Edward J. Lowe and the Nottingham observatories

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Edward Lowe and his father owned no fewer than three observatories. In 1851 Lowe became secretary of the Lawson Committee, set up to fund a public observatory in Nottingham. This paper gives a brief account of his astronomical work at both local and national level.

Edward Joseph Lowe was born on 11 November 1825 at Highfield House, Lenton, two and a half miles south-west of Nottingham. He came from a wealthy landowning family, and his father, Alfred Lowe, was a member of many national and local learned societies. Alfred was particularly interested in meteorology and astronomy, and Edward inherited these interests from him.

Both father and son were founder members of the Meteorological (later Royal Meteorological) Society, and Edward wrote several books on the subject. He wrote weather reports for the "Times" newspaper for many years and also telegraphed his daily observations to Greenwich. He was a member of many other institutions, including the Royal, Geological and Linnaean Societies. In later life he became an expert on shells and British ferns and won many medals for his collections. He was elected a member of the Royal Astronomical Society in January 1848, at the age of 23, and read several papers to the Society.

Figure 1. Edward J. Lowe

Sun, Moon and weather

Lowe's first paper, read to the Royal Astronomical Society in April 1849[1] and published in the Society's *Monthly Notices* (*MNRAS)* later that year, described how he and other observers had seen the umbra of a sunspot open in the centre and divide into two parts. In a footnote he described a 'simple and neat' contrivance for registering the spots – a reticule of small squares now known as a réseau. The observations are carefully recorded, and the attention to detail is typical of Lowe's work.

In the same volume of *MNRAS,*[2] Lowe gave a brief report on the phases of the Moon and the weather. He had studied his own and other weather records since 1840, and now concluded that there was no correlation between the lunar phases and the weather at all. The French astronomer François Arago and the meteorologist at Greenwich, James Glaisher, held the same view. Lowe had been taking part in an experiment for the Royal Agricultural Society to ascertain whether there was any astronomical basis for popular weather lore, and had written a book on the subject entitled *Prognostications of the Weather.* One interesting conclusion he reached in *Prognostications* was that 'experiment decisively shows that no difference can be observed in the qualities of vegetables planted at different times of the lunar month'.[3]

In a later work, *The Coming Drought,*[4] Lowe trawled through all known records of severe frosts and droughts and estimated that the weather followed a cycle with a period of about eleven years. In all probability the disturbing cause was magnetism, he said, possibly brought about by earthquakes and volcanic eruptions. Lowe seems to have identified the eleven-year periodicity of the solar cycle as manifested in its effect on the Earth's weather. Lowe identified an 11-year cycle in the weather, which he thought was due to magnetic disturbances, but did not connect it with the Sun.

The zodiacal light and meteors

The zodiacal light was one of Lowe's favourite subjects, and four of his papers were published in *MNRAS.* It may seem astonishing to us, in our light-polluted skies, that this phenomenon was once observed so often. Lowe seems to have seen it numerous occasions on clear spring evenings, and recorded his observations, again in great detail and with great clarity. In his earliest report, published in

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1850,[5] he noted that the zodiacal light exceeded the brightness of the Milky Way ('the brightest I have observed in seven years') and that variations in brightness led to small stars being alternately visible and invisible. Three years later he described how he observed the apex of the cone of light advancing and receding by about 5°.[6] It again displayed pulsations of brilliancy and was capable of dimming stars in its path. He had previously observed similar pulsations at 30-second intervals, and noted that the band of light seemed to widen when at its brightest.[7] Lowe concluded that 'changes in the brightness and the expansion and contraction of the cone are not produced by our atmospheric influence, as [they are] always apparent when the phenomenon is brilliant, whatever the hygrometrical state of the air'. The cone appeared to rotate, and he inferred that the light may be 'the edge of a ring surrounding the sun', though at an immense distance from it.[8]

Meteors were another interest of Lowe's. In 1846, when only twenty-one, he wrote what was considered to be an important book on the subject. *A Treatise on Atmospheric Phenomena*[9] made the distinction for the first time between meteorology and the study of meteorites. His later report of the Great Meteor Shower of 27 November 1872 is particularly interesting. This shower of Andromedids (or Bielids) was recorded by many other observers, and lasted for over five hours.

