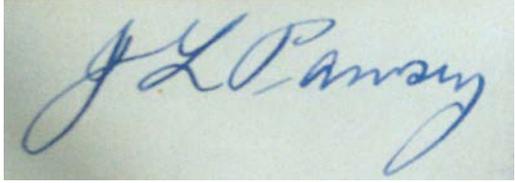
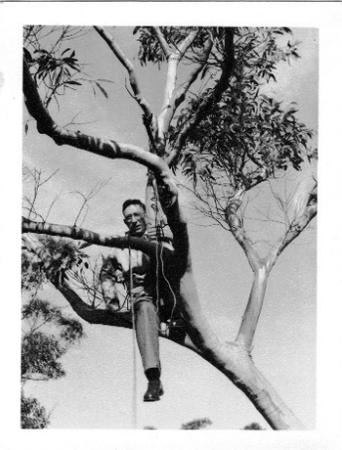




J.L. Pawsey : Pioneer Radio Astronomer: Our Completed Book after 13 Years

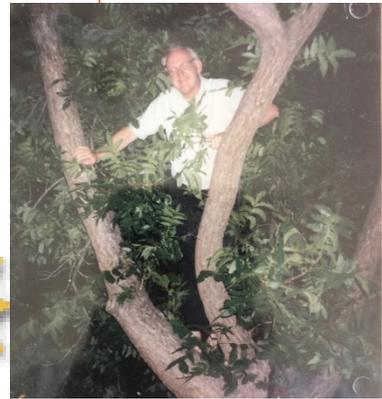


J.L. Pawsey



Miller Goss
NRAO

Domenici Science Operations Center, Socorro, NM
16 March 2022

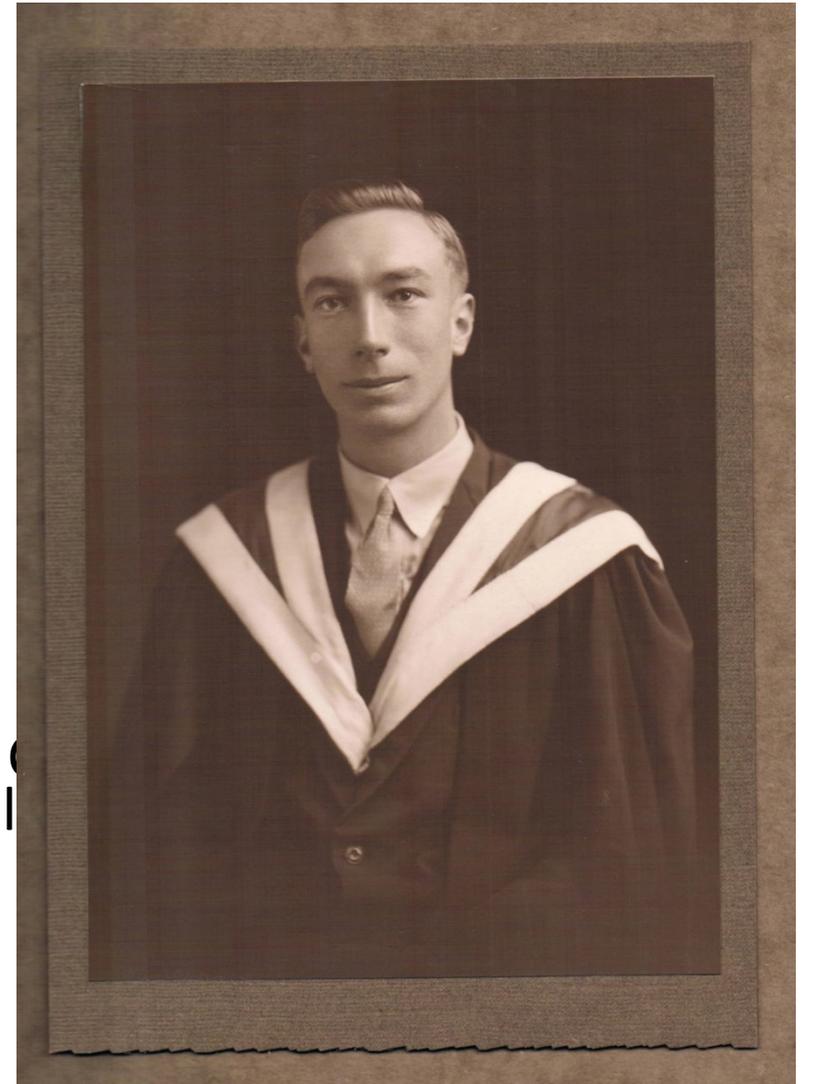


Joe Pawsey and the Founding of Australian Radio Astronomy- Early Results, From the Sun to the Cosmos Springer 2022 or 2023

- Goss, Ekers and Hooker
- Open Access CC By 4.0
- Use ESM electronic subsidiary material – online
- NRAO ONLINE texts also
- About 800 pages
- Book Launch at the Pawsey Supercomputer Centre Perth

Pawsey- his life

