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WILLIAM DOBERCK – DOUBLE STAR ASTRONOMER

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Abstract: We outline the role of astronomy in the career of William Doberck (1852–1941). After taking a PhD in astronomy at the University of Jena in 1873, he accepted a position as superintendent of Markree Observatory in the west of Ireland. There he refurbished the great 13-inch refractor and spent nine years observing mostly double star systems, paying only such attention to meteorological monitoring as was required of his position. In 1883 he became the founding Director of a new observatory in Hong Kong, a post which he held for 24 years. His frustrations in attempting to continue his purely astronomical work, not assuaged by his combative and prickly personality, and in the face of the strictly practical demands of that mercantile society for comprehensive storm forecasting, are described. Finally, his observations in retirement in England, and his overall contribution to astronomy, are summarised.

Key words: William Doberck, Markree Observatory, Hong Kong Observatory, colonial astronomy, double stars.

1 INTRODUCTION

William Doberck (1852–1941) had a long career in astronomy. He was already a sufficiently accomplished astronomer to have earned a doctoral degree in the subject by the age of 21, and was still making observations well into his 70s, resulting in more than 200 published reports on his astronomical researches. But, as we will see, astronomy was sometimes to be but a private diversion for a quarter of a century in an eventful, if stormy, career in meteorology as Director of the Hong Kong Observatory. A well-regarded astronomer when he died, whose work is still sometimes cited, very little has been written about him, and most of his personal life seems totally lost to posterity. His years at the Hong Kong Observatory receive some coverage in the three published histories of that institution (see Dyson, 1983; Ho, 2003; Starbuck, 1951), while his career and achievements outside astronomy have recently been described by MacKeown (2004).

We describe the four epochs in Doberck's career, his youth and education, his spell as Director of the Markree Observatory in the West of Ireland, his stay in Hong Kong, and finally, his own 'gentleman's observatory' in England, and give a brief overview of his opus. Of these epochs, his period in Hong Kong is by far the best documented. Incidental to an account of Doberck's career, this paper will also try to throw some light on the early history of astronomy in Hong Kong; a comprehensive account of astronomy there from the 1940s onwards has been compiled by Alan Chu (2003).

2 EARLY YEARS

We know that August William Doberck was born in Copenhagen on 12 September 1852, one of four children of Frederik Wilhelm Doberck and Marthe Stine Johansen; another son, Carl Alfred, was to have a distinguished career in the Danish Naval Service, while one of his sisters, Anna, will feature briefly in this story. The children were introduced to intellectual life from an early age for their father was an internationally-recognised arts smith master and art collector, and an accomplished artist, as is witnessed by the portrait of the young William shown in Figure 1 that he painted around 1870. The household of the young man was one of culture and learning, and the writer Hans Christian Andersen, the philosopher Søren Kierkegaard and many art professors were regular visitors. In family folklore the young William is reputed to have shown an early and keen interest in learning and matters scientific.[1]

Figure 1: A portrait of the young William Doberck painted by his father (by kind permission of Michael Doberck).

When he was a student at the University of Copenhagen the Professor of Astronomy there was Heinrich L d'Arrest, a distinguished scientist who had played an important part in the discovery of Neptune. Two other fellow-citizens and near contemporaries of Doberck who attained some astronomical fame thanks to the influence of d'Arrest were Carl Frederik Pechüle and, more especially, John Louis Emil Dreyer. We have little information on Doberck's early life, but can

assume that it had a lot in common with his fellow-student, Dreyer, who recounts his enthusiastic visits to d'Arrest's observatory (Obituary, 1927), even before he entered the University. He speaks especially of the encouragement he received from the junior astronomer, Professor Schjellerup. D'Arrest's main interest was in comets, of which he had discovered three, and it would seem that he passed on this interest to the young Doberck, who proceeded to work on comets, both in Copenhagen and at the Pulkovo Observatory in St Petersburg. In 1873, at the age of 21, Doberck was awarded a doctorate by the University of Jena. At the time, this University was a major centre of optical and astronomical research. Although the University of Copenhagen also offered doctorate degrees in astronomy,[2] Doberck may have been directed by d'Arrest (who was a German) to register at the University of Jena where a doctorate could be obtained *in absentia* and at moderate cost, with perhaps better prospects of finding a position at an observatory elsewhere in Europe. His main activity at this time seems to have been theoretical rather than observational, and his thesis, *Bahnbestimmung der Cometen I 1801, III 1840 und II 1869*, was published in Copenhagen in the same year (Doberck, 1873d). In addition to these three comets, by the end of 1874 he had also published orbital elements for three other comets.

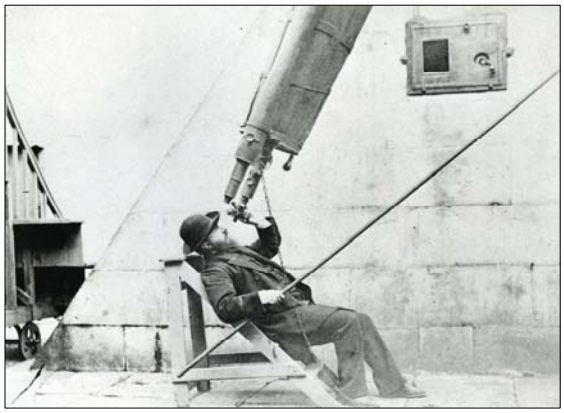

Figure 2: Dr Doberck with the 13-inch refractor at the Markree Observatory in the late 1870s (by kind permission of the Librarian, Royal Astronomical Society).

3 MARKREE OBSERVATORY

3.1 Doberck's Appointment

Opportunities for professional astronomers were even less common then than they are today, so upon graduating Doberck had a formidable search to make if he wished to pursue such a career. Even so, his next step may seem a little surprising. He went to take charge of Markree Observatory in the west of Ireland (Ireland at that time was still part of the United Kingdom). Twenty years earlier, however, in connection with staffing the new Melbourne Observatory, Thomas Romney Robinson (Director of the Armagh Observatory, and a very influential figure in astronomical circles) wrote: "If Britain cannot furnish a qualified person, let us carry out free trade and seek him at Berlin or Poulkova." (Robinson, 1852). This was the approach which presumably led to Doberck taking up the position at Markree—and note that both of his successors in the position were Germans. It is interesting to contrast Doberck's career with that of his near contemporary, J.L.E. Dreyer: both of them born in Copenhagen in the same year (1852), both moved to Ireland in 1874, and both transferred to 'tenured' positions in 1882-1883, Dreyer to the prestigious position as Director at Armagh and Doberck to the 'astronomical backwater' of Hong Kong. It is hard to imagine that there was not some rivalry in these parallel careers, but the only evidence we have of their relationship is a photograph of Doberck posing with the great refractor at Markree (Figure 2). This photograph, which was probably taken around 1880, was found in one of Dreyer's photographic albums.

