

**DIVISION X, XII / COMMISSION 40, 41 / WORKING GROUP  
on HISTORICAL RADIO ASTRONOMY**

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**TRIENNIAL REPORT 2009-2012**

**1. Introduction**

The IAU Working Group on Historical Radio Astronomy (WGHRA) was formed at the 2003 General Assembly of the IAU as a Joint Working Group of Commissions 40 (Radio Astronomy) and 41 (History of Astronomy), in order to: a) assemble a master list of surviving historically-significant radio telescopes and associated instrumentation found worldwide; b) document the technical specifications and scientific achievements of these instruments; c) maintain an on-going bibliography of publications on the history of radio astronomy; and d) monitor other developments relating to the history of radio astronomy (including the deaths of pioneering radio astronomers).

The WGHRA is now an Inter Division (DX and DXII) Working Group.

**2. WG Web site**

The IAU WGHRA maintains a web site at <http://rahist.nrao.edu/> which includes past as well as current WG reports, brief biographical notes on Grote Reber Gold Medalists for Innovative Contributions to Radio Astronomy, photographs and memorial articles on recently deceased radio astronomers, and links to various sources of material on the history of radio astronomy.

**3. Preservation of Historical Radio Astronomy Sites and Papers**

The WG noted with satisfaction that the reported deterioration of the Bell Labs horn reflector used by Penzias and Wilson to detect the CMB has been addressed by Lucent Technologies, and that the horn has been refurbished. However, the Bell Labs property where Karl Jansky made his pioneering discovery is being sold to a real estate developer. In 1998 Bell Labs erected a Karl Jansky Monument on the exact location of the original

Jansky antenna. Regrettably this monument has fallen into disrepair, but efforts are underway to secure the preservation of the site and its public access.

In the Netherlands, the 25-meter Dwingeloo dish, inaugurated in 1956, and used for major research programs up to 1998, has been repaired and modernized by CAMRAS, a foundation run by radio amateurs, since 2006. The Dutch Ministry of Education, Culture and Science has granted a major subsidy for the full restoration of the telescope, which was started in June, 2012. The telescope will be made available for education and research projects by high-school students. The 60th anniversary of the first 21 cm mapping of the Milky Way with the 7.5 meter dish at Kootwijk was celebrated at the original site on 11 May 2011.

Ten of the original thirty two concrete piers which were part of Ron Bracewells spectro-heliograph were shipped to the VLA site where they will form part of the Ron Bracewell Sundial designed by Woody Sullivan and funded the Friends of the Bracewell Observatory. These piers contain the signatures of many radio astronomy pioneers which were chiseled into the concrete at the time of their visits to see the radio heliograph.

The first telescope on Haleakala on Maui was Grote Reber's sea interferometer which he built the early 1950's. Although most of Reber's antenna was destroyed in a storm, the base of the antenna, known as "Reber's Ring" still remains, but will soon be transformed into a parking lot in support of the ATST.

In 2003, the National Radio Astronomy Observatory initiated the first Archives devoted exclusively to radio astronomy. The NRAO Archives seeks out, collects, organizes, and preserves institutional records, personal papers, audio-visual materials, and oral histories of enduring value documenting NRAO's development, institutional history, instrument construction, and ongoing activities, including its participation in multi-institutional collaborations. As the national facility for radio astronomy, the Archives also includes an increasing collection of materials on the history and development of radio astronomy and the work of individual astronomers especially in the United States. See <http://www.nrao.edu/archives/>.

The processed collection now extends to 435 linear feet and includes the institutional records of NRAO, Web resources on early radio astronomy courses and on Nan Dieter Conklin and Harold "Doc" Ewen, as well as personal papers of Don Backer, Ronald Bracewell, Bernard Burke, Marshall Cohen, John Findlay, Mark Gordon, David Heesch, David Hogg, Kenneth Kellermann, John Kraus, Grote Reber, Arthur Shalloway, A. Richard Thompson, and Paul Vanden Bout. Processing of NRAO records is ongoing, as material is transferred to the Archives from the Directors Office and from other NRAO sites.

