

# Natural Radio

*News, Comments and Letters About Natural Radio*

**June 2000**

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*Of Cats, Static, Weird Sounds And Research* Amid the great and wondrous mysteries of the universe, I have just discovered another. Why do my cats, who totally ignore or avoid me at other times, love to rub against my leg when I am outside listening for whistlers? This creates enough static to totally obliterate the hum that usually blankets my listening. Are they attracted to the static charge that drains through the E-field antenna from my local part of the universe and builds up a high potential across the high resistance of my shoes? Or maybe they can sense my irritation and therefore continue, as causing irritation seems to be a reinforcement for feline behavior.

This and another experience that I shall relate shortly got me thinking about our role as amateur experimenters and observers. If you check out the sites at Stanford or University of Iowa, it is obvious that some heavy duty research is being done on whistler related phenomenon. I have difficulty making it through even the titles on most of the research papers. These kinds of studies are valuable and are the results of hard work from dedicated researchers. However, scientists often face constraints dictated by their specialty and the scope of the research grant. They can't always follow the interesting side roads that arise from their studies. Peer pressure and professional reputations prevent them from investigating some of the fringe areas of silence. As amateur observers and researchers we are free from these restrictions.

I occasionally do some shortwave listening, both on commercial frequencies and in the hambands. I have noticed, for the past year or so, that in listening to a station I often hear what sounds like a carrier being rapidly swept across the frequency. Sort of like the sound you hear when you spin the dial and rapidly tune across several strong stations. At first I wrote this off as some irritating ham tuning his rig across the band with the key down. However, the frequency of occurrence, and the fact that they seemed to be happening on all bands – commercial, broadcast and amateur – led me to believe it was more than the mischief of a few disturbed hams.

Several weeks ago, after a bug-free winter, I contracted a nasty cough and cold and was having difficulty sleeping. I turned on the SW receiver that is on my nightstand and tuned to an unused frequency near 6.8 MHz. I began hearing the rapid sweeps at the rate of about one every two or three minutes. I switched to 11.2 MHz. Same thing. 3.4 MHz. Same thing. Hmm. Maybe I discovered HF whistlers! (A delusion no doubt fueled by codeine and lack of sleep.) In any case, more investigation was in order, especially to eliminate possibility that the sounds were coming from within the receiver.

Several days later I turned on two SW receivers in the shack around 6.8 MHz and tuned a few hundred kHz apart. Sure enough I began hearing the sounds and sure enough first in one receiver and then the other. I determined that the signal was an upwardly sweeping carrier being tuned at approximately 100 kHz. per second. Time to do some research. It only took about an hour on the internet to locate some correspondence on one of the shortwave newsgroups that talked about the phenomenon. It seems that the explanation is that these signals come from ionosondes, which are devices used to measure the propagation

characteristics of the ionosphere at a given time. As I understand it, the device transmits a carrier that is swept across the desired band. A receiver, which tracks the transmit frequency, either listens for reflections off the ionosphere or at some remote location senses propagation across a desired communication path. One use might be to see which frequencies are best for communications between two points at any given time. They typically sweep the band at about 100 kHz per second which correlates with my rough measurements. The devices are purportedly used by governments and the military which is why they don't seem to mind interfering with amateur, commercial and broadcast communications.

Now of course you may ask, "What does this have to do with natural radio?" At this time maybe not a lot. But it raises questions as to why the government is so interested in HF propagation lately? Might it have something to do with the HAARP project? Maybe the military just trying to get more efficient use of the crowded HF spectrum. The point here is that this is another observation that may be of use someday and as amateurs we can investigate these things and maybe someday find some relationships that lead to discovery. In my experience, it is rare that some piece of esoteric knowledge I acquired didn't find a use later on.

In the correspondence I receive, I find that many of you have diverse interests -- amateur radio, study of earthquakes, radio astronomy -- and much more. The cross pollination of these varied interests can lead to some interesting discoveries, and then we can let the professional researchers work out the math.

On the other side of the coin, being amateur observers means that we can listen for the sheer enjoyment of hearing the sounds of nature and nothing more. Discovery and research aren't required. Sometimes the joy of tuning into the sounds that are all around us but no one else hears is enough.

***Dayton Hamvention*** I just returned from the Dayton Hamvention this afternoon, and for those of you who have never attended it is a real experience, especially the fleamarket. I drove out early Friday morning with two of my sons, Jeff, KB9SXU and Kevin. We immediately met up with my cousin Dave KB9JKL from Ohio and we began touring the fleamarket. I didn't see much LF gear, a few commercial receivers that covered the LF range and that was it.