3.2 Doberck's Stay at Markree

Doberck's move to Sligo was certainly a step down from the professionalism he experienced at Pulkovo Observatory, when he spent time there during his doctoral research. Markree Observatory was a 'gentleman's observatory' of a type not uncommon in those days—Ireland, in particular, had a number of them (McKenna, 1967). They were nurtured by enthusiastic, and sufficiently wealthy, amateurs—in this case by a certain Edward J. Cooper, who had studied at Eton and Christ Church (Oxford) but had never taken a degree. Remote it may have been, but it was known to astronomers, professionals and amateurs alike, mainly for its 13.3-inch refracting telescope.[3] To quote Doberck (1884a): "… in a remote corner of Ireland the largest telescope ever made had been erected by a gentleman [Edward Cooper] then unknown to astronomical fame." (cf. Doberck, 1884b; Hoskin, 1982). In fact, the most important work done with this telescope was completed before Doberck's arrival, and involved the discovery of the asteroid 9 Metis (in 1848) and the publication of the 'Markree Catalogue' of over 60,000 stars (in 1851-1856). Following Cooper's death in 1863, "… all the astronomical instruments [including, presumably, the large refracting telescope], transit circle, clocks etc. and library …" (*The Astronomical Register*, 1863) were advertised for sale as one job lot, but there was presumably no response to the asking price of £2,500 for dispersal fortunately did not occur. The Observatory then remained inactive for nine years and no annual reports were issued, then a nephew of the founder, Colonel Edward H. Cooper, succeeded to Markree Castle in 1872 and reactivated the Observatory. However, his interests were mainly meteorological, and in his obituary Markree Observatory is described as "… one of the best meteorological stations in Ireland." (Obituary, 1903).

Doberck took up his position at Markree Observatory on 1 May 1874, and as part of his integration into a new academic *milieu* he was elected a Member of the Royal Irish Academy in January 1876. Although he did read a few papers at the Royal Astronomical Society in London in 1874 and 1875, he does not seem to have been a Fellow of that mainstream organisation of which almost all major astronomers in the Anglo-centred world became members. He did, however, forward the Society brief annual reports of the Markree Observatory for 1875 through 1882, and these were published in their *Monthly Notices of the Royal Astronomical Society* (see Doberck, 1876k; 1877k; 1878n; 1879g; 1880e; 1881d; 1882 and 1883a). These reports, together with an essay on the Observatory that he wrote after he moved to Hong Kong (Doberck, 1884a, 1884b), form the basis of almost all we know

about his activities at Markree. This essay seems to be the only outcome of a project he mentioned in his report for 1881 where he states that "… a sketch of the History of Astronomy in Ireland is in progress." (Doberck, 1882).

Notwithstanding its former fame, Markree Observatory had been neglected during the nine years since its founder's death, and in his first report to the Royal Astronomical Society Doberck (1876k) writes that he "… found the instruments decaying from neglect ... and the building in such a dilapidated condition that the rain penetrated through the roof. The Refractor, exposed during forty years in the open air to the winds and rains of Connaught, was of course in the worst condition." It was not until December 1875 that he could use the large telescope to make observations, but even then he feared that the harmful effects on it of having been exposed to the open air for so many years could never be remedied. In observing double stars, as distinct from comets on which his earlier work was based, he was, to some extent, following fashion (Wright, 1993). The study of such systems had been a glamour subject in the first quarter of the century, but had fallen by the wayside only to be revived by the publication of a new catalogue by the Chicago amateur S.W. Burnham in 1873 (see Aitken, 1918). Apart from double stars, a topic he was to make very much his own throughout his later career, Doberck would have liked to work on variable stars but, as he lamented in his 1877 Annual Report, "… the sky in this part of Ireland is too seldom and too irregularly clear to allow of the observation of variable stars with any chance of success." (Doberck, 1878n). Nevertheless, by the time he left Markree he had published almost one hundred reports on his researches, mainly in *Astronomische Nachrichten* and in *Monthly Notices of the Royal Astronomical Society*. These included some observations of comets, but most reported observations of double stars and the calculation of their orbital elements. In the obituary notice for Doberck that he prepared, Aitken (1941) wrote that "… he was favourably known for the great number of double-star orbits he computed."

In his report for the year 1875 Doberck (1876k) relates how he was assisted by his sister Anna, although this seems only to have lasted for a year or so. A contemporary local historian at the time wrote of his 'accomplished' sister, and described them as "… a brother and sister that remind one forcibly, by their common love of science and their mutual affection, of William and Caroline Herschel …" and that they "… are not only maintaining, but extending daily the fame and usefulness of Mr Cooper's great foundation." (O'Rorke, 1878). Miss Doberck, he claimed, was at the time "… elaborating, on the continent, an 'Essay on the Climate of Ireland.'" (ibid.). It seems unlikely that she published any such account, for her brother would surely have mentioned it when he wrote, fifteen years later, to support her application for the position of meteorological assistant at the Hong Kong Observatory.

3.3 Departure from Markree

When a vacancy arose in 1882 for a founding Director of a new observatory in Hong Kong Doberck somehow brought himself into consideration for the job. It is not clear how this arose, but it was probably through informal communications between the Astronomer Royal, William H.M. Christie, and the Director of the Dunsink Observatory, Robert S. Ball (who is likely to have been in regular contact with Markree). Doberck ended up second on a short list of five, and after the other favoured candidate[4] withdrew he was appointed to head the new institution.

Why did he leave Markree? Obviously there was no financial inducement because less than two years into his new position—if we are to believe a letter he wrote to the Colonial Secretary—he was complaining: "I should have been materially better off had I not resigned my position in Ireland." (Doberck, 1885b). He gave no indication of discontent in his last report from Markree to the Royal Astronomical Society in 1882, where he wrote at length about the many projects he had on the drawing board. He mentioned plans for a more comprehensive monitoring of the meteorological data, "… as soon as the desired sum of money is placed at [his] disposal." (Doberck, 1883). New 'first-class' magnetic instruments had been added to the Markree Observatory during the year, as had a 'rain-band spectroscope' and a 'Browning's solar eyepiece' for the telescope. Furthermore, he had started to experiment with photography, and a photographic eyepiece for the large refractor was on order (ibid.). We have no surviving copies of his correspondence, so we can only ask why? In the nine years he was there he restored the Observatory to something like its former glory, but it was to be a brief revival.[5] Having journeyed from St Petersburg to Sligo, perhaps it was a renewed wanderlust that led William Doberck to depart for the Orient.

3.4 Doberck's Career in Astronomy to Date

Doberck's departure from Markree marks an opportune time to take stock of his achievements in astronomy, because for several years in his new position he would be too preoccupied with meteorology and managerial issues to pursue his interests in the subject. As noted, his earliest work was on comets, and his first four research papers,[6] written while he was in Copenhagen and Pulkovo, were concerned with determining the orbital elements of Comets II 1869, III 1840, II 1867 and I 1801 (see Doberck, 1872; 1873a; 1873b and 1873c respectively), on the basis of published data provided by other astronomers. Some of this material also went into his doctoral thesis. Doberck continued with these analyses when he moved to Markree, extending them to determine orbital elements for comets I 1845 (see Doberck, 1874c; 1875a; 1875h) and I 1824, (Doberck, 1874b). Almost twenty years later, he wrote one further, final, paper on cometary orbital elements (Doberck, 1895c). Although comets were only a small part of his endeavours, he gets a respectable fourteen citations in Kronk's *Cometography* (1999).

Apart from the odd paper on planetary astronomy, a few on the history of astronomy, and reports on the 1882 transit of Venus (Doberck, 1883b, 1884c), Doberck's publications from Markree Observatory relate to the study of double stars. Altogether there are seventy-three publications, and most of them are in *Astronomische Nachrichten*. These papers contain technical details of his observing methods (Doberck, 1878g; 1878h); his raw data from these observations (Doberck, 1878j; 1878k; 1878l; 1879b); his methods of data analysis to determine double star orbits, using his

own observations and data provided by others (Doberck, 1878a; 1878b); and, finally, the computed orbital elements. The latter reports are sometimes very short, and merely list the final values that he obtained for the orbital elements.