Lowe carefully traced the Andromedid radiant and observed that at least 20 meteors were detected motionless close to the radiant. Most of the meteor trails early in the shower were extremely short, especially those near the radiant. All had 'tails' and few left 'streaks'. They differed considerably from those of the 'ordinary November epoch'. In one 40-minute period an average of 43 meteors per minute were observed in one quarter of the sky. There was 'no doubt that a small proportion of meteors came from a second radiant', which was confirmed by a motionless meteor.[10] Lowe asked if these two points could be related to the twin nuclei of Biela's Comet, which had broken in two some years earlier (in fact they were). He estimated that a staggering 58,660 meteors fell between 5.50 and 10.30 p.m. Several times during the evening he heard noises resembling very distant gunshots (which must have been bolides), leaving him in no doubt that the phenomena were connected.

The Nottingham Observatory

Lowe was acquainted with many of the leading astronomers and telescope-makers of the day, including George Dollond. The two of them wrote a paper, published in the *Proceedings of the British Association for the Advancement of Science* in 1846, about the possibility of establishing a weather station that would register its findings on a continuous roll of paper, without the need for a human observer. This instrument sounds like the sort of chart recorder that was in widespread use in the twentieth century.

Lowe was keen to establish a public observatory in Nottingham, and after the Great Exhibition of 1851 had led to the funding of such projects around the country, he and Dollond discussed how they might set one up locally. Lowe contacted the Nottingham Corporation with his ideas, while his friend Henry Lawson FRAS, of Bath, offered to donate his collection of meteorological and astro-

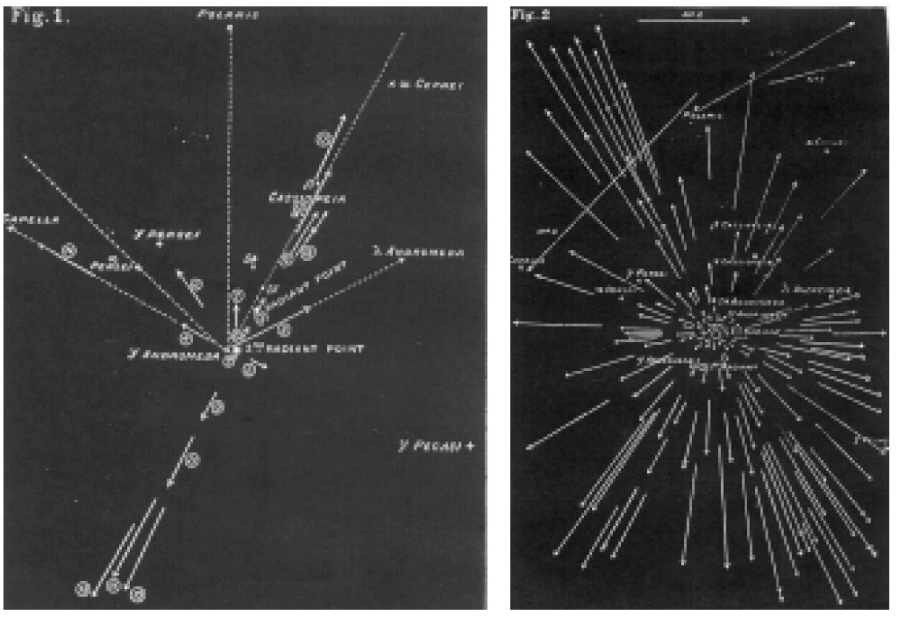

Figure 2. Plots by Lowe of the Great Meteor Shower of 27 November 1872. The left shows two possible radiants; the right shows, in addition to many Andromedids, the paths of four sporadics.

nomical instruments, plus a thousand guineas, on condition that sufficient public funds could be raised to house them and to pay an observer £200 per annum. The Corporation agreed, and the Lawson Observatory Committee was set up in December 1851, with Lowe as secretary and the Duke of Newcastle as chairman. A site was eventually chosen north of the city, at Coppice Farm in Mapperly, which the Council offered to sell for £100. The Government said it would donate £2,000 for the project, and the Trustees of the project advertised for subscribers, of whom 800 came forward in the next three years.

