

## IAU HISTORIC RADIO ASTRONOMY WORKING GROUP: TRIENNIAL REPORT (2009-2011)

**CHAIR** Kenneth Kellermann  
**VICE CHAIR** Wayne Orchiston  
**COMMITTEE** Rod Davies  
Leonid Gurvits  
Masato Ishiguro  
James Lequeux  
Govind Swarup  
Jasper Wall  
Richard Wielebinski  
Hugo van Woerden

### 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 HRA WG is now an Inter-Division (DX and DXII) Working Group.

### 2 WEB SITE

The IAU HRA WG 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 radio telescope, which was started in June, 2012. The radio 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 by 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 in the early 1950s. 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 Advanced Technology Solar Telescope which is being constructed on a nearby site.

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 in the USA, 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 the 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 on-going, 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. His book covers the period up to 1953, but 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 un-transcribed inter-

views 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, Émile 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 Heesch, Yuri Ilyasov, Naum Kaidanovsky, Kinaki Kawabata, Masatoshi Kitamura, Bernard Krygier, Mukul Kundu, Arkadij Kuzmin, Norm Labrum, Thomas 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 and Gisbert Winnewisser.

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

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.

#### 5 CONFERENCES

Celebrations of the 50th anniversaries of the 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.

#### 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. Stewart (2009) has discussed the CSIRO Radiophysics field stations at Penrith and Dapto in his Ph.D. thesis with James Cook University (Australia). 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 and McGee (2009) have published a biography of Ruby Payne-Scott which conveys her personal challenges in 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.

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) and Encrenaz et al. (2011). The early history of radio astronomy in Germany has been published by Wolf-schmidt (2008). Papers on the history of the Stockert Radio Telescope by Wielebinski (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.spiral-galaxy.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 our Galaxy, from Kapteyn (1886) up to the 21-cm mapping at Kootwijk and Sydney (1951-1958).

Orchiston and Mathewson (2009) have described the development of the Chris Cross at Fleurs, while Stewart et al. (2010) have described the Radiophysics field station at Penrith. Orchiston et al. (2011) have edited the publication *Highlighting the History of Astronomy in the Asia-Pacific Region* (Springer) which includes history of radio astronomy papers by Stewart et al. (2011a), Stewart et al. (2011b), Stewart et al. (2011c), Wendt (2011), Wendt et al. (2011a), Wendt et al. (2011b) and Wendt et al. (2011c). Orchiston has completed his project on early French radio astronomy and is working with Masato Ishiguro and other Japanese astronomers to document the early history of radio astronomy in Japan (e.g. see Ishiguro et al., 2012). Govind Swarup (2010) has written an important paper about the “Growth and development of radio astronomy in India”.

**Ken Kellermann**

*Chair,  
Working Group on Historical Radio Astronomy*

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