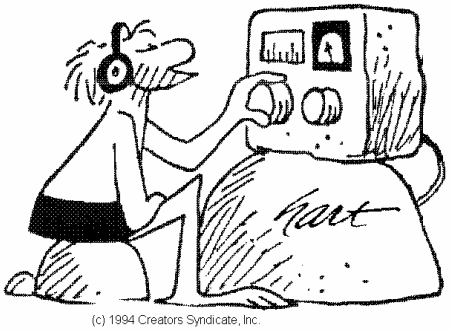

BARA Facts

Newsletter of the Binghamton Amateur Radio Association

March 2003

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

UPDATE ON THE SHACK

Ron, AA2EQ, reports that the Shack on Milks Road has been cleaned out and Paul, N2NCB, reports that NYSEG has turned off the power as we wrap up the final details of "closing out" and decommissioning the Shack.

Several potential new sites have also been investigated and we continue the search. Thanks to all who have brought locations to the Club's attention and to those who have evaluated the locations!

SKYWARN Training & Notes

Jack, WB2GHH, reports that the program for March will be our annual Skywarn Training and that it will be provided by Dave Morford, KB2TTT, the SKYWARN Coordinator from the Binghamton Office of the National Weather Service.

Please feel free to invite friends and family (Hams and non-Hams alike) to this meeting. Dave's presentation is always interesting and we understand that it has been updated with new and topical material. SKYWARN Training is always useful and a valuable aid towards understanding what happens "above and around" us here in Western New York.

Jack also reminds us that March 16th through 22nd is Severe Weather Awareness Week. Listen to NOAA Radio as well as to 146.82 MHz and the Local Repeaters for "Special Events!

New York State Antenna Bill

S63 — The New York State Antenna Bill — was reported out of committee on 5 March and is now on the State Senate calendar for a vote. You can find details — including how your Senator voted the last time around — at http://www.hudson.arrl.org/.

If you have not written to your Senator, please take a moment to do so now. Sample letters can be found at the noted Website. If you write, please be sure to note the Bill Number (S63). Note too the key points that the bill is a restatement of Federal Provision and that Radio Amateurs provide valuable Public Service and Communications when All Else Fails.

The bill is named for Jimmy Hannell, W2JHO, who ran the news-stand in the Legislative Office Building. Jimmy worked very hard to get the bill passed by the Senate last year and passed away suddenly in January of this year.

Congratulations Are In Order!

The Quarter Century Wireless Association Journal, in its Winter 2002 issue, reports that Andrew F. Schaefer, KB2ZWZ, was awarded the *QCWA Travis Baird (W9VQD) Memorial Scholarship.* As you may recall, Andrew, the son of Andy (W3SW, Ex WA3WKA) and Karen Schaefer, was recognized last year by BARA as the first recipient of our own *Esther Valky Scholarship.* Congratulations to the Schaefer family. *– Jack, WB2GHH*

Bill Pierpont, N0HFF, SK

Bill Pierpont, N0HFF, became a Silent Key on 20 February at the age of 88. Although his name and call might not be known to you, perhaps they ought to be. Bill is quite well known among fans of CW as the author of *The Art and Skill of Radio-Telegraphy.* A fan and student of CW Operation who understood well the difficulties that many beginners encounter, Bill researched CW Learning Methods and developed a careful synopsis that distilled the best of what he had learned. In the tradition of Ham Radio he made his knowledge available to anyone who was interested in learning CW and with the help of friends his text was placed on the Internet as HTML and later PDF Files. You can see the text at http://www.qsl.net/n9bor/n0hff.htm and download it for reading and use. Covering all aspects of CW Operation from the basics of learning the code through overcoming pitfalls and developing good habits, Bill is at once a wise guide and an understanding Elmer.

If you have never learned the code, if you are struggling to get past a plateau, or if you are an experienced CW Operator you will find something of lasting interest and value in Bill's book.

A native of Wichita, Kansas, Bill worked as an Aeronautical Engineer until his retirement. He was also a dedicated Christian and a student of languages who authored or co-authored several books and articles related to Biblical Studies and Translation. Sometimes it is surprising the things we don't know about the people we meet, but sometimes it is just those "unknowns" that make a person whole and interesting. In Bill's case it seems that those things that really mattered to him filled and informed his actions. The words "Freely I have given as freely I have received" and "To comfort the weary" come to mind and are the perfect counterpoint to the work he made available and shared with all — Ham and Non-Ham alike.

