

## **The IAU Historic Radio Astronomy Working Group. 1: Progress Report**

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This new Working Group was established at the July 2003 IAU General Assembly in Sydney, with a view to:

- (1) assembling a master list of surviving historically-significant radio telescopes and associated instrumentation found world-wide;
- (2) documenting the technical specifications and scientific achievements of such instruments;
- (3) maintaining an on-going bibliography of publications on the history of radio astronomy;
- (4) monitoring other developments relating to the history of radio astronomy.

This was a joint initiative of Commissions 40 (Radio Astronomy) and 41 (History of Astronomy), and as such the new WG comes under the umbrella of both Commissions and Divisions X and XII.

Coincident with the formation of the WG at the General Assembly were 1.5 days of meetings about the history of radio astronomy, organised jointly by Commissions 40 and 41. Given

Australia's pioneering efforts in international radio astronomy, it was only natural that such sessions should form part of the program at the Sydney GA, and it was pleasing to see that they drew capacity audiences. Science Meeting 2, on "The Early Development of Australian Radio Astronomy", ran all day on July 21, and attracted the following oral and poster papers:

- Sullivan, W. A half-century of Australian radio astronomy, 1939-1988: from wartime radar to the Australia Telescope.
- Minnett, H. Fifty years of radio science and its applications.
- Murray, J. The Penrith and Dapto solar radio spectrographs.
- Robinson, B. Joe Pawsey and his influence on the development of Australian radio astronomy.
- Slee, B. Early Australian measurements of radio source structure.
- Robinson, B. Early observations of the H-line in Sydney.

- Murray, J. Development of the Murraybank multi-channel H-line receiver.
- McLean, D. The solar radio astronomy program at Culgoora: an historical overview.
- Suzuki, S. The Culgoora Spectropolarimeter.
- Duncan, R.A. History of the determination of Jupiter's rotation period.
- McAdam, B. From Molonglo Cross to MOST: a scientific appraisal.
- Batchelor, B., Brooks, J., & Sinclair, M. "Receiver development for the Parkes Radio Telescope.
- Milne, D., & Whiteoak, J. The impact of Frank Gardner on the first years of research with the Parkes Radio Telescope.
- Finlay, E., & Jones, B. The 30 MHz array at Fleurs.
- Robinson, B. URSI (Sydney) 1952: the first international meeting of radio astronomers.

Most of these papers dealt with the work at the various C.S.I.R.O. Division of Radiophysics field stations and at Parkes, although Bruce McAdam gave an excellent review paper about the University of Sydney's Molonglo Cross. Apart from Woody Sullivan's introductory overview—which effectively set the scene for the day—all of the papers were prepared by retired radio astronomers who were actively involved in Australian radio astronomy at one time or another during the period 1945–1988. In addition to the various papers, a video about Grote Reber was screened during lunchtime. This Science Meeting was organised by Miller Goss, Dave Jauncey, Ken Kellermann, Wayne Orchiston (Co-Chair), and Woody Sullivan (Co-Chair).

For those wanting yet more, Wayne Orchiston and Bruce Slee organised Science Meeting 5 on "Pioneering Observations in Radio Astronomy", which was held on the morning of July 22. This featured the following oral and poster papers:

- Kellermann, K. Grote Reber: maverick scientist and father of radio astronomy.
- Radhakrishnan, V. Olof Rydbeck and early radio astronomy in Sweden.
- Sullivan, W. Wurzburg dishes: German WWII radar antennas vital to early radio astronomy in every country but Germany (and Australia).
- Orchiston, W. Dr Elizabeth Alexander: first female radio astronomer?
- Goss, M. Ruby Payne-Scott (1912-1981): Australian pioneer in radiophysics and radio astronomy.
- Kardashev, N., & Matvenko, L.I. The early development of USSR radio astronomy.
- Goss, M., McGee, R., and Slee, B. The discoveries of Sagittarius A in New South Wales in 1951 and Sagittarius A\* in West Virginia in 1974.
- Morimoto, M. Early Japanese mm-wave observations and their impact on international radio astronomy.
- Débarbat, S. Fifty years of radio astronomy in France.
- Jauncey, D., Lovell, J.E.J., Koyama, Y., Fey, A.L., Edwards, P.G., Aller, M.F., Aller, H.D., Klein, M.J., & the GAVRT Team. Interstellar scintillation observations: back to the future.
- Orchiston, W., Chapman, J., Parsons, B., Sharp, P., Slee, B., & Wilcockson, B. Interpretation of the historic Dover Heights field station: an ATNF heritage project.

