March 2021

Hilltop Cloud Time Travellers Club

Dear Club Members,

This month we are leaving behind the cares and stresses of this small rocky planet and looking outwards. We are travelling to the far end of our solar system towards Uranus.
On 13th March 1781 William Hershel was looking up at the night sky through a telescope and spotted a small bright light. It was the first planet to be indentified using a telescope, though at first Hershel did mistake it for a comet or a star. It took two more years of study, mostly by fellow astronomer Johann Elert Bode, before it was confirmed as a planet. Herschel tried to name his discovery Georgium Sidus after King George III, the British king. Thankfully he was unsuccessful. Instead the scientific community accepted Bode's suggestion to name it Uranus, the Greek god of the sky.
Uranus itself is a ball of frozen gas, with 27 rings, and like its gas giant neighbours. Saturn, Jupiter and Neptune, it has rings. What makes Uranus unique is that it rotates on it's side. We have very little close-up data and images of this planet. The only spacecraft that flew near it was Voyager 2, back in 1986. All the other images of Uranus come from long range space telescopes like the Hubble telescope. The colours of those images have inspired your fibre this month.

William Hershel did quite well out of his discovery, despite the planet not being called Georgium Sidus. King George made him Court Astronomer and he was elected as a fellow of the Royal Society. His name now pops up all over the place in the world of astronomy. The William Hershel Telescope is located on the Canary Islands. Scientists used to find evidence of a Super Massive Black Hole at the centre of the Milky Way. In space, yet another telescope carried his name, The Herschel space observatory was launched by the European Space Agency in 2009, the images and date it captured allowed us to see evidence of water vapour on the dwarf planet Ceres.

Herschel's scientific discoveries don't just end with the discovery of Uranus. He went on building better and larger telescopes, and looking up to the skies. He also discovered infra red beyond the end of the visible spectrum, and looking small rather than big found out that coral was not a plant, as it lacks cell walls.

Given March is also the month of International Womans Day it also seems appropriate that we talk about William's sister, Caroline. She was an astronomer in her own right. She was the first woman to receive a salary as a scientist, and the first woman in England to hold a government position. She was also the first woman to be allowed to publish papers in the Royal Society, and to be named an Honorary Member of the Royal Astronomical Society. To begin with Caroline worked as Williams assistant, and general housekeeper, but as time went on she fell in love with the work. While William was away in 1786 she took over use of his telescope and discovered her first comet. Over the next 11 years she discovered 7 more. Her work in cataloguing stars and nebulae was often done to assist her brother in his recording, and later she did the same task for her nephew. Towards the end of Caroline's life, she arranged two-and-a-half thousand nebulae and star clusters into zones of similar polar distances so that her nephew, John Herschel, could re-examine them systematically. The list was eventually enlarged and renamed the New General Catalogue.

Many non-stellar objects are still identified by their NGC number. In 1828 the Royal Astronomical Society presented her with their Gold Medal for this work—no woman would be awarded it again until Vera Rubin in 1996. She has no telescopes named after her, no long list of buildings around the world bearing her name. Just 4 things in space are named after her; Asteroid 281 Lucretia, The open clusters NGC 2360 (Caroline's Cluster), and NGC 7789 (Caroline's Rose).
On 6 November 2020, a satellite named after her (ÑuSat 10 or "Caroline", COSPAR 2020-079B) was launched into space.

Caroline is not the exception of her time in the sense that she was doing scientific research. She is exceptional because we know who she is. Many male scientists of that era relied on wives, daughter and sisters to act as assistants, and often trained those assistants to do work in their own right. However their discoveries were nearly always published in the mans name. We've later learned something of some of these women, but many are lost to history. Caroline is unusual not because she was doing the work, but because she was recognised for it in her own time.

Happy Spinning

Katie

Further Reading-

William Hershel
https://en.wikipedia.org/wiki/William_Herschel
https://en.wikipedia.org/wiki/William_Herschel_Telescope
https://en.wikipedia.org/wiki/Herschel_Space_Observatory

Caroline Hershel
https://en.wikipedia.org/wiki/Caroline_Herschel
https://royalsocietypublishing.org/doi/10.1098/rsta.2014.0210
https://www.brooklynmuseum.org/eascfa/dinner_party/place_settings/caroline_herschel
https://scientificwomen.net/women/herschel-caroline-43

Uranus
https://solarsystem.nasa.gov/planets/uranus/overview/
https://www.space.com/41076-uranus-weird-til-icy-rock-crash.html
https://www.skyatnightmagazine.com/space-science/how-was-uranus-discovered/

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