

# Signal and noise?

A cross-disciplinary conversation about what caused radio astronomy in Australia

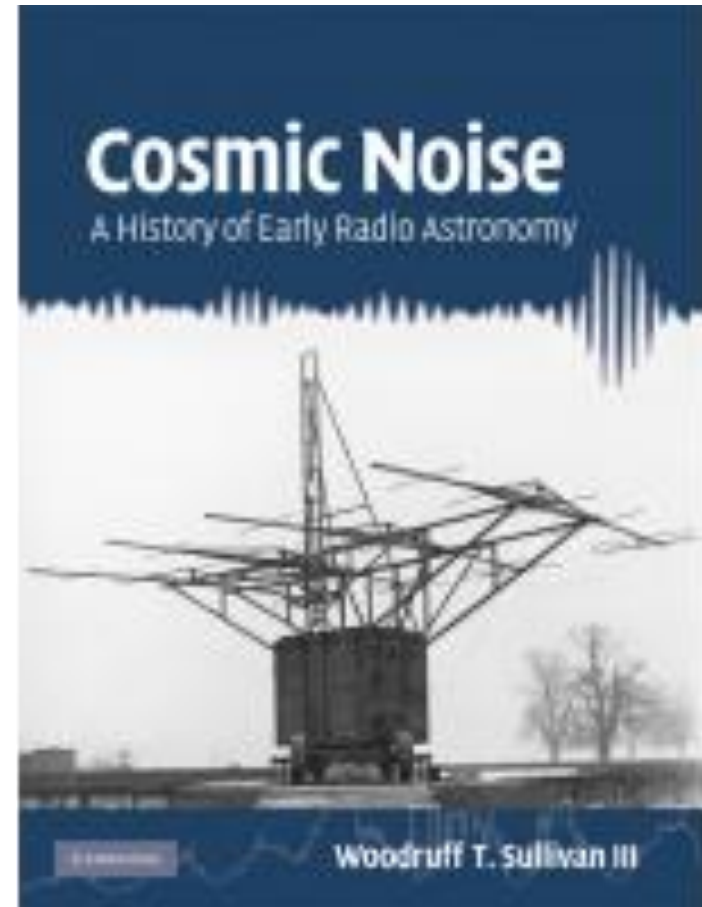
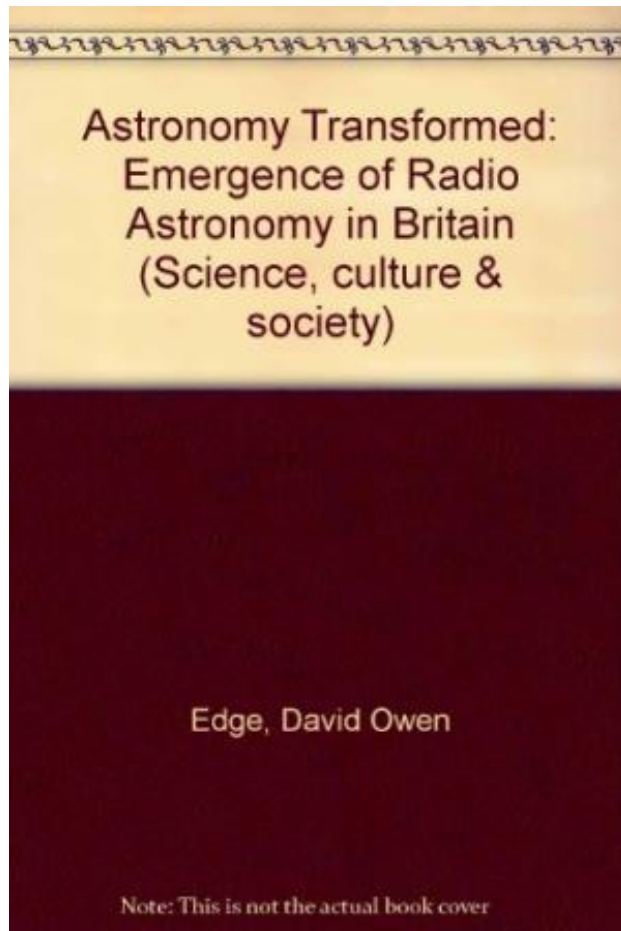
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CENTRE FOR VALUES, ETHICS AND THE LAW IN MEDICINE &  
SYDNEY SCHOOL OF PUBLIC HEALTH; NRAO; ATNF, CSIRO



