

Reginald Lawson Waterfield, 1900-86

M. J. Hendrie

An account of the life and work of the great comet-observer and former BAA President.

Dr Reginald Lawson Waterfield, M.B., B.Sc., F.R.C.P., F.R.A.S., died at his home in Woolston, Somerset, on 1986 June 10. He had been an active and devoted member of the Association for 72 years, during which time he served as President (1954-56) and Director of the Mars Section (1931-42). He was awarded the Walter Goodacre medal and gift in 1966.

Waterfield had a very perceptive mind that enabled him to get to the root of a problem quickly and this, combined with boundless energy and the ability to fire the enthusiasm of those around him, enabled him to achieve much of lasting value both in his profession, medicine, and in astronomy. It is impossible to do justice to all his work and influence in a short obituary note, especially for the years before World War 2, as he outlived so many of his contemporaries.

Dr Reginald Waterfield, or 'Reggie' as he insisted on being called, was born on 1900 April 12. His father, the Rev. R. Waterfield, had been a chaplain in the household of Queen Victoria and a tutor to Prince Arthur of Connaught; he was Head of Cheltenham before becoming Dean of Hereford and died in his hundredth year. Reggie Waterfield was educated at Winchester and on leaving school joined the Army, being sent to the front shortly before hostilities ceased in 1918.

His medical career

On demobilisation he entered the medical profession, qualifying at Guy's Hospital in London in 1925. He spent the years 1927-29 on the staff of the Johns Hopkins Hospital in Baltimore before returning to Guy's where he remained until 1937. He was then sent to Switzerland because of a severe illness from which he was not expected to recover. However he heard of a doctor with a new treatment that might help him and he discharged himself from the sanatorium and travelled to Berne. A great improvement in his health enabled Waterfield to return to Guy's, and he was among the



Dr Waterfield in 1951

first to give on the spot treatment to the victims of the air raids on London in 1940-41.

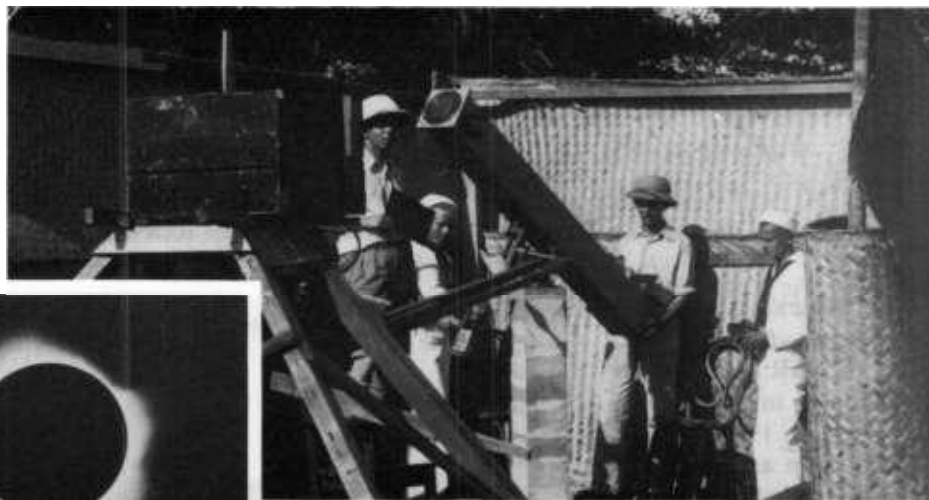
In 1942 he was released from Guy's to head a blood transfusion unit of the Royal Army Medical Corps in North Africa and during the Italian campaign. After being wounded he was invalided out of the Army and returned to Guy's where he continued his work as consultant haematologist until 1949, when he contracted a severe strain of poliomyelitis that left him confined to a wheelchair for the last 37 years of his life.

Despite this handicap Reggie Waterfield continued to head his department at Guy's until normal retirement. His special knowledge was in disorders of the blood, and he realised that the accurate measurement of the volumes of red blood cells could greatly aid the diagnosis of anaemias. He first developed the Halometer for measuring mean cell diameter and then the Waterfield Spherocytometer which enabled the volume and ratio of the thickness to diameter to be measured, using a diffraction technique which has a parallel in the appearance of star images seen in instruments of different apertures.