Between 2010 and 2012, Woodruff Sullivan III donated research materials gathered over 30 years in writing his book, *Cosmic Noise: A History of Early Radio Astronomy* Sullivan (2009a) including 255 interviews with radio astronomers audio-taped between 1971 and 1988. The book covers the period up to 1953, and a significant portion of his interviews and his other materials illuminates post-1953 radio astronomy history. The 2011 Pollock Award from Dudley Observatory funded the digitization of the taped interviews and the preparation of detailed finding aids for the Sullivan collection. Work is currently in progress to transcribe previously untranscribed interviews and to scan and correct existing transcripts. See <http://www.nrao.edu/archives/Sullivan/sullivan.shtml/>.

Additional material on the history of radio astronomy can be found at:

<http://www.astro.washington.edu/users/woody/hra.html> //

We are very pleased to note that in recognition of his outstanding contribution to the history of astronomy, Sullivan was awarded the 2012 Doggett Prize of the AAS in recognition of his "leadership in the history of astronomy community."

#### 4. Necrology

We note with sadness the passing of the following friends and colleagues: David Axon, Don Backer, John Baldwin, Dipak Basu, Emile Blum, Geoffrey Burbidge, Tom Carr, Robin Conway, Dave DeYoung, Bill Ellis, Shinzo Enome, Istvan Fejes, Andrej Finkelstein, Georgij Gelfreikh, Vitali Ginzburg, Bill Gordon, Stan Gorgolewski, Albert Greve, David Heeschen, Yuri Ilyasov, Naum Kaidanovsky, Kinaki Kawabata, Masatoshi Kitamura, Bernard Krygier, Mukul Kundu, Arkadij Kuzmin, Norm Labrum, Tomas Legg, Jack Locke, Frank Low, Bernard Lovell, Bernie Mills, Jelena Milogradov-Turin, Masaki Morimoto, Koh-Ichiro Morita, Vengataraman Radhakrishnan, Ernst Raimond, Jorma Riihimaa, Steve Rawlings, Bob Rood, Vagharshak Sanamian, Kevin Sheridan, Natalia Soboleva, Titus Spoelstra, Jaap Tinbergen, Keiya Takakubo, Atsushi Tsuchiya, Gisbert Winnewisser.

We are saddened by their loss but are grateful having known them and for their contributions to science.

#### 5. Conferences

Celebrations of the 50th anniversary of NRAO, Bridle et al.(2008) and Parkes in 2011 (see <http://www.atnf.csiro.au/research/conferences/Parkes50th/program.html>) and the 40th anniversary of Westerbork (<http://www.astron.nl/wsrt40/>) and Effelsberg (<http://www.mpifr-bonn.mpg.de/div/effelsberg/40years/en/index.html>) each contained historical reviews of the development of radio astronomy. In November 2009, Kellermann and Ekers organized a session on *Discoveries in Astronomy* at the American Philosophical Society with an emphasis on radio astronomy in presentations by Ekers and Kellermann (2011) on *Discoveries in Astronomy*, by Schmidt (2011) on the *Discovery of Quasars*, by Longair (2011) on *The Discovery of Pulsars and the Aftermath* and by R.W. Wilson on the *Discovery of the Cosmic Microwave Background* (unpublished). All of the presentations can be viewed on-line at <http://www.amphilsoc.org/meetings/webcast/archive/y/2009/m/11>.

At the 2011 General Assembly of URSI Commission J, Kellermann reviewed the careers of recently deceased radio astronomers. The Working Group web site maintains a list of deceased radio astronomers with brief career descriptions. Notification of future deaths should be brought to the attention of the Working Group Chair for posting on the web site.

