

Sic Itur Ad Astra: A History of the Norman Lockyer Observatory

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This paper reviews the declining fortunes of the Norman Lockyer Observatory over the 70 years since its inception by one of this country's most remarkable Victorian astronomers.

FOUNDATION

At the age of 73, when most men have been retired for nearly a decade, Sir J. Norman Lockyer was forced to vacate the post of Director of the Solar Physics Laboratory at South Kensington, a post he had held since 1885. With characteristic zeal he decided to found a Hill Observatory in Britain to continue his solar and spectroscopic studies.

With his retirement in mind Lockyer and his wife, who owned land in Sidmouth, Devon, had built themselves a new home on Salcombe Hill overlooking the seaside resort, hence it was appropriate to him that his Hill Observatory should also be built nearby.

With an initial donation of £5000 and 5 acres of land from the Lockyers as well as £9000 from Francis K. McClean (later Sir Francis), a family friend of Norman and his son, Dr W. J. S. (Jim) Lockyer, the Observatory was started in 1912 and opened a year later, on a site described in the first *Handbook* of the Observatory as being 565 feet (172 m) above sea level at latitude $50^{\circ} 41' 13''.3$ N, longitude $3^{\circ} 13' 7''$ W.

It possessed an unbroken horizon of 360° well away from traffic tremours and night glare, qualities that remain to this day; modern sodium lighting barely penetrates the night from the valley below the Observatory.

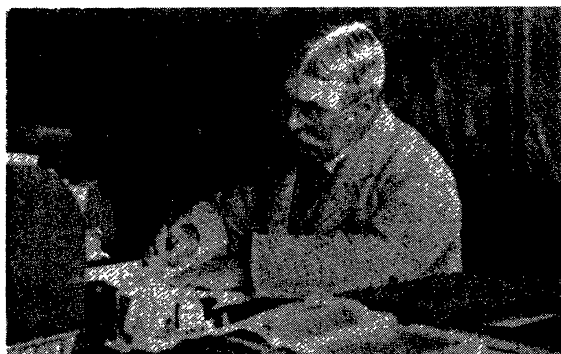


Figure 1. Sir Norman Lockyer at his desk in the Solar Physics Laboratory.

The land possessed gravel quarries which allowed the buildings to be constructed of concrete blocks cast on site. Access for other building materials was facilitated by the construction of an inclined railway which had two trucks counterbalancing each other on the cable-railway principle. Tracks were also laid horizontally along the Terrace where the offices and workshops were constructed. Although removed many years ago, the position of the inclined railway can still be seen from the end of the Terrace as a cutting running through the trees of the hillside.

EQUIPMENT AND STAFFING

In 1913 the Observatory boasted Offices and Laboratories consisting of five rooms each 6 metres square; a Store Room; Power House; Cottage and two 6-metre diameter domes. These last each contained twin equatorial refractors. The first, the McClean Dome, contained an instrument presented by Sir Francis McClean which had been constructed by Grubb for his father, Frank McClean, FRS, who had it erected at his home in Tunbridge Wells. The refractors have object glasses of 300 mm and 250 mm; the former was fitted with either a 20° or 15° prism for stellar spectro-photography, and the latter was a purely visual observational instrument.

The Kensington Dome contained another 250 mm visual instrument and a 225 mm object glass fitted with a 45° prism. This Thomas Cooke instrument was presented by Sir Norman and had been in use at the SPL, Kensington.

Astronomical work commenced in 1913 April with Sir Norman as Director; Jim Lockyer as Chief Assistant; H. E. Goodson, Assistant, and an Observatory Attendant, E. C. Lake. By 1914 August an additional assistant was appointed, N. K. Johnson, but he left seven months later to join the Royal Flying Corps, whilst Jim Lockyer received a commission in the RNVR and was attached to the Royal Naval Air Service in July of the same year. Goodson remained at the Observatory until 1916 September when he left



Figure 2. Domes of the 'Kensington' (foreground) and McClean (background) telescopes.

for munitions work, leaving only Mr Lake who resided in the cottage to look after the buildings and instruments.

After the war work was recommenced in 1919 May, D. L. Edwards being employed as Assistant after his demobilization from the Royal Engineers. Major Jim Lockyer took up duties again in August and a year later, after the death of his father on 1920 August 16, acted as Director until his official appointment to the post in 1921 February, Edwards becoming Chief Assistant. On the death of Mr Lake in 1924, a Mr Boot was appointed in his place as Attendant.

The Observatory was Incorporated in 1916 July 25 to protect and further increase its status. In the Articles of Association the objects of the Corporation's establishment are stated as, "the Observatory or Observatories shall be used for astronomical observations and investigations and the promotion of astronomical study or, other allied objects". The Site and Reservoir were conveyed to the Corporation in 1917 and the northern boundary extended by a gift of land by Miss Leigh Brown, and the Corporation adopted the motto "Sic Itur Ad Astra" ("Thus do we reach the Stars").