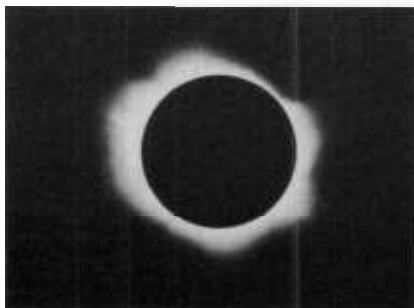
Telescopes

Waterfield saw the Daylight Comet in 1910 and began serious observing in 1913, using a 75mm refractor and a 150mm Gregorian reflector to acquire a working knowledge of the heavens. His first astronomical photographs were of the Sun in 1914, when he also recorded a partial solar eclipse. The same year he began using the 250mm refractor (now at the Mills Observatory, Dundee) owned by James Worthington and then located at the Four Marks Observatory near Winchester. Waterfield observed all the planets in these years with the large refractor, and in 1916 he was given the use of a 150mm Cooke refractor at the home of industrialist J. Player at Thirlestane Hall in Cheltenham; this telescope later became his own and he used it until his death.

The total solar eclipse of 1929 showing the 125mm coronagraph and 'long arm' connected to the driving clock in the foreground. Waterfield is holding the telescope tube in the centre of the picture.



The eclipsed Sun taken with the 125mm Alvan Clark objective at the 1929 total solar eclipse in the Philippines.



After the War he continued to observe at Cheltenham and he also began to use the instruments at the Rev. T. E. R. Phillips' observatory at Headley, Surrey - especially the 200mm refractor. The year 1920 also saw Waterfield and his lifelong friend Dr W. H. Steavenson using the 710mm (28-inch) refractor at the Royal Observatory, Greenwich, to observe Saturn during the Earth's passage through its ring-plane.

Mars, eclipses and occultations

From about 1920 Waterfield made every effort to observe Mars using the instruments at Greenwich, Headley and Cheltenham. He made many beautiful drawings of the planet, most still unpublished but now being used by the Mars Section for long-term studies of the planet. He wrote an excellent review of the current knowledge of Mars for *Splendour of the Heavens* published in 1923. The apparition 1928-29 was observed with the 240mm refractor at Baltimore, but he was back in England for the following one. In 1931 Council appointed him Director of the Mars Section and he produced a Section Report in 1935, the first for many years. In the same year he observed Mars from Meudon, Paris, with the 840mm (33-inch) refractor at the invitation of E. M. Antoniadi with whom he kept a regular correspondence.

Ill health prevented observations in 1937 and with the call-up to the RAMC in 1942 he was succeeded as Director by P. M. Ryves. He continued to observe Mars until 1969 but in later years found drawing at the telescope increasingly difficult. The 'Player' equatorial had been moved to Headley by 1932 and remained there during World War 2. The Rev. Phillips died in 1940 and the observatory buildings were damaged by a flying bomb in 1944, but the instruments survived intact.

Between the wars Waterfield travelled to five total solar eclipses and served on the Joint Permanent Eclipse Committee. His group employed photography

to study the colour and structure of the middle and outer corona, often under very difficult conditions. The photographs were all taken on glass plates which required preparation before exposure and took time to change during the brief moments of totality. He was fortunate to have clear skies at Giggleswick (1927), the Philippines (1929) and Chios, Greece (1936), and thin cloud in California (1930); only New Hampshire (1932) was completely cloudy at his site. He also observed the total eclipse of 1954 from a Hermes at 4000m flying east of the Shetlands, though no scientific work was possible.

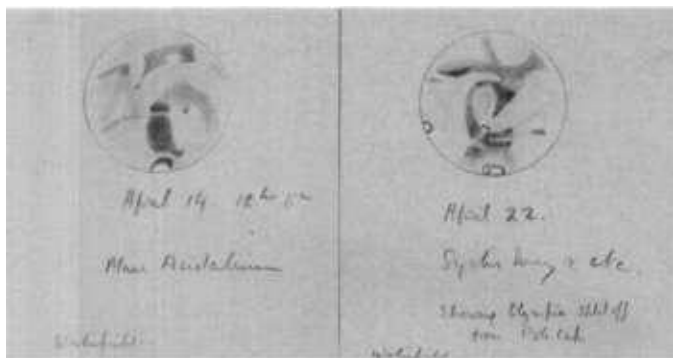
He was interested in lunar eclipses, too, and photographed the eclipsed and uneclipsed full Moon in the visible and near infrared regions of the spectrum in 1932 for photometric study.