- Born Ararat Victoria Australia May 14, 1908
- His mother was a bearer of maternal ambition
- Died Sydney , 30 November 1962
- University of Melbourne 1926-1929 BSc
- Master of Science 1931
- Given a 1851 Exhibition Scholarship to University of
Rutherford- 1935 PhD working on motions of the E I
J.A. Ratcliffe and E Rutherford
- Appointed NRAO Director 31 October 1961
- Died Sydney, 30 November 1962, age 54



Ionospheric transmitter and two receiving stations
 – separation on the ground 600 and 300 m
 E layer at 90 km . Transmitter at 89 km

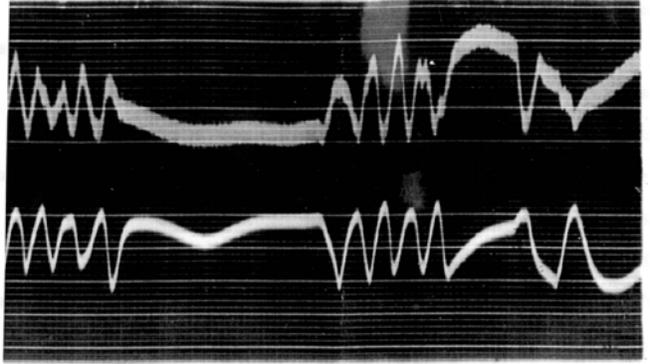
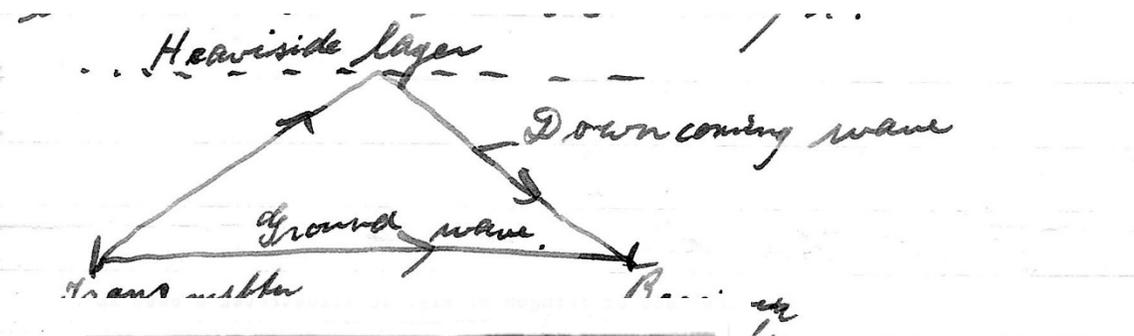
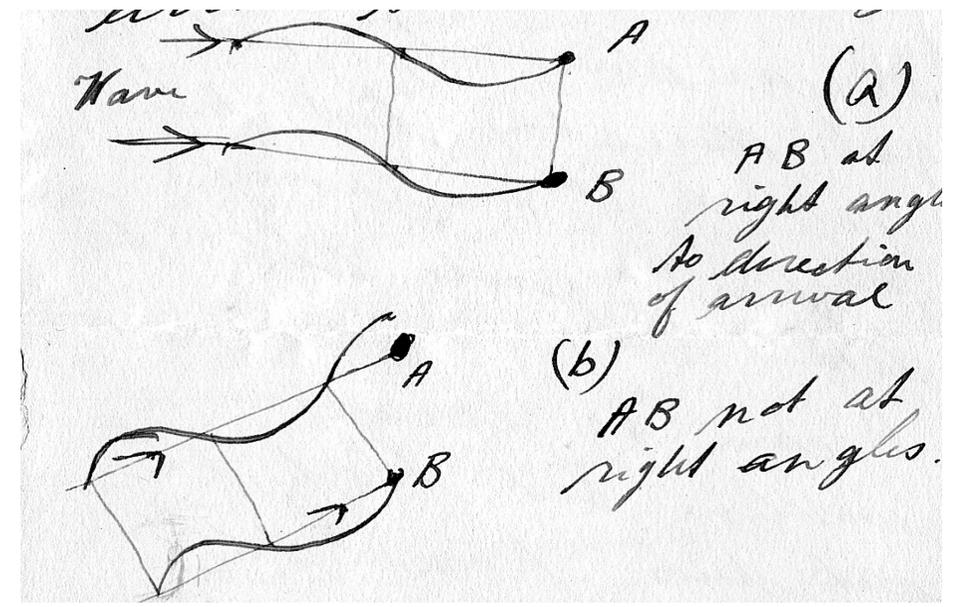


