

For as long as I can remember, I have been intrigued and fascinated by the history of astronomy and physics. There is no shortage of information available on these subjects and I have endeavored to assimilate as much of this material as I can. During the progression of my study of these subjects, I have realized that two objects stand as icons because of the fundamental roles they played in discoveries that significantly altered our understanding of the universe. One of these is the 100 inch Hooker Telescope at Mt. Wilson Observatory. In 1929, Edwin Hubble employed this instrument to discover the expanding universe. The other is the 20 foot Horn Antenna in Holmdel, New Jersey. In 1965 Arno Penzias and Robert Wilson, working for Bell Laboratories, used this antenna to discover the Cosmic Microwave Background Radiation generated by the Big Bang. Penzias and Wilson were awarded the Nobel Prize for Physics for this discovery and went on to enjoy successful careers. Sadly, the Horn Antenna, which played such a vital role in their discovery, has not fared as well as its employers. The following is an account of what I discovered during my trip to see this historic symbol of the dawn of modern cosmology.

On the morning of May 8, 2010, with growing excitement and anticipation, I boarded an airplane in Cleveland, Ohio and began a trip to Holmdel, New Jersey for the sole purpose of seeing the Horn Antenna. The flight took me to Philadelphia, Pennsylvania. There I rented a car to drive the remaining seventy miles to Holmdel. I was armed with several maps, Google Earth satellite photos of the area and my personal GPS unit because, try as I might, I was never able to pinpoint the location of the Horn Antenna on neither the satellite photos nor the maps. I was not too concerned though, because I had a general idea of its location and was confident that, once I got to Holmdel, I would have little difficulty finding it. After all, it is a National Historic Landmark! I knew that it was on Crawford Hill Road and my plan was simple. I would start at one end of the Crawford Hill Road and drive to the other. I was certain that, once I got close, there would be signs directing me to the site.

You know what they say about the best laid plans of men and mice often going awry? This was the case with my simple plan. Crawford Hill Road is just a little over two miles long, rural road, connecting Red Hill Road, at one end, with Crawford Corners at the other end. One side of the road is, primarily, farmland with few houses. The other side would not be considered heavily populated but there are a few housing developments and commercial enterprises interspersed among open spaces. Up and down this road I drove. For over an hour I searched for, what had become, a very elusive National Historic Landmark. I did encounter a small sign claiming that it was located near the spot where the Cosmic

Microwave Background Radiation was discovered. That sign was certainly in error because, as it turned out, the Horn Antenna was nowhere near it. It did serve to confuse the issue though and throw me off track for a while as I vainly searched that area. Eventually I realized that I was wasting my time there and, dejectedly, continued my excursion up and down Crawford Hill Road.

The seeds of desperation were beginning to take root as I began to realize that I, truly, might never find the Horn Antenna. I obviously needed to change my strategy. I needed to get to a more populated area and ask directions. As I was reluctantly preparing to leave the area I happened to pass a sign for Lucent Technologies. I remembered, from my reading, that Lucent Technologies had taken over the site of Bell Laboratories. I was suddenly re-energized with optimism. I turned the car around and followed that sign.

I entered the Lucent Technologies site and drove along a narrow road to a small parking area. As I approached the parking area I saw, attached to a post, a small sign that displayed an arrow and two wonderful words, "Horn Antenna". The arrow pointed up a flight of stairs that led to the top of a small hill. Then, suddenly, the optimism that I had just elevated my spirit evaporated. A locked gate blocked the stairway and was preventing me from reaching my goal. I could not believe that I had come this far only to be denied my goal by a locked gate. To my dismay, that is exactly what appeared to be happening. I decided, then and there, that if all else failed, I was going to climb that fence and find the horn antenna. Before undertaking such an illegal activity, and risking being arrested for trespassing, I knew that I needed to exhaust all other possibilities.

