

Wyoming Tribune Eagle, March 10, 2016: “You like StarDate? You will love its observatory” Casper Star Tribune of March 13: “Looking for details on dark energy”

StarDate is a favorite radio program of mine. Narrated by Sandy Wood, the daily show began in 1978, making it the longest-running radio science feature in the country. Its Spanish-language online version is Universo. StarDate airs on more than 300 radio stations and is produced by the University of Texas McDonald Observatory.

While sojourning in Alpine, TX, I put in a visit to McDonald Observatory.

Since its dedication in 1939, this observatory has become a world research center. Here is the colorful history of its beginnings:

William McDonald, a wealthy banker and amateur astronomer, bequeathed 1.1 million dollars to University of Texas to develop and staff an observatory. He had remained a bachelor with no children, but his will also bequeathed certain sums to family members. The relatives, who apparently counted on a big inheritance, sued over the will, claiming Mr. McDonald was not of sound mind when it was written. The court determined this was not the case, but the disgruntled relatives appealed the finding. The case was eventually settled out of court, with the bequest to astronomy trimmed to \$800,000: large enough to build the first telescope and dome—the mountain top for the dome was donated by a woman rancher—, but not enough to develop the program. At the time, the University of Texas at Austin had one single faculty astronomer.

Hence, Austin partnered with the University of Chicago in a thirty-year contract. That school had a thriving faculty but lacked the facility to do them justice. At the end of the thirty years, Austin took over the McDonald facilities.

Today the McDonald group atop Mount Locke numbers more than 100 scientists, faculty, researchers, and graduate students. They often collaborate with astronomers around the country, even the world, to probe the mysteries of the universe. Since the nearest town, Fort Davis, is a 20-minute drive away, McDonald provides many of its own services. It has a fire station and EMS unit, a small lodge for visiting astronomers and other guests, athletic facilities, and a school bus that shuttles children to Fort Davis.

It was February, and only five of us attended the bus tour that took us to the various telescopes inside their domes. When the guide asked where we were from, a mid-forties man traveling with his wife said they were from Argentina; he would be at U of TX Austin for six months. The other two men, also his age, hailed from Germany but traveled with the Argentinian couple.

“So you are a visiting scholar,” I said to the man from Argentina.

“Yes,” he said in his soft accent. “I am a visiting scholar.”

I smiled at him. People from another country often repeat an English phrase as if to acquaint themselves with the words.

The Germans explained that on the following day their party planned to tour Big Bend National Park.

“Be sure to hike Window Trail,” I said. “And if you can do it, take the Rio Grande tour.”

At McDonald we visited the Hobby-Eberly Telescope, its proudest possession. While most telescopes' mirrors are a single piece of glass, HET's mirror consists of 91 identical six-sided segments fitted together. Each segment is one meter across and two inches thick. Small computer-controlled motors, attached to the back of each segment, adjust the positions of individual segments to maintain the proper, overall mirror shape.

From the use of such instruments, we now know that the universe contains more than a hundred billion galaxies, each consisting of billions of stars. Our own Milky Way, in addition to its hundreds of billions of stars, holds giant clouds of gas and dust.

All galaxies have central black holes that are millions or billion of times as massive as our Sun. These holes swallow lots of gas, and the gas convulsions are seen as quasar: the gas gets ferociously hot and emits enormous jets of energy. The jets heat the gas that is not swallowed by the black holes, preventing it from forming new stars.

The universe expands more rapidly as it ages, and scientists are debating why this is so. It could be caused by an energy from space itself, by undiscovered particles or fields—or it could be, our understanding of gravity is incomplete. Scientists have dubbed this mysterious expansion “dark energy.” In the 1990s, astronomers determined that the universe will expand forever.

Now McDonald astronomers are conducting an ambitious project. The Hobby-Eberly Telescope Dark Energy Experiment gathers basic information on two million galaxies. This will produce detailed maps of a portion of the universe and reveal how fast the galaxies are moving away from us. The McDonald team hopes to determine therefrom how the universe has been expanding since the Big Bang. This knowledge, they believe, will yield information about the nature of dark energy.