E.E. Barnard - Pioneering Astrophotographer

E.E. Barnard circa 1885 Photo credit: University of Chicago Photographic Archive, apf6-00204, Special Collections Research Center, University of Chicago Library)

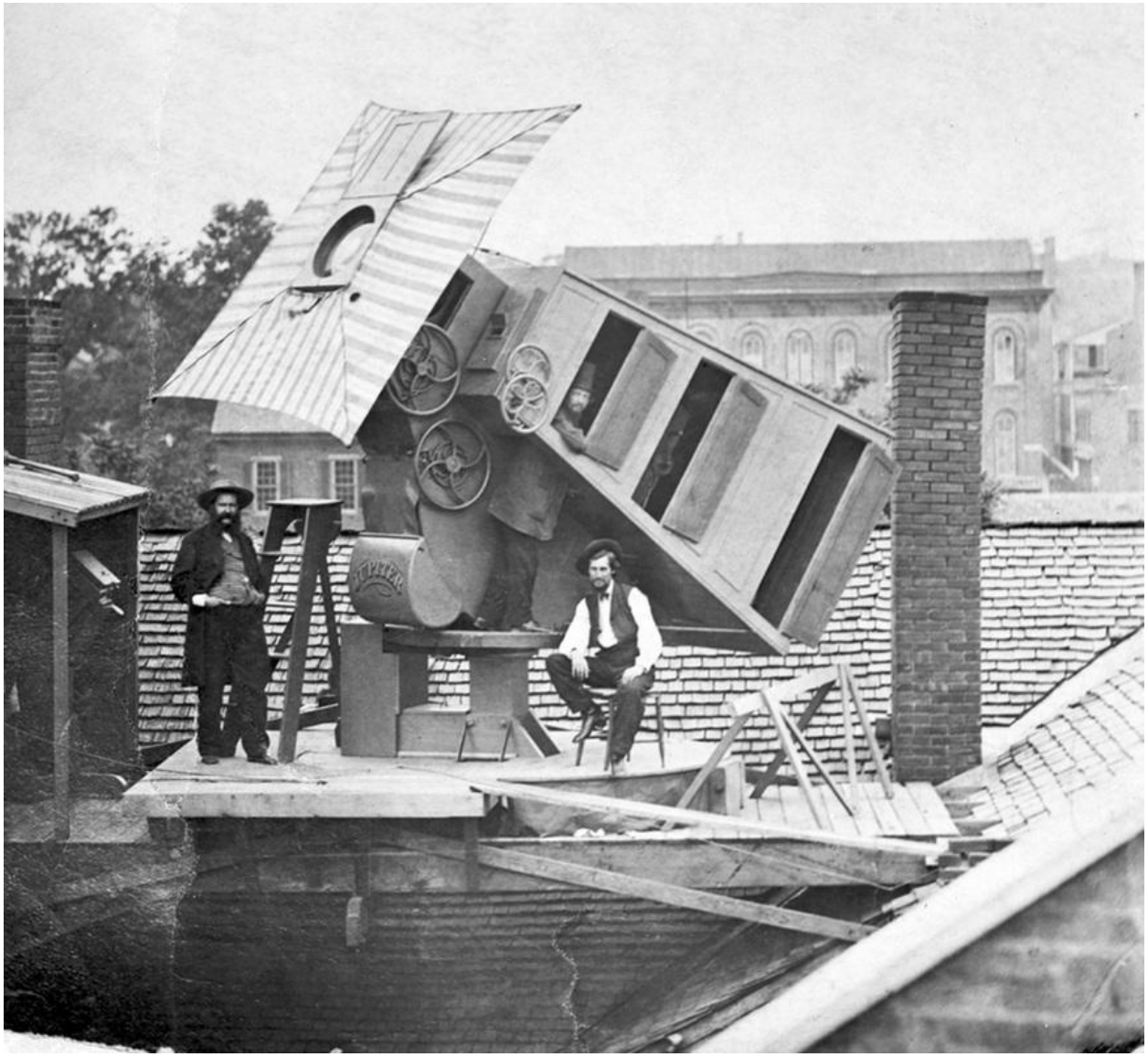
Edward Emerson Barnard was one of the greatest observational astronomers of all time. Despite having virtually no formal education, his enthusiasm and his knowledge of the night sky enabled him to become a staff astronomer at both the Lick and Yerkes Observatories. It was from these 'Great' Observatories that he took some of the finest 'wide field' images ever captured of our universe

Edward Emerson Barnard circa 1868 (Photo Credit: University of Chicago Photographic Archive, apf6-04135, Special Collections Research Center, University of Chicago Library.)

