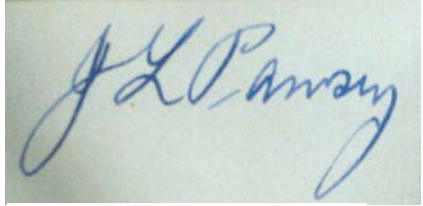




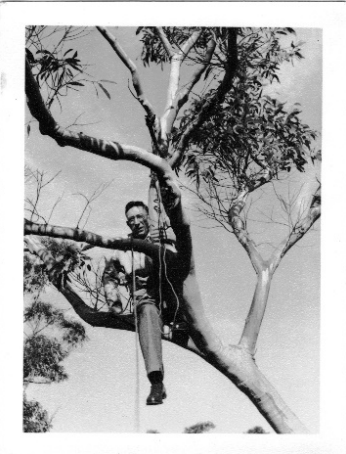
J.L. Pawsey : His 1961-1962 Plans for the Future of NRAO and a Proto-VLA ----- Would He Have Built the VLA ?



J.L. Pawsey



Miller Goss
NRAO



Domenici Science Operations Center, Socorro, NM
22 February 2023



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

- Goss, Ekers and Hooker
- Open Access CC By 4.0
- Link.Springer.com--- search “Pawsey”
- In next weeks pdf will be updated ?

Perhaps a DSOC book launch 27 Sept 2023

Springer Historical and Cultural Astronomy

SpringerSeries – HCA, same as *Open Skies* by

Kellermann, Bouton and Brandt

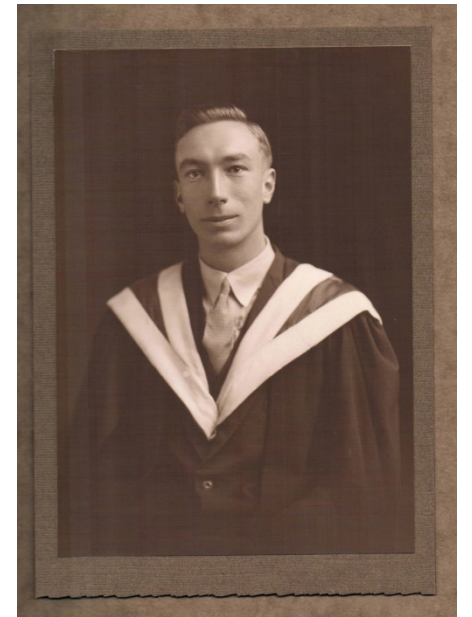
Problem with the ESM – “Electronic Supplemental Material” -- NOW on NRAO site with the NRAO ONLINE files (background material) use

<https://science.nrao.edu/about/publications/pawsey>



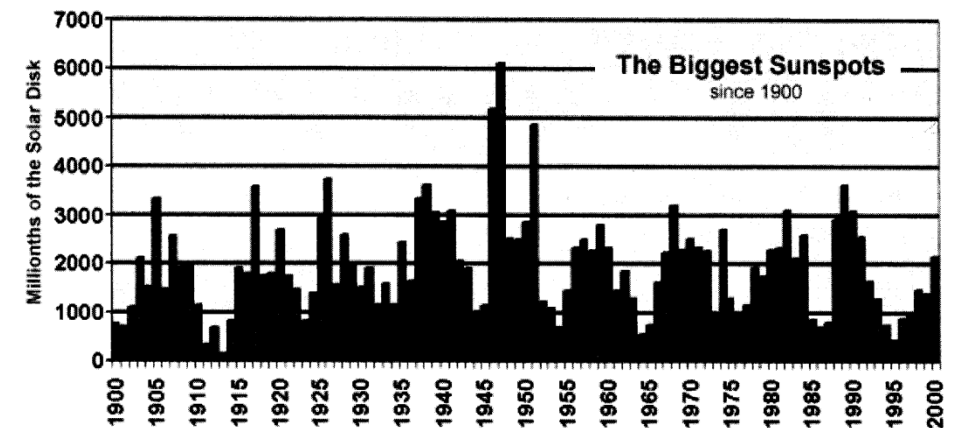
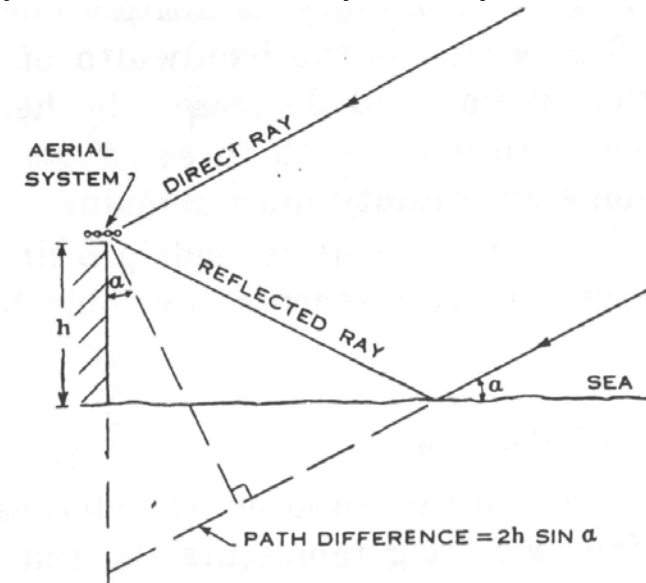
Pawsey- his life