Fig. 10. Frequency change 'fringes' obtained with a receiver separation of 600 m. A change of phase of about 180° occurs in the first set of fringes. (290 m. Distance 89 Km. Bearing 199° E. of N.) .0720 G.M.T. 24/11/33



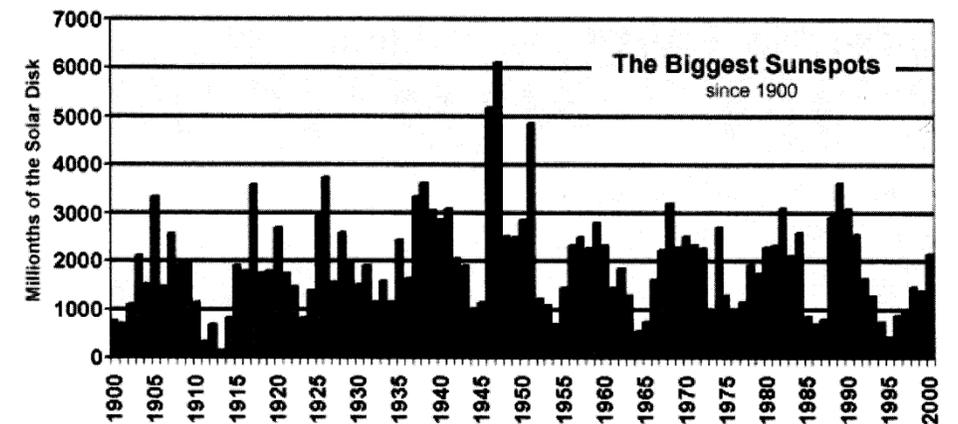
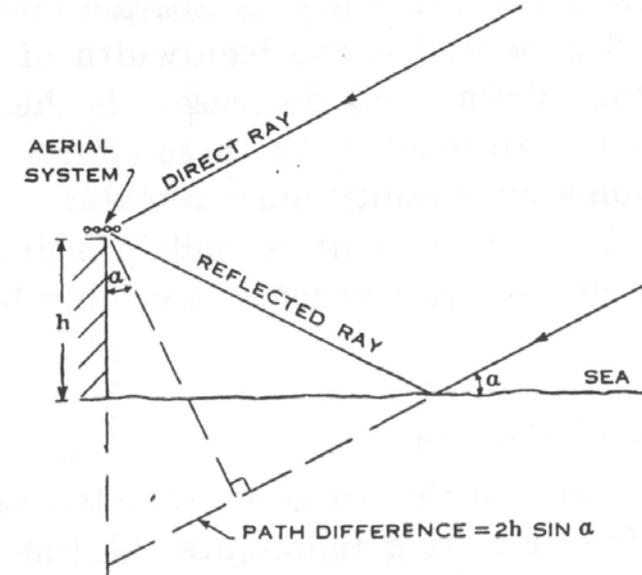
Influence on post war radio astronomy

- We can make sense of the ways of thinking that eventually produced interferometry as a significant method in early radio astronomy. The ideas and techniques used to make sense of the communication fading due to interference of waves reflected from the ionosphere had a strong continuity with those that former radar scientists used to slowly characterise the unknown extraterrestrial phenomena they were exploring in the post war era of 1945.

