

The C41/ICHA Transits of Venus Working Group. I: An introduction

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1 Introduction

Currently IAU Commission 41 (History of Astronomy) and the Inter-Union Commission for History of Astronomy have four active Working Groups (WGs):

- Archives (chaired by Dr Suzanne Débarbat, France)
- Astronomical Chronology (chaired by Professor Alex Gurshtein, Russia)
- Historical Instruments (chaired by Professor Il-Seong Nha, Korea)
- Transits of Venus (chaired by Dr Wayne Orchiston, Australia)

2 Formation of the Transits of Venus WG

Ever since Crabtree and Horrocks observed the 1639 transit of Venus, these rare events have captivated astronomers, none more so than in 1761, 1769, 1874 and 1882 when they were vital tools in determining that basic celestial yardstick, the 'astronomical unit'.

There is already a formidable transits of Venus bibliography which documents considerable scholarship, but at the 2000 General Assembly of the IAU in Manchester the following Resolution was adopted at the Business Meeting of Commission 41:

"Recognizing the historical importance of previous transits of Venus and the numerous transit of Venus expeditions mounted by various countries, and

Noting the rarity of the upcoming transits in 2004 and 2012

Commission 41 **Recommends** that the sites of previous transit of Venus expeditions be inventoried, marked", and preserved, as well as instrumentation and documents associated with these expeditions."

In order to take this Resolution forward, a Transits of Venus WG was formed. In addition to inventorying, marking, and preserving the sites of previous transit of Venus expeditions and researching the instruments used at these sites and the observations made, the WG also aims to prepare a bibliography of existing publications relating to all transits of Venus, and encourage colleagues to carry out further research and to publish their results.

The following WG Committee was set up: Dr Wayne Orchiston (Australia – Chair), Dr Steven Dick (USA), Professor Alexander Gurshtein (Russia) and Professor Rajesh Kochhar (India). In 2002 July, Dr Luisa Pigatto (Italy) was added to the Committee.

3 Progress since Manchester

Since its formation, ICHA members in Australia, Brazil, Canada, Germany, Italy, Japan, South Africa, UK, and the USA have actively researched various transits and other means of establishing the solar parallax, resulting in a number of publications (e.g. see Hughes, 2001; Orchiston, Love and Dick, 2000; Pigatto and Zanini, 2001; Schaefer, 2001), and the WG Committee has begun preparing a list of post-1989 research papers on transits of Venus (see Section 5, below). In light of the up-coming 2004 and 2012 transits, a number of popular books have been published. One of these is co-authored by ICHA member, Sir Patrick Moore (see Maunder and Moore, 2000), while books by two other members, Michael Chauvin and William Sheehan (with co-author John Westfall), are due for release in 2003. In addition, Steven Dick's monumental history of the U.S. Naval Observatory contains a sizable chapter about the 1874 and 1882 transit programmes.

Meanwhile, much work is in progress. By way of example, Luisa Pigatto and her Italian colleagues are studying the various Italian expeditions, and preparing a list of transit of Venus publications. Hilmar Duerbeck recently presented a conference paper on "The German Venus expedition to Persia in 1874" and is developing this work and his research on the 1882 transit further; Herta Wolf is also researching German and other expeditions, with emphasis on photography. In the Netherlands, Rob van Gent, Al van Helden, Huib Zuidervart, and other astronomers are busy writing papers and gathering texts and materials about Dutch transit of Venus observations, while Steve van Roode has established a fine web site (<http://home.hetnet.nl/~smvanroode/venustransit/>).

Jessica Ratcliff is studying the nineteenth century British transit of Venus programmes for a D.Phil. at Oxford University, while Peter Hingley (n.d.) has prepared a paper on the 1874 expedition to Kerguelen Island and Michael Chauvin's (2003) book focuses on the British expedition to Hawaii in 1874. Willie Koorts is investigating observations of the transit made in South Africa and monuments associated with the transit stations (see his excellent web site: <http://canopus.sao.ac.za/~wpk/tov1882/tovwell.html>), and Wayne Orchiston is carrying out similar studies for Australia and New Zealand.

