



28.1 Edwin Hubble

Edwin Hubble was an accomplished academic that many astronomers credit with “discovering the universe.”

A good student and even better athlete



Courtesy, Carnegie Observatories, Carnegie Institution of Washington

Edwin Hubble was born on November 29, 1889, in Marshfield, Missouri. His family moved to Chicago when he was ten years old. Hubble was an active, imaginative boy. He was an avid reader of science fiction. Jules Verne’s adventure novels were among his favorite stories.

Science fascinated Hubble, and he loved the way Verne wove futuristic inventions and scientific content into stories that took the reader on voyages to some strange and exotic destinations.

Hubble was a very good student and also an excellent athlete. In 1906 he set an Illinois state record for the high jump, and in that same season he took seven first place medals and one third place medal in a single high school track meet.

Focus turns to academics

Hubble continued his athletic success by participating in basketball and boxing at the University of Chicago. Eventually though, his studies became his primary focus. Hubble graduated with a bachelors degree in Mathematics and Astronomy in 1910.

Hubble was selected as a Rhodes Scholar and spent the next three years at the University of Oxford, in England. Instead of continuing his studies in math and science, he decided to pursue a law degree. He completed the degree in 1913 and returned to the United States. He set up a law practice in Louisville, Kentucky. However, it was a short lived law career.

Returning to Astronomy

It took Hubble less than a year to become bored with his law practice, and he returned to the University of Chicago to study astronomy. He did much of his work at the Yerkes Observatory, and received his Ph.D. in astronomy in 1917.

Hubble joined the army at this time and served a tour of duty in World War I. He attained the rank of Major. When he returned in 1919, he was offered a job by

George Ellery Hale, the founder and director of Carnegie Institution's Mount Wilson Observatory, near Pasadena, California.

The best tool for the job

The timing could not have been better. The 100-inch Hooker telescope, the world’s most powerful telescope at the time, had just been constructed. This telescope could easily focus images that were fuzzy, too dim, or too small to be seen clearly through other large telescopes.

The Hooker telescope enabled Hubble to make some astounding discoveries. Astronomers had believed that the many large fuzzy patches they saw through their powerful telescopes were huge gas clouds within our own Milky Way galaxy. They called these fuzzy patches “nebulae,” a Greek word meaning “cloud.”

Hubble’s observations in 1923 and 1924 proved that while a few of these fuzzy objects were inside our galaxy, most were in fact entire galaxies themselves, not only separate from the Milky Way but millions of light years away. This greatly enlarged the accepted size of the universe, which many scientists at the time believed was limited to the Milky Way alone.

Another landmark discovery

Hubble also used **spectroscopy** to study galaxies. He observed that galaxies’ spectral lines were shifting toward the red end of the spectrum, which meant they were moving away from each other. He showed that the farther away a galaxy was, the faster it was moving away from Earth. In 1929, Hubble and fellow astronomer Milton Humason announced that all observed galaxies are moving away from each other with a speed proportional to the distance between them. This became known as Hubble’s Law, and it proved that the universe was expanding.

Albert Einstein visited Hubble and personally thanked him for this discovery, as it matched with Einstein’s calculations, providing observable evidence confirming his predictions.

Hubble worked at the Wilson Observatory until his death in 1953. He is considered the father of modern **cosmology**. To honor him, scientists have named a space telescope, a crater on the moon, and an asteroid after him.



Reading reflection

1. Look up the definition of each boldface word in the article. Write down the definitions and be sure to credit your source.
2. **Research:** What is a Rhodes Scholarship?
3. **Research:** Why does a larger telescope allow astronomers to see more?
4. Imagine you knew Edwin Hubble. Describe how you think he may have felt when Albert Einstein came to visit and thank him for his discoveries.
5. **Research:** Before Hubble's discovery, people thought that the universe had always been about the same size. How did Hubble's discovery that the universe is currently expanding change scientific thought about the size of the universe *in the past*?