It would be some time before Doberck could return to these double star studies, but return he eventually did, both in Hong Kong and later, during his retirement, in England.

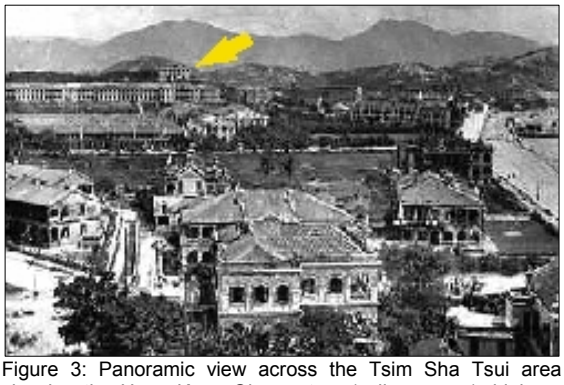

Figure 3: Panoramic view across the Tsim Sha Tsui area showing the Hong Kong Observatory (yellow arrow), high on the hillside above the harbour (courtesy Hong Kong Observatory).

4 A CAREER IN HONG KONG

4.1 The Hong Kong Observatory

Let us briefly take a look at the background to the new institution that Doberck was about to lead. Within the first thirty years of the setting up of the Colony of Hong Kong its commercial importance grew significantly, and this attracted increasing numbers of vessels to the port. Consequently, there was soon a need for a reliable time service, and the demand for a time-ball justified the setting up of an observatory. The depredations wrought on the Colony by unannounced typhoons, and the extent to which the effects of these could be ameliorated—as evidenced by the warnings heeded in the Bay of Bengal and, after 1880, by warnings issued from the observatory in Manila—were yet another justification for such a proposal. Finally, the Royal Society in London was keen to monitor geophysical phenomena, and particularly geomagnetic variations, on a global scale and by establishing an observatory in Hong Kong a major gap in the coverage would be plugged.

Figure 4: Close-up of the 1883 Hong Kong Observatory building, taken in 1913 (courtesy Hong Kong Observatory).

In October 1877 the Surveyor General, J.M. Price, submitted a proposal for a 'small Observatory', which emphasized the operation of a time ball and allowed for some automated meteorological monitoring. The report noted that "… it may not be too much to aspire perhaps in future years to a sufficiently powerful Equatorial [telescope] to join usefully in the general work of British Colonial Observatories." (*Hong Kong Government Gazette*, 1877). Four years later this proposal was amplified, it must be said without any obvious acknowledgement, by a Colonel Palmer from the Corps of Engineers, who was an aide-de-camp to the Governor, J. Pope Hennessy. Apart from a time ser-vice and meteorological observations, Palmer's plan also encompassed geomagnetic monitoring, but no further astronomical component was included. In 1882 Palmer's proposal was rejected in London as being too expensive—but the acrimonious politicking involving Pope Hennessy at the time, which found Price on the 'other side of the fence' from where most of the Colonial Office's sympathies lay, must not be discounted in this decision. Price was asked to produce and cost a new proposal, so he simply revised his 1877 version, added basic geomagnetic monitoring, and came up with a total cost which was a little more than half that submitted by Palmer. He submitted his 'new' proposal, and it was accepted in 1882.

In a letter from the Secretary of State for the Colonies written in January 1883, Lord Derby formally offered the position of Director of the new Observatory to Doberck, and he accepted it without quibble (for him, a not very common procedure). The appointment, formally from 2 March, was endorsed by the Astronomer Royal, Christie (1882), who gave as his opinion that "… Dr Doberck is … best fitted for the post. From what I know of his scientific attainments I should not hesitate … in recommending him for the appointment." Doberck's new position was welcomed by a commentary in *Nature* (1883) where he was referred to as the "… astronomer to the new institution." At this time there were 'Government Astronomers' at Mauritius, Madras and in the Australian Colonies, and it was noted that the opportunities afforded for independent and original work in Hong Kong were very great. As we will see later, this early ambiguity in some quarters as to Doberck's exact title—'Director' or 'Government Astronomer'—was to become a major bone of contention in his relations with the authorities in Hong Kong. In addition to providing a time service, the new Observatory (Figures 3 and 4) was charged with making meteorological and magnetic observations, but strangely there was no mention of weather forecasting!

It became clear very early on that Doberck's view of his new position (which was essentially the Head of a Department in the Civil Service) was radically different from what was expected in such an appointee. Even before he had taken up his position there was the first indication of what Dyson (1983b) calls "… Doberck's generally irreverent attitude to the accepted formalities of the colonial service." Within a month of his accepting the appointment we have Colonial Office minutes (1883a) that state "… this gentleman is likely to give trouble …", followed by one a day later: "… the sooner this apparently unpleasant man goes out the better … he must be prepared to be in the same subordinate position to the Governor as any other officer." (Colonial Office: minutes, 1883b). Such comments were precursors to

very many more in a similar vein over the next quarter of a century.

Doberck arrived in the Colony in June of 1883, and his appointment as 'Director' of the Hong Kong Observatory was gazetted in November (*Hong Kong Government Gazette*, 1883). He was to hold the position until retirement at age 55, twenty-four years later. In the early days he was also often referred to as the 'Government Astronomer', especially by himself, and until 1886 signed his annual reports to Government as such. He was accompanied by his assistant, Frederick George Figg, who, although without credentials in astronomy, turned out to be an invaluable colleague, and eventual succeeded Doberck as Director of the Observatory.

4.2 Astronomy in Hong Kong

Astronomy was a science well known to the Chinese, and 'modern' astronomy had been introduced at Peking by the Jesuits many years before (e.g. see Pigatto, 2004; Shi and Xing, 2006; Zhang, 1998). There had, however, been a long hiatus of about one hundred and thirty years in the publication in Chinese of translated European texts on modern developments in astronomy, when such developments were flourishing elsewhere. After about 1850, with the re-entry of Christian missionaries into the mainland, a new spurt of publishing works on modern science occurred; these were mostly produced by Protestant missionaries. In Shanghai, in 1849, two popular works on astronomy were published in Chinese: *A Digest of Astronomy* by a medical missionary, Benjamin Hobson, and a translation of Andrew P. Happer's *Q&A in Astronomy*. More important was the translation of the Fifth Edition of Herschel's *Outlines of Astronomy* (1858), which appeared in Shanghai in 1859, and thereafter was widely read (Hu, 2005). Whether by the time of Doberck's arrival there was any intellectual base among readers of Chinese in Hong Kong to take advantage of these publications is something that requires further study. However, there was some popular interest in astronomy among English-speakers, as evidenced by the newspaper columns. For example, a long article on the comet of May 1881,[7] extracting mainly from overseas publications, was published in the *China Mail* on 20 August of that year.