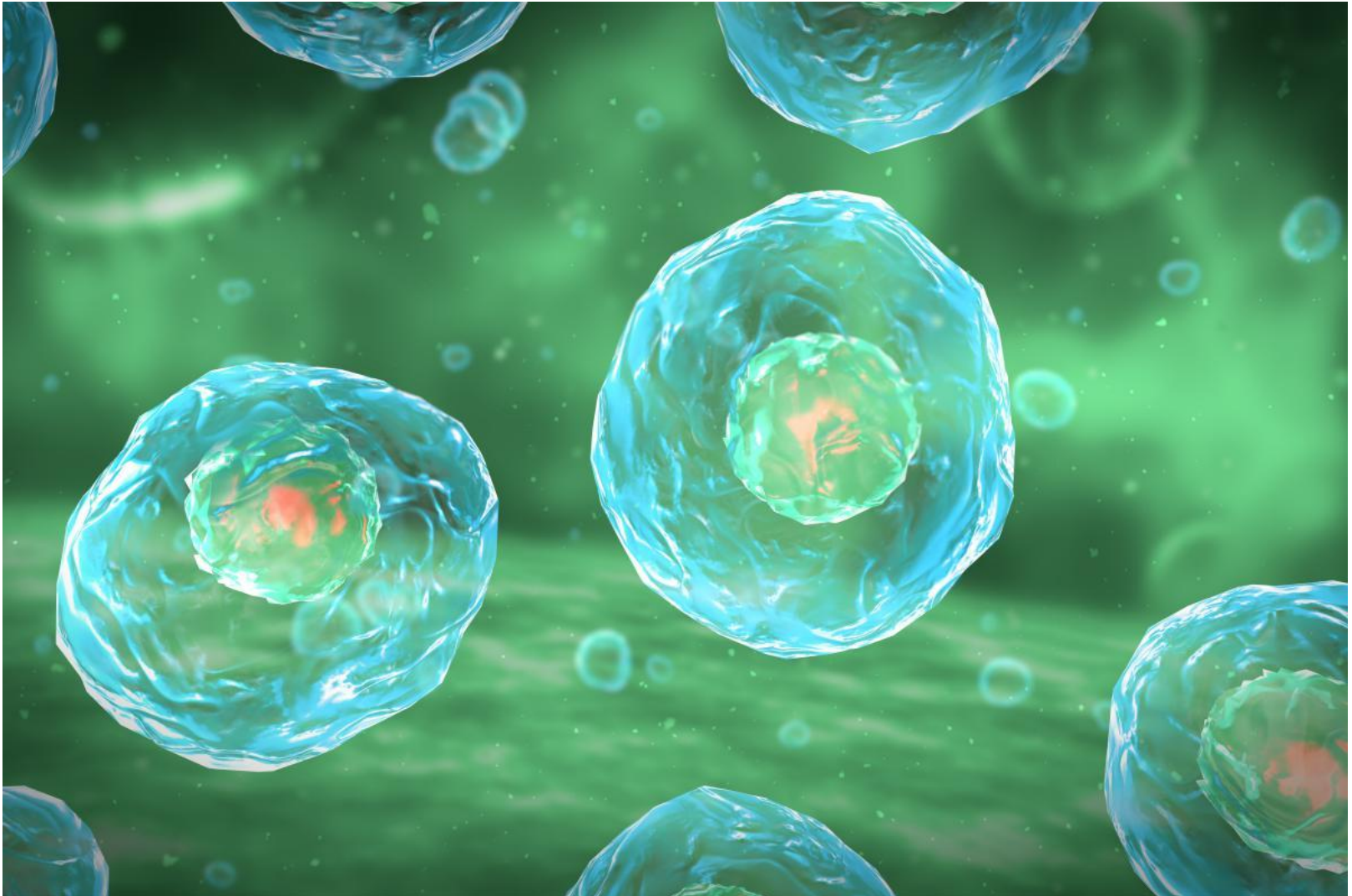
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- › How do new areas of science emerge?
- › What determines a scientist's choice of research topic?
- › How do discoveries occur and how do scientists respond to them?
- › What is the effect of competition in science?
- › How do scientists organise themselves so as to exploit the techniques they have developed?
- › Under what conditions do scientific disputes occur?
- › ... all questions about how social relations of science and intellectual development are connected

