Natural Radio

News, Comments and Letters About Natural Radio

December 2006

It is almost as simple as attaching a long wire antenna to the input of an ordinary high gain amplifier.

Of course there has to be one filter to keep out the hum picked up by the antenna – 60, 120 cycles, all the odd harmonics thru the 11th and 13th – another to keep out 19 kc. and above, plus a clipper to protect the amplifier from blocking on loud bonks and crashes.

It is well to have the antenna wire atilt, with one end as high as possible. A location away from power lines and civilization helps to keep down the hum; battery operation helps, too. The whole idea is to substitute an amplifier for the radio set.

Liner Notes from *Out of This World* – 1953 – Cook Laboratories

Internet Wanderings, Lost Navy Airfields & Extremely Wide Stereo – The need for adventure and discovery is somehow embedded in the human spirit – probably some remnant of our not-too-distant past when ones survival depended on finding, stalking and catching game.

This probably, in part at least, explains why we stay up to all hours listening to a static filled radio pursing that elusive NDB or brave the predawn darkness and drive off to some location without facilities in the middle of nowhere to listen for whistlers. It's akin to fishing, heading out into a lake with the sun glistening off the water, and using a piece of painted wood with some plastic streamers attached to entice a large fish to attach itself to the end of our line. And most of us know the excitement of driving off in the early morning crispness to a hamfest and chasing that elusive piece of radio gear or stalking potential customers to buy the stuff we bought at the last hamfest.

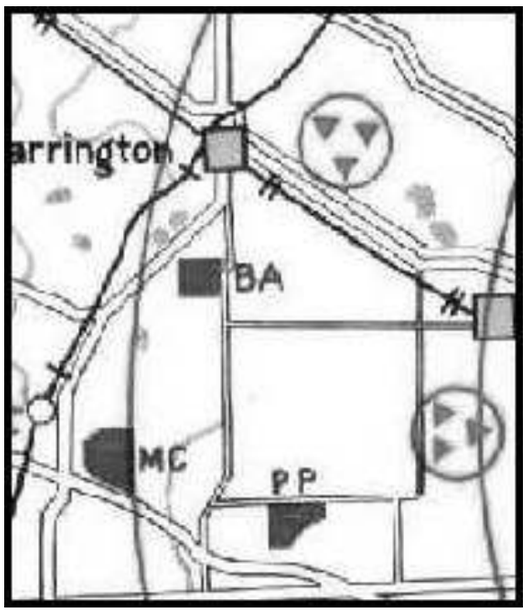
The Internet can provide this same excitement whether pursuing lost history, esoteric information or searching for some collectible. I find this kind of a treasure hunt a nice way to wind down at the end of the day and much more entertaining than "Dancing with the Stars." I usually begin with some tidbit from the far recesses of my memory that seemed intriguing and then head down the search engine path and see where it leads.

One evening a few weeks ago, I was trying to find out if there were any long-gone radio facilities in the in the "neighborhood." Searching under "radio" and related terms produced no useful results so I decided to check out old military installations and see if that would uncover anything. I began with the Nike missile bases that surrounded the

Chicago area in the 1950s and ‘60s. I had some vague memories of the program and even remember building a Revel plastic model Nike rocket and launcher as a kid.

It seemed like a good place to start as there was the remains of a base a few miles from my home that was finally leveled a couple of years ago to build a shopping center. A friend actually got to go down into the bunkers at that time and they made the determination that the 10 foot thick reinforced concrete walls could not be removed so the bunker would be filled in and paved over for a parking lot.

Anyway, after learning more about the Nike program than I really needed to know, following the information trail eventually led me to a site called “Lost and Forgotten Airfields”.



I discovered that my little town of Barrington was home to two Navy Airfields during WWII. (See the map to the right.) Were there NDBs associated with these fields? I would think that the fields would have had at least some type of radio to communicate with the planes. There are symbols on the map that I can’t identify – the circles inscribing three triangles. I don’t know if they are NDBs, beacon lights or something else.

