

The questions an academic historian asks about early radio astronomy

Presented by

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With thanks to colleagues W M Goss and especially R D
Ekers, without whom none of this would be possible



Acknowledgment of Country

Today we stand in the footsteps of millennia old.

May we acknowledge the traditional owners whose cultures and customs have nurtured, and continue to nurture, this land, since men and women awoke from the great dream.

We honour the presence of these ancestors who reside in the imagination of this land and whose irrepressible spirituality flows through all creation.

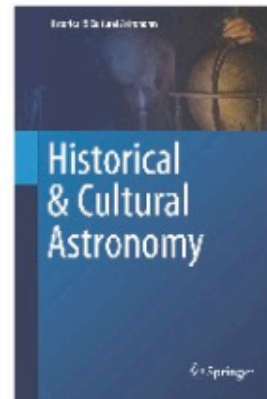
- Jonathan Hill, Creative Spirits website





From the Sun to the Cosmos,
J.L. Pawsey, Founder of Australian Radio Astronomy

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3 types of history making

- Antiquarian historians locate, assemble and delight in the details of the past, for its own sake. Antiquarian history describes family history, local history, and specialist histories, for example, of railways, or dolls.
- In science this has often been histories of collections or of local institutes
- Practitioner histories are written by insiders: doctors who write the history of medicine, pilots who author aviation histories, and scientists who author the histories of their disciplines.
- Practitioner histories typically select the events and topics of professional interest for inclusion, and represent these events in ways that reflect what is valued or expected in that professional context. In science, this often means writing about discoveries—and not about ideas that led nowhere.
- In our book, we comment in various places on analogies between past problems in radio astronomy and present ones and draw some possible inferences for present approaches.

Influential (for us) example: the ionosphere

A practitioner historian such as Stewart Gillmor might provide an account of how the ionosphere was “discovered” by Sir Edward Appleton, and publish technical details about the experimental design and equipment used.

Antiquarian historians might fill in this picture with minutiae (eg, the type of connector used by Marconi when cobbling his first radio transmission equipment together).



Ionosphere, continued

An academic historian such as Chen-Pang Yeang might not use the word “discovery”, but instead ask how the idea of a conducting layer in the earth’s atmosphere came to be held by many different people. Such an historian might identify that recently invented technologies, such as the coaxial cable, might influence this idea (Heaviside imagined that an entity rather like a giant coaxial cable, encircled the earth, with radio waves reflected within it.)

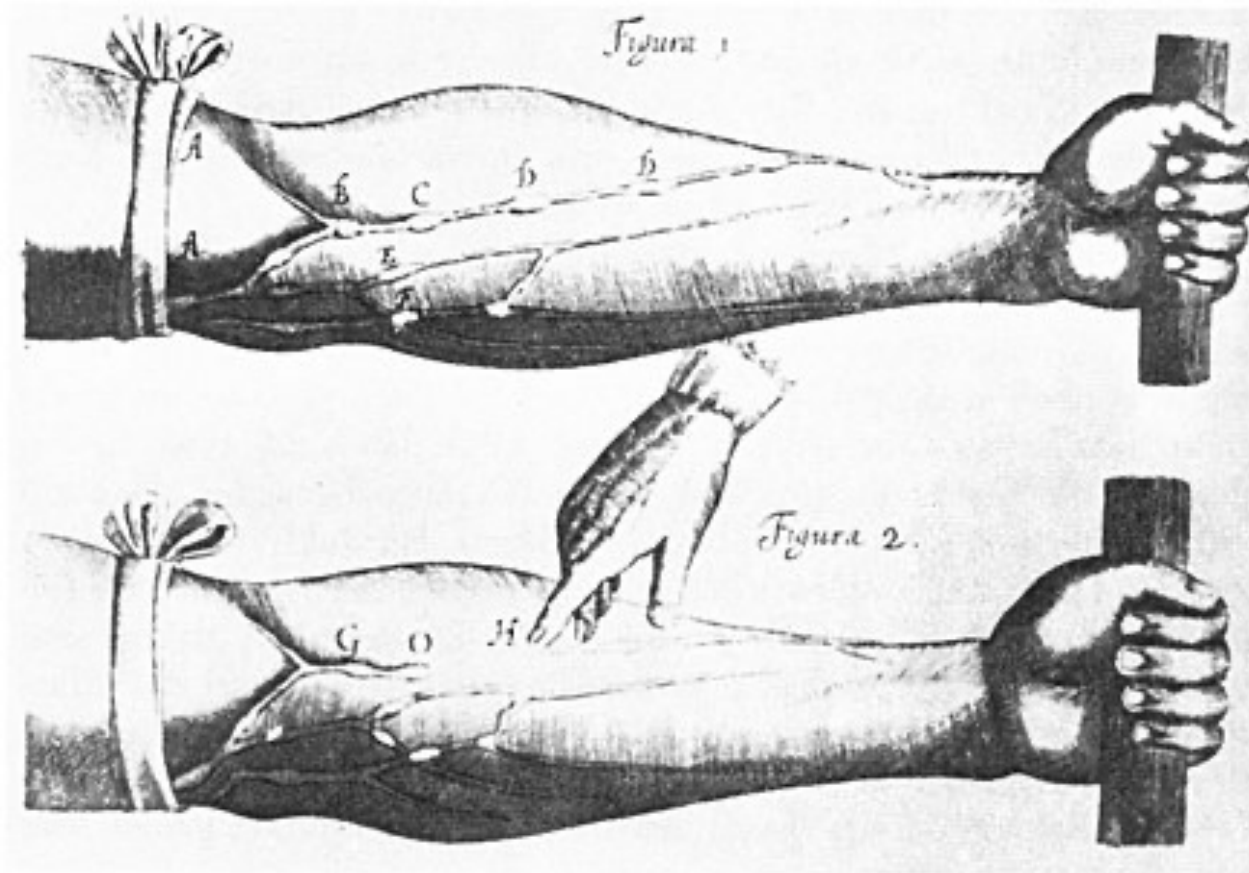
Then there was the puzzling longevity of ‘surface diffraction’ – mathematical theory for radio wave propagation that explained none of its most salient observable features.



