Pulsar Pioneer visits Armagh Planetarium

By Colin Johnston, Science Communicator

In 1967, Jocelyn Bell, a Cambridge student from County Armagh, was part of a team constructing a radio telescope under the supervision of Antony Hewish. This telescope was not in the familiar dish shape, but was an 'antenna farm' of cables strung between posts, covering 1.8 hectares (4.5 acres). Building it took Jocelyn Bell two years, erecting posts herself with the aid of a heavy sledgehammer.

When it was complete the instrument was used to study the recently-discovered objects known as quasars. In those days the results were recorded on paper tape, and while laboriously studying miles of this data Bell found a bit of "scruff" that moved across the sky with the stars. Not only that, but she found that the signal was regularly pulsing, about once per second. This was a real achievement demanding great persistence as the signals were mingled with radio noise from many other sources. At the time there was no known natural source for such regular signals and the team referred to the mysterious source as "Little Green Man 1". Three more sets of signals were discovered from other parts of the sky by Bell (many more have been discovered since then) and the name 'pulsar' (pulsing star) was coined to describe them.

> "Jocelyn Bell Burnell's father was the chief architect of Armagh Planetarium"

Pulsars were eventually identified as rapidly rotating neutron stars emitting a narrow beam of energy rather like a lighthouse. As the pulsar rotates the beam sweeps over the Earth to be detected. Astronomers have learned a lot about how some stars end their lives from studying pulsars. Bell's supervisor Antony Hewish shared the Nobel Prize for Physics in 1974 "for his decisive role in the discovery of pulsars".

Image Credit: Armagh Planetarium

Jocelyn Bell Burnell with Astronotes editor Colin Johnston.

Today, Jocelyn Bell is Professor Bell Burnell and is an eminent figure in astronomy being the recipient of many awards for her work. She is also a superb public speaker to audiences of all ages. In February 2007 Jocelyn Bell Burnell paid a visit to both Armagh Planetarium and Observatory. Professor Bell-Burnell's links with the Planetarium go back to before it opened as her father was the chief architect of the Planetarium building.

Jocelyn Bell Burnell generously took time from her busy schedule for an interview for Astronotes.

Astronotes: How would you describe a pulsar?

JBB: It's the left-overs from an exploding star. It's only 20km across and very dense. If you had a sewing thimble, and jammed the six billion people who live on Earth into it, it would weigh as much as a thimbleful of pulsar. That's how dense it is.

Astronotes: Say you were floating in space close to a pulsar, what would it look like?

JBB: Dangerous! It would be a small, dull ball, but emitting a lethal beam of radiation.

Astronotes: Did you ever seriously think you had really found little green men?

JBB: No! That was tongue in cheek, just a nickname.

Astronotes: If your team had not discovered pulsars would anyone else have found them? Or would they still be out there waiting for us to find them?

JBB: Ten years later maybe. The X-ray astronomers were on the track. They were actually looking for neutron stars but couldn't clinch it, but they would have eventually got there.

Astronotes: In your opinion what is the greatest astronomical discovery in the last forty years?

JBB: Dark matter- we haven't worked fully through it yet. It's a discovery that's still going on.

Astronotes: You are very skilful in communicating astrophysics to the public. What's your secret?

JBB: I don't know, I think I inherited it from my father. He was an excellent teacher.

Astronotes: Do you have any advice for young people who are interested in astronomy?

JBB: It's a great subject- do it!