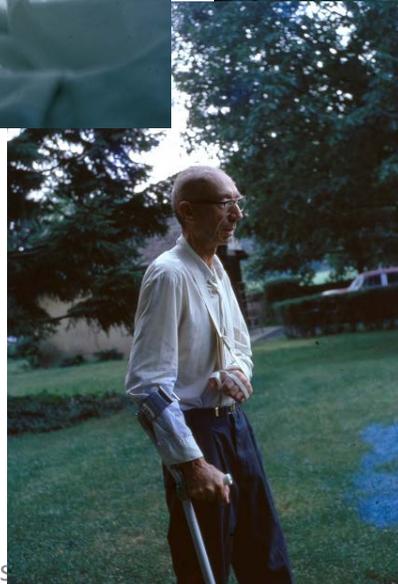


Dover Heights WWII- first aerial for interferometry- 26 Jan 1946 – principles worked out in WWII by John Jaeger in Sydney

Principle of aperture synthesis described in the paper

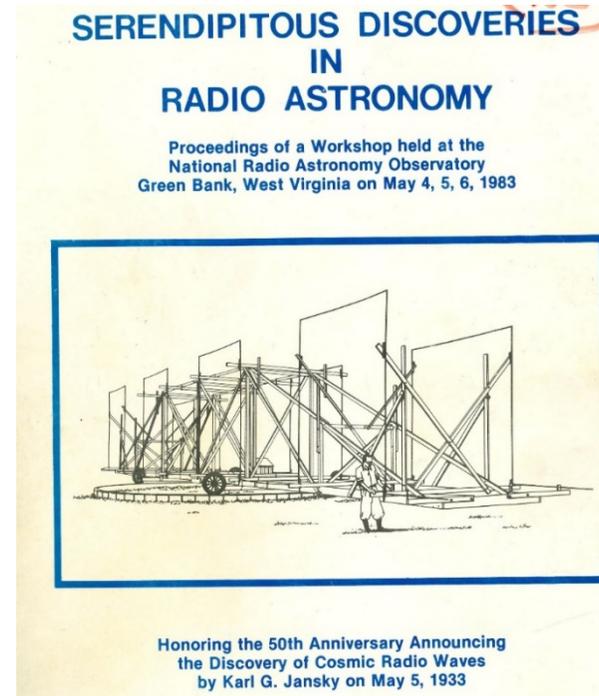
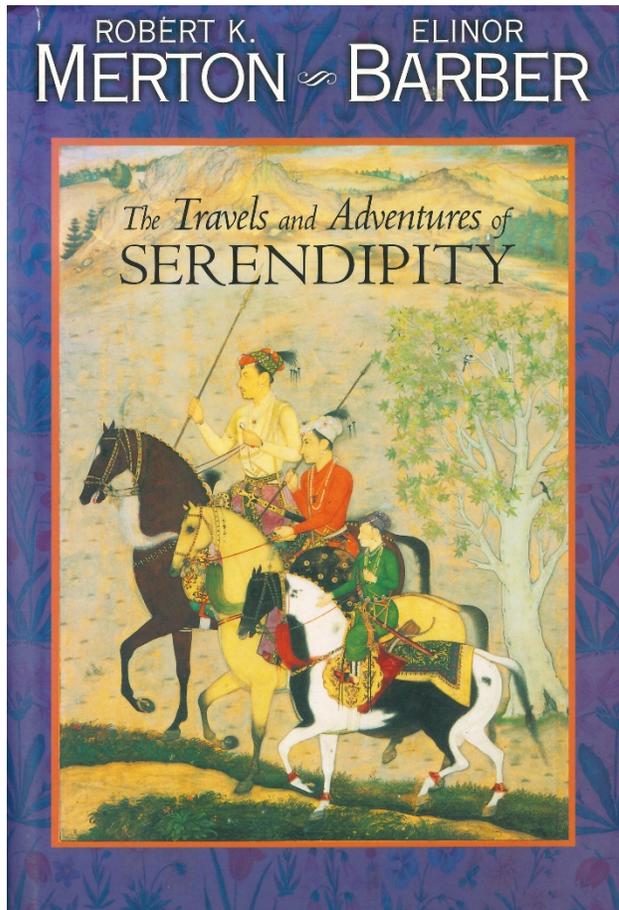