All seemed to be going well, and in 1854 a local directory[11] announced that the observatory would be ready to house the instruments in 1855. But this announcement was premature, and behind the scenes a tragedy was unfolding with unhappy consequences. The Government had withdrawn its funding, and the subscribers and local council were unable to raise enough cash, despite a pledge of more money from Henry Lawson.

So why did the Government change its mind, and refuse the £2,000 promised in 1851? First, it appears that the Treasury had offered the money for both meteorological and astronomical work, whereas the House of Commons motion said it was to be for meteorological observation only, without the need for an observer. They understood that Lawson's instruments were purely for astronomical pursuits and thus not suitable (which was incorrect – see below). Second, the Government maintained it had been misled about the value of the instruments, which it had had valued at £2,000, whereas the Lawson Committee had valued them at £10,000. So, like all governments the world over, it found an excuse to withhold the funding.[12]

How had this confusion arisen? John Herschel and the Astronomer Royal, George Biddell Airy, had been asked by the Government for their opinion and had concluded that another astronomical observatory was unnecessary. However, a meteorological one somewhere in the Midlands would be of great benefit to science. Herschel had been one of the original supporters of the project, and why he had then changed his mind is unclear. It would be illuminating to examine his correspondence with Lowe on this matter in the archives of the Royal Society. To its disadvantage, the Lawson Committee had not lobbied for parliamentary support – even though it had been warned before the House of Commons debate that the grant might be withheld. There was dismay in Nottingham that even its most famous astronomer son, John Russell Hind, had not been asked to come out in support of the project.

Herschel had been asked to value Lawson's instruments, but had delegated the task to William Rutter Dawes, who along with many other eminent astronomers, including James South, Lawson himself and George Dollond's nephew, said they were worth at most £2,000 (Lawson had purchased them from Dollond for this price). But Lowe himself had told the Government that George Dollond, who had made the instruments, had valued them at £10,000 – an enormous sum of money in 1854, equivalent to about £675,000 today. Right to the end, Lowe maintained this figure was correct, but he had never bothered to inform the subscribers that there was a disagreement with the Government.

How and why he came up with this figure is a mystery (George Dollond had recently died so couldn't be asked), although everyone who saw the instruments acknowledged that they were of superb quality. Did Lowe think that by putting a high value on them it would increase the project's prestige? We shall probably never know, but this was one factor that dealt a fatal blow to the project, which was abandoned in September 1854, the subscribers' money being returned to them. Nottingham never did get a public observatory, though there is a flourishing astronomical society there today who do have their own. Lowe and the Lawson Committee obviously handled the whole project badly, and the Government must also take its share of the blame. This affair seems to be the only blot in Lowe's otherwise illustrious public career.

The Lawson Observatory

After this fiasco, the dying Lawson persuaded Lowe to accept the instruments for himself, which he eventually did, and the Lawson Observatory was set up in 1855 at Lowe's house in Beeston, about half a mile south of Highfield. Broadgate House had been purpose-built a few years earlier as an observatory, with a rotating cupola roof. Despite extensive enquiries I have been unable to find a contemporary picture of the house. However, a complete description of it and the Lawson collection of instruments was provided by William Fyfe.[13]

Fyfe, a Nottingham writer who visited the observatory in 1855, called it 'one of the most complete meteorological observatories that ever existed'.[14] Its instruments included, among other things, an

Figure 3. Broadgate House as it appears today

earthquake pendulum, a gimbal vane, an ozonometer, an evaporator, an electrical kite, an automatic atmospheric recorder and 30 thermometers. There was also a dead-beat clock that had been made by a Dr Narne in London and had been the first transit clock erected at the Cambridge Observatory. Other astronomical instruments included a 'beautiful little pocket sextant'[15] and Lowe's 11-foot (3.4-m) focal length telescope with an object glass 4 inches (100 mm) in diameter. The eyepiece contained five fine cross-wires made of spiders' webs. There were also Lawson's 'exquisitely beautiful transit instrument'[16] and a sidereal clock, both housed in a purpose-built transit room. Lowe himself gave Fyfe a guided tour of his observatory in the summer of 1855, shortly after the Lawson instruments had been installed. The building still exists today (see Figure 3), though the dome has been removed from the roof.