'Academic' histories of science

- Academic historians develop conceptually driven (historians say “theoretically-driven”) analyses of historical circumstances, aimed at understanding the social structures, systems and processes that drive change over time. [Or how some things remain very stable despite apparent surface turbulence!]
- The aim is to provide insight into why people act in certain ways, and how and why those actions have impact,
- In particular, to ask, how ideas ever came to be conceived – what made it possible to think or try something
- Why some ideas spread and others don't

Ideas don't spread because they are true



About history: is it, or could it be, science?

- Are history and science about facts?
- Initial idea of history as being strictly factual – rather than delivering moral(or practical) lessons (Leopold van Ranke, mid 1800s: “To history has been assigned the office of judging the past, of instructing the present for the benefit of future ages. To such high offices this work does not aspire: It wants only to show what actually happened”)
- But actually, you have to select which documents you attend to, and select what you report on out of those documents
- You use your own theories to select and to interpret the significance and relevance of your sources
- Ranke was telling a story about how all civilization emerged from the intersection of ‘Teutonic’ and ‘Romantic’ peoples. (He wasn’t aware that he was developing this as a *theory* of how ‘civilization’ emerged).
- Civilisation emerged from the different ideas these people had about how society should work (which they tried to put into practice as political actors)
- His story did not include the perspectives or the activities of women, poor people, non Europeans (etc)