In addition to the two specialized sessions mentioned above, other historic radio astronomy papers were given in Science Meeting 1 (on a possible 500–2000 yr old SN in the Crux-Centaurus region recorded in Maori 'star lore'), and Working Group Meeting 1 (an account of the ATNF's Historic Photographic Archive and development of a digital database). It is hoped that all Australian-related papers from these various meetings will be brought together in a book.

Meanwhile, publications on the history of radio astronomy that have appeared since 1998 include:

- Birthday dish [40<sup>th</sup> Birthday of the Parkes Radio Telescope]. *Sky & Space*, 14(5), 18-27 (2001).
- Bracewell, R.A., 2002. The discovery of strong extragalactic polarization using the Parkes Radio Telescope. *Journal of Astronomical History and Heritage*, 5, 107-114.
- Davies, R.D., 2003. Fred Hoyle and Manchester. *Astrophysics and Space Science*, 285, 309-319.
- Finley, D.G., and Goss, W.M. (eds.), 2000. *Radio Interferometry: The Saga and the Science*. Green Bank, National Radio Astronomy Observatory (Workshop Number 27).
- Kellermann, K.I., and Moran, J.M., 2001. The development of high-resolution imaging in radio astronomy. *Annual Review of Astronomy and Astrophysics*, 39, 457-509.
- Menon, T.K., 2001. The discovery of the first HI shell in the Galaxy. In Taylor, A.R., Landecker, T.L., and Willis, A.G. (eds.). *Seeing Through the Dust. The Detection of HI and the Exploration of the ISM in Galaxies*. San Francisco, ASP (Conference Series, Volume 276). Pp. 23-26.
- Moran, J.M., 1998. Thirty years of VLBI: early days, successes, and future. In Zensus, J.A., Taylor, G.B., and Wrobel, J.M. (eds.). *Radio Emission from Galactic and Extragalactic Compact Sources*. San Francisco, ASP (Conference Series Volume 144). Pp. 1-10.
- Orchiston, W., 2001. Focus on history of Australian radio astronomy. *ATNF News*, 45, 12-15.
- Orchiston, W., 2004a. From the solar corona to clusters of galaxies: the radio astronomy of Bruce Slee. *Publications of the Astronomical Society of Australia*, 21, 23-71.
- Orchiston, W., 2004b. Radio astronomy at the short-lived Georges Heights field-station. *ATNF News*, 52, 8-9.
- Orchiston, W., 2004c. The rise and fall of the Chris Cross: a pioneering Australian radio telescope. In Orchiston, W., Stephenson, R., Débarbat, S., and Nha, I-S. (eds.). *Astronomical Archives and Instruments in the Asia-Pacific Region*. Seoul, Yonsei University Press. Pp. 157-162.
- Orchiston, W., and Slee, B., 2002a. The Australasian discovery of solar radio emission. *AAO Newsletter*, 101, 25-27.
- Orchiston, W., and Slee, B., 2002b. The flowering of Fleurs: an interesting interlude in Australian radio astronomy. *ATNF News*, 47, 12-15.
- Orchiston, W., and Slee, B., 2002c. Ingenuity and initiative in Australian radio astronomy: the Dover Heights hole-in-the-ground