Edward Emerson Barnard had an inauspicious start to life. Barnard was born December 16, 1857 in Nashville, Tennessee, to Reuben Barnard and Elizabeth Jane Barnard (*née* Haywood), and had one brother. His father died three months before his birth. He was brought up in Tennessee, amid the poverty, disease and death of the American Civil War and did not receive much in the way of formal education. From an early age he needed to work to help support his family. Yet despite all of this he grew up to become one of the greatest astronomers of his age and the earliest pioneer of '*wide field'* Astrophotography.

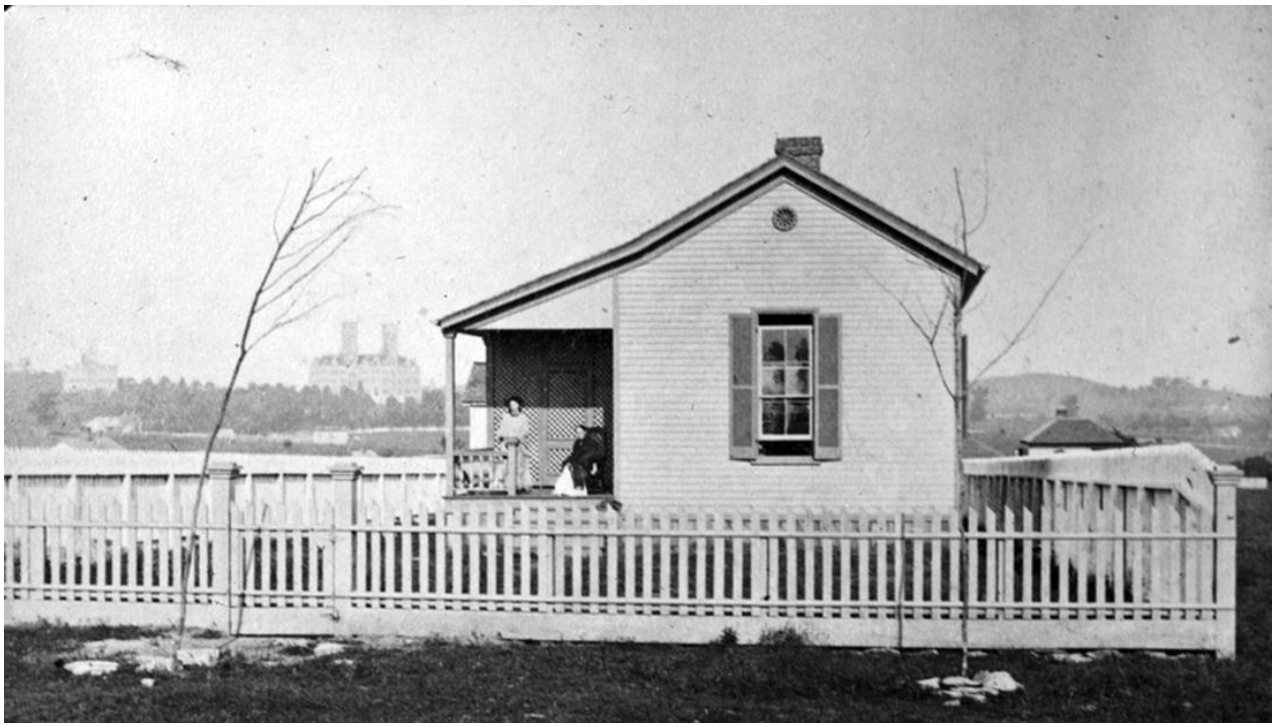
It is not surprising that Barnard developed a high degree of self reliance, a great capacity for hard work and a tenacity to persevere no matter what life had to throw at him. When he was only a boy of nine, he began working as a photographer's assistant to Van Stavoren and later J. W. Braid. He

remained at the same studio for the next seventeen years learning the business of photography; a skill that would prove invaluable, when he turned his attention to photographing the heavens.



Solar-enlarging camera used at Van Stavoren's Photographic Studio, Nashville, Tennessee. The operation of this instrument was one of the duties of Edward Emerson Barnard. (Photo credit: University of Chicago Photographic Archive, apf6-01170, Special Collections Research Center, University of Chicago Library.)

While he was still working at the photography studio he married English-born Rhoda Calvert in 1881. In the 1880s, Hulbert Harrington Warner, a wealthy patron of astronomy, offered $200 per discovery of a new comet. E.E. Barnard discovered a total of five, and used the money to build a house.