Peter Broughton and colleagues from the Historical Committee of the Royal Astronomical Society of Canada are planning to install a monument near St. Johns, Newfoundland, where John Winthrop observed the 1761 transit, and Sara Schechner from the Collection of Historical Scientific Instruments at Harvard University is investigating the possibility of having someone construct a replica of the Short reflecting telescope used by Winthrop (that could be used by the Canadian group for an historic re-enactment, and then loaned to institutions for display purposes).

Further south, James Bryan is studying transit observations made from Texas, William Sheehan has researched Todd's expedition to Mt. Hamilton in 1882 and Robert Ariaail is gathering information on 12.7-cm (5-in.) Clark refractors used by US expeditions in 1874, while R R de Freitas Mourão is researching Brazilian observations of the nineteenth century transits for a book.

On the display front, Harvard University is planning to show off the instruments used by Winthrop in their new museum gallery; Klaus Staubermann is organizing an exhibition about Dutch transit of Venus observations for the Utrecht University museum; and Nick Lomb is planning a display on Australian transit expeditions for Sydney Observatory. In addition, William Sheehan and Tony Misch are preparing a movie of the 1882 transit based on old plates they have located, and the much anticipated world premier is scheduled for the Sydney General Assembly!

Finally, Juergen Giessen has set up an excellent general transit of Venus web site, with a long list of links (see: <http://www.venus-transit.de>), and Stephen Johnston, Sara Schechner, and Steven Turner are in the process of creating a web site on behalf of the Scientific Instrument Commission of the International Union of the History and Philosophy of Science. The C41/ICHA WG looks forward to working closely with this group, and providing information and photographs for the web site and the associated database.

4 Concluding Remarks

Although a number of major unforeseen 'distractions' preoccupied those on the Committee of this WG following the Manchester General Assembly, much valuable progress has been made. However, we anticipate an exponential increase in activity as the date of the 2004 transit nears.

In the shorter term, WG members and other interested astronomers will be able to report on their transits of Venus research via oral and poster papers at a half-day WG meeting that is scheduled for the 2003 July General Assembly of the IAU in Sydney. In addition, Gordon Bromage is planning an international conference at Preston, U.K., in June 2004, which will include a sizable transits of Venus component.

5 References

- Listed below are some papers and books that deal wholly or in part with transits of Venus, published since 1990. A further list will be provided in the next general report of the WG.
- Chapman, A., 1990. Jeremiah Horrocks, the transit of Venus, and the 'New Astronomy' in early seventeenth century England. *Quarterly Journal of the Royal Astronomical Society*, **31**:333-357.
- Chauvin, M., 1993. Astronomy in the Sandwich Islands: the 1874 transit of Venus. *The Hawaiian Journal of History*, **27**:185-225.
- Chauvin, M., 2003. *Hokulo's: The British 1874 Transit of Venus Expedition to Hawaii*. Bishop Museum Press, Honolulu.
- Dick, S.J., 1995. The American transit of Venus expedition of 1882, including San Antonio. *Bulletin of the American Astronomical Society*, **27**:1331.
- Dick, S.J., 2002. *Sky and Ocean Joined. The U.S. Naval Observatory, 1830-2000*. Cambridge University Press, Cambridge.
- Dick, S.J., Orchiston, W. and Love, T., 1998. Simon Newcomb, William Harkness and the nineteenth century American transit of Venus expeditions. *Journal for the History of Astronomy*, **29**:221-255.
- Fernie, J.D., 1998. Transits, travels and tribulations. 4. *American Scientist*, **86**:422-425 [about the 1769 expeditions of d'Aueroche and William Wales].
- Hingley, P.D., n.d. The priest and the stuffed penguin: the 1874 transit of Venus expedition to Kerguelen Island. MS.
- Howse, D., and Murray, A., 1997. Lieutenant Cook and the transit of Venus, 1769. *Astronomy & Geophysics*, **38**(4):27-30.
- Hughes, D.W., 2001. Six stages in the history of the astronomical unit. *Journal of Astronomical History and Heritage*, **4**:15-28.
- Kollerstrom, N., 1991. Crabtree's Venus-transit measurement. *Quarterly Journal of the Royal Astronomical Society*, **32**:51.
- Macdonald, P., 1991. The transits of Venus in 2004 and 2012. *Journal of the British Astronomical Association*, **101**:176-178.
- Maor, E., 2000. *June 8, 2004: Venus in Transit*. Princeton University Press.
- Maunder, M., and Moore, P., 2000. *Transit: When Planets Cross the Sun*. Springer-Verlag, London.
- Morikubo, S. (ed.), 1994. *Twentieth Anniversary of Building the Monument to the Transit of Venus of 1874*. Tokyo [in Japanese].
- Muenzel, G., 2001. Ladislaus Weinel (1848-1913). *Acta Historica Astronomiae*, **13**:127-166. [In German]
- Orchiston, W., 1998. From the South Seas to the Sun: the astronomy of Cook's voyages. In M. Lincoln (ed.). *Science and Exploration in the Pacific. European Voyages to the Southern Oceans in the Eighteenth Century*. Boydell Press, in association with the National Maritime Museum, Woodbridge, pp.55-72.

