

The very lonely seismometer: A 'dormant' earthquake monitoring program's last remnants

December 2 2020, by Kevin Krajick



A decaying seismic station that a hiker found in the woods of Mountain Lakes Park, some 60 miles north of New York City. Credit: Karl Zuk

In mid-November 2020, we received an email from one Karl Zuk. It

regarded a hike he had just taken at Mountain Lakes Park, a hilly, forested area about 60 miles north of New York City, owned by Westchester County. Zuk had been descending a steep, muddy trail in the dusk of late afternoon when he glimpsed what looked like a TV antenna amid a tangle of bare tree trunks well off the trail.

He made his way over, and found a heavily rusted, partially collapsed 55-gallon oil drum. The drum's top, weighted down by a head-size local metamorphic rock, was secured by a removable metal door, padlocked shut. Bracketed to its side was a 10-foot TV mast, topped by a horizontal antenna. Zuk, a longtime broadcast engineer, identified the antenna as an outmoded Yagi, designed to send or receive FM radio signals to or from a specific direction. Near its bottom, the drum sprouted a couple of worn cables running into the ground. Stenciled in faded yellow paint on one side: FOR INFO CALL 914-359-2900. ASK FOR FRED. Zuk eventually decoded the remains of even more faded lettering, parts of which had rotted off: COLUMBIA UNIVERSITY EARTHQUAKE RESEARCH PROJECT PLEASE DO NOT DISTURB

Was this forlorn assemblage more archaeology than seismology? "It is not every day you see a self-standing antenna in the forest," he said in his email. Had the setup "once collected some kind of seismic data, maybe in the 1980s?" he asked. "I would enjoy writing about this adventure in my local amateur radio club's newsletter." Photos, and his phone number, were appended.

In fact, scientists at Columbia University's Lamont-Doherty Earth Observatory, with whom I work, have operated a network of seismometers across the U.S. Northeast since the 1970s. Until recently, it was funded by the U.S. Geological Survey. It is called the [Lamont-Doherty Cooperative Seismographic Network](#), or LCSN. Some of the [seismic stations](#) are in the cellars of schools and colleges. Others are buried outside, often on public land. They run more or less continuously,

and their data is sent to Lamont. Most of the current 40-some installations are clustered in New York and contiguous states, including one in Manhattan's Central Park. Others have been set up as far off as Vermont and Maryland.

These stations have [recorded hundreds of earthquakes](#) in the region. Most are too small to be felt by people; they exist mainly in the squiggles of digital seismograms analyzed by the scientists. But at least several times a year, citizens and news media flood Lamont with inquiries after the earth jolts a little harder than usual somewhere. Dishes rattle. A door slams. Maybe it feels like your house was picked up ever so slightly, and dropped. Startling, but generally harmless.



Credit: Karl Zuk

Over decades, the cumulative locations and strengths of these quakes, both felt and unfelt, have revealed a stitchery of faults crisscrossing the region. These are not highly active, violently lurching tectonic monsters like California's San Andreas; rather, they are ancient, tired crack systems formed in the distant past, now for the most part occasionally readjusting themselves. They include the Ramapo Seismic Zone, which runs from eastern Pennsylvania up into the mid-Hudson Valley; Manhattan's 125th Street fault, which bisects the island from northwest to southeast; and a couple of systems that appear to intersect near the Indian Point nuclear power plant, north of the city.

The LCSN data demonstrate that modest earthquakes are actually pretty common around here—and suggest that sizable ones are [more of a danger than once thought](#). The biggest regional event so far recorded by the network was a 1985 magnitude 4.1 shock near the Hudson Valley village of Dobbs Ferry. It did little harm. However, old news accounts suggest that quakes maybe 10 times more powerful hit in 1737, 1783 and 1884—that last one toppling chimneys across New York and New Jersey. Were quakes of this size, or bigger, to hit today's vast infrastructure of buildings, highways, bridges, power lines and aqueducts, the damage could be immense. The converging fault lines near Indian Point have been cited as a reason for its impending closure.

Once in a while the instruments also shed light on unnatural events. On Sept. 11, 2001, they [recorded the shocks](#) as commercial jets hit the World Trade Center, and the ensuing collapses of the twin towers. This later helped establish the exact times of these events. In February 2016, Lamont seismologists assured authorities that powerful shock waves felt

by people along the East Coast one afternoon were not a dangerous shifting of the earth, but [apparent sonic booms from military aircraft](#).