- › Sometimes cause-effect  $\parallel$  dose-response
- › Or cause is proximal/distal, downstream/upstream
- › Or there's the 'web of causation'





- › A method / methods (Logical-positivism to Popper)
- › Paradigms and revolutions (Kuhn and Lakatos)
- › CUDOS norms (Merton/ Ziman)
- › Gift-exchange (Hagstrom)
- › Economy (Latour)
- › Various 'strong-program' social systems
- › Actor-network (Callon, Latour again)
- › 'Realist' / process-function theories

- › Imperial-colonial science
- › Towards 'big' science?
- › Open / closed social structures
- › Exploratory / problem-solving programs
- › Scientists / engineers
- › 'Theory-laden observation'



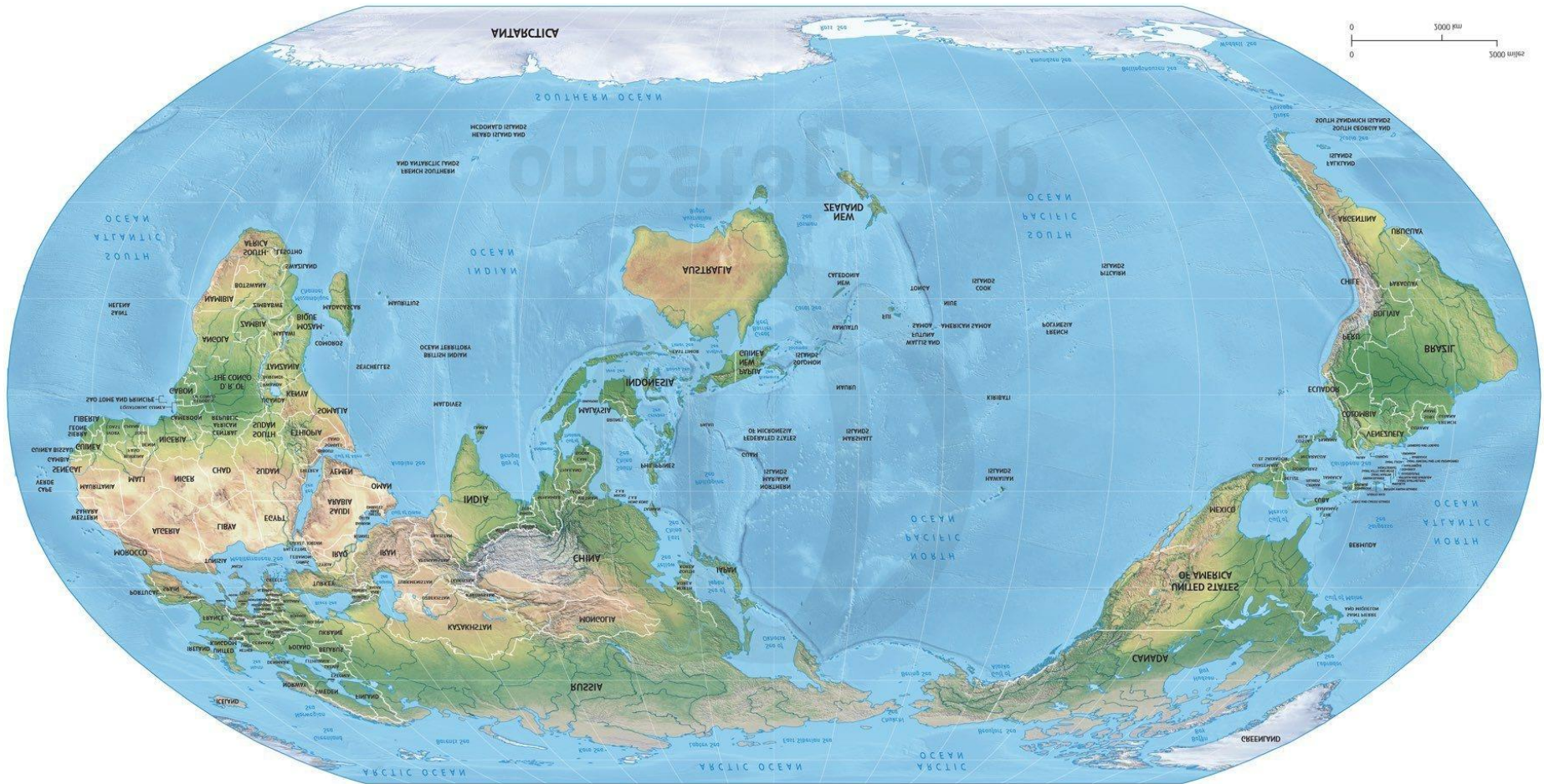
# Science and empire, centre and periphery