The earliest figure on the 'astronomical scene' in Hong Kong appears to have been Henry Spencer Palmer, who has already been mentioned in connection with the establishment of the Observatory.[8] A surveyor in the Royal Corps of Engineers, he came to Hong Kong in March 1878 as an engineer for the Admiralty, at the same time serving as aide-de-camp to the Governor, John Pope Hennessy, with whom he had served in the same position earlier in Barbados. Colonel Palmer had more competence and interest in astronomy than his fellow surveyor colleagues. In 1873 he had spent about ten months training at the Royal Observatory, Greenwich, prior to leading an expedition to New Zealand to observe the 1874 transit of Venus (see Orchiston, 2004). He was elected a Fellow of the Royal Astronomical Society in the same year. Although he believed that his transit observations made on 9 December were of little value (because of heavy cloud cover), when all the global measurements were analysed his results were seen to be highly reliable and were commended by the Astronomer Royal, Sir George Airy. Palmer was very keen to play a similar role during the 1882 transit, and he canvassed Airy in the matter and on several occasions volunteering his services. However, by the time this event occurred Airy had retired from his position, and a suitable opportunity to engage Palmer on an observing team did not present itself. Palmer was always keen to write for popular publications, and in his later years, while based in Japan, he would contribute a regular column to the *Times* of London. He also published an article on "The Great Comet of 1882" in a local newspaper, *The Daily Press*, on 20 November 1882, and this was reprinted in the *Japan Mail* on 2 December, and between 9 and 14 March 1882 he had engaged in a correspondence on the determination of longitude in the other local newspaper, *The China Mail*. Palmer's chief contribution was his determination of the latitude of the site proposed for the new observatory. This he made with a 2.5-inch aperture transit instrument, borrowed from the commander of a U.S. survey ship which was making a local survey. Using this as a zenith telescope, and employing Talcott's method, which he explained in his report (see *Hong Kong Government Gazette*, 1882), Palmer obtained a final result of 22° 18′ 11.89±0.19″, which can be compared with the currently-accepted value of 22° 18′ 12.82″. Palmer had left Hong Kong by the time Doberck arrived, but the Director always referred wistfully to the full Palmer proposal (as much for the higher Director's salary suggested there as for its other substance), which, as we have seen, was sidetracked in favour of a more economical version. Palmer enters our story again, very briefly but crucially, in 1890.

The only other astronomy-related report dating to those early days seems to be one written by James Painter McEwen (1882) who in a December 1882 issue of *Nature* described his naked eye observations of a comet, and gave its position in the sky and an upper limit to its brightness on 27 November. From 1875, McEwen was variously Assistant Harbour Master and Superintendent of Victoria Gaol. He remained in Hong Kong until about 1887, but seems not to have contributed to the subject of astronomy again.

That Doberck's plans for the new Observatory included astronomy (other than the transit observations required for time-keeping)—even though this was not included in his brief—is clear from the beginning. Apart from using the title of 'Government Astronomer' at every opportunity, as early as February 1884 Doberck sent a report to the Government on cloud cover throughout the year[9] and commented (Doberck, 1885c), with perhaps a bit of wishful thinking, that "… the part of the Northern sky which it is most difficult to observe in England can be particularly well explored from this Colony."

The astronomical equipment in the new Observatory was inferior to what Doberck had been used to in earlier years, but that did not hold him back. To establish the time-service he had an f/15 2.75-in Troughton and Simms transit telescope, which was also fitted with a micrometer for zenith observations (although it seldom could be spared for the latter work). From early 1885 onwards Doberck also had what he refers to as the '6-in Lee Equatorial'. This was housed in a separate building, and apparently was a gift or loan to the Observatory from the Astronomer Royal, William

Christie. I believe that this instrument can be identified with the 5.9-in refractor—with a highly-regarded lens by Tully—that was installed by Admiral W.H. Smyth in his Bedford Observatory in the 1830s and was used in compiling his 'Bedford Catalogue' (see Figure 5). In 1839, Smyth sold the telescope to Dr John Lee, who used it in his Hartwell House Observatory until some time after 1865. In 1886 Doberck wrote: "The Lee Equatorial is described by Admiral Smyth in the "*Speculum Hartwellianum*" and the "*Celestial Cycle*" and particulars concerning the magnifying powers of the eye pieces and the scale values of the micrometers are to be found in *Copernicus* (Vol. II p. 93)." (Doberck, 1886b). In 1902 Doberck (1902c) described its limitations, and noted that it was "… upward of eighty years of age, and nearly past use." The last mention of its use seems to be in the Director's report for 1910, where J.I. Plummer writes of an attempt to photograph Comet 1P Halley transiting the Sun in May of that year—Plummer (about whom more anon, and who retired in January 1911) seems to have rarely used the telescope after Doberck's departure. It was finally returned to the Royal Observatory, Greenwich, in April 1914 (Hong Kong Observatory, *Annual Report* …, 1914), and its dome at the Hong Kong Observatory was eventually demolished in July 1933. The telescope is now in the Science Museum, London.

Figure 5: The 5.9-in 'Lee Equatorial' whilst still at the Bedford Observatory (after King, 1979: 195).

Seeing conditions for most of the year in Hong Kong are notoriously bad, and in connection with observing transits for the time-service Doberck (1895b) remarked that "… in early spring … sometimes not a single observation can be obtained for five weeks consecutively." We can also assume that he was minimally frustrated by the seeing conditions, as he had previously pursued the same goals at Sligo where conditions were, if anything, even worse. In the above quote Doberck is being somewhat more honest than in his optimistic report to the Government a year earlier: in its first year of operation he reports viewing Jupiter, Saturn and a few double stars. However, seeing conditions were to prove but a small handicap compared to his on-going struggle with officialdom.

4.3 Adjusting to Colonial Life

Doberck was a dynamic Director, and he readily sacrificed the time he would have liked to devote to astronomy to the many other concerns relevant to the evolution of the Observatory. But his adaptation to colonial life was not without its frustrations. Within four months of Doberck's arrival in Hong Kong, the Governor was writing to the Colonial Office in London, chastising them for their choice of Director, and noting that his "… appearance and manner resemble those of a Professor from one of the smaller German Universities, who has been domesticated in Connaught." (Bowen, 1883). We should also note an unfortunate antipathy on Doberck's part towards the Jesuit-run observatories at Zicawei (Shanghai) and Manila, which coloured his career and can be seen as having had a regressive effect on the development of meteorology in the region. We will only keep track Doberck's meteorological work—which, perforce, occupied most of his time in Hong Kong—in so far as it impinges on his astronomical activities at the time.

Doberck had only been Director for three years, and already had several run-ins with officialdom, when the Colonial Secretary (1886) wrote (with unusual familiarity):

> My dear Dr Doberck, the point you refer to in connection with the publication of your Annual Report was duly considered. While Government Astronomer may be a convenient local designation Director of the Observatory is your official title. In the Dispatch announcing your appointment you were so designated and by that designation you were gazetted on your arrival in the Colony. Yours very truly …

Like all departmental heads, Doberck was obliged to write an annual report on his department's performance for the Governor. The proofs of his draft report for 1886 were acknowledged as follows by the Colonial Secretary (1887):

> … His Excellency is unable to authorize the publication of your Annual Report for 1886 in its present shape ... your remarks on the alleged shortcomings of the Observatory are unbecoming a public report and might be considered as a disrespectful criticism of the decision of the Secretary of State. Statements made in paragraphs 4 and 13 are inaccurate …

Apart from the fact that the draft was still signed 'Government Astronomer', what probably most riled the Governor was the gratuitous comment in it that the "… Royal Alfred Observatory, Mauritius, where such improvements have been lately effected under the genial rule of a Governor well qualified to grasp the importance of scientific research." The draft report also contained the following unremarkable sentence: "Micrometric measurements of Jupiter and Saturn have been reduced and published in the Astronomical Report and progress has been made in the reduction of Double Star Observations." A series of exchanges—both locally and with the Colonial Office in London—followed, which resulted in Doberck finally forwarding a two-page report, which was still signed 'Government Astronomer'. It also retained the mention of double

star observations, which some Government officials realised had nothing to do with Dobeck's assigned task of keeping-time. The upshot of the affair was that Dobeck was effectively barred from conducting pure astronomical research in the future. As previously mentioned, he was in the habit of submitting brief annual reports on the Observatory to the Royal Astronomical Society (see Doberck, 1885a; 1886a; 1887; 1889; 1890a; 1891a; 1892; 1893; 1894a; 1895a; 1896a; 1897a; 1898h; 1899a; 1900a; 1902g; and 1905d). However, none appeared for 1887, which in his report for the following year (Doberck, 1889), he attributed to "… circumstances connected with a change of government in Hong Kong. His Excellency the present Governor has decided that purely astronomical observations are not to be subsidised here in future, but the magnetic observations are to be continued."

