

Dr Isaac Roberts (1829–1904) and his observatories

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Isaac Roberts was born on 1829 January 27 at Groes near Denbigh, North Wales. His father William Roberts, like his father before him, had been a farmer at Groes. William married in 1825 and when Isaac was six the family moved to Liverpool. The only education Isaac received up to the age of fourteen was from his father, and in elementary schools of that time, especially a Welsh Calvinistic School with which his father was connected. He retained his knowledge of the Welsh language all his life, writing and speaking it fluently. Like many Welshmen he had an excellent voice and sang bass with the Liverpool Philharmonic Choral Society in later years.

When he was 15, in 1844, Roberts was bound apprentice for seven years to the firm of John Johnson and Sons, builders and lime burners in Liverpool. The firm had a very good reputation, having been established for sixty years. In 1847 Peter Robinson, who had been with the firm over thirty years was admitted a partner, so Isaac completed his apprenticeship with the new firm of Johnson and Robinson. During this time, even though working thirteen hours a day, Isaac found time to attend evening classes at the Mechanic's Institute and elsewhere. From serving an apprenticeship with 'Freemen', Isaac also became a Freeman of the City of Liverpool.

Isaac was made manager when Peter Robinson died in 1855, and when in 1856 the other partner John Johnson died, Isaac wound up the business. By 1859 he had set up his own business as a builder and in 1862 Mr J. Robinson, son of Peter, joined him as partner, the firm becoming Roberts and Robinson.

The firm's first contract was the construction of the Birkenhead Water Works on Flaybrick Hill, Cheshire. This was followed by other major contracts, such as with the Liverpool Gas Company, and as a prime contractor for brick and masonry work on the Lime Street Station Hotel. During this time Isaac became president of the Master Builders Association.

Isaac was now becoming a wealthy man and also had the time to pursue his scientific interests. His first paper was written in 1869 on the wells and water of Liverpool. He was also a founder committee member of the Liverpool Biological Society. During its first year Isaac presented a Negretti and Zambra deep sea reversing thermometer for recording the temperature of water at the bottom. In 1870 he was elected a Fellow of the Geological Society.

From 1870 onwards he became absorbed in many branches of science. He also found time to court, and in

1875 married Ellen Anne Cartmel. In 1878 he read a paper to the British Association on the filtration of sea water through triassic sandstone. From 1882, when he was elected a Fellow of the Royal Astronomical Society, to 1889, he carried out a series of experiments regarding the movements of underground water in the Liverpool area, collating them with the attraction of the Sun and Moon and the effects of barometric pressure. He also did a lot of work on the vertical and lateral pressure acting on granular substances, such as corn, sand etc., as stored in 80 foot high hoppers at Liverpool docks, which necessitated devising ingenious weighing machines. The results were published in the Proceedings of the Royal Society for 1884 January 31st.

It was also in 1878 that Isaac began serious astronomical observations at his home at 26 Rock Park, Rock Ferry, (previously the home of the author Nathaniel Hawthorne, who was also the American Consul in Liverpool), with a 7-inch Cooke refractor. In 1882 he moved to 'Kennessee', Magull, 7 miles north of Liverpool. It was here, in 1883, that he began experimenting with astronomical photography, first with ordinary portrait lenses ranging in aperture from $\frac{3}{4}$ inch to 5 inches. The results were compared with the photograph of the nebula M42 in Orion, taken in 1882 by the foremost astronomical photographer of his day, Andrew Common, 1841–1903, with his 36-inch Calver. The results were very promising, so Isaac equipped himself with an 18-inch Grubb reflector and, at the RAS meeting of 1886 January, he reported taking over 200 astronomical photographs the previous year! Isaac, who was by this time president of the Astronomical Society of Liverpool, subsequently presented the 18-inch Grubb to the Observatory at Dunsink, Ireland.