- Orchiston, W., and Buchanan, A., 1993. Illuminating incidents in Antipodean astronomy: Campbell Town, and the 1874 transit of Venus. *Australian Journal of Astronomy*, **5**:11-31.
- Orchiston, W., and Howse, D., 1998. From transit of Venus to teaching navigation: the work of William Wales. *Astronomy & Geophysics* **39**(6):21-24. Reprinted, with some elaborations, in *Journal of Navigation*, **53**:156-166 (2000).
- Orchiston, W., Love, T. and Dick, S.J., 2000. Refining the astronomical unit: Queenstown and the 1874 transit of Venus. *Journal of Astronomical History and Heritage*, **3**:23-44.
- Pigatto, L., and Zanini, V., 2001. Spectroscopic observations of the 1874 transit of Venus: the Italian party at Muddapur, eastern India. *Journal of Astronomical History and Heritage*, **4**:43-58.
- Ponko, V., 1994. 19th century science in New Mexico: the 1882 transit of Venus observations at Cerro Roblero. *Journal of the West*, **33**:44-51.
- Ponko, V., 1995. Cedar Key, Florida and the transit of Venus: the 1882 site observations. *Gulf Coast Historical Review*, **10**:47-65.
- Schaefer, B.E., 2001. The transit of Venus and the notorious Black Drop Effect. *Journal for the History of Astronomy*, **32**:325-336.
- Sellers, D., 2001. *The Transit of Venus. The Quest to Find the True Distance of the Sun*. Maga Velda Press, Leeds.
- Smith, D.L. and Jetson, T., 1994. Samuel Tillman and the transit of Venus, Campbell Town, Tasmania, 1874. *Tasmanian History Research Association Papers and Proceedings*, **41**:141-153.
- Stephenson, F.R., 1990. Historical science concerning the Sun: interpretation of sunspot records during the telescopic and pretelescopic eras. *Philosophical Transactions of the Royal Society*, **A330**:499-512.
- van Helden, A., 1995. Measuring solar parallax: the Venus transits of 1761 and 1769 and their nineteenth-century sequels. In R. Taton and C. Wilson (eds.), *The General History of Astronomy. Volume 2. Planetary Astronomy from the Renaissance to the Rise of Astrophysics. Part B: The Eighteenth and Nineteenth Centuries*. Cambridge University Press, Cambridge, pp. 153-168.
- Westfall, J.E., 1992. The 1769 transit of Venus expedition to San Jose del Cabo. In S. J. Edberg(ed.). *Research Amateur Astronomy*. Astronomical Society of the Pacific, San Francisco (Conference Series, Volume 33), pp.234-242.
- Young, G., 1990. Two expeditions to Tahiti: 1769 and 1989. *Astronomy Now*, **4**(2):43-45.