These were 2 of the 15 auxiliary airfields to Glenview Naval Air Station built in the Northwest suburbs of Chicago. Almost all the fighter and bomber pilots in WWII learned their skills at Glenview, practicing their landing skills out on Lake Michigan on two passenger ships that had been converted to aircraft carriers, the Wolverine and Sable I surmise that these auxiliary fields might have been used for preliminary training before the boys practiced their carrier landings on the Lake.

One of the airfields, the one labeled “BA” is less than one half mile from my home and in the northern part of the forest preserve that is my local quiet site for Natural Radio listening. During my subsequent searches I found aerial photographs from 1938 that showed a possible airfield existing on this site as well as references to news articles about the fields and at least three navy aircraft crashes in town. I’ll have to go beyond the net and look up the microfilm at the library. It is interesting to note that the airfields are not mentioned in any local history sources.

That was an interesting warm-up, but didn’t lead to any conclusive radio information. Nevertheless, it reinforced the awesome power of the Internet to locate obscure information and provided a bit of entertainment and excitement along the way.

My next search was more fruitful, at least for this article. I remembered from some of the old 1950s Popular Electronics magazines from the fifties, reading of a man named Emory Cook. Real Hi-Fi buffs in the ‘50s listened to Emory Cook records. That’s about all I remembered, so off to Google.

I discovered that Emory Cook was an audio engineer who did much of the pioneering work on stereo recording and was also the founder of Cook Laboratories. Before he died in 2002, he and his wife, Martha, donated their record companies, master tapes, patents and papers to the Smithsonian Institution in 1990.

Since I spend a good deal of my time producing audio recordings, I thought that investigating Mr. Cook and his audio pursuits might be worthwhile and interesting so I pressed on to the Smithsonian website. I found that Emory Cook was instrumental in the development of vinyl disk technology and the introduction of high fidelity recordings.

His first audio invention was a cutting head with feedback that greatly increased the quality of vinyl records. He made some sample recordings of piano and organ performances to show what could be accomplished with his techniques and improved equipment. Then he rented a small suite at the 1949 Audio Fair in New York to demonstrate these new records. Hundreds of audio enthusiasts flocked to his suite to listen to these records; and their reaction was so positive that Cook immediately knew where his future lay.

Thus in 1950, he founded the record label, Sounds of Our Times, which specialized in high fidelity records. Using his new cutting head and his custom electronics, these recordings demonstrated increased frequency range and innovative microphone placement techniques.

One of his major innovations was the first binaural record. The system was different from the later compatible stereo records in that it had two sets of grooves. It had to be played with a special binaural arm with two needles. Each needle connected fed a loudspeaker on either side of a room, to create one of the first stereo recordings.

The first recordings he produced were of environmental sounds such as storms, trains, airplane noises, ships whistles, babies crying, and bull frogs. He then branched out into ethnic and folk music, and his Calypso recordings are classics. These recordings were originally designed for hi-fi buffs, but the records sold out as fast as they could be pressed and proved to be a hit among the general public.

Here's where the research got very interesting. Among the earlier recordings a couple releases caught my eye – specifically catalog numbers 5012 and 5013, respectively titled *Out of This World* and *Ionosphere*. These are probably the first commercial Natural Radio recordings ever produced.

The actual recordings were done by Professor Millet Granger Morgan (W1HDA) from Dartmouth College in Hanover, New Hampshire. A press release from Dartmouth on his death in 2002 summed up his career:

"In the early 1950s Prof. Morgan established a research program to use the newly discovered phenomena of naturally occurring audio-frequency radio waves produced by lightening and the aurora as a tool to study the properties of space plasma in the vicinity of the earth, a region now known as the upper ionosphere and the

magnetosphere. These studies made it possible to gain insights about the properties of this region of near-earth space in the years before space craft began to make direct observations. Prof. Morgan recorded the naturally occurring signals, referred to by descriptive names such as "whistlers" and "dawn chorus," at a network of receiving stations, and interpreted them to obtain some of the earliest measurements of the density of free electrons many thousands of kilometers above the earth. His work provided experimental foundations for early studies of how the earth and its magnetic field interact with the solar wind.