Isaac had been in contact with Dr William Huggins FRS (1824–1910), who was at that time a skilful spectroscopist and photographer, being one of the first to obtain photographic stellar spectra. So when in 1886, Isaac ordered from Grubb a 20-inch prime focus photographic reflector, Dr Huggins ingeniously devised its mounting on the declination axis of the 7-inch Cooke in place of its counterweight. Both telescopes had independent motion in declination whilst the very accurate clock drive in right ascension was common to both. The combination of the two telescopes became known as the 'Twin Equatorial'. Isaac planned to use the 20-inch to produce a photographic chart of the sky, starting at the North Pole, and a 15-minute exposure was chosen for each plate; several were sent to the RAS for comment. At the 1886 November meeting of the RAS

Isaac presented a photograph of the Pleiades, also taken with the 20-inch. The exposure was of three hours and this showed for the first time nebulosity surrounding Alcyone, Maia, Merope and Electra.

Because of the perishable nature of the photographic plates, Isaac sought a means of preserving the results. In collaboration with Adam Hilger (1839–1897), the Bristol optician and instrument maker, famous for his spectroscopes, they produce the ‘Stellar Pantograver’, an instrument for engraving directly onto copper the stars shown on the glass plates. However, in 1887 an International Photographic convention was held in Paris to discuss the charting of both hemispheres. This resulted in the setting up of the *Carte du Ciel* to coordinate the results from eighteen professional observatories world wide (a task that has never been completed). It was obvious to Isaac that the project should be ‘professionally’ run so he relinquished his share and turned his attention to clusters and nebulae.

In 1888 Isaac retired and his firm ‘sold up’. This left him with the time and considerable monies to devote to astronomy. In his constant striving to produce better photographs, he substituted a Calver mirror for the 20-inch. The weather in Maghull did not produce many clear nights and, as he suffered from bronchitis, he began to investigate other sites, even going out to the West Indies to see if he could find better conditions.

In 1885 Charles Leeson Prince FRAS, FRMet Soc.



Figure 1. M31 in Andromeda by Isaac Roberts 1888 October 1st, 20 inch Grubb. (By kind permission of the RAS.)

(1821–1899), was sending out his book *Observations upon the Topography and Climate of Crowborough Hill, Sussex*, extolling its attraction as a health resort, with bracing climate and recuperative qualities of the air. Whether Isaac already knew Leeson Prince is not known, but they had a mutual friend in Captain William Noble FRAS (1828–1904), so they probably did. Leeson Prince had set up his observatory and home in Church Road, Crowborough, on a very large corner plot of land in 1872, which became known as ‘The Observatory’. He sold part of his grounds, in fact about four acres, to Roberts who, himself supervised the building of his own observatory and bungalow by local artisans, thus ensuring the work was up to his exacting standards. By 1890 Isaac had moved into the new house in Beacon Road, which he called ‘Starfields’, probably in honour of William Lassell, 1799–1880, whose Liverpool observatory was similarly named. Starfields was almost on the summit of Crowborough Beacon at a height of about 800 feet above sea level which commanded magnificent views – an ideal situation for an observatory. Not only was the observatory well appointed, but so was the house. The grounds included a tennis lawn, productive kitchen garden and fruit plantation. There was also a meteorological station.

During 1890, William S. Franks FRAS (1851–1935), joined him as his practical photographer and thus a great number of plates were taken. It was in this year that Isaac was elected a Fellow of the Royal Society, and in 1893 the University of Dublin conferred upon him the degree of DSc on the occasion of its centenary. By this time Isaac had amassed enough plates to publish the first of two quarto volumes of *Photographs of Stars, Star clusters and Nebulae*. The second volume was published in 1899. As was his custom, Isaac generously distributed copies and some plates to many observatories and libraries.

The Royal Astronomical Society awarded its Gold Medal to Dr Isaac Roberts in 1895 for his photographs of star clusters and nebulae, with the address on presentation being given by the President, Sir W. de W. Abney. In that same year Roberts mounted a 5-inch Cooke camera ‘piggy-back’ onto the 20-inch.