Later that evening I met up with long-time LWCA member Henry Lee III, KB1PE and his friend Ed, WA3NGD (Not an LWCA member, but we are working on him). We spent several hours discussing Natural radio and LF topics and swapping stories. Henry is in a fairly quiet location north of Baltimore but hears only tweeks and spherics but never whistlers. This is similar to my experience. Our question, of course, is do whistlers favor the western areas of the US? Or is it just that in those quiet locations away from power lines, listeners can crank up their gain to hear the fainter whistlers and other natural radio signals. It would be nice to hear from anyone in the Midwest or East who listens on a regular basis to see if we can develop a pattern to the appearance of whistlers.

It was great having a face-to-face meeting with other Natural Radio enthusiasts. It would be great to expand the group at Dayton next year.

***The Strange Sounds of SLF*** Those of you who read this column regularly should be familiar with John Lauerman, WB7TQT. John is a frequent contributor to this column and one of the few who does regular observing at the frequencies below 3 Hz.

John has produced a cassette of some of the recordings he has made at these frequencies, which has been for sale here for the past few months. This is another splendid illustration of the wonders of Natural Radio.

Now of course radio below 3 Hz is not within our audible range, so John has done a couple of tricks to make the observations audible.

On side one of the tape the events are “time compressed”. That is, the original events are recorded on a special tape recorder (with a response to below 0.1 Hertz and then sped up by a factor of 550, thus bringing them into the audible range.)

One side two of the tape a different technique is used. The incoming signal modulates a 450 Hz. carrier tone, thus allowing the SLF wave to be heard as modulation on the tone, thus allowing “real time” listening.

This is an extremely well done tape and I’m sure it represents countless hours of work on John’s part. There are two reasons you should get this tape. The first is if you are doing monitoring in the SLF spectrum, this tape will be a good reference as to what signals down there should sound like. The other reason is that if you aren’t listening in the SLF range, this tape is a way to experience the amazing sounds from that region. Maybe it will inspire you to build a receiver for that band.

The past couple issues of *The Lowdown* and possibly this current one contained an ad with ordering information. This tape is definitely a worthwhile purchase.

***Whistlers or Bust*** I will be leaving in mid June for a fishing trip with two of my sons to Red Lake in Canada. I plan to do more listening than fishing and will be taking several receivers and recording equipment. We should be miles from any power lines and I hope to get some good recordings if the ionosphere cooperates.

## ***Your Much Appreciated Correspondence***

• **Jim Stoughton, Seattle, WA** Jim sent in a description, schematics and photos of his \$5. chart recorder that was mentioned last month. It’s a very nice little project and we’ll publish it here in the July or August issue.

• **Eric Vogel, [evogel@flash.net](mailto:evogel@flash.net)**. I have done some additional work on the hum problem. Check my web site at <http://home.flash.net/~evogel/>. I have two pages on subject: one using CoolEdit96 to remove hum from recordings and one demonstrating a hardware approach that can be used with recordings or in real time.

The experience with CoolEdit96 suggested that a good place to put the hum suppression was in a DSP, and we all have those in our PCs! I suggested this to Richard Horne (author GRAM) via email and he replied that the idea was interesting but he didn't have time to work on it at this time.

I would love to hear from others about their approaches. I know that Dave Ewer is building a bank of notch filters...

# Natural Radio Log

Month Day	Time UTC	What Heard (whistlers/hour where applicable)	ID Grid Sq.
04/12	1001-1020	SLF - Weak Pc1 0.88 Hz.	JL-CN87
04/12	1100-1118	SLF - Weak Pc1 0.96 Hz.	JL-CN87
04/13	1441-1550	VLF - Very strong whistlers @ 25/hr. several 2-hop and echo train whistlers.	JL-CN87
04/16	0230-0309	SLF- Long low Pc1 descending 0.55 - 0.38 Hz. with "pearl" modulation.	JL-CN87
04/16	0658-0839	SLF - Multiple strong high freq. Pc1's 1.45 & 2.0 Hz. against rumbling solar wind.	JL-CN87
04/17	2235	Pc2 (83 millihertz) activity	
04/18	0100-0200	Strong 1.27 Hz. Pc1 with "pearl" modulation. (Sounding like a UFO)	JL-CN87

**JL - John Lauerman, Issaquah, WA.** Equipment - Homebrew VLF Receiver, 300 Hz - 20 kHz. with 102 turn 2' x 2' square loop & comb filter. Homebrew ELF/ULF/SLF Receiver 0.03 to 300 Hz., 47,000 turn loop.