#### 6. Other Major Publications

Sullivan (2009b) has published an extensive history of radio telescopes covering the postwar period up to 1990. Wielebinski and Wilson (2010) have reviewed the history of radio astronomy instruments and their state of preservation. As part of her Masters thesis at West Virginia University, Kenwolf (2010) has discussed the personnel issues associated with the establishment and operation of the NRAO in Green Bank. Tritton (2011) discusses the history of radio telescopes in Great Britain, while Strom (2008) reminds us of de Voogt's contributions as both an amateur and professional astronomer. Goss & McGee (2009) have published a biography of Ruby Payne-Scott which conveys her personal challenges trying to do radio astronomy in post-war Australia. In 2012, a new edition of this book for a non science audience *Making Waves: The Story of Ruby Payne-Scott, Australian Pioneer Radio Astronomer* will be published by Goss as part of the Springer *Astronomers' Universe* popular astronomy series. Several papers reviewing

the history of radio astronomy in France have been published by Orchiston et al. (2009), Lequeux et al. (2009), Pick et al. (2011), Encrenaz et al. (2011). The early history of radio astronomy in Germany has been published by Wolfschmidt (2008). Papers on the history of the Stockert radio telescope by Wielebinski, R. (2010) and the Effelsberg radio telescope by Wielebinski et al. (2011) also document the development of radio astronomy in Germany. Kellermann (2012) has edited a translation by Denise Gabuzda of the 1986 book in Russian on *A Brief History of Radio Astronomy in the USSR*. Maarten Roos and Pieter-Rim de Kroon have produced a short film (See <http://www.spiralgalaxy.nl/>) "Spiral Galaxy - De Melkweg Ontrafeld" (in Dutch with English or German sub titles) which discusses the development of our knowledge of the structure of the Milky Way Galaxy, from Kapteyn (1886) up to the 21-cm mapping at Kootwijk and Sydney (1951-1958). Wayne Orchiston is working with Masato Ishiguro to document the early history of radio astronomy in Japan Ishiguro, & Orchiston, (2012). Govind Swarup Swarup (2010) has written an important paper about the *Growth and Development of Radio Astronomy in India*.

Ken Kellermann

*Chair of Working Group on Historical Radio Astronomy*

## References

- Bridle, A. H., Condon, J. J., & Hunt, G. C. 2008, *Frontiers of Astrophysics: A Celebration of NRAO's 50th Anniversary*, Astronomical Society of the Pacific conference Series, Number 395.
- Ekers, R.D. and Kellermann, K.I. 2011, *Discoveries in Astronomy* Publications of the American Philosophical Society, 115, 2, 129-133.
- Encrenaz, P., Gómez-González, Jesús, Lequeux, J. & Orchiston, W. 2011, *Highlighting the History of French Radio Astronomy 7: The Genesis of the Institute of Radioastronomy at Millimeter Wavelengths (IRAM)*, Journal of Astronomical History and Heritage 14 (2) 83-92.
- Goss, W.M. and McGee, R.X. 2009, *Under the Radar, The First Woman in Radio Astronomy*, Ruby Payne-Scott (Springer ASSL series).
- Ishiguro, M. & Orchiston, W., 2012, to appear in *The Development of Astronomy and Emergence of Astrophysics in Asia*, T. Nakamura and W. Orchiston (eds), Springer, New York.
- Kellermann, K. I. 2012, *A Brief History of Radio Astronomy in the USSR* (Springer ASSL series).
- Kenwolf, L. G. 2010, "A Social and Political History of the National Radio Astronomy Observatory at Green Bank, West Virginia", M.A. Thesis, Dept. of History, West Virginia University.
- Lequeux, J., Steinberg, J.-L. & Orchiston, W. 2009, *Highlighting the History of French Radio Astronomy 5: The Nancay Large Radio Telescope*, Journal of Astronomical History and Heritage 13(1) 29-42.
- Longair, Malcolm, 2011, *The Discovery of Pulsars and the Aftermath*, Publications of the American Philosophical Society, 115, 2, 147-157.
- Orchiston, W., Steinberg, J.-L., Kundu, M., Arzac, J. & Blum, E.J. 2009, *Highlighting the History of French Radio Astronomy 4: Early Solar Research at the École Normale Supérieure, Marcoussis and Nancay*, Journal of Astronomical History and Heritage 12(3), 175-188.
- Pick, M., Steinberg, J.-L. & Boischoit, A. 2011, *Highlighting the History of French Radio Astronomy 6: The Multi-Element Grating Arrays at Nancay*, Journal of Astronomical History and Heritage 14 (1) 57-77.
- Schmidt, M. 2011, *The Discovery of Quasars*, Publications of the American Philosophical Society, 115, 2, 142-146.
- Strom, R. 2008, *Ir A.H. de Voogt's Pioneering Role as Radio Amateur and Astronomer*, pp. 467-501 in G. Wolfschmidt (ed.) *Heinrich Hertz (1857-1894) and the Devel-*