- antenna. *Journal of Astronomical History and Heritage*, 5, 21-34.
- Orchiston, W., Chapman, J., and Norris, B., 2004. The ATNF Historic Photographic Archive: documenting the history of Australian radio astronomy. In Orchiston, W., Stephenson, R., Débarbat, S., and Nha, I-S. (eds.). *Astronomical Archives and Instruments in the Asia-Pacific Region*. Seoul, Yonsei University Press. Pp. 41-48.
- Radhakrishnan, V., 2001. The first twenty years. In Taylor, A.R., Landecker, T.L., and Willis, A.G. (eds.). *Seeing Through the Dust. The Detection of HI and the Exploration of the ISM in Galaxies*. San Francisco, ASP (Conference Series, Volume 276). Pp. 6-18.
- Robinson, B., 1999. Frequency allocation: the first forty years. *Annual Review of Astronomy and Astrophysics*, 37, 65-96.
- Robinson, B., 2001. Reminiscences of early 21-cm research at the C.S.I.R.O. In Taylor, A.R., Landecker, T.L., and Willis, A.G. (eds.). *Seeing Through the Dust. The Detection of HI and the Exploration of the ISM in Galaxies*. San Francisco, ASP (Conference Series, Volume 276). Pp. 19-22.
- Robinson, B., 2002. Recollections of the URSI 10<sup>th</sup> General Assembly Sydney 1952. *The Radio Science Bulletin*, 300, 22-30.
- Steinberg, J.-L., 2004. Les cinquante ans de Nançay. *L'Astronomie*, 118, 5-9.
- Sullivan, W.T., 2000. Kapteyn's influence on the style and content of twentieth century Dutch astronomy. In Kruit, P.C. van der, and Berkel, K. van (eds.). *The Legacy of J.C. Kapteyn*. Dordrecht, Kluwer. Pp. 229-264.
- Sullivan, W.T., 2001. The cultural value of radio astronomy. In Cohen, R.J., and Sullivan, W.T. III (eds.). *Preserving the Astronomical Sky*. San Francisco, ASP. Pp. 369-376.
- Tarter, J., 2001. The search for extraterrestrial intelligence (SETI). *Annual Review of Astronomy and Astrophysics*, 39, 511-548.
- Westerhout, G., 2001a. The pioneers of HI. In Taylor, A.R., Landecker, T.L., and Willis, A.G. (eds.). *Seeing Through the Dust. The Detection of HI and the Exploration of the ISM in Galaxies*. San Francisco, ASP (Conference Series, Volume 276). Pp. 3-5.
- Westerhout, G., 2001b. The start of 21-cm line research: the early Dutch years. In Taylor, A.R., Landecker, T.L., and Willis, A.G. (eds.). *Seeing Through the Dust. The Detection of HI and the Exploration of the ISM in Galaxies*. San Francisco, ASP (Conference Series, Volume 276). Pp. 27-33.
- contributors of radio astronomy or SETI-type papers are Bruce Balick, Ron Bracewell, Chris Chyba, Marshall Cohen, Steve Dick, Frank Drake, Miller Goss, Mott Greene, Alastair Gunn, Karl Hufbauer, Richard Jarrell, Ken Kellermann, Wayne Orchiston & Bruce Slee, Richard Strom and Dan Werthimer.
- With the passing of the years, increasing numbers of radio astronomy pioneers are being taken from us. Those who have died within the last three years include Semion Braude (Ukraine), Frank Gardner (Australia), Robert Hanbury Brown (U.K. and Australia), Victor Hughes (U.K. and Canada), Harry Minnett (Australia), Grote Reber (U.S.A. and Australia), Gordon Stanley (Australia and U.S.A.), Kevin Westfold (Australia), and Don Yabsley (Australia). Obituaries for Gardner and Minnett are in active preparation, while for Hanbury Brown, Reber, Stanley, Westfold and Yabsley refer to the following publications:
- Browne, G., & Burge, E., 2001-2002. Kevin Charles Westfold 24 August 1921–3 October 2001. *Trinity Today*, Number 59 [Electronic Newsletter of Trinity College, University of Melbourne. URL: <http://www.trinity.unimelb.edu.au/publications/trinitytoday/>].
- Hanbury Brown, R., 1991. *Boffin. A Personal Story of the Early Days of Radar, Radio Astronomy and Quantum Optics*. Bristol, Adam Hilger.
- Kellermann, K., 2003. Obituaries: Gordon James Stanley. *Physics Today*, 56(2), 74-75.
- Kellermann, K., 2003. Obituaries: Grote Reber, 1911–2002. *Bulletin of the American Astronomical Society*, 35, 1472-1473.
- Kellermann, K.I., 2003. Obituary. Grote Reber (1911-2002). *Nature*, 421, 596.
- Kellermann, K.I., Orchiston, W., and Slee, B., n.d. Gordon James Stanley and the early development of radio astronomy in Australia and California. Submitted to *Publications of the Astronomical Society of Australia*.
- Orchiston, W., 2004. Solar radio astronomy at the short-lived Georges Heights field station. *ATNF News*, 52, 8-9. [About Lehany and Yabsley]
- Orchiston, W., and Slee, B., 2002. Vale Gordon Stanley. *ATNF News*, 46, 3.
- Tyson, J.A., 2003. Obituaries:Grote Reber. *Physics Today*, 56(8), 63-64.