Glioblastoma multiforme- GBM. Operation in Boston 16 May 1962 – then back at Princeton on 12 July 1962 Died back in Australia 30 Nov



Pawsey's role post 1945

- Started many research areas himself- solar corona, solar burst work, stimulated HI research in 1951
- Hired the key people, Mills, Swarup, Wild, Bolton etc
- Invented the term ' radio astronomy ' in early 1948 about same time as Ryle
- Wrote one of the first text books on radio astronomy in 1955 with Ron Bracewell
- The first statement of the principle of aperture synthesis from the 1946 data
- NRAO Director end-1961 to mid-1962



**If I have seen farther, it is by standing on the shoulders of giants.
Newton to Hooke in 1675.**

A student paper of the history of radio astronomy

- **An early radio astronomer was Jansen, who used the telephone to hear noise coming from the center of the universe. Rebel heard it too. After WWII, a couple of radar operators, Lowel and Ryan, picked up a lot of second-hand stuff cheap and took off....**
-
-
- **From a student paper on the history of radio astronomy**

The Giants for us today

- Robert Merton
 - Pawsey
 - Ryle
 - Lovell
 - Hey
-
- And many more including Barry Clark, Ken Kellermann and Ron Ekers

Some of the Serendipity Hall of Fame

- Jansky 1933
- Hot Corona0 Pawsey
- Correlation sunspot with solar bursts- Pawsey
- Radio Stars were mainly extragalactic !
- Jupiter Bursts Carnegie Institution of Washington
- CMB Penzias and Wilson 2.7 K background
- Faraday rotation in EG sources
- Quasars
- Pulsars
- Fast radio Bursts
- Perytons – microwave ovens at Parkes

Robert K Merton 1910 to 2003 Prof at Columbia
book from 1958 (time capsule) translation to
Italian 2002 and English 2004



Standard Scientific Model is: (1) Predict, (2) Observe and then (3) Confirm--- worked for the 1951 detection of the HI line on 25 March 1951 at Harvard by Ewen and Purcell

The neologism “serendipity” is defined: accidental and sagacity

Unanticipated anomalies and strategic research

Pasteur: “In fields of observations, chance favors only the mind that is prepared”

Chance of discoveries depends on an impressive list of qualities

- (1) Enterprise, (2) Courage, (3) Curiosity, (4) Imagination, (5) Determination, (6) Assiduity, (7) Alertness
- “There is nothing fortuitous” in a so-called “accidental discoveries”
- Merton believed in “controlled sloppiness”- untidy experiments and of course sometimes real discoveries occur

WILDCATS OR LONG SHOTS

Pawsey was an explicit supporter of what he termed “wildcat experiments” or “long shots”. How do we reconcile Pawsey’s conservative response in some circumstances with his enthusiasm to try new things? We suggest that he was often conservative in relation to physical interpretation, but not at all conservative about trying new experiments! He was also not in the least cautious (in contrast to Bowen, White or, famously, Martin Ryle) about sharing research results

Whimiscal definitions of serendipity

- New York Times -1999- review of autobiography of Alec Guinness: ----
"his serendipitous writing style (sly, witty, elegant)."
- On the internet in 2001: "SERENDIPITY- When loves feels like magic...you call it *destiny*. When destiny has a sense of humor.... you call it.... Serendipity."

