

John Louis Emil Dreyer – A Short Biography

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The Danish astronomer Dreyer was the most influential cataloguer of nebulae and clusters in the 19th century.¹ He is the creator of the famous New General Catalogue (NGC), published in 1888. He also made major historical contributions, especially about Tycho Brahe.

Copenhagen

Johan Ludvig Emil Dreyer (in English later: John Louis Emil) was born on 13 February 1852 in Copenhagen (Fig. 1). Many of his ancestors served in the army and navy. His father, Johan Christopher Friedrich Dreyer,² became Danish Minister of War and the Navy in 1864. Also three of Dreyer's sons kept this tradition, e.g. Frederic Charles Dreyer as Admiral of the Royal Navy. But the Dreyer with whom we are concerned obviously took a very different path, becoming an eminent astronomer. He attended school in Copenhagen and was initially interested in languages, history and science. At the age of 14 he got a book about Tycho Brahe, from which originated his lifetime fascination for the great Danish astronomer. Now his aim was to study astronomy. Dreyer often visited the new Copenhagen Observatory at Østervold; especially Schjellerup took care of the interested pupil. Even at that time, his talent for observations and precise analyses had already appeared.



Fig. 1: John Louis Emil Dreyer (1852–1926) during his time in Armagh.

In 1869, at the age of 17, Dreyer began his study of mathematics and astronomy at Copenhagen University. There he was particularly fascinated by the lectures of Heinrich Ludwig d'Arrest, director of the observatory. Throughout his life, d'Arrest was his great idol, whose influence can be traced in all his work, especially on nebulae. Just a year later Dreyer was allowed to use the telescopes. In 1872 he wrote some popular articles on Tycho Brahe, and a year later his first scientific paper was published.³ Dreyer graduated in 1873 as M.A. with a work on observational errors at the Pistor and Martins meridian-circle of Copenhagen Observatory. An enlarged version was published in 1877, titled 'On personal errors in astronomical transit observations' (Dreyer 1877).

¹ For a comprehensive presentation of his work on nebulae and star clusters see Steinicke (2010).

² He was married to Ida Nicoline Margrethe Dreyer (*née* Randrup); they had four sons and two daughters; see **Family tree**.

³ It contains an orbit calculation of the comet of 1870 (Dreyer 1873). Sampson's bibliography of Dreyer lists 122 publications (Sampson 1934).

Birr Castle

In August 1874 Dreyer, then aged 22, left Copenhagen for Irish Parsonstown (now Birr). He was employed as Astronomer at the Earl of Rosse's Observatory to assist Lawrence Parsons, the Fourth Earl of Rosse. He followed Ralph Copeland, who changed to Dunsink. The 15-years-older English astronomer was a life-long friend. In 1875 Dreyer became a Fellow of the Royal Astronomical Society (RAS).

At Birr Castle he had access to the 36" and 72" reflectors (Fig. 2) and his main task was observing and cataloguing nebulae. Here Dreyer wrote his first papers on the subject: reviews of the publications of Schultz, Schönfeld and Vogel, which appeared in the *Vierteljahrsschrift der Astronomischen Gesellschaft* (Dreyer 1875, 1876a, 1876b). In 1877 he published his first catalogue of non-stellar objects, the 'Supplement to John Herschel's General Catalogue' (GCS; Dreyer 1878). He was also responsible for the compilation of all Birr Castle observations of nebulae, which appeared in 1880 (Parsons 1880). That work contains some of his sketches.