- Born Ararat Victoria Australia May 14, 1908
- His mother was a bearer of maternal ambition
- University of Melbourne 1926-1929 BSc
- Master of Science 1931
- Given a 1851 Exhibition Scholarship to University of Cambridge – footsteps of E Rutherford- 1935 PhD working on motions of the E layer of the ionosphere with J.A. Ratcliffe and E Rutherford-----PhD in
- Played a major role in Australian CSIR radar in WWII
- Started radio astronomy in Australia
- Appointed NRAO Director 31 October 1961
- Died Sydney, 30 November 1962, age 54



Dover Heights WWII- first aerial for interferometry- 26 Jan 1946 – principles worked out by Pawsey and Ruby Payne-Scott

Principle of aperture synthesis described in the paper



Pawsey's role post 1945

- Started many research areas himself- solar corona, solar burst work, stimulated HI research in 1951--- ID of Crab nebula, M87 and Cen A in 1949 by Bolton, Stanley and Slee the RP group of Pawsey at Dover Heights Sydney
- Hired the key people, Payne-Scott, Kerr, 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
- Died of glioblastoma multiforme cancer after hospitalized in Washington and Boston and died back in Australia 30 Nov 1962 - age54

David S. Heeschen age 36

The OBSERVER

11

October 31, 1962



Next pages from OPEN SKIES by Kellermann, Bouton and Brandt-2020

On 5 March 1962, Heeschen acted boldly and requested \$3 million to be included in the FY1964 budget "for the first phase in the development of a very large radio telescope.."

.

Phase I---- begin by establishing the performance requirements and the antenna configuration needed to meet those requirements, followed by designing the antenna elements and electronics, studying of the effects of the atmosphere on phase stability

Regarding the site, Heeschen noted, in passing, that "Green Bank may not be suitable." Phase II, which Heeschen optimistically projected could begin in FY1965 or 1966, would be to "construct full telescope by expanding the portion built in Phase I." As Heeschen noted in a 1991 handwritten note scribbled on a copy of his 5 March 1962 memo, "**We never got the \$3M - but this was the formal beginning of the VLA [project] & in fact the [program] outlined was generally carried out.**" [The committee members were Wade, Hogg, Drake, Findlay, Hvatum, Vinokur and Fred Crews.]

Heeschen 28 and 29 November 2007 email and phone

- Heeschen wrote: We told him all about our plans and hopes, including the VLA. We had not yet settled on
- any of the details of the VLA of course, but were sure we wanted a general- purpose instrument that would
- do high resolution imaging, have compatible resolution and sensitivity limits, and minimal instrumental effects.
- .

... Shortly after his visit he wrote a letter [the 17 July 1962 “Notes on Future Program at Green Bank”],to Rabi or Tape, who then forwarded it to us in GB [We should] go on with our plans for a big instrument.

He also described his own idea which was to bring together a few experts [Erickson and Scheuer] to review what was then known and unknown about discrete radio sources and try to decide specifically what sort of instrument might best address the unknowns. This was consistent with what had been the approach up to that time - pick a problem and design an instrument to study it, and it had been enormously successful up to then. **It was also almost the exact opposite of our idea for a general purpose instrument.**

Goss interviewed Heeschen on the phone, the next day -- 29 November 2007. The conversation was recorded and later transcribed. Goss asked Heeschen a delicate question: "What would NRAO have been like if Joe Pawsey had lived? You see this is a tricky question."

Heeschen replied: " I think I know the answer but it's self-serving in a way and so I'm not sure that I want to go into it...."

Goss "Well , let me give what I think your answer would be, and then, is that OK if I do that?"

Heeschen added: "Yeah, go ahead."

Goss: “I think that we wouldn’t have the VLA.”

Heeschen than interrupted and provided his answer:

“I think we wouldn’t have it, that’s correct. “

Goss: “Pawsey was a firm believe in- Let’s get an astronomical problem like the nature of extragalactic sources and build an instrument to solve it.”

Heeschen: “That’s correct. This reminds me of the different attitude of Drake, Hogg and I were there at the beginning talking about what we wanted to do. I was overwhelmed with the concepts of the problems that were happening because there was such a mismatch between sensitivity and resolution of all the instruments that existed [in 1962].”

Why the VLA – as seen in 1960s- David Heesch:

“We set out from the beginning to build a flexible, general purpose instrument for a broad scientific purpose, to be used by a lot of people other than, or in addition to, the designers..”

Conclusion

In 2007, David Heeschen told Goss facetiously: “We were so bold with our design of the VLA because of our inexperience.”

Campbell Wade reiterated this statement on 16 October 2018: “Our group just did not realise that the VLA was an ‘impossible’ concept. We were saved by our lack of experience.”

PS see the amazing interview with Cam Wade done by Robyn Harrison in 2009 – our book editor and now an expert on Australian radio astronomy. 131 min

<https://www.nrao.edu/archives/items/show/13767>

Also 2015 interview with Cam Wade by Ken Kellermann ---- url above with 13897- 124 min

A major step was the Green Bank interferometer project begun in 1963 – one additional 85 foot and hired Barry Clark in 1964

Heeschen “Barry of course has been a major contributor to just about every NRAO activity since then.

Kellermann, Bouton and Brandt continued in 2020
OPEN SKIES

“For the next half a century, Clark, probably more than any anyone else, was the intellectual force behind the VLA software, and arguably the only person who understood all aspects of the VLA design.”



Annual Reviews Monograph

TELESCOPES FOR THE 1980s

Edited by G. Burbidge and A. Hewitt

Two Books

Women's History Month- March 2022-- Lots of news in Australia about Ruby Payne Scott – OVERLOOKED obit in NY Times in 2018 29 August. See MG for PDF