My best chance was to try to find someone to help me. With this in mind, I drove around the Lucent Technologies campus searching for anyone who could help me. I had not searched very long before I came upon two workers, dressed in work clothes and wearing hard hats. I could tell from their expressions that they were surprised to see me. As one of them approached my car and I engaged the automatic control to lower the car window on the passenger's side. He leaned in asked if I needed help. I explained to him that I was trying to find for the horn antenna.

"Which one?" he asked.

That seemed like an odd response but I was not to be deterred. "The one used by Arno Penzias and Robert Wilson to discover the Cosmic Microwave Background Radiation", I explained to him, trying to sound authoritative.

“Oh, that one!” he replied. He then pointed up the hill behind him and said, “It’s right on top of this hill but you’ll have to drive around because the gate, back there, is locked.”

“Which way do I go?” I asked.

“Just follow this road up and to the right and you’ll come right to it,” he instructed.

I thanked him and set off with a new determination. After driving only a couple hundred yards I saw, on my left, an old radio antenna. It was about forty feet tall, was painted white and did not, even remotely, resemble the horn antenna I was seeking. I then knew what the worker had meant when he asked me which one. There was more than one antenna at the facility. This second antenna interested me so I made a mental note to come back and explore it later. That would have to wait though because I had come to see the Horn Antenna and that, I hoped, still lay ahead of me.

I continued to follow the road for, perhaps, another quarter of a mile. I finally saw it! Up ahead of me, on the right, in all its glory, sat the famous 20 foot Horn Antenna. I quickly drove the short distance remaining and pulled the car onto the graveled area surrounding the antenna. I stopped the car, turned off the engine and just sat there, in the car, staring at it. All of the stories I had read about how Penzias and Wilson had worked so hard to get this thing working properly filled my head. Time seemed to stand still and I don’t know how long I sat there. Eventually, the initial excitement abated and I prepared to take a much closer look. I removed my camcorder and Digital SLR from my camera bag and got out of the car.

In my initial excitement it seemed as magnificent as it must have been back in the days that Penzias and Wilson employed it so skillfully but, as I approached it, I soon realized that my initial impression was totally wrong. Time had taken its toll. Rust had begun to eat away at it. The bolts connecting various sections were corroded and rusted as well as were the gears that once allowed it to be so easily pointed at any spot in the sky. The steps leading to the small room at the narrow end of the horn were dirty and rusted. The white paint that covered the base of the instrument was filthy. Trash had accumulated under the assembly. As if this were not insult enough, someone was using the 20 foot horn as an umbrella to protect a piece of equipment from the elements and a step ladder had been, thoughtlessly, left leaning against the base. I was shocked, sickened and disgusted!

After the initial shock had passed, I set to the task of compiling a photographic record of what damage neglect had inflicted upon this important piece of astronomical history and National Historic Landmark.

Before returning to Philadelphia, I did return to the other antenna, as I had planned and took a few photographs. I was too upset with what I had seen earlier to generate any great interest so I quickly departed.

I spent that night in Philadelphia and returned home the next morning.

Upon returning home I was still bothered by what I had seen in Holmdel. I had a feeling that if I did not report what I saw, the Horn Antenna would be permitted to further deteriorate and, ultimately, become a pile of rusted scrap metal

A quick search of the Internet informed me that National Historic Landmarks were under the jurisdiction of the National Park Service. Another web search provided me with the name of the person in charge of the National Park Service in the Holmdel area. I carefully drafted, and sent off, an email message describing what I had witnessed and inquiring as to what action could be taken to prevent further neglect and deterioration.

In a remarkably short period of two days, I received a reply to my email. In the reply, the writer acknowledged that he was aware of the problem but was not currently working with National Historic Landmarks He told me that he was sending a copy of my email and his reply to someone who would be in a position to help. Five weeks later the second person, an Architectural Historian, responded. She assured me that she would be collecting information and that the Horn Antenna could be placed on the "Watch List of Threatened and Endangered National Historic Landmarks". This was the kind of good news I was hoping for.