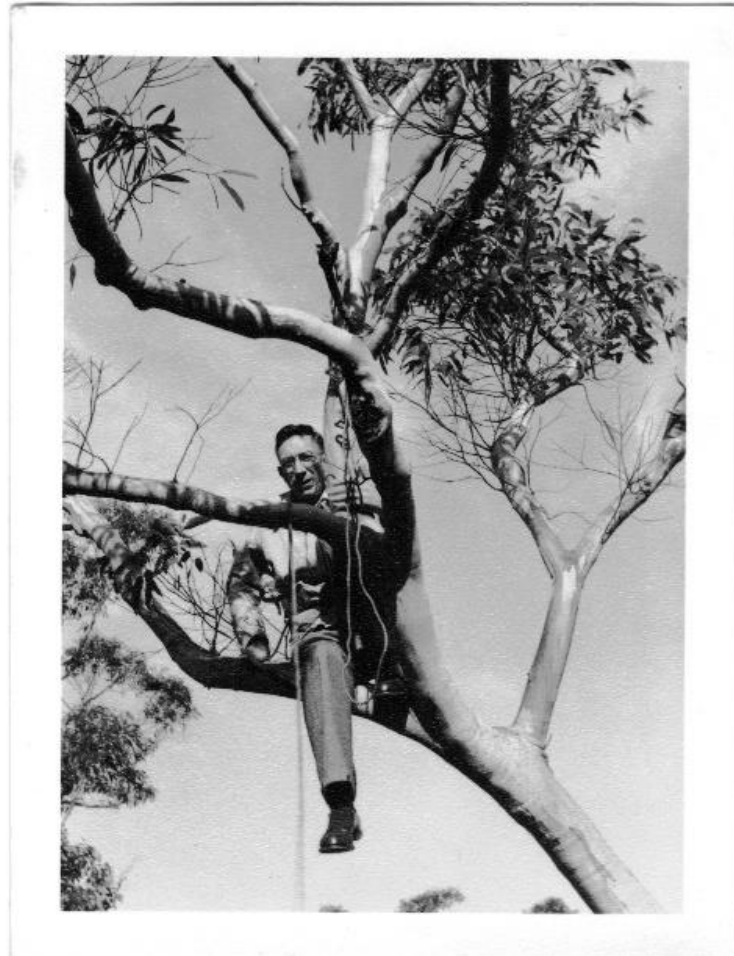


# The Empire Writes Back

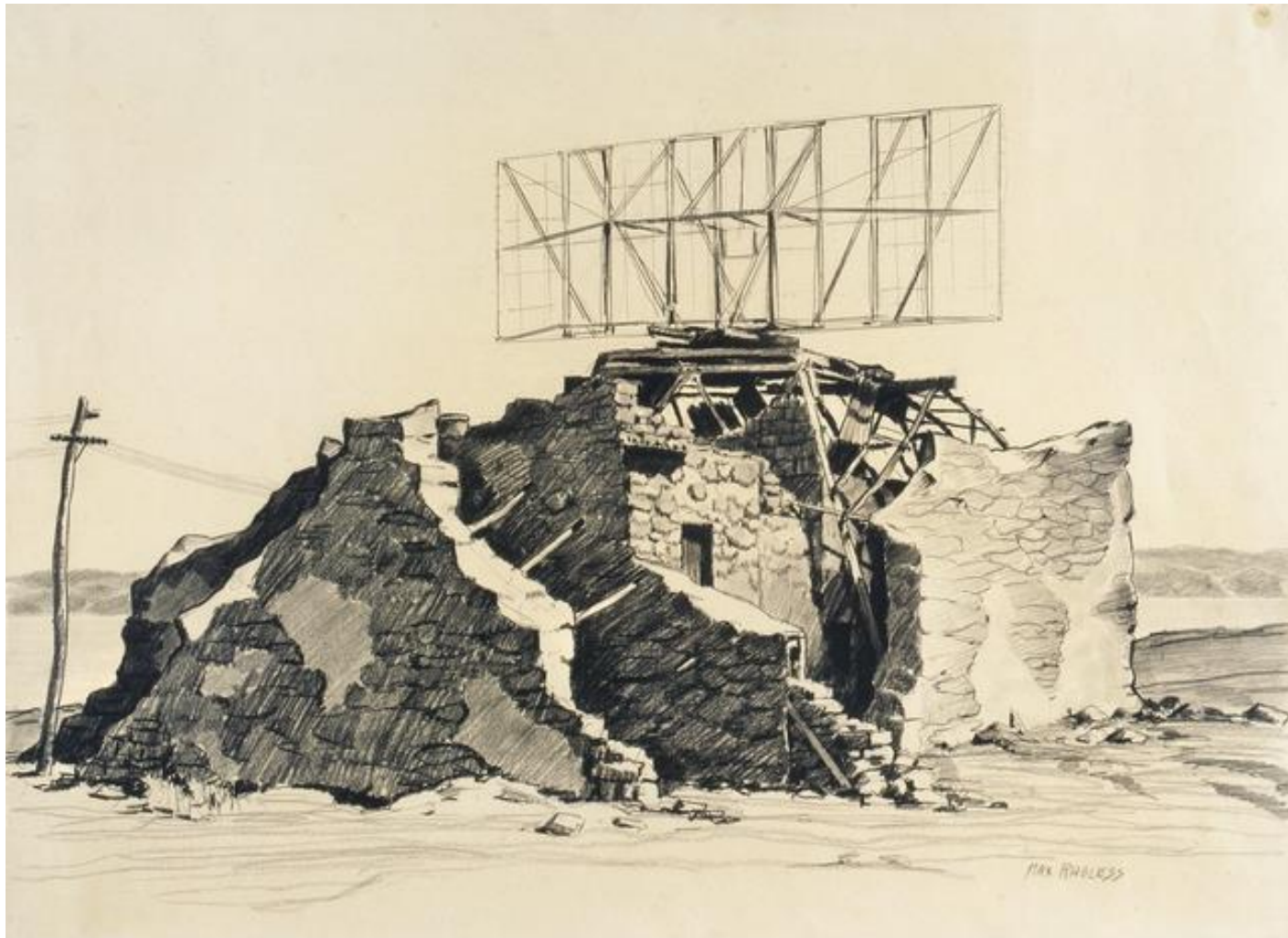




# Joe Pawsey: Dominion scientist



Any test tube fumbler could manage by a few hit and miss trials to get some sort of procedure for getting a specimen of ammonia nitrate, but there was only one possible way of finding out how to get the maximum amount in the purest condition: get a complete phase rule model of the complex component system with its dozen or more possible phases....What an utterly stupid practice blind empirical stabbing would have been, since even if there were some success, the chance of highest success would be 1 in a million.

