s/80 /XS	SCH 120	SCH 160	XXS
⅛	0.404 (10.26)	0.035 (0.889)	0.049 (1.245)	0.057 (1.448)	0.068 (1.727)	0.095 (2.413)	—	—	—
¼	0.540 (13.72)	0.049 (1.245)	0.065 (1.651)	0.073 (1.854)	0.088 (2.235)	0.119 (3.023)	—	—	—
⅜	0.675 (17.15)	0.049 (1.245)	0.065 (1.651)	0.073 (1.854)	0.091 (2.311)	0.126 (3.200)	—	—	—
½	0.840 (21.34)	0.065 (1.651)	0.083 (2.108)	0.095 (2.413)	0.109 (2.769)	0.147 (3.734)	—	0.188 (4.775)	0.294 (7.468)
¾	1.050 (26.67)	0.065 (1.651)	0.083 (2.108)	0.095 (2.413)	0.113 (2.870)	0.154 (3.912)	—	0.219 (5.563)	0.308 (7.823)
1	1.315 (33.40)	0.065 (1.651)	0.109 (2.769)	0.114 (2.896)	0.133 (3.378)	0.179 (4.547)	—	0.250 (6.350)	0.358 (9.093)
1¼	1.660 (42.16)	0.065 (1.651)	0.109 (2.769)	0.117 (2.972)	0.140 (3.556)	0.191 (4.851)	—	0.250 (6.350)	0.382 (9.703)
1½	1.900 (48.26)	0.065 (1.651)	0.109 (2.769)	0.125 (3.175)	0.145 (3.683)	0.200 (5.080)	—	0.281 (7.137)	0.400 (10.160)
2	2.375 (60.33)	0.065 (1.651)	0.109 (2.769)	0.125 (3.175)	0.154 (3.912)	0.218 (5.537)	0.250 (6.350)	0.344 (8.738)	0.436 (11.074)
2½	2.875 (73.03)	0.083 (2.108)	0.120 (3.048)	0.188 (4.775)	0.203 (5.156)	0.276 (7.010)	0.300 (7.620)	0.375 (9.525)	0.552 (14.021)
3	3.500 (88.90)	0.083 (2.108)	0.120 (3.048)	0.188 (4.775)	0.216 (5.486)	0.300 (7.620)	0.350 (8.890)	0.438 (11.125)	0.600 (15.240)
3½	4.000 (101.60)	0.083 (2.108)	0.120 (3.048)	0.188 (4.775)	0.226 (5.740)	0.318 (8.077)	—	—	0.636 (16.154)

# For Next Time

- **Report from Dayton?**
  - **Hopefully with pictures ... we all want to hear about the new venue!**
- **Report from Field Day**
  - **Again, pictures gratefully received!**
- **New Antenna Ideas**
  - **Please let me know what you are interested in (vertical, dipole, NVIS, something different?)**
- **News from ARRL**
- **Profiles in amateur radio**

**Take care of each other, have fun, operate in public, and don't be afraid to explain what you are doing ... you are the face of amateur radio!**