Another area of special interest was the accurate timing of lunar and the occasional planetary occultations, for which the 150mm refractor and his Cooke sidereal clock, also from Player's Cheltenham observatory, were well suited. Between 1954 and 1970 he undertook a long series of observations, reaching a high standard of accuracy. He was particularly interested in the rather more difficult reappearances of faint stars and described ways of setting the micrometer webs at the point of reappearance of the star.

Cometary observations

Along with the planet Mars, Reggie Waterfield's other lifelong observational interest was in comets. He began observing comets seriously in 1914 with the apparition of the third magnitude comet Delavan 1914V, followed by comet Mellish 191511 which also reached naked eye brightness. Between 1914 and 1925 he observed 16 different comets on 127 dates.

In 1932 Waterfield ordered a 150mm aperture f/4.5 Cooke triplet (similar to the larger Franklin Adams lens) from Cooke, Troughton and Simms, and this was hand-figured on all six surfaces by Dennis Taylor. It was mounted in a camera with a revolving back and fine focusing vernier that would take up to whole plates (216 x 165mm), and it was attached to the Player

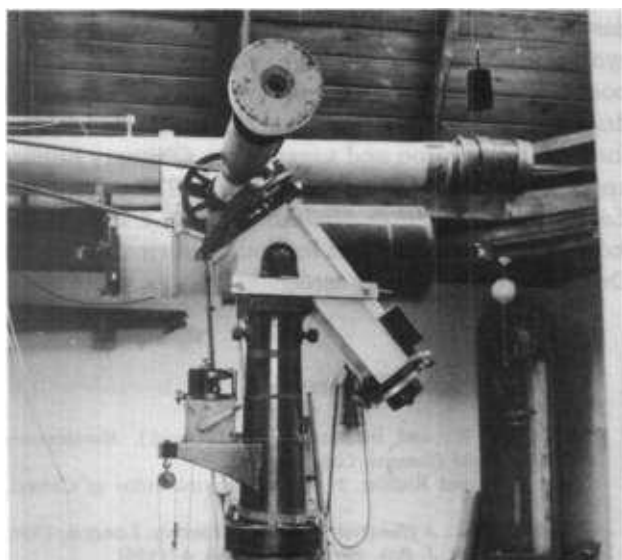


Two drawings of Mars by R. L. Waterfield during the 1935 apparition:
 (a) 1935 April 14, showing the Mare Acidalium region;
 (b) 1935 April 22, showing the Syrtis Major region, with Olympia detached from the North Polar Cap. 150mm refractor at Headley, Surrey.

equatorial alongside the 150mm Cooke refractor and installed at Headley. Waterfield used the Cooke triplet mainly for the photography of comets, including comet Jurlof-Achmarof-Hassel 1939III, but the war prevented further work for several years. In 1948 the telescope was moved to Silwood Park, Sunninghill, near Ascot, where it was in regular use until 1968 when it was again moved to darker skies at Woolston, North Cadbury, Somerset, where the photography of comets was the main programme until Waterfield's death.

After 1950 Waterfield was confined largely to his wheelchair, though he could be helped onto a specially designed electrically powered observing chair. The observatory was re-equipped with a new roof with electrically driven rotation and shutters that enabled him to continue to observe with some assistance on most clear nights.

A total of 735 plates showing comets were taken between 1935 and 1986, representing 139 individual cometary apparitions. His measurement of accurate positions commenced in 1956 with comet Arend-



The 150mm Player equatorial at the Woolston Observatory, with the old wooden roof. The Cooke sidereal clock used for occultations stands in the corner. Below the 150mm f/13 Cooke refractor is the 150mm f/4.5 Cooke triplet camera used for hundreds of comet photographs from 1933 to 1985. (M. J. Hendrie)

Roland 1957III and ended 26 years later, during which time 339 plates had been measured. He made all the reductions by hand, mostly with the help of an old Brusviga lever-set machine. Until the publication of the SAO *Catalogues*, suitable reference stars had to be found from other catalogues such as the AGK2 and Harvard series.

