

## Chapter One

### Thomas Smith 1752-1815 - Scotland's first lighting engineer

#### Family recollections

In Ferryport-on-Craig, Fife, a small village opposite Dundee, Thomas Smith was born in 1752. That same year a pamphlet entitled *Proposals for carrying out certain public works in the city of Edinburgh* was published. He was born into an era of reform on which future generations could build a new and better life in the capital of Scotland. The pamphlet was explicit about the geographical limitations of the existing city and its unhealthy living conditions. Expensive and far reaching plans were made for a great extension of the capital and during the next eighty years they were actually carried out. An outstanding need to drain or canalise the Nor' Loch was obvious. Equally important, a great bridge had to be engineered and built to take the citizens and all their traffic from the ancient city to their beautiful New Town. Great advances in national and international trade made Edinburgh a most desirable place in which to stay in spite of the fickle climate. With only a few hours of daylight during the winter months one outstanding need was the improvement of the city's primitive lighting system.

Equally necessary was some form of new lighting round the treacherous waters of the Scottish coast. Seafarers for generations had struggled from port to port plying their various trades and the coasts were littered with the wrecks of ships that never reached a safe harbour.

It must have had a great impact on Thomas, as a small child, to have witnessed the drowning in a shipwreck of his father, also called Thomas. His mother Mary Kay was the daughter of a prosperous sea-trader in Leith. She gave her son a good education locally and when he was 12 apprenticed him to a Dundee metal-worker. He was clever with his hands, ingenious

and able to express himself well. In 1770, when James Craig's plans for Edinburgh were well under way at the East End of the New Town, Thomas arrived in the city. He lodged at first with his Kay relatives and took employment with an established metal-worker. In 1781 he was trading as a tinsmith from Bristo Street', where he manufactured oil lamps, brass fittings and fenders. By 1790, when his workload had increased, he had moved to premises in Blair Street' where he was able to employ a larger workforce. This talented young man found immediate success; for a time he was a partner in a concern called the Commercial Shipping Company.<sup>1</sup> His descendants possess a silver cup inscribed to him thus:

BEING A SMALL TOKEN  
OF THE SENSE ENTERTAINED  
OF HIS GREAT EXERTIONS AS A PARTNER  
IN THE ORIGINAL ESTABLISHMENT OF THE CONCERN,  
AND HIS UNWEARIED ATTENTION TO THE  
INTEREST OF THE COMPANY

In 1787 he secured the contract from the Town Council to provide street lamps for the Old and part of the New Town. His tender was the most attractive, and he had designed a new oil lamp which had a parabolic polished metal reflector behind it. The result was a stronger light than any of his rivals and a considerable income for years to come. He expanded his business to take on the contract for the lighting of Glasgow twelve years later at the same price of sixpence per lamp. By 1807 he was contracting to light the streets of Perth, Stirling, Ayr, Haddington, and Aberdeen, and in 1810 to light Leith as well.

Thomas realised that with further refinement his new lamps

could also be used to guide sailors safely home to port. Seamen everywhere had to rely on visual landmarks and occasional coal fires which blew out in wind or rain and were totally obscured in fog. One example was the beacon on the Isle of May, at the entrance to the Firth of Forth which was still virtually unchanged since it was first lit in 1635. Scattered rocks and islands are in the path of the main shipping lane up to Edinburgh and beyond to Stirling. Increasing trade brought about by the Industrial Revolution meant more wrecks, bringing demands for better navigation lights, and as a result the Northern Lighthouse Trustees (later the Northern Lighthouse Board) was established in 1786 with authority to build four lighthouses on the Scottish coast.

Kinnaird Head, North Ronaldsay (Orkney), Eilean Glas (Outer Hebrides) and the Mull of Kintyre were chosen as sites for the first four lights. Parliament had asked for them to be completed in four years but Thomas did so in three. Access to Kintyre, although it was on the mainland, required a hair-raising scramble over 12 miles of rough trackless moorland and mountains, over bogs and through poorly mapped country.

Each light presented a separate challenge; land had to be bargained for, suitable keepers found and trained, and storm-proof dwelling houses built for their families. Different lighting requirements were also needed for each site. From November probably to May each year work had to be abandoned because of impossible weather conditions, and the time was spent planning and constructing the lamp parts in Edinburgh.

Great physical strength, business acumen, courage, ingenuity and a passionate dedication to the job in hand were gifts Thomas had to the full. None of the family of engineers who followed



[2] Miniature painting of Jane Lillie

him probably achieved anything so difficult as the lighting of these first four lighthouses.