In November 1887 we again have a concerned minute from the Governor:

> … I observe that Dr Doberck signs himself as Government Astronomer and I request that he will cease so to sign himself, so giving a wrong idea of his position. He is Director of the Observatory and was appointed as such for specific purposes, though, after these are provided for, there is, of course, no objection to his giving his spare time to the general interests of science. (Governor's minute, 1887; his underlining).

By now, Doberck's insistence on using the title 'Government Astronomer' is seen by the Governor to be not as petty as it first appeared, and Doberck's motivation is further clarified by the afore-mentioned minute and a later one: "I cannot see sufficient justification for the publication, at Government expense, of the tables on Double Stars. The printing for the Observatory already costs very disproportionately to the advantage obtained by the Colony …" (ibid.), and "… Dr Doberck in his paper on Double Stars shows that he has abundance of spare time for other objects than those specific ones which occasioned his appointment." (Governor's minute, 1888). The double star material referred to was unfinished work from Doberck's Markree days.

It was not delusions of grandeur, or presumption to a local equivalent of the Astronomer Royal,[10] that drove Doberck's enthusiasm for his title. Rather, it was the expectation that 'Government Astronomer' would entitle him to material support for the pursuit of astronomy in the Observatory, for he saw himself, above all, as a professional astronomer; and with some justification. When he died in 1941 he merited an obituary notice in *Nature* that lauded his astronomical achievements, while working "… in various parts of the world, including Kowloon …" (Obituary, 1941a) was the only mention that his twenty-four years in Hong Kong received. So after many years of bureaucratic conflict he may not have been unhappy to leave Kowloon when he reached the earliest retirement age of 55 in 1907; now he could finally return to what he had always wanted to do, observing double stars.

Neither did the publication setback on double stars abort Doberck's astronomical ambitions in Hong Kong. He just had to be more circumspect, and omit such topics from future Annual Reports. Thus he became an 'undercover astronomer'. In his published Report for 1887, in which paragraph 6 had been censored—a more effective technique on the Governor's part than engaging his confrontational Director in extended exchanges—Doberck had yielded on the title of Government Astronomer and signs as 'Director'. But he was clearly enamoured with the former title, even though it was never legally his, because in a report on a lecture that he delivered to the Liverpool Astronomical Society he is referred to as "… Her Majesty's Astronomer at Hong Kong …" (Doberck, 1888), and in the less official 'Meteorological Register', carried in the daily press, he was still signing himself 'Government Astronomer' as late as 16 October 1889. However, he was presumably stung by a letter that appeared in the *China Mail* on that same day pointing out that he had no right to the title ('Veritas', 1889), because from 17 October he signed as 'Director of the Observatory'. Even so, as late as February 1925, in a letter resigning from an IAU Commission on double stars, he signs himself as "… late Government Astronomer, Hong Kong." (Doberck, 1925a). But (with one exception), no mention occurs in later annual reports, either formally to the Government or in his annual *Observations and Researches* of astronomical work, although in his brief annual submissions to the Royal Astronomical Society he does mention such work (which, if anything, appears to increase in output).

4.4 'Undercover Astronomer'

An opportunity to advance astronomy in the Observatory arose from an unexpected quarter in 1890. There was widespread dissatisfaction among the commercial and maritime circles in the Colony with the Observatory's performance and, in particular, the failure to raise warning signals for a typhoon that struck the Hong Kong in October 1889. The Governor hoped to rein in his recalcitrant Director, so he appointed a Commission to enquire into the workings of the Hong Kong Observatory (*Hong Kong Government Gazette*, 1890). The first of five Commissions or Committees of Enquiry that Doberck was to face during his tenure, this one was formed with six members, and was chaired by the Captain Superintendent of Police. It had a broad remit, including the rather pointed question of "… whether the Commission would recommend the continuance of the Observatory in its present form."

The report of the Commission was never published, but its findings seem to have been very sympathetic to the Director, at one point noting that "… an Observatory is essentially one of those Institutions on which, if thoroughly good results are to be obtained, a considerable sum of money must be spent." (Hong Hong Observatory, *Annual Report for 1890*). Much of the credit for such a favourable outcome to the enquiry, as far as Doberck was concerned, must be put down to an unforeseen event: the intervention of (by now) Major General H.S. Palmer, the person who earlier drafted plans for an observatory in Hong Kong. In late January 1890 when the Commission was in session Palmer just happened to be passing through Hong Kong on his way from Japan to England, and since he was seen as a well-qualified and independent authority he was asked for an opinion on the status of the Observatory. He wrote—to quote the Committee's report—a "… very valuable memorandum … in whose conclusions we in the main concur." We do not have the full text of this memorandum, although we know that it did—for the last time in official documents, at least—refer to the Director as the 'Government Astronomer'. But, from a commentary on it in the *China Mail* (1980), an organ

that was unrelentingly hostile to the Director, we learn that Palmer's report was "… almost entirely a special pleading for Dr Doberck." The Government accepted the Commission's findings (perhaps reluctantly), and provision was made for the addition of a Chief Assistant and an Assistant Meteorologist. The latter turned out to be William Doberck's sister, Anna (who had assisted him at Markree), and she was to hold this position for twenty-five years.

Figure 6: The only known photograph of J.I. Plummer, 1845–1925 (by kind permission of Kenneth J. Goward, F.R.A.S.).

Knowing of Doberck's enthusiasm for astronomy and his desire to boost the astronomical output of the Observatory, one might suspect that it was no accident that the new Chief Assistant, John Isaac Plummer (1845–1925), was an astronomer of some competence and that Doberck engineered his appointment. A Fellow of the Royal Astronomical Society from 1876, Plummer (Figure 6) had worked at Glasgow Observatory, Durham Observatory and Orwell Park Observatory in England before his arrival in Hong Kong and, among other things, he had published the book, *Introduction to Astronomy*, in 1872. He held an honorary M.A. from the University of Durham. On the face of it, Doberck's hand would not seem to have swayed this choice as the prescribed form detailing the position, signed by him and sent to the Colonial Office, simply specified qualifications that were "… the same as for an Assistant Astronomer in the British Isles …" and stated that the selection should be made by the Astronomer Royal. However, in a letter Doberck (1894b) subsequently revealed that he had been in contact with Christie, the Astronomer Royal: "Mr Plummer was selected according to my own suggestion for his fitness as an assistant astronomer …" By the time the relevant paperwork reached Christie, he had already received several informal approaches about the position, including one on behalf of Plummer, who "… is not of an uneven or irritable temper …" (no doubt in contrast to the candidate he recommended for a Hong Kong appointment eight years earlier!), and since "Mr Plummer seems such a good man for the post …", Christie did not think it was necessary to advertise the post. So Christie recommended Plummer, whom he knew to be in search of a new position (as his previous post at Orwell Park had come to an end with the death of Colonel Tomline and the abandonment of astronomy at that institution). Nor were Plummer's chances harmed by the submissions he received from members of the aristocracy: both Lord Colville of Culross and the Marquess of Bristol wrote to Lord Knutsford, the Secretary of State for the Colonies. The latter reported how he had met Plummer while "… staying with the late Col. Tomline who kept a 'tame' astronomer about the place … he seemed a very respectable, pleasant man … anxious to do anything for a living being a candidate for a mastership of a Union House in ??? [illegible]! I should be glad if I heard in the future that he could keep to his congenial pursuits at Hong Kong." (Marquess of Bristol, 1891). And so Plummer was appointed to the post, but he was hardly a solution to the perennial problem of typhoon-prediction—which continued to preoccupy the minds of those in the Colony—for he had no meteorological publications to his name.