In addition to the photographic plates taken for astrometric purposes, he also made many longer exposures to take full advantage of the speed and wide field of excellent definition given by the Cooke triplet. His series of pictures of comet Arend-Roland in 1957 appeared in the London evening newspapers and in the *Illustrated London News*. As it was the first comet that many people had seen, it attracted a wide interest, and an outside radio broadcast was made from the Ascot observatory. Series of photographs of comets Arend-Roland and Bennett 1970II taken at Waterfield's observatory were used by Högner and Richter in their *Isophotometric Atlas of Comets*. He made a particular point of observing newly discovered comets for positions and faint periodic comets that were often neglected by other observers. His observations appeared regularly on the IAU *Circular* announcement cards and more recently in the *Minor Planets* and *Comets Circulars*.

Honours and achievements

Reggie Waterfield was awarded the Comet Medal of the Astronomical Society of the Pacific in 1969 for outstanding contributions by a non-professional to the study of comets. He served on the IAU Commission for the Physical Study of Comets, and attended a number of IAU meetings.

Despite his disability he continued to travel widely by car, doing much of the driving, and visited Italy every



Comet Arend-Roland 1957III showing the famous 'spike' or antitail. Taken on 1957 April 24.9 this 35-minute exposure was made on a Kodak Oa-O plate and Ilford Aviol 102 pale yellow filter, observer Reggie Waterfield.



Waterfield's Woolston Observatory after the installation of the new metal clad roof, viewed from the west. (M. J. Hendrie)

summer during the late 1950s and early 1960s, in search of the Sun. His time in the USA, on eclipse expeditions and at meetings at home and abroad brought him into contact with many famous scientists and there were many visitors to his observatory at Woolston. He was a good pianist with a special love of Bach, and he liked to tell of the time he accompanied Albert Einstein, who was a keen violinist.

In 1942 Waterfield was awarded the Hannah Jackson-Gwilt Gift and Medal of the Royal Astronomical Society, which he joined in 1916. The award was for his general astronomical work and the citation identified three aspects: personal astronomical observation; the organisation of observing; and astronomical history. We have noted examples of his work in the first two categories, and for history of astronomy one could hardly do better than to refer to his book *A Hundred Years of Astronomy*¹ and his two BAA Presidential Addresses *Instrumental and Technical Advances of the Last Forty Years*² and *The Story of the Hertzsprung-Russell Diagram*³. He wrote a second book in 1942 for those wishing to take advantage of the blacked-out wartime skies: *The Revolving Heavens*⁴ is still one of the clearest expositions of what can be seen with the naked eye. Waterfield contributed many notes, papers and photographs to the *BAA Journal*, to *Monthly Notices* of the RAS and to *The Observatory*. He took part in early radio broadcasts before the war and in television teaching experiments at Alexandra Palace. Asteroid 1645 was named after him.

Waterfield served on the Council of the RAS in 1937-42 and again in 1958-63, during which time he also served as a Vice President (1959-61). He also served on the Board of Visitors to the Royal Observatory (1959-64).

Reggie Waterfield was a man of great determination and had a keen sense of humour, though he was not tolerant of woolly thinking or slipshod work. He took very great pains to optimise every step of the observational process: the very fine photographs and drawings that he made and the accuracy of his results were not just due to good equipment, though he sought the best,



Comet Bennett 1970II taken at Woolston by Waterfield on 1970 April 7.16, exposure 25 minutes, showing the separation of ion and dust tails.

but to his detailed preparation and the discipline of a strict observing routine.

He will be missed by his many friends and colleagues who were always welcome visitors to his observatory. He had been a Fellow of the RAS for 70 years and a member of our Association for nearly 72 years, one of the longest serving. During the whole of this time, with but short breaks for illness and war service, he was an active observer. Fittingly the last object he saw through his telescope in the winter of 1985-86 was Halley's comet. He was always ready to give help and encouragement to those with a genuine wish to learn. He was not married but we offer our condolences to his sister Mrs Patsy Warner who survives him.

Acknowledgements

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- 4 Waterfield, R.L., *J. Brit. astron. Assoc.*, **66**, 4 (1956).
- 5 *ibid.*, **67**, 1 (1956).
- 6 Waterfield, R.L., *The Revolving Heavens*, London, 1942.

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