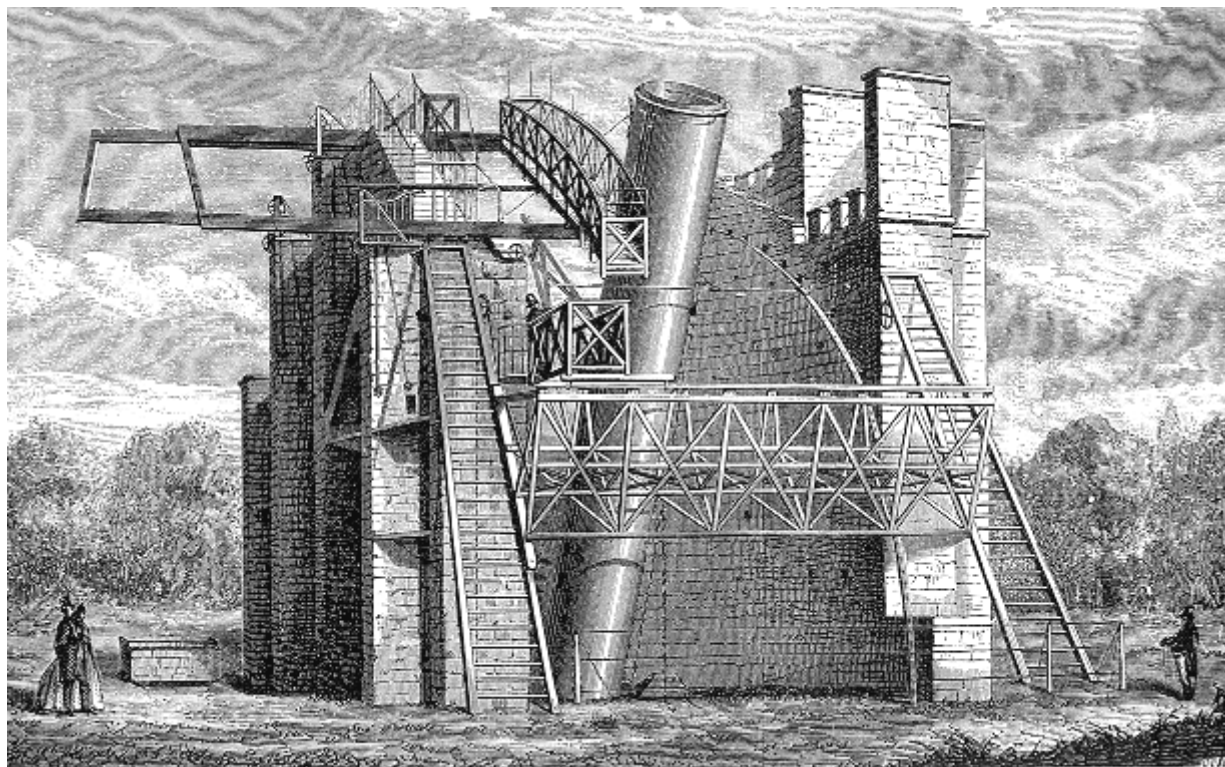


Fig. 2: Lord Rosse's 72" reflector at Birr Castle.

In Parsonstown Dreyer met the woman who was later to become his wife, Katherine 'Kate' Hannah Tuthill, daughter of John Tuthill from Kilmore (County Limerick). The marriage took place on 11 November 1875 at the local church. On 24 December 1876 their son John 'Jack' Tuthill Dreyer was born, followed by Frederic Charles (8 January 1878). Dreyer stayed at Birr Castle for four years. No doubt he was the driving force and his departure initiated the decline of the wellrespected observatory.

Dunsink Observatory

In August 1878, aged scarcely 26, Dreyer moved to Dunsink, the site of the Trinity College Observatory of Dublin University.⁴ He became the assistant of Robert Stawell Ball, following Charles Burton (both former Birr Castle observers). Ralph Copeland – who had been an assistant at Dunsink during 1874–76, before changing to Lord Lindsay's Dun Echt Observatory in Scotland – might have recommended him for the job. Ball entrusted the young astronomer with observations at the meridian-circle by Pistor and Martins (well known from Copenhagen). Dreyer measured, for instance, the positions of 321 red stars (a catalogue appeared in 1882 in Dublin). His daughter Alice Beatrice Dreyer (later Shaw-Hamilton) was born in Dunsink on 28 October 1879.