RESEARCH WORK

When Jim Lockyer became Director, the Hill Observatory changed its name to the Norman Lockyer Observatory which remains to this day. The research programme was basically fourfold:

1. The spectra of novae using the Kensington 225 mm refractor;
2. The spectra of bright-line stars using the McClean 300 mm refractor;
3. Determination of stellar distances from absorption spectra;
4. Routine photography of stars, comets and nebulae.

Results of this programme were first published in the Observatory's own *Bulletin*, but from 1920 onwards until 1938 papers were almost exclusively published

by the RAS in their *Monthly Notices* and *Memoirs*. After 1938 and up to 1961, when Mr D. R. Barber retired, papers were published in other journals and the Observatory Corporation published the occasional *Bulletin* in 1938, 1939, 1970 and 1974.

During the 1920s there were four research students employed at the Observatory, W. B. Rimmer, H. C. Woods, H. W. P. Richards and E. G. Williams, all of whom were mainly engaged on spectroscopic parallax determinations. They were followed by Williams again in 1936; Professor F. I. Blumbach (research associate), who was a Russian Jew sponsored by Sir Robert Mond to attend from the Pulkovo Observatory, 1936–39; Dr G. Alter 1939–45; S. N. Svolopoulos 1951–53; and S. F. J. Archer 1958–60 as research fellow. By this time the staff had changed over the years. Jim Lockyer had died suddenly at the Observatory in 1936, and Mr Edwards was appointed as Director, Mr Barber joining the Observatory as Assistant. He subsequently was awarded a Martin-Kellogg Fellowship in Astronomy tenable at Lick Observatory, and was granted leave of absence from the NLO from 1940 summer to 1941 August. But he did not return until well after the Second World War for, when he came back from the United States, he joined the Kodak Research Laboratory at Harrow, eventually returning to Sidmouth as Chief Assistant in 1945 September, and then, on the death of Edwards in 1956, he was appointed Superintendent. Mr Boot was succeeded by A. J. Denner in 1943, and he was destined to be the last full-time employee of the Corporation.

In 1932 the Astronomer Royal, Sir Frank Dyson, opened the third and last dome which was donated by Sir Robert Mond, one of the original signatories of the Corporation and a generous benefactor to the Observatory. His dome contained a purely photographic instrument consisting of a Zeiss anastigmat of 70 mm aperture and three Zeiss triplet lenses of 171 mm, 140 mm and 104 mm apertures, these being donated by Capt. W. N. McClean, Miss Leigh Brown and the Air Ministry. The whole was mounted by Cooke, Troughton and Simms. This instrument was mainly used for a photographic survey of galactic clusters from 1939 to 1948, at which time the Observ-

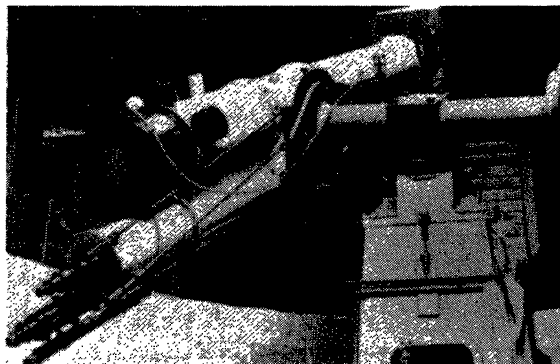


Figure 3. The McClean twin refractor.

atory was in severe financial difficulties. The assets of the Corporation had been added to over the years, starting with the work of its Appeals Committee formed in 1913 having Prince Arthur of Connaught as its President, but it was the subsequent bequests from the wills of Jim Lockyer and Lady Lockyer, the latter in 1942, that substantially increased the holdings so that by 1948–49 the total land vested in the Corporation was 42.3 acres. Even so, investment income was insufficient to run such an establishment as it stood. So it was that on 1948 May 1, at a General Meeting of the Corporation at the Observatory, the Chairman, Sir Richard Gregory, transferred control of the Observatory, and its funds and staff, to the new Council of the Corporation of the Norman Lockyer Observatory of the University of the South-West, along with some 10 000 stellar photographs and an astronomical library, which in 1929 had totalled 5370 books and 7500 pamphlets.

Small grants were subsequently regularly received from the University but we still find that eight years later at a special meeting of Council, Edwards referred to “Dire Financial straits” and made the following recommendations:

1. . . . that the Observatory, in some modified form, be transferred ultimately to the University site (Exeter). . . .
2. That the University is encouraged to pursue the possibility of establishing a post in astrophysics (or some related subject). . . .