The 'Beeston Lighthouse'

Edward's father, Alfred, had another observatory built at Beeston, an octagonal tower used mainly for weather recording but which also housed a telescope (see Figure 4). It was built on low-lying ground near the railway station, apparently in a very damp and foggy area. Like Broadgate House, this tower was also called the Beeston Observatory, which is confusing, and it was also nicknamed the 'Beeston Lighthouse', 'Pepperbox Hall' and the 'Beeston Fogworks' by locals.

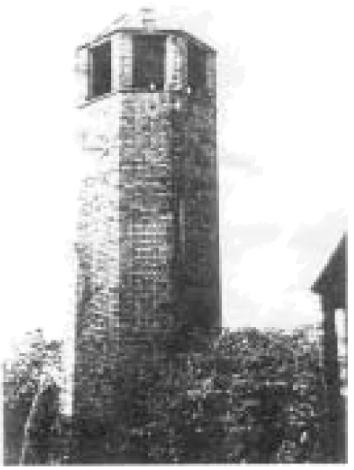

Figure 4. The 'Beeston Lighthouse' shortly before demolition.

In 1864 a penny pamphlet appeared in Nottingham called 'Prospectus of a New Ass-tronomical Magazine, wherein to make known the wonderful discoveries of Pepper Box Hall'.[17] This lampoon, signed by 'The Thistle-eater', included the following verses:

Oh! Have you heard the news of late!
About my master wise and great!
Who built a tower on his estate!!
He built it with an octagonal wall
And gave it the name of Pepper Box Hall.

What is this tower at Beeston station,
Daily causing such botheration,
To many a traveller through the nation,
Who vainly ask for its explanation?
'Tis like an overgrown pepper-box,
The houses we build in lieu of the stocks:
Or the places where roost young turkey-cocks.
'Tis called the lighthouse to the Ryland locks.
But he who understands it must be able
To add a story to this tower of Babel.

There was a reference as well to 'the wonderful and extraordinary instruments which we have purchased'. Perhaps the author was confusing the tower with the observatory at Broadgate House. What Edward made of this lampoon is not known (his father had died in 1856), but the observatory was obviously a great topic of conversation in the district. The building was eventually abandoned to the elements and was demolished sometime in the 1960s.

Highfield House Observatory

The third observatory was that at Highfield House itself. The house had been built by Edward's grandfather Joseph Lowe in 1797, and the observatory on the roof was added by his father. Edward moved back here – the place of his birth – after the death of his mother in 1866, and eventually all the instruments from both the Beeston observatories came back also. The building now houses the University of Nottingham's Personnel Department.

Figure 5. Highfield House, depicted in 1890.

As well as 'the usual meteorological instruments' it had 'a large and beautiful telescope'[18] on the roof and an instrument for determining solar radiation. On the night of Fyfe's visit, Lowe Senior showed

him the rings of Saturn, star clouds in the Milky Way and the Orion Nebula. The zodiacal light was also partially visible. The house itself commanded a wonderful view over the Trent Valley, and even today it has a lovely vista on the south side.

In 1882 Edward Lowe and his family moved to Shirenewton Hall in Monmouthshire, where he died in 1900. It would be interesting to find out what eventually became of his collection of instruments. There is no evidence that any of Lowe's children were interested in astronomy.

Assessment of Lowe's astronomical career

So how would we sum up Lowe's astronomical career? During his life, he had a worldwide reputation as an astronomer and meteorologist,[19] and Fyfe described him as 'the best expositor of philosophical instruments whom we ever chanced to accompany'.[20] He was obviously an excellent observer and recorder, and a real enthusiast – one of the last of the wealthy amateurs who had the leisure and resources to follow their passions full-time. He contributed a great deal to the scientific and cultural life of Nottingham, and to astronomy in general in this country.

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15. Ibid., p. 202.
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