During the International Geophysical Year (IGY, 1957-8) Prof. Morgan chaired the US National Committee's Panel on Ionospheric Research of the National Research Council, which oversaw radio studies conducted all around the earth. In early 1958 he joined the re-supply mission to the US Antarctic station on the Weddell Sea as the senior scientific representative. In his own IGY research he maintained an extensive series of stations throughout the Americas."

Prof. Morgan was undoubtedly one of the key players in the early days of ionospheric research. I've never looked at Dartmouth as a source of Natural radio information, but it obviously will be the object of some future research.

Getting back to Emory Cook's two Natural Radio releases, only *Ionosphere* is available from the Smithsonian site. You can download .MP3 sound files of this recording for $2.98 from the Smithsonian, which seems to me to be a real bargain for this type of historical recording.

Unfortunately, although the cover is online, liner notes for *Ionosphere* are not available for download. They do exist in the archives, but access to the Cook collection is closed at least until next summer, as the Smithsonian is preparing the collections for a move to a new location. There is some correspondence from Professor Morgan in the files and I hope to research it when the archives are again available. In the meantime I'll be scouring the Internet and record stores for a copy of *Ionosphere* with liner notes.

Ionosphere was released in 1955 and contains simultaneous Natural Radio recordings made in Hanover, NH near Dartmouth College where Professor Morgan was on staff and Washington, DC. Hanover and Washington are separated by about 415 miles or 665 km. which generates some very wide spaced stereo. The quality of the recording is quite good but exhibits the same problems with hum and buzz that we all have.

I don't know if the channels were brought together via phone lines or recorded separately and then synced up later. I am assuming they were recorded separately at each location and then put together in stereo because each of the channels has time signals occasionally. The second channel has several WWV recordings that were recorded from a microphone and receiver, as you can hear wife and kids in the background during the time signals. On the other channel the announcer will say, "Mark", and then give the time. The WWV signals and the other time marks don't happen concurrently, so putting these two recordings together must have taken some effort.

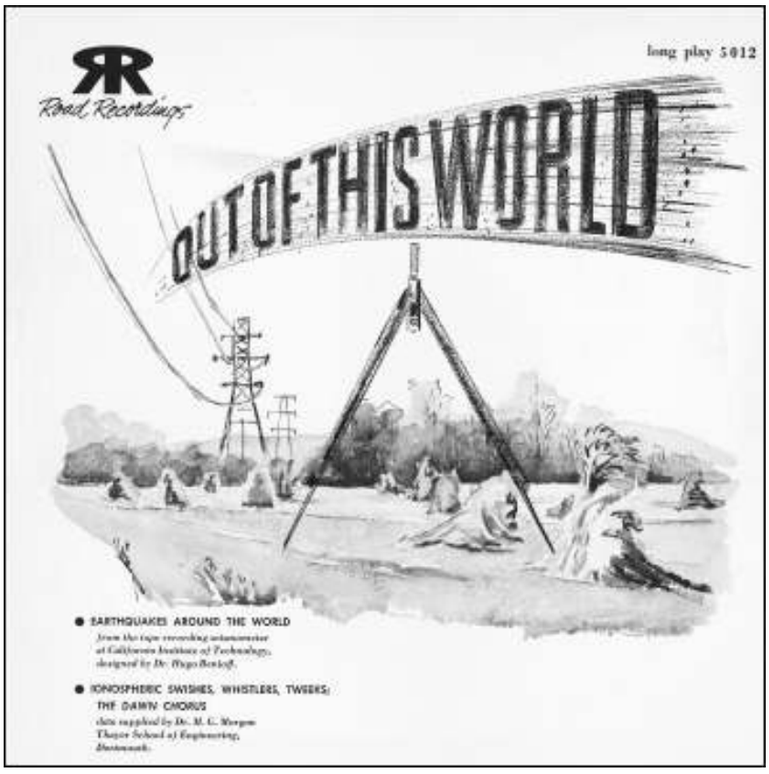
At that time, the receivers and recording equipment would have had vacuum tube electronics. Recording could have been done to tape, but with Emory Cook's interest in vinyl, the recording could have been directly to disc.