In 1778 Thomas married Elizabeth Couper, daughter of a Liberton farmer; a daughter, Jane, was the first of five children. By 1786 his beloved wife Elizabeth and three of their children had died. A year later he married Mary Jack, daughter of a Stirling builder, and they had one girl. While enjoying a steady success in business ventures, he had a saga of domestic tragedy. With Mary Jack's death he was left with three small children to care for at a time when he was required to travel to remote corners of Scotland on lighthouse work. Two more lights had been erected, at Pladda and on Little Cumbrae in the Clyde estuary. Greenock was handling several hundred ships daily from the American cotton and tobacco run, and the work was urgent. The situation was desperate for him, but a close friend and neighbour who had known both his former wives offered to care for his home and children while he was away. She was called Jane Stevenson or Hogg.

Jane was born in Glasgow on November 21st, 1751, the seventh child of David Lillie, who was shortly to be Deacon of Wrights in that city, and his wife Isobel Miller. [2] Her elder sister Bethia Lillie, married George Laurie, the merchant founder of Laurieston, later known as Gorbals.

We know nothing of Jane Lillie's youth except that she attended a private girl's school in Edinburgh, possibly Mrs Hannay Robertson's Young Ladies School of Arts, for her father and mother were comparatively well off. At the age of 19 she married a young merchant, Alan Stevenson, six months her junior, the son and grandson of Glasgow maltsters (or brewers), both named Robert Stevenson. There is no record of this

marriage but it is said to have occurred in 1771, and the first and only child of this union, Robert, was born in Glasgow on June 8th, 1772.

Robert's father, Alan Stevenson, worked as a storekeeper for a Glasgow firm trading in the West Indies. He died from fever on the Island of St Christopher, now St Kitts, in 1774 while in pursuit of a thief, leaving Robert fatherless from the age of two. It was many years before his mother Jane (née Lillie) saw any money from her young husband's estate and, as her own father and mother died at about the same time, she was left in a condition of great want.

Robert Louis Stevenson wrote that there was 'something romantic' about his great-grandparents' marriage<sup>1</sup> and as there had been no Lillie or Stevenson witnesses at Robert's baptism it was probably an elopement without family approval on either side. This could also account in part for Jane Stevenson's poverty after the death of her husband.

Years later Robert wrote a 'Memoranda' for the information of his family and said:

'My mother's ingenious and gentle spirit amidst all her difficulties never failed her. She still relied on the providence of God, though sometimes, in the recollection of her father's house and her younger days, she remarked that the ways of Providence were often dark to us.'

In spite of her deep religious convictions this well-educated girl made the same mistake twice and she conceived a son with another young Glasgow merchant called James Hogg. He was variously described as a weaver, hammerman and manufacturer. Jane was three months pregnant at the wedding on April 19th,

1777 and the child arrived in October. Three years later Jane and James Hogg moved out of Glasgow to Milton of Balgonie in Fife. On December 7th, 1780 they had another child, again a boy. The Hoggs moved to Edinburgh where James deserted his wife and vanished into England. What happened to Robert's two half brothers is quite unknown they may have been taken by their father or they may have died in infancy. All his long life Robert respected his mother's privacy regarding this second marriage.

Jane was herself living in the High Street of Edinburgh, and she had as a close neighbour Thomas Smith. She was a friend to Elizabeth Couper, and then to Mary Jack. She moved in to his home to look after his remaining three children after Mary had died and Thomas was called away on urgent lighthouse business. Referring to the 'dark days of her life' before she had met Thomas Smith, Robert, in his 'Memoranda', again, tells us:

'The Bible, and attendance on the ministrations, chiefly of Mr. Randall of Lady Yester's Church, afterwards Dr. Davidson of the Tolbooth, and at other churches, where I was almost always her constant attendant, were the great sources of her comfort.'

Thomas proposed marriage to her but she was still married to a man who had now disappeared. In 1792 James Hogg was traced to Orton in Westmorland and, anxious to marry Thomas Smith, Jane started divorce proceedings. Robert was 20 years old when he and Thomas, together with Jane's lawyer John Easton, who lived in Allan's Close, Edinburgh, travelled south to appear as witnesses for her. The divorce was almost certainly obtained with a bit of bribery.