A few days later I got another email from the National Park Service Architectural Historian updating me on what was being done about my complaint. She wrote, "Alcatel-Lucent began scraping and painting the Antenna on Friday, June 18<sup>th</sup> and they've recently repaired the drive that allows for movement of the Horn Antenna". I was elated when I read those words. Unfortunately my elation was premature because the very next sentence read, "Evidently, equipment has been stored below the antenna for years, but that alone does not constitute a threat to the National Historic Landmark".

That did not sit well with me at all and I sent the following reply, “Following this logic, it would be proper for me to drive to Washington, D.C. and, being unable to find a parking spot, park next to the Washington Monument. That alone would not constitute a threat to the monument”. I then went on to suggest that Alcatel-Lucent could find a more appropriate place to store their equipment. To date I have not received a response to this email.

I was left facing the following facts: the Horn Antenna had, obviously, been neglected and allowed to deteriorate for several years and would not have received any maintenance had I not reported what I saw. These facts, coupled with the knowledge that the National Park Service did not care that the antenna was being used as a storage area, led me to the conclusions that ongoing maintenance was not going to happen and that the Horn Antenna was still in jeopardy. It would only be a matter of time before it would be in the same, or worse, condition that it was in when I made my visit. Clearly, something more had to be done.

My next letters went to the Smithsonian Institute in Washington, D.C. and to the American Museum of Natural History in New York City. I figured that either of these institutions could supply the restoration and protection that was required. Either institution could provide an ideal location where the Horn Antenna could be exhibited and where people, who may have never even heard of it, could view and learn about its pivotal contribution to science.

Within a matter of days I received an email response to my letter from Tom D. Crouch, Ph.D. Dr. Crouch is the Senior Curator of Aeronautics at the Smithsonian Institute. He related to me his interest and that he was passing my suggestion on to the Division of Space History. I waited with interest, and with a bit apprehension, for further news.

The news that I had been waiting for arrived in the form of a detailed email from David DeVorkin, the Senior Curator at the Division of Space History. In the email he informed me that Lucent Technologies had been approached in the past by both the Smithsonian Institute and the National Radio Astronomy Observatory, in West Virginia, about the Horn Antenna and that their policy was not to donate historic material. He said that there are four options available to anyone trying to preserve the Horn Antenna. These options are: 1) preservation on site, 2) dismantling and transport to a site capable preservation, reconstruction and display, 3) dismantling and storage and 4) selection of critical technologic and historic components that reflect the essence and its importance. He pointed out that the

Smithsonian Institute typically limits its activities to option 4 but have, in certain cases, engaged in options 2 and 3. Furthermore, he said that he checked with the National Park Service to see if there were any limitations since it was designated a landmark. What he discovered shocked me and helped to explain why the Horn Antenna was in such poor condition.

**From:** <http://www.nps.gov/nhl/QA.htm#9>

**Are there requirements that I maintain my property to NPS standards or restore it to its original or historic appearance?** No. The National Park Service monitors the status of Landmarks, and will often contact owners and discuss preservation needs. But while the NPS encourages owners to use the Secretary of the Interior's Standards for Historic Preservation Projects, owners are under no requirement to follow this guidance.

After digesting all the material I had obtained I came to the following conclusion. Lucent Technologies owns the Horn Antenna and, since they are under no obligation to do so, have not taken care of it. Furthermore, they will allow neither the Smithsonian Institute nor the National Radio Astronomy Observatory to do so. It would appear to me that the only way to have the antenna properly cared for is to convince Lucent Technologies to change its policy regarding the donation of historical material. Perhaps if the problem with the Horn Antenna was more widely known, Lucent Technologies would realize that people actually care about that important piece of astronomical and cosmological history.

In an attempt to disseminate the information I had, I contacted several science publications. To date I have received requests from Science News and Sky and Telescope Magazine to submit a Letter to the Editor outlining what I have written here.

It is my hope that I will, someday, be able to again view this icon of cosmology in the condition that it was in when so skillfully employed by two Nobel Laureates. Unfortunately, if the current situation continues, I don't foresee this taking place.