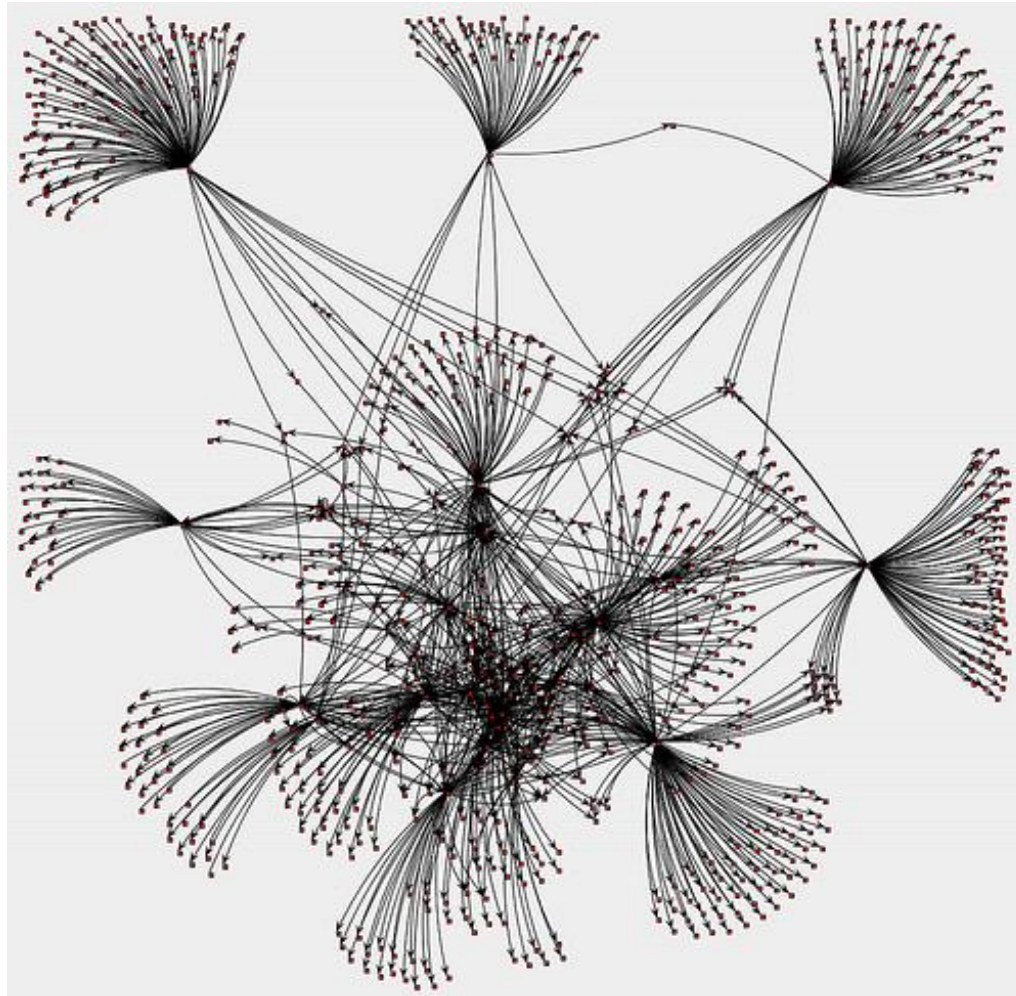


AUSTRALIAN WAR MEMORIAL

ART 30198



# The 'moving metropolis', nationalism and internationalism



- › Physicists diverted by war into radar, returned to their University departments of physics
- › Team assembled for radar work who stayed in their government institution but directed their goals to radio astronomy
- › Teams where astronomers took the initiative
- › Teams in University departments of electrical engineering

## Social structural questions in early radio astronomy

- › Exploratory and problem solving focus
- › Closed or open communication styles
- › Scientists and engineers
- › 'little' and 'big' science

- › Cosmic rays, ionospheric research, 'normal solar', radio propagation
- › Why did Pawsey and Ruby 'see' the application of Fourier transform for radio astronomy?