Some details

- Pawsey’s view of “primary” and “verification” discoveries closely match the analysis of the “serendipity pattern”. These categories provide an apt classification for discoveries made during the first two decades of radio astronomy research internationally.
- A “highlight reel” of post WWII radio astronomy reflects what Merton termed the “reward system” in science—scientists are rewarded, not by riches, but by recognition for priority and for discovery. A highlight reel version of Pawsey’s life would tell us that he was the first to detect the Hot Corona, the correlation of sunspots with solar bursts and his election to the Royal Society of London (1954).
- The early years of radio astronomy were characterised by many serendipitous discoveries. (As demonstrated by Harwit (2019), the rate of new discoveries is highest at the inception of a new field). Merton first unveiled the concept of the

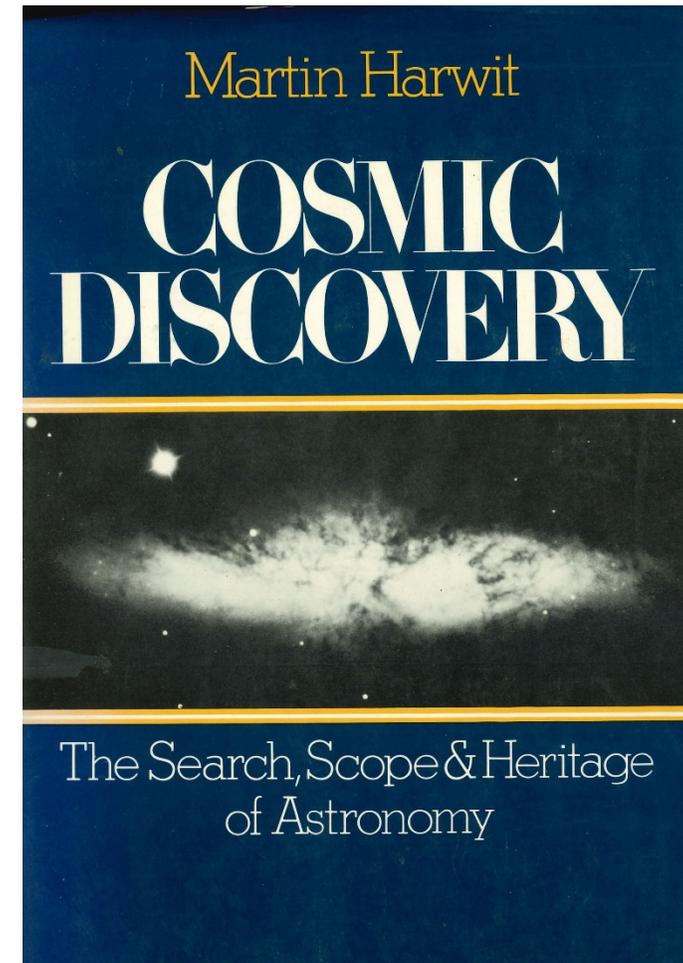
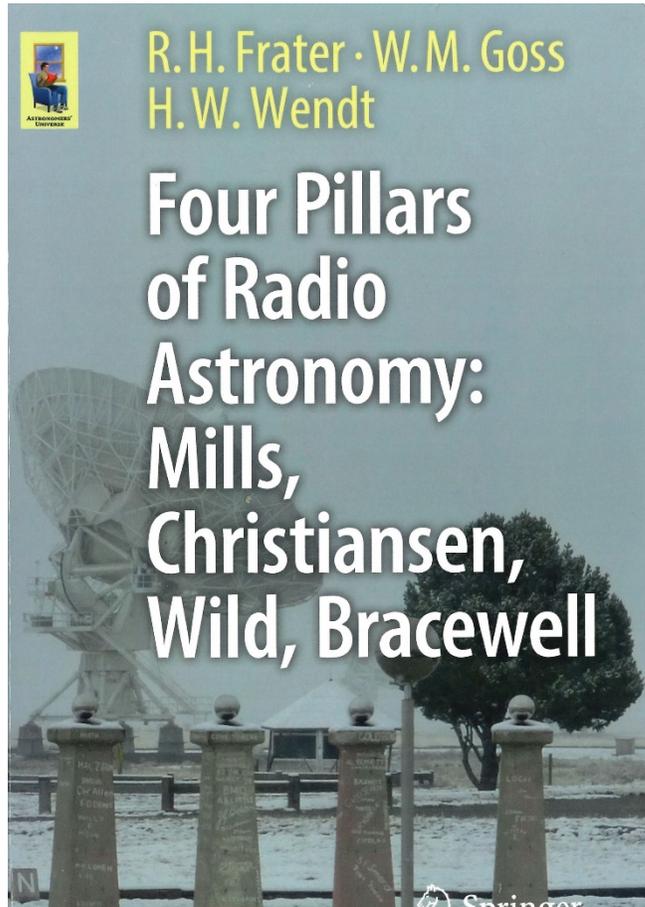
Conclusion

