Ruby Payne-Scott (1912-81)

The World's First Female Radio Astronomer

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Brief Biography

1931-33: Gained 1st Class Hons in Physics and Maths at Sydney University.

1934-36: Conducted Cancer Research and completed a Masters of Physics

1938: Only option as a female was to become a science teacher at a girls boarding school.

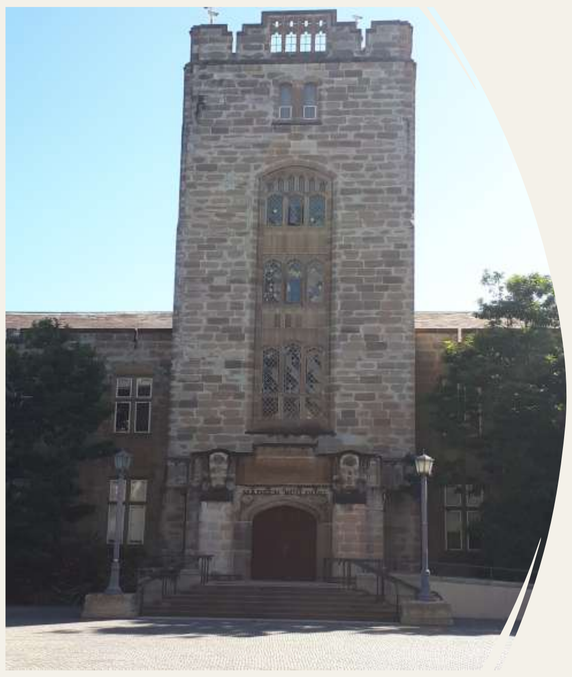
1941: joined CSIRO Radiophysics, engaging in vital secret wartime radar research.

1945: World's first female Radio Astronomer

1951: pregnant and expecting her first child at age 39, she had to leave a promising scientific career to which she never returned.

World War Two & CSIRO Radiophysics, Sydney

- Set up in 1939 on the grounds of Sydney University.
- **Pearl Harbour, Dec 1941**: failure of Radars to detect hundreds of incoming Japanese bombers a wake-up call for the Allies.
- Developed unique **Light Weight Air Warning** (LW/AW) **Radar** used in island hopping in the Pacific campaigns.
- RP had to use initiative and ingenuity; qualities that would enable them to become the World leaders in Radio Astronomy.



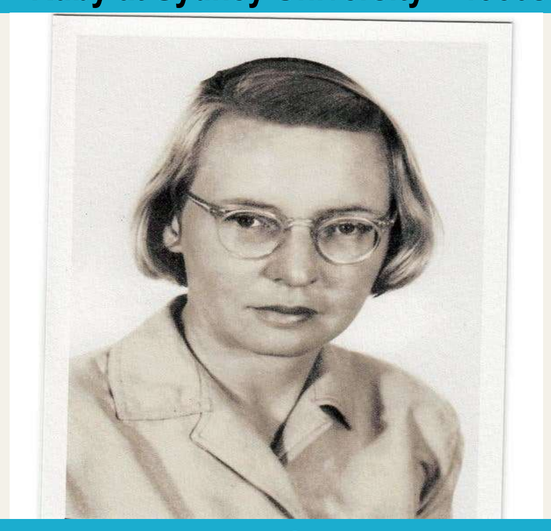
Ruby Screenplay

The true story of Ruby Payne-Scott, the world's first female Radio Astronomer, working as a woman Physicist in a predominantly male profession during and after WWII.

Her radical political, feminist and environmental views place her on a collision course with the establishment, and she ultimately has to make the unfair decision to have a family instead of pursuing a promising scientific career.

I have written a screenplay based on Ruby's life which has been positively reviewed by several Radio Astronomers. If you are interested in finding out more please contact me at stephenmullaly01@gmail.com

Ruby at Sydney University – 1930s



Aperture Synthesis

- **Aperture synthesis** is a type of interferometry that mixes signals from a collection of telescopes to produce images having the same resolution as a much larger instrument.
- First proposed by **Payne-Scott** in 1946, and later developed by Astronomers at Cambridge.
- **1974 Nobel Prize**: awarded to **Martin Ryle** – for pioneering work on **Aperture Synthesis**; he failed to ever acknowledge the contribution of **Payne-Scott**.
- **2019**: **Event Horizon Telescope** derived the first ever image of a black hole using aperture synthesis

Ruby as a Champion for Women in Science

The Australian Academy of Science presents an Annual **Ruby Payne-Scott medal** to women researchers.

According to Professor Nalini Joshi – a world-renown mathematician and recipient of the Award - Ruby was more than a scientist – she was an advocate for women's rights at a time when doing so came at great personal cost.

"She questioned why women couldn't wear shorts while climbing radio towers, why they weren't paid equally, why they were forced to resign upon marriage or pregnancy.

"Ruby didn't win every battle. In fact, she was forced out of her role after expecting her second child, ending her scientific career far too early at the age of 39.

"But the stands she took helped shift the conversation – and eventually, the policies – that had kept women out of science."

Contribution to Radio Astronomy

- Made classic contributions to **Solar Radio Astronomy** and was considered by her peers to be one of the leading lights at CSIRO Radiophysics.
- Proposed a mathematical method to convert the output of a radio telescope consisting of more than one element into a radio picture of the universe – later called **Aperture Synthesis** – that came into common use throughout the world.

Ruby Payne-Scott: the Ferry

In June 2025 Transport for NSW launched a new fleet of ferries for service on Sydney Harbour. One of these has been named the "*Ruby Payne-Scott*" in her memory.

Photo © CSIRO 2025 taken on Sydney Harbour, from left to right: Ron Ekers (former President IAU) Fiona Hall (Ruby's daughter, prominent Artist), Vanessa Moss, Elizabeth Mahony & Douglas Bock (all Astronomers)

Payne-Scott Awards

In 2009 CSIRO initiated the **Payne-Scott Awards** in Ruby's honour. These awards are designed to support researchers who have taken extended leave to care for a new born child re-establish their careers.

Ruby Payne-Scott