Hanbury Brown's autobiography is captivating reading, and far more scintillating than any obituary!

Semion Braude was Ukraine's foremost radio astronomer, and Gregory Tsarevsky kindly arranged for his colleagues to provide us with biographical notes which were used in compiling the following brief account.

Semion Yakovych Braude was born on 28 January 1911 in Poltava, Ukraine, and in 1932 graduated from the Kharkov Institute of Physics, Chemistry and Mathematics (now the Kharkov National University), where he had studied physics. He subsequently obtained a Ph.D. (1937) and Doctor of Technics (1943). From 1933 until 1955 he worked at the Institute of Physics and Technology of the Academy of Sciences of Ukraine, rising to Department Head (1949-1955). In 1955 he was appointed Scientific Deputy Director of the Institute of

We are keen to build up a definitive bibliography on the history of radio astronomy, and would like to hear of other recent publications—particularly in languages other than English—which are not included in the above list (e-mail details to: [Wayne.Orchiston@csiro.au](mailto:Wayne.Orchiston@csiro.au)).

An up-coming conference with a significant historical radio astronomy component is "The New Astronomy: Opening the Electromagnetic Window and Expanding our View of Planet Earth. A Meeting to Honor Woody Sullivan on his 60<sup>th</sup> Birthday". This will be held at the University of Washington, Seattle, from 16 to 18 June 2004, and a separate notice (including the URL of the web site) appears elsewhere in this *Newsletter*. Confirmed

Radio Physics and Electronics Engineering, NASU, and from 1980 to 1987 was Head of the Department. From 1987 until his death he was a Councillor for the Directorship of the Institute.

Braude's initial research fields were radio-location and radio-oceanography, but in 1957 he turned his attention to radio astronomy. He then established an observatory in the Kharkov region where he and his colleagues erected a number of high-yield broadband decametric radio telescopes, the largest and best-known being the UTR-2. He was behind the URAN Project, which involved a VLBI network of decametric antennas that was used for a high-resolution survey of selected radio sources. He was an important pioneer in decametric radio astronomy.

Over the years, Professor Braude published more than 270 monographs and papers, and

received many honours from both the Ukraine and the USSR. He was a man of talent, wide erudition, inexhaustible energy and capacity to work, rare charm and kindness. He was sociable and witty, and will be remembered by everyone who was lucky to commune with him. With his passing, on 29 June 2003 at the age of 92, the scientific community lost an outstanding radio astronomer.

Finally, like other C40 members we were shocked to hear of Lucia Padielli's death on 22 December 2003. Lucia was Chair of Commission 40 when plans for the formation of our WG were in train, and she gave us her whole-hearted support and encouragement. We extend our condolences to her family, her colleagues and her institute.