- J.L. Pawsey was certainly a remarkable man, leader and father. Radio astronomy in Australia and the world was heavily influenced by his energy and inspiration. He could pick promising colleagues, he was the ultimate “networker” as he made contacts within the astronomy world wide community of astronomers. He played a major role turning “solar noise” and “cosmic noise” into radio astronomy and astronomy in the era 1945 to 1960.
- The foundation of Australian radio astronomy is based on this complex, successful and controversial interplay between E.G. Bowen and J.L. Pawsey.
- There is no doubt that all of us here today have been directly or indirectly influenced by the life of this scientific pioneer.

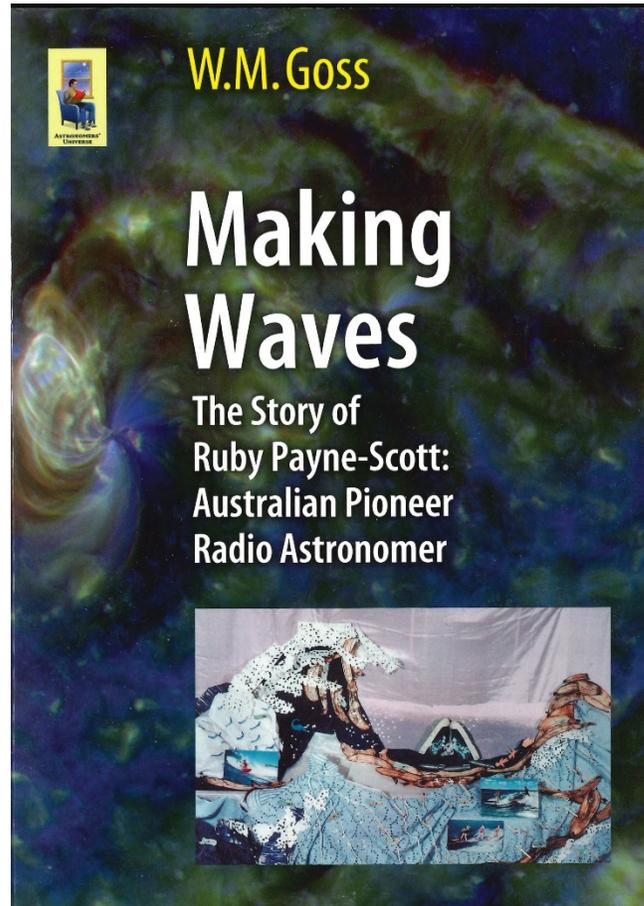
Final Word

- Reconsidering the early history of radio astronomy through the perspective provided by a close examination of Pawsey's life, underscores the importance of cultivating a healthy social, institutional and intellectual ecosystem, for science to flourish. Such an ecosystem provides the capacity for big science projects, while maintaining niches for less conformist people or ideas.

Two Relevant Books



Women's History Month Lots of news in Australia about Ruby Payne Scott – OVERLOOKED obit in NY Times in 2018 29 August. See MG for PDF for his books



Special Treat

- Tania Burchell text
- The Black Cloud – Scientists in Science Fiction
- Novel from Fred Hoyle THE BLACK CLOUD from 1957
- Joe Pawsey is a main character Harry Leicester !
- If interested ask me