

Astrobiology News January 2015: The Adler Planetarium Celebrates Clergy Contributions to Science –Past, Present, and Future

In celebration of the upcoming 10th anniversary of *Evolution Weekend*, this month's piece diverges from my usual *Astrobiology News*. We at the Adler Planetarium in Chicago will be supporting *Evolution Weekend* events by offering free admission and shows to all clergy on Tuesday, February 10th, as well as offering opportunities for discussions with scientists and other clergy in the afternoon. Advanced registration is required. (Send me email if you want the flyer with instructions on how to register for this.) I thought I'd take this opportunity to tell you about some of the people visitors will encounter on posters throughout the museum.

Dr. Jocelyn Bell Burnell (b. 1943) was the first female President of the Institute of Physics. Bell discovered a type of extremely dense stars known as pulsars in 1967. Because she was a graduate student at the time, it was her advisor, Anthony Hewish, who received a share of the 1974 Nobel Prize for this discovery. Bell and Hewish initially thought pulsars might be indications of extraterrestrial technology due to their rapid, regular, radio pulses, and they nicknamed the new objects LGM for "Little Green Men". Pulsars were later identified with rapidly rotating neutron stars, which send out radio waves like lighthouse beams. Bell is a life-long Quaker who has served the tradition in many capacities, including as a member of the *Quaker Peace and Social Witness Testimonies Committee*, which produced *Engaging with the Quaker Testimonies: a Toolkit* (2007), for which she wrote the introductory essay.¹

Bell describes the press attention her discovery attracted:

"When the paper was published the press descended, and when they discovered a woman was involved they descended even faster. I had my photograph taken standing on a bank, sitting on a bank, standing on a bank examining bogus records, sitting on a bank examining bogus records: one of them even had me running down the bank waving my arms in the air - Look happy dear, you've just made a Discovery! Meanwhile the journalists were asking relevant questions like was I taller than or not quite as tall as Princess Margaret and how many boyfriends did I have at a time?"²

Rev. Robert Evans (b. 1937) is a citizen scientist and Methodist minister who has discovered a world record number of 42 supernovae. Using a 12-inch Newtonian reflector telescope, Evans observes from his backyard in Hazelbrook, New South Wales (about 70 miles west of Sydney, Australia) by memorizing fields of galaxies. He has memorized the environments of more than 1,000 galaxies, so he can rapidly check for the appearance of "new" stars.³ Supernovae are critically important for

¹ <https://www.quaker.org.uk/jocelyn-bell-burnell-born-1943>

² <http://www.bigear.org/vol1no1/burnell.htm>

³ <http://www.tenagraobservatories.com/Interview%20of%20Robert%20Evans.html>

helping to establish the distances to galaxies, and the expansion and age of the Universe. Early observations are particularly important to capture peak brightness and how this declines with time. These observations allow the supernova's apparent brightness to be converted to its actual (absolute) brightness, so its distance can be calculated.

Frs. Francesco Grimaldi SJ (1613-1663) and Giovanni Riccioli SJ (1598-1671) were Jesuit scientists who composed an accurate lunar map ("selenograph") that is the basis for all modern Moon maps. Grimaldi is responsible for the practice of naming lunar regions after astronomers and physicists, rather than ideas such as "tranquility". More than two dozen lunar craters are named for clergy, mostly Jesuits. Grimaldi was also one of the earliest physicists to suggest that light was wavelike in nature. He discovered the diffraction property of light, gave it this name, which means "breaking up", and laid the groundwork for the later invention of the diffraction grating, which is used in spectroscopy. (Check out the Adler's on-line Collections for lots of cool artifacts and maps, including many produced by Jesuit astronomers.⁴)

Fr. Georges Lemaitre (1894-1966) is known as the "'Father' of the Big Bang". This Belgian priest was the first person to propose what became known as the Big Bang theory of the origin of the Universe. He recognized that a static Universe was not consistent with Einstein's General Relativity and found evidence that Einstein's equations suggested an expanding Universe. Lemaitre also published the relationship between a galaxy's distance and its velocity two years before Hubble published this relationship, but Lemaitre felt that Hubble's observations were stronger than his own theory, so when Lemaitre translated his own paper from French into English, he omitted the part we now know as "Hubble's Law".

When Pope Pius XII referred to the new theory of the origin of the universe as a scientific validation of the Catholic faith, Lemaitre responded: "As far as I can see, such a theory remains entirely outside any metaphysical or religious question. It leaves the materialist free to deny any transcendental Being... For the believer, it removes any attempt at familiarity with God... It is consonant with Isaiah speaking of the hidden God, hidden even in the beginning of the universe."⁵

Fr. Angelo Secchi SJ (1818-1878) is sometimes known as the "'Father' of Astrophysics". This Jesuit scientist devised the first system of classifying stars by their spectral types. Although his system was superseded by the Harvard system in the 20th century, Secchi's work was critical to later studies of the compositions of stars. He also organized systematic monitoring of the Earth's magnetic field and established a Magnetic Observatory in Rome in 1858.⁶

⁴ <http://www.adlerplanetarium.org/collections/>

⁵ http://www.amnh.org/education/resources/rfl/web/essaybooks/cosmic/p_lemaitre.html

⁶ <http://www.newadvent.org/cathen/13669a.htm>

“Spectral studies of celestial bodies are not aimed just at curiosity, but from them it depends the solution of many important cosmic questions. The first and the most important one is to recognize the nature of the matter composing the atmosphere of the celestial bodies ...” (Secchi, 1863)

Visitors will also encounter a poster about several women in the *Society of Ordained Scientists*⁷, an organization of clergy scientists with active members in physics, chemistry, biology, engineering and many other disciplines. Although rooted in the Anglican tradition, the Society welcomes members from many churches.

As you can see, the brief biographies above are somewhat weighted to the Catholic and mainline Protestant traditions. Please email me if you have suggestions for clergy or lay leaders in other traditions that have made significant contributions to science in general, and astronomy in particular!

I hope you have exciting *Evolution Weekend* events planned! - Grace

Grace Wolf-Chase, Ph.D. (gwolfchase@adlerplanetarium.org)

⁷ <https://ordainedscientists.wordpress.com/>