On the phone to Zuk, my first question was: So. Did you call 914-359-2900, and ask for Fred? Yes, of course, he said. Whoever answered had never heard of any Fred. But I remembered: Most of lower New York state used to be in area code 914. With proliferating demand for phone numbers, most of the region at some point got assigned a new area code—845—and everyone in 845 got to keep the rest of their number. (Thank you, Wikipedia, for the switchover date: June 15, 2000.) Today, the Lamont switchboard is at 845-359-2900. So yes: That thing in the woods is, or was, ours. But that left a lot of blanks. Among others: Why was it put in this lonely spot? Was it purposely abandoned? What is it was still doing there? And who is Fred?

Zuk, who had recorded the gadgetry's latitude and longitude with his cell phone, quickly unearthed more information. Scouring the Internet, he found [a 2001 USGS technical report](#) listing all the LCSN installations at the time. One was station CRNY (for Cross River, N.Y., an exurban hamlet); its lat/long matched the oil drum in the woods. The report said it had been turned on in December 1981, and was still active as of 2001.



Signals from the station were once transmitted by a now long-outmoded FM antenna. Credit: Karl Zuk

To see if we could find out more, I tracked down several former seismology staffers.

Mitch Gold, a onetime Lamont electronics technician, and John Armbruster, a now-retired seismologist, both remembered station CRNY. But they had nothing to do with building it; that was before their time. They told me that, like some other out-in-the-woods locations, this one took some hiking, and just finding it could be a problem. The seismometer itself was not in the oil drum, said Mitch; it was buried about 50 feet off, over the edge of a cliff, connected to the drum by a buried cable. The drum itself housed some other instrumentation, and a couple of non-rechargeable zinc batteries that kept the setup working. About every six months, they would have to lug up a new batch of heavy replacement batteries. Solar power would have been so much easier, but the forest didn't admit enough light.

As for the antenna, Mitch said it had transmitted data via conventional FM radio signals to a radio tower at Lamont, about 30 miles southwest and across the Hudson River. Whoever had set up station CRNY must have chosen the spot because, at 961 feet elevation, it was nearly the highest point for miles around, with an unobstructed sight line to the receiver.

But as time passed, the FM setup became problematic. Walkie-talkie conversations from a nearby hospital kept cutting into the frequencies used by the seismic station; ditto dispatcher conversations with cars from a local taxi service. Then, there was cost: for decades, the federal

government had given free use of the transmission frequencies as a public service; around 2005, they began demanding thousands of dollars in yearly licensing fees.

With FM radio on the way out, by this time the staff had already converted most of the LCSN stations to transmit digital signals that could be sent more easily via the Internet, through hard-wired lines or cell towers. Then around 2006, Lamont's rotting old radio tower was dismantled, cutting FM reception altogether. The seismology crew later tried reviving station CRNY by installing a shorter-frequency digital radio setup. They couldn't get it to work, so in 2011 they officially decommissioned CRNY. With the park's permission, they left everything in place, just in case they could figure out some other way to fix it.



A team from Lamont-Doherty Earth Observatory plants a temporary seismic monitor in a farm field after a [series of mysterious earthquakes](#) near Albany, N.Y. in 2009-2010. Credit: (Kevin Krajick/Earth Institute)

As for Fred: Zuk poked around on the web, and became convinced it was Fred Knubel, a longtime spokesman for Columbia who died in a 1998 bicycle accident. I ran this down, and he was wrong. John Contino, a longtime Lamont technician told me it had to be Fred England, a Lamont technician who had long ago quit. Now probably in his 80s, England almost certainly had built station CRNY and been its original custodian. As an engineer, Zuk, was super-impressed that Fred England's setup was still standing after 40 years outside.

Seismologist Won-Young Kim was chief of the LCSN for many years until this spring, when he took a leave of to visit his native South Korea. Won-Young insisted in an email that station CRNY is "not abandoned. It is in a dormant state."

"We had a plan to reactivate it whenever there is a need and resources available," he added. "If there [is] a significant earthquake around NYC, then we can reoccupy the site even for short-term," to monitor for aftershocks, he said.

This might be harder than ever now, because the federal government cut off funds to the entire LCSN in March. Lamont scientists protested the apparent cost-cutting move, but to no avail. They are now trying to get the funds reinstated, or find alternate sources. Most of the seismometers are still running on autopilot, and some partner institutions are maintaining them. But no one at Lamont is processing the data nor updating the LCSN web site with information about the latest quakes. It may be only a matter of time before various parts of the network go down.

The U.S. Geological Survey continues to monitor the region for earthquakes via its own seismometers. But these are thinly spread, and designed to pick up only rare big events, not the daily subtle grind of the earth. The last earthquake displayed on the LCSN site was a minor magnitude 1.5 tremor, 13.3 kilometers north of Potsdam, N.Y., on March 31, 2020. There were no news reports of anyone feeling the quake. Other quakes have undoubtedly occurred around the region since then, but at the moment, no one is listening.

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