Written in his own hand into a family Bible starting with his grandparents Robert gives dates for the entire family with births, marriages and deaths. There was not a word of his mother's second marriage to James Hogg. None of the children of Robert and Jane Stevenson knew of their deeply religious grandmother's moral indiscretions. Robert Louis Stevenson, two generations later, certainly did not, and if he had he would probably have applauded the lady's courage and turned the whole saga into a magnificent melodrama with heavily disguised names!

Thomas Smith and Jean Stevenson were able to marry on the 14th of November 1792 and their marriage was a happy one. They had one little girl whom they named Elizabeth after Thomas's first wife. Betsy, as she was called, died suddenly in 1803 aged seven. She was much loved by Robert, who wrote in a letter [now lost] to a friend, 'I am sure there never was a greater appearance of health and a finer girl of her age.' They had deeply felt religious beliefs; although Thomas had left the Church of Scotland to join the Baptists in mid-life, he returned to his original faith because he could not reconcile the Baptists' peaceful views with his activities as a militiaman. Thomas had become a member of the Loyal Edinburgh Spearmen, later the Royal Edinburgh Volunteers, in 1793 together with Walter Scott. [3] As a Captain, Thomas was on duty during the troubles associated with the trials of the political radicals Muir and Palmer in that year.

A letter written in 1794 from Thomas Smith to Jeanie, and addressed to her at 4 Blair Street, Edinburgh, survives and shows his concern for his third wife.

'Glasgow 10th Augt. 1794  
Sunday

My dear Jeanie

I arrived here this day in good health and will be home tomorrow night, God willing. I have seen our Friends and was in time for the afternoons Church. I hope you will not have any more of your low spirits. You ought to be very thankful that I am safe landed. I was very near to be taken by the French squadron. They will be chased off the coast before Bob comes home. I am happier tonight in the hopes of seeing you and all the children than I have been since I went away.

I am Dear Jeanie your ever faithful and affectionate husband  
Thomas Smith.<sup>5</sup>

Jane's son, Robert, had been brought up from his arrival in Edinburgh aged six as a playmate with the Smith children. He was apprenticed first with a gun-smith called Innes, who died. As he grew up he was frequently in Thomas Smith's busy workshop. Thereafter he knew where his great interest and real talent lay. Thomas found him an invaluable assistant and apprenticed him formally. By 1797 he was established as a business partner.

Thomas Smith's oldest daughter Jane married Robert in the last year of the century. She had been his step-sister for many years. Robert was twenty-seven and Jane twenty years old.

Those looking at the family tree have to digest the fact that Robert's father-in-law and step-father were the same person!



[4] *Thomas's house, Baxter's Place, Edinburgh 1804.*

Thomas's second surviving daughter, Janet, had to wait until 1816 before she could marry an Edinburgh engineer called David Swan. He came from a Scottish provincial family living in Kirkcaldy. The Swans had given Thomas Carlyle a helping hand when he was in Kirkcaldy Academy by engaging him for a while as a tutor. For some reason, lost in the mist of time, Robert's wife, Jane objected to the marriage of Janet who accused her of delaying it for six long years. In the event they had one son called William. Janet lost her husband when their child was only three years old.

The century ended with Thomas making a magnificent gesture to the Lighthouse Commissioners—he gifted them a sloop that was ready to be launched from the yards in Elie. He had her fitted out with special comfort for the crew and workmen. This was the second *Pharos* in a long line of lighthouse inspection vessels.

He had been elected to the Edinburgh Guild of Hammermen in 1789, becoming its Master and a City Magistrate in 1802. He had bought an extensive feu in the tiny

the Commissioners as an impediment to his appointment as their Engineer, as such skills could be and were brought in under his general direction. He was not however their first choice for this post. In September 1786 the Board had invited Ezekiel Walker of King's Lynn, who had introduced improved lighting at Hunstanton lighthouse in 1779, to erect their first four lighthouses. Walker had declined this invitation but offered instead to erect one lighthouse, give directions for the other three and, for fifty guineas, to instruct their representative in the whole of his principles and improvements. The Commissioners evidently had confidence in Thomas as they took up only the last part of Walker's offer. Within a matter of weeks Thomas was in Norfolk receiving the proffered instruction.

On 21 March 1787 the Board was informed that Thomas was fully instructed in the whole principles of constructing Light Houses by lamps and reflectors and also directions from Mr Walker for constructing the Light houses. The clerk informed that he had employed Mr Kay Architeck to make drawings of the different light houses as well as elevations and sections agreeable to the directions of Messrs Walker & Smith.<sup>9</sup> During the next two decades, commencing with the conversion of Kinnaird Castle into a lighthouse [5], Thomas was responsible for providing or improving the illumination at no less than thirteen lighthouses, mostly at remote locations.

