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Mt. Wilson Observatory: Center of scientific breakthroughs

The installation of the 100-inch Hooker telescope in 1917 set the stage for two shocking discoveries: The universe was far larger than anyone imagined and it was expanding.

By John Johnson Jr.

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For nearly half a century, the Mt. Wilson Observatory was not only the center of the universe for the study of space science, it taught us just how huge that universe was.

At the eyepiece of the observatory's then-groundbreaking 100-inch Hooker telescope, astronomer Edwin Hubble made two of the most shocking scientific discoveries of the 20th century: The universe was far larger than anyone imagined and it was expanding.

Those discoveries knocked man from his cherished place at the seat of creation to the status of a middling creature scuttling across the surface of an obscure planet among trillions of stars. They also set the stage for major breakthroughs in cosmology that followed, including the Big Bang theory and the discovery that some force, known as dark energy, is accelerating the expansion of the universe.

"Those telescopes revolutionized astronomy. They rank among the most significant scientific instruments of all time," said Wendy Freedman, director of the Carnegie Observatories in Pasadena. Carnegie operated the observatory for most of the 20th century before turning over management two decades ago to a nonprofit group called the Mount Wilson Institute.

It was in 1904 that a charismatic yet troubled astronomer named George Ellery Hale founded the observatory, located at the 5,700-foot level of the mountain above Pasadena. At the time, Los Angeles was a much smaller, much dimmer town. The region's inversion layer, responsible for trapping smog in the basin, keeps the air up at Mt. Wilson crisply still, perfect for viewing the heavens.

Hale, who at times claimed to be in contact with forces who advised him in his work, built his first telescope around a mirror that was 5 feet across and weighed 1,900 pounds. The telescope mounting and mirror were carried up the mountain by mule train. In 1908, work was finally completed on what was then the largest telescope in the world.

The first big breakthrough came under astronomer Harlow Shapley, who proved that the sun was just another star in the Milky Way galaxy -- a big surprise. "Since the time of Copernicus, people believed the sun was at the center of the universe," Freedman said.

Through skillful measurements of astronomical distances with the 60-inch telescope, Shapley showed

that the sun was not even close to the center of the galaxy -- a good thing, since experts now think a giant black hole is lurking there -- but is about two-thirds of the way to the edge.

A driven man, Hale wanted a larger and far more powerful telescope on Mt. Wilson. In 1917, the 100-inch Hooker telescope, named for a Los Angeles businessman who donated the money for the 8-foot-diameter mirror, was completed.

Mt. Wilson's newest astronomer, a lawyer-turned-scientist named Edwin Hubble, used this breathtaking new tool to prove that the blurry objects at the far reaches of the Milky Way were not clouds of gas, but other galaxies. This showed that the universe was far larger than anyone had imagined.

As he classified the new galaxies he was finding, Hubble noticed something unusual. The galaxies appeared to be speeding away from ours, and from each other, in all directions. And the farther away the galaxy was, the faster it was moving.

Besides proving that the universe was expanding, this became one of the building blocks of the Big Bang theory, which suggests the universe began in a single explosive moment, the aftershocks of which are still being felt.

Ninety-year-old Don Nicholson, whose father, Seth, was an astronomer at Mt. Wilson during Hubble's time, recalls playing in the snow and hiking in the hills among the score or more of scientific buildings and collection of small houses, one of which was once occupied by Albert Einstein. Nicholson, who lives in West Los Angeles, also recalled the strict, Byzantine rules of hierarchy that were enforced during dinner in the dormitory, known as the Monastery.

"At the head of the table sat the astronomer for the 100-inch," Nicholson said. This was usually Hubble. Next to him was the astronomer on the 60-inch. Each had a napkin ring appropriate to his status.

Mt. Wilson's reign lasted until work was completed on the 200-inch Palomar Observatory telescope in San Diego County in 1949. Mt. Wilson's telescopes have been far surpassed by others, but the observatory is still proving its worth as a research institution, even if its days of big, sweeping cosmological discoveries have long past.

Two observatories are probing subsurface structures in the sun to better understand the solar cycle and its impact on Earth's weather. Mt. Wilson also is home to the six-telescope CHARA array that is measuring the size and shapes of stars, said Hal McAlister, director of the observatory. "Mt. Wilson remains a terrific site for astronomy," he said.

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