Dreyer and Copeland edited the Dublin magazine *Copernicus* bearing the subtitle 'International Journal of Astronomy'. From January to July 1881 it was first titled 'Urania'. Since a publication with the same name already

⁴ Dunsink lies about 100 km east of Birr; see O'Hora (1961) and McKenna (1967): 283–285.

existed (though with astrological content), a new name was chosen. Lord Lindsay, the owner of Dun Echt Observatory, financially supported the project, but obviously the enthusiastic publishers had underestimated the international competition in the shape of the *Astronomical Journal*, *Bulletin Astronomique* and *Astronomische Nachrichten* (which was effectively remodelled by Krüger in Kiel). Thus, after a notable initial success, *Copernicus* was abandoned in 1884, after only three volumes.

Alongside the regular work at Dunsink, Dreyer was able to continue his cataloguing of non-stellar objects. During his first period, until the end of 1879, he finished the publication of the Birr Castle observations; Lawrence Parsons had left him all of the necessary records and Ball, as a former 'Rosse man', of course supported this task.

Armagh Observatory

With the death of Thomas Romney Robinson on 28 February 1882 the office of the Director of Armagh Observatory became vacant.⁵ He was in charge for 59 years, a unique record. Dreyer was under discussion as a possible successor and traditionally it was up to the Royal Astronomer in Greenwich to render an official 'certification of fitness'. William Christie stated on 9 May 1882 '*I have much pleasure in stating that I consider Mr. J. L. E. Dreyer a fit and proper person for the post of Astronomer of the Armagh Observatory.*'⁶ On the following day, a formal offer was sent to the 30-year-old Dreyer. After visiting Armagh, he eventually accepted on 22 May, and on 16 June was appointed as the new Director of Armagh Observatory.⁷ Owing to an urgent refurbishment of the observatory, Dreyer could not move into his new home until 31 August 1882. The site is a bit off the town centre on the wooded, 70-m-high College Hill. The main building offered a commodious flat (Fig. 3). Three children were born there. The first was George Villiers Dreyer on 27 February 1883, making a career at the Royal Navy. The two others, William Lloyd and Margaret Ida (born 17 May 1885 and 5 September 1887), died when at the early age of three and one, respectively. In 1885 Dreyer became a British citizen.



Fig. 3: Dreyer at Armagh Observatory in about 1890 (Armagh Obs.).

As little as six weeks after Dreyer had moved in, he had to write his first annual report. In 1882 he had been awarded his doctorate degree from Copenhagen University for his work on the constant of precession.⁸ It was particularly appreciated by the 'Pope' of celestial mechanics, Simon Newcomb, who was normally feared for his critical judgement.

⁵ Armagh, now belonging to Northern Ireland, lies about 100 km north of Dunsink; see McKenna (1967): 285–287, Michaud (1983); McFarland (1990).

⁶ Bennett (1990): 155.

⁷ Dreyer's activity in Armagh was described in detail by Patrick Moore (Moore 1967).

⁸ Dreyer (1882).

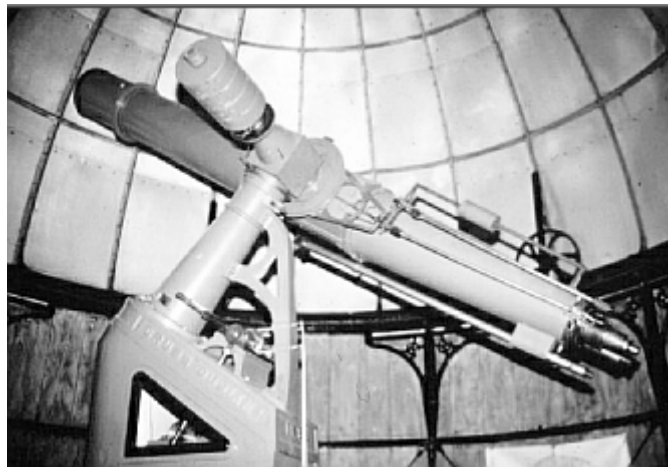


Abb. 4: Dreyer's 10" Grubb refractor at Armagh.