The technical aspects of Thomas's work were essentially confined to the overall planning and illumination of lighthouses. This is confirmed in his report to the Lord Provost of Glasgow in 1792 anent erecting an oil light with reflectors on the Cumbra Lighthouse [Little Cumbrae, Bute]. He wrote, *I really am not a judge what these temporary erections might cost and*

*indeed I never had anything to do with the mason work of the tower or keepers houses in the Government [N.L.B.] Lighthouses. I confined myself wholly to forming the plan and only executed the parts that belonged to my own business. However, by the annexed states of the supposed expence you may be able to judge nearly of the necessary expences excepting the tower, the keepers house and store house which are not included and which I could not undertake.*

*If the work goes forward I shall give every assistance in my power, and shall pay particular attention to the sufficiency of it ... As to the light on the Strone point [at the entrance to the Holy Loch] it will not cost near so much on account of the number of reflectors being reduced. About twelve may be sufficient, and this will also render its annual expence two thirds less. The one with 36 reflectors may cost about £50 and the one with 12 about £16 annually. George Sheills, a very careful [Edinburgh] mason, built three of the lighthouses [Mull of Kintyre, Pladda and Eilean Glas]. He was furnished all the materials and had so much a week for his work and trouble in overseeing the other workmen. If you think proper to follow this method I dare say I can procure him to do your work.<sup>10</sup>*

Some idea of the broader scope of Thomas's work can be gleaned from his lighthouse inspection voyage in the *Swift* of Elswick from June to September 1793. At the Mull of Kintyre he found the lighthouse in very good condition but the keeper ... *much molested by the Moil Company [the Mull Company; tenant farmers of the Duke of Argyll?] who insist that he shall not keep a dog or gun, which I think is necessary as the place is infested with wild cats which are dangerous.* He then visited Scalpay [Eilean Glas] and was supportive of the keeper's request to graze a cow and about a score of sheep, but the landowner absolutely refused to grant this liberty in terms very disrespectful.

village of Greenside, part of the New Town beside the Calton Hill. Here at what is now Baxter Place he built a splendid house, with five stories facing North and six to the South with a large garden and apple orchards. [4] It stood well back from the quiet road that led down to Leith. A ground floor side entrance opened directly into Greenside Lane and both Thomas and Robert were able to conduct the Lighthouse business from there for the duration of their partnership. Thomas' manufacturing business continued in Blair Street and he was to devote time to brokerage and insurance. Men of enterprise and wealth were his friends and he was a very successful businessman. For holidays the family would go to Mayshade, a villa in the country just ten miles south of the heart of Edinburgh, owned by the same Baxters from whom Thomas had bought his town feu. The oldest building still stands today.

The Napoleonic wars raged throughout most of his life. Although an ardent volunteer soldier and always ready to take up arms if the call came, he never actually had to fight for his country.

Three generations of Stevensons including Louis have looked in vain for the likeness of Thomas Smith. A description of him was given to Louis by an ancient sailor, who remembered seeing him as a stout man coming ashore with a gun under his arm. A portrait may have existed, as Robert left pictures in his will to his son Alan. He died in Baxter Place in the same year as the Battle of Waterloo and his wife, Jane, five years later.

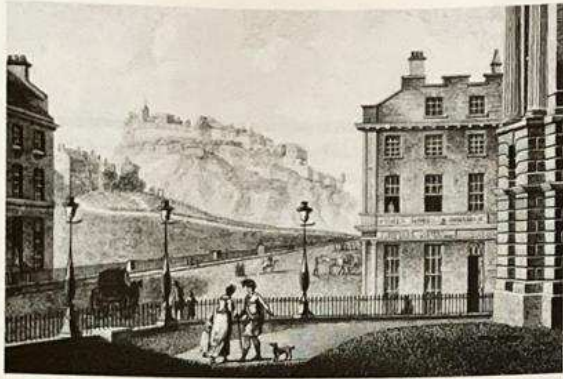
#### **A professional aspect**

Thomas Smith had taken an interest in improving lighthouse illumination even before the Board of Commissioners of Northern Lighthouses was formed and had appointed him as

their *Engineer* on 22 January 1787. In May 1786 he had proposed to the Chamber of Commerce at Edinburgh that reflector lights be substituted for the coal light at the old private lighthouse on the Isle of May, but old traditions die hard and they were of the opinion that the coal light should be continued.<sup>6</sup>