Professionally, Plummer had much in common with Doberck: he was yet another import from a private observatory in the British Isles, and his work had mostly been on comets (e.g. he is cited sixty-one times in Kronk (1999)). On the other hand, for Plummer this was a major step down in the world, for someone who was in the habit of submitting annual reports to the Royal Astronomical Society, and would now be asked by Doberck to perform a range of different tasks, including the cleaning of the time-ball! One would imagine that Doberck welcomed the news of Plummer's appointment; although probably not known to him personally, there had been some interaction in the past as Plummer referred to Doberck's work in some of his early papers. And in the published literature Doberck lauds Plummer on several occasions for his observational skill. For example, in Doberck (1905c) we find: "… Mr Plummer's skill is well known and the smallness of the probable errors prove that the work was accurately done …", yet their relationship was far from smooth. Plummer was already 46 (eight years older than Doberck) when he took up the position on 1 May 1891, and a later Colonial Office minute (1894) reveals that "… it was evident that Dr Doberck did not hit it off with Mr Plummer." Within six months we have the Colonial Secretary (1891) writing Doberck: "… I am to inform you that His Excellency trusts that you, as Head of the Department in which you are both working, will find the means of placing your relations with Mr Plummer on a sounder footing …" A frosty, if not unprofessional, relationship existed between the two men for the next sixteen years, and Plummer was never permitted to forget his junior status. He was entrusted with many observations and calculations that had no obvious connection with time-keeping, and although his contributions were acknowledged he never shared any authorial credit (and apart from a pamphlet on the origin of typhoons seems not to have published anything during his time in Hong Kong). Although bypassed for the Directorship in favour of his nominally junior colleague, Figg, upon Doberck's retirement, Plummer remained in the Observatory until he reached the compulsory retirement age of 65 in 1911. His Fellowship in the Royal Astronomical Society presumably lapsed along the way, as no obituary notice for him is to be found in *Monthly Notices*.

In this context it should be noted that Doberck in no way encouraged astronomy among local people; his earliest expressed opinions on the scientific ability of the locally-employed staff was very negative, although

he did mollify his views in later years and commend the ability of some junior staff—but only in the context of meteorological work.

4.5 Doberck's Astronomical Work Whilst in Hong Kong

Of more than eighty reports that Doberck published during his years at the Hong Kong Observatory, less than 15% relate to subjects other than astronomy. But, after his abortive attempts to have his work on double stars published in 1886, he makes no further mention of purely astronomical work in his annual reports and, in fact, seems to have set aside this work for some years. Then in three longish papers that were published in 1890-1891, he reduced some of the observations he made earlier at Markree (see Doberck, 1890b, 1890c, 1891b), and he returned to them again briefly later (Doberck, 1902e). Then from the mid-1890s, he begins presenting new astronomical material in the literature, and at least sixty-one publications appeared between 1895 and his departure from Hong Kong in 1907. This not only represents surreptitious astronomical work conducted at the Observatory, but research carried out while he was away from Hong Kong and on long leave. The early dedication evidenced by an eleven-year tour of duty gave way to his taking regular leave every three years. In 1897, for example, he spent time at the McMillin Observatory at Ohio State University in Columbus. His wife, Harriet Elizabeth Harris, was possibly American, and apparently had some connection with Dayton, Ohio, which could explain Doberck's decision to work at this new Observatory. We have a photograph of him taken about this time in a salon in Dayton (see Figure 7). Then in 1900, and again in 1903, Doberck spent time observing at the Copenhagen Observatory.

As at Markree, Doberck spent most of his time observing double stars, although from 1898 he tended to focus on Southern Hemisphere stars (Doberck, 1898f, 1898g, 1899c, 1900b). And in publishing the orbital elements, he frequently acknowledged Plummer's assistance. Doberck's double star observations made at Hong Kong, Columbus and Copenhagen are reported in a series of papers (see Doberck, 1896e, 1898a, 1901a, 1902c, 1902d, 1903e, 1907a). In Table 1, below, we list references for double star orbital parameters that he calculated whilst in Hong Kong.

4.6 Departure After a Stormy Career

Much of Doberck's later career in Hong Kong is overshadowed by his hostile attitude to the Jesuit observatories in Shanghai and Manila, whose staff he accused of incompetence and plagiarism. This attracted much attention from the Hong Kong press at the time, which echoed more complaints about the Hong Kong Observatory's performance. Doberck (1898i) asserted that the Manila Observatory was

> … in the hands of the Spanish priests, who possess very little scientific education, and who derive much of the matter which they print from the publications, weather telegrams etc issued from this Observatory without however in any way acknowledging their indebtedness to this Observatory …

Furthermore, "… one of the objects of the Jesuits is to undermine non-Roman Catholic scientific institutions and for this and similar reasons they have been expelled from most countries." (ibid.). However, he retained the confidence of the Governor, and seemed indifferent to what he saw as ignorant criticism, devoting more of his time to (semi-furtive) astronomical research. Such an attitude is reflected in his response to an enquiry from the Governor, motivated by a letter from a reader of a local newspaper who asked why no advance notice of the lunar eclipse of 27 June 1899 had been issued by the Observatory. Doberck (1899b) noted that notice had been given four years earlier in the *Nautical Almanac*, and that it was not in the *Gazette* "… because that is not the business of newspapers."

Figure 7: A studio photo of Dr Doberck in Dayton, Ohio, around 1897 (by kind permission of the Librarian, Lick Observatory Archives).

Doberck retired at age 55. It may have been that he felt twenty-four years in the tropics was enough, or he may have hankered for the life of a 'gentleman astronomer', which was to be his fate. But equally likely, he may have been encouraged to go, for his original contract did provide for retirement on full pension at 55. He had long antagonised his superiors, both in Hong Kong and in London, and one more episode of sparring with the Government may have been the deciding factor. Even if, by now, he did not draw attention to his astronomical activities, some awareness of them seems to have existed outside the Observatory. In its editorial of 20 September 1906, the *China Mail* asked "… [do] we have a perfectly equipped and officered astronomical station and meteorology is rather contemptuously relegated to the second place?" This was in the context of calling for an enquiry into why the Observatory had failed to raise storm-warning signals in time prior to a disastrous typhoon that had struck Hong Kong two days earlier. The first signal only went up at 8:00 a.m. on 18 September, and by 11 a.m. the same day it was all over. Probably the worst

typhoon to strike Hong Kong in recorded times, it resulted in enormous loss in ships and at least 10,000 lives (i.e. ~3% of the Colony's population). In the subsequent enquiry—which exonerated the Observatory and its Director from incompetence—surprisingly nobody raised questions about the time Doberck and his staff devoted to astronomy (*Hong Kong Government Gazette*, 1907).[11] Several, for the most part unfriendly, communications followed, including one from the Governor: "I must express my surprise at the tone adopted in the minute of the Director of the Observatory … The language used by Dr Doberck is calculated to shake one's confidence in his fitness to occupy the position he fills …" (Governor's minute, 1907). One suspects that the Governor was not entirely pleased by the conclusions of the enquiry, but he sent the report, along with ones supplied by the Zicawei and Manila Observatories, in his dispatches to London, and requested that the opinion of the Royal Observatory at Greenwich on the matter be obtained. Ignoring any possible role of rivalry with the Jesuits, the Astronomer Royal reported promptly and stated that he could find no reason to disagree with the Committee's conclusions: "….a review of the evidence placed before the Committee of investigation points to the conclusion that the finding of the Committee was practically inevitable … [and] there remains no question of dereliction of duty at the Observatory." (Hong Kong Legislative Council, 1907).