N0HFF may be a silent key now, but there are many who remember his words of encouragement and appreciate the gift he freely gave over the Internet.

A New LOFER Record

Reaching Alaska from the United Kingdom using just a single Watt ERP is quite a feat for any band, but the Radio Society of Great Britain reports that Laurie Mayhead, G3AQC, was heard in Alaska on 136 kHz. In the early hours of February 15, he transmitted to Laurence Howell, GM4DMA/KL1Y in Anchorage, and just before UK dawn at 0615 his call sign was clearly identified using software to read the signal.

G3AQC was using QRSS--very slow CW--with a 60-second-long dit. The 7278-km distance is a transmission record for 1 W ERP on 136 kHz.

Two years ago, Mayhead and Larry Kayser, VA3LK, made ham radio history when they completed the first two-way transatlantic exchange on 136 kHz, also using very slow speed CW. Last year G3AQC became the first person to span the Atlantic on 73 kHz.

Howell expressed surprise that the path involved in the latest accomplishment is "notoriously poor" between southeastern Alaska, on the east coast of the Pacific, and Europe. "The signal would theoretically go on a Great Circle route to nearly 90 degrees north, over the northern Canadian Arctic, northern Greenland, east of Iceland, Glasgow, then over the UK to the South Coast--across and through the auroral oval." He said there's speculation that the actual path might been around or even under the auroral zone, since no auroral Doppler was seen on the received signal. Howell and Mayhead credited research and preparation carried out by G3NYK, G3LDO, W3EEE, and W4DEY, for helping to set the new LF record. *— RSGB via the ARRL Letter of 7 March*

The Reality of SWR

Standing Waves in an Antenna System arise whenever there is a change of Impedance. If the Feedline/Antenna System is "flat" and there is no Impedance Change along the path from the Transmitter to the Antenna, there will be no Standing Waves. When there is a change of Impedance the RF Voltage and Current as well as the resultant Power divide ***at the point of impedance change*** and some portion is reflected back towards the Transmitter while the remainder is absorbed across the Impedance "Bump". The proportion of division is expressed using a dimensionless value called the Reflection Coefficient.

RF Voltage and RF Current combine as RF Power and the portions reflected due to an Impedance Mismatch give rise to Standing Waves (and hence a Standing Wave Ratio or SWR) in the system. The Reflection Coefficient is a common factor that permits us to relate these quantities. But note this important fact: ***The Reflection Coefficient is a property developed at the point where Impedance Changes.*** It there is no Impedance Change, there is no Reflection Coefficient and although the "flat" portion of your system may show different RF Voltages and Currents at different points along the Feedline (because the RF Voltage and Current are sine waves), the SWR is constant! That's right, the SWR along a"flat", lossless, Feedline is constant. Furthermore, SWR can be referenced to VSWR (Voltage Standing Wave Ratio) or ISWR (Current Standing Wave Ratio).

Now, to be honest, practical Feedlines are not lossless and attenuation due to these Feedline losses will result in a change of SWR, along the Feedline, however this reduction is solely due to attenuation in the line and will be different for different grades of Feedline. It also represents a real loss and if it is great enough to "improve" your SWR you would be better off getting better Feedline.

Why then do some claim that you can change the SWR by adjusting Feedline Length? The answer comes from a special property of a Feedline, namely that — subject to certain constraints — a Line Section can act as an Impedance Transformer. You cannot move the Transmitter Feedpoint to a point where the SWR is "better" by adding or subtracting Feedline, but you can change the degree of Impedance Mismatch by adding or subtracting Feedline. This leads to a new value for the Reflection Coefficient and this in turn to a different SWR!

That's worth careful consideration: The junction between the Antenna and Feedline may be fifty ohms when the antenna is resonant, but it assumes some other value when the antenna is operated off its Resonant Frequency. Under these conditions a fifty ohm Coax Cable can be trimmed (or lengthened) to bring the System Feedpoint *at the Transmitter* to fifty ohms. This is not the same as "moving to a place on the line where the SWR is better". On the other hand, the length of the Coax does not really matter if the Antenna Feedpoint presents the same Impedance as the Coax.