Thomas did not give up his idea and on 16 June 1786 he prepared a statement entitled *A comparative view of the superior advantages of lamps above coal light when applyd to light houses, in which he confirmed that he had constructed 2 small reflectors & lamp with a view to demonstrate by experiment what has been only laid down in theory*.<sup>7</sup> In July 1786 he petitioned the Board of Manufactures in Edinburgh on the utility of reflector lamp lights for lighthouses, of which he had *already made several small ones, one of which has been seen and much approved of by several gentlemen, who have expressed a desire to see one executed on a larger scale, and placed on Inchkeith. The Board resolved to allow twenty pounds towards the expense of making the model and trying the experiment upon Inchkeith*.<sup>8</sup> Although this trial seems to have been successful, his proposal of reflector lights for the Isle of May lighthouse was never adopted. It was not until the year after his death, by which time the Northern Lighthouse Board had acquired the old lighthouse from the Duke and Duchess of Portland, that the present structure was completed and became operational with silvered-copper reflector lamps.

From early in 1787, Thomas enthusiastically set to work on providing Scotland's new lighthouses even though he does not appear to have received any salary for about six years. In 1793 he was awarded a salary of £60 per annum over and above his expenses. His lack of building experience was not regarded by



[6] Register Office, Edinburgh, with street lighting, c. 1804.

The situation at Scalpay was as nothing to what he found at North Ronaldsay. The lighthouse was in a tolerable good state of repair excepting some glasses which were tore out of the reflectors by the carelessness of the keeper in cleaning [but] the keeper had acted the most dishonest and infamous part that can be imagined, he has by his own confession before a number of witnesses, sold the oil sent to him in very great quantities throughout the whole of North Ronaldsha and the neighbouring island of Sanda so that his conduct is notorious. A great deficiency being still in the number of his casks he endeavoured to make it up by saying that he had a great number stolen by the people of the island, he mentioned eight in one night, this I believe to be an entire falsehood to cover his knavery. I have dismissed him. At Kinnaird lighthouse he proposed strengthening the light from the south by putting in another sash & adding six or seven reflectors. He also recommended waterproofing the light platform.<sup>11</sup>

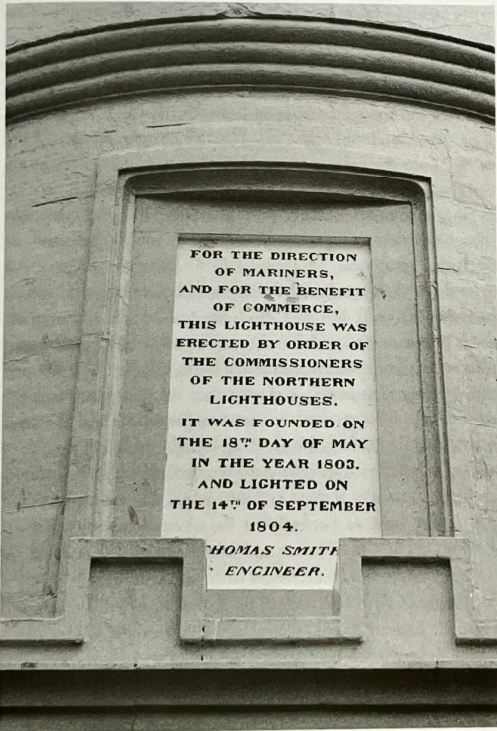
At Inchkeith, one of the Board's most attractive-looking lighthouses completed in 1804 Thomas is commemorated above the door as its *Engineer*. [7,8] Independently of the Board, he was also responsible for harbour lights at Leith, Portpatrick and on the rivers Clyde and Tay. [9] His last major lighthouse, another fine-looking building, was Start Point, Orkney. Robert formally succeeded Thomas as Engineer to the Board on 12 July 1808.