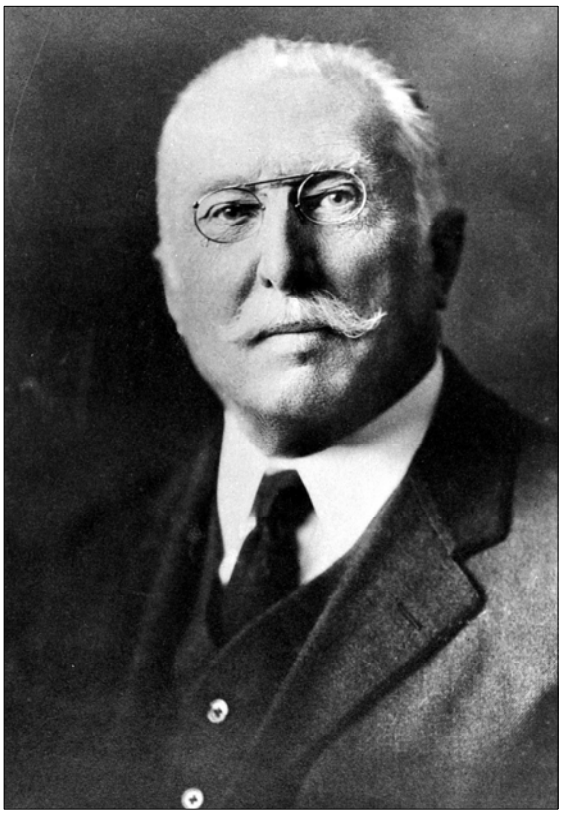

Figure 8: Dr Doberck in later life (by kind permission of the Director, Hong Kong Observatory).

5 'KOWLOON OBSERVATORY', SURREY

In June 1907 Doberck went to England on leave, and he retired on a pension of £360 per year in September. Whatever the reason for his departure in June, he stayed on in England, where he was destined to live for another thirty-four years. He immediately proceeded to set up his own gentleman's observatory, 'Kowloon', at Sutton in Surrey, which was equipped with a 6-in refractor (Doberck, 1909a). Although it lacked the grandeur of Markree, Kowloon Observatory was grand enough to keep Doberck occupied for another quarter of a century, and he continued his stellar observations, initially with a little financial support from Harvard College Observatory. It was only in 1908—after his retirement—that he was elected a Fellow of the Royal Astronomical Society, but later he appears to have let his membership lapse as no obituary for him appeared in *Monthly Not-ices*. A photograph of Doberck in later life is shown in Figure 8.

At Sutton Doberck continued with his analysis of double star orbits, made regular observations of different doubles, and from 1919 reported observations of variable stars. His wife helped him to some extent, for in the account of his new observatory in *Monthly Notices* he speaks of her cooperation in measuring double stars (ibid.), and many years later, in a letter to R.G. Aitken he wrote that "… my wife has promised to assist me for one year, and with her help I am able to do twice the amount of work in the same time as when I work alone." (Doberck, 1922). But any suggestion that it was more than a domestic duty is contradicted by his elaboration: "… if you have to appoint a double star observer, you ought to make it a condition that his wife assists him." His attitude in these matters was also illustrated in a letter he wrote in 1891 recommending his sister for appointment as his meteorological assistant at the Hong Kong Observatory (Doberck, 1891c). After noting the frequent employment of females in observatories, including Greenwich, Kew, Durham (where only the Director was a man), Madras etc., because "… they are very steady at such work…", he also gave as an excuse for employing her that "… it is important that I should have somebody living with me who would be at my beck and call at any hour day or night."

At some point, Doberck was appointed to the IAU Commission on Double Stars, but in early 1925, he found himself in a minority on some aspects of a report prepared by the Commission and resigned (Doberck, 1925a).

6 DOBERCK'S LEGACY IN ASTRONOMY

It is with the field of astronomy—rather than meteorology, to which he was obliged to devote so much of his life—that Doberck's reputation lies. Doberck started off working on cometary orbits (Doberck, 1872; 1873a; 1873b; 1873c; 1873d; 1874a; 1874b; 1874c; 1874d; 1875a), and after his retirement published a couple of further papers on comets (Doberck, 1912b; 1915). Then between 1918 and 1925 he reported some observations of variable stars (Doberck, 1917; 1918a; 1918b; 1918c; 1919a; 1919b; 1919c; 1919d; 1919e; 1919f; 1919g; 1920a; 1920b; 1920c; 1924a; 1924b; 1924c; 1924d; 1924e; 1925c).[13] But he should be remembered mainly for his work on double stars.

Table 1 summarises his double star work by listing all of the stars he investigated during his intervals at Markree Observatory, Hong Kong Observatory and his Kowloon Observatory, along with the associated publications. Raw data from his Sutton Observatory

observations are presented in a long series of reports in *Astronomische Nachrichten* (Doberck, 1909h, 1910b, 1911a, 1911b, 1911d, 1912d, 1912e, 1913a, 1913c, 1914a, 1914b, 1914c, 1923, 1925b, 1926, 1930, 1931, 1933, 1935). Note that his final report appeared in 1935, when he was 83 years old.

Doberck did not have equipment suited to carrying out exhaustive searches for new (close) double stars, and consequently all of the major Northern Hemisphere systems that lay within the resolving power of his telescopes had been discovered long before he began investigating them.[12] Nor did he have photographic facilities that would enable him to study spectroscopic binaries, and his tentative excursions in that direction—as we have seen—were aborted by his move from Markree to Hong Kong. And so it was that known visual binaries were to occupy him for most of his years. During his quarter century in Hong Kong his observing schedule had to be somewhat furtive, and necessarily conducted at a slow pace, yet this was a time when others were forging ahead with the study of binaries, especially using new spectrographic techniques. But to these studies he could bring his natural affinity for precise quantitative measurement, where biases and measuring uncertainties could be systematically evaluated, and this was an aspect that he emphasized. In his publications he always laid great stress on taking statistical and systematic errors into account when evaluating the published data (e.g. see Doberck, 1908c; 1909k). From chronologically-accumulated data he could then produce reliable orbits for several stellar pairs, and Aitken (1918: 240) referred to Doberck as a "… the veteran computer … who has investigated more double star orbits than any other astronomer …" (and he specifically endorsed fourteen of Doberck's orbits). For example, in calculating the orbit for τ Ophiuchi, Doberck (1906a) used data that extended over thirty years, and for his investigation of ξ Bootis the measurements extended from 1877 to 1921 (Doberck, 1921b). We should also note that the orbital parameters he derived for the difficult long period double star, Castor AB (α Geminorum), are similar to the currently-accepted value (see Heintz, 1988). Doberck was also the first to draw attention to a tendency for the eccentricity in double star orbits to correlate with their periods (see Doberck, 1878e, 1898b; cf. Aitken, 1918: 195), a phenomenon whose interpretation is still a current topic of interest (Dommanget, 2003).