The WWV signals indicate that the recordings were made between 9:45 and 10:18 AM EST. There is no indication of the date, nor is there any indication of which channel was recorded in which city. I was surprised by the amount of whistlers heard that late in the morning, especially since 1955 was at the bottom of the sunspot cycle.

The second channel has interference almost all the way through that sounds like LORAN. LORAN-C wasn't deployed until 1957, but there were LORAN-A stations up and down the coast. I searched for a recording of LORAN-A to try and compare the sounds, but couldn't find any thing.

There are several good stereo whistlers on the recordings, and it's probably worth the $2.98 for the download if you have any interest in this type of thing.

The earlier recording, *Out of This World* (Cook 5012) was produced in 1953 and is not available online from the Smithsonian, although from some comments I read on the web it appears that it was for a while. I did find one on the web from a used record dealer which set me back $45. plus shipping, not as good as the deal from the Smithsonian on *Ionosphere,* but to me, well worth it for this rare recording.



One side of this album contains Natural radio recordings recorded by Professor Millet Morgan, and the second side contains sped-up (750X) recordings of earthquakes made by Dr. Hugo Benioff at California Institute of Technology on his Tape Recording Seismometer.

I found some references on the net that the album, *Out of this World,* was originally going to be called *Earthquake* and contain only Benioff's earthquake recordings, but the released album was named *Out of this World* and has Natural Radio recordings on one side and the earthquake recordings on the other. It is possible that limited editions of the recordings were released as separate albums, but there is no reference to this in the Cook Recordings catalog on the Smithsonian site.

The sixteen tracks of Natural Radio sounds on the album contain recordings of tweeks, swishes, whistlers, risers and the dawn chorus. Some of the recordings are at half speed. Unfortunately, there is no information on the equipment used to make the recordings or when they were made. This album showed up in the mail just before this article was due, so I haven't had a chance to listen to it yet. With a little luck, I'll be able to dust off the turntable and hook it up so that I can transfer the album to CD over the Thanksgiving holiday.

Benioff's Earthquake recordings are made from his seismometer and information as to which earthquake they are from is provided in the liner notes. Most of the recordings are sped up 750 times in order to be audible.

Incidentally, besides being a Cal Tech professor and being noted for his work in charting the location of deep earthquakes in the Pacific Ocean, Benioff's other claim to fame is that he was one of the early inventors of the electric violin. It seems that the vibrating strings of musical instruments and seismometers have a lot in common, as do the methods for converting the vibrations to electrical energy – but that is another story.

Emory Cook comments on the recording as follows:

"The possible philosophical implications of ionospheric music are certainly manifold – such as the environmental business of reaching out into the utmost skin of earth's physical shell, *the ionosphere,* only to find that there is more – very much more. Magnetic flux lines emanating from the earth may not seem quite tangible to us, but the sounds that appear to travel along them are very real, with an aesthetic that seems compatible with the circumstances. The enigmas of the *dawn chorus* and the linear ascending occasional *whistle* before the *swish* will be solved, possible explanations found, but in the process ten new things will be discovered requiring ten newer solutions.

It is not even necessarily certain that all of the signals recorded here originated on "earth" or were *transduced* here into audio/radio signals from the impingement of particle energy from the outside. Amid the swishes and chorus there may also be radio sounds of a certain mode from outer space, tangentially trapped by free electrons on a magnetic line, then guided to us through the ionospheric mask."

So much for my Internet wanderings. They produced some useful information, satified my need for discovery and suggested several paths for future research. I wonder where the next Internet expedition will lead?