That year Edwards died and Barber became the last full-time astronomer at the NLO. Staffing was still short and it was not until 1958 August that Simon Archer was elected as Research Fellow, returning to South Africa in 1960.

During the period of Mr Barber’s term as Superintendent, until his retirement in the spring of 1961 when all regular astronomical observations ceased, the research programme included:

1. Colour-temperature studies initiated in 1937 by the Research Committee involving the spectrophotometry of selected gradient stars;
2. Regular observations of γ Cassiopeia;
3. Spectrophotometric studies of the twilight night airglow;
4. General photoelectric observations.

The University College of the South-West became the University of Exeter in 1955 December and, having no Chair of Astronomy, the Observatory began to be used as a geophysical outstation. The large area of land and its comparative isolation from electrical noise made it an ideal site for geomagnetic and electrical field studies in relation to Earth and sea tides, the latter as the Observatory is only 1 km from the English Channel. Other research was into the background electromagnetic noise in that part of the ELF band between 1 Hz and 400 Hz, and, in particular, “Schumann Resonances” found between 5 Hz and 90 Hz.



Figure 4. The Observatory Library, once the Registered Office of the Corporation.

This and other work has been published elsewhere and are of no direct significance to the astronomical history of the NLO but, before all reference to research is finished here, mention should be made of a NLO *Memoir* published in 1974 which included the reduction of data obtained from the objective-prism spectroscopy of early-type stars between 1937 and 1961 with the McClean prismatic instrument. The reduction was made by Mr Barber after his retirement and received acclaim from many sources, two of which are worth mentioning here as they serve to counter the view of those who would say that no useful astronomical work is possible in Britain in general and at a small observatory in particular.

Firstly, from the late Professor H. H. Plaskett, FRS, of Oxford, a member of the NLO Research Committee:

“What a substantial achievement it is and what a justification for the creation of the NLO.”¹

Secondly, from Patrick Treanor, SJ, lately Director of the Vatican Observatory:

“Nowadays, fundamental work of this kind, produced without the glamour of large telescopes and under all kinds of practical difficulties, tends to be overshadowed by showy short-term adventures in research which are mostly nine-day wonders. . . . it is of permanent value and fully justifies the years of dedicated labour involved.”²

For the last 25 years geophysical research has continued under the Directorship of the late Professor G. K. T. Conn and the present Professor G. N. Fowler, so that our history of the astronomical merit of the NLO becomes abbreviated although no less important to the story. In 1967 Mr J. Nelson visited the Observatory and spent much time thereafter cleaning and overhauling first the Kensington, struck by lightning in July of that year, and then starting similar work on the McClean. A task he had to forgo due to ill health, but which was subsequently completed by the newly formed Sidmouth Astronomical Society with the financial help of the RAS. In May of 1967, on the night of 25/26, there was a most spectacular aurora observed optically and magnetically, and described by one observer as ‘vivid!’ During 1966–69 Professor A. J. Meadows spent much time at

the Observatory preparing his definitive biography of Lockyer³.

In 1968 Capt. W. N. McClean died after a 55-year association with the Observatory, having served as its secretary from 1913 until its incorporation with the University in 1948. Also in 1968 a flux-gate magnetometer was installed and, for a while, work was sufficiently increased that the part-time secretary was employed on a permanent basis. In 1971 Capt. H. C. Lockyer (grandson to Sir Norman) died and his widow generously presented Sir Norman's ceremonial robes to the Corporation, whilst a year later the town of Sidmouth named a street after Lockyer. It was also in this year that Lockyer's 160 mm refractor was loaned to the Exeter Astronomical Society⁴.

In 1975 the Sidmouth Astronomical Society leased the McClean Dome and turned the old pumphouse into a Club Room. Then, in 1977, after 35 years, Mr Denner retired and, with increasing financial difficulties, yet again the Corporation had to rethink the future of the Observatory, and it was decided that a Residential Sixth-Form Science Study Centre would be an appropriate use, but once again the problem was financial and the scheme had to be shelved from lack of funds.

PRESENT AND FUTURE OF THE OBSERVATORY

At the time of writing the Council has two proposals before it for the future of the NLO. The first is the

recommendation of the Director that the whole site be disposed of and the subsequent assets be used to found a chair or fellowship in astrophysics; the second is from a group who would see the Observatory used by visiting amateur astronomers, and the permanent establishment of a museum and library of Lockyer memorabilia. Both proposals require suitable financial aid; both necessitate the disposal of at least part of the Observatory grounds. Whatever the outcome of the next few months the Norman Lockyer Observatory, having served at least part of its purpose, will never be the same again.

ACKNOWLEDGEMENTS

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