Doberck always held his own in any argument or confrontation, and deferred to none, but one cannot fail to see some hints of frustration in his long career, in part due to his limited access to suitable observing facilities and in part because of his irascible nature. His systematic study, over the best part of fifty years, of the motions in some double star systems was of value to the astronomical community, and to quote from his obituary (1941a), "… it is as an exceptionally diligent and successful student of visual double stars that he will always be remembered." Meanwhile, Aitken (1941) says this in the obituary that he wrote for Doberck: "… his entire career exemplifies what an enthusiastic amateur can accomplish even when he must content himself with a small telescope located where atmospheric conditions are only moderately favourable …" This very much echoed Doberck's own opinion, as expressed in an essay written almost sixty years earlier where he quotes a remark by Bessel: "… a practical astronomer ought to be able to do something, even if he has only a cart-wheel and a gun-barrel at his disposal." (Doberck, 1884b).

Table 1: Double stars investigated by William Doberck, 1875-1935.

Double Star	Doberck's Publications
α Centauri	1879c, 1896b, 1907d, 1910c
α Geminorum(Σ 1110)	1878d, 1878f, 1898c, 1902a, 1904a, 1910c
β 101	1913b
β 416	1903b, 1910c
β 733 (85 Pegasi)	1906c
γ Centauri	1906b, 1910c
γ Coronae Australis	1912c
γ Coronae Borealis(Σ 1967)	1877b, 1877d, 1878c, 1905a, 1909e, 1910c
γ Leonis(Σ 1424)	1875c, 1875e, 1875m, 1876g, 1879d, 1897d
γ Virginis	1896c, 1908a, 1910c
ζ Aquarii(Σ 2909)	1875c, 1875f, 1875n
ζ Cancri(Σ 1196)	1880d, 1907b, 1909b, 1910c
ζ Herculis	1881a, 1897c, 1910c
ζ Librae	1877c
ζ Sagittarii	1904b, 1910c
η Cassiopeiæ(Σ 1424)	1876a, 1876d, 1876g, 1878d, 1901b, 1909d, 1910c
η Coronae Borealis(Σ 1937)	1881b, 1886d, 1910c
θ Orionis	1908b
ι Leonis	1875c, 1875f, 1876e
λ Ophiuchi(Σ 2055)	1876i, 1877e, 1878d
μ^2 Boötis(Σ 1938)	1875b, 1875d, 1875g, 1876g, 1878i, 1897b, 1910c
μ Draconis(Σ 2130)	1876a, 1876e
μ^2 Herculis	1880a, 1907c, 1910c
ξ Boötis(Σ 1888)	1877a, 1877f, 1878c, 1903a, 1909g, 1921b, 1910c, 1921b
ξ Librae(Σ 1998)	1876j, 1878c
ξ Scorpii	1907c, 1910c
O(Σ 235)	1880b, 1880c
O (Σ 298)	1879f
O(Σ 387)	1898d, 1910c
O(Σ 400)	1898e
σ Coronae(Σ 2032)	1875c, 1875d, 1875i, 1876h, 1878d, 1905b, 1910c
Σ 228	1898e, 1910c
Σ 1757	1876e
Σ 1768	1877i, 1878c
Σ 1819	1876e
Σ 2173	1907c, 1910c
Σ 2525	1911c
Σ 3062	1877j, 1878c, 1879e
Σ 3121	1877i, 1878c, 1907c, 1910c
τ Ophiuchi(Σ 2262)	1875c, 1875e, 1875j, 1875k, 1875l, 1876g, 1877e, 1878d, 1906a, 1910c
φ Ursae majoris	1903c, 1910c
ω Leonis(Σ 1356)	1876b, 1876c, 1876f, 1878c, 1907b, 1910c
4 Aquarii	1880a, 1912a
25 Canum Venaticorum(Σ 1768)	1881c, 1910c

36 Andromedæ(Σ 73)	1875f, 1875p, 1879a
40 O2 Eridani	1910d
42 Comae Berenices(Σ 1728)	1909c, 1910c
44 ι Boötis(Σ 1909)	1875q, 1876a, 1876g, 1878d, 1909i, 1910c
70 p Ophiuchi	1906d, 1910c
85 Pegasi	1910c
99 Herculis	1903d, 1910c
H I 39	1907b, 1910c
p Eridani	1877h, 1878c
Sirius	1904c, 1910c

7 NOTES

1. What little we do know about Doberck's early life is almost entirely due to an entry in the *Dansk Biografisk Lexikon* (see Bricka, 1890)—which only takes us up to about 1900—and two short obituary notices (Obituary, 1941a; 1941b).
2. Working under d'Arrest, Dreyer was awarded a University of Copenhagen doctorate in 1874.
3. By a strange coincidence, in the 1930s this telescope ended up at a Jesuit seminary in Aberdeen, Hong Kong. However, Doberck does not seem to have been involved in this transfer.
4. This was Colonel A.R. Clarke, F.R.S.
5. Doberck's successor at Markree Observatory was the German, Albert Marth. A well-respected astronomer (Dreyer, 1897), Marth was 55 when he took up the post. However, he seems to have made no use of the astronomical instruments during his fourteen years there, and spent most of his efforts calculating ephemerides. After his death, in 1897, all astronomical work ceased and the Observatory functioned purely as a meteorological facility.
6. These four papers, and his doctoral thesis, were the only astronomical contributions that Doberck wrote in German.
7. This was the Great Comet of 1881, which was discovered by the well-known Australian astronomer, John Tebbutt. For information on this comet see Orchiston (1999).
8. Henry Spencer Palmer (1838-1893) spent much of his later life in Japan, where he died in 1893. A highly-appreciative obituary occurs in *Monthly Notices* (Obituary, 1894), and an outline biography has been written by Higuchi (2002).
9. This was based on data accumulated during the previous four years, and indicated that 70% cloud cover could be expected from February through to May.
10. Doberck was in fact accorded this title by at least one writer: "… Dr. Doberck, the present distinguished Astronomer-Royal of Hong Kong, has rendered services to science which are spoken of with respect in all the observatories of the world." (O'Rorke, 1889: 529).
11. The full report was a Supplement to the *Gazette*.
12. The Markree telescope had a resolving power of ~0.43″, and the instruments he had at Hong Kong and in retirement had only half this resolving power.
13. Around 1917 Doberck took a break from double stars in favour of observing variable stars. They had attracted him as long ago as his time in Sligo, but he realised that the atrocious weather conditions there made such observations almost impossible. While he does not mention an improvement in seeing in Surrey, he does confidently report on the variability of a large number of stars.

8 ACKNOWLEDGEMENTS

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9 REFERENCES

Minutes from the Public Records Office (U.K.) are from files CO129/297 (1882) through CO129/340 (1907). Material from the Hong Kong Public Records Office is in files HKRS149-2-1558, HKRS356 and HKRS842. Different spellings in early documents, Hongkong, Hong-Kong, Kaulung, etc., are all standardised throughout to 'Hong Kong'. I have not distinguished between 'Governor', 'Acting Governor' and 'Officer Administering the Government', nor between 'Colonial Secretary' and 'Acting Colonial Secretary', unless such a distinction is essential.

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