Consider now Reflected Power when the SWR is greater then one. Despite some "conventional wisdom" the Reflected Power is eventually radiated by the Antenna. Once it reaches the System Feedpoint, it is re-reflected back towards the Antenna and it will be radiated. That's right, except for a slight loss due to attenuation in the Feedline all of the reflected power is re-reflected and radiated. For proof, see Walt Maxwell's *Reflections,* the *Antenna Handbook,* or the texts written by the people who make their living designing commercial Antenna systems. Understanding this fact is the first step towards using SWR and Reflected Power measurements to form an intelligent assessment of a particular Feedline/Antenna System.

So let's analyze several situations where the SWR for a Feedline/Antenna System is known and we wish to make a general inference about the System as a whole.

My SWR is low (or flat) across the entire band. So is the SWR for a Dummy Load. Although it is possible to "broadband" an Antenna by taking certain design steps to assure that the SWR is low for a certain range of frequencies *we should always be suspicious if an SWR Curve for an Antenna is too flat.* In extreme cases losses in a bad Feedline may dissipate a large portion of power or some part of the Antenna System may be acting as a terminating resistor to dissipate a portion of power as heat.

My SWR changes along the feedline. If the SWR at the Transmitter is significantly different from the SWR at the Antenna Feedpoint there are two possible causes: (a) The Feedline is radiating because of coupling between the Antenna and Feedline or (b) The Feedline is excessively lossy. A Balun may cure the Feedline Radiation, excessively lossy line should be replaced.

My SWR changes over time. Running periodic SWR Curves on an Antenna System is a good way to detect hidden problems. *A System SWR Curve should remain constant if the system is not changed* so sudden increases *or decreases* in SWR are indicators of a problem.

My SWR is too high. Define "too high". The reality of SWR is that *unless your Feedline is excessively lossy SWR in itself will not introduce any significant Power Loss.* Further, unless you are involved in television transmission, RADAR, or certain other applications where the combination of modulation technique and/or Feedline Length/Transmission Frequency lead to signal degradation in the presence of high SWR there is only one area of concern introduced by High SWR and that is *excessive RF Voltage in the Feedline.* Voltages are excessive if they cause breakdown of the insulation in the Feedline (or Transmatch) or damage to Transmitter "Finals" because their operating limits are exceeded. In either case, however, the problem is not SWR itself, but the Voltage Maximums and these can be derived from SWR (see the ARRL *Antenna Handbook*) by multiplying the Power (in Watts) delivered to the Feedline (at the Transmitter) by the Line Impedance (typically 50 Ohms for Coax) and the SWR. Extract the Square Root and multiply the result by 1.41 (the Square Root of two) to get the Peak Instantaneous Voltage on the line. If this Voltage exceeds the limits for your Feedline (or your Finals) your SWR is "too high". If it is comfortably less, then your only concerns should be: (a) The loss due to SWR which, as noted in the past, is often far less than expected; and (b) Using an Antenna Matching Unit to reduce SWR *as presented to the Transmitter* in order to avoid the tendency of certain Solid State Transmitters to reduce power in the presence of SWR.

Writing for the *BARA Facts*

The Editorial Staff of the *BARA Facts* is always pleased to receive articles and notes. If you would like to submit an article, please send it to your editor Ed, KB2SCF, via e-mail (kb2scf@arrl.net), by snail mail to his Callbook Address, or to the BARA Post Office Box.

Our skilled wordsmiths will massage your prose into verbage similarly resembling to that which were spoken by the Bard of Avon or approximating nearly thereto that of Hemingway!

Seriously, though, this is *your* Club Newsletter and we want it to reflect *your* interests. Submissions and suggestions are always welcome and provide welcome relief from whatever happens to get shaken out of your editor's dustbucket as a Monday deadline approaches.

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, March 19th Unitarian Universalist Church Riverside Drive, Binghamton, Next to Lourdes Hospital

Board Meeting

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

Exam Session

7:00 PM Monday, March 31st
Vestal Public Library, Route 434 Vestal
1:30 PM, Saturday April 12th
Endicott Fire Station, Across from UE High School

BARA Dues

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