From 1797 Thomas delegated and allowed almost complete autonomy in lighthouse matters to his energetic mature apprentice, Robert. This enabled him to concentrate on lamp manufacture and the expansion of his other interests, not least his general and

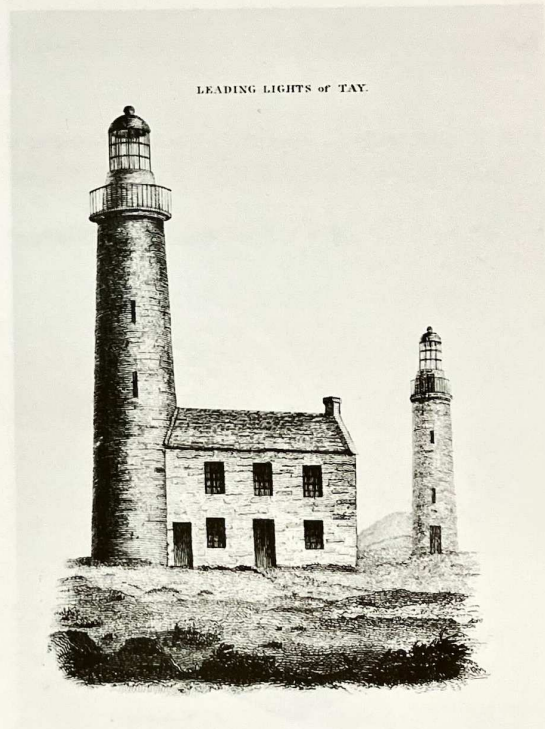


[7] Inchkeith Lighthouse, 1804. From Robert's article 'Lighthouse' in the *Edinburgh Encyclopedia*, 1818.





[8] Inchkeith Lighthouse tablet.



[9] Tay leading lights, Buddon Ness. From Robert's article 'Lighthouse' in the *Edinburgh Encyclopedia*, 1818.



[10] Model of Thomas Smith's reflector lamp.

street lighting business, an idea of the extent of which can be gauged from his extensive correspondence with the Carron Company from 1787 to 1807. By the early nineteenth century his lamps were lighting much of eastern and central Scotland. In 1804 he was the public lighting contractor for both the *Old* and *New* towns of Edinburgh. [6] Thomas is understood to have retired from the firm in 1808, which was then carried on by his son James.

In terms of technical innovation Thomas deserves recognition for improving the intensity of illumination in Scottish lighthouses by means of the catoptric or reflector system. He developed and made arrays of parabolic reflector oil lamps of his own design. Each lamp had a light source at its focus and a curved reflector formed of small pieces of mirror glass set in plaster which produced a beam of light. [10] Because the reflector was made of glass rather than metal it had the advantages of being more resistant to distortion and the wear occasioned by the frequent cleaning it required before the use of wicks enclosed by glass chimneys. However, because of its joints and less accurately formed curved surface, his apparatus could not reflect light as perfectly as the silvered-copper reflectors already in use in France and soon installed elsewhere in conjunction with Argand lamps with glass chimneys.

Thomas's first operational light was installed at Kinnaird Head. It had an intensity of about 1,000 candlepower, which although very feeble compared with 690,000 candlepower for its modern counterpart, it nevertheless represented a worthwhile improvement on coal lights. He continued to adopt glass facet reflectors for new lights until 1801, after which he and Robert made and installed Argand lamps with silvered-copper

reflectors, beginning at Inchkeith lighthouse in 1804 with reflectors of 21-inch diameter. Most existing installations with glass facet reflectors continued in operation until the 1820s.

Details of Thomas's practically derived reflectors became more generally known from an article *Reflector for a light-house* in the supplement to the *Encyclopedia Britannica* (1801).<sup>12</sup> In it Thomas is described as *an ingenious and modest man [who] has carried [his inventions] to a high degree of perfection without knowing that something of the same kind had been long used in France*. This tribute is omitted from later issues, including the last carrying the article (1823), after the editor had learned of Walker's prior development of the glass facet reflector concept. Reference is also made to the superiority of Thomas's reflectors over *obviously wrong* continuous metal ones! His change of mind by 1804 in favour of metal reflectors in conjunction with Argand lamps [7], a considerable improvement, was almost certainly due to Robert's influence.

The Lighthouse Board was later criticised by Sir David Brewster for not having applied a more scientific approach to

lighthouse illumination in 1787. Whilst there is probably some truth in this charge Thomas's ingenious expedients undoubtedly represented the most practicable means of achieving an immediate improvement before the Argand lamp, patented in 1784, was eventually applied to this purpose.

Thomas deserves to be remembered chiefly for improving lighting in Scotland and for laying the foundation of the Stevenson dynasty of engineers. He achieved the latter by encouraging and sustaining the training and education of Robert, by ensuring his succession to the engineership of the Northern Lighthouse Board and by providing at least some of the financial support necessary to sustain Robert's civil engineering business through its formative years.

Although further research is required into the details and extent of Thomas's practice and that of others, there is little doubt from the depth and scale of what is already known that he has a good claim to be regarded as Scotland's first lighting engineer.