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1. INTRODUCTION

The period 1850-1910 was a "golden age" in Australian astronomy, with the establishment of professional observatories, substantial growth of popular interest in astronomy, establishment of a network of significant private observatories across the nation, and formation of Australia's earliest astronomical groups and societies.

During this period, amateur astronomers were able to make a significant contribution internationally to positional astronomy. This paper briefly examines amateur-professional relations in Australian astronomy at the time, and the interplay of power and politics.

2. CO-OPERATION vs COMPETITION: EVOLVING AMATEUR-PROFESSIONAL RELATIONS

During the period under consideration, there was little difference between Australian professional astronomers and serious amateurs. They had similar intellectual, mathematical and analytical skills; joined the same scientific societies (both in Australia and overseas); served on the same committees; vied for the same prizes and awards; possessed instruments of similar size and precision (the Great Melbourne Telescope excepted), carried out similar research (until the advent of the International Astrophraphic Catalogue); and published in the same local and international journals.

In nineteenth century Australia, the amateur-professional split which occurred in other countries was lacking largely because Australian professional astronomers remained committed to positional astronomy. A further factor was the remarkable publications output of the nation's leading amateur astronomers, led by John Tebbutt.

As a result, amiable amateur-professional relations permeated much of Australian astronomy, with amateurs assisting their professional colleagues on transit of Mercury, transit of Venus and solar eclipse expeditions; loaning and gifting telescopes and other equipment to the professional observatories; and helping popularise astronomy. In this healthy environment of co-operation, transfers from amateur to professional ranks were not uncommon.

The only conspicuous breakdown in peaceful amateur-professional relations occurred in Sydney where Henry Russell (the Government Astronomer of New South Wales) and John Tebbutt (the amateur astronomer from nearby Windsor) vied for supremacy.

Henry Chamberlain Russell (1836-1907) joined the staff of the Sydney Observatory in 1858, becoming Director and Government Astronomer in 1870. During his tenure, he acquired a 29.2cm refractor and a 33cm astrograph for the Observatory, made significant contributions to southern double star astronomy, was a leading figure in the Royal Society of New South Wales (chairing the short-lived Astronomy Section), and founded the Australasian Association for the Advancement of Science. In addition to its time-keeping functions and astronomical research, the Sydney Observatory was involved in meteor-ology, seismology and tidal studies during Russell's directorship, and also provided a public information service. In recognition of his overall contribution to Australian science, Russell was elected a Fellow of the Royal Society.

John Tebbutt (1834-1916) established the Windsor Observatory in 1862 and gradually built up the instrumentation, culminating in the acquisition of a 20.3cm refractor in 1886. He was involved in observational astronomy, and also carried out meteorological and tidal observations and kept

a record of local floods. He maintained a local time service, and was very active in popularising astronomy. In addition to discovering the Great Comets 1861 and 1881 and Nova V728 Scorpii 1862, he carried out wide-ranging observations of comets, double stars, variable stars, planets, minor planets, solar and lunar eclipses, transits of Mercury and Venus, Jovian satellite phenomena, lunar occultations of stars and planets, and occultations of stars by planets. Tebbutt published 385 research papers, 16 Annual Reports, 8 meteorological monographs, 2 books and several pamphlets. In 1882 he formed the short-lived Australian Comet Corps (the nation's first national scientific group of any kind), and over the years he built up an outstanding private research library.

During the 1870s, Tebbutt and Russell were friends, but Tebbutt's emerging status in world astronomy led to a breakdown in relations during the 1880s and eventually to an open feud. Russell also experienced a similar problem with Joseph Brooks, the "Field Astronomer" in the rival New South Wales Lands Department. Brooks was quick to point out that "... Mr Russell does not like anyone to be "near the throne"."

Increasingly during the 1880s, Russell turned the focus of Sydney Observatory away from astronomy towards meteorology, and Tebbutt and other local amateur astronomers (including R.T.A. Innes and C.J. Merfield who both were to become well-known professional astronomers) became more and more critical of this strategy.

Matters came to a head in 1891 when Tebbutt privately published and distributed a pamphlet critical of the Observatory. This discussed the relative expenditures and publication outputs in astronomy and meteorology, and critically examined the Observatory's overall contribution to international astronomy. In addition, Tebbutt and his supporters wrote letters to the newspapers and to politicians, arranged a deputation to the relevant Government minister, and actively boycotted the scientific societies with which Russell was intimately associated.

In the light of Tebbutt's criticisms and comments, a Russell-Tebbutt comparison is illuminating. Tebbutt's publications output far surpassed Russell's and this was particularly so in astronomy (see 1). Russell wielded local and national power through the scientific societies which he controlled, but

TABLE 1. *Astronomical publications by Russell and Tebbutt*

Astronomer	Decade		
	1870s	1880s	1890s
Russell	33	13	24
Tebbutt	75	134	110

it was Tebbutt who was selected as the founding President of the New South Wales Branch of the British Astronomical Association. While Russell was elected an FRS, during his lifetime Tebbutt had to content himself with the Jackson-Gwilt Medal and Gift from the RAS. As Government Astronomer of New South Wales and Vice-Chancellor of the University of Sydney, Russell had a strong power base and the ear of parliament, yet Tebbutt was openly feted as the doyen of Australian astronomy. In international astronomical circles, Tebbutt's supremacy was unquestioned - despite his amateur status - but his contribution to world astronomy was only fully recognised in 1973 when a crater on the Moon was renamed "Tebbutt" and in 1984 when an Australian \$100 bank note was issued featuring Tebbutt's face and his Windsor Observatory. Finally, in 1989, the two remaining Tebbutt Observatory buildings were opened as a memorial museum of astronomy.

3. CONCLUDING REMARKS

For more than two decades, the Russell-Tebbutt feud permeated Australian professional and amateur astronomy, and this situation only changed in 1907 with Russell's death. However, following Russell's retirement in 1905, amiable relations were re-established between Sydney Observatory staff and the powerful local amateur astronomical fraternity.

Tebbutt's death in 1916 marked the end of an era. No longer would it be possible for an Aus-

tralian amateur astronomer, working in comparative isolation, to make a significant contribution to world astronomy. The emergence of astrophysics saw to that.