The opportunity to observe a total eclipse of the Sun in 1896 was not to be missed by Isaac, so along with



Figure 2. Isaac Roberts outside his home and observatory ‘Starfields’, Crowborough, Sussex. (By kind permission of the RAS.)

many other astronomers he joined the party aboard the steamship *Norse King*, and sailed to Vadso in Norway. The total eclipse itself was clouded out and only a glimpse of the partial phase was seen. However, among the party was Dorothea Klumpke (1861–1942), a native of California, who, in 1891, was appointed head of the Carte du Ciel Office at the Paris Observatory. As Isaac's first wife had died some years before, the friendship grew, and in 1902 they were married.

Together, Isaac and Dorothea began the systematic measurement of the vast collection of photographic plates. Around this time, Dorothea's sister, Anne, painted a portrait of Isaac seated in an armchair holding in his hand his favourite photographic plate, that of the great nebula in Andromeda, taken some fifteen years before.

Isaac was an original member of the British Astronomical Association, and on 1904 July 13 he attended the funeral of its first president, Captain William Noble, at Nutley, just five miles from Crowborough. Three days later Isaac himself died. The *Kent and Sussex Courier* of 1904 July 22nd reports, 'All last winter he (Isaac Roberts) was abroad on account of the bronchial catarrh from which he suffered. On Sunday after breakfast he strolled in the garden with Mrs Roberts, but afterwards, feeling unwell, he went indoors. Mrs Roberts applied remedies and sent for medical help, but before the arrival of Dr Basden and Dr Griffiths, death had taken place. At the inquest on Tuesday it was stated, 'Death was due to failure of the heart's action accelerated by the heat'. Isaac was cremated and his ashes retained by Dorothea until 1908 July 21 when they were sealed in a granite pillar in the cemetery at Flaybrick Hill, not far from the site of Isaac's old firm's first building project. The internment was attended by his widow, Liverpool's Lord Mayor and many other notable people. Two of Isaac's most famous astronomical photographs were represented in the headstone, the Andromeda nebula to the left and the California nebula to the right along with the motto 'Heaven within us'.



Figure 3. Portrait of Dr Isaac Roberts c. 1890. (By kind permission of the RAS.)

Isaac had no children by either marriage, so his estate of £80,000 gave annuities to Dorothea and other of his relatives. The capital was ultimately to go to the Universities of Cardiff (at which he had served as a Governor), Liverpool and Bangor for the foundation of scholarships.

His instruments were auctioned by Langridge and Freeman of London. The telescope and mount being bought by the Royal Greenwich Observatory, where they remained for some years. Ultimately they passed to the Science Museum, South Kensington, where they are to this day, still on the original mount in a dome on the museum roof. Unfortunately it is not open to the public.

Although the telescope had been removed, the dome remained on Isaac's house when it was purchased by Mr Mackinnon Wood. The house was again on the market in 1928 following Mr Mackinnon Wood's death, and was sold in 1929 before auction to the Uckfield Rural Council for £3,500. By 1934 the Council's staff had expanded from 17 to 29 and it was agreed to alter and extend the building. Unfortunately, it was decided that the dome did not fit into the new scheme and was removed. The work was completed in 1935 and included a new Council Chamber. During the early 1980s Starfields became too small for the Wealdon District Council and a new complex was built about half a mile away, Starfields being sold for housing development. Regrettably, local historians were unable to get the Department of the Environment to list the building, so Starfields is now demolished, but its name for the estate will remain.

Dorothea returned to France to live with her sister, who had inherited a small castle, La Maison de Rosa at By Thomery, near Fontainebleau. She took with her the collection of plates Isaac had bequeathed to her. For the next thirty years she continued to work on the plates, publishing two photographic atlases and associated catalogues as memorials to Isaac.

Just before the outbreak of World War II, Dorothea returned to San Francisco where, at the age of 81, she died, in 1942.

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