Comet House in Nashville, Tennessee. Rhoda Calvert Barnard (standing) on the porch next to her mother-in law Elizabeth Haywood Barnard (seated) Vanderbilt University can be seen in the background (Photo credit: University of Chicago Photographic Archive, apf6-00697, Special Collections Research Center, University of Chicago Library.)

E.E. Barnard's discoveries gained the attention of amateur astronomers in Nashville who raised enough money to give him a fellowship to Vanderbilt University. Barnard never graduated from the school, but he did receive the only honorary degree Vanderbilt has ever awarded. In 1883 he was hired by the Vanderbilt Observatory, Discovering binary nature of Beta2 Capricorni on November 5th. Barnard joined the staff of the Lick Observatory in 1887. Edward Barnard was awarded the Arago Gold Medal by the French Academy of Sciences in 1893.

In 1889 he observed the moon Iapetus pass behind Saturn's rings. As he watched Iapetus pass through the space between Saturn's innermost rings and the planet itself, he saw a shadow pass over the moon. Although he did not realize it at the time, he had discovered proof of the "spokes" of Saturn, dark shadows running perpendicular to the circular paths of the rings. These spokes were doubted at first, but confirmed by the spacecraft Voyager.

In 1892 Barnard made observations of a nova and was the first to notice the gaseous emissions, thus deducing that it was a stellar explosion. The same of

Jupiter. He was the first to discover a new moon of Jupiter since Galileo Galilei in 1609. This was the last satellite discovered by visual observation.

Barnard joined the staff of the University of Chicago in 1895 as a professor of astronomy. As a staff astronomer he was able to use the 40-inch telescope at the newly built Yerkes Observatory. In 1897 Barnard was awarded Gold Medal by the Royal Astronomical Society. Barnard received the Bruce Gold Medal awarded by the Astronomical Society of the Pacific in 1918.

The Barnard residence in Williams Bay 1897 (Photo Credit: University of Chicago Photographic Archive, apf6-00678, Special Collections Research Center, University of Chicago Library)

The Bruce telescope at the observatory was built to facilitate Barnard's astronomical photography. Barnard had contracted for a 10–inch photographic telescope to be built by the famous optical firm of John A. Brashear. The telescope was a compound of three separate telescopes, one a 10–inch "doublet" of 50–inch focal length, one a 6 ½ inch lens of 35–inch focal length,

and a 3–inch guiding refractor, all mounted into a single structure to form a powerful photographic survey instrument. This is the famous Bruce telescope with which Barnard would make photographs for the Atlas.

Much of his work during this period was photographing the Milky Way. Together with Max Wolf, he discovered that certain dark regions of the galaxy were actually clouds of gas and dust that obscured the more distant stars in the background. In 1905, his niece Mary R. Calvert began working as his assistant and computer

E.E. Barnard at Yerkes Observatory (Photo Credit: University of Chicago Photographic Archive, apf6-04461, Special Collections Research Center, University of Chicago Library)

The faint Barnard's Star is named for E.E. Barnard after he discovered in 1916 that it had a very large proper motion, relative to other stars. This is the second nearest star system to the Sun, second only to the Alpha Centauri system. A pioneering astrophotographer, Barnard cataloged a series of dark nebulae, known as Barnard objects giving them numerical designations akin to the Messier catalog. In 1919 Barnard published "On the Dark Markings of the Sky with a Catalogue of 182 such Objects" in the *Astrophysical Journal.*

E.E. Barnard died on February 6, 1923 in Williams Bay, Wisconsin, and was buried in Nashville. In 1907 the Carnegie Institution guaranteed fund to publish E.E. Barnard's "An Atlas of Selected Regions of the Milky Way" However, Barnard, ever the perfectionist worked for many years on assembling the photographs and their descriptions from the more than 35,000 photographic prints that were required for the 700 copies of the Atlas, had not completed the task by the time of his death in 1923. The work would be completed by Edwin B. Frost, then director of the Yerkes Observatory, and by Barnard's niece (and twenty year associate) Mary R. Calvert. The two volume Atlas, one volume of the photographs and the other a description of each field, was finally published by the Carnegie Institution in 1927.

E.E. Barnard© by Michelle Bie Love

***Citation**:*
Vanderbilt University, "Edward Emerson Barnard: Star Gazer", April 11, 2016,
http://www.library.vanderbilt.edu/speccol/exhibits/barnard/vanderbilt.shtml

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