Dreyer's first concern was the instrumental upgrade of the observatory. To study nebulae, he required a mid-sized refractor. The 15" Grubb reflector (which had been erected in 1835) with a metal mirror was outdated,⁹ but funding the new instrument – later called the 'Robinson Equatorial' – caused difficulties. Owing to Dreyer's tenacity, the state, the church and the Royal Society eventually provided £2000 – however, under the condition that there should be no request for any further grants. Dreyer chose a 10" refractor by Grubb with a focal ratio of 1:12 (Fig. 4). Since his great model d'Arrest had impressively demonstrated that such a modest aperture was sufficient to observe nebulae.

Dreyer used the time while the instrument was being built for reducing Robinson's star observations, which were completed by additional measurements with the meridian-circle. The result appeared in 1886 in Dublin as the Second Armagh Catalogue, containing positions of 3300 stars for the epoch 1875. The Grubb refractor, which was equipped with two micrometer eye-pieces (one without illumination), was ready to use on 28 July 1885. The dome, which was located in the observatory park south of the main building, has a diameter of 4.9 m.

Besides observing nebulae, Dreyer carried on his catalogue work. In 1886 he offered the RAS a 'Second supplement' to the General Catalogue. Surprisingly, the Society refused it, favouring rather a completely new catalogue. Dreyer agreed and only two years later the work was published in the *Memoirs* of the RAS as the 'New general catalogue of nebulae and clusters of stars' – this is the famous NGC (Dreyer 1888). Afterwards, special objects (especially those supposed to be variable) were observed with the Grubb refractor. The results were published in 1894 in the *Transactions of the Royal Irish Academy*, giving positions and notes to 100 nebulae. By and by a growing number of new nebulae and star clusters were discovered – partly by photography. Thanks to the NGC, the rising interest in non-stellar objects brought a considerable amount of corrections. Dreyer, accurately following the issue, thus created two additional works: the Index Catalogues, which were published in the *Memoirs* (Dreyer 1895, 1908). He also wrote various articles about nebulae. He was also interested in double stars, but his observations remained unpublished.

As an assistant in Dunsink, Dreyer's main duty was astrometry, but in Armagh, being now the director, he had complete freedom to do whatever he liked. After the legacy of the Second Armagh Catalogue, he focused not only on nebulae but also on another subject that would eventually become most important: the history of astronomy. As early as in 1883 Dreyer had written a 'Historical account of the Armagh Observatory', which was published in Liverpool (Dreyer 1883), but his main interest, originating from his youth, related to his home country Denmark and its great astronomer Tycho Brahe. In 1890 he published in Edinburgh a biography titled *Tycho Brahe, a Picture of Scientific Life and Work in the Sixteenth Century*. The 405-page book is still a standard work. There he described the importance of historical studies: '*Astronomers are so frequently obliged to recur to observations made during former ages for the purpose of supporting the results of the observers of the present day, that there is a special inducement for them to study the historical development of their science.*'

Though Armagh Observatory hosted a respectable library, which had been set up by Robinson, it was not sufficient for Dreyer's historical research. Thus he often visited Dun Echt Observatory in Scotland. Its 'Crawford Library', which had been amassed by Lord Lindsay, was a unique treasure of rare old books. After the closure of the site in mid 1890, the instruments and library found a new home at the Royal Observatory Edinburgh on

⁹ Glass (1997): 17-19.