- opment of Communication (Norderstedt bei Hamburg). See <http://www.math.uni-hamburg.de/spag/ign/hertz/hertz-symp07.pdf>.
- Sullivan, W. T. III, *Cosmic Noise: A History of Early Radio Astronomy* 2009, (Cambridge U. Press).
- Sullivan, W.T. 2009, *The History of Radio Telescopes, 1945-1990*, in *Experimental Astron.* 25:107-124.
- Swarup, G. 2010, *Growth and Development of Radio Astronomy in India* Ch. V, pp.73-110, in T. Padmanabhan,(ed.) *Astronomy in India: A Historical Perspective*, Indian National Science Academy, Springer, New Delhi.
- Tritton, K. 2011, *The Festival of Britain Radio Telescope*, *Astron. & Geophysics* 52, 6.25-26.
- Wielebinski, R. and Wilson, T. 2010, *The Development of Radio Astronomy*, in *Heritage Sites of Astronomy and Archaeoastronomy*, 213–220.
- Wielebinski, R. 2010, *The Stockert Radio Telescope*, in: *Heritage Sites of Astronomy and Archaeoastronomy*, IAU-UNESCO Thematic Study, Ocarina Books, pp. 221–222.
- Wielebinski, R., Junkes, N., & Grahl, B., 2011, *The Effelsberg 100-m Radio Telescope: Construction and Forty Years of Radio Astronomy*, in *Journal of Astronomical History and Heritage*, 14 (1) pp. 3-21.
- Wolfschmidt, G. 2008, *From Wurzburg Giant to the Giant Telescope - Development of Radio Astronomy in Germany until 1970*, pp. 503-15 in G. Wolfschmidt (ed.) *Heinrich Hertz (1857-1894) and the Development of Communication* (Norderstedt bei Hamburg). See <http://www.math.uni-hamburg.de/spag/ign/hertz/hertz-symp07.pdf>.

3 HRA WG established in 2003 as Joint WG of C40/41 Div X(B)/XII(C) Maintain an ongoing bibliography of publications relevant to the history of radio astronomy Document and preserve surviving historically- significant radio telescopes and associated instrumentation Document the careers of deceased radio astronomers " Biographical Memoirs. 4 Publications & Research Books " 2013, Baars, International Radio Telescope Projects " 2013, Goss, Making Waves-Ruby Payne Scott " 2015, Orchiston, History of New Zealand Astronomy " Schwartz and Zensus " History of MPIfR (in German) COMMISSION 50 WORKING GROUP Div. XII / Commission 50 WG Controlling Light Pollution. TRIENNIAL REPORT 2009-2012. 1. Introduction. The activities of the Commission have continued to focus on controlling unwanted light and radio emissions at observatory sites, monitoring of conditions at observatory sites, and education and outreach. Commission members have been active in securing new legislation in several locations to further the protection of observatory sites as well as in the international regulation of the use of the radio spectrum and the protection of radio astronomical observations. To 10:30 - Pietro Ubertini (Welcome) 10:40 - Pietro Ubertini and Michael Burton (Report from Division President-VP) 11:00 - Prajval Shastri (Report from B3 CP: Astroinformatics & Astrostatistics) 11:30 - Mc Bride, Vanessa (Report Office of Astronomy for Development, OAD) 11:40 - Barak Zackay (Presentation of the IAU PhD Prize Winner).