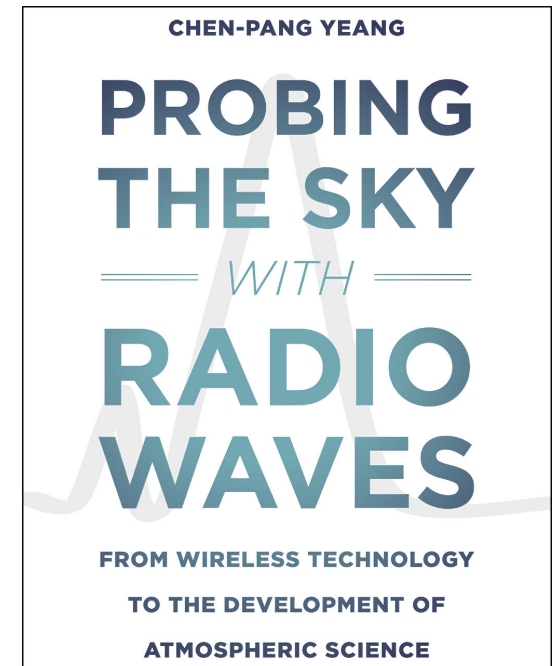
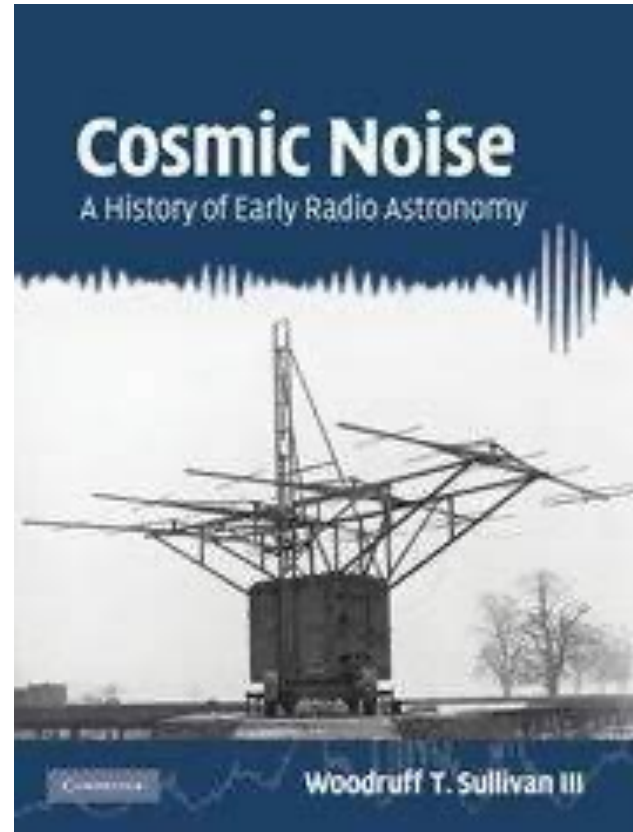
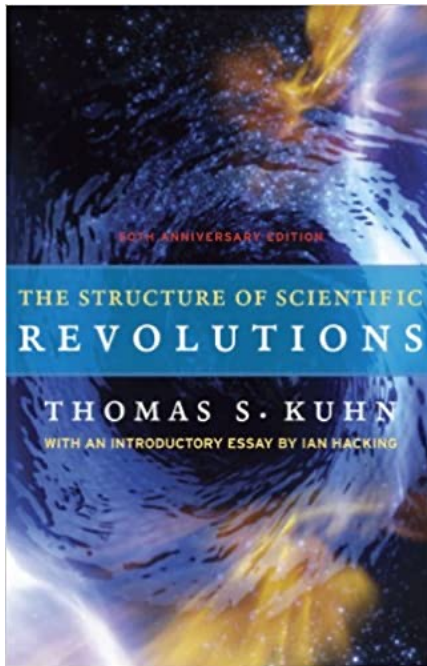
What if history was about materials rather than ideals?

- Marx –‘historical materialism’
- Interested in producing a theory that can explain the development and changes of human societies throughout history
- asserts that the material conditions – ie, a society's mode of production and relations of production, fundamentally determine society's organization and development.
- Material conditions also produce consciousness, rather than the other way around.
- Hence – struggle between those who control the means of production and those who sell their labour is the driver of social change

The past is a foreign country

- History is necessarily perspectival and interpretive
- There is no single correct version – history is like the blind people describing the elephant, or like describing a mountain ('standpoint epistemologies', Sandra Harding)
- We can study how people have 'constructed' reality by representing the world in certain ways - for example, the notion of 'civilization'

These issues have strongly influenced the history of science



What sort of questions did we ask about the early history of radio astronomy?

- Some were about people: what was it about the specific characteristics of the people involved that influenced how research and ideas progressed? Did different leadership styles have much impact on the different research groups?
- Some were about organisations: what kinds of organizational values and culture supported this research?
- Some were about the continuity of the structuring relations of colonialism / geography and about industry connections – much did ‘the tyranny of distance’ matter?
- Some were about the place of science in society – how did ideals about scientific internationalism shape scientists’ actions and how did this, in turn, matter?

History of ideas, discoveries

- But a lot of our questions were about the context in which ideas and instruments emerged:
- Where would people have come across the use of Fourier components in the pre-computer age, and how widely were Fourier transforms being performed?
- Why did the Sydney group not first observe the HI line?
- How can we best make sense of ‘discovery’ of the galactic centre?
- What factors produced the prolonged and sometimes acrimonious disputes about discrepancies between early surveys? (fights about cosmologies? An inability to shift an implicit, but no longer tenable, ‘radio star’ model? Ryle’s inability to admit he was wrong? ‘epistemic values’ – for particular instruments? To fit existing information?)
- Where were some of the most serious misses? (eg late adoption of computers)



Thank you!