Blackford Hill. It now owns more than 15000 books and manuscripts on astronomy, philosophy and science, many from the fifteenth and sixteenth centuries. The library is one of the largest of its kind. Naturally, Dreyer was a frequent visitor on Blackford Hill – meeting there Copeland, who was appointed the first director in 1889 and third Astronomer Royal of Scotland. Despite health problems lasting for nearly two years, Dreyer's historical studies led to another important work: his *History of Planetary Systems from Thales to Kepler*, which was published in 1906 in Cambridge and is 432 pages long.

In early 1910 the Royal Society and the Royal Astronomical Society decided to produce an edition of the complete work of William Herschel.¹⁰ A committee was founded and Dreyer became a member. Given his broad knowledge about observing and cataloguing nebulae (especially concerning Herschel's contribution) and history, he was the ideal person for this task. Consequently the editing of the bulky matter was up to him. The result was published in 1912 in two volumes with altogether 1441 pages: the *Scientific Papers of Sir William Herschel*.¹¹ Dreyer not only revised Herschel's three catalogues of non-stellar objects but also wrote an important biography, using unpublished material (the first chapter in Vol. I).

For his important contributions to astronomy, Dreyer was awarded the RAS gold medal on 11 February 1916. Ralph Allan Sampson, President and fifth Astronomer Royal of Scotland, gave the laudation (Sampson 1916). At that time, Dreyer had nearly terminated his observations; his last entry in the notebook is dated 7 November 1914, treating the transit of Mercury. Since he was exclusively concentrated on historical studies, he eventually decided to resign from his office. In his last report of 1916 one reads that '*The difficulty carrying on this work, which often requires that I should refer to rare old books, found from great libraries, and the desire to be able to devote my whole time to the work, have after much consideration decided me to resign from my appointment here and to remove to Oxford.*'¹²

An enduring issue in his 34-year office was financial problems. He always had to beg for money to operate the observatory, to maintain its instruments or for his publications. In contrast to Robinson, Dreyer had no assistants. Occasionally Charles Faris, who had already been employed by his predecessor in 1868, helped him with meteorological measurements. In Armagh Dreyer was a lone fighter, which did not suit his nature. He was very communicative, wrote and received many letters and was often visited by astronomers.¹³ Among them were local figures, such as Robert Ball, Ralph Copeland and William Rambaut, but also people from the continent and even the United States. For instance, Edward Emerson Barnard and his wife Rhoda visited Armagh on 25 July 1893. Dreyer's children and grandchildren were frequent guests too.

In June 1917 Joseph Hardcastle was appointed as Dreyer's successor.¹⁴ Unfortunately, he suddenly died on 10 November (at the early age of 49) without acceding to the office. Eventually William Ellison became the new Director of Armagh, holding the office until his death in 1936.

Oxford

From 30 September 1916 onwards Dreyer (now 64 years old) and his wife, Kate, lived in Oxford, at 14 Staverton Road. Above all, the famous Bodleian Library promised new material for his historical studies. Dreyer was engaged with a mammoth task: the edition of the complete work of Tycho Brahe.¹⁵ Since 1908 he had frequently obtained manuscripts from the Royal Library in Copenhagen. The final work, funded by the Danish Carlsberg Institute and completely written in Latin, was to comprise 15 volumes; eight were published in Armagh (the first in 1913) and the remainder appeared in Oxford (the last three in 1929, after Dreyer's death).

Owing to the proximity to London, Dreyer was often present at RAS meetings. Together with Turner he edited the *History of the Royal Astronomical Society*, which appeared in 1923, covering the first 100 years (1820–1920).¹⁶ The chapters (treating 10-year periods until 1880) were written by several authors; Dreyer contributed those on the periods 1830–40 and 1880–1920.

¹⁰ Just after William Herschel's death in 1822, his son John had planned such a work, but he found on inquiry that no publisher would be willing to undertake the risk.

¹¹ Dreyer (1912); in 1918 he compiled a 'Descriptive Catalogue of a Collection of William Herschel's Papers' for the RAS (Dreyer 1918).

¹² Report Armagh Observatory 1916.

¹³ The 'Visitor's Book' is stored in the Armagh archive.

¹⁴ Hardcastle was a grandson of William Herschel and member of the committee to edit his work.

¹⁵ See e.g. Gingerich (1982).

¹⁶ A second volume, covering 1920–80, appeared in 1987.

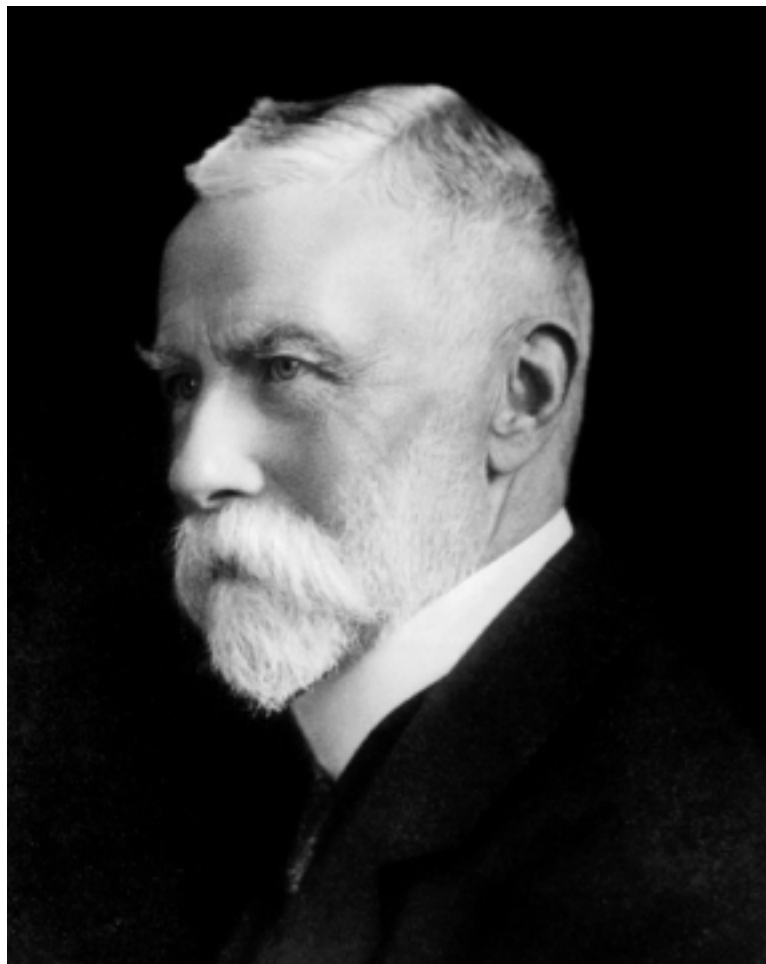


Fig. 5: The late John Louis Emil Dreyer.

At the age of 72, Dreyer received another honour:¹⁷ on 9 February 1923 he was elected President of the RAS, succeeding Arthur Eddington. Unfortunately, a month before, his beloved wife Kate had died at the age of 75 – after 47 years of marriage this was a severe loss. Dreyer's wish for an edition of the complete work of Isaac Newton, which he proposed to the RAS in 1924, could not be realised. He fell ill in 1925 and had to resign from the presidency (James Jeans followed him). John Louis Emil Dreyer (Fig. 5) did not recover from his illness and died in Oxford on 14 September 1926 at the age of 74.¹⁸

Dreyer was a friendly, helpful and highly educated man, always sharing his knowledge with others. He was never a professor – perhaps this explains the lack of a university connection and the fact that no estate could be localised. Anyway, there must have been a large number of letters, manuscripts and records. Up to now, the intensive efforts of the author (investigating archives, querying descendents and scholars) have brought no result. Since Dreyer's wife died first, it is possible that the estate was auctioned.

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¹⁷ In 1970 a crater on the back side of the moon with a diameter of 61 km was named after Dreyer.

¹⁸ Obituaries: Knobel (1927), Fotheringham (1926), Anon (1926a), Anon (1926b) and Burrau (1927); see also Sampson (1934), Lindsay (1965), Alexander (1971), Ashbrook (1984), Gingerich (1988), Marriot (1992), Chapman (2002) and McFarland (2002).

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J.L.E. Dreyer – Family tree

Father: Johan Christopher Frederik 'Frits' Dreyer *13 Jan 1814 (Køge) †12 Sep 1898 (Copenhagen)

Mother: Ida Nicoline Margrethe Randrup *18 Dec 1812 (Copenhagen) †1 Mar 1893 (Copenhagen)
[mar. 8 Dec 1839 Rendsburg]

Children:

1. ??? Dreyer (female)
2. Frederik Wilhelm Cajus Dreyer *22 Jun 1843 †27 Nov 1915
3. Carl Wilhelm Johannes Dreyer *7 Jun 1845 (Roskilde) †3 May 1934
4. Paula Ida Marie Dreyer *19 Apr 1876 †3 Feb 1927
5. Jens Henrik Emil Dreyer

6. **Johan Ludvig Emil Dreyer** *13 Feb 1852 (Copenhagen) †14 Sep 1926 (Oxford)
[bapt. 11 Jul 1852 Citadelskirken, Copenhagen; British nat. 23 Mar 1885]

Wife: Katherine 'Kate' Hannah Tuthill *20 Nov 1847 (Rapla) †Jan 1923 (Oxford)
daughter of John Tuthill (Klimore, Co. Limerick)
[mar. 11 Nov 1875 Parsonstown]

Children:

1. John 'Jack' Tuthill Dreyer *24 Dec 1876 (Parsonstown) †23 May 1959
Wife: Penelope Aylmer Holme [mar. 14 Jul 1914 Waldron]
Children: John Frederic Rodney Dreyer *13 Oct 1916 (London) †1996
Christopher William Stuart Dreyer *18 Jun 1918 (Oxford) †2003
??? Dreyer (female)
2. Frederic Charles Dreyer *8 Jan 1878 (Parsonstown) †11 Dec 1956 (Winchester)
Wife: Una Maria Hallett *28 Aug 1876 (Priors Hardwick) †1959
[mar. 26 Jun 1901 Bishops Tachbrook]
Children: Phyllis Una Tuthill Dreyer *24 Apr 1902 (Sheerness)
Dorothea Joy Dreyer *1905 (Bishops Tachbrook)
Richard Christopher John Dreyer *1908 (London)
Desmond Perry Dreyer *1910 (Bishops Tachbrook) †2003
Raymond Garnier Dreyer *1917 (London)
3. Alice Beatrice Dreyer *28 Oct 1879 (Dunsink)
Husband: Warham Jemmett Shaw-Hamilton *20 Jan 1874 (Darton, Co. Armagh)
[mar. 4 Jun 1901, Armagh]
Children: Robert Jemmett Shaw-Hamilton *1902
John Dreyer Shaw-Hamilton *1904
Rupert Warham Shaw-Hamilton *1908
John Matthews Shaw-Hamilton *1917
4. George Villiers Dreyer *27 Feb 1883 (Armagh) †18 Jun 1965
First wife: Valeska Margaret Critchley
Child: Peter Tuthill Dreyer
*10 Oct 1923 (Srinagar) †24 May 1941 (on see, HMS Prince of Wales)
Second wife: Gertrude Eleanor Kathleen Campbell-Lambert *18 Sep 1903
[mar. 19 Aug 1935]
5. Wilfried Lloyd Dreyer *17 May 1885 (Armagh) †8 Apr 1889 (Armagh)
6. Margaret Ida Dreyer *5 Sep 1887 (